Electronic Journal of Research in Educational Psychology
ejrep
EDUCATION & PSYCHOLOGY I+D+i
Ilustre Colegio Oficial de Psicología de Andalucía Oriental

Divergent Explanatory Production: The relationship between resilience and creativity

Óscar Sánchez Hernández[1], **Francisco Xavier Méndez** [1] **and**
Judy Garber [2]

[1] Department of Personality, Psychological Assessment and Treatment. University of Murcia
[2] Vanderbilt University, Nashville (USA)

Spain / USA

Correspondence: Óscar Sánchez Hernández. Facultad de Psicología. Campus Universitario de Espinardo (Murcia). CP: 30100. Spain. E-mail: oscarsh@um.es

Abstract

Introduction. The aim of the study is to describe and analyze a new test and construct, Divergent Explanatory Production (DEP), defined as the ability to observe adverse situations from various points of view. At the theoretical level, it is a bridge between the reformulated model of learned helplessness (as a resilience model), and creative intelligence. In this paper the relationship between DEP and creative intelligence is examined, as well as gender differences.

Method. The sample consisted of 89 participants from 1st and 2nd year of secondary education from seven schools in the Region of Murcia. Two tests were applied to measure the relationship between DEP and creativity. Correlational analysis, regression and differences of independent means, according to gender and low or high DEP, were performed.

Results. The various statistical analyses were applied to reflect whether participants who produced more causal explanations in general and more resilient causal explanations in particular, with regard to hypothetical adversities, were associated with greater creative intelligence. No significant gender differences were found.

Discussion. Having obtained interesting results from relating resilient explanatory style to creativity, new studies with larger samples are needed to study its relationship to other pertinent variables (cognitive flexibility, explanatory flexibility, dispositional optimism, curiosity, etc.) as well as its role in hypothesized mediators in improvement in preventive interventions and the treatment of emotional problems.

Keywords: Divergent Explanatory Production, explanatory style, creativity, resilience, optimism, gender.

Received: 10.24.15 *Initial acceptance: 10.27.15* *Final acceptance: 11.19.15.*

Producción Divergente Explicativa: la relación entre resiliencia y creatividad

Resumen

Introduction. El objetivo del estudio es describir y analizar un nuevo test y constructo, la Producción Divergente Explicativa (PDE), definido como la capacidad de observar las situaciones adversas desde varios puntos de vista. A nivel teórico supone un puente entre el modelo reformulado de indefensión aprendida como modelo de resiliencia, con la inteligencia creativa. En este trabajo se estudia la relación de la PDE con la inteligencia creativa, así como las diferencias de género.

Método. La muestra estuvo formada por 89 participantes 1º y 2º de ESO pertenecientes a siete centros educativos de la Región de Murcia a la que se les aplicó dos test para medir la relación entre PDE y creatividad. Se realizaron análisis correlacionales, de regresión y de diferencia de medias independientes respecto al género y baja o alta PDE.

Resultados. Los distintos análisis estadísticos que se aplicaron reflejan que los participantes que produjeron más explicaciones causales en general y más explicaciones causales resilientes en particular, ante hipotéticas adversidades, se asociaron con una mayor inteligencia creativa. No se hallaron diferencias significativas de género.

Discusión. Siendo unos resultados interesantes, al relacionar el estilo explicativo resiliente con la creatividad, es necesario nuevos estudios, con mayores muestras, estudiar la relación con otras variables afines (flexibilidad cognitiva, flexibilidad explicativa, optimismo disposicional, curiosidad, etc) así como estudiar su papel en las hipótesis de los mediadores sobre la mejora en intervenciones preventivas y de tratamiento de problemas emocionales.

Palabras Clave. Producción divergente explicativa, estilo explicativo, creatividad, resiliencia, optimismo, género.

Recibido: 24.10.15 *Aceptación Inicial: 27.10.15* *Aceptación final: 19.11.15*

Introduction

The study and promotion of resilience in childhood and adolescence can help youth to overcome adversities they may have to face in life, whether as a consequence of daily stress (academic, social, etc.), or due to crises and/or natural disasters. Explanatory style is one of the most studied variables in connection with resilience (Seligman, 2005). Persons with a resilient or optimistic explanatory style tend to explain adversity with external, temporary and specific attributions; by contrast, the pessimistic explanatory style makes internal, global, and permanent attributions for negative events. The way that events are explained affects a person's motivation to persevere toward goals and their adaptation in adversity.

