Artículos originales de investigación
doi: https://doi.org/10.16925/pe.v13i22.1984

Factorial Validity of a Spanish Language Generativity Scale: Yet Another Scale with Method Effects?

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Recibido: 17 de enero del 2017
Aprobado: 23 de agosto del 2017

Cómo citar este artículo: García-Romero, D. A., Fernández, I., Tomás, J. M., Cerviño-Vázquez, C. y Georgieva, S. (2017). Factorial Validity of a Spanish Language Generativity Scale: Yet Another Scale with Method Effects? Pensando Psicología, 13(22), 5-13. doi: https://doi.org/10.16925/pe.v13i22.1984

Abstract

Introduction: The term "generativity" was used for the first time by Erikson (1950). It refers to the state of adulthood in the life cycle, which implies procreativity, productivity and creativity, it also impulses the development of one's own identity. There are several ways to measure generativity such as interviews, direct observation, case studies, or self-report questionnaires. The most widely used method is self-report, and among the available scales, the Loyola Generativity Scale (LGS) is one of the salient scales. LGS is a self-report measure composed of twenty items that measure a general factor of generativity. *Objective:* This study examined the factorial validity and internal consistency of the adaptation of the Loyola Generativity Scale to Spanish for its use with Dominican teachers. *Method:* Two competitive factor models were tested based on previous existing literature, and a third model with method effects associated to negatively worded items was added, in order to find the best fitting solution for this sample. In order to examine the factorial validity of the three models, three Confirmatory Factor Analysis (CFA) were performed, and internal consistency and composite reliability indices were also calculated. *Results:* In general, the three models showed good psychometric properties. However, the third model that considered a general factor of generativity together with a method effect factor showed the best fit for this sample. *Conclusion:* Implications for an adequate measurement of generativity are discussed. More research is needed to examine if these properties are stable on different samples from different populations.

Keywords: bias, creativity, procreativity, productivity, negatively worded items.

ISSN 1900-3099 (impreso) | ISSN 2382-3984 (en línea) doi: https://doi.org/10.16925/pe.v13i22.1984

Validez factorial de una escala de generatividad en español: ¿otra escala con efectos de método?

Resumen

Introducción: Erikson (1950) utilizó el término "generatividad" por primera vez y se refiere al estado de adultez en el ciclo de vida, lo que implica procreatividad, productividad y creatividad e impulsa el desarrollo de la propia identidad. Existen varias formas de medir la generatividad como las entrevistas, la observación directa, los estudios de caso o los cuestionarios de autoinforme. El método más utilizado es el autoinforme y, entre las escalas disponibles, una de las más destacadas es la Escala de Generatividad de Loyola (EGL). La EGL es una medida de autoinforme que consta de veinte ítems que miden un factor general de generatividad. *Objetivo:* este estudio examinó la validez factorial y la consistencia interna de la Escala de Generatividad de Loyola adaptada al español para su uso con profesores dominicanos. *Método:* se probaron dos modelos de factores competitivos con base en la literatura existente y se añadió un tercer modelo con efectos de método asociados a ítems negativos con el fin de encontrar la mejor solución de ajuste para esta muestra. Para examinar la validez factorial de los tres modelos, se realizaron tres Análisis Factoriales Confirmatorios (AFC) y también se calcularon los índices de consistencia interna y de fiabilidad compuesta. *Resultados:* en general, los tres modelos mostraron buenas propiedades psicométricas. Sin embargo, el tercer modelo que tuvo en cuenta un factor general de generatividad junto con un factor de efecto de método mostró el mejor ajuste para esta muestra. *Conclusión:* se discuten las implicaciones para una medición adecuada de la generatividad. Se necesitan más investigaciones para examinar si estas propiedades son estables en diferentes muestras de diferentes poblaciones.

Palabras clave: sesgo, creatividad, procreatividad, productividad, ítems negativos.

Validade fatorial de uma escala de geratividade em espanhol: outra escala com efeitos de método?

