



## Evaluation of hybrid and distance education learning environments in Spain

Rosario Ferrer-Cascales  
University of Alicante

Scott L. Walker  
Northwest Vista College

Abilio Reig-Ferrer, María Dolores Fernández-Pascual,  
Natalia Albaladejo-Blázquez  
Universidad de Alicante

This article describes the adaptation and validation of the *Distance Education Learning Environments Survey* (DELES) for use in investigating the qualities found in distance and hybrid education psycho-social learning environments in Spain. As Europe moves toward post-secondary student mobility, equanimity in access to higher education, and more standardised degree programs across the European Higher Education Area (EHEA) the need for a high quality method for continually assessing the excellence of distance and hybrid learning environments has arisen. This study outlines how the English language DELES was adapted into the new *Spanish-Distance Education Learning Environments Survey* (S-DELES) for use with a Bachelor of Psychology and Criminology degree program offering both distance and hybrid education classes. We present the relationships between psycho-social learning environment perceptions and those of student affect. We also present the asynchronous aspects of the environment, scale means, and a comparison between the perceptions of distance education students and their hybrid education counterparts that inform the university about the baseline health of the information and communication technologies (ICT) environment within which the study was conducted.

### Introduction

Spanish post-secondary higher education is facing major challenges related to changes required for becoming part of the European Higher Education Area (EHEA). The EHEA is a cohesive, 46-country area derived from the 1999 Bologna Declaration that aims to unite the higher education institutions in multiple countries into providing increased student mobility, equal educational access, a standard Bachelor-Master-Doctorate degree structure, cooperation in quality assurance, and national education reform within the geographical area. A component of this reform effort is for institutions to introduce transfer credit programs, appropriate resource distribution, and organisational management processes that include teaching and learning feedback (Gvaramadze, 2008).

In certain Spanish universities the transformation of instructional methods has been highlighted as a key factor in adapting to propositions for a transformed university system aimed at European convergence. Universities in Spain have discovered the

need to adapt to a profile to “consider and manage education from the perspective of those involved in the learning process, and in this sense university teachers must shift from being mere transmitters of knowledge to become facilitators of information, resources and learning strategies” (Ferrer-Cascales, et al., 2010, p. 1). This is particularly true in the use of information and communication technologies (ICT) in Spanish post-secondary education, due to the nature of increasing usage of the Internet for instructor-student communication. The Internet and the variety of ICT tools used in education in today’s paradigm offer a new space within which university instructors must work. The network and associated tools have become prominent in supporting the teaching-learning process, thus this space as it is utilised today exceeds prior physical and temporal confines, making it necessary to introduce new instructional methods (Pérez, 2007) so universities in Spain, and elsewhere, can progressively adapt to the demands of the EHEA, as well as improve the quality of the education experienced by students.

Nevertheless, in order to enhance and assure quality, the methods by which instructors are communicating with students must be evaluated. Additionally, evaluation must also focus on more than student outcomes and teaching methods. It must take into consideration the psychological and social learning environment, otherwise referred to as “classroom climate” (Fraser, 1986, p. 1) or “classroom learning environment” (Goh & Khine, 2002, p. ix), found within the ICT spaces where education happens in distance and hybrid learning scenarios. And, it is our assertion that this should be done from the perspective of the recipient — the student.

This paper presents a study at the University of Alicante (Spain) whereby students’ perceptions of their digital learning environments were considered through a psychosocial learning environment framework. At question are the qualities found in the learning environments established in distance and hybrid education. We present the method by which we have begun to capture student perceptions through the development and adaptation of an established psychosocial learning environments instrument and the results of the analyses regarding our students’ perceptions of their learning environments. We present what we have identified as areas that have strong results, as well as areas that need consideration for the improvement of the quality of education in our distance and hybrid education program offerings. Finally, we discuss our outcomes and offer suggestions for further research in both our program, the EHEA in general, and in the international arena.