A resilient explanatory style is associated with lower indices of physical illness, depression and suicide, and, when present in higher degree, with academic and sports performance, professional adaptation and quality of family life (Seligman, 1998). On the other hand, a pessimistic explanatory style, among other cognitive variables, has been suggested as one factor responsible for increased depression during adolescence. Research also indicates that a large part of this increase during adolescence is accounted for by increased depression particularly among girls. It was found that a more negative cognitive style in adolescent girls mediated gender differences in depressive symptomatology (Hankin & Abramson, 2002).

Children and adolescents were also observed to interpret social situations with the first pessimistic thought that crossed their minds, tending to react with hostility in these situations. For this reason, they are taught to first stop and think before reacting, and to try to find other possible causes for the situation. This brings emotional relief, to start, and also helps them find other ways to cope with the situation without falling into either passivity or aggressiveness (Seligman et al, 2005).

Interest in this new construct was prompted by observing one of the techniques of the preventive program by Seligman et al. (2005), designed to promote a *resilient explanatory style*. This style helps children who have tended to see their contribution to problems in terms of all or nothing, and have trouble assuming their part of the responsibility. This technique consists of suggesting the greatest number of possible causes for the appearance of a certain adversity, assessing the problem with the greatest possible objectivity, and taking into account

Electronic Journal of Research in Educational Psychology, *13*(3), 551-568. ISSN: 1696-2095. 2015, no. 37
http://dx.doi.org/10.14204/ejrep.37.14126

causes related to oneself, for which one can take responsibility, as well as causes related to other people or other external factors.

Divergent explanatory production could be related to problem solving models, leading Guilford to state in 1977 that we find intellectual skills that work together in both problem solving and creative thinking. We point to the program by Mahoney (1981), called SCIENCE, where a step prior to the search for solutions is to first identify the causes of the problem. Explanations as to possible causes for a given problem might determine the psychological framework wherein possible solutions will be found. Divergent explanatory production also falls within the context of psychological flexibility, having to do with the ability to observe problems from different viewpoints (Kashdan & Rottenberg, 2010).

Objective and hypothesis

While it has been considered important to assess explanatory style and its relationship to other variables like depression, we have lacked a measurement instrument that assesses the ability to generate diverse causal explanations for adversities. A new test, presented in this study for the first time, is designed to assess the construct that we have named *divergent explanatory production* (DEP), defined as the ability to produce the greatest number of possible causes or attributions for certain hypothetical adversities. Like the CREA test (Corbalán et al, 2003), which measures divergent production, DEP may be related to flexibility, fluency or originality (Guilford, 1977; Torrance, 1974), problem finding (Runco, 1994) and lateral thinking (De Bono, 1998).

The objective of this study is to analyze the relationship between DEP and creative intelligence, as well as gender differences. The *hypothesis* states that DEP (a greater number of causal explanations for hypothetical adversities) is positively related to creativity; and more specifically, resilient DEP (a greater number of resilient causal explanations, defined in this study as temporary and specific) is also positively related to creativity. Regarding gender differences, higher DEP scores are expected from the boys, given that this variable may mediate in gender differences with regard to emotional problems at this age.

Method

Participants

Participants were taken from a sample of 1212 adolescents enrolled in 1st or 2nd year of secondary education at seven schools in the Murcia Region (Spain). The schools were located within the city of Murcia, except for one school in the town of Abanilla. The final sample was formed by 89 adolescents from this group, enrolled in either public schools (80.9%) or subsidized/private (19.1%). Gender was distributed between 52% girls and 48% boys, and ages fell between 12 and 15 years (mean age 13.88 years, standard deviation 0.95).

Instruments

Divergent explanatory production (DEP). The test was prepared using 5 adversities that both adolescents and experts have identified as problematic (Hankin & Abramson, 2002). They represent the adolescents' different spheres of life (interpersonal, family, academic and extra-curricular): (1) You would like to have a relationship with a boyfriend/girlfriend, but you don't have one; (2) There is going to be a party that you would like to go to, but no one has invited you; (3) You get your grades from the last term and they are bad; (4) During the weekend you have a big argument (fight) with your parents; (5) You want to be part of a certain afterschool activity (like a sports team, club, recreation, game, etc.) but you are not chosen and you get left out.

