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Zuckerman-Kuhlman-Aluja Personality Questionnaire (ZKA-PQ) and Cloninger's Temperament and Character Inventory Revised (TCI-R): A comparative study

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Abstract: The aim of this study was to analyze the psychometric properties (normal distribution values, reliabilities and factor structure) of Zuckerman-Kuhlman-Aluja Personality Questionnaire (ZKA-PQ) and the Temperament and Character Inventory revised (TCI-R), the similarities and differences between both facet-factor questionnaires. The total sample consisted of 482 subjects (53.1 % men and 46.9 % women) from diverse age. Results showed somewhat better psychometric properties, like reliability and facet-factor structure, for the ZKA-PQ than the TCI-R. The expected five factor facet structure of the ZKA-PQ was clear found. However, the seven factor structure of TCI-R was not clear and it did not show a clear distinction between Temperament and Character factors. When ZKA-PQ and TCI-R variables are analysed together, the ZKA-PQ factors are related to the Character as well as the Temperament factors. In some cases they represent the opposite poles of ZKA-PQ factors, e.g. Neuroticism versus Self-Directiveness and Aggression versus Cooperativeness. Some are directly and highly related to ZKA-PQ factors, e.g. Sensation Seeking and Novelty Seeking, Extraversion and Reward Dependence, Neuroticism and Harm Avoidance, and Activity and Persistence

Keywords: ZKA-PQ, ZKPQ, TCI-R, Zuckerman's Alternative five factors, Cloninger's personality model, construct validity.

INTRODUCTION

During the last two decades Zuckerman (1991, 2005) developed a psychobiological approach to personality. His personality model, the Alternative Five, includes five basic factors: Impulsive Sensation Seeking, Neuroticism-Anxiety, Aggression-Hostility, Sociability and Activity (Zuckerman, 2002, 2008). This factor structure has been replicated across different languages and countries: China (Wu, Wang, Du, Jianh & Wang, 2000), French-Switzerland (Rossier, Verardi, Massoudi, & Aluja, 2008), Germany (Angleitner, Reinan & Spinath, 2004; Schmitz, 2004), Spain (Aluja, García, & García, 2004), and the United States (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993).

Considering the strong psychobiological foundation of Zuckerman's model (Stelmack, 2004; Zuckerman, 2005), it may be used as a useful framework to explore the psychobiological basis of personality and, in contrast to taxonomic models as the FFM (Five Factor Model), a causal explanation of individual differences in personality is provided. For instance, it has been postulated that Zuckerman's traits are based on biological correlates, including the monoamine neurotransmitters and the enzymes regulating them. Therefore, since these traits are cross-cultural, partly heritable and partly determined by biological mechanisms, they can be viewed as temperamental traits (Buss & Plomin, 1984; Strelau, 1998).

Cloninger (1987) provides another personality model based on temperamental and characterological characteristics. As in Zuckerman's (1995) model, Cloninger postulates that the monoamine neurotransmitter systems form part of the basis of personality traits. After an initial three-dimensional system (Cloninger, 1987), Cloninger and his colleagues expanded model to a seven factor one composed of four temperamental factors (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence), and three character factors (Self-directiveness, Cooperativeness, and Self-transcendence) (Cloninger, Svrakic & Przybeck, 1993). According to Cloninger, Temperament traits are described as heritable dispositions affecting processing of information by the "perceptual memory system," whereas character traits are based on

differences in the self-concept involving acceptance of self, others, and “nature in general”. They develop from interactions of temperament with the environment and life experiences, and are supposedly less heritable and biologically based than temperament traits.

Cloninger's original design was based on three major factors genetically independent, stable and inheritable: Novelty Seeking, Harm Avoidance, and Reward Dependence. They were assessed through the TPQ (Temperament Personality Questionnaire). However, Cloninger redefined his model and, subsequently, the TPQ became the TCI (Temperament and Character Inventory), a questionnaire incorporating 7 factors, four of Temperament and three of Character scales. However, the TCI showed low reliabilities for some scales. Cloninger, Svrakic, Bayón and Przybeck (1999) revised the questionnaire changing the response format to a Likert-type with five response options and including other modifications. This revised instrument was named the TCI-R. The TCI-R measures the same seven personality factors as the TCI, as well as 29 subscales or facets (16 and 13 facets for the Temperament and 13 facets for the Character traits).

However, the theoretically expected differences between Temperament and Character traits were not supported in previous psychometric studies. Farmer and Goldberg (2008a) and Aluja, Blanch, Gallart, and Dolcet, (2010) showed psychometric **problems including an insufficient** factor structure validation for the TCI-R. Using Structural Equation Modelling techniques, Maitland, Nyberg, Bäckman, Nilson and Adolfsson (2009) also rejected the division between Temperament and Character factors (also, Farmer & Goldberg, 2008b). Arguing against this distinction are the significant correlations between both kind of scales (De Fruyt, Van De Wiele, & Van Heeringen, 2000; Preiss, Kuchařová, Novák, & Štěpánková, 2007). Factor analyzing the facets in seven factors, an unstable structure is usually obtained with facets from different factors of Temperament and Character loading on the same factor (Farmer & Goldberg, 2008a).

Zuckerman's model, the Alternative Five, was developed originally by factoring scales from different tests used in studies of biological factors in personality. Items based on these

factors were used in the development of a personality questionnaire, the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991; Zuckerman, et al., 1993). However, the absence of facets in the ZKPQ precludes the possibility, for instance, of developing more useful equations, based on the Zuckerman's Alternative Five, to predict personality disorders (Aluja, Cuevas, García, & García, 2007). Besides, some studies have demonstrated that facets can be more useful than general factors in predicting some behaviors (Paunonen, Haddock, Forsterling, & Keinonen, 2003). In general, personality profiles for clinical, educational or organizational purposes are more enriched by using many facets rather than broad general factors (Westen, 1995). Following this reasoning, Aluja, Zuckerman and Kuhlman (2010) developed a new test (the Zuckerman-Kuhlman-Aluja Personality Questionnaire [ZKA-PQ]) that includes four facets for each factor. This new instrument has showed a robust five-factor structure and good internal reliabilities for factors and facets within factors in American and Spanish samples (Aluja et al., 2010).

Zuckerman and Cloninger (1996) correlated the scales from the ZKPQ, TCI-R and Eysenck's EPQ questionnaires. Comparing the ZKPQ and the TCI-R Impulsive Sensation Seeking correlated with Novelty Seeking (0.66), Neuroticism-Anxiety with Harm Avoidance (0.68), and Aggression-Hostility with Cooperativeness (-0.60), with some lower correlations: Activity correlated with Persistence (0.46), Self-Directiveness with Neuroticism-Anxiety (-0.49) and Aggression-Hostility (-0.32), Reward Dependence with Sociability (0.31) and Aggression-Hostility (-0.27), and Self-Transcendence with Impulsive Sensation Seeking (0.28). In an unpublished doctoral dissertation, Dolcet (2006) correlated the factors of a short version of the ZKPQ (ZKPQ-50-CC; Aluja, Rossier, García, Angleitner, Kuhlman, & Zuckerman, 2006) with TCI-R in a sample from the Spanish population. Reported results were very similar to those of Zuckerman and Cloninger's (1996).

Aluja et al. (2010), examined the relationships between the ZKA-PQ and the TCI-R short version scales. TCI-R Harm-Avoidance correlated positively and Self-Directiveness correlated

negatively with ZKA-PQ Neuroticism; TCI-R Novelty Seeking correlated with ZKA-PQ Sensation Seeking, TCI-R Reward dependence correlated with ZKA-PQ Extraversion; TCI-R Persistence correlated with ZKA-PQ Activity; TCI-R Cooperativeness correlated negatively with ZKA-PQ Aggressiveness. These convergent correlations ranged from moderate to high and all were markedly higher than correlations with irrelevant factors thus demonstrating good convergent and discriminant validities for the five ZKA-PQ factors. Correlations between ZKA-PQ and TCI-R facets were not provided in this study.