Resumo

Introdução: Erikson (1950) utilizou o termo *geratividade* pela primeira vez, que se refere ao estado de idade adulta no ciclo da vida, o que implica procriatividade, produtividade e criatividade, e impulsiona o desenvolvimento da própria identidade. Existem várias formas de medir a geratividade, como as entrevistas, a observação direta, os estudos de caso ou os questionários de autorrelato. O método mais utilizado é o autorrelato e, entre as escalas disponíveis, uma das mais destacadas é a Escala de Geratividade de Loyola (EGL). A EGL é uma medida de autorrelato que consta de vinte itens que medem um fator geral de geratividade. *Objetivo*: este estudo examinou a validade fatorial e a consistência interna da EGL adaptada ao espanhol para seu uso com professores dominicanos. *Método*: testaram-se dois modelos de fatores competitivos com base na literatura existente e acrescentou-se um terceiro modelo com efeitos de método associados a itens negativos com o fim de encontrar a melhor solução de ajuste para essa amostra. Para analisar a validade fatorial dos três modelos, realizaram-se três Análises Fatoriais Confirmatórias (AFC) e também se calcularam-se os índices de consistência interna e de fiabilidade composta. *Resultados*: em geral, os três modelos mostraram boas propriedades psicométricas. Contudo, o terceiro modelo que considerou um fator geral de geratividade junto com um fator de efeito de método mostrou o melhor ajuste para essa amostra. *Conclusões*: discutem-se as implicações para uma medição adequada da geratividade. Necessitam-se mais pesquisas para examinar se essas propriedades são estáveis em diferentes amostras de diferentes populações.

Palavras-chave: viés, criatividade, procriatividade, produtividade, itens negativos.

Introduction

The term "generativity" was used for the first time by Erik Erikson (1950) in reference to the theory of the stages of psychological development. Generativity refers to the state of adulthood in the life cycle, which implies procreativity, productivity and creativity. It also impulses the development of one's own identity (Erikson, 2007). From the age of thirty, generativity takes place, given that this is the life stage in which it is common to create a family and/or engage in a job (Erikson, 2007). Generativity also supposes a challenge that the individual has to experience in order to face middle adulthood (Villar, López, & Celdrán, 2013). There are several characteristics of generativity: engagement in professional activities; involvement in social, religious or political organizations; and other actions that involve taking care of other people (Zacarés & Serra, 2011). Raising offspring is one of the biggest generative events for most adults, according to Erikson (2007).

Generativity can be understood by seven different traits (McAdams, & St Aubin, 1992): cultural needs, personal desires, generative concerns, faith in the human species, engagement, generative activity, and individual's narrative. It is also related to the contribution an individual makes to each generation (Hofer, Bush, Chasiotis, Kätner, & Campos, 2008). For this reason, generativity is considered to be similar to teaching (Fernández, 2011). There is a relationship between generativity and maturity in adulthood because of the interest in autonomy and personal growth, taking care of others, and signs of maturity, are cornerstones of this construct. Generativity is considered to be a bipolar construct, with the opposite pole being stagnation. Stagnation is characterized by low engagement and low inclusion in activities, as well as the lack of interest in political and social events (Cornaccione et al., 2012). Stagnation is also related to dissatisfaction with oneself and to the lack of perception of young people's needs (Slater, 2003).

Generativity is common in educational environments and it can be appreciated in many teachers. Teachers exhibit generativity in several ways: they exhibit interest in the improvement of their students, usually employing a variety of techniques in order to ensure the understanding of the material, while providing them with social support; they encourage the development of student's creativity in order to solve different problems in new ways; they see themselves as leaders and mediators in the learning process, trying to increase students' motivation and involvement; and they also ensure the creation of an appropriate learning environment in which to increase students' autonomy. As a result of these behaviors, teachers report an improvement in their self-esteem and an increased engagement with their job (Zacarés & Serra, 2011).