Participants were given instructions to try to clearly imagine themselves in each of the situations presented, and, for each situation, to take two minutes to write down all the reasons that they think might have caused that situation. Scoring the test includes a quantitative interpretation (total number of causal explanations) and a qualitative interpretation, where the number of causal explanations are classified according to individual dimensions (personalization, duration and scope) from the reformulated model of learned helplessness (Abramson, Seligman & Teasdale, 1978). There was adequate inter-judge agreement according to the intraclass correlation coefficient of the different dimensions: Total attributions (0.94), Internal (0.93), External (0.90), Permanent (0.71), Temporary (0.75), Global (0.86), Specific (0.78), Permanent-Global (0.81), Temporary-Specific (0.69), Permanent-Global-Internal (0.85), Permanent-Global-External (0.78), Temporary-Specific-External (0.50), Temporary-Specific-Internal (0.52).

Creative intelligence (CREA; Corbalán et al., 2003). CREA measures divergent production. The task consists of generating questions about a given stimulus. CREA includes two cards designed for adolescents and adults (A and B) and one for children (C). This study only used cards A and B. After being shown one of the cards, subjects are given 4 minutes to formulate questions. The number of questions generated is interpreted as an indicator of cognitive flexibility and a measure of the subject's ability to relate cognitive schemata, something that is closely related to creativity (Corbalán, Martínez, Donolo, Tejerina & Limiñana, 2003). For Card B of CREA, participants are asked to create questions about a social situation, while for Card A, they are asked to generate questions about an inanimate object (a telephone). Other studies have pointed to differences between the two cards with respect to programs for promoting well-being (see Sánchez-Hernández, 2012), so the two cards are analyzed separately. Estimated reliability according to the internal consistency coefficient for Cards A and B was 0.87.

Procedure

A sample of 1212 adolescents enrolled in 1st or 2nd year of secondary education at seven schools in the Murcia Region (Spain) were invited to participate in a project for the promotion of well-being. The program was held during afterschool hours, and a total of 89 participants attended. One of the project sessions was used for the assessment reported in this study. First, the test of divergent explanatory production was applied, followed immediately by the creativity measure. The test was corrected by two collaborators who were trained in classifying causal explanations among the different individual dimensions (personalization, duration, and scope), according to the reformulated model of learned helplessness (Abramson, Seligman & Teasdale, 1978). This method had been used in other studies (Schulman, Castellon, & Seligman, 1989). We decided to use the average of the assessments performed by the two experts in our analyses.

Data analyses

The degree of association between these three variables was analyzed through the Peason correlation index. In order to come closer to the consideration of a predictive relationship, given that correlations can be understood in both directions, we decided to do regression analysis to evaluate the percentage of variance on the creativity test that was explained by the

variable Divergent Explanatory Production. Hypotheses were also checked with Student's t test using means for independent samples. This was applied for studying gender differences as well as for comparing creativity scores between participants with high DEP and low DEP. To carry out the latter analysis, subjects were divided into two groups, low and high DEP, determined by cutoff scores obtained using the arithmetic mean of the different dimensions of DEP.

Results

Bivariate correlation relationships

Overall, the results confirm that there is a positive relationship between creativity and greater DEP in general, and greater resilient DEP (temporary and specific attributions) in particular. Internal attributions are observed to be more strongly related to creativity. Table 1 describes the correlations found.

Table 1. **Correlations between creativity and divergent explanatory production, together with the interpreted magnitude of Cohen's effect size (Cohen, 1988)**

DIVERGENT EXPLANATORY PRODUCTION	CREA A	CREA B
Total attributions	0.43** (Mean)	0.32 * (Mean)
Internal attributions	0.42** (Mean)	0.30* (Mean)
External attributions	0.21 (low)	0.18 (low)
Permanent attributions	0.18 (low)	0.07 (null)
Temporary attributions	0.49*** (Mean)	0.43*** (Mean)
Global attributions	0.21 (low)	0.12 (low)
Specific attributions	0.36** (Mean)	0.30* (Mean)
Permanent, global attributions	0 (null)	-0.05 (null)
Temporary, specific attributions	0.42** (Mean)	0.44*** (Mean)
Internal, permanent, global attributions	0.01 (null)	-0.01 (null)
External, permanent, global attributions	0.02 (null)	-0.04 (null)
External, temporary specific attributions	0.21 (low)	0.33** (Mean)
Internal, temporary specific attributions	0.41** (Mean)	0.37** (Mean)

* $p<0,05$; ** $p<0,01$; *** $p<0,001$

Electronic Journal of Research in Educational Psychology, *13*(3), 551-568. ISSN: 1696-2095. 2015, no. 37
http://dx.doi.org/10.14204/ejrep.37.14126

Predictive regression relationships

Regression analyses with DEP as predictive variable showed a significant prediction between DEP and creativity. Specifically, greater DEP in general (total attributions) and greater resilient DEP in particular (temporary specific attributions) predict the creativity score, on both CREA-A and CREA-B.