The purpose of the present study is to analyze the psychometric properties (distribution, reliabilities and factor structure) of ZKA-PQ and TCI-R in a Spanish sample comparing the Zuckerman's (ZKA-PQ) and Cloninger's (TCI-R) personality models. This comparison is of interest for three reasons: a) both models are focused on temperament or basic personality traits, b) the inclusion of facets in both instruments, and c) both the Zuckerman's and Cloninger's personality models have been used in research in the psychobiological and psychopathological fields of personality (Cloninger et al., 1993; Svrakic, Draganic, Hill, Bayon, Przybeck, & Cloninger, 2002; Zuckerman, 1991; 2005; Zuckerman & Kuhlman, 2000). Unlike previous research comparing the ZKPQ and ZKA-PQ with the TCI-R their internal and cross-test comparisons will be done using factor analyses of facets in both tests.

METHOD

Subjects

The sample consisted of 482 subjects (256 male and 226 female). The mean age was 30.20 (S.D.: 14.60) for men, and 35.54 (S.D.: 14.12) for females. The subjects were recruited from the general population by university students who collaborated in the collection of data. Participation was voluntary and anonymous. In regard to the education level, 43.2% has university studies, 12.9% has finished some university degree, 28.3% completed the High School, 8.5% of the sample has primary or secondary studies, and the remaining, 7.1% no provided

information. This sample is different from that used in the ZKA-PQ original study (Aluja et al, 2010).

Measures

Zuckerman-Kuhlman-Aluja Personality Questionnaire (ZKA-PQ)

The ZKA-PQ has 200 items with a Likert Type response format of four options (Disagree strongly, Disagree somewhat, Agree somewhat, and Agree strongly). The ZKA-PQ includes scores on the five basic factors of the Zuckerman's personality model (Aggressiveness, Neuroticism, Activity, Extraversion and Sensation Seeking). Due to the broader content sampling introduced by facets in this new instrument (Aluja et al, 2010¹), the names of the factors have been slightly modified from the ZKPQ questionnaire. The ZKA-PQ includes four facets for each factor: Sensation Seeking (SS): SS1 (Thrill and Adventure Seeking), SS2 (Experience Seeking), SS3 (Disinhibition) and SS4 (Boredom Susceptibility/Impulsivity); Neuroticism (NE): NE1 (Anxiety), NE2 (Depression), NE3 (Dependency) and NE4 (Low Self-Esteem); Aggression (AG): AG1 (Physical Aggression), AG2 (Verbal Aggression), AG3 (Anger) and AG4 (Hostility). Extraversion (EX): EX1 (Positive Emotions), EX2 (Social Warmth), EX3 (Exhibitionism) and EX4 (Sociability). Activity (AC): AC1 (Work Compulsion), AC2 (General Activity), AC3 (Restlessness) and AC4 (Work Energy). Factor scores are the sums of the four facets for each factor. The Spanish version of the ZKA-PQ (Aluja, et al., 2010) was used in the present study.

Temperament and Character Inventory-Revised

The Temperament and Character Inventory Revised (TCI-R) was developed by Cloninger, Svrakic, Bayón and Przybeck (1999). It has 240 items with a 5-point Likert-type scale measuring four temperament and three character factors from Cloninger's biosocial personality model and their respective facets. The four Temperament factors are Novelty Seeking (NS), Harm

Avoidance (HA), Reward Dependence (RD), and Persistence (PS). The TCI-R measures the following four facets for each temperament dimension: Novelty Seeking (NS): Exploratory excitability (NS1), Impulsiveness (NS2), Extravagance (NS3) and Disorderliness (NS4); Harm Avoidance (HA): Anticipatory worry (HA1), Fear of uncertainty (HA2), Shyness with strangers (HA3) and Fatigability (HA4); Reward Dependence (RD): Sentimentality (RD1), Openness to warmth (RD2), Attachment (RD3) and Dependence (RD4); and Persistence (PS): Eagerness of effort (PS1), Work-hardened (PS2), Ambitious (PS3) and Perfectionist (PS4).

The three character factors are Self-directiveness (SD) (Five facets), Cooperativeness (CO) (Five facets) and Self-transcendence (ST) (Three facets). The facets are as follows: Self-directiveness: Responsibility (SD1), Purposefulness (SD2), Resourcefulness (SD3), Self-acceptance (SD4), and Enlightened second nature (SD5); Cooperativeness (CO): Social acceptance (C1), Empathy (C2), Helpfulness (C3), Compassion (C4), Pure-hearted conscience (C5); and Self-transcendence (ST): Self-forgetful (ST1), Transpersonal identification (ST2) and Spiritual acceptance (ST3). The Spanish version of the Temperament and Character Inventory-Revised (Gutierrez-Zotes, Bayón, et al., 2004) was used in the present study. They reported similar psychometric properties to the original American version in a Spanish population.

RESULTS

Descriptive statistics

Means, standard deviations, normal distribution values, alphas and *t*-test (and Cohen's *d*) comparing genders in ZKA-PQ and TCI-R are shown in Tables 1 and 2, respectively. ZKA-PQ showed appropriate skewness indexes and reliability coefficients in the present sample (± 1). Only one facet (AC3: Restlessness) had an alpha below 0.60). Most were similar to those reported in the original study in a Spanish population (Aluja et al., 2010). *T*-tests showed sex differences with males significantly higher than females on three Sensation Seeking facets, and females

¹ The ZKA-PQ [including the key scores] is available in Aluja et al. (2010).

higher on all Neuroticism and three Extraversion facets. For the TCI-R, skewness and kurtosis indexes were good and most reliability coefficients were adequate except for 9 of the 29 facets with very low alpha coefficients (<0.60). Females scored significantly higher than males on Harm-Avoidance, Reward Dependence and Cooperativeness.

PLEASE, INSERT TABLES 1 AND 2 ABOUT HERE

Exploratory factor analyses (EFA) of ZKA-PQ and TCI-R

We applied a Principal Axis Analysis with Varimax Rotation with the ZKA-PQ facets (Table 3). The five factors extracted accounting for by 57.26% of the variance. (The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.829, and Bartlett's Test of Sphericity: Approx. Chi-Square: 4530.29; d.f.: 190; $p < 0.001$). The MAP method (Verlicer, 1976; O'Connor, 2000) supports the extraction of five factors since the lowest value was obtained for the fifth component (the average squared partial correlations were 0.0275, 0.0252 and 0.0292 for the fourth, fifth and sixth factors, respectively). As can be seen, all facets had their highest loadings on the appropriate factors, with the exception of EX3 (Exhibitionism) that loaded 0.45 on the Sensation Seeking factor and 0.37 on the Extraversion factor. Two facets (Physical Aggression [AG1] and Hostility [AG1]) also had relatively high secondary loadings on the Sensation Seeking (0.405) and Neuroticism (0.427) factors. Congruency coefficients inform that the current factorials matrix is equivalent to original Spanish validations matrix (Aluja et al., 2010)

PLEASE, INSERT TABLE 3 ABOUT HERE

Table 4 shows the factor analysis of the Temperament and Character facets of the TCI-R. Although the MAP method (Verlicer, 1976; O'Connor, 2000) supports the extraction of five factors since the lowest value was obtained for the fifth component (the average squared partial

correlations were 0.0145, 0.0139 and 0.0152 for the fourth, fifth and sixth factors, respectively), seven factors were retained according to the Cloninger's theory through Principal Axis with Varimax rotation procedure. The seven factors accounted for by the 51.19% of the variance (The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.84, and Bartlett's Test of Sphericity: Approx. Chi-Square: 5521.178; d.f.: 406; $p < 0.001$). The order of facets depicted in Table 2 has been retained.

