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Are indigenous personality dimensions culture-specific? Mexican inventories and the Five-Factor Model ☆

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Abstract

The universality versus cultural specificity of Mexican personality dimensions was investigated by examining: (a) the replicability of Mexican personality dimensions assessed by indigenous inventories; and (b) the extent to which Mexican dimensions are encompassed by the Five-Factor Model (FFM), one hypothesized universal model of personality structure. Mexican university students ($N = 794$) completed nine indigenous inventories and the Spanish version of the Revised NEO Personality Inventory. The FFM replicated well, although reliability was poor for a few facet scales. Reliability was acceptable for the indigenous Mexican scales. However, for most indigenous instruments, a cross-sample replication criterion suggested alternative structures of fewer, more replicable dimensions. Multiple regression and joint factor analyses revealed that most of the Mexican dimensions were well subsumed by the FFM. Thus, cultural differences did not involve clearly culture-specific dimensions, but more subtle differences in the salience or cultural flavor of particular traits.

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1. Introduction

A fundamental question for personality psychology is the extent to which personality dimensions are universal or culture-specific. For example, in their Five-Factor Theory, McCrae and Costa (1996) argued that there is a basic personality trait structure, or set of personality dimensions, that is universal across cultures. These dimensions, which comprise the Five-Factor Model (FFM), are Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Indeed, although originally identified in the United States, the cross-cultural generalizability of these dimensions, as measured by the Revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae, 1992), has now been demonstrated in 50 cultures (McCrae, Terracciano, and 78 Members of the Personality Profiles of Cultures Project, 2005).

Cross-cultural psychologists, however, distinguish between *emic* and *etic* research (Berry, 1969). Cross-cultural studies with the NEO-PI-R illustrate the *imposed-etic* approach, in which instruments developed in one culture are translated and administered in other cultures, where they may impose their structure to some extent. In contrast, in the emic approach, indigenous dimensions are independently derived in a culture by drawing on indigenous languages, psychological literature, and cultural informants. The emic method can provide particularly persuasive evidence of universality if, in fact, dimensions emerge that resemble those in other cultures or hypothesized universal dimensions. Finally, some researchers have used a combined emic–etic approach, in which indigenous (emic) and hypothesized universal (etic) dimensions are related (e.g., Benet-Martinez and Waller, 1997; Cheung et al., 2001; Katigbak, Church, Guanzon-Lapeña, Carlota, and del Pilar, 2002). In the present study, we used a combined emic–etic approach to investigate the indigenous structure or dimensions of personality in Mexico, as captured by indigenous personality inventories, then related these dimensions to the FFM.

We offer two caveats regarding our approach. First, although the cross-cultural generalizability of the FFM, as assessed with the NEO-PI-R, is well established, lexical studies have recently suggested that the Big Five or FFM may not provide the optimal or most comprehensive model of personality structure across cultures (Saucier and Goldberg, 2001). For example, Ashton and Lee (2001; Ashton et al., 2004) discovered a sixth Honesty–Humility factor in lexical studies in several cultures and proposed a six-factor HEXACO model. The model includes Extraversion (X), Conscientiousness (C), and Openness to Experience (O) dimensions that are similar to their namesakes in the Big Five model; Emotionality (E) and Agreeableness (A) dimensions that are rotational variants of Big Five Neuroticism and Agreeableness; plus an Honesty–Humility (H) dimension that Ashton and Lee (2001) view as only peripherally related to the Big Five dimensions. Alternative seven-factor models have also been proposed, which include Big Five-like dimensions, but also Positive and Negative Valence dimensions defined by purely evaluative terms (Benet and Waller, 1995; Saucier, 2003). Given the number of Mexican inventories administered in the present study, it was not feasible to administer imported inventories

representing each of these alternative models. Therefore, we began with the model (FFM) and inventory (NEO-PI-R) with the most extensive evidence of cross-cultural generalizability to date, at least in inventory data. The FFM was also of interest because previous Mexican studies had yielded only partial support for the model and had not yet examined self-report data with the full NEO-PI-R. Nonetheless, we considered alternative models in our examination and interpretation of indigenous Mexican dimensions.

