

The development and validation of a scale for assessing peer-mentoring processes in programs for first-year university students

Rafael García-Ros¹, María C. Fuentes², Francisco Pérez-González³, Alicia Villar-Aguilés⁴, Francisco Hernández i Dobon⁵

^{1,3} Department of Developmental and Educational Psychology, University of Valencia, Valencia

² Department of Methodology for the Behavioral Sciences, University of Valencia, Valencia

^{4,5} Department of Sociology and Social Anthropology, University of Valencia, Valencia

Spain

Correspondence: Rafael García-Ros. Department of Developmental and Educational Psychology, School of Psychology. Av. Blasco Ibáñez, 21, 46010-Valencia.España. E-mail: rafael.garcia@uv.es

© Universidad de Almería and Ilustre Colegio Oficial de la Psicología de Andalucía Oriental (Spain)

Abstract

Introduction. This study focuses on the development and validation of the Mentoring Processes Assessment Questionnaire –MPAQ- designed to assess mentoring processes in peer-mentoring programs aimed at first-year university students.

Method. Participants in the study were 354 first-year students from a broad set of degrees at the University of Valencia in the 2013-14 and 2014-15 access cohorts. The factorial structure of the MPAQ was analyzed using both Exploratory and Confirmatory Factorial Analyses. A multi-group analysis was performed on the MPAQ to examine the factorial invariance and test the equivalence/non-equivalence of its structure across the participants' sex and age. The reliability of the factorial solution was also tested. Lastly, concurrent validity was assessed by examining the MPAQ relationships with (a) students' satisfaction with the program and the processes of mentoring and, (b) different psychosocial variables related to the permanence in the studies evaluated through the College Persistence Questionnaire.

Results. The one-dimensional structure of MPAQ was confirmed, as well as its factorial invariance across sex and age. The reliability obtained was also adequate. Regarding concurrent validity, significant and positive relationships with students' satisfaction with the program and the processes of mentoring, academic and social integration, institutional commitment and satisfaction with support services were found.

Discussion or Conclusion. Results highlight the MPAQ as a valid and reliable instrument for assessing peer-mentoring processes in programs for first-year university students and its potential usefulness in predicting retention after the first year of university, given its significant relationship with the psychosocial and emotional dimensions directly related to this phenomenon.

Keywords: peer mentoring; first-year university students; students experience; assessment; validation

Resumen

Introducción. Se presenta el proceso de desarrollo y validación del Cuestionario de Evaluación de los Procesos de Mentorización –CEPM- en los programas de mentorías entre iguales dirigidos a estudiantes de nuevo acceso a la universidad.

Método. En el estudio participaron 354 estudiantes de nueva incorporación a la universidad a un amplio conjunto de titulaciones de la Universidad de Valencia de las cohortes de acceso 2013-14 y 2014-15. Se analizó su estructura factorial a través de técnicas de análisis factorial exploratorio y confirmatorio. Se aplicó un análisis multigrupo con el objetivo de analizar su invarianza factorial y comprobar su equivalencia/no-equivalencia estructural en función del sexo y edad de acceso a la universidad de los participantes, comprobando también la fiabilidad de la solución factorial obtenida. Por último, se analizó la validez concurrente del CEPM a partir de examinar sus relaciones con (a) la satisfacción de los estudiantes con los procesos de mentorización y (b) con distintas variables psicosociales relacionadas con la permanencia en los estudios evaluadas a través del College Persistence Questionnaire.

Resultados. Se constató la estructura unidimensional del CEPM, sus adecuados niveles de fiabilidad, así como su invarianza factorial en función del sexo y de la edad de acceso a la universidad de los estudiantes. Con respecto a su validez concurrente, se obtuvieron relaciones significativas positivas de las puntuaciones en el CEPM con el nivel de satisfacción de los estudiantes con el programa de mentorización, con sus niveles de integración académica y social, así como con sus niveles de compromiso institucional y satisfacción con los servicios de apoyo al estudiante proporcionados por la universidad.

Discusión y conclusiones. El CEPM constituye un instrumento válido y fiable para evaluar los procesos de mentorización en los programas de mentoría a través de iguales dirigidos a estudiantes de nuevo acceso a la universidad, constatándose su validez convergente con los principales constructos psicológicos relacionados con la permanencia en los estudios universitarios.

Palabras Clave: mentorías entre iguales; estudiantes de nuevo acceso a la universidad; experiencias universitarias; evaluación; validación.