The variables that best explain creativity, on CREA-A, were Temporary attributions (TA; 23% of variance explained), Total attributions (TOTA; 17%), Internal attributions (INA; 16%), Temporary, specific attributions (TSE; 16%) Internal, temporary specific attributions (INTSA; 15%) and Specific attributions (SA; 11%). The rest of the results are presented in Table 2.

Regarding CREA-B, the variables that best explain creativity were Temporary, specific attributions (TSE; 18%); Temporary attributions (TA; 17%), Internal, temporary specific attributions (INTSA; 12%); External, temporary, specific attributions (EXTSA; 10%); Total attributions (TOTA; 9%), Specific attributions (SA; 8%), and Internal attributions (INA; 7%). The rest of the results are presented in Table 3.

Table 2. **Simple regression analysis using the different dimensions of DEP with predictive variables from CREA A**

CREA-A	R	R^2	R^2 cor.	Est.Std.Error	F	SIG.
TOTA	.427	.183	.169	5.39667	13.181	.001
INA	.424	.179	.165	5.40729	12.898	.001
EXA	.212	.045	.029	5.83340	2.777	.101
PA	.178	.032	.015	5.87406	1.925	.171
TA	.493	.243	.230	5.19478	18.900	.000
GA	.210	.044	.028	5.83652	2.711	.105
EXA	.361	.130	.115	5.56699	8.832	.004
PGA	.003	.000	-.017	5.96911	.000	.985
ETA	.423	.179	.165	5.40957	12.837	.001
INPGA	.007	.000	-.017	5.96899	.003	.959
EXPGA	.022	.000	-.016	5.96767	.029	.866
EXTSA	.209	.044	.027	5.83752	2.690	.106
INTSA	.410	.168	.154	5.44321	11.952	.001

CREA-A = Card A of the CREA test; TOTA = Total attributions; INA = Internal attributions; EXA = External attributions; PA = Permanent attributions; TA = temporary attributions; GA= Global attributions; SA = Specific attributions; PGA = Permanent global attributions; TSA = Temporary specific attributions; INPGA = Internal, permanent global attributions; EXPGA = External, permanent global attributions; EXTSA = External, temporary specific attributions; INTSA = Internal, temporary, specific attributions.

Table 3. **Simple regression analysis using the different dimensions of DEP with predictive variables from CREA B**

CREA-B	R	R^2	R^2 cor.	Est. Std. Error	F	SIG.
TOTA	.320	.103	.087	7.13558	6.743	.012
INA	.301	.091	.075	7.18311	5.876	.018
EXA	.181	.033	.017	7.40728	2.009	.162
PA	.067	.005	-.012	7.51532	.267	.607
TA	.434	.189	.175	6.78521	13.708	.000
GA	.121	.015	-.002	7.47728	.872	.354
EA	.305	.093	.078	7.17300	6.059	.017
PGA	.054	.003	-.014	7.52117	.175	.677
TSA	.438	.192	.178	6.77044	14.026	.000
INPGA	.014	.000	-.017	7.53158	.011	.915
EXPGA	.037	.000	-.016	7.52716	.081	.777
EXTSA	.333	.111	.096	7.10321	7.344	.009
INTSA	.366	.134	.119	7.00930	9.133	.004

CREA-B = Card B of the CREA test; TOTA = Total attributions; INA = Internal attributions; EXA = External attributions; PA = Permanent attributions; TA = temporary attributions; GA= Global attributions; SA = Specific attributions; PGA = Permanent global attributions; TSA = Temporary specific attributions; INPGA = Internal, permanent global attributions; EXPGA = External, permanent global attributions; EXTSA = External, temporary, specific attributions; INTSA = Internal, temporary, specific attributions.

Gender Differences in Divergent Explanatory Production and Creativity

No significant gender differences were found in the study variables. For more information, see Table 4.

