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Psychometric properties of a Spanish version of the Dyadic Adjustment Scale

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Abstract   The Dyadic Adjustment Scale (DAS) is a self-report instrument measuring marital satisfaction, which has been widely used in different cultures. In Spain, there are to date no studies analysing the psychometric properties of the scale in functional and dysfunctional couples, nor performing independent factor analysis of men and women's data. The objective of this study is to determine some psychometric properties of a Spanish DAS version on a sample of 915 participants: 403 who requested couple therapy, and 512 who did not request therapy. Results support the reliability of the instrument for both subsamples. The confirmatory factor analysis showed a four-factor internal structure that corresponds to the one proposed by the author of the original scale. Furthermore, the Spanish DAS has high discriminant power between both subsamples, and presents as a valid and reliable instrument to measure marital quality in Spanish couples who request couple therapy and those who do not request it.

Resumen   La Escala de Ajuste Diádico (EAD) es una escala de autoinforme de satisfacción conyugal que ha sido ampliamente utilizada en distintas culturas. En España no existen en la actualidad estudios que analicen las propiedades psicométricas de la escala en parejas con y sin malestar ni que realicen análisis factoriales independientes de los datos de hombres y mujeres. El objetivo de este estudio es determinar algunas propiedades psicométricas de una versión española de la EAD en una muestra de 915 participantes: 403 que buscaban terapia de pareja y 512 que no requerían terapia. Los resultados respaldan la fiabilidad del instrumento para ambas submuestras. El análisis factorial confirmatorio mostró una estructura interna de cuatro factores que se corresponde con la propuesta por el autor de la escala original. Además, la versión

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española de la EAD ofrece una alta capacidad discriminante entre ambos subgrupos, constituyendo un instrumento válido y fiable para medir la satisfacción conyugal en parejas españolas que buscan terapia y en aquellas que no la requieren.

Over the years, researchers and clinicians have shown an increasing interest in assessing the quality of couple relationships. Much effort has been made to design instruments that assess the quality and satisfaction of those special relationships. Still to date, couple satisfaction is one of the most studied variables in marital research (Graham, Diebels, & Barnow, 2011). The underlying construct, Dyadic Adjustment, is the result of a process determined by the degree of troublesome dyadic differences, interpersonal tensions and personal anxiety, dyadic satisfaction, dyadic cohesion, and consensus on matters of importance to dyadic functioning (Spanier, 1976). The Dyadic Adjustment Scale (DAS) (Spanier, 1976) was used in more than 1000 studies within the first 10 years of its publication, and currently is perhaps the most used measure of relationship quality worldwide (Graham, Liu, & Jeziorski, 2006; South, Krueger, & Iacono, 2009).

The DAS, developed by Graham Spanier, is a 32-item scale for which the author reported high reliability (Cronbach alpha: .96), and presented content, criterion, and construct validity. Its four underlying factors form the subscales Dyadic Consensus, Dyadic Cohesion, Dyadic Satisfaction, and Affectional Expression, which can be grouped in a total score. Spanier and Thompson (1982) concluded in a confirmatory analysis that the four subscales appeared robust, accounting for 94% of the covariance among the items, and confirmed high reliability (.91 alpha coefficient) for the overall scale.

However, concerns have been raised about the replicability of the factor structure proposed by Spanier (Kazak, Jarmas, & Snitzer, 1988; Norton, 1983; Sharpley & Cross, 1982). Kazak et al. (1988) suggested that further research was needed to support the robustness of the four factors as well as to confirm the factorial structure taking into consideration gender differences. In any case, although some researchers have questioned the independent use of the subscales of the questionnaire (Crane, Busby, & Larson, 1991; Kazak et al., 1988; Norton, 1983; Sharpley & Cross, 1982; Spanier & Thompson, 1982), it has been repeatedly confirmed as a global measure of marital quality. Meta-analytic research conducted by Graham et al. (2006) with a sample of 91 published studies and a total of 25,035 participants, concluded that the DAS remains "a viable force" for the measurement of relationship quality. Factorial invariance across gender has been reported (South et al., 2009), although not in the Spanish population. Within the past year, the DAS has been used to measure dyadic satisfaction in many different medical disciplines such as cardiology (Rychik et al., 2013), neurology (Norup & Elklit, 2013), obstetrics and gynaecology (Galhardo, Cunha, Pinto-Gouveia, & Matos, 2013; Van den Broeck et al., 2013), oncology (Fife, Weaver, Cook, & Stump, 2013; Robbins, Mehl, Smith, & Weihs, 2013), otorhinolaryngology (Smith, Pukall, & Chamberlain, 2013), urology (Walker, Hampton, Wassersug, Thomas, & Robinson, 2013), or psychology (Daspe, Sabourin, Péloquin, Lussier, & Wright, 2013; Varghese et al., 2013).