Introduction

Mentoring programs are one of the leading measures developed by university institutions to promote students' permanence in their degrees until graduation, and they are especially directed toward the most vulnerable groups and first-year university students (Crisp & Cruz, 2009). Their general objective is to offer different types of support to students to facilitate their academic and social integration, increase their institutional commitment and academic results, and, in sum, increase university retention and graduation rates (Budge, 2006). In a recent review study, Gershenfeld (2014) highlighted the varied typology and diversity of programs that fall under the general term of mentoring, pointing out a need for a greater conceptual definition and more rigorous research in this area. Thus, the more traditional programs used to incorporate university professors or technical personnel as mentors, whereas peer-mentoring programs are becoming more and more frequent, where classmates from more advanced courses act as mentors (Andrews & Clark, 2011; Jacobi, 1991).

In this study, we focus on these latter programs, defined as a process where one or more students (mentees) receive different types of support from more experienced classmates (mentors) in order to facilitate their improved academic and social functioning (Leidenfrost, Strassnig, Schabmann, Spiel & Carbon, 2011; Milne, Keating & Gabb, 2007; Topping, 2005). Thus, unlike in other programs based on the professors, in this case, students with greater experience and knowledge provide support and assistance to their mentored peers (McKellar & Kempster, 2017). The scant research results highlight that these types of programs produce positive results for both the mentors and the mentees (e.g., Budge, 2006; Crisp & Cruz, 2009; Enrich, Hansford & Tennet, 2004), and the institutions that promote them, whether in terms of their academic efficiency and efficacy or the improvement and sustainability of the services they provide to their students (Enrich et al., 2004; Leidenfrost et al., 2011).

These programs usually focus on the most vulnerable groups of students in the different educational stages and at times of special complexity in their academic development (e.g., transition and access to the university), considering their sociodemographic (e.g., mature students, minority social groups) and previous educational (e.g., pre-university preparation, university access modality) characteristics. Thus, their objectives, reach, organization, and types of support can be quite diverse, focusing on the specific academic, psychosocial, and emo-

tional needs of the target collective. However, the common defining characteristic of all of them is the emphasis on personal relationships and emotional support between mentors and mentees, as well as the accessibility and spontaneity of the communication between them, which differentiates them qualitatively from programs based on the teaching staff (Yomtov, Plunkett, Efrat & Marin, 2017).

More specifically, this study is focused on peer-mentoring programs for first-year university students, which have experienced considerable growth in recent years (Andrews & Clark, 2011; Michavila et al., 2012). These programs are especially relevant given the important academic and social changes involved in entering the university, as more than half of the cases of attrition and transfer from one degree to another occur in the first year (García-Ros & Pérez-González, 2011; García-Ros, Fuentes & Pérez-González, 2016; Villar-Aguilés, Hernández-Dobon & García-Ros, 2017). Thus, various authors point out that they are a standard characteristic of good practices to ease the transition and access to these studies (Egege & Kuthiele, 2015), promoting faster and better academic and social integration, and increase in the students' institutional commitment, and higher levels of persistence and satisfaction (Collings, Swanson & Watkins, 2015; Crisp, 2010). Recent studies show their academic and psychosocial benefits, highlighting that students who follow these programs obtain better results than those who do not (Asgari & Cartes, 2016). Students increase their feelings of integration, permanence, and identification with their university (Yomtov et al., 2017), and they present higher retention rates from the first to the second year in the different degrees (Leidenfrost et al., 2011).

The Entreiguals Program

Entreiguals® is the institutional peer-mentoring program for first-year students at the University of Valencia. The program stems from an initiative of the Student Delegation of the university, and it was designed and coordinated by the Student Information and Booster Service (in Spanish, Servicio de Información y Dinamización de Estudiantes –SEDI-). SEDI provides resources, materials, and technical support for the program, it performs the initial training of the mentors, and it carries out the program's follow-up and final assessment. Its basic objective is to ease the transition and incorporation into the university through different types of support provided by a student in more advanced cohorts of the same degree. The functions of the mentors are organized around the three areas traditionally considered in the field, relat-

ed to: (a) providing psychosocial and emotional support and (b) academic assistance and orientation, and (c) student role modeling (Jacobi, 1991). Given that the research points out that the psychosocial function is more important than career function in novice university students (Rose, 2005), and taking into account that supportive relationships are one of the most important ways to facilitate academic adjustment (Tinto, 1993, 2012), the program focuses mainly on the psychosocial and emotional dimension.

The potential mentors who voluntarily express their desire to participate in the program join it after completing five common training sessions and one specific section in each participating center to adjust the program to its characteristics and needs (e.g., volume of mentoring requests). In addition, in order to improve the results and satisfaction with the program, the main assignment criterion for mentees and mentors is that they have to be students in the same major (Lee & Bush, 2003; McLean, 2004; Terrion & Leonard, 2007). In addition, their mother tongue (Spanish or Catalan), age, and access modality to the university (e.g., baccalaureate or vocational training), as well as the organizational characteristics of certain majors (e.g., high achievement groups or groups in English), are also considered. Moreover, the mentors have a professor-tutor who gives them orientation and guidance if needed to respond to the demands of their mentees.