The second caveat involves the uncertain comprehensiveness of existing Mexican personality inventories. A comprehensive lexical study of Spanish trait terms used by Mexicans might reveal additional indigenous dimensions. While acknowledging this limitation, we also note that some Mexican inventory developers have attempted to assess a broad range of traits generated by cultural informants. Thus, it is likely, though not guaranteed, that any salient culture-specific dimensions will be represented in the many inventories examined here.

1.1. Theoretical and empirical bases for expecting cultural similarities versus differences

McCrae and Costa's (1996) Five-Factor Theory provides a theoretical basis for expecting cultural universals in personality dimensions. In their theory, certain basic tendencies, including the dimensions of the FFM, are viewed as having a biological or genetic basis. These basic tendencies combine with environmental influences, including culture, to influence individuals' characteristic adaptations, such as self-concepts, personal strivings, and attitudes. However, the basic tendencies themselves, including the Big Five dimensions, are viewed by McCrae and Costa as independent of culture. As a result, in Five-Factor Theory, the Big Five are expected to emerge as replicable dimensions in all cultures. Evolutionary psychologists have also offered theoretical bases for expecting the Big Five dimensions to be cultural universals (MacDonald, 1998). Indeed, there is considerable evidence for the universality of Big Five-like dimensions from studies with both imported and indigenous inventories (Katigbak et al., 2002; McCrae and Allik, 2002), as well as indigenous lexical studies (Church and Katigbak, 2005). Proponents of the alternative HEXACO model have also proposed that the six dimensions of their model have an evolutionary and hereditary basis (Ashton and Lee, 2001), again leading to the prediction of universal trait dimensions. Of course, the identification of universal personality dimensions does not necessarily tie one to biological explanations. Universal dimensions could also reflect universal adaptations to socio-cultural contexts.

At the same time, cross-cultural and Mexican researchers have noted a number of differences between Mexican and American culture and personality, which could impact personality structure. Hofstede (2001) ranked 53 cultures along four value-based dimensions. On the Individualism dimension, Mexico ranked 32nd and the United States ranked 1st. That is, Mexican culture is relatively collectivistic, with a strong emphasis on tightly knit family and social relations (Díaz-Loving and Draguns, 1999). On the Power Distance dimension, Mexico ranked much higher (tied for 5th) than the United States (38th), suggesting a greater acceptance of unequal power and status in Mexican culture. Mexico also ranked higher (6th) than the United States (15th) on the Masculinity dimension, perhaps reflecting higher motives to achieve material success and a higher degree of gender differentiation of roles. On the Uncertainty Avoidance dimension, Mexico ranked 18th and the United States 43rd, implying greater discomfort with uncertainty and ambiguity in Mexican culture than in American culture. Levine and Norenzayan (1999), in a comparison of

behavioral indicators of pace of life in 31 countries, ranked Mexico as slowest in pace of life, whereas the United States ranked 16th.

Díaz-Guerrero (1967) culled statements from Mexican sayings, proverbs, and other forms of popular communication that reflect what he termed the historic-socio-cultural premises underlying Mexican culture (e.g., "Life is to be enjoyed"; "The place of the woman is in the household."). Factor analyses of responses to these statements have yielded nine dimensions: machismo, affiliative obedience, value of virginity, abnegation, fear of authority, family status quo, respect over love, family honor, and cultural rigidity. Díaz-Guerrero (1986) viewed these cultural premises as important in understanding Mexican personality and behavior. Other Mexican personality themes mentioned in the literature include a philosophy of life consistent with self-modification (i.e., changing oneself to adapt to the needs and wishes of others), as opposed to more assertive coping strategies, and a cultural script of *simpatía*, which involves an emphasis on agreeable interpersonal behavior and avoidance of conflict (Díaz-Guerrero, 1979; Díaz-Loving and Draguns, 1999; Triandis, Marin, Lisansky, and Betancourt, 1984). Given these Mexican cultural features, one might expect to find some differences in the salience of various personality constructs in Mexican versus American psychology. What is not clear is whether these differences impact the structure or dimensionality of personality, or simply the mean level of various universal personality traits.

