A cross-cultural shortened form of the ZKPQ (ZKPQ-50-cc) adapted to English, French, German, and Spanish languages

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Received 22 November 2005; received in revised form 3 February 2006; accepted 1 March 2006
Available online 5 May 2006

Abstract

The aim of the present study was to develop a version of the (ZKPQ) with a robust structure and acceptable psychometric properties in four languages: English (United States), French (Switzerland), German (Germany), and Spanish (Spain). The total sample (N = 4621) was randomly divided into calibration and validation samples. An exploratory factor analysis was conducted in the calibration sample. Using several criteria derived from EFA and CFA item analysis, including modification index and standardized regression weights, 10 items per scale were selected. This short version (named ZKPQ-50-CC) presents psychometric properties strongly similar to the original version in the four countries. Moreover, the factor structure is near equivalent across the four countries since the congruence indices were all higher than 0.90. It is concluded that the ZKPQ-50-CC presented high cross-language replicability, and could be a useful questionnaire for personality research.

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1. Introduction

The Zuckerman–Kuhlman Personality Questionnaire (ZKPQ) was designed within the framework of Zuckerman’s Alternative Five Personality Model (Zuckerman, Kuhlman, Teta, Joireman, & Kraft, 1993). This model was developed by comparing structures based on 3, 4, 5, and 6 factor solutions of several personality questionnaires (Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991). Zuckerman et al. (1993) concluded that both the three- and five-factor models were robust and reliable. Based on these results, a questionnaire was developed using the items most clearly defining the five factors, excluding items showing a strong social desirability influence. The 99-item version contained the following scales: Impulsive-Sensation Seeking (ImpSS, 19 items), Neuroticism-Anxiety (N-Anx, 19 items), Aggression-Hostility (Agg-Host, 17 items), Activity (Act, 17 items), Sociability (Sy, 17 items), and Infrequency (Inf, 10 items). The Inf scale is only used to assess the validity of individual records and is not intended to be a trait scale. Internal consistency for both sexes varied between 0.72 and 0.86 [for more detail on the development of the ZKPQ and its reliability and validity, see Joireman and Kuhlman (2004), and Zuckerman (2002)].

The original version of the ZKPQ has been adapted in different countries and languages: China (Wu et al., 2000), Germany (Ostendorf & Angleitner, 1994), Italy (De Pascalis & Russo, 2003), Japan (Shiomi et al., 1996), and Spain (Catalan [Gomà-i-Freixanet, Valero, Puntí, & Zuckerman, 2004; Gomà-i-Freixanet, Wismeijer, & Valero, 2005], and Spanish versions [Aluja, García, & García, 2002, 2004a; Herrero, Viña, González, Ibáñez, & Peñate, 2001; Romero, Luengo, Gómez-Fraguela, & Sobral, 2002]). In general, the factor structure and the psychometric properties have replicated results found for the original English version.

As far as we know, two short versions of the ZKPQ have been developed. The first one (Zuckerman, 2002) is made up of 35 items, with seven items per scale. Items with the highest correlations with the total scores on each of the five factors and the greater response variance were selected. Several items were eliminated because of redundancy of content, and the next highest correlation was substituted. These short scales had Cronbach alphas between 0.62 and 0.79. The second one (Aluja, García, & García, 2003a) is composed of 69 items selected through exploratory and confirmatory factor analysis (Byrne, 1993; Yadama & Drake, 1995). Internal consistencies were similar to the 89-item version, and varied between 0.74 and 0.81.

The 69-item version was developed following an empirical criterion with no pre-conceived idea as to the number of items. The resulting scales presented a number of items per scale between 11 (Activity) and 18 (N-Anx) (Aluja et al., 2003a). However, the number of items retained in the 69-item version and the statistical procedure made it possible to further reduce the number of items per scale. This approach generated a shorter version maintaining the same psychometric properties, including reliability coefficients, of the ZKPQ as well as the structural validity of the questionnaire. Two instances support this possibility. Firstly, the Activity scale improved its psychometric properties in the short version, although six items were suppressed (Aluja et al., 2003a). Secondly, the 10-item Extraversion and Neuroticism scales of the EPQ-R presented good
psychometric and structural properties (Aluja, García, & García, 2003b). According to these findings, we hypothesised that ZKPQ scales formed by 8–12 items will only have similar psychometric properties to the original questionnaire. The availability of these short scales has obvious advantages in practical and research settings, since the administration and correction time are considerably reduced (Buchanan, Johnson, & Goldberg, 2005).