## Background

In the second half of the 1990s many post-secondary institutions adopted the use of asynchronous ICT platforms for teaching and learning communication (Desai, Hart & Richards, 2008). A variety of terms have been used in relation to this method of instruction to include, but are not limited to: *e-learning*, *distance learning*, *online education*, *virtual learning*, and so on. Rosenberg (2001) stated that there are three criteria to be met in order to correctly apply these terms related to distance learning: a) it is performed within a computer network, allowing immediate updating, storage, retrieval, distribution, and sharing of content and information, b) it is accessed by the end user through a computer using standard Internet technology, and c) it focuses on the broadest view of learning solutions that go beyond traditional paradigms of education. On the other hand, the notion of *hybrid learning*, that also utilises asynchronous ICT, also comes with a variety of titles such as: *blended learning*, *flexible*

*learning, technology-enhanced education, web-enhanced classes, etc.* (Muirhead, 2005). This genera of education can be defined as learning where the learner and the educational resources are not in the same physical space all of the time (Bartolomé, 2004; Muirhead, 2005), regardless of the exact structure or schedule of the educational situation, which differs greatly from one post-secondary setting to another.

For the sake of consistent terminology, in this paper we use the term *distance education* in reference to asynchronous educational activities where the students and the instructors do not exchange communication or participate in educational activities in a face to face environment. All educational interaction is conducted using a web-based learning platform. We use the term *hybrid education* in reference to any scenario where face to face educational activities are conducted in conjunction with asynchronous educational activities.

In addition to making clear the definitions we are using, it is also pertinent to differentiate approaches from which we can assess the quality distance and hybrid education. According to Sangrá (2001) one could argue that there are two major trends in the practices of assessing the quality of institutions providing virtual learning environments for their students: 1) the *partial approach* focusing primarily on individual components such as educational activities, materials, technology platforms, and the cost/benefit of the activities, and 2) the *holistic approach* that focuses on systems, models, learning environments, and quality standards.

For the study presented here, we are taking a holistic approach with specific consideration toward the psychosocial learning environment. Learning environments studies capture education participants' perspectives of the psychosocial environments in which they participate on a day to day basis. As participants deeply involved in classroom environments, students and instructors have unique viewpoints of what goes on in that environment (Walker, 2003). Capturing student perspectives and considering those perspectives in relation to observations of external investigators is the essence of learning environments research. In order to capture student perspectives, survey instruments are commonly utilised in learning environments research. We reviewed eight prominent hybrid/distance education learning environment instruments (Table 1) in terms of their scales and the potential adaptability of the instrument/scales for use with our population and investigatory goals. We settled on the *Distance Education Learning Environments Survey* (DELES) (Walker & Fraser, 2005) as our framework due to the nature of its strengths in global adaptations, as well as language adaptations. The DELES has consistently held up well in terms of validity and reliability in 27 independent studies, including studies where the instrument has been translated into Mandarin, Turkish and Arabic (Liang, 2006; Özkök, Walker & Büyüköztürk, 2009; Shehab, 2007) and modified for use in Malaysia (Ng, 2009) and Palestine (Azaiza, 2010).

## **Research method**

### **Study population**

The population studied in this investigation consisted of 176 students enrolled in distance education and hybrid classes in the Department of Health Psychology at the University of Alicante. The classes were part of the Bachelor of Psychology and Criminology program. The distance education participants made up 56% of the population, while 44% of the population was enrolled in hybrid classes.