The mentors obtain up to 3 credits in compensation for completing the training and mentoring phases throughout the program. To earn the first 1.5 credits, they have to attend all the training sessions. Earning the second 1.5 credits is more complicated and considers three complementary criteria: (a) record of the actions taken with their mentees; (b) rating by the professor-tutor who supervised the activity; and (c) the mentees' rating of the mentoring process. Within this general framework, it is necessary to have tools with contrasted validity and reliability for the adequate assessment of the mentoring process. In addition, these tools must be easy to distribute and administer to the participants in the program, and they must be brief and simple to fill out, given that there is usually a low response rate when a lot of time has to be invested (Bean & Roszowski, 1995; Gogol *et al.*, 2014). Along these lines, few studies have focused on developing assessment instruments of traditional mentoring programs, but even fewer have dealt specifically with peer-mentoring programs (Arkün Kocadere, 2015). This study intends to address this gap.

Assessment of peer mentoring

Although there are different assessment instruments of mentoring processes based on university professors or technical personnel, to date there are no specific validated and reliable instruments designed to assess the mentors' action in peer-mentoring programs for first-year university students (Arkun Kocadere, 2015). Among the first ones, the College Student Mentoring Scale (Crisp, 2009) stands out, which assesses four dimensions related to (a) psychological and emotional support, (b) support in making academic decisions, (c) support for academic learning, and (d) the student role model. However, the high correlation between the dimensions casts doubt on their discriminant validity, showing the existence of one general underlying factor. More recently, Arkün Kocadere (2015), through the responses of 126 college students and different discussion groups with students, develops and validates an assessment scale for peer-mentoring programs designed to provide academic learning support (peer-learning or peer-tutoring programs). The resulting questionnaire includes three dimensions – contributions to the mentee, characteristics of the mentor, and peer relationships-, also revealing the adequacy of an overall score for the mentoring process in this type of program. In sum, this study stems from the need to develop assessment tools of the mentoring processes in peer-mentoring programs mainly designed to offer psychological, social, and emotional support to student mentees. These mentoring programs are commonly used to facilitate the academic and social integration of first-year university students (Andrews & Clark, 2011), and they have different objectives from those designed specifically to provide support for academic learning (Anderson & Boud, 1996, p. 15).

The initial version of the Mentoring Processes Assessment Questionnaire (MPAQ) - written and administered to participants in the study in Spanish (see Anex 1)- comes from the review study by Terrion and Leonard (2007) about the mentor characteristics that produce better results in this type of program in both the psychosocial dimensions (e.g., emotional support, personal feedback, relationship of friendship and trust) and career development (e.g., performance strategies in the university). For example, the former emphasizes the mentor's accessibility, availability, and time commitment to the mentoring tasks, whereas the latter highlights the credibility and validity of the information provided to the mentees (Ferrari, 2004).

Method

Participants

The participants in the study were 354 first-year university students who followed the *Entreiguals*® mentoring program at the University of Valencia (124 in the 2013-14 academic year and 230 in the 2014-15 academic year). The participants in the 2013-2014 academic year were distributed in 33 majors (Experimental Sciences, 18.8%; Engineering, 15.3%; Humanities, 19.4%; Social Sciences, 32%; Health, 13.9%). Of them, 41.7% were males, and 85.1% had a normal university access age (less than 20 years old) ($M = 18.92$, $SD = 5.57$, range 17-50). The participants in the 2014-15 academic year were students from 43 majors (Experimental Sciences, 19.6%; Engineering, 15.9%; Humanities, 17.1%; Social Sciences, 30.8%; Health, 16.0%). Of them, there were 234 female (66.1%) and 120 (33.9%) male participants, and 83.0% of the participants had a normal access age ($M = 19.35$, $SD = 5.0$, range 17-57).

Instruments

The initial version of the Mentoring Processes Assessment Questionnaire –MPAQ– contains nine items designed to assess the mentees' rating of their mentors' performance (see table 1) in the program during the 2013-14 academic year. The students had to indicate their degree of agreement with the items on a 5-point response scale (1 = completely disagree, 5 = completely agree). The academic integration and social integration subscales from the College Persistence Questionnaire –CPQ– (Davidson, Beck & Williams, 2009; adapted to the Spanish population by García-Ros et al., 2016) were administered together, and there was an additional question about the degree of satisfaction with the program.

In the 2014-15 academic year, the MPAQ was administered to the second group of participants, but this time along with a short version of the CPQ. This version of the CPQ evaluates six factors related to persistence in the major (academic integration, social integration, satisfaction with support services, academic conscientiousness, commitment to degree, and institutional commitment) and the same question about the degree of satisfaction with the program. The factorial validity of the short version of the CPQ was shown through confirmatory factor analysis, revealing a satisfactory level of fit to the structure of the original instrument ($SB\chi^2(173) = 304.29$, $p < .001$, NNFI = .921, CFI = .935, RMSEA = .056 [.046 - .066]) and adequate levels of reliability on the different subscales ($\alpha > .70$).