The aim of the present study was to develop a version of the ZKPQ with a robust structure and acceptable psychometric properties in four languages: English (United States), French (Switzerland), German (Germany), and Spanish (Spain). A procedure similar to that used by Aluja et al. (2003a) will be carried out combining exploratory (EFA) and confirmatory (CFA) factor analyses: (a) selecting items with loadings higher than 0.30 on the EFA, (b) deleting the worst item of every pair of items which error terms were highly correlated (i.e. reaching a Modification Index higher than 100 in the CFA), and (c) only items with standardized regression weights larger than 0.30 on the CFA could be considered for the short version. Developing the same measure for different countries has the advantage of establishing the same metric for all countries analyzed. This characteristic would largely facilitate cross-cultural research with Zuckerman’s Alternative Five Personality Model.

2. Method

2.1. Subjects

The total sample consisted of 4621 subjects (1667 males [36.1%], and 2954 females [63.9%]) from four countries. Inclusion in the study was restricted to subjects under 35 years of age in order to reduce the age differences between samples. The numbers of subjects in the four countries were 517 from Germany (mean age: 26.94; SD: 4.31), 962 from Spain (mean age: 21.39; SD 2.97), 764 from the French-speaking part of Switzerland (mean age: 21.68; SD 3.05), and 2378 from the United States of America (the age variable was not coded for this sample). Since all subjects in the American sample were university students enrolled in introductory psychology courses, the mean age is known to be around 19 years. Frequencies for sex were 117 males and 400 females for Germany, 351 and 611 for Spain, 294 and 470 for Switzerland, and 905 and 1473 for USA. The samples from Spain, Switzerland, and the United States of America were university students. The German sample was a pool of two sub samples: one of university students, and one taken from the Bielefeld twin study. The total sample was randomly divided into calibration ($n = 2322$) and validation ($n = 2299$) subsamples.

3. Results

3.1. Exploratory factor analysis (EFA)

Five factors were explicitly extracted in the calibration sample following a principal components method with Varimax rotation. Those five factors accounted for 25.69% of the variance. Eighty items (ImpSS: 20; N-Anx: 19; Act: 15; Sy: 12 and Agg-Host: 14) had loadings equal to
or higher than 0.30 on their own factor, and lower on the remaining factors. They were selected for being analyzed through CFA methods. The items not considered for subsequent analyses were 3, 16, 27, 36, 49, 58, 82, 98 and 99.

3.2. Confirmatory factor analysis (CFA)

A CFA was performed in the validation sample employing the Amos 4.01 (Arbuckle, 1999). The estimation method was Maximum Likelihood. Model identification was achieved by fixing regression coefficients of the error terms over the endogenous variables and also the variance of factors to 1 (MacCallum, Browne, & Sugawara, 1996). Each item was linked to a single factor. Following EFA results, item 53 was linked to ImpSS instead of Sy. This analysis showed that the error terms of 25 item pairs were highly correlated, with Modification Indices (MIs) higher than 100. Examination of these items revealed within-pair redundancy, and as recommended elsewhere (Byrne, 1993; Yadama & Drake, 1995), one item was deleted from each pair. Within all but two of the above pairs, the item with the lowest loading was deleted. Following this procedure, all ZKPQ scales were composed of 10 or more items, excepting Sy. Two item pairs on this scale (43–48 and 68–87) were strongly correlated, but no item was deleted in order to test all of them through the standardized regression weights. A CFA model was performed on the 57 items remaining after the deletions described above. Based on the standardized regression weights, those items with the lowest values were removed until 10 items per scale remained. Note that all weights were significant. No item from the Sy scale was removed, because the standardized regression weights of this scale were acceptable (ranging between 0.33 and 0.61) and similar to those obtained in the remaining four scales (see Table 1). With these modifications, the questionnaire was reduced to 50 items (10 per scale).

A CFA was performed on these 50 items ($\chi^2$: 5664.66; d.f.: 1165; $\chi^2$/d.f.: 4.86; SMSR: 0.01; CFI: 0.78; GFI: 0.90; RMSEA: 0.04). Correlations between the latent variables for oblique models were ImpSS/N-Anx: $-0.11/-0.04$; ImpSS/Agg-Host: 0.31/0.34, ImpSS/Act: 0.19/0.14, ImpSS/Sy:

<table>
<thead>
<tr>
<th>Item</th>
<th>SRW</th>
<th>Item</th>
<th>SRW</th>
<th>Item</th>
<th>SRW</th>
<th>Item</th>
<th>SRW</th>
<th>Item</th>
<th>SRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
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<td>14</td>
<td>0.44</td>
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<td>0.40</td>
<td>8</td>
<td>0.47</td>
<td>5</td>
<td>0.48</td>
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<td>0.61</td>
<td>34</td>
<td>0.43</td>
<td>22</td>
<td>$-0.46$</td>
<td>11</td>
<td>0.42</td>
<td>13</td>
<td>0.33</td>
</tr>
<tr>
<td>35</td>
<td>0.58</td>
<td>39</td>
<td>0.57</td>
<td>37</td>
<td>0.33</td>
<td>21</td>
<td>$-0.40$</td>
<td>33</td>
<td>0.72</td>
</tr>
<tr>
<td>41</td>
<td>0.51</td>
<td>55</td>
<td>0.56</td>
<td>43</td>
<td>0.50</td>
<td>31</td>
<td>$-0.28$</td>
<td>38</td>
<td>$-0.40$</td>
</tr>
<tr>
<td>46</td>
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<td>0.43</td>
<td>48</td>
<td>$-0.49$</td>
<td>42</td>
<td>0.34</td>
<td>44</td>
<td>$-0.69$</td>
</tr>
<tr>
<td>61</td>
<td>0.54</td>
<td>65</td>
<td>0.41</td>
<td>63</td>
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<td>59</td>
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</tr>
<tr>
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<td>0.50</td>
<td>70</td>
<td>0.55</td>
<td>68</td>
<td>0.56</td>
<td>72</td>
<td>0.49</td>
<td>64</td>
<td>0.28</td>
</tr>
<tr>
<td>80</td>
<td>0.58</td>
<td>79</td>
<td>0.45</td>
<td>78</td>
<td>$-0.49$</td>
<td>77</td>
<td>0.49</td>
<td>74</td>
<td>0.44</td>
</tr>
<tr>
<td>85</td>
<td>$-0.50$</td>
<td>84</td>
<td>0.44</td>
<td>87</td>
<td>0.61</td>
<td>86</td>
<td>$-0.44$</td>
<td>83</td>
<td>0.78</td>
</tr>
<tr>
<td>90</td>
<td>0.52</td>
<td>95</td>
<td>0.42</td>
<td>92</td>
<td>$-0.35$</td>
<td>97</td>
<td>0.50</td>
<td>94</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note: Neuroticism-Anxiety (N-Anx), Impulsive-Sensation Seeking (ImpSS), Activity (Act), Sociability (Sy), Aggression-Hostility (Agg-Host).
Correlations in the total sample between the scores obtained with the original ZKPQ (89-items) and the ZKPQ-50-CC were 0.90, 0.87, 0.94, 0.95, and 0.92 for the N-Anx, ImpSS, Sy, Agg-Host, and Act scales, respectively. Thus, the scores obtained with the 50-item instrument are quite comparable to those obtained with the longer version. The correlations between ZKPQ factor-derived scales for the 50-item version were ImpSS/N-Anx: 0.05; ImpSS/Agg-Host: 0.19, ImpSS/Act: 0.14, ImpSS/Sy: 0.20, N-Anx/Agg-Host: 0.18, N-Anx/Act: −0.09, N-Anx/Sy: −0.09, Agg-Host/Act: −0.01, Agg-Host/Sy: 0.08 and Act-Sy: 0.14. Congruent with Zuckerman’s orthogonal model, correlations are quite low.

### 3.3. Cross-cultural comparisons of the ZKPQ-50-CC

Table 2 shows the descriptive statistics (mean, standard deviation, skewness, and kurtosis), and alphas of the ZKPQ-50-CC for each country. All scales have satisfactory alpha coefficients above