As previously reported in the literature, no clear distinction between Temperament and Character factors can be observed. Firstly, only two facets have loadings larger than 0.40 on the first factor (NS1 and NS2). All facets of Harm Avoidance and three facets of Self-Directiveness had their highest loadings on a second factor. Harm Avoidance is a temperament trait and Self-Directiveness is a character trait yet in the factor analysis they simply represent the opposite poles of a temperament dimension most appropriately called Neuroticism. The third and fourth factors are mainly defined by Reward Dependence and Persistence facets, respectively. The fifth factor is more heterogeneous being composed of four facets of the Cooperativeness character dimension, three facets of temperament (NS4, RD4, and PS3) and one facet of Self-Directiveness (SD4; Self-acceptance). The Self-Transcendence facets defined the sixth factor. Finally, no facet had a high loading on the last factor, the largest loading was for C1 (Social Acceptance; 0.389). As can be seen, the structure of four temperament and three character factors is not supported. Some factors reflect, specially the second and the fifth ones, a mixture of Temperament and Character facets and others (the first and seventh ones) are somewhat difficult to interpret. Five of the 7 factors have at least one of their facets loading more highly on another factor other than the one they are supposed to define. Overall the facet structure shows a weakness, particularly of discriminant validity.

PLEASE, INSERT TABLE 4 ABOUT HERE

The next analyses were performed using a Principal Axis (Varimax rotation) factor method including the 20 facets of the ZKA-PQ and the 29 facets of the TCI-R. Since the ZKA-PQ model postulates 5 factors and the TCI-R model suggests 7 we decided to do both 5 and 7 factor rotations. The 5 factor analysis is shown in Table 5 and the 7 factor in Table 6. The 5 factors accounted for 52% and the 7 factors for 59% of the total variance among the facets.

In the 5 factor solution (The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.887, and Bartlett's Test of Sphericity: Approx. Chi-Square: 13012.82; d.f.: 1176; $p < 0.001$.) the first factor of the 5 factor analysis includes all 4 of the Neuroticism facets from the ZKA-PQ and these are the highest loading facets of the factor. However, it also includes two Aggression facets (AG3, anger, and AG4, hostility) from the ZKA-PQ; two Harm Avoidance Scales (HA 1, worry, HA4, fatigability) from the TCI-R, and (negative loadings) 3 Self-Directive facets (SD 1, 3, & 5) from the TCI-R. This bipolar factor may be called Neuroticism vs. Self-Directiveness.

INSERT TABLE 5 ABOUT HERE

The second factor includes all 4 of the Sensation Seeking scales from the ZKA-PQ, two of the Aggression facet scales (AG1, physical aggression, AG2 verbal aggression), and two Novelty Seeking (NS 2 and 4) facets from the TCI-R. It also includes ZKA-PQ exhibitionism (EX3) and negative loadings from TCI-R self-acceptance (SD4) and fear of uncertainty (HA2) and a positive loading from impulsiveness (NS2). Although this is primarily a sensation seeking factor it is mixed with other kinds of facets.

The third factor contains 3 of the 4 facets of the Extraversion factor from the ZKA-PQ, 3 of the 4 Reward Dependence facets from the TCI-R, and all 5 of the Cooperativeness facets from the TCI-R. In terms of the highest loading facets it could be labelled Extraversion or sociability,

but it also includes many elements of Cooperativeness or what is called "Agreeableness" in the FFM.

The fourth factor is formed by all 4 of the Activity facets from the ZKA-PQ and the 4 Persistence facets of the TCI-R. It may be called Activity/Persistence or Energy. The fifth factor consisted of the 3 Self-Transcendence facets from the TCI-R.

Although the analysis confirmed 4 of the 5 factors of the ZKA-PQ, aggression facets were split between behavioural expressions (physical and verbal aggression) which loaded on the Sensation Seeking factor and emotional expressions (anger and hostility) that loaded on the Neuroticism factor (del Barrio, Aluja, Spielberger, 2004).

Table 6 shows the factor analysis with 7 factors rotated (The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.887, and Bartlett's Test of Sphericity: Approx. Chi-Square: 13012.82; d.f.: 1176; $p < 0.001$.) The seven factor solution yields a clearer picture of the factors and the relationships between ZKA-PQ and TCI-R facets within factors. The first factor is again Neuroticism including all 4 facets of the ZKA-PQ Neuroticism factor, 2 of the 4 Harm Avoidance facets of the TCI-R, and negative loadings from 3 of the 5 Self-Directiveness facets from the TCI-R. The 2 Harm Avoidance facets loading this factor were anticipatory worry (HA1) and Fatigability (HA4). Shyness (HA3) loaded negatively on the Extraversion factor and fear of uncertainty (HA2) loaded negatively on the Sensation Seeking factor. In Cloninger's model Self-Directiveness is a Character rather than a Temperament trait but in this analysis it appears to represent the stable pole of Neuroticism.

PLEASE, INSERT TABLE 6 ABOUT HERE

Aggressiveness appears as an independent factor in this analysis with all 4 of its ZKA-PQ facets included and 4 of the 5 TCI-R facets of Cooperativeness at the opposite pole. Like Self-Directiveness, Cooperativeness is described as a Character trait in Cloninger's model. Both of

these “Character traits” appear to be merely the positive or well-adjusted ends of the negative personality trait dimensions of Neuroticism and Aggressiveness. Of course there is something to be said for measuring the positive ends of traits that are socially undesirable and it may be of some advantage to include both poles in assessment (. The third factor is a combination of all of the Activity facets from the ZKA-PQ and all of the Persistence facets from the TCI-R.

The Extraversion factor is more narrowly defined in the 7 factor solution including facets of Warmth and Sociability from both tests. All 4 ZKA-PQ Extraversion facets, including Exhibitionism, are included.

The Sensation Seeking factor is again defined by all 4 of its facets from the ZKA-PQ plus 2 Novelty Seeking and one Harm Avoidance facet from the TCI-R. Aggressiveness facets do not load on this factor as they did in the 5 factor analysis. The Activity factor from the ZKA-PQ and the Persistence factor from the TCI-R are closely related. What they have in common is a strong energetic work motivation with high standards for achievement. They should be useful in applied research on predicting work effectiveness.

The fifth factor contains all of the Sensation Seeking facets from the ZKA-PQ and two of the Novelty Seeking facets (NS1, Exploratory Excitability, and NS4, Disorderliness) from the TCI-R. As noted previously, fear of uncertainty (HA2) from the Harm Avoidance factor of the TCI-R, loads negatively on this factor. The sixth factor consists solely of the 3 Self-Transcendence facets from the TCI-R. The seventh and weakest factor consists solely of two impulsivity scales: NS2 and NS3 from the TCI-R and a secondary loading of Boredom Susceptibility/Impulsivity (SS4) from the ZKA-PQ.

Correlations

Correlations between the ZKA-PQ and TCI-R dimensions and facets are presented in the Table 7. Focusing on the most relevant correlations between dimensions, Novelty Seeking correlates with Sensation Seeking (0.53), Harm Avoidance with Neuroticism (0.61), Reward

Dependence with Extroversion (0.61), Persistence with Activity (0.69), Self-Directiveness with Aggressiveness (-0.51), and Neuroticism (-0.63), and Cooperativeness with Aggressiveness (-0.55) and Extroversion (0.41). Self-Transcendence has no relevant correlation being the largest relationship with Neuroticism (0.21). In general, reported results replicate the pattern observed by Zuckerman and Cloninger (1996).