There are several ways to measure generativity (Fernández, 2011). It can be measured with interviews or direct observation (Vaillant & Milofsky, 1980) with instruments such as the California Adult Questionnaire – Generativity Scale "(CAQ-GS), which is a questionnaire of 13 items filled out by the observer. It intends to measure three dimensions of generativity: generosity; pro-social competence and productivity; and perspective (Wink & Dillon, 2003). Generativity can also be measured by examining case studies (Peterson & Stewart, 1990). However, the most used way to measure generativity employs self-report questionnaires (Ryff & Migdal, 1984). Three of the most widely used self-report questionnaires are the Generative Behavior Checklist (GBC) (McAdams & StAubin, 1992), the Loyola Generativity Scale (LGS) (McAdams & StAubin, 1992), and the Multidimensional Generativity Scale (MGS) (Cornaccione et al., 2012). The Generative Behavior Checklist (McAdams & StAubin, 1992) is a 50-items scale divided in two categories: 40 items measure the construct of generativity, while the remaining 10 items are considered neutral items. The items measuring generativity consist of a checklist of behaviours performed (or not) in the last two months. The Multidimensional Generativity Scale (Cornaccione et al., 2012) measures a general factor of generativity, and also several dimensions: demand, desire, behavior, engagement, and generative model. The MGS has 32 items asking about the willingness to perform certain behaviors.

With respect to the measurement instrument of interest, The Loyola Generativity Scale (McAdams & StAubin, 1992) measures generative concerns with twenty items. The Loyola Generativity Scale has had a great impact in research because it has had different adaptations for different populations, young generational attitudes (Cheng, 2009), or wellbeing and social implication (Blanco & Díaz, 2005; Hart, McAdams, Hirsch, & Bauer, 2001). The Loyola Generativity Scale has been adapted for Spanish teachers by Zacarés, Ruiz and Amer (2002). The original as well as the adapted scale are composed of twenty items which are measured from 0 (never applies) to 3 (very often/nearly always applies), and both scales include negatively worded items. The main difference between both scales is that in the Spanish version adapted to the teacher population, items' contents are referred to students and the school.

The aim of this study was to test the factorial validity and internal consistency of the adaptation of the Loyola Generativity Scale (LGS) (McAdams y StAubin, 1992) to Spanish language in a sample of Dominican teachers. Particularly, it was of interest to test for a single factor structure but with potential method effects associated to negatively worded items, a problem widely spread across measures (Dalal & Carter, 2015; Tomás, Oliver, Galiana, Sancho & Lila, 2013).

Method

Sample

The sample was composed of 633 teachers from Dominican Republic. The sample was obtained by cluster random sampling. First, two provinces were chosen: Santo Domingo and La Vega. Santo Domingo is a federal district characterized by an urban context, whereas La Vega is much more of a rural context. Afterwards educational districts (the clusters) were randomly chosen within these two provinces. Sampling size within each educational district was determined using Krejcie and Morgan's (1970) sampling procedure, assuming the chi square value for one degree of freedom and a proportion of 0.5 of the population. This yielded a total of 316 desired sample units from La Vega and 322 sample units from Santo Domingo. Finally, the sample was formed by 316 (49.9%) participants from La Vega and 317 (50.1%) from Santo Domingo. The sample was composed of 79.5% women and 20.5% men. Regarding civil state, 63.7% were married, 16.6% were single and 19.7% had other marital status. A total of 61.6% of the sample were teaching in primary education, 30.2% were teaching in secondary education, and the remaining were teaching other educational levels.

Instruments

The Loyola Generativity Scale (McAdams & StAubin, 1992) is a self-report measure composed by twenty items that measure generativity as defined by the express concern to guide new generations. Items' scale ranges from 1 (totally disagree) to 5 (totally agree). All items are supposed to correspond to a general factor of generativity. A score higher than 45 indicates a sense of responsibility to guide younger members of society, while a score lower than 10 is associated to people that see themselves as having limited capacity to influence others. This scale was adapted to be used with teachers' populations in Spanish by Zacarés, Ruiz and Amer (2002), and this adapted version is the one chosen for this study, given the nature of the sample. Example items of this scale are "I think I have a positive influence in my colleagues or in the parents of my students", and "Students and/or colleagues come to me to ask for advice".