<table>
<thead>
<tr>
<th>Country</th>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>S</th>
<th>K</th>
<th>Alpha</th>
<th>Agea,b</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>America (N = 2378)</td>
<td>N-Anx</td>
<td>4.64</td>
<td>2.89</td>
<td>.11</td>
<td>−1.06</td>
<td>0.80</td>
<td></td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>ImpSS</td>
<td>6.00</td>
<td>2.55</td>
<td>−.03</td>
<td>−.76</td>
<td>0.72</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Act</td>
<td>4.15</td>
<td>2.60</td>
<td>.31</td>
<td>−.82</td>
<td>0.74</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Sy</td>
<td>6.46</td>
<td>2.53</td>
<td>−.62</td>
<td>−.35</td>
<td>0.74</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Agg-Host</td>
<td>5.47</td>
<td>2.56</td>
<td>−.11</td>
<td>−.83</td>
<td>0.72</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Germany (N = 517)</td>
<td>N-Anx</td>
<td>4.25</td>
<td>3.02</td>
<td>.29</td>
<td>−1.08</td>
<td>0.82</td>
<td>−.15***</td>
<td>−</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>ImpSS</td>
<td>3.94</td>
<td>2.58</td>
<td>.28</td>
<td>−.85</td>
<td>0.73</td>
<td>−.23***</td>
<td>−</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Act</td>
<td>4.81</td>
<td>2.77</td>
<td>.11</td>
<td>−.97</td>
<td>0.74</td>
<td>−.09</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Sy</td>
<td>5.28</td>
<td>2.34</td>
<td>−.35</td>
<td>−.83</td>
<td>0.67</td>
<td>−.13**</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Agg-Host</td>
<td>4.79</td>
<td>2.30</td>
<td>.23</td>
<td>−.64</td>
<td>0.60</td>
<td>−.12**</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Spain (N = 962)</td>
<td>N-Anx</td>
<td>4.02</td>
<td>2.75</td>
<td>.45</td>
<td>−.75</td>
<td>0.79</td>
<td>−.16***</td>
<td>−</td>
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</tr>
<tr>
<td></td>
<td>ImpSS</td>
<td>6.01</td>
<td>2.56</td>
<td>−.33</td>
<td>−.79</td>
<td>0.73</td>
<td>−.15***</td>
<td>−</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Act</td>
<td>4.89</td>
<td>2.84</td>
<td>−.04</td>
<td>−1.10</td>
<td>0.79</td>
<td>−.03</td>
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<td>−</td>
</tr>
<tr>
<td></td>
<td>Sy</td>
<td>6.51</td>
<td>2.49</td>
<td>−.60</td>
<td>−.42</td>
<td>0.74</td>
<td>−.12***</td>
<td>−</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Agg-Host</td>
<td>4.86</td>
<td>2.42</td>
<td>.10</td>
<td>−.75</td>
<td>0.66</td>
<td>−.07*</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Switzerland (N = 764)</td>
<td>N-Anx</td>
<td>4.43</td>
<td>3.03</td>
<td>.25</td>
<td>−1.03</td>
<td>0.83</td>
<td>−.14**</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>ImpSS</td>
<td>5.43</td>
<td>2.68</td>
<td>−.11</td>
<td>−.94</td>
<td>0.74</td>
<td>−.11**</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Act</td>
<td>3.76</td>
<td>2.60</td>
<td>.44</td>
<td>−.75</td>
<td>0.76</td>
<td>−.01</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Sy</td>
<td>5.67</td>
<td>2.42</td>
<td>−.89</td>
<td>−.69</td>
<td>0.71</td>
<td>−.08*</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>Agg-Host</td>
<td>4.72</td>
<td>2.44</td>
<td>.06</td>
<td>−.82</td>
<td>0.68</td>
<td>−.03</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

*a Correlations with age can not be computed for the American sample.

b *p < 0.05; **p < 0.01; ***p > 0.001.
0.70 in each country, except for the Agg-Host scale in Germany, Spain and Switzerland, and the Sy scale in Germany. However, these latter alpha coefficients were only slightly lower (0.60–0.68). Scores show a normal distribution. Only the N-Anx scale in the American, German and Swiss samples and the Act scale in Spain show a slightly high kurtosis. Table 2 also shows correlations between the five factors and age for all countries except the United States. On average over the five dimensions and the three countries, age accounts for 1.24% ($d = 0.20$) of the total variance. Thus, the global effect of age is small (Cohen, 1969). In Germany, correlations range from −0.09 to −0.19 and age accounts on average for 1.90% ($d = 0.26$) of the total variance. In Spain, correlations range from −0.03 to −0.16 and age accounts on average for 1.31% ($d = 0.20$) of the total variance, and in Switzerland, correlations range from −0.01 to −0.11 and age accounts on average for 0.52% ($d = 0.12$) of the total variance.