Procedure

The questionnaires were completed in both academic courses during the period between the second week in April and the first week in May. An email was sent to the mentee participants in the program, asking them to answer the questionnaires anonymously, and indicating that the objective was to analyze their degree of satisfaction with the program and obtain information to improve it in future editions. Of all the questionnaires completed, fourteen cases were eliminated due to leaving more than 20% of the questions unanswered.

Data Analysis

In order to determine the psychometric characteristics, reliability, and structural validity of the MPAQ, an exploratory factorial analysis -EFA- of principal components was initially performed with the mentees' responses in the 2013-14 academic year. To determine the number of factors, the Kaiser criterion was used, considering a saturation equal to or greater than .40 as the cutoff for assigning the items to the factors (Nunnally, 1978).

The factor solution obtained in the 2013-14 academic year was submitted to confirmatory factorial analysis -CFA- with the responses of the participants from the 2014-15 academic year. The robust maximum likelihood procedure was applied based on the Satorra-Bentler Chi-square statistic (Satorra & Bentler, 2001) and other robust alternative fit indices: the Comparative Fit Index (CFI; Bentler, 1990) and the Root Mean Square Error of Approximation (RMSEA; Hu & Bentler, 1999) with its confidence interval of 90% (CI). CFI values $\geq .90$ show a good fit (Medsker, Williams & Holahan, 1994; Marsh & Hau, 1996). RMSEA values $\leq .05$ indicate a good fit, values in the range of .05 - .08 indicate a reasonable fit, and values $> .10$ indicate a poor fit (Browne & Cudeck, 1992).

Later, a multi-group analysis was performed to examine the factorial invariance and test the equivalence/non-equivalence of its structure across the participants' sex and age (usual entrance age = 18-19 years old; late entrance = 20 years old or more). For this purpose, three nested models were considered that increased the restrictions by progressively equaling free parameters. Thus, from the base model, where each parameter was freely estimated for each group, first the equivalence of the factorial weights for the groups was fixed, and then the measurement errors. By increasing the restrictions of the parameters in each model, degrees of freedom are liberated, and the chi-squared is increased. If the $\Delta\chi^2$ (Δgl) is statistically

significant, the null hypothesis of model equivalence is rejected. However, considering the sensitivity of the $\Delta\chi^2$ to the sample size, Cheung & Rensvold (2002), based on the results obtained in an extensive simulation study, proposed examining the invariance through the change in CFI, so that $|\Delta\text{CFI}| < .01$ “indicates that the null hypothesis of equivalence should not be rejected” (p. 251).

The reliability of the subscales was determined through their internal consistency (Cronbach’s alpha). Finally, the relationships between the resulting scales and the CPQ dimensions and satisfaction with the program were calculated through Pearson’s correlation index (bilateral).

Results

Exploratory factor analysis

Before performing the EFA with the participants’ responses in the 2013-14 academic year, various indicators were considered to guarantee the data’s adequacy for this type of analysis. The values of the inter-item correlations matrix determinant (value of .001), the Bartlett Sphericity Test ($\chi^2_{36} = 477.5, p < .001$), and the sample fit indexes ($KMO = .89$) indicated its relevance.

Table 1 presents the basic descriptive statistics, the asymmetry, kurtosis, and communality indices of the initial elements of the MPAQ. Although item 4 showed a communality index of .103, we decided to keep it in the EFA. The results highlight the existence of an underlying dimension (eigenvalue of 5.14) that explains 57.11% of the variance in the participants’ responses. All the items showed factor saturations above .40, except the aforementioned item 4, which was eliminated in later analyses. The resulting scale showed adequate levels of reliability ($\alpha = .91$) and significant relationships with Academic Integration ($r = .22, p < .05$) and Social Integration ($r = .32, p < .01$) from the CPQ, and with the level of satisfaction with the program ($r = .81, p < .001$).

Table 1. *Descriptive statistics, asymmetry, kurtosis, and communality indices, and factorial saturation of the items on the initial version of the MPAQ*

<i>Items My mentor...</i>	<i>Mean</i>	<i>s.d.</i>	<i>Asymmetry</i>	<i>Kurtosis</i>	<i>h²</i>	<i>Factor Saturation</i>
1.- has always been accessible and available when I needed him/her	4.33	.926	-1.584	2.497	.630	.794
2.- has adequately structured and organized the mentoring process	3.87	1.056	-.740	.008	.747	.864
3.- had enough experience and knowledge about the university and my major	4.15	.950	-1.135	1.163	.620	.787
4.- did NOT respect my view and perspective of the problems	1.91	1.362	1.195	-.016	.103	-.031
5.- has shown a high level of involvement and enthusiasm	3.77	1.186	-.810	-.030	.691	.831
6.- has usually been able to put him/herself in my place when I have pointed out questions and difficulties	3.96	1.015	-1.026	1.051	.696	.834
7.- has encouraged me to solve my own problems	3.67	1.220	-.646	-.447	.418	.646
8.- has been completely honest with me	3.85	1.063	-.859	.611	.613	.783
9.- has been a "model" for how to behave in the university	3.88	1.184	-1.025	.341	.724	.851