Table 4. **Differences of means between genders. Descriptive statistics (Mean and standard deviation) for each sex on the different dimensions of DEP and CREA.**

	Gender	n	Mean	SD	Error	T	d.f.	P
CREA-A	female	35	13.5714	5.81219	.98244	1.038	61	.304
	male	28	12.0000	6.17042	1.16610			
CREA-B	female	35	14.8000	7.53736	1.27405	1.252	61	.215
	male	28	12.4643	7.12056	1.34566			
TOTA	female	38	20.3026	8.36623	1.35718	-.784	65	.436
	male	29	21.8103	6.97625	1.29546			
INA	female	38	11.5658	5.88076	.95399	-1.189	65	.239
	male	29	13.2759	5.76409	1.07036			
EXA	female	38	8.7368	5.53946	.89862	.202	65	.841
	male	29	8.5000	3.48978	.64804			
PA	female	38	11.5526	5.27204	.85524	-.262	65	.794
	male	29	11.8793	4.75968	.88385			

TA	female	38	8.7368	5.14878	.83524	-.997	65	.322
	male	29	9.9138	4.25749	.79060			
GA	female	38	10.5000	6.88221	1.11644	.022	65	.983
	male	29	10.4655	5.57727	1.03567			
EXA	female	38	10.0132	4.84975	.78673	-1.039	65	.303
	male	29	11.3448	5.62854	1.04519			
PGA	female	38	6.8553	5.13587	.83315	-.249	65	.804
	male	29	7.1552	4.50813	.83714			
TSA	female	38	5.2500	3.64608	.59147	-1.242	65	.219
	male	29	6.3103	3.20550	.59525			
INPGA	female	38	3.6184	3.33579	.54114	-1.374	65	.174
	male	29	4.7759	3.52184	.65399			
EXPGA	female	38	3.1974	3.27055	.53055	1.281	65	.205
	male	29	2.3103	2.04159	.37911			
EXTSA	female	38	2.1579	1.88201	.30530	-1.434	65	.156
	male	29	2.7931	1.67714	.31144			
INTSA	female	38	2.9868	1.95727	.31751	-1.553	65	.125
	male	29	3.8621	2.65887	.49374			

CREA-A= Card A of the CREA test; TOTA = Total attributions; INA = Internal attributions; EXA = External attributions; PA = Permanent attributions; TA = temporary attributions; GA= Global attributions; SA = Specific attributions; PGA = Permanent global attributions; TSA = Temporary specific attributions; INPGA = Internal, permanent global attributions; EXPGA = External, permanent global attributions; EXTSA = External, temporary, specific attributions; INTSA = Internal, temporary, specific attributions.

Differences of means in creativity between high and low levels of divergent explanatory production.

We decided to study differences in creativity with low and high levels of the different dimensions of DEP, using the arithmetic mean on the different DEP dimensions as the dividing line. In general, on both CREA-A and CREA-B, participants with greater DEP in general, and with more resilient DEP (temporary and specific attributions) showed significantly more creativity with respect to the group with lower general DEP, and the group with lower resilient DEP. When comparing creativity results on the CREA-A, the participants with high DEP in internal attributions (INA) were found to have significantly greater creativity with respect to the group with lower DEP in INA. Results can be seen in Tables 5 and 6.

Table 5. **Differences of means on CREA-A according to high or low levels of DEP. Means and standard deviation on CREA-A according to high or low levels of DEP.**

Levels of DEP	N	Mean	SD	Error	T	d.f.	P
TOTA-High	28	15.3929	6.17246	1.16648	2.940	59	.005
TOTA-Low	33	11.1818	5.01532	.87305			
INA-High	31	15.3548	5.82837	1.04681	3.233	59	.002
INA-Low	30	10.8000	5.14212	.93882			
EXA-High	26	14.3846	6.46267	1.26743	1.458	59	.150
EXA-Low	35	12.1714	5.38236	.90978			
PA-High	31	13.7742	5.25807	.94438	.883	59	.381
PA-Low	30	12.4333	6.55314	1.19643			
TA-High	27	15.7407	6.04847	1.16403	3.339	59	.001
TA-Low	34	11.0294	4.97561	.85331			
GA-High	29	14.5172	6.13899	1.13998	1.794	59	.078
GA-Low	32	11.8438	5.50137	.97251			
SA-High	24	14.9583	6.52406	24	2.008	59	.049
SA-Low	37	11.9189	5.24075	37			
PGA-High	27	12.8889	5.46551	1.05184	-.264	59	.793
PGA-Low	34	13.2941	6.33188	1.08591			
TSA-High	26	14.5385	6.43261	1.26154	1.642	59	.106
TSA-Low	35	12.0571	5.35747	.90558			
INPGA-Alta	31	13.7097	6.18166	1.11026	.796	59	.429
INPGA-Baja	30	12.5000	5.67359	1.03585			
EXPGA-High	21	13.5714	5.66190	1.23553	.434	59	.666
EXPGA-Low	40	12.8750	6.10669	.96555			
EXTSA-High	34	13.9118	6.15146	1.05497	1.184	59	.241
EXTSA-Low	27	12.1111	5.56316	1.07063			
INTSA-Alta	31	14.6452	6.24259	1.12120	2.111	59	.039
INTSA-Baja	30	11.5333	5.20433	.95018			