Statistical Analyses

For the present study, those models that appear in the literature were tested with Confirmatory Factor Analysis (CFA). These were: 1) Model 1, a one-factor model of generativity based on the results obtained by McAdams and StAubin (1992); 2) Model 2, a two-factor model of generativity with pupils and generativity with colleagues based on the results obtained by Fernández (2011). These models are shown in Figure 1.

In addition, a third model –with a general factor of generativity and a method-effect factor– was also tested (Model 3). The method factor comprises all negatively worded items. It is a well-known result that sometimes the negatively worded items produce a spurious dimensional solution in which all negatively worded items load on a separate factor, even when the scale was developed to measure a single factor (Dalal & Carter, 2015; Tomás & Oliver, 1999; Tomás et al., 2013). Accordingly and in order to test this method's effect, a new model was proposed and tested, this model is shown in Figure 2.

To assess model fit, several fit indices were calculated, as recommended by the literature (Hu & Bentler, 1999; Tanaka, 1993): a chi square statistic (χ^2), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). Generally, values of >.90 for the CFI and <.08 for the RMSEA are considered to indicate a good fit, with values >.95 for the CFI and <.05 for the RMSEA indicating an excellent fit (Hu & Bentler, 1999). Additionally and for model comparison purposes, the Akaike Information Criterion (AIC) was also calculated. The model with lowest AIC is the preferred one. All CFAs were estimated with Maximum Likelihood Robust (MLR), given the non-normality of the items. Internal consistency was additionally estimated using Cronbach's alfa and the Composite Reliability Index (CRI). Alpha