The DAS has been adapted for use in many countries. In Spain, there are some published translations (Bornstein & Bornstein, 1988; Cáceres, 1996), but there is scant information on their psychometric properties and translation procedures. Santos-Iglesias, Vallejo-Medina, & Sierra (2009) developed a 13-item version of the scale. However, although the abridged form of the DAS reduces time to respond, it does not offer the range of specificity provided by the four subscales, which is of special usefulness for clinical practice (Hollist et al., 2012). Although the DAS has been used in Spain to assess community couples (Cuenca, Graña, Peña, & Andreu, 2013), there is a lack of studies comparing its psychometric properties with clinical and nonclinical couples, as well as considering gender differences.

Consequently, we designed this study with the objectives: a) to translate the DAS into Spanish, b) to analyse the psychometric properties of the resulting Spanish version in relation to its reliability and its factor and criterion-related validity, c) to analyse the degree of intra-couple response agreement for each factor and for the total scale score, d) to analyse the factor structure for both male and female participants e) to study the differences between clinical (couples seeking therapy) and nonclinical (not in treatment for marital distress) couples, and f) to establish a cut-off score for the Spanish DAS.

Method

Participants

The sample consisted of 915 caucasian individuals (456 males, 459 females) who were recruited from several sources throughout a 10-year period, from 2001 to 2012. All couples were heterosexual, and 99.3% of them were married. In most cases, (n = 830) both members of the couple agreed to participate in the study. The mean age of the total sample was 43.1 years (SD = 9.8), —mean age for males was 43.7 (SD = 9.8), and 42.5 (SD = 9.8) for females—. This large sample was divided into two subsamples for some of the statistical analyses. The first subsample (clinical couples) reported marital distress and consisted of 403 participants who had sought consultation at the Unit of Diagnosis and Family Therapy at the *Clínica Universidad de Navarra*, and who had been asked to complete the DAS together with other questionnaires and interviews as part of their diagnostic protocol. Their mean age was 44.4 years

(SD = 10.2), and had been married for a mean of 16.3 years (SD = 10.9). The second subsample was formed by 512 community couples not seeking therapy (nonclinical couples) proceeding from five different sources. A larger group were 261 subjects who participated in Spanish multi-site research studying marriages with one member fulfilling DSM-IV criteria for a first episode of Major Depression (Moyá, Cano, Seva, & Alonso, 2010). Their mean age was 43.6 years (SD = 11.1), and they had been married for a mean of 16.6 years (SD = 11.4). Out of these 261 subjects, 60 were depressed and had a healthy partner. The remaining 141 subjects were healthy controls. The second and third groups were made up of 55 and 144 parents who respectively accompanied their children to the Pediatrics Department (mean age 35.8 [SD = 5.8]; mean years of marriage 8.8 [SD = 4.6]) or to the Children and Adolescent Psychiatry Unit (mean age 43.2 [SD = 5.9]; mean years of marriage 15.7 [SD = 5.6]) at the *Clínica Universidad de Navarra*. A further group comprised 37 individuals who volunteered for a couple communication study also conducted at the above-mentioned Unit, in which they filled in the DAS and The Family Assessment Device (FAD) (Epstein, Baldwin, & Bishop, 1983), and maintained a problem-solving conversation that was codified with the Rapid Marital Interaction Coding System (Heyman & Vivian, 2011). This last group had been married for a mean of 8 years (SD = 6.6) and their mean age was 35.7 years (SD = 5.6). The remaining 15 participants were patients seeking psychological advice at the same department, and not referring marital distress. Their mean age was 43.2 (SD = 8.8) years.

Every group of participants had different motivations, underwent different protocols, and were administered the DAS by different researchers. However, we ensured confidentiality, gave all participants the same instructions and offered a quiet setting apart from the partner to complete the scale.