PLEASE, INSERT TABLE 7 ABOUT HERE

DISCUSSION

This study was designed to analyze the psychometric properties of the ZKA-PQ and the TCI-R instruments and to compare differences and semblances in factors and facets. Results showed similar ZKA-PQ descriptive statistics, sex differences, internal consistence and factor structure comparing with previous studies (Aluja et al., 2010; García, Escorial, García, Blanch, & Aluja, *in press*) obtained in different samples.

In regard to the psychometric properties, the ZKA-PQ dimension with the highest reliability coefficient was Aggressiveness (0.91) and the lowest was Sensation Seeking (0.86). The coefficients for the dimensions of the TCI-R range between 0.87 and 0.63, for Persistence and Novelty Seeking, respectively. It deserves to be mentioned that the low reliability of Novelty Seeking as well as the lack of significant gender differences on this trait generally observed in many other studies assessing similar constructs (i.e., Costa, Terracciano & McCrae, 2001; Ball, Farnil, & Wangeman, 1984; Zuckerman, 1994) argue against the validity of this scale. In general, the ZKA-PQ is more reliable than TCI-R considering that the mean reliability coefficient of all dimensions and facets of the ZKA-PQ and TCI-R was 0.76 and 0.67, respectively.

On regard to the factor structure, the five factor solution for the ZKA-PQ resembles the original one reported for American and Spanish samples (Aluja et al., 2010) with almost no secondary loadings for any facet. On the contrary, the factor structure for the TCI-R did not

support the distinction between temperament and character since some factors were formed by a combination of facets of both kinds. It is highlighted that the last two factors were difficult to interpret given the lack of relevant loadings on them. Therefore, results of the current study do not justify Cloninger's distinction between Temperament and Character traits.

As expected, the most intense relationships between both models are reported for the Cloninger's Temperament dimensions. Neuroticism is highly related with Harm Avoidance, Cloninger's Temperament trait Persistency with Activity in the ZKA-PQ, and Novelty Seeking with Sensation Seeking. Focusing on the character traits, the Self-Directiveness factor is the reverse of Neuroticism and the Cooperativeness dimension is the opposite pole of the Aggressiveness factor in the ZKA-PQ. Only Self-transcendence is unique to the TCI-R and distinctive from other personality traits in the ZKA-PQ and the remaining variables of the TCI-R. It should be remarked that, although a Self-transcendence or spiritual trait may be meaningful and valid in some contexts, there is no evidence of it as a basic personality trait in other systems.

Factorial validity is also better for the ZKA-PQ. Only one of the 20 ZKA-PQ facets (Exhibitionism, EX3) loaded higher (slightly) on another factor (Sensation Seeking) than the one to which it had been assigned (Extraversion). In fact, only 3 facets had moderate secondary loadings on a factor other than the one to which they were supposed to belong. In contrast 5 of the 7 TCI-R factors had at least one facet loading more highly on another factor than the one to which they were assigned.

Bearing in mind the better psychometric properties and factor structure of ZKA-PQ, this could be view as the preferred choice in practical and research setting. This statement may be particular appropriate in, for instance, the measurement of Sensation Seeking trait. Since construct validity of the Zuckerman's Sensation seeking scale as well as its psychometric properties are better than the corresponding scale in the Cloninger's system (Novelty Seeking), the SS trait may be more useful to predict disorders related with impulsivity and the need for new and risky activities as, for instance, Antisocial and other Cluster B personality disorders

(Zuckerman, 1999) than do Novelty Seeking. On the other hand, research findings may advocate for using the TCI-R in different contexts. In this way, Self-Directiveness trait has been observed to be especially useful in the description of personality disorders (Svrakic, et al., 2002). Since this trait is not well covered by the Zuckerman's model, it may add some incremental power to the Zuckerman's dimensions in the prediction of psychiatric disorders. Another example is the relevance of two TCI-R character traits, Self-directedness and Cooperativeness, for well-being (Cloninger & Zohar, 2011).

A limitation of this study is the nature of the sample. Although it is far from being composed by university students only, the proportion of highly educated people is large, so it is not entirely representative of the general population.

Summing up, there is certainly much in common between ZKA-PQ and TCI-R factors using facets: Neuroticism and Harm-Avoidance, Aggression and Cooperativeness, Sensation Seeking and Novelty Seeking, Extraversion and Reward Dependence, and Activity and Persistence. However, considering that the actual correlations between the factors vary from 0.51 to 0.69, there is enough room for some factor variance not shared and specific to each test. Helpful studies to understand this not shared variance may analyse each instrument conjointly with other personality measures. Since the FFM supposes a somewhat different view of personality compared to this psychobiological approach, and the NEO-PI-R is also composed by facets, this instrument could be of special interest. Some papers have already addressed this issue (De Fruyt, et al., 2010; García et al., *in press*).

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TABLES

Table 1

ZKA-PQ descriptive statistics, internal consistency and sex differences.

Facets and Factors	All					Male		Female		<i>t</i>	Sig.	Cohen's <i>d</i>
	M	Sd	S	K	Alpha	Mean	Sd	Mean	Sd			
AG1 Physical Aggression	19.74	6.80	.603	-.365	.879	20.85	6.92	18.49	6.46	3.845	.000	.35
AG2 Verbal Aggression	26.39	4.91	.175	.094	.716	26.20	4.65	26.60	5.19	-.888	.375	-.08
AG3 Anger	22.90	5.42	.243	.059	.800	22.22	5.10	23.66	5.67	-2.925	.004	-.26
AG4 Hostility	21.12	4.54	.085	-.028	.683	21.38	4.49	20.83	4.59	1.329	.185	.12
<i>Aggressiveness</i>	<i>90.16</i>	<i>17.47</i>	<i>.286</i>	<i>-.052</i>	<i>.910</i>	<i>90.66</i>	<i>16.82</i>	<i>89.59</i>	<i>18.19</i>	<i>.671</i>	<i>.503</i>	<i>-.06</i>
AC1 Work Compulsion	24.48	5.23	.062	-.232	.732	24.56	5.38	24.40	5.08	.334	.738	.03
AC2 General Activity	27.24	5.19	.012	-.209	.752	27.36	5.21	27.12	5.19	.505	.614	.04
AC3 Restlessness	27.44	4.27	.000	.040	.593	26.78	4.32	28.20	4.11	-3.693	.000	-.33
AC4 Work Energy	30.35	5.33	-.339	-.092	.824	29.83	5.49	30.94	5.11	-2.281	.023	-.20
<i>Activity</i>	<i>109.53</i>	<i>14.86</i>	<i>.035</i>	<i>.362</i>	<i>.868</i>	<i>108.54</i>	<i>15.05</i>	<i>110.66</i>	<i>14.60</i>	<i>-1.572</i>	<i>.117</i>	<i>-.14</i>
EX1 Positive Emotions	32.48	4.36	-.678	.330	.727	31.90	4.41	33.14	4.21	-3.165	.002	-.28
EX2 Social Warmth	31.23	5.29	-.298	-.252	.815	30.40	5.04	32.17	5.42	-3.721	.000	-.33
EX3 Exhibitionism	25.61	4.94	-.021	.133	.746	25.97	4.84	25.21	5.03	1.679	.094	.15
EX4 Sociability	30.17	4.92	-.306	-.240	.743	29.72	4.90	30.67	4.91	-2.111	.035	-.19
<i>Extraversion</i>	<i>119.50</i>	<i>14.67</i>	<i>-.111</i>	<i>.161</i>	<i>.882</i>	<i>118.00</i>	<i>14.99</i>	<i>121.21</i>	<i>14.13</i>	<i>-2.408</i>	<i>.016</i>	<i>-.22</i>
NE1 Anxiety	23.65	4.95	.165	.058	.708	23.07	4.83	24.31	5.03	-2.778	.006	-.25
NE2 Depression	22.14	4.83	.344	.173	.689	21.34	4.57	23.05	4.98	-3.928	.000	-.35
NE3 Dependence	23.90	4.47	.054	-.078	.630	23.29	4.27	24.59	4.61	-3.200	.001	-.29
NE4 Low Self-esteem	20.86	5.53	.205	-.244	.812	20.17	5.58	21.65	5.40	-2.947	.003	-.26
<i>Neuroticism</i>	<i>90.55</i>	<i>17.47</i>	<i>.286</i>	<i>-.052</i>	<i>.895</i>	<i>87.87</i>	<i>15.87</i>	<i>93.60</i>	<i>16.73</i>	<i>-3.856</i>	<i>.000</i>	<i>-.35</i>
SS1 Thrill and Adventure	24.85	5.70	-.131	-.225	.693	26.41	5.44	23.10	5.49	6.635	.000	.60
SS2 Experience Seeking	25.96	4.86	-.137	-.016	.681	25.76	4.60	26.19	5.15	-.995	.340	-.08
SS3 Desinhibition	23.35	5.48	.061	-.386	.771	23.87	5.12	22.77	5.82	2.218	.027	.20
SS4 Boredom Susceptibil.	20.35	4.01	.256	.725	.629	20.71	4.10	19.94	3.88	2.219	.034	.19
<i>Sensation Seeking</i>	<i>94.52</i>	<i>15.05</i>	<i>-.266</i>	<i>-.137</i>	<i>.856</i>	<i>96.76</i>	<i>14.29</i>	<i>91.99</i>	<i>15.53</i>	<i>3.509</i>	<i>.000</i>	<i>.32</i>