CREA-A = Card A of the CREA test; TOTA = Total attributions; INA = Internal attributions; EXA = External attributions; PA = Permanent attributions; TA = temporary attributions; GA= Global attributions; SA = Specific attributions; PGA = Permanent global attributions; TSA = Temporary specific attributions; INPGA = Internal, permanent global attributions; EXPGA = External, permanent global attributions; EXTSA = External, temporary specific attributions; INTSA = Internal, temporary, specific attributions.

Electronic Journal of Research in Educational Psychology, *13*(3), 551-568. ISSN: 1696-2095. 2015, no. 37
http://dx.doi.org/10.14204/ejrep.37.14126

Table 6. **Differences of means on CREA-B according to high or low levels of DEP. Means and standard deviations on CREA-B according to high or low levels of DEP.**

Levels of DEP	N	Mean	SD	Error	T	d.f.	P
TOTA-High	28	16.0000	7.83629	1.48092	2.076	59	,042
TOTA-Low	33	12.1212	6.75813	1.17644			
INA-High	31	15.7097	7.07669	1.27101	1.967	59	,054
INA-Low	30	12.0333	7.51772	1.37254			
EXA-High	26	14.7692	8.23314	1.61465	,779	59	,439
EXA-Low	35	13.2571	6.89988	1.16629			
PA-High	31	14.0645	6.44947	1.15836	,172	59	,864
PA-Low	30	13.7333	8.50531	1.55285			
TA-High	27	17.3333	7.82009	1.50498	3.481	59	,001
TA-Low	34	11.1765	5.99733	1.02853			
GA-High	29	14.9310	6.79249	1.26133	1.025	59	,309
GA-Low	32	12.9688	8.02610	1.41883			
SA-High	24	16.4583	8.78724	1.79369	2.223	59	,030
SA-Low	37	12.2432	6.03879	,99277			
PGA-High	27	13.2963	6.89378	1.32671	-,561	59	,577
PGA-Low	34	14.3824	7.96589	1.36614			
TSA-High	26	16.6538	8.36154	1.63983	2.596	59	,012
TSA-Low	35	11.8571	6.07862	1.02747			
INPGA-Alta	31	14.3871	7.45957	1.33978	,513	59	,610
INPGA-Low	30	13.4000	7.57309	1.38265			
EXPGA-High	21	14.0952	7.28632	1.59001	,145	59	,885
EXPGA-Low	40	13.8000	7.65339	1.21011			
EXTSA-High	34	14.8824	8.44147	1.44770	1.154	59	,253
EXTSA-Low	27	12.6667	5.95496	1.14603			
INTSA-Alta	31	15.6774	8.61157	1.54668	1.930	59	,058
INTSA-Baja	30	12.0667	5.64424	1.03049			

CREA-B = Card B of the CREA test; TOTA = Total attributions; INA = Internal attributions; EXA = External attributions; PA = Permanent attributions; TA = temporary attributions; GA= Global attributions; SA = Specific attributions; PGA = Permanent global attributions; TSA = Temporary specific attributions; INPGA = Internal, permanent global attributions; EXPGA = External, permanent global attributions; EXTSA = External, temporary, specific attributions; INTSA = Internal, temporary, specific attributions.

Discussion and Conclusions

The participants who, when faced with hypothetical adversities, produced more causal explanations in general, and more resilient causal explanations in particular, were associated with higher creative intelligence or divergent production. In all calculations, the dimension of duration stood out from the rest (greater production of temporary attributions for hypothetical adversities), showing a clear relationship to greater creativity. It is important to note that the duration dimension is what has been most clearly demonstrated to be a protective factor against depression (Seligman, 2005). Also, the scope dimension (greater production of specific attributions for hypothetical adversities) concurs with the scientific literature as a protective dimension against depression.