Instruments

- A sociodemographic questionnaire was administered to collect data concerning gender, age, length of engagement, years of marriage, socioeconomic status, and number of children born to the couple.
- The Dyadic Adjustment Scale was completed by all participants. Items in the questionnaire are to be answered in a five-point, six-point or seven-point Likert scales, and it also contains two dichotomous items. Higher scores are indicative of better adjustment.
- The Spanish version (Barroilhet, Cano-Prous, Cervera-Enguix, Forjaz, & Guillén-Grima, 2009) of the Family Assessment Device (FAD) (Epstein et al., 1983) was administered to a total of 566 participants (61.9% of the total sample). Good internal consistency has been reported for both English (Cronbach's alpha = .92) and Spanish (Cronbach's alpha = .86) versions. The FAD contains 60 items on a 5-point Likert-type scale, conforming one overall scale and six subscales that correspond to the McMaster Model. Lower scores represent better family functioning. This questionnaire was included to assess convergent validity because it is known that family functioning is associated with dyadic adjustment (Sheets & Miller, 2010; Shek, 2001; Stevenson-Hinde & Akister, 1995).

Procedure

In a first phase of the study, authorisation from the editor of the original DAS was obtained to translate the instrument. The translation was performed by a panel of four experts following a process that -although a decade has gone by- still today meets the standard guidelines recommended for intercultural adaptation of psychology questionnaires (Gudmundsson, 2009; International Test Commission, 2010; Muñiz, Elosua, & Hambleton, 2013). The process included two forward translations by two independent translators, reconciliation of the forward translations, and back translation performed by a bilingual translator without previous contact with the original version. The back translation served as an instrument to find inaccuracies in the forward reconciled translation by comparing it to the original version. At this point, discrepancies between the three translators involved were discussed to reach a more refined version, which was later reviewed by an external Spanish native expert to ensure natural wording. The final version was then reviewed and accepted by a board of experts in the field of family therapy, and pilot tested on a sample of 24 voluntary psychiatric patients -and/or their partners-. These 24 volunteers also completed a form in which they were asked if they had understood all the items, found anything irrelevant or offensive, or had any comment or suggestion for additional questions to be included. Respondents did not suffer from any important pathology that could represent a significant mental impairment to complete the DAS and the pilot test form. The comments and suggestions reported were considered and discussed, resulting in some minor changes to the final version.

As inclusion criteria, all respondents should 1) be over 18 years old, 2) cohabit with their partners in a heterosexual stable relationship, and 3) sign informed consent before the start of any procedure. This research was approved by the Ethics Committee of the *Clínica Universidad de Navarra*.

Data analysis

Confirmatory Factor Analysis was performed with Stata 12.1. using Structural Equation Modeling (SEM) on a polychoric correlation matrix, and *maximum likelihood* estimation method. Four models were tested: a monofactorial model, a hierarchical model, a four-factor model similar to the one proposed by Spanier, and a four-factor modified model to best fit the data. For the four-factor models, items loadings were left free to vary on the subscales proposed by Spanier (1976), and were fixed at zero for the remaining subscales. The Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI) were chosen as measures of incremental fit (values above .90 are indicative of a good fit), and the Root-Mean-Square Error of Approximation (RMSEA) was selected as a measure of parsimonious fit (values equal or below .05 imply a good fit to the model). Also, a Stata 12.1 program (ordalpha) based on code by Coveney (2012) and modified by one of the authors was used to compute ordinal alpha coefficients of the Total Adjustment scale and its subscales, given that those coefficients are preferred for likert-type scales (Zumbo, Gadermann, & Zeisser, 2007). SPSS v.15 program was used to calculate item-corrected total correlations, and to assess

Table 1 Goodness-of-fit indices for each tested model and indices by gender.