A two-way ANOVA on N-Anx with country and gender as factors indicated that there was a significant country effect, $F(3,4613) = 12.73$, $p < 0.001$ ($d = 0.18$), a significant gender effect, $F(1,4613) = 386.36$, $p < 0.001$ ($d = 0.58$), and a significant interaction effect, $F(3,4613) = 12.85$, $p < 0.001$ ($d = 0.18$). Only the gender effect was associated with a $d$ higher than 0.20. Women scored globally higher than men on this scale. For ImpSS, there was a significant country effect, $F(3,4613) = 69.83$, $p < 0.001$ ($d = 0.43$), and a significant gender effect, $F(1,4613) = 44.57$, $p < 0.001$ ($d = 0.20$), but no significant interaction effect, $F(3,4613) = 0.16$, $p = 0.93$ ($d < 0.01$). Country and gender effects were associated with a $d$ higher than 0.20. The American sample scored particularly high and the German sample particularly low on this scale (see Table 2). Moreover, women scored lower than men on this scale. For Act, there was a significant country effect, $F(3,4613) = 31.93$, $p < 0.001$ ($d = 0.28$), and a significant gender effect, $F(1,4613) = 18.50$, $p < 0.001$ ($d = 0.12$), but no significant interaction effect, $F(3,4613) = 0.38$, $p = 0.77$ ($d < 0.01$). Only the country effect was associated with a $d$ higher than 0.20. The Spanish sample scored particularly high and the Swiss sample particularly low on this scale. For Sy, there was a significant country effect, $F(3,4613) = 44.16$, $p < 0.001$ ($d = 0.35$), and a significant gender effect, $F(1,4613) = 15.44$, $p < 0.001$ ($d = 0.10$), but no significant interaction effect, $F(3,4613) = 1.99$, $p = 0.11$ ($d = 0.06$). Only the country effect was associated with a $d$ higher than 0.20. The American and the Spanish samples scored particularly high and the German and the Swiss samples particularly low on this scale. For Agg-Host, there was a significant country effect, $F(3,4613) = 38.40$, $p < 0.001$ ($d = 0.30$), a significant gender effect, $F(1,4613) = 4.42$, $p = 0.04$ ($d = 0.06$), and a significant interaction effect, $F(3,4613) = 11.74$, $p < 0.001$ ($d = 0.18$). Only the country effect was associated with a $d$ higher than 0.20. The American sample scored particularly high on this factor compared to the three other samples. Globally, the country factor accounted for 2.5% of the total variance, the gender variable for 1.9% of the total variance, and the interaction term for 0.3% of the total variance. Finally, since the age variable also plays a role in personality mean-level (Eysenck & Eysenck, 1985), it should be controlled. Specifically for the ZKPQ, ImpSS and N-Anx decrease with age (Zuckerman, 1994). When controlling for age, the country variable, excluding the American sample, accounted for 1.5% of the total variance, the gender variable for 2.1% of the total variance, and the interaction term for 0.4% of the total variance. Gender and age group means by country are available upon request from the first author.

In order to test if the 50-item structure fits well across countries, a principal components analysis with Varimax solution over the 50-item version was obtained separately for each country. The Scree plot supported a five-factor solution in the four countries. The variance accounted for by the
five factors was around 34% in all cases. The 50 items loaded as expected, except for item 48 (Sy) in the German sample (0.11), item 92 (Sy) in both the German (−0.08) and Swiss (−0.01) samples, and item 3 (Agg-Host) in the Swiss sample (0.29) (Again, item number is with regard to the original ZKPQ). Congruence coefficients were computed following the Orthogonal Procrustes method used by McCrae, Zonderman, Costa, Bond, and Paunonen (1996). The total congruence coefficient between each pair of countries was SP–SW (0.94), SP–US (0.96), SP–GE (0.92), SW–US (0.96), SW–GE (0.93), and US–GE (0.93). To reinforce these analyses, a multi-group CFA was conducted. The oblique 50-item model was simultaneously fitted in the four countries. This model obtained a $\chi^2$ of 9602.629 ($p < 0.001$; d.f. = 4660). Although the CFI was not good (0.77), other fit indexes as the $\chi^2$/d.f. (2.06), SMSR (0.01) and the RMSEA (0.02) support that this structure is invariant across the four countries.

4. Discussion

The main aim of this study was to obtain a ZKPQ version with acceptable psychometric properties in four languages. In this way, a 50-item version (10 per scale) of the ZKPQ (ZKPQ-50-CC) was developed using several multivariate techniques such as exploratory and confirmatory factor analysis. This short version of the ZKPQ presents an equivalent factor structure in the four languages, since all scales obtained high congruence indexes across the four languages and multi-group CFA results were satisfactory. As regards reliability, the mean of the five scales was higher than 0.70 in the four countries, and all indexes were similar to those obtained for the original version.