Discerning whether an indigenous dimension is, in fact, culture-specific is not an entirely straightforward matter. The clearest case of culture-specificity would involve a replicable indigenous dimension that exhibited little, if any, overlap with hypothesized universal models of personality such as the FFM. This could be manifested in the dimension's emergence as a distinct factor in joint factor analyses of indigenous and imported dimensions, or in low multiple correlations when indigenous dimensions are predicted by imported dimensions. The threshold for culture-specificity—say, for example, a multiple correlation of less than .40 with imported dimensions—is necessarily somewhat arbitrary, but can perhaps achieve a degree of consensus among researchers. Although the dimensions identified in indigenous lexical studies have sometimes carved up the personality domain somewhat differently (e.g., Benet-Martinez and Waller, 1997; Church, Reyes, Katigbak, and Grimm, 1997; Saucier, Georgiades, Tsaousis, and Goldberg, 2005; Yik and Bond, 1993), they have typically exhibited considerable overlap with the Big Five. The most widely cited example of a possible culture-specific dimension was the Interpersonal Relations dimension identified in Chinese samples by Cheung et al. (2001) using an indigenous inventory. The dimension was initially viewed as culture-specific because it emerged as a separate factor in joint factor analyses of indigenous Chinese scales and measures of the FFM. However, recent research indicates that the Interpersonal Relations dimension can also be identified in American samples (Cheung, Cheung, Leung, Ward, and Leong, 2003; Lin and Church, 2004), indicating that it is not unique to Chinese populations.

Researchers should also be open to the possibility that cultural differences will be reflected not in clearly unique dimensions, but in the relative salience of particular dimensions, the content subthemes within dimensions, or the behavioral exemplars of traits. For example, Katigbak, Church, and Akamine (1996) noted that the modest overlap between Philippine inventory dimensions measuring Broad-Mindedness and Concern for Others and comparable FFM dimensions might be due to culture-specific behavioral exemplars and content subthemes associated with the Philippine dimensions. Similarly, Benet and Waller (1995) noted that the Big Seven model was clearly recognizable in Spanish samples, but noted some meaningful cultural differences in the structuring of affect terms.

1.2. Studies of Mexican personality structure

1.2.1. Big five studies in Mexico

Only a few studies of the Big Five or FFM have been conducted in Mexico. Rodríguez de Díaz and Díaz-Guerrero (1997) selected five to seven of Goldberg's (1992) bipolar adjective markers, in Spanish translation, to measure each Big Five dimension. In a sample of Mexican high school students ($N = 300$), a principal components analysis yielded Extraversion, Emotional Stability, and Conscientiousness factors, although these three dimensions were also defined by some unintended markers. Markers of the Intellect or Openness to Experience dimension tended to split off to load on other factors, and Agreeableness markers failed to cohere on a single dimension. Although the sample size was fairly large, only a limited number of markers of each Big Five dimension were included.

Rodríguez and Church (2003) factor analyzed the Spanish version of the Big Five Inventory (Benet and Waller, 1995) in a sample of Mexican college students ($N = 351$). In a principal components analysis, Extraversion, Neuroticism, and Openness to Experience dimensions were fairly well replicated, but the Agreeableness and Conscientiousness terms divided among the remaining two factors. In a Procrustes factor solution, all five dimensions were replicated, but replication was weakest for the Agreeableness factor, for which only five of nine items had high factor loadings. Ramírez-Esparza, Gosling, Benet-Martínez, Potter, and Pennebaker (2006) compared the mean BFI profiles of large Mexican and American samples. Americans averaged higher than Mexicans in Extraversion, Agreeableness, Conscientiousness, and Openness to Experience, and lower in Neuroticism. However, these researchers did not examine the internal consistency or factor structure of the scales in Mexico.

The most comprehensive measure of the FFM is the Revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae, 1992). McCrae et al. (2005) administered the third-person version of the Spanish NEO-PI-R to Mexican university students, who rated an adult or college-aged man or woman whom they knew well. The American self-report structure was clearly replicated in these peer-rating data, but the researchers did not directly examine self-report structure.

Finally, a few studies indicate that the Big Five, and an alternative Big Seven model, replicate well in Spain using Spanish translations of imported measures (e.g., Benet and Waller, 1995) or indigenous lexical terms (Benet-Martinez and Waller, 1997). Although these studies used the Spanish language, we can not conclude from studies in Spain or other Spanish-speaking countries that these models will necessarily generalize to Mexican samples.