Table 1: Instruments for evaluating teaching-learning time and distance

Instrument	Reference
Online Communities of Inquiry	Bangert, A. (2009). Building a validity argument for the community of inquiry survey instrument. <i>The Internet and Higher Education</i> , 12(2), 104-111. <a href="http://dx.doi.org/10.1016/j.iheduc.2009.06.001">http://dx.doi.org/10.1016/j.iheduc.2009.06.001</a>
Distance Education Learning Environments Survey	Walker, S. L. & Fraser, B. J. (2005). Development and validation of an instrument for assessing distance education learning environments in higher education: The Distance Education Learning Environments Survey (DELES). <i>Learning Environments Research</i> , 8(3), 289-308. <a href="http://dx.doi.org/10.1007/s10984-005-1568-3">http://dx.doi.org/10.1007/s10984-005-1568-3</a>
Distance and Open Learning Environment Scale	Fraser, B. J. (1998). Classroom environment instruments: Development, validity and application. <i>Learning Environments Research</i> , 1, 7-34. <a href="http://dx.doi.org/10.1023/A:1009932514731">http://dx.doi.org/10.1023/A:1009932514731</a>
Hexagonal E-Learning Assessment Model	Ozkan, S., Kosel, R. & Baikal, N. (2009). Evaluating learning management systems: Adoption of hexagonal e-learning assessment model in higher education. <i>Transforming Government: People, Process and Policy</i> , 3(2), 111-130. [URL not found 20 Nov 2011]
Learners' Views on Blended Learning	Akkoyunlu, B., & Yilmaz-Soylu, M. (2008). Development of a scale on learners' views on blended learning and its implementation process. <i>The Internet and Higher Education</i> , 11(1), 26-32. <a href="http://dx.doi.org/10.1016/j.iheduc.2007.12.006">http://dx.doi.org/10.1016/j.iheduc.2007.12.006</a>
Online Learning Environment Survey	Pearson, J. & Trinidad, S. (2005). OLES: An instrument for refining the design of e-learning environments. <i>Journal of Computer Assisted Learning</i> , 21, 396-404. <a href="http://dx.doi.org/10.1016/10.1111/j.1365-2729.2005.00146.x">http://dx.doi.org/10.1016/10.1111/j.1365-2729.2005.00146.x</a>
Online Self-regulated Learning Questionnaire	Barnard, L., Lan, W., To, Y., Paton, V. & Lai, S. (2008). Measuring self-regulation in online and blended learning environments. <i>The Internet and Higher Education</i> , 12(1), 1-6. <a href="http://dx.doi.org/10.1016/j.iheduc.2008.10.005">http://dx.doi.org/10.1016/j.iheduc.2008.10.005</a>
Technology-Rich Outcomes-Focused Learning Environment Inventory	Aldridge, J., Dorman, J. & Fraser, B. J. (2004). Use of multitrait-multimethod modelling to validate actual and preferred forms of the Technology-Rich Outcomes-Focused Learning Environment Inventory (TROFLEI). <i>Australian Journal of Educational &amp; Development Psychology</i> , 4, 110-125. <a href="http://www.eric.ed.gov/PDFS/EJ815557.pdf">http://www.eric.ed.gov/PDFS/EJ815557.pdf</a>

### Survey instrument and administration

The Distance Education Learning Environment Survey (DELES) formed the basis of our survey instrument. The English-language version of the DELES was translated into Spanish and then back translated. The survey instrument consists of 34 items, each with five response options of *Always*, *Often*, *Sometimes*, *Seldom*, and *Never*, measuring six psychosocial scales of: (1) instructor support, (2) interaction and collaboration among students, (3) personal relevance of the class work, (4) authentic learning, (5) active learning, (6) student autonomy. Added to the instrument was a preceding section designed to capture student demographics. Additional scales regarding the asynchronous environment and satisfaction were included to provide feedback regarding students' study situation perceptions and affect perceptions.

The instrument, referred to as the *Spanish Distance Education Learning Environments Survey* (S-DELES) herewith, was administered in May 2010, via the world wide web over a 15-day period in which students responded anonymously. Data were captured and downloaded in a spreadsheet file ready for analysis. Analyses were conducted with the statistical program *PASW Statistics 18.0*.

## Results

This section discusses the results of the S-DELES; first presenting participant demographics followed by learning environment descriptive outcomes, then results of analyses exploring scale associations and comparison of means in terms of two study groups — the distance education students and the hybrid education students.

### Participant demographics

Fifty-two percent of the students enrolled in our hybrid education classes responded to the survey, while 51% of the distance education students responded. Table 2 presents a demographic overview of the participant population.

Table 2: Participant demographics

	Hybrid students (n=72)	Distance education students (n=92)
Age range	20-54	
Mean age	30 years old	35 years old
Male students	24%	48%
Female students	76%	52%
Spanish nationality	100%	100%
Married students	25%	47%
Students with children	19%	35%
Full time employed	59%	78%
"Good" to "Very good" economic status	60%	61%

### Learning environment, affect, and asynchrony scale results

The six S-DELES scales of *Instructor support*, *Student-to-student interaction*, *Relevance*, *Authentic learning*, *Active learning*, and *Autonomy* were analysed with the affect scale of *Student satisfaction* and *Asynchrony* in order to assess the psychosocial quality of the distance education and hybrid education environments from the perspective of the enrolled students. Of the 176 original responses 164 were usable. The results from the entire population of hybrid students and distance education students ( $N=164$ ) were tested for reliability using Cronbach's alpha, demonstrating  $\alpha = 0.93$ . The same measure was applied to the hybrid student sample alone ( $n=72$ ) resulting in  $\alpha = 0.95$ , while the distance education students alone ( $n = 92$ ) resulted in  $\alpha = 0.93$ .