Table 2
TCI-R descriptive statistics, internal consistency and sex differences.

Facets and Factors	All					Male		Female		<i>t</i>	Sig	Cohen's <i>d</i>
	M	SD	S	K	Alpha	M	SD	M	SD			
NS1 Exploratory excitability	31.70	5.00	-.075	.214	.476	31.31	4.82	32.15	5.16	-1.84	.066	-.16
NS2 Impulsiveness	23.42	5.46	.093	-.135	.667	23.75	5.46	23.05	5.46	1.38	.166	.12
NS3 Extravagance	27.90	4.16	-.023	-.321	.639	27.53	4.17	28.33	4.11	-2.21	.034	-.19
NS4 Disorderliness	19.30	4.29	.251	.102	.490	19.64	4.25	18.90	4.32	1.89	.059	.17
<i>NS Novelty Seeking</i>	<i>102.34</i>	<i>11.46</i>	<i>-.033</i>	<i>-.094</i>	<i>.631</i>	<i>102.24</i>	<i>11.24</i>	<i>102.45</i>	<i>11.73</i>	<i>-.20</i>	<i>.842</i>	<i>-.01</i>
HA1 Anticipatory worry	30.16	5.43	.269	.511	.567	29.66	5.39	30.73	5.44	-2.15	.032	-.19
HA2 Fear of uncertainty	22.85	5.02	-.120	-.034	.653	21.62	4.89	24.25	4.81	-5.93	.000	-.54
HA3 Shyness with strangers	20.52	4.94	.146	-.156	.682	20.56	4.76	20.48	5.15	.168	.000	.01
HA4 Fatigability	21.46	5.12	.168	.166	.648	21.04	5.13	21.93	5.07	-1.902	.058	.17
<i>HA Total Harm Avoid</i>	<i>95.01</i>	<i>15.02</i>	<i>.099</i>	<i>.014</i>	<i>.817</i>	<i>92.89</i>	<i>14.77</i>	<i>97.40</i>	<i>14.97</i>	<i>-3.32</i>	<i>.001</i>	<i>-.30</i>
RD1 Sentimentality	27.62	4.75	-.089	-.168	.583	26.41	4.46	28.98	4.71	-6.13	.000	-.56
RD2 Openness to warm	35.11	6.19	-.019	.079	.717	34.44	5.92	35.88	6.41	-2.54	.011	-.23
RD3 Attachment	21.09	4.76	-.265	-.309	.694	20.53	4.52	21.73	4.95	-2.75	.006	-.25
RD4 Dependence	20.35	3.93	-.020	-.452	.544	19.96	3.78	20.79	4.05	-2.30	.022	-.21
<i>RD Total Reward Dependence</i>	<i>104.18</i>	<i>14.30</i>	<i>.021</i>	<i>.184</i>	<i>.819</i>	<i>101.36</i>	<i>12.88</i>	<i>107.38</i>	<i>15.17</i>	<i>-4.71</i>	<i>.000</i>	<i>-.43</i>
PS1 Eagerness of effort	28.32	5.34	.072	-.107	.630	27.64	5.35	29.09	5.25	-3.00	.003	-.27
PS2 Work hardened	26.71	4.56	-.125	.263	.616	26.68	4.67	26.73	4.44	-.12	.902	-.01
PS3 Ambitious	31.10	6.39	.108	-.232	.758	32.17	6.04	29.89	6.57	3.97	.000	.36
PS4 Perfectionist	25.79	5.18	-.071	.408	.698	25.83	5.18	25.74	5.18	.187	.851	.01
<i>PS Total persistence</i>	<i>111.93</i>	<i>16.93</i>	<i>.050</i>	<i>.701</i>	<i>.866</i>	<i>112.33</i>	<i>16.86</i>	<i>111.47</i>	<i>17.04</i>	<i>.557</i>	<i>.572</i>	<i>.05</i>
SD1 Responsibility	30.26	5.18	-.338	-.275	.693	30.04	5.16	30.51	5.19	-1.00	.316	-.09
SD2 Purposefulness	22.81	3.87	-.697	.689	.574	22.84	3.81	22.78	3.94	.171	.864	.01
SD3 Resourcefulness	18.22	3.48	-.398	.218	.605	18.40	3.41	18.01	3.56	1.23	.218	.11
SD4 Self-acceptance	31.04	6.96	-.190	-.284	.734	30.70	6.98	31.43	6.94	-1.14	.251	-.10
SD5 Enlightened second	38.59	5.47	-.053	.084	.603	38.43	5.50	38.78	5.44	-.69	.490	-.06
<i>SD Total Self-directiveness</i>	<i>140.94</i>	<i>16.93</i>	<i>-.007</i>	<i>-.152</i>	<i>.830</i>	<i>140.43</i>	<i>16.80</i>	<i>141.53</i>	<i>17.08</i>	<i>-.71</i>	<i>.478</i>	<i>-.06</i>
C1 Social acceptance	30.45	4.84	-.405	-.095	.693	29.69	4.90	31.32	4.63	-3.74	.000	-.34
C2 Empathy	17.70	3.13	-.236	-.182	.450	17.08	2.92	18.40	3.23	-4.70	.000	-.43
C3 Helpfulness	29.61	4.25	-.263	.284	.536	28.89	4.09	30.43	4.30	-4.02	.000	-.36
C4 Compassion	26.45	5.36	-.733	-.054	.798	25.55	5.44	27.48	5.10	-4.00	.000	-.36
C5 Pure-hearted conscience	29.59	4.58	-.055	-.343	.501	28.93	4.63	30.34	4.41	-3.41	.001	-.31
<i>C Total cooperativeness</i>	<i>133.83</i>	<i>16.42</i>	<i>-.274</i>	<i>-.283</i>	<i>.853</i>	<i>130.15</i>	<i>16.03</i>	<i>137.99</i>	<i>15.89</i>	<i>-5.37</i>	<i>.000</i>	<i>-.49</i>
ST1 Self-forgetful	30.95	6.95	.004	.058	.723	30.71	6.74	31.22	7.19	-.81	.418	-.07
ST2 Transpersonal identify	19.61	5.15	.083	-.376	.648	19.58	5.13	19.63	5.19	-.09	.927	.00
ST3 Spiritual acceptance	18.87	5.49	.485	.067	.675	18.17	5.20	19.66	5.71	-3.00	.003	-.20
<i>ST Total self-transcend.</i>	<i>69.43</i>	<i>13.90</i>	<i>.074</i>	<i>.111</i>	<i>.821</i>	<i>68.47</i>	<i>13.79</i>	<i>70.52</i>	<i>13.98</i>	<i>-1.62</i>	<i>.106</i>	<i>-.14</i>

Note: M: Mean; SD: Standard deviation; S: Skewness; K: Kurtosis

Table 3

ZKA-PQ facets factor analysis and congruence coefficients with the original Spanish validation sample.