1.2.2. Indigenous dimensions and measures

Mexican psychologists have developed many instruments to measure indigenous personality dimensions (Díaz-Loving, 1999). They have typically drawn on ethnosemantic methods, free associations, and focus groups to identify indigenous constructs and their behavioral exemplars. For example, in developing the Multidimensional Self-Concept Scale, La Rosa and Díaz-Loving (1991) used a free association task to derive indigenous self-concept categories and relevant trait descriptors in each category. Exploratory and confirmatory factor analyses were conducted on students' self ratings on these traits. The result was nine indigenous dimensions of Mexican personality. Similar methods have been used to identify and measure other indigenous Mexican dimensions. The most widely used

personality measures, which were administered in the present study, are described in Section 2.2.

The methods used by Mexican psychologists have ensured that the derived trait concepts and their meanings would be largely emic or indigenous. Other positive features include the widespread use of reliability and factor analyses to examine the dimensional structure of the instruments. At the same time, one suspects that item pools have sometimes been over-factored, with many small factors extracted. Small factors with few items are less likely to replicate across samples. Indeed, for some instruments, structural replication appears to be weak, or not yet demonstrated. Finally, these indigenous dimensions have not yet been related to the dimensions of the FFM, or alternative cross-cultural models, so it is unclear whether they are culture-specific or Mexican versions of universal dimensions.

1.3. Overview of the present study

We had two overarching goals: (a) to clarify the structure of Mexican personality, as measured by indigenous inventories; and (b) to determine the extent of universality versus culture-specificity of Mexican personality dimensions. To accomplish these goals, we administered a comprehensive set of indigenous Mexican inventories, plus the imported NEO-PI-R, to university students in Mexico. As a necessary first step, we first tested the generalizability of the FFM in Mexico, then sought to identify and replicate the personality dimensions measured by indigenous Mexican inventories. Finally, we used regression and joint factor analyses to examine the comparability of the indigenous scales and factors to the dimensions of the FFM, which some view as a universal model of personality trait structure.

2. Method

2.1. Participants

We sampled college students from two areas of Mexico. The final sample was comprised of 794 college students (309 men, 485 women) from the National Autonomous University of Mexico at Iztacala (NAUM-Iztacala; $n = 201$), the Hidalgan Institute of Higher Learning Studies (HIHLS; $n = 199$), and the Autonomous University of Yucatan (AUY; $n = 394$). Data for eight other respondents were discarded because of missing or careless responses. Mean age was 19.8 ($SD = 2.3$) and year levels were as follows: 530 freshmen, 138 sophomores, 58 juniors, and 68 seniors. Self-reported majors included psychology ($n = 478$), business ($n = 100$), chemistry ($n = 108$), engineering ($n = 69$), humanities ($n = 19$), biology ($n = 16$), and law ($n = 4$). All participants reported their ethnic background to be *Mestizo*. *Mestizo* is the predominant ethnicity in Mexico and is a mixture of European (usually Spanish) and American Indian ancestry.

2.1.1. Replication subsamples

To determine the number of replicable dimensions in the indigenous instruments, we divided the total sample into two subsamples of approximately equal size. One subsample ($n = 400$; 102 men, 298 women) was comprised of participants from (a) the National Autonomous University of Mexico at Iztacala (NAUM-Iztacala), which is located in the

southern part of Mexico City, and (b) the Hidalgan Institute of Higher Learning Studies (HIHLS), which is located in the city of Pachuca, 58 miles south of Mexico City. The second subsample was comprised of 394 students (207 men, 187 women) from the Autonomous University of Yucatan at Merida, which is located on the Yucatan Peninsula. Mean ages for the two subsamples were 20.4 ($SD = 2.9$) and 19.2 ($SD = 1.5$), respectively. Although all three universities draw students from across Mexico, the first subsample has a larger proportion of students from central and northern Mexico, and the second subsample a larger proportion of students from southeastern Mexico.