The first examination we conducted was a simple descriptive analysis to demonstrate scale mean and standard deviation. This analysis offers the opportunity to see how students perceive their learning environment on each of the psychosocial scales, the scale of *Satisfaction*, and the scale of *Asynchrony*. Given that the response scale values are *Always* = 5, *Often* = 4, *Sometimes* = 3, *Seldom* = 2, and *Never* = 1, the higher a scale's response value in Figures 3 and 4, and Tables 2 and 3, the stronger, or more positive, the students view their learning environment, satisfaction, and asynchrony.

It is apparent that students in the distance learning classes (Figure 1 and Table 3) view student-to-student interaction as low ( $M = 2.2$ ) in the online environment, while they view the other areas measured as often occurring. Similarly, students in the hybrid classes find interaction occurring less ( $M = 3.6$ ) than the other areas measured, yet not as low as those views of the distance education students. The asynchronous nature of

these education models appear to be most highly valued by students in both groups,  $M = 4.5$  in the distance education population and  $M = 4.6$  among the hybrid class population.

While it may be evident that there are subtle differences in perspectives between the distance education and hybrid education students on most scales, and an obvious one on the scale of *Interaction*, we conducted an independent samples *t*-test in order to investigate any potentially significant differences between the two groups. We discovered that, while both groups of students find student-to-student interaction to be lowest of the scales measured, there is a statistically significant difference between the groups ( $t = 12.45, df = 10, p = .000$ ) on the scale of *Interaction*, likely due to the fact that a hybrid class will naturally have more interaction in its face to face component than would occur in a purely distance education scenario.

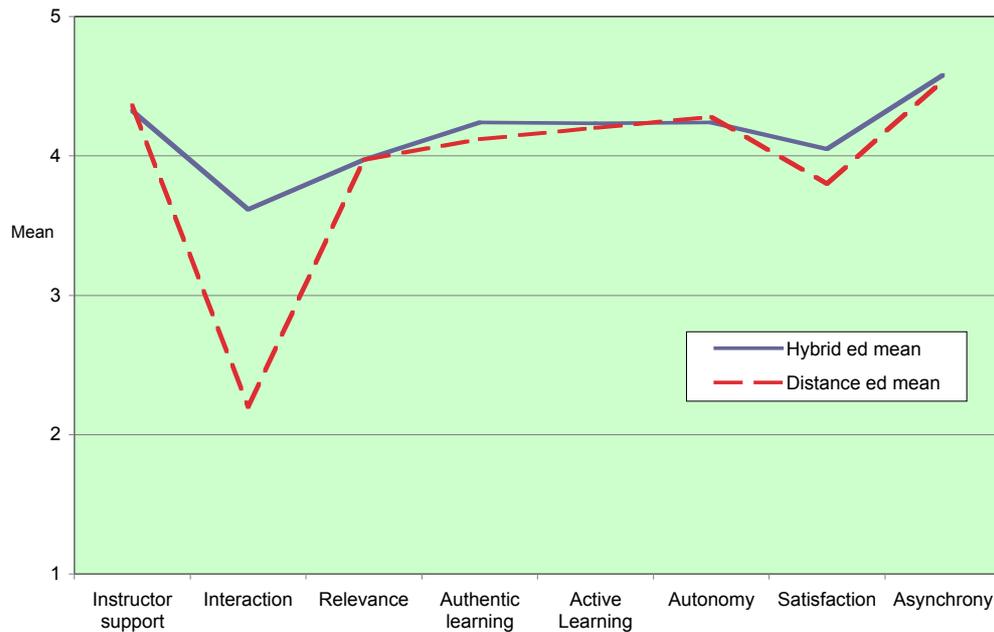


Figure 1: Scale means for distance and hybrid education

Table 3: Scale means and standard deviations for the distance education population

	Instructor support	Interaction	Relevance	Authentic learning	Active learning	Autonomy	Satisfaction	Asynchrony
Distance mean	4.36	2.20	3.97	4.12	4.20	4.28	3.80	4.54
SD	0.11	0.26	0.14	0.15	0.17	0.11	0.42	0.13
Hybrid mean	4.32	3.61	3.97	4.24	4.23	4.24	4.05	4.58
SD	0.20	0.09	0.18	0.11	0.05	0.11	0.17	0.16

After examining scale means we analysed the data with simple bivariate correlation analyses in search of associations between the six psychosocial learning environment scales and the scales of *Satisfaction* and *Asynchrony*. First we analysed the distance

education student group (Table 4) independently and then the hybrid student group (Table 5) independently.