Confirmatory factor analysis–CFA–

In order to determine the structural validity of the one-factor solution, after removing the item 4 that showed an inadequate functioning and renumbering the remaining eight items, a CFA was carried out using the robust maximum likelihood method with the participants' responses in the 2014-15 academic year. All the indices considered showed the adequate fit of the one-factor model to the data - $SB\chi^2(20) = 31.8$, $p = .045$; NNFI = .981; CFI = .993; RMSEA = .050, 90% CI = .007 - .081. In addition, all of the items showed high and significant saturations at .001, in a range between .61 and .94 (figure 1).

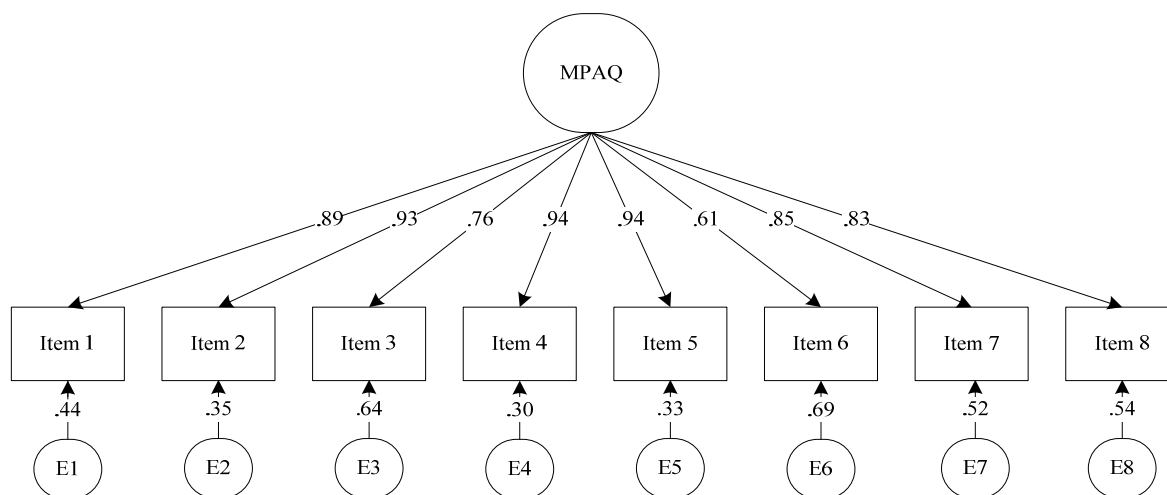


Figure 1. Results of the CFA on the final version of the MPAQ

Multi-group analysis

The results of the multi-group analysis confirmed the equivalence of its one-factor structure with regard to the variables sex and age of entrance to the university, with a decrease in CFI ($|\Delta\text{CFI}| < .01$). Therefore, it can be observed that from the base model (Tr_0), the factorial saturation of the items does not differ between the groups (Tr_1 , $\Delta\text{CFI}_{\text{sex}} < .01$; $\Delta\text{CFI}_{\text{age}} < .01$), and the measurement errors do not affect them differentially (Tr_2 , $\Delta\text{CFI}_{\text{sex}} < .01$; $\Delta\text{CFI}_{\text{age}} < .01$) (see Table 2).

Table 2. Multi-sample analysis by sex and age

MODEL	SB- χ^2	gl	NNFI	RMSEA [IC*90%]	CFI	ΔCFI
<i>Sex (men vs. women)</i>						
Tr0. Theoretical multi-sample	48.13	40	.99	.03 [.00 - .06]	.99	<.01
Tr1. Equal factorial saturation	57.18	47	.99	.03 [.00 - .06]	.99	<.01
Tr2. Equal variance of errors	60.55	56	.99	.02 [.00 - .05]	.99	<.01
<i>Age (18-19 vs. ≥ 20 years)</i>						
Tr0. Theoretical multi-sample	59.43	40	.98	.05 [.02 - .07]	.98	<.01
Tr1. Equal factorial saturation	70.55	47	.98	.05 [.02 - .07]	.98	<.01
Tr2. Equal variance of errors	84.84	56	.98	.05 [.02 - .07]	.98	<.01

* CI: Confidence interval of the RMSEA statistic for 90%.