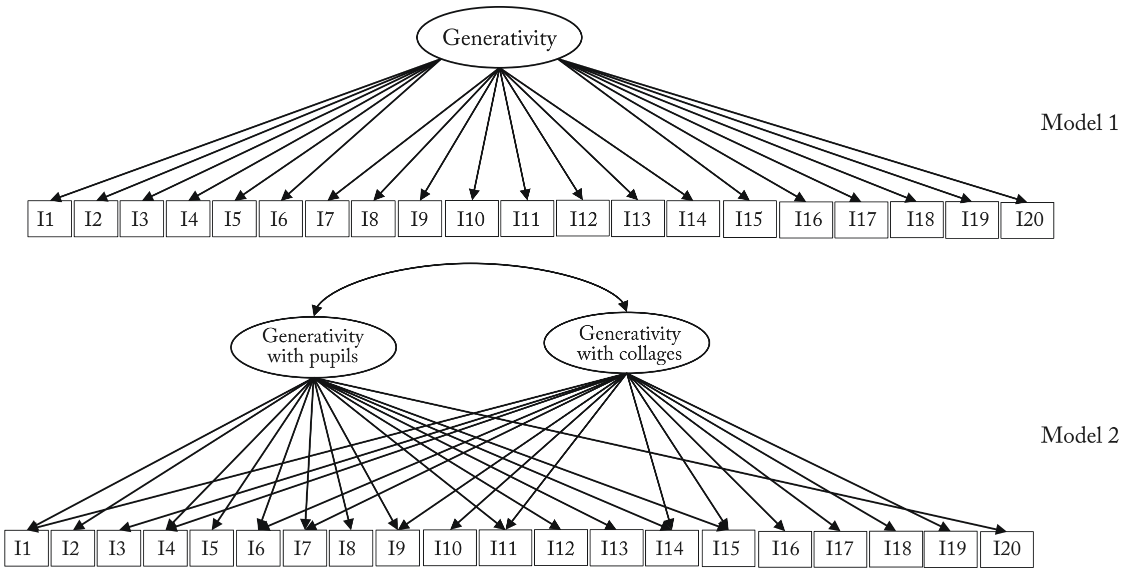

Figure 1. Alternative models retrieved from literature. Compiled by the authors

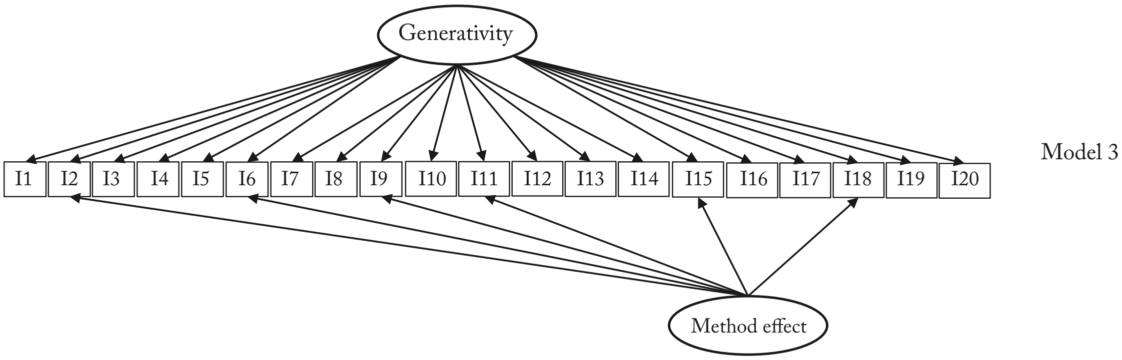

Figure 2. Authors' proposed model. Compiled by the authors

is the most used measure of internal consistency and it is based on observed covariance among the items, whereas the CRI is a factor analysis-based index in which factor loadings and residuals are used to estimate consistency. All these analyses were conducted with SPSS 21 and EQS 6.1.

Results

Factorial Validity

Table 1 shows the fit indices for all tested models. All models showed a good-to-excellent fit. Regarding CFI, models 2 and 3 showed excellent and very similar fits, with model 3 being slightly better. RMSEA was excellent for model 3 only. More importantly, the drop in AIC values for model 3 was spectacular. All in all, model 3 results the best fitting model. Model 3 corresponds to a factor of generativity and a method-effect factor comprising all the negative items in the scale. These items are worded in such ways as: "I don't think I am very necessary for my students", "I feel as if I hadn't done anything valuable that could be useful for the students", or "I think that the responsibility to improve the school should not devolve upon me". Table 2 shows the standardized factor loadings of the retained model.

Table 1

Fit indices for all tested models

	χ^2	df	p	CFI	RMSEA	CI 90%	AIC
Model 1	952.86	170	<.001	.950	.093	.088-.099	612.86
Model 2	465.33	161	<.001	.981	.06	.054-.066	143.33
Model 3	354.71	164	<.001	.988	.047	.040-.054	26.71

Note. χ^2= Chi-Square; df= degree freedom; CFI= Confirmatory Fit Index; RMSEA= Root Mean Square Error of Approximation; CI= Confidence interval; AIC= Akaike Information Criterion. Compiled by the authors

Table 2

Standardized factor loadings of the best fitting model

Item	F1. Generativity	F2. Method effect
1	.804	
2	-.471	.531
3	.717	
4	.777	
5	.749	
6	-.339	.541
7	.604	
8	.672	
9	-.275	.551
10	.790	
11	-.477	.668
12	.834	
13	.824	
14	.509	
15	-.425	.673
16	.712	
17	.774	
18	-.169	.521
19	.688	
20	.692	

Note. Compiled by the authors

Internal consistency

Cronbach's alphas were calculated for the three models. Model 1 presented measures of 0.78; Model 2 presented alpha data of 0.64 and 0.67 of generativity with pupils and generativity with colleagues, respectively. Model 3 presented 0.78 in reference to generativity and 0.75 in reference to the method effect. CRI was estimated for the best fitting model, model 3, and the result was 0.82 for the generativity factor and 0.74 for the method effect factor.