Table 4: Associations between scales using simple correlation analysis for distance education classes

	Inter-action	Relevance	Authentic learning	Active learning	Autonomy	Satisfaction	Asynchrony
Instructor support	-.075	-.382	-.167	-1.000**	.645	-.158	.165
Interaction		.779	-.976**	-.500	-.756	-.116	.470
Relevance			-.764	.500	-.845	.190	.095
Authentic learning				.500	.645	.327	-.477
Active learning					-.500	.500	-.629
Autonomy						.423	-.142
Satisfaction							.401

\*\*  $p < 0.01$ ,  $n = 92$

The strongest positive associations we found in the distance education population were between *Instructor support* and student *Autonomy* ( $r = 0.65$ ,  $p = 0.24$ ), and *Instructor support* and *Authentic learning* ( $r = 0.65$ ,  $p = 0.23$ ). Just as revealing though were the negative associations between *Instructor support* and *Active learning* ( $r = -1.0$ ,  $p = 0.000$ ), and *Student interaction* and *Authentic learning* ( $r = -0.98$ ,  $p = 0.004$ ). Student *Satisfaction* in distance education in this study appears to be most strongly associated with *Active learning* ( $r = 0.50$ ) and *Autonomy* ( $r = 0.42$ ), yet neither are statistically significant.

Table 5: Associations between scales using simple correlation analysis for hybrid classes

	Inter-action	Relevance	Authentic learning	Active learning	Autonomy	Satisfaction	Asynchrony
Instructor support	.520	-.340	-.564	.277	-.809	-.746*	.323
Interaction		-.164	.294	1.000**	-.686	-.959**	.068
Relevance			-.160	-.189	-.046	.184	-.933*
Authentic learning				.866	.423	-.235	.320
Active learning					-.866	-1.000**	.500
Autonomy						.774	-.080
Satisfaction							-.210

\*\*  $p < 0.01$ , \*  $p < 0.05$ ,  $n = 72$

Hybrid education students seem to have an altogether different set of perspectives related to the psychosocial learning environment in that there was a perfect association between *Active learning* and *Interaction* among students ( $r = 1.0$ ,  $p = 0.000$ ). Also significant, yet in a negative direction, were the associations between *Satisfaction* and *Instructor support* ( $r = -0.75$ ,  $p = 0.034$ ), *Interaction* between students ( $r = -0.96$ ,  $p = 0.002$ ), and *Active learning* ( $r = -1.0$ ,  $p = 0.000$ ). *Autonomy* appears to have the greatest association with *Satisfaction* ( $r = 0.77$ ,  $p = 0.125$ ), yet only practically significant.

## Discussion

The overarching purpose behind this study was to establish a sound method for investigating the qualities found in the learning environments established in distance and hybrid education, in order to address institutional changes required to meet the standards of the European Higher Education Area (EHEA). We have done this successfully and from this study have (1) adopted and modified an instrument to

allow us to (2) investigate the psychosocial learning environments of our distance education and hybrid education programs, offering us feedback from the perspective of the learners themselves. Likewise, through the utilisation of the new *Spanish Distance Education Learning Environments Survey* (S-DELES) we are able to identify areas of distance education and hybrid education learning environments that (3) provide satisfaction to our students and to identify areas that (4) need attention in education delivered exclusively or partially through information and communication technologies (ICT).

The S-DELES has proven reliable overall and with the individual study populations (distance education and hybrid). Its reliability in this study ( $\alpha = 0.94$ ) is in line with the reliability of the original English-language DELES ( $\alpha = 0.93$ ) (Walker, 2003) and with at least one of the translated versions, the Turkish-language DELES ( $\alpha = 0.93$ ) (Özkök, Walker & Büyüköztürk, 2009). The analyses of the scale means demonstrates that the distance education student population ( $n = 92$ ) views their learning environment, that is exclusively delivered via ICT, very positive with all areas having a mean response of at least  $M = 4$  or greater (*often* occurring), with the exception of the scale of *Interaction*. Given the fact that student-to-student interaction is one of the most difficult aspects of distance education to facilitate (Walker & Resta, 2002), this is not a surprising outcome. However, given the very low mean on this scale ( $M = 2.2$ , *seldom* occurring), we view this as an opportunity to make improvements — the exact reason for conducting this type of student-centred investigation. The results of the hybrid learning environment measures, although delivered via the same ICTs, yet from a different education model, demonstrate an overall strong learning environment scenario with all results in the *Sometimes-often* occurring range.