	Chi-squared	d.f.	RMSEA	CFI	TLI
1-factor model	3288.85*	464	.08	.80	.78
Hierarchical model	2473.85*	455	.07	.88	.87
4-factor model	2155.22*	458	.06	.88	.87
Improved 4-factor model					
Total sample	1653.91*	455	.05	.91	.90
By gender					
Men	1005.20*	455	.05	.92	.92
Women	1139.80*	455	.06	.90	.89

* $p < .001$.
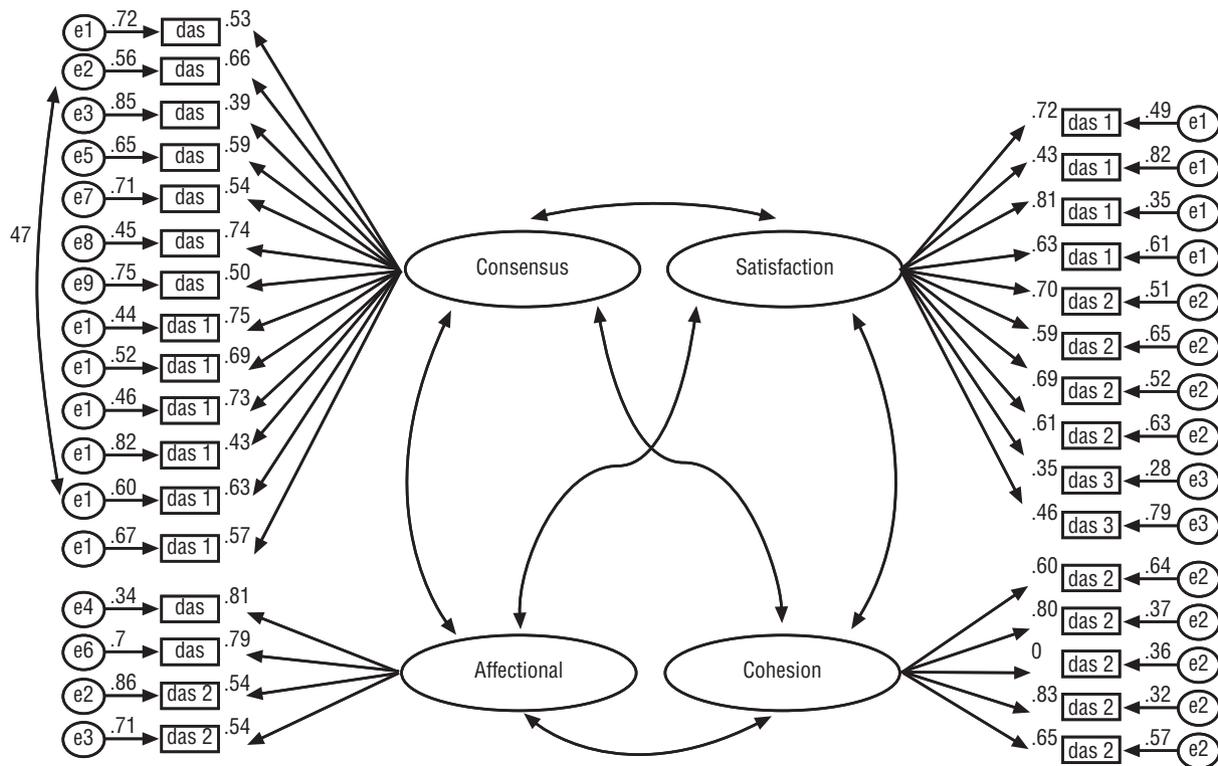
Figure 1 Path diagram for the improved four-factor model of the DAS. All factor loadings $p < .001$.

Results

Confirmatory Factor Analysis, item analysis and reliability

To test whether the factor structure proposed by Spanier was suitable for our data, we performed Confirmatory Factor Analysis (CFA). Both the unifactorial and the hierarchi-cal models did not show a good fit. Spanier's original 4-factor model also yielded inadequate fit values, although modification indices suggested freeing the covariances between three pairs of error terms (e.das2*e.das14; e.das16*e.das17; e.das21*e.das22). The subsequent modi-fied model freeing these paths was found to have a signi-ficantly better fit (change $\chi^2_{(3)} = 501.22$, $p < .001$), and was afterwards satisfactorily tested on male and female data (Table 1).

The CFA also showed all items had loadings on the expec-ted factors over .30 (as in Spanier's original model), with p values < .001. It also confirmed high correlations between the four latent variables (Figure 1).

Analysing the total sample ($n = 915$), the item-corrected total correlations in the DAS all yielded values over .30, except for item 29 ($r = .27$) ($p < .001$). However, deletion

discriminant validity (independent samples Student's t tests), intra-couple agreement (Pearson's correlation coeffi-cients), and to determine a cut-off score for the scale and its predictive performance, using ROC analysis. 95%CI for sensitivity and specificity at the optimal cut-off were calcu-lated using Stata 12.1. All p-values are two-tailed.