Discussion and conclusions

This study examined the factorial validity and internal consistency of the adaptation of the Loyola Generativity Scale to Spanish and for its use with Dominican teachers (McAdams & StAubin, 1992) with a representative and random sample. Three competitive models were tested based on previous existing literature, and a third model was added in order to find the best fitting solution for this sample. In order to examine the factorial validity of the three models, three Confirmatory Factor Analysis (CFA) were performed. The first model, which was the original one-factor model of generativity, showed a good internal consistency estimate, but it was the model with the worst fit. The second model was a two-factor model which separated positive and negative items and it was based on Fernández (2011). This model showed poorer consistency estimates than the one-factor solution, with alphas well below the usual cut-off criterion of 0.7. Nevertheless, model fit improved over the one factor structure, but overall fit was not as good as that of model 3. Model 3 was based on the methodological literature that has repeatedly found that negatively worded items produce a false multidimensionality by grouping all negative items (Carmines & Zeller, 1979; DiStefano & Motl, 2009; Horan, DiStefano, & Motl, 2003; Motl, & DiStefano, 2002; Wang, Siegal, Falck, & Carlson, 2001).This model showed very good internal consistency estimates and an excellent and superior model fit.

McAdams and StAubin used two samples, one of 149 adults (ages between 19 and 68) and another of 165 college students. A bank of 31 original items was reduced to the best 20 items, based on their inter-correlations. Further analyses were then performed with this data: an Exploratory Factor Analysis was performed. This Analysis showed a general factor that was named Positive Generativity that explained 26 % of the variance for the adults' sample, and 29 % of the variance for the college students' sample. Nevertheless, another second factor was found which explained an additional 10 % and 9 % of the variance for adults and students, grouping mainly the negatively worded items. This same data was also examined with two CFAs and it showed up a good fit for a one-factor solution.

A different result was found by Fernández (2011). Based on the original one factor model, this author estimated a Confirmatory Factorial Analysis (CFA), but found unsatisfactory fit indexes. Consequently, an Exploratory Factor Analysis was performed using 18 items of the scale. It resulted in two factors with good internal consistencies. Therefore, none of the available factorial structures examined in the literature for the LGS gives support to our results, but this is no surprise, since none of the results found in the literature have tested all the sequence of models our current research has tested. This, together with the fact that the aforementioned results are based mostly on exploratory rather than confirmatory analysis, makes comparison difficult.

This was the first time the psychometric properties of this scale were examined in a representative sample of Dominican teachers. Unfortunately, we cannot say that this adapted version of the LGS has good psychometric properties. Its main problem is an acute method factor that explains a non-trivial amount of variance in many of the items (those that are negatively worded), which is not good news for its application, as spurious relations could be found when correlating the scale with other instruments with the same problem. Therefore, more research is needed to examine whether these properties are stable on different samples from different populations. It could also be a good idea to modify the items that compose the method effect factor in order to deeply understand if this negative wording has, indeed, such a profound effect on the psychometric properties of the scale.

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Appendix I: Spanish adaptation to the teacher population of the Loyola Generativity Scale (Zacarés, Ruiz & Amer, 2002)

1. Intento transmitir a otros el conocimiento que he obtenido con mis experiencias.
2. No creo que yo sea muy necesario/a para mis alumnos.
3. Me siento necesario para mis compañeros docentes.
4. Siento que me gusta trabajar como docente.
5. Pienso que yo les importo mucho a mis alumnos/as.
6. Acostumbro a no participar en actividades complementarias, extraescolares.
7. Diseño programas creativos y actividades que tienen impacto en otras personas.
8. Creo que, después de jubilarme, seré recordado durante un tiempo.
9. La sociedad no debe ser responsable de dar comida y vivienda a gente sin hogar.
10. Otros compañeros/as docentes dirían de mí que soy una persona productiva.
11. Siento como si no hubiese hecho nada valioso que pudiese servir a los alumnos.
12. Tengo habilidades y conocimientos interesantes que intento enseñar al alumnado.
13. Me siento bien al saber que, desde la educación, he hecho algo que me sobrevivirá.
14. Me gustaría enseñar a los demás de otra forma o en otros lugares.
15. En general mis acciones no suelen tener un efecto positivo sobre el alumnado.
16. Durante mi vida me he comprometido con diferentes tipos de personas y de actividades.
17. Creo que influyo positivamente en compañeros o en padres de alumnos.
18. Creo que la responsabilidad de mejorar el colegio/instituto no debe recaer sobre mi.
19. Alumnos y/o compañeros vienen a mi para pedirme consejo.
20. Creo que mis aportaciones permanecerán después de que me haya marchado.