In terms of student satisfaction, an established pre-cursor to student success (Fraser, 1998a, 1998b, 2002), both study populations reported their perceptions as strong (*often* they are satisfied). Nevertheless, the data for the distance education population again points to areas where resources can be offered to facilitate improvements, in this case in terms of *Instructor support* and *Interaction* where there are inverse associations. On the other hand, there is evidence that in distance education we must maintain our strong associations of *Active learning* and student *Autonomy*, and perhaps keep an eye on how we support *Relevance* of the content and *Authentic learning*, areas that have a mediocre association with *Satisfaction* (Table 4).

Student satisfaction in the hybrid learning education model is somewhat driven by different psychosocial learning environment characteristics it appears. While *Instructor support* and *Interaction* demonstrate inverse associations, the scale of *Active learning* demonstrates a perfectly negative association. This fact warrants further investigation to get at the root causes.

The scale of *Asynchrony*, added as a modification to the original DELES, offers insight into the value of students' learning in an asynchronous learning environment. Example items in this scale include: *I have access to campus resources, I can control my time, I can complete activities on my own time, I can view instructor information at any time, I can consult with the professor when it is convenient*. Reported as almost *Always* occurring, with means greater than 4.5 out of 5 for both study populations, it speaks to the expediency offered by having access to education at the students' convenience rather than the university's convenience. This is especially true given that the study population is predominantly in their 30s, many of them are married and have children,

but most obvious, over 60% of the population — at least 106 of the original 176 students — work full time *and* attend university. Of particular interest though is the fact that *Satisfaction* and *Asynchrony* are associated at  $r = 0.40$  with the distance education students, yet only  $r = -0.21$  with the hybrid students — another area that needs further investigation.

### Further studies

There are at least three further studies that come to mind when considering the development of this study and its results, the first being that the results at this point are not generalisable given the relatively small number of participants. This study was intended to investigate a means by which the Department of Health Psychology at the University of Alicante could pursue its goals of change in order to cooperate within the European Higher Education Area (EHEA) by focusing on quality. A larger number of participants spanning a larger geographical area of Spain would be needed in order to extrapolate results that could be said to offer knowledge to a wider Spanish audience. In fact, an EHEA-wide study and even an international study using different language versions of the DELES would prove valuable.

Including a consideration of the perceptions of the instructors of the distance and hybrid education classes would offer unique insight into differences between student perspectives and those of their instructors. Often instructors view their instruction and classes through rose-coloured glasses. Contrasting what students see versus what the instructor sees opens doors for dialogue that could possibly result in significant program improvement if conducted in a positive, non-evaluative way. Instructor versions of psychosocial learning environment instruments have historically been a means by which researchers can gain useful insight related to higher education learning environments (Fraser & Treagust, 1986).

Further, this study could be used as a baseline for other studies in our program or as comparative results for other similar programs or institutions in Spain or the EHEA. Likewise, this investigation, and others like it, could stand to follow up on the quantitative results with qualitative investigations, perhaps with student focus groups that could yield insight on why some of the results are as they are.

This paper has described a study that modified a popular psychosocial learning environment instrument from English to Spanish and successfully implemented the use of it to gain valuable insight on the quality of a particular post-secondary educational program in order to enact change that addresses the needs of students. The new S-DELES has demonstrated reliability, has yielded results that can direct positive change in our program, and establishes a baseline for further studies as well as longitudinal studies of our program and perhaps others at other Spanish institutions of higher education.

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**Authors:** Rosario Ferrer-Cascales, Department of Health Psychology, University of Alicante, Ap. de Correos, 99, 03080, Alicante, Spain.  
Email: [rosario.ferrer@ua.es](mailto:rosario.ferrer@ua.es) Web: <http://www.ua.es/dpto/dps/>

Scott L. Walker, Department of Social Sciences  
Northwest Vista College, 3535 N. Ellison Drive, San Antonio, Texas, USA.  
Email: [swalker6@alamo.edu](mailto:swalker6@alamo.edu)

Abilio Reig-Ferrer, Chair, Department of Health Psychology, University of Alicante  
Email: [areig@ua.es](mailto:areig@ua.es)

María Dolores Fernández-Pascual, Department of Health Psychology, University of Alicante. Email: [mariadolores.fernandez@ua.es](mailto:mariadolores.fernandez@ua.es)

Natalia Albaladejo-Blázquez, Department of Health Psychology, University of Alicante. Email: [natalia.albaladejo@ua.es](mailto:natalia.albaladejo@ua.es)

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