The results of this study represent, therefore, a double contribution to the ZKPQ literature: (1) demonstrating the cross-cultural validity of Zuckerman’s Alternative Five Personality Model, and (2) developing a short version with good psychometric and structural properties in four different languages (English, French, German, and Spanish). The cross-cultural design and the use of multivariate statistical procedures in its development give this short version the edge over the 35- and 69-item ZKPQ versions developed with American and Spanish samples, respectively.

Developing short versions of personality questionnaires is a common practice in personality assessment (Buchanan et al., 2005). Some instances are the Eysenck Personality Questionnaire (EPQ-RS, Eysenck & Eysenck, 1991), the NEO-PI-R (Aluja, García, Rossier, & García, 2005; McCrae & Costa, 2004), the Sensation Seeking Scale, form V (Aluja, García, & García, 2004b; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002), the Big Five Goldberg’s adjectives (García, Aluja, & García, 2004; Goldberg, 1992), the STAXI-CA (del Barrio, Aluja, & Spielberger, 2004). These short versions can reduce the administration time for the scales at little cost in terms of reduced reliability. The decision as to the number of items of these short versions varies depending on the authors, but it is usually a data driven procedure based on statistical criteria such as, for instance, classical theory indexes or factor loadings. In the present study, we have

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1 We thank Robert R. McCrae for providing us with the SPSS version of the program that performs the Orthogonal Procrustes rotation.

2 GE = Germany; SP = Spain; SW = Switzerland; US = United States of America.

3 Additional statistical information is available from the first author.
conducted a similar procedure to that used by (Aluja et al., 2003a). Following this procedure, the Sy scale would have 8 items (MIs > 100). However, we decided to retain 10 items for this scale for several reasons: (a) to maintain the same number of items for all scales, (b) all standardized regression weights of the Sy scale were high which gives support to the construct validity and dimensionality of the scale, (c) the internal consistency of the 10-item scale in the four countries was acceptable, and (d) there was a high correlation between the original and the 10-item Sy scales.

The CFA is a useful tool for analysing questionnaires and the selection of items, and for testing the factorial validity of scores from a measurement instrument (Byrne, 2001, pp. 104–119). Following this idea, fit indexes, multi-group analysis and standardized regression weights were used in the present study. The results strongly support the construct and cross-cultural validity of the items selected for each scale. Although fit indexes could be improved if the number of items was reduced to five per factor, this strategy would result in limited content diversity and reduce the reliability of the scale.

Alpha reliability coefficients were similar to those of the original 89-item version. Moreover, correlations between the short form of the scale and the original versions were around 0.90. This is especially interesting in the case of the ImpSS scale, since the new scale includes only 2 items of the impulsivity facet. However, the remaining 8 items also reflect a kind of impulsivity expressed in spontaneous types of sensation seeking without reflection on possible risks or consequences. Markon, Krueger, and Watson (2005) maintain that an “Unconscientious Disinhibition” factor, represented by the ImpSS scale in the ZKPQ, is one of four primary factors found in a hierarchical structure common to normal and abnormal personality.

The effect sizes of the mean-level comparisons across countries show only slight differences between Americans, German, Spanish, and Swiss mean scores ($d \leq 0.43$). The largest differences may be observed between the American and German samples. Globally the country variable accounted for 2.5% of the total variance, which corresponds to a $d$-value of 0.32. Age differences between samples could explain this pattern, especially for the ImpSS scale. Indeed, the impact of the country variable decreased to 1.5% of the total variance after controlling for age ($d = 0.24$). The gender differences were similar to those usually observed using the ZKPQ (Zuckerman, 2002). Interestingly, no interaction between gender and country with a $d$-value higher than 0.20 was observed. However, it should be remarked that this study is mainly focused on the structural validity of the ZKPQ-50-CC across cultures, and the results support the structure developed in the four countries.

Summing up, the present results support the equivalence of the short version (ZKPQ-50-CC) across the four languages and countries: English (United States), French (Switzerland), German (Germany), and Spanish (Spain). If the validation process had been conducted separately for each language, it is possible that different items would have been selected. Our procedure, in contrast, facilitates the simultaneous selection of the best items in all languages, and tests the resulting factor structure within each one. The ZKPQ-50-CC is, therefore, a useful instrument for assessing personality traits involved in Zuckerman’s Alternative Five-factor Model, and facilitates cross-cultural research since the same items are used in all languages. Nevertheless, the cross-cultural convergent validity of this short scale still needs to be tested, by demonstrating that it correlates equally with expected criteria across cultures. The satisfactory psychometric and cross-cultural properties of ZKPQ-50-CC suggest that it is the short version of election for the research on Zuckerman’s personality model.
References