2.2. Instruments

2.2.1. NEO Personality Inventory-Revised (NEO-PI-R)

The 240-item NEO-PI-R (Costa and McCrae, 1992) measures the Big Five dimensions and 30 facet subscales, with six facets for each Big Five domain. Items are rated on a five-point scale, ranging from "strongly disagree" to "strongly agree." The NEO-PI-R was previously translated into Spanish by professional translators using the backtranslation method (Gellman, 1994). Gellman (1994) reported acceptable equivalence of the English and Spanish versions in a bilingual test-retest study with college students in the United States. Internal consistency reliability estimates for the Spanish version were generally comparable to those found in the American normative sample (Costa and McCrae, 1992). A primary exception was the Openness to Actions facet scale, which had low reliability ($\alpha = .42$), but good convergent validity across language versions and a high loading on the intended factor. The Spanish version has been used previously in Mexico (McCrae et al., 2005) and extensive validity evidence has been reported for the NEO-PI-R in a variety of languages and cultures (McCrae and Allik, 2002). For the present study, the Spanish NEO-PI-R was further reviewed by a clinical psychology professor in Mexico and a Spanish language professor at Washington State University, both of whom were born in Mexico and fluent in Mexican Spanish. Based on their recommendations, some minor corrections in grammar and syntax were made.

Alpha reliability estimates for the NEO-PI-R domain scales in the total sample ranged from .79 to .88. These values are acceptable but somewhat lower than the range of .86 to .92 reported for the American normative sample (Costa and McCrae, 1992). The range of alpha estimates for the facet scales was .55 to .71 for Neuroticism, .50 to .70 for Extraversion, .24 to .75 for Openness to Experience, .32 to .71 for Agreeableness, and .46 to .74 for Conscientiousness. Some facet scales had substantially lower alpha values in our Mexican sample. In particular, the alpha values for the following facet scales were lower by .10 or more in Mexico, as compared to the American normative sample: N1: Anxiety (.57 vs. .78); E5: Excitement-Seeking (.50 vs. .65); O2: Aesthetics (.56 vs. .76); O4: Actions (.24 vs. .58); O6: Values (.30 vs. .67); A2: Straightforwardness (.61 vs. .71); and C2: Order (.46 vs. .66). These results suggest that some items in the Spanish NEO-PI-R need retranslation or are less relevant for Mexican samples. The alpha reliabilities for three facet scales, O4: Actions, O6: Values, and A6: Tender-mindedness, were clearly marginal. Despite this, these scales exhibited acceptable factor loadings in the principal components analysis reported in Section 3.

2.2.2. Multidimensional self-concept scale

La Rosa and Díaz-Loving (1991) developed a multidimensional self-concept inventory consisting of 73 bipolar (antonym) trait adjectives, which are presented in a seven-point

semantic differential format. The trait adjectives were derived using a free association task in which students provided self descriptions. Factor analyses of student responses ($N = 2626$) to the rating form yielded nine dimensions: Affiliative Sociability (e.g., courteous, amiable); Expressive Sociability (e.g., friendly, communicative); Accessibility (e.g., accessible, agreeable); Emotional States (e.g., happy, jovial); Interindividual Feelings (e.g., tender, loving); Emotional Health (e.g., calm, serene); Occupational (e.g., studious, capable); Ethical (e.g., loyal, honest); and Initiative (e.g., dynamic, fast).[1] The instrument has been used to investigate self-concept differences and correlates in a variety of Mexican samples (e.g., Bonilla, Hernández, Andrade-Palos, and Cordoba, 1996; Iuit-Briceño, Osorio-Belmon, Alpuche-Hernández, and Flores-Galaz, 1996). The factor structure and reliability of the indigenous instruments in the present sample are reported in Section 3.

2.2.3. Multidimensional self-concept scale

Valdez-Medina (1994) used the Natural Semantic Network Technique to develop this instrument, which contains 37 trait adjectives. This technique involved eliciting concepts about the self from informants and then applying weights that enabled the researcher to rank order the importance or salience of each concept. Participants who fill out the instrument rate the degree to which they possess the self-concept attributes (i.e., trait adjectives) on a five-point scale ranging from "totally" to "not at all." The test author's factor analysis in a sample of 368 high school students yielded six factors: Social Expressive (e.g., talker, friendly); Social Normative (e.g., orderly, responsible); Expressive Affective (e.g., sentimental, affectionate); Ethical Moral (e.g., honest, loyal); Intellectual Work (e.g., studious, intelligent); and Rebelliousness (e.g., liar, faultfinding). Several authors have conducted studies with this six-dimensional scale and replicated the original factor structure (Balcázar-Nava, 1996; Gonzáles and Valdez-Medina, 1996; Maya, 1996).