Reliability and concurrent validity

The results also highlight the MPAQ's adequate internal consistency ($\alpha = .95$), a high level of association with satisfaction with the program ($r = .75, p < .001$), and a significant relationship with four dimensions of the CPQ. More specifically, it shows significant relationships with Academic Integration ($r = .24, p < .001$), Social Integration ($r = .28, p < .001$), Institutional Commitment ($r = .17, p < .05$), and Satisfaction with Support Services ($r = .43, p < .001$). This is not the case for Degree Commitment and Academic Conscientiousness (in both cases, $r = .04, p > .05$).

Discussion

This study presents the development and validation process of an instrument to assess the mentoring processes in peer-mentoring programs for first-year university students. Its objective responds to the lack of assessment instruments in this area, despite the pronounced increase in these types of programs in recent years (Andrews & Clark, 2011; Michavila et al., 2012) and their consideration as a key element in models of good practices to ease the transition and incorporation into the university (Collings et al., 2015; Crisp, 2010).

Using a sample of first-year university students with a wide variety of majors, the study has shown the psychometric and factorial validity of the MPAQ, revealing its one-factor structure. Moreover, the results have also shown its factorial invariance across the participants' sex and entrance age, highlighting its suitability to evaluate the mentoring processes in a similar way and with the same precision in the groups established, and guaranteeing the correct interpretation of the potential differences between them based on these variables and not on the characteristics of the measurement instrument. Thus, the factorial saturations of the items in one general mentoring factor, the values of the different fit indices considered, and the levels of reliability obtained, show that it provides a valid and reliable score for the students' rating of the mentoring processes experienced throughout the program.

The results have also shown the concurrent validity of the MPAQ with different psychosocial dimensions closely related to permanence in face-to-face and on-line university studies (Davidson et al., 2009; Beck & Milligan, 2014; García-Ros, Pérez-González, Cavas-Martínez & Tomás, 2018a, 2018b). Thus, it shows a high relationship with satisfaction with the program, medium with satisfaction with students support services provided by the univer-

sity, and medium-low with feelings of belonging and identification with the university (institutional commitment) and satisfaction with the knowledge and instructional methodology used in the degree (academic integration). However, its relationship with degree commitment and academic conscientiousness (e.g., academic dedication or class attendance) is not significant. These results converge with those obtained in previous studies highlighting that these types of programs promote the academic and social integration of the students and increase their institutional commitment and levels of persistence and satisfaction with their studies (Collings et al., 2015; Crisp, 2010). Additionally, despite their correlational nature, these results highlight the potential usefulness of the MPAQ in predicting retention after the first year of university, given its significant relationship with the psychosocial and emotional dimensions directly related to this phenomenon (Tinto, 2012).

Although there is a need to further examine the validation process of this instrument to determine its usefulness with different collectives of students (e.g., with permanent educational needs) and in different university institutions, this study shows that the MPAQ is a scale with contrasted validity and reliability to evaluate mentoring processes in peer-mentoring programs for first-year university students. Moreover, the scores the students obtain are related to the most relevant psychosocial dimensions for promoting academic persistence. Finally, we think these results make it possible to incorporate relevant information that can improve mentors' training, highlighting aspects assessed with the MPAQ in the training sessions and their relationship with mentees' satisfaction with the *Entreiguals*® program, as well as with the social and academic integration of first-year university students. In addition, the results also provide additional criteria for the selection of program mentors through the evaluation of their motivations and attitudes related to the aspects assessed by the questionnaire. Finally, the MPAQ can also help to improve the follow-up of the mentoring processes throughout the program, by administering it to mentees at different time points during the academic course and determining their final satisfaction with its development.

References

- Anderson, G., & Boud, D. (1996). Extending the role of peer learning in university courses. *Research and Development in Higher Education*, 19, 15-19.