Regarding the external-internal dimension, the relationship was stronger for the internal dimension than the external, unlike what might be expected in theory, according to the reformulated model of learned helplessness (external, specific, temporary attributions), but in agreement with what has been found in other research studies (Maldonado, Luque & Herrera, 1999). This result is in line with the distinction made by Seligman et al (2005), between behavioral internal beliefs (e.g., "I should have studied more") and what they call characterological internal beliefs (e.g., "I'm terrible as a student"). The former are modifiable and lead to action to try to fix the problem, so they guard against feelings of hopelessness or uselessness. By contrast, the latter are permanent, attributing the occurrence of the adversity to the person's character, and thus leading to feelings of incapacity and uselessness. Based on the results, we suggest a possible cascade or feedback effect, in other words, that the production of internal, *more resilient causal explanations* (temporary and specific) would help to produce better states of mind, as well as a greater sense of mastery, which in turn contributes to higher scores on the creativity test, while more negative causal explanations would produce more depressive states of mind, tending to bring down one's scores on the creativity test. Whitmer and Gotlib (2013) indicate in their model of attentional scope that a depressive state of mind may reduce attention, and thus decrease repertories of thought and action, encouraging more repetitive thought, thus creating a negative emotional spiral. A future line of work would be to further develop the theoretical model of the psychological processes involved. No gender differences were found in the variables studied.

 Electronic Journal of Research in Educational Psychology, *13*(3), 551-568. ISSN: 1696-2095. 2015, no. 37
http://dx.doi.org/10.14204/ejrep.37.14126

Implications

In terms of theory, this represents a bridge between the reformulated model of learned helplessness (as a model of resilience and optimism) and creative intelligence. In terms of psychological assessment, a new instrument is offered that connects the variables of optimistic thought with divergent production, closely related to creativity, in the line of other research studies that have tried to relate the two variables (Sánchez-Hernández, Martín-Brufau, Méndez, Corbalán & Limiñana, 2010). Explanatory divergent production could be related to problem-solving models (Guilford, 1977; Mahoney, 1981). Explanations as to possible causes for a given problem might determine the psychological framework wherein possible solutions will be found. *Divergent explanatory production* (DEP) also falls within the context of psychological flexibility, which includes the ability to observe problems from different viewpoints (Kashdan & Rottenberg, 2010). This new measurement could help us monitor participants' progress when being trained in this skill in psychological well-being programs, in psychological prevention programs and/or in clinical interventions.

One *therapeutic application,* conceived by Sánchez-Hernández and Méndez (2009) and inspired by studies by Seligman et al. (2005), is found in "El Sol Optimista" (The Optimistic Sun). It consists of drawing a circle, and describing the adversity inside of it. Next, the adolescent must generate all possible explanations that may have brought about the adversity, where each of these is a ray of Sunshine. The hypothesis is that producing a greater number of explanations, when faced with negative events, is related to better adaptation, because the person will have more points of view. These would include both internal causes, for which one could take responsibility and act in order to find the solution, and external causes that help to attain a more realistic view of the situation, and recognize what is outside one's own responsibility, protecting self-esteem with the understanding that one is not the direct cause of the negative event. Similarly, *El Sol Optimista* encourages production of more contextual, descriptive attributions for the given situation (temporary and specific), instead of abstract attributions (permanent and global). This method is also easy to use at the start of therapy ("tell me all the causes you can think of for why this adversity has happened to you"), both for the sake of assessment, and for developing this skill.

Limitations and prospects

This paper may be considered a pilot study for presenting this new variable and measure of psychological flexibility. Limitations would be the small sample size, lack of adequate recruiting to ensure the sample's representativeness of the population, limiting the study to creativity and therefore the lack of other psychometric assessment data that may relate it to other variables, as well as the need to further develop the underlying theoretical model.

While results are interesting, in that they relate a resilient explanatory style to creativity, new studies are needed with larger samples, to study its relationship to other similar variables that measure cognitive flexibility, an important skill for effective cognitive restructing in therapy (Johnco, Wuthrich & Rapee, 2014), and to explanatory flexibility (Fresco, Rytwinski & Craighead, 2006) and other measures of creativity. It would also be interesting to analyze the relationship to psychological well-being, depression, self-concept, dispositional optimism, curiosity, etc. Another line of research would be to study its role in hypotheses of mediators in improvements during preventive interventions, and its role in treating emotional problems, as well as how it relates to other measurements that assess compensatory skills, in the line of Barber and DeRubeis (1992).