2.2.4. Multidimensional self-concept inventory

Díaz-Loving, Reyes-Lagunes, and Rivera-Aragón (2002) developed an integrated 90-item Multidimensional Self-Concept Inventory, starting with a selection of attributes from the self-concept scales of La Rosa and Díaz-Loving (1991) and Valdez-Medina (1994). Participants respond using a seven-point pictorial rating scale, in which increasingly larger circles suggest a continuum of frequency or amount (Reyes-Lagunes, 1996). Items were administered to 2270 students and adults in four cities representing different socio-cultural regions of Mexico. Factor analyses yielded nine dimensions: Social Expressive (e.g., friendly, sociable); Ethical Normative (e.g., honest, decent); Socio-Emotional Intelligence (e.g., tolerant, reserved); External Negative Passive Control (e.g., pessimistic, lazy); Social-Affiliative (e.g., romantic, affectionate); Emotive Negative-Self-Affirming (e.g., conflictive, unreliable); Instrumental-Constructive (e.g., hard-working, punctual); Emotional Vulnerability (e.g., timid, volatile); and Depressive (e.g., melancholic, nervous). The validity of this instrument has not yet been investigated, but can possibly be inferred from the validity of the two instruments on which it was based.

[1] The English labels presented in this article for the test authors' scales are either direct translations from the Spanish source articles or translations used by the original Mexican authors in English abstracts of their Spanish articles.

2.2.5. Instrumentality and expressivity scale

Reyes-Lagunes (1999) used the Natural Semantic Network technique, free associations, and focus groups to derive 88 instrumental (masculine) and expressive (feminine) trait adjectives. The test authors administered the instrument to adults in four regions of Mexico ($N = 576$) and the adjectives were rated on a seven-point pictorial scale. Factor analysis yielded four dimensions: Androgyny (e.g., capable, attentive); Normative Positive Expressivity (e.g., gentle, generous); Negative Instrumentality (e.g., abusive, haughty); and Negative Expressivity (e.g., insecure, fearful). Ibarra-Sagasta, Laborín-Alvarez, and Vera-Noriega (2002) replicated these four factors, but also showed, using confirmatory factor analysis, that the items could be organized under the three-dimensional model of instrumentality, expressivity, and androgyny proposed by Spence and Helmreich (1978).

2.2.6. Scale of expressive and instrumental traits

Díaz-Loving, Rivera-Aragón, and Sánchez-Aragón (2001) had previously used focus groups to elicit 323 instrumental and expressive attributes and had respondents indicate how typical and ideal these attributes were of males and females in Mexico. Díaz-Loving, Rocha-Sánchez, and Sánchez-Aragón (2004) drew on these 323 attributes to derive two versions of their scale, a long version containing 117 trait adjectives and a short version comprised of 65 items with the highest factor loadings. In both versions, respondents rate their attributes on a five-point scale ranging from "absolutely" to "not at all." In a sample of 617 adults, the test authors factor analyzed the 117-item version and obtained the following dimensions: Instrumental Cooperative (e.g., punctual, responsible); Instrumental Focused on Achievement (e.g., competent, persistent); Instrumental Egocentric (e.g., daring, bold); Instrumental Machismo (e.g., violent, rude); Instrumental Authoritarian (e.g., proud, vengeful); Instrumental Social Rebellious (e.g., discourteous, lack of interest); Affiliative Affective (e.g., loving, affectionate); Romantic Dreamer (e.g., romantic, dreamer); Egocentric Negative Emotive (e.g., unstable, liar); Emotional Vulnerability (e.g., jealous, fearful); and External Negative Passive External Control (e.g., conforming, undecided). This new instrument has not yet been validated against external criteria. We administered the 65-item version.