Table 2 Alphas for the total, and for the clinical and nonclinical samples.

	Total sample (n = 915) Cronbach's alpha	Total sample (n = 915) ordinal alpha	Clinical sample (n = 403) ordinal alpha	Nonclinical sample (n = 512) ordinal alpha
Dyadic Consensus	.88	.90	.83	.90
Dyadic Satisfaction	.88	.90	.85	.87
Dyadic Cohesion	.85	.87	.81	.83
Affectional expression	.69	.81	.72	.78
Total Adjustment	.94	.95	.92	.94

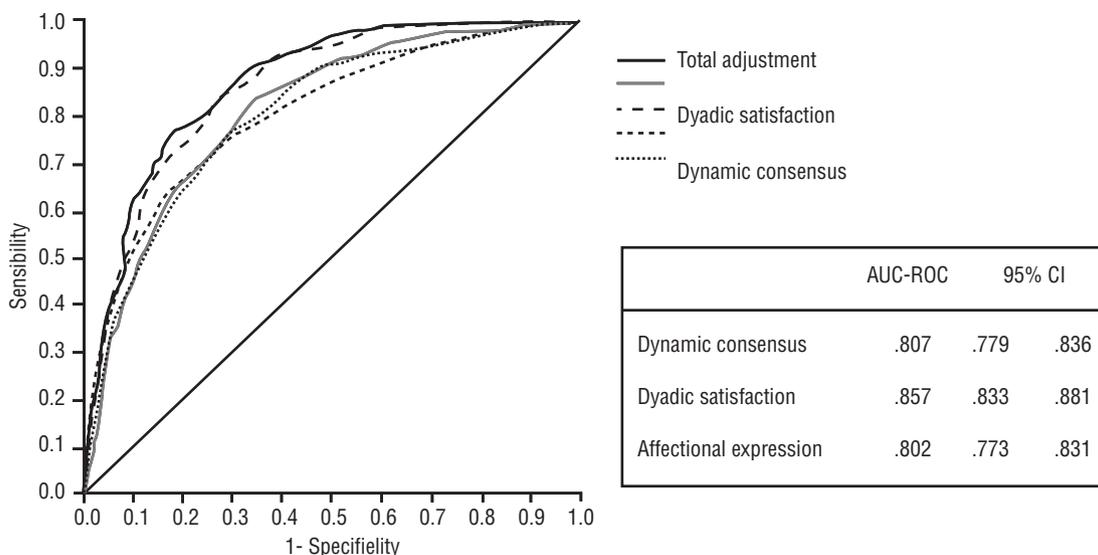|	AUC-ROC	95% CI	
Dynamic consensus	.807	.779	.836
Dyadic satisfaction	.857	.833	.881
Affectional expression	.802	.773	.831

Figure 2 ROC analysis of DAS subscales and Total Adjustment.

of item 29 did not mean a relevant increase in the reliability of the scale (ordinal alpha coefficient increasing from .954 to .955). The reliability ordinal alpha coefficients were high for the total sample as well as for the clinical and nonclincal samples independently. We include Cronbach's alpha values of the total sample for comparison with DAS published research (Table 2).

Discriminating analysis

Initially, we performed a t-student test for independent samples for women and men scores, and it showed no statistically meaningful differences. In order to test the discriminating power of the DAS, we performed a ROC curve analysis. Results support high discriminating capability of all DAS subscales (Figure 2). In addition, statistically meaningful differences were found for all DAS scores between the clinical and nonclinical subsamples (Table 3). The maximum Youden index was acquired at the optimal DAS cut-off point of 100 (in the Total Adjustment scale) to discriminate between clinical and nonclinical couples. This cut-off point had a sensitivity of 75.7% and a specificity of 82.4% with a 79.5% accuracy (percentage of cases correctly classified).

Convergent validity and intra-couple agreement in perceived adjustment

Convergent validity was analysed on a sample of 566 clinical and nonclinical partners who had completed both the DAS and FAD scales. As hypothesized, all DAS subscales were significantly correlated with all FAD subscales (Table 4).