	I	II	III	IV	V	CC
AG1 Physical Aggression	.59	-.01	-.32	.00	.40	.98
AG2 Verbal Aggression	.68	-.01	.17	.19	.22	.96
AG3 Anger	.76	.04	-.13	.38	.12	1
AG4 Hostility	.57	-.02	-.33	.43	.17	1
AC1 Work Compulsion	-.03	.63	-.08	.06	.04	.97
AC3 Restlessness	-.03	.76	.11	-.05	.20	1
AC2 General Activity	.20	.55	.17	.10	.07	.97
AC4 Work Energy	-.17	.65	.28	-.26	-.28	.99
EX1 Positive Emotions	-.06	.26	.67	-.35	-.02	.97
EX2 Social Warmth	-.14	.03	.74	-.11	-.08	.99
EX3 Exhibitionism	.19	.01	.37	-.04	.45	.95
EX4 Sociability	-.02	.11	.75	-.11	.23	1
NE1 Anxiety	.26	.14	-.10	.74	.14	.99
NE2 Depression	.21	-.03	-.20	.77	-.03	1
NE3 Dependence	.07	-.01	.06	.70	-.10	.97
NE4 Low Self-esteem	.09	-.08	-.33	.77	.06	.98
SS1 Thrill and Adventure	.12	.17	-.08	-.12	.58	.98
SS2 Experience Seeking	-.03	.09	.22	.05	.63	.97
SS3 Disinhibition	.24	.01	.09	.05	.80	1
SS4 Boredom Susceptibility	.19	-.09	-.22	.12	.56	.98
<i>Eigenvalues</i>	<i>4.74</i>	<i>2.23</i>	<i>1.43</i>	<i>1.17</i>	<i>1.09</i>	
<i>% Accounted variance</i>	<i>10.42</i>	<i>9.05</i>	<i>11.71</i>	<i>14.30</i>	<i>11.78</i>	
<i>CC</i>	<i>.98</i>	<i>.97</i>	<i>.99</i>	<i>.99</i>	<i>.97</i>	<i>.98</i>

Note: Loadings > 0.40 are in boldface. CC: Congruence Coefficient.

Table 4
TCI-R facets factor analysis.

	I	II	III	IV	V	VI	VII
NS1 Exploratory excitability	.44	.07	.22	.39	.14	.11	.18
NS2 Impulsiveness	.40	.01	-.05	-.18	-.31	.08	-.07
NS3 Extravagance	.38	.13	.06	-.10	.08	-.12	-.07
NS4 Disorderliness	.37	.06	.13	-.19	-.45	.02	.31
HA1 Anticipatory worry	-.11	-.71	-.00	-.06	-.05	-.01	.01
HA2 Fear of uncertainty	-.32	-.55	.08	-.17	.35	-.03	-.21
HA3 Shyness with strangers	-.38	-.41	-.31	-.14	-.01	-.10	-.06
HA4 Fatigability	-.13	-.49	-.03	-.48	.05	.08	.01
RD1 Sentimentality	-.17	-.28	.52	.07	.25	.24	.11
RD2 Openness to warm	.12	.18	.83	.10	.13	.07	.08
RD3 Attachment	.16	.06	.70	.00	.15	-.04	-.06
RD4 Dependence	.01	-.11	.22	-.04	.50	-.10	-.03
PS1 Eagerness of effort	-.02	.05	.00	.64	.16	.11	-.15
PS2 Work hardened	-.06	.18	.08	.71	.05	.12	.18
PS3 Ambitious	-.04	.12	.13	.68	-.45	.01	.10
PS4 Perfectionist	-.13	.08	-.01	.80	.04	.04	-.03
SD1 Responsibility	.01	.51	.13	.05	.39	-.31	.08
SD2 Purposefulness	-.09	.37	.22	.34	.19	-.07	.11
SD3 Resourcefulness	.13	.50	-.00	.42	.23	-.12	.03
SD4 Self-acceptance	-.01	.18	-.22	-.17	.68	.02	-.10
SD5 Enlightened second	-.23	.52	.15	.34	.27	-.16	-.18
C1 Social acceptance	-.13	.17	.28	.04	.52	-.07	.39
C2 Empathy	-.08	.09	.43	.10	.32	.12	.34
C3 Helpfulness	.01	.20	.24	.06	.72	-.12	.10
C4 Compassion	.01	.03	.21	.09	.65	.01	.05
C5 Pure-hearted conscience	.03	.05	.15	.17	.61	-.01	.00
ST1 Self-forgetful	-.04	-.13	.11	.17	-.27	.64	.27
ST2 Transpersonal	-.05	.00	.11	.06	-.11	.76	-.03
ST3 Spiritual acceptance	.05	-.05	-.02	.00	.07	.57	-.05
<i>Eigenvalues</i>	<i>6.07</i>	<i>4.18</i>	<i>2.77</i>	<i>2.49</i>	<i>1.49</i>	<i>1.18</i>	<i>0.94</i>
<i>% Accounted variance</i>	<i>3.86</i>	<i>8.56</i>	<i>7.72</i>	<i>10.72</i>	<i>12.32</i>	<i>5.66</i>	<i>2.39</i>

Note: Loadings > 0.40 are in boldface.

Table 5.

ZKA-PQ and TCI-R facets factors analysis (Five factors solution).