2.2.7. Flexibility scale

Melgoza-Enríquez and Díaz-Guerrero (1990) developed this 20-item scale because they considered flexibility to be a cardinal trait of Mexican personality. Bipolar trait items (e.g., very malleable vs. not very malleable) were rated on a four-point scale. A factor analysis of self-ratings in a sample of 80 teachers in Mexico City yielded three factors: Agreeableness (e.g., tolerant vs. not tolerant); Obligingness (e.g., not accommodating vs. very accommodating); and Flexibility (e.g., like conceding vs. do not like conceding). The researchers have hypothesized that these flexibility dimensions will correlate with indigenous measures of affiliative obedience, assertiveness, and abnegation, but these predictions have not yet been investigated.

2.2.8. Multidimensional scale of assertiveness

Flores-Galaz (1989) used a combined etic–emic approach to develop this 45-item scale. In student samples, Flores-Galaz, Díaz-Loving, and Rivera-Aragón (1987) and Flores-Galaz (1989) had previously obtained the same three-factor structure for the imported Rathus Assertiveness Scale (Rathus, 1973), which differed, however, from the factors

reported in United States samples. Flores-Galaz (1989) added new items for each dimension to obtain the following scales: (a) Indirect Assertiveness (e.g., "I can express my affection with greater ease through cards and/or letters than personally."); (b) Non-Assertiveness (e.g., "It is hard to begin a relationship with people that I have just met."); and (c) Assertiveness (e.g., "I can ask to be taught how to do something that I am not able to do."). Items are rated on a five-point scale, ranging from "strongly disagree" to "strongly agree." Flores-Galaz and Díaz-Loving (1994) reported sensible correlations with indigenous measures of locus of control, achievement orientation, and self-concept.

2.2.9. Abnegation scale

Avendaño-Sandoval, Díaz-Guerrero, and Reyes-Lagunes (1997) developed a 20-item measure of abnegation, or the tendency to sacrifice self for others. Items are rated on a three-point scale: "true," "do not know," and "false." The test authors factor analyzed the self-ratings of 850 respondents in Mexico City and identified three factors: Family Centered Abnegation (e.g., "I enjoy overworking if it is for my family."); Social Conduct Centered Abnegation (e.g., "I accept apologies."); and Sensitive or Cautious Abnegation (e.g., "It embarrasses me to say no."). Flores-Galaz and Aguilar-Ortega (1998) found that these subscales correlated in the expected negative direction with indigenous measures of assertiveness.

2.2.10. Personal strength scale

Díaz-Guerrero and Melgoza-Enríquez (1994) developed this four-item scale to measure the capacity for self-modification when coping with life challenges. The items, which contain culture-specific and colloquial expressions, ask respondents about their endurance to confront crises and emotional problems, ability "to carry their own cross," and patience in aiding loved ones and friends with their emotional problems. Items are rated on a four-point scale, ranging from "not strong" to "very strong". In a sample of 80 teachers, the test authors favored a one-factor solution. Ortega-Estrada (1996) and Varela-Macedo et al. (1998) reported validity evidence for the scale.

2.3. Procedure

Volunteer students at each university completed the ten instruments over three class sessions. The instruments were administered by José de Jesús Vargas-Flores and Joselina Ibáñez-Reyes at the National Autonomous University of Mexico at Iztacala (NAUM-Iztacala), by Mirta Flores-Galaz and Jorge Isaías Iuit-Briceño at the Autonomous University of Yucatan (AUY), and by Jose Miguel Escamilla at the Hidalgan Institute of Higher Learning Studies (HIHLS). The researchers distributed the instruments in three orders and students took an average of three hours (i.e., three class periods) to fill them out.

3. Results

3.1. Replicability of the Five-Factor Model in Mexico

A necessary first step was to demonstrate the generalizability of the NEO-PI-R structure in a Mexican sample. We conducted principal components analyses with varimax rotations on the facet scales. In the total sample, the pattern of eigenvalues indicated a

break after the fifth factor (the first seven eigenvalues were 7.14, 2.92, 2.72, 1.91, 1.63, 1.06, and .94). The five factors were interpretable as the Big Five dimensions of the Five-Factor Model (FFM). Factor congruence coefficients (Tucker, 1951) computed between matched factors in the Mexican total sample and the American normative sample ranged from .91 to .97.