Finally, to assess whether both couple members had similar perception of the marriage adjustment and so the instrument was measuring the same reality, intra-couple agreement was assessed with data from both partners (n = 415 couples). Significant correlations were found for the four DAS subscales and for Total Adjustment (Table 5).

Discussion

In the present study, we evaluate a Spanish version of the DAS, and analyse its psychometric properties on a sample of clinical and nonclinical couples. For this purpose, we translated the original scale following the process reported, which unites the two most popular translation methods: back translation, and reconciliation of forward translations. To date there is not a total agreement about which inde-

Table 3 Score differences between clinical and nonclinical samples.

.	Clinical partners (n = 403)		Nonclinical partners (n = 512)		
	Mean	SD	Mean	SD	t value
Dyadic Consensus	42.03	8.55	51.51	7.77	17.53*
Dyadic Satisfaction	28.43	7.13	38.63	6.32	22.90*
Affectional Expression	10.34	4.86	16.07	4.75	17.94*
Dyadic Cohesion	5.69	2.68	8.72	2.25	18.52*
Total Adjustment	86.50	19.19	114.93	17.47	23.40*

*p < .001.

Table 4 Pearson correlation of DAS and FAD subscales.

n = 566	FAD Problem solving	FAD Communi -cation	FAD Roles	FAD Affective responsiveness	FAD Affective Involvement	FAD Behavioral control	FAD General functioning
Dyadic Consensus	−.45*	−.43*	−.39*	−.32*	−.35*	−.36*	−.59*
Dyadic Satisfaction	−.50*	−.50*	−.37*	−.38*	−.40*	−.37*	−.67*
Affectional Expression	−.39*	−.43*	−.30*	−.37*	−.22*	−.24*	−.49*
Dyadic Cohesion	−.47*	−.46*	−.27*	−.36*	−.34*	−.35*	−.57*
Total Adjustment	−.55*	−.55*	−.41*	−.43*	−.41*	−.40*	−.71*

* p < .01.

Table 5 Intra-couple agreement for DAS subscales and Total Adjustment.

n = 415 couples	r
Dyadic Consensus	.61
Dyadic Satisfaction	.68
Affectional Expression	.66
Dyadic Cohesion	.63
Total Adjustment	.72

p < .001.

pendent method is empirically more valid (Gudmundsson, 2009): the mechanical use of back translations may mislead forward translators to produce literal versions easier to back translate; reconciled forward translations, although are also encouraged (Muñiz et al., 2013), when used alone provide weak criteria on the quality of the final version (Gudmundsson, 2009). In our study, we applied a conservative combination of both methods (Eremenco, 1998) which allowed us to reach a naturally worded version that keeps all meaning nuances of the original scale.

Concerning the characteristics of our sample, it was a heterogeneous and large sample spanning from voluntary well-adjusted partners to distressed couples seeking therapy. We consider this allowed us to cover a wider range of DAS scores. The sample was divided into clinical (seeking couple therapy) and nonclinical couples (not in treatment for marital distress). To our knowledge, there is no other published research analysing Spanish DAS properties on clinical and nonclinical samples. The nonclinical group comprised some participants at the time of a first diagnosis of Major Depression. Although this fact could be supposed to

affect marital dynamics, it was not the case in our sample (Moyá et al., 2010). We also included couples consulting with a child at a Children and Adolescent Psychiatry unit, which could have meant a source of stress to the marital dynamics. However, it has also been argued that having an ill child can strengthen a marriage (Brioso & Del Campo, 2012; Cappelli, McGrath, Daniels, Manion, & Schillinger, 1994). Finally, participants included who consulted at an Adult Psychiatry service were not referring marital dysfunction. We assume that the particular situation of each volunteering subgroup was not affecting marital dynamics. In fact, when analysing the mean scores of the clinical and nonclinical samples, they dramatically strayed from one another, reporting the nonclinical group higher satisfaction.

Some participants (0.7% of the total sample) were unmarried and cohabiting, a growing tendency in western societies, and their relationship was considered equivalent to one of a legal marriage. There is a possibility that this could have exerted a slight influence in the results of this study. However, Spanier and Lewis in 1980 advised on the convenience of theoretical and methodological discussions to focus not in "marital relations" and "cohabitation relations", but in "dyadic relations". Graham et al. (2006) also concluded that the reliability of the DAS was not affected by civil status, and in fact, virtually all samples recruited in studies analysing DAS properties indistinctly include married and cohabiting couples (Carey, Spector, Lantinga, & Krauss, 1993; Cuenca et al., 2013; Gentili, Contreras, Cassaniti, & D'Arista, 2002; Santos-Iglesias et al., 2009).