- Andrews, J., & Clark, R. (2011). *Peer mentoring works! How peer-mentoring enhances student success in higher education*. The Higher Education Academy: Aston University.
- Arkün Kocadere, S. (2015). The development of a scale on assessing peer mentoring at the college level. *Mentoring & Tutoring*, 23, 328-340. doi: [10.1080/13611267.2015.1090283](https://doi.org/10.1080/13611267.2015.1090283)
- Asgari, S., & Carter, F. (2016). Peer mentors can improve academic performance: A quasi-experimental study of peer mentorship in introductory courses. *Teaching of Psychology*, 43, 131-135. doi: 10.1177/0098628316636288
- Bean, A. G., & Roszkowski, M. J. (1995). The long and short of it. *Marketing Research*, 7, 21-25.
- Beck, H. P., & Milligan, M. (2014). Factors influencing the institutional commitment of online students. *The Internet and Higher Education*, 20, 51-56. doi: [10.1016/j.iheduc.2013.09.002](https://doi.org/10.1016/j.iheduc.2013.09.002)
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238-246. doi: [10.1037/0033-2909.107.2.238](https://doi.org/10.1037/0033-2909.107.2.238)
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, 21, 230–258. doi: 10.1177/0049124192021002005
- Budge, S. (2006). Peer mentoring in postsecondary education: Implications for research and practice. *Journal of College Reading and Learning*, 37, 71-85. doi: [10.1080/10790195.2006.10850194](https://doi.org/10.1080/10790195.2006.10850194)
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233–255. doi: [10.1207/S15328007SEM0902_5](https://doi.org/10.1207/S15328007SEM0902_5)
- Collings, R., Swanson, V., & Watkins, R. (2014). The impact of peer mentoring on levels of student wellbeing, integration and retention: a controlled comparative evaluation of residential students in UK higher education. *Higher Education*, 68, 927-942. doi: 10.1007/s10734-014-9752-y
- Crisp, G. (2009). Conceptualization and initial validation of the College Student Mentoring Scale (CSMS). *Journal of College Student Development*, 50, 177-194. doi: [10.1353/csd.0.0061](https://doi.org/10.1353/csd.0.0061)
- Crisp, G. (2010). The impact of mentoring on the success of community college students. *The Review of Higher Education*, 34, 39-60. doi: [10.1353/rhe.2010.0003](https://doi.org/10.1353/rhe.2010.0003)

- Crisp, G., & Cruz, I. (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education*, 50, 525-545. doi: 10.1007/s11162-009-9130-2
- Davidson, W. B., Beck, H. P., & Milligan, M. (2009). The college persistence questionnaire: Development and validation of an instrument that predicts student attrition. *Journal of College Student Development*, 50, 373-390. doi: [10.1353/csd.0.0079](https://doi.org/10.1353/csd.0.0079)
- Egege, S., & Kutieleh, S. (2015). Peer mentors as a transition strategy at University: Why mentoring needs to have boundaries. *Australian Journal of Education*, 59, 265-277. doi: 10.1177/0004944115604697
- Ehrich, L. C., Hansford, B., & Tennent, L. (2004). Formal mentoring programs in education and other professions: A review of the literature. *Educational Administration Quarterly*, 40, 518-540. doi: 10.1177/0013161X04267118
- Ferrari, J. R. (2004). Mentors in life and at school: Impact on undergraduate protégé perceptions of university mission and values. *Mentoring & Tutoring*, 12, 295-307. doi: [10.1080/030910042000275909](https://doi.org/10.1080/030910042000275909)
- García-Ros, R., & Pérez-González, F. (2011). Validez predictiva e incremental de las habilidades de autorregulación sobre el éxito académico en la universidad. *Revista de Psicodidáctica*, 16, 231-250. doi: [10.1387/RevPsicodidact.1002](https://doi.org/10.1387/RevPsicodidact.1002)
- García-Ros, R., Fuentes, M.C., & Pérez-González, F. (2016, June). *Validación inicial de una adaptación española del College Persistence Questionnaire*. [Spanish initial validation of the College Persistence Questionnaire]. VIII International Congress of Psychology and Education, p. 2010-11. Scientific Association of Psychology and Education, Alicante (Spain).
- García-Ros, R., Pérez-González, F., Cavas-Martínez, F. & Tomás, J. M. (2018a). Social interaction learning strategies, motivation, first-year students' experiences and permanence in university studies. *Educational Psychology*, 38, 451-469. doi: 10.1080/01443410.2017.1394448
- García-Ros, R., Pérez-González, F., Cavas-Martínez, F. & Tomás, J. M. (2018b). Effects of pre-college variables and first-year engineering students' experiences on academic achievement and retention: a structural model. *International Journal of Technology and Design Education*. <https://doi.org/10.1007/s10798-018-9466-z>
- Gershenfeld, S. (2014). A review of undergraduate mentoring programs. *Review of Educational Research*, 84, 365-391. doi: 10.3102/0034654313520512