	I	II	III	IV	V
NE2 Depression	.79	.05	-.09	-.07	.12
NE1 Anxiety	.76	.20	-.01	.10	.10
NE4 Low Self-esteem	.75	.04	-.19	-.16	.15
NE3 Dependence	.68	-.07	.12	-.07	.07
HA1 Anticipatory worry	.66	-.07	-.13	-.05	.03
AG3 Anger	.57	.46	-.15	.06	-.18
AG4 Hostility	.56	.43	-.35	.00	-.09
SD3 Resourcefulness	-.54	-.04	.19	.36	-.13
HA4 Fatigability	.49	-.15	-.10	-.45	.08
SD5 Enlightened second nature	-.48	-.29	.22	.35	-.17
SD1 Responsibility	-.46	-.19	.34	.05	-.34
SS3 Disinhibition	.02	.77	.10	.01	.11
NS4 Disorderliness	.03	.65	.07	-.18	.00
AG1 Physical Aggression	.17	.62	-.35	.03	-.15
EX3 Exhibitionism	-.10	.59	.33	.08	.05
SS4 Boredom Susceptibility/Impulsivity	.10	.57	-.16	-.14	.09
SD4 Self-acceptance	-.24	-.54	.10	-.17	-.05
HA2 Fear of uncertainty	.52	-.54	.06	-.14	-.08
SS1 Thrill and Adventure Seeking	-.13	.50	-.08	.19	.01
AG2 Verbal Aggression	.36	.49	.11	.06	-.26
SS2 Experience Seeking	-.06	.48	.25	.10	.23
NS2 Impulsiveness	.02	.42	-.13	-.15	.00
RD2 Openness to warm	-.01	.14	.79	.11	.05
EX2 Social Warmth	-.18	-.09	.73	.05	-.10
EX4 Sociability	-.18	.21	.69	.13	-.10
RD3 Attachment	.01	.07	.63	-.04	-.06
EX1 Positive Emotions	-.37	-.05	.56	.30	-.15
C3 Helpfulness	-.19	-.45	.55	.04	-.12
C2 Empathy	.00	-.11	.55	.10	.14
C1 Social acceptance	-.18	-.30	.53	.00	.05
RD1 Sentimentality	.40	-.16	.51	.12	.20
C4 Compassion	-.09	-.45	.49	.04	.07
C5 Pure-hearted conscience	-.09	-.39	.41	.13	-.03
NS1 Exploratory excitability	-.15	.24	.41	.27	.16
HA3 Shyness with strangers	.37	-.32	-.40	-.06	-.09
RD4 Dependence	.10	-.35	.40	-.06	-.10
PS4 Perfectionist	-.15	-.10	.00	.73	.12
PS2 Work hardened	-.17	.02	.17	.70	.18
PS1 Eagerness of effort	-.03	-.15	.05	.69	.04
AC4 Work Energy	-.24	-.35	.18	.66	-.07
PS3 Ambitious	-.11	.36	-.05	.65	.11
AC2 General Activity	-.05	.12	.10	.64	-.01
AC1 Work Compulsion	.09	.00	-.07	.61	.14
AC3 Restlessness	.15	.14	.17	.50	-.16
SD2 Purposefulness	-.34	-.10	.31	.40	-.07
ST2 Transpersonal identification	.08	.10	.03	.07	.67
ST1 Self-forgetful	.20	.29	.03	.19	.59
ST3 Spiritual acceptance	.09	-.03	.01	.00	.44
NS3 Extravagance	-.14	.13	.17	-.14	-.19
<i>Eigenvalues</i>	<i>9.04</i>	<i>5.50</i>	<i>3.82</i>	<i>3.26</i>	<i>1.52</i>
<i>% Accounted Variance</i>	<i>18.45</i>	<i>11.22</i>	<i>7.80</i>	<i>6.66</i>	<i>3.11</i>

Note: Loadings > 0.40 are in boldface.

Table 6

ZKA-PQ and TCI-R facets factors (Seven factors solution).

	1	2	3	4	5	6	7
NE4 Low Self-esteem	.80	-.05	-.13	-.23	.08	.09	.01
NE2 Depression	.79	-.13	-.06	-.05	-.03	.10	-.02
NE1 Anxiety	.77	-.15	.13	.01	.11	.10	.15
NE3 Dependence	.68	.02	-.07	.12	-.09	.05	-.07
HA1 Anticipatory worry	.67	-.05	-.04	-.12	-.07	-.02	-.10
SD3 Resourcefulness	-.53	.16	.36	.13	.07	-.13	.01
SD5 Enlightened second nature	-.51	.19	.33	.21	-.24	-.13	-.13
HA4 Fatigability	.50	.06	-.43	-.12	-.14	.06	-.04
SD1 Responsibility	-.45	.32	.06	.25	-.04	-.34	.03
C4 Compassion	-.03	.68	.09	.24	-.06	.01	.02
C3 Helpfulness	-.15	.66	.09	.33	-.09	-.17	.01
SD4 Self-acceptance	-.20	.62	-.10	-.14	-.24	-.05	.17
AG1 Physical Aggression	.14	-.62	-.01	-.16	.27	-.11	.19
AG4 Hostility	.51	-.58	-.02	-.14	.06	-.03	.13
C1 Social acceptance	-.10	.56	.00	.33	.14	-.09	-.27
AG3 Anger	.51	-.53	.06	.05	.03	-.07	.32
C5 Pure-hearted conscience	-.05	.53	.17	.23	-.11	-.06	-.01
RD4 Dependence	.13	.45	-.02	.25	-.12	-.13	-.01
AG2 Verbal Aggression	.31	-.43	.03	.27	.18	-.21	.14
PS1 Eagerness of effort	-.05	.14	.74	.00	-.10	.09	.14
PS4 Perfectionist	-.16	.03	.71	-.01	.00	.08	-.20
PS2 Work hardened	-.16	.06	.68	.13	.18	.12	-.20
AC4 Work Energy	-.26	.26	.66	.12	-.20	-.06	-.13
AC2 General Activity	-.04	.00	.65	.07	.18	-.03	.05
AC1 Work Compulsion	.08	-.06	.60	-.07	.03	.12	-.08
PS3 Ambitious	-.14	-.41	.59	.10	.22	.09	-.22
AC3 Restlessness	.14	-.03	.56	.17	.03	-.10	.36
SD2 Purposefulness	-.36	.13	.38	.31	-.04	-.07	-.14
RD2 Openness to warm	-.03	.10	.09	.83	.08	.10	.00
EX2 Social Warmth	-.20	.29	.05	.70	-.05	-.05	.01
RD3 Attachment	-.03	.10	-.05	.68	-.03	.02	.08
EX4 Sociability	-.18	.11	.11	.67	.26	-.12	-.03
EX1 Positive Emotions	-.37	.23	.29	.51	.05	-.15	-.04
RD1 Sentimentality	.39	.24	.13	.47	-.09	.20	-.10
EX3 Exhibitionism	-.13	-.35	.04	.47	.35	.10	.10
C2 Empathy	.03	.32	.09	.45	.11	.07	-.18
HA3 Shyness with strangers	.37	-.01	-.06	-.40	-.29	-.13	-.19
SS2 Experience Seeking	.02	.01	.11	.16	.69	.12	.08
SS3 Disinhibition	.06	-.39	-.02	.17	.68	.04	.11
SS1 Thrill and Adventure Seeking	-.07	-.25	.16	-.07	.59	-.13	-.08
HA2 Fear of uncertainty	.49	.27	-.11	.02	-.52	-.04	-.07
SS4 Boredom Susceptibility/Impulsivity	.13	-.27	-.11	-.15	.47	.11	.43
NS4 Disorderliness	.03	-.39	-.20	.17	.43	.02	.21
NS1 Exploratory excitability	-.10	.17	.29	.31	.41	.11	.13
ST2 Transpersonal identification	.07	-.07	.06	.06	.07	.73	-.07
ST1 Self-forgetful	.20	-.21	.17	.09	.22	.59	-.10
ST3 Spiritual acceptance	.08	.06	.03	-.01	-.04	.52	.10
NS2 Impulsiveness	.00	-.25	-.12	-.08	.21	.10	.51
NS3 Extravagance	-.15	.05	-.12	.15	.08	-.13	.30
<i>Eigenvalues</i>	9.08	5.56	3.86	3.30	1.58	1.97	0.96
<i>% Accounted Variance</i>	18.52	11.34	7.87	6.74	3.22	2.44	1.96

Note: Loadings > 0.40 are in boldface.

Table 7. Correlations between ZKA-PQ and TCI-R (factors and facets).