Concerning the factor structure of the DAS, some authors have spoken in favour of a unidimensional (Kazak et al., 1988; Sharpley & Cross, 1982) or a hierarchical (Busby, Christensen, Crane, & Larson, 1995; Cuenca et al., 2013)

structure. For this reason, we tested a one-factor, a hierarchical and a four-factor model, which revealed an inadequate fit of our data. We then tested a modified four-factor model in which covariances between three pairs of error terms were freed. These error terms corresponded to items 2 and 14 (which refer to recreation interests), items 16 and 17, and items 21 and 22 (which address negative events occurring in the relationship). Items 16 and 17 are related to physical (permanent of temporary) separation or partners, and items 21 and 22 concern tense discussions within the couple, and can be viewed as alternate form items (Busby et al., 1995). Although it could be debatable whether these items would be somewhat redundant, the fact is that higher scores in one of the items imply higher scores in its related pair. Consequently, we consider this theoretical framework supports the decision of freeing the existing covariances to find a better-fitting model. Thus, the resulting improved four-factor model showed a good fit and was the most adequate for our data. Furthermore, modification indices did not suggest changing items to other factors. It is noteworthy that the modified model was also adequate when independently analysing men and women data, a finding congruent with the literature (South et al., 2009). Loadings of all items were above .30 on the hypothesized factors, and highly significant, which would imply that the four dimensions measured by Spanier are replicated. Loadings displayed for Affectional Expression were also high, showing a more robust subscale in comparison to some author's findings (Antill & Cotton, 1982; Baillargeon, Dubois, & Marineau, 1986; Graham et al., 2006; Sharpley & Cross, 1982; Shek, 1995; Spanier & Thompson, 1982). Some short versions of the questionnaire (Santos-Iglesias et al., 2009) sacrifice that subscale. However, the original presentation of the questionnaire with its four underlying factors is of higher interest especially for clinical intervention (Hollist et al., 2012). Specifically, given that we are assessing dyads characterised by the affection, we consider Affective Expression subscale is of special interest.

With regard to reliability, alpha values in the total sample, as well as in the clinical and nonclinical samples independently, were excellent. The weakest alpha coefficients corresponded in all cases to the Affectional Expression subscale, although they can be considered acceptable and are higher than other values reported in some studies conducted with the original DAS (Antill & Cotton, 1982; deTurk & Miller, 1986; Johnson & Greenberg, 1985; Kurdek & Smith, 1986). These data reveal good internal consistency of this DAS version with clinical and nonclinical couples.

The optimal cut-off for our Spanish DAS version was established at 100 points, what is in agreement with published literature, which typically establishes DAS cut-off point between 92 and 107 (Crane, Allgood, Larson & Griffin, 1990; Heyman, Feldbau-Kohn, Ehrensaft, Langhinrichsen-Rohling, & O'Leary, 2001). Furthermore, the ROC analysis for every subscale yield high values that reveal their importance to accurately understand marital functioning.

External validity was tested by analysing correlations between DAS and FAD scores, given that marital functioning is essential to reach an adequate family functioning (Sheets & Miller, 2010; Shek, 2001; Stevenson-Hinde & Akister, 1995). Furthermore, the high correlation found between all

subscales, as well as between husbands and wives would mean that the desired construct is being measured, and that differences in scores in each couple would be due to real differences in perceived adjustment and not to an artefact of the instrument.

Certain limitations should be considered, however, when interpreting the results of the present study. We should note that our sample was collected over a period of ten years, an important time lapse, which could represent a change on the social characteristics of marriages. Nevertheless, the DAS was created almost 40 years ago and is still useful in many cultures and languages. Also, it is important to consider that couples seeking therapy were correlatively invited to take part in the study, while nonclinical couples formed a convenience sample not randomly selected. Therefore, it would be worthy to assess the differences in dyadic adjustment with randomly selected couples, and to analyse special characteristics of couples (number of children, years of marriage, length of engagement, etc.) potentially influencing the DAS performance in clinical and nonclinical settings.

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