- Gogol, K., Brunner, M., Goetz, T., Martin, R., Ugen, S., Keller, U., ..., & Preckel, F. (2014). "My questionnaire is too long!" The assessments of motivational-affective constructs with three-item and single-item measures. *Contemporary Educational Psychology*, 39, 188-205. doi: [10.1016/j.cedpsych.2014.04.002](https://doi.org/10.1016/j.cedpsych.2014.04.002)
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55. doi: [10.1080/10705519909540118](https://doi.org/10.1080/10705519909540118)
- Jacobi, M. (1991). Mentoring and undergraduate academic success: A literature review. *Review of Educational Research*, 61, 505-532. doi: 10.3102/00346543061004505
- Lee, L. M., & Bush, T. (2003). Student mentoring in higher education: Hong Kong Baptist University. *Mentoring & Tutoring*, 11, 263-271. doi: [10.1080/1361126032000138319](https://doi.org/10.1080/1361126032000138319)
- Leidenfrost, B., Strassnig, B., Schütz, M., Carbon, C. C., & Schabmann, A. (2014). The impact of peer mentoring on mentee academic performance: Is any mentoring style better than no mentoring at all? *International Journal of Teaching and Learning in Higher Education*, 26, 102-111.
- Marsh, H. W., & Hau, K. T. (1996). Assessing goodness of fit: Is parsimony always desirable? *Journal of Experimental Education*, 64, 364–390. doi: [10.1080/00220973.1996.10806604](https://doi.org/10.1080/00220973.1996.10806604)
- McKellar, L., & Kempster, C. (2017). We're all in this together: Midwifery student peer mentoring. *Nurse Education in Practice*, 24, 112-117. doi: [10.1016/j.nepr.2015.08.014](https://doi.org/10.1016/j.nepr.2015.08.014)
- McLean, M. (2004). Does the curriculum matter in peer mentoring? From mentee to mentor in problem-based learning: A unique case study. *Mentoring & Tutoring*, 12, 173-186. doi: [10.1080/1361126042000239929](https://doi.org/10.1080/1361126042000239929)
- Medsker, G. J., Williams, L. J., & Holahan, P. J. (1994). A review of current practices for evaluating causal-models in organizational-behavior and human resources management research. *Journal of Management*, 20, 439–464. doi: 10.1177/014920639402000207
- Michavila, F., García, J., Martínez, J., Merhi, R., Esteve, F., & Martínez, A. (2012). *Análisis de las políticas y estrategias de acogida e integración de los estudiantes de nuevo ingreso en las universidades españolas*. Madrid: Ministerio de Educación, Cultura y Deporte. Retrieved 28-9-2016 <http://www.catedraunesco.es/>
- Milne, L., Keating, S., & Gabb, R. (2007). *Student peer mentoring at Victoria University*. Postcompulsory Education Centre: Victoria University. Retrieved 10-9-2016

http://tls.vu.edu.au/portal/site/research/resources/student_peer_mentoring_at_VU_fin_al_report.pdf.

- Nunnally, J. (1978). *Psychometric theory*. NY: McGraw-Hill
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66, 507–514. doi: 10.1007/BF02296192
- Terrion, J. L., & Leonard, D. (2007). A taxonomy of the characteristics of student peer mentors in higher education: Findings from a literature review. *Mentoring & Tutoring*, 15, 149-164. doi: [10.1080/13611260601086311](https://doi.org/10.1080/13611260601086311)
- Tinto, V. (1993). *Leaving college: Rethinking the cause and cures of student attrition* (2nd edition). Chicago: University of Chicago
- Tinto, V. (2012). *Completing college: Rethinking institutional action*. Chicago: University of Chicago Press.
- Topping, K. J. (2005). Trends in peer learning. *Educational Psychology*, 25(6), 631-645. doi: [10.1080/01443410500345172](https://doi.org/10.1080/01443410500345172)
- Villar-Aguilés, A., Hernández-Dobon, J.F., & García-Ros, R. (2017). Relocating within the university. Proposal of a relocation rate based on a study of educational trajectories. *Electronic Journal of Educational Research, Assessment and Evaluation*, 23(1), art. 5. doi: [10.7203/relieve.23.1.9059](https://doi.org/10.7203/relieve.23.1.9059)
- Yomtov, D., Plunkett, S. W., Efrat, R., & Marin, A. G. (2017). Can peer mentors improve first-year experiences of university students? *Journal of College Student Retention: Research, Theory & Practice*, 19, 25-44. doi: 1521025115611398.

Anex 1. *Mentoring Processes Assessment Questionnaire –MPAQ-: Spanish initial version administered in the study (Cuestionario de Evaluación de Procesos de Mentorización).*

Mentoring Processes Assessment Questionnaire: Spanish initial version administered in the study translated into English.

Please indicate how much you agree or disagree with the following statements about the figure of your mentor. Answer with sincerity using the following response scale.

1	2	3	4	5
Completely disagree	Disagree	Neutral	Agree	Completely agree

My mentor ...

1. Has always been accessible and available when I needed him/her.	1	2	3	4	5
2. Has adequately structured and organized the mentoring process	1	2	3	4	5
3. Had enough experience and knowledge about the university and my major.	1	2	3	4	5
4. Did NOT respect my view and perspective of the problems.	1	2	3	4	5
5. Has shown a high level of involvement and enthusiasm	1	2	3	4	5
6. Has usually been able to put him/herself in my place when I have pointed out questions and difficulties	1	2	3	4	5
7. Has encouraged me to solve my own problems	1	2	3	4	5
8. Has been completely honest with me	1	2	3	4	5
9. Has been a “model” for how to behave in the university	1	2	3	4	5