	AG	AC	NE	EX	SS	AG1	SS1	AC1	EX1	NE1	AG2	SS2	AC2	EX2	NE2	AG3	SS3	AC3	EX3	NE3	AG4	SS4	AC4	EX4	NE4
NS	.25	-.01	-.04	.28	.53	.23	.23	-.05	.10	.10	.21	.45	.04	.09	-.06	.21	.46	.18	.41	-.10	.11	.47	-.16	.22	-.06
HA	.14	-.22	.61	-.44	-.31	-.06	-.30	-.07	-.37	.44	.06	-.26	-.25	-.24	.55	.23	-.26	-.12	-.39	.49	.28	-.08	-.20	-.33	.56
RD	-.16	.13	.07	.61	-.07	-.30	-.14	.00	.38	.08	.09	.08	.08	.66	.05	-.05	.01	.16	.24	.22	-.21	-.16	.15	.54	-.07
PS	-.04	.69	-.16	.21	.13	-.01	.21	.52	.28	.01	-.01	.17	.56	.08	-.15	-.03	.06	.39	.15	-.16	-.07	-.08	.57	.14	-.22
SD	-.51	.26	-.63	.32	-.30	-.38	-.15	.01	.51	-.51	-.27	-.10	.14	.36	-.54	-.46	-.31	.09	-.12	-.40	-.54	-.38	.50	.24	-.61
C	-.55	.16	-.18	.41	-.25	-.56	-.17	-.01	.46	-.17	-.21	.03	.07	.51	-.17	-.42	-.26	.07	-.08	-.02	-.56	-.37	.34	.36	-.20
ST	.12	.07	.21	-.03	.17	.08	.00	.17	-.07	.22	.03	.23	.05	-.09	.20	.15	.19	.02	.13	.12	.13	.11	-.03	-.06	.15
NS1	-.07	.27	-.12	.41	.35	-.06	.17	.14	.32	.03	.06	.45	.26	.26	-.18	-.08	.26	.21	.30	-.05	-.14	.16	.18	.36	-.17
NS2	.26	-.07	.07	-.06	.33	.28	.13	-.02	-.16	.15	.11	.15	-.02	-.14	.05	.23	.27	.13	.18	-.07	.19	.51	-.26	-.05	.08
NS3	.01	-.08	-.14	.18	.10	-.02	.02	-.16	.16	-.12	.07	.15	-.12	.16	-.11	.05	.07	.03	.11	-.11	-.06	.06	.01	.11	-.14
NS4	.39	-.15	.08	.15	.49	.35	.24	-.12	-.06	.14	.29	.35	-.03	-.03	.08	.31	.51	.06	.41	-.01	.29	.36	-.33	.12	.06
HA1	.26	-.07	.62	-.29	-.03	.10	-.06	.06	-.34	.55	.16	-.06	-.07	-.18	.55	.28	-.04	-.01	-.13	.42	.36	.10	-.19	-.22	.53
HA2	-.08	-.11	.39	-.19	-.52	-.26	-.49	-.10	-.09	.26	-.02	-.31	-.20	.01	.35	.08	-.42	-.04	-.34	.35	.01	-.29	.02	-.14	.32
HA3	.08	-.09	.31	-.49	-.25	-.01	-.12	.00	-.26	.14	-.01	-.26	-.12	-.34	.29	.13	-.24	-.10	-.46	.26	.19	-.12	-.05	-.41	.33
HA4	.13	-.37	.46	-.33	-.12	-.01	-.21	-.18	-.37	.31	.04	-.12	-.35	-.20	.41	.19	-.06	-.21	-.22	.39	.25	.06	-.35	-.21	.43
RD1	-.05	.15	.31	.25	-.10	-.25	-.17	.08	.16	.25	.11	.06	.08	.32	.28	.08	-.04	.18	.00	.32	-.05	-.15	.11	.25	.19
RD2	-.10	.15	-.05	.69	.08	-.21	-.02	.02	.45	.03	.15	.18	.13	.64	-.05	-.05	.15	.15	.40	.08	-.18	-.10	.14	.56	-.19
RD3	-.09	.01	-.07	.53	-.02	-.15	-.10	-.10	.28	-.05	.08	.04	.03	.56	-.05	-.05	.04	.10	.29	.04	-.16	-.04	.02	.44	-.16
RD4	-.26	.05	.06	.21	-.22	-.28	-.16	-.01	.16	.01	-.13	-.12	-.03	.32	-.02	-.16	-.21	.01	-.09	.23	-.23	-.18	.17	.25	-.01
PS1	-.09	.63	-.08	.10	-.06	-.10	-.01	.42	.23	.03	-.09	.05	.48	.09	-.10	.00	-.13	.45	-.05	-.07	-.09	-.10	.52	.05	-.12
PS2	-.11	.57	-.16	.27	.13	-.08	.18	.41	.30	-.05	-.01	.22	.46	.16	-.15	-.13	.05	.28	.14	-.14	-.14	-.11	.50	.22	-.18
PS3	.16	.46	-.09	.20	.30	.20	.34	.40	.16	.06	.12	.18	.43	-.02	-.10	.09	.28	.25	.32	-.10	.09	.05	.27	.14	-.16
PS4	-.13	.55	-.18	.12	.00	-.11	.11	.41	.23	-.02	-.09	.07	.39	.07	-.13	-.10	-.07	.25	.03	-.19	-.13	-.13	.54	.04	-.23
SD1	-.31	.11	-.50	.32	-.15	-.26	-.06	-.11	.42	-.42	-.05	-.02	.09	.32	-.44	-.29	-.14	.06	-.05	-.31	-.40	-.25	.27	.28	-.47
SD2	-.25	.36	-.39	.39	-.09	-.20	.02	.20	.50	-.26	-.09	.00	.25	.27	-.36	-.24	-.08	.20	.11	-.20	-.27	-.26	.42	.31	-.46
SD3	-.23	.30	-.55	.31	.01	-.09	.09	.13	.38	-.37	-.10	.11	.21	.26	-.44	-.25	-.04	.11	.07	-.47	-.33	-.17	.43	.24	-.54
SD4	-.44	-.05	-.25	-.08	-.37	-.36	-.30	-.14	.11	-.27	-.33	-.18	-.11	.12	-.23	-.36	-.41	-.07	-.38	-.14	-.35	-.21	.18	-.10	-.19
SD5	-.40	.31	-.52	.33	-.26	-.26	-.08	.10	.45	-.41	-.25	-.13	.19	.31	-.44	-.37	-.23	.10	.02	-.32	-.43	-.39	.49	.24	-.54
C1	-.44	.03	-.16	.34	-.10	-.40	-.03	-.09	.37	-.17	-.18	.11	.02	.37	-.12	-.37	-.12	-.05	-.07	-.06	-.43	-.29	.19	.35	-.18
C2	-.19	.10	-.02	.35	-.02	-.24	.00	.03	.29	-.03	.06	.12	.07	.36	-.01	-.11	.01	.05	.07	.05	-.30	-.23	.15	.33	-.07
C3	-.46	.15	-.22	.35	-.29	-.43	-.23	-.01	.43	-.22	-.19	-.05	.05	.43	-.23	-.38	-.29	.07	-.11	-.03	-.48	-.32	.32	.30	-.24
C4	-.52	.13	-.09	.27	-.24	-.53	-.22	-.01	.32	-.08	-.25	-.01	.07	.37	-.11	-.39	-.25	.08	-.09	.01	-.48	-.23	.25	.20	-.11
C5	-.35	.18	-.12	.25	-.23	-.38	-.12	.06	.31	-.12	-.15	-.02	.04	.34	-.12	-.23	-.27	.10	-.06	-.02	-.35	-.30	.33	.18	-.14
ST1	.24	.11	.23	.01	.27	.18	.06	.19	-.01	.27	.17	.32	.10	-.12	.20	.21	.29	.07	.18	.11	.21	.13	-.03	-.01	.18
ST2	.01	.04	.14	-.01	.12	.00	.03	.13	-.09	.15	-.05	.14	.04	-.05	.13	.03	.11	-.05	.12	.11	.04	.09	-.02	-.03	.08
ST3	-.01	.01	.11	-.08	-.01	-.04	-.10	.06	-.08	.09	-.08	.05	-.04	-.04	.12	.08	.00	.02	-.02	.07	.02	.03	-.02	-.10	.09

Correlations > .18 are significant according to Bonferroni adjustment (.05/900=0.00001).