In summary, this new test and construct reflects the relationship between two key concepts, resilience and creativity; it would be valuable to continue studies in this new line of research that has clear practical applications in assessment and treatment of emotional problems, as well as in promoting well-being in the population.

References

Abramson L. Y., Seligman M. E. P. & Teasdale J. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87,* 49-74. doi:10.1037/0021-843X.87.1.49

Barber, J. P. & DeRubeis, R. J. (1992) The Ways of Responding: a scale to assess compensatory skills taught in cognitive therapy. *Behavioral Assessment, 14,* 93-115

Corbalán, F.J., Martínez, F., Donolo, D., Tejerina, M., & Limiñana, R.M. (2003). *CREA Inteligencia Creativa. Una medida cognitiva de la creatividad*. [CREA, Creative Intelligence. A cognitive measurement of creativity] Madrid: TEA Ediciones. Awarded the 7th annual International Prize from TEA publishing.

De Bono, E. (1998). *El Pensamiento Lateral: Manual de Creatividad.* [Lateral thinking: Creativity Manual] Barcelona: Paidos Ibérica.

Fresco, D. M., Rytwinski, N. K. & Craighead, L. W. (2006). Explanatory flexibility and negative life events interact to predict depression symptoms. *Journal of Social and Clinical Psychology, 26 (5),* 595-608. doi: 10.1521/jscp.2007.26.5.595

Guilford, J.P. (1977). *La naturaleza de la inteligencia humana*. [The nature of human intelligence.] Buenos Aires: Paidos.

Hankin, B. L. & Abramson, L. Y. (2002). Measuring cognitive vulnerability to depression in adolescents: Reliability, validity, and gender differences. *Journal of Clinical Child and Adolescent Psychology, 31,* 491–504. doi: 10.1207/S15374424JCCP3104_8

Johnco, C., Wuthrich, V. M. & Rapee, R. M. (2014). The influence of cognitive flexibility on treatment outcome and cognitive restructuring skill acquisition during cognitive behavioural treatment for anxiety and depression in older adults: Results of a pilot study. *Behaviour Research and Therapy 57,* 55-64. doi: 10.1016/j.brat.2014.04.005

Kashdan, T. B. & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30,* 865–878. doi: 10.1016/j.cpr.2010.03.001

Mahoney, M. J. (1981). Ciencia personal: Una terapia cognitiva del aprendizaje. [Personal knowledge: a cognitive learning therapy.] In A. Ellis & R. Grieger (eds.). *Manual de terapia racional-emotiva* (pp. 369-382). Bilbao: Declée de Brouwer.

Maldonado, A., Luque, G. & Herrera, A. (1999). Cognición, estilo atribucional y depresión. [Cognition, attributional style and depression.] *Ansiedad y Estrés, 5 (2-3),* 161-174.

Runco, M.A. (Ed). (1994). *Problem finding, problem solving, and creativity. Creativity research*. Westport, CT, US: Ablex Publishing.

Sánchez-Hernández, Ó. & Méndez, F. X. (2009). *Programa Sonrisa*. [The smile program.] Unpublished manuscript.

Sánchez-Hernández, O., Martín-Brufau, R., Méndez, F. X., Corbalan, F. J. & Limiñana, R.M. (2010). The relationship between optimism, creativity and psychopathological symptoms in university students. *Electronic Journal of Research in Educational Psychology, 8(3), 1151-1178.* Retrieved from http://www.redalyc.org/articulo.oa?id=293122000011

Schulman, P., Castellon, C. & Seligman, M. E. P (1989). Assessing explanatory style: the content analysis of verbatim explanationes and the attributional style questionnaire. *Behaviour Research and Therapy, 27(5),* 505-512.

doi: 10.1016/0005-7967(89)90084-3

Seligman, M.E.P. (1998). *Aprenda optimismo: Haga de la vida una experiencia maravillosa*. [Learn optimism: Make life a wonderful experience.] Barcelona: Grijalbo.

Seligman, M.E.P., Reivich, K., Jaycox, L. & Gillham, J. (2005). *Niños optimistas*. [Optimistic children.] Barcelona: Random House Mondadori, S.A.

Torrance, E.P. (1974). *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.

Whitmer, A. J. & Gotlib, I. H. (2013). An attentional scope model of rumination. *Psychological Bulletin, 139,* 1036-1061. doi: 10.1037/a0030923