Table 1 shows the varimax-rotated factor matrix. Despite the overall level of cross-cultural replication, six facet scales had their highest loading on the wrong factor in the varimax-rotated solution. Four of the six were Extraversion and Agreeableness facets, suggesting a shift in the rotational orientation of these two dimensions in varimax solutions (Rolland, 2002). Indeed, when we applied Procrustes rotations to seek maximum fit with the American normative solution, cross-cultural replication was further improved and only two facet scales, E3, Assertiveness; and O3, Feelings; still loaded higher on an unintended factor. The Procrustes solution is also shown in Table 1. After Procrustes rotation, congruence coefficients computed between the Mexican and American normative samples ranged from .94 to .97. Using .40 as a cut-off for secondary loadings, the four facet scales in the Mexican Procrustes solution with secondary loadings all had secondary loadings in the American normative sample as well. The fifth facet scale with a secondary loading in the American sample (C1, Competence loaded −.41 on Neuroticism) also loaded negatively on Neuroticism (−.37) in the Mexican sample. Thus, even secondary loadings were well replicated in the Mexican sample. In summary, although some facet scales exhibited marginal internal consistency in our Mexican sample, replication of the FFM was very good.

4. Replicability of indigenous Mexican dimensions

4.1. Overview of analyses

To determine the replicability of the indigenous Mexican dimensions, we conducted reliability and factor analyses for each measure. First, we compared alpha reliability coefficients in our total Mexican sample with those reported by the authors of the instruments. In these analyses, we computed alpha reliabilities for the scales as scored by the test authors. As seen in Table 2, the alpha values in the present sample were generally comparable to those reported by the test authors and were all acceptable. Thus, each of the test authors' original scales measure reasonably homogeneous constructs.

Acceptable alpha values do not, however, imply that the original scales provide the optimal or most replicable structural representation of the items in the instruments. To determine this, we conducted item-level factor analyses for each instrument, using the factor extraction and rotation methods used by the original researchers (generally principal components or principal axis extractions with varimax rotations). We determined the replicability of factors by examining the congruence of factors across our two subsamples for factor solutions with successive numbers of factors. This enabled us to compare the factor replicability of the test authors' preferred number of dimensions, and, where relevant, to make a case for a different number of more replicable factors. For each instrument, we selected the factor solution with the largest number of factors for which the mean congruence coefficient was greater than .90 and all individual congruence coefficients were at least .85 (Haven and ten Berge, 1977). In all cases, the most replicable factor solution across the two subsamples was also replicated in the total sample.

Table 1
Five component solution for Spanish NEO-PI-R in Mexican total sample after varimax and procrustes rotations

Facets	Varimax-rotated components					Procrustes-rotated components					FC[a]
	N	E	O	A	C	N	E	O	A	C	
Neuroticism facets											
N1 Anxiety	**.79**	.01	−.07	.09	.00	**.79**	−.01	−.08	.10	.00	.98
N2 Angry Hostility	**.66**	−.34	.00	−.32	−.13	**.67**	−.20	−.01	**−.41**	−.12	.97
N3 Depression	**.74**	−.21	−.01	.08	−.22	**.74**	−.21	−.03	.01	−.22	.99
N4 Self-Consciousness	**.72**	−.14	−.14	.17	−.17	**.72**	−.17	−.16	.12	−.17	.99
N5 Impulsiveness	**.58**	.13	.09	−.25	−.33	**.58**	.21	.09	−.19	−.32	.97
N6 Vulnerability	**.69**	−.08	−.17	.10	−.34	**.69**	−.09	−.19	.07	−.34	.99
Extraversion facets											
E1 Warmth	−.21	**.78**	.13	.08	.15	−.22	**.70**	.15	.34	.14	.99
E2 Gregariousness	−.11	**.75**	−.16	−.02	−.02	−.12	**.72**	−.14	.23	−.02	.95
E3 Assertiveness	−.37	.25	.18	**−.40**	.35	−.37	.35	.21	−.29	.35	.99
E4 Activity	−.09	.37	.05	**−.44**	.39	−.09	**.49**	.08	−.28	**.40**	.98
E5 Excitement Seeking	−.05	**.54**	.26	−.29	−.03	−.05	**.60**	.28	−.09	−.03	.88
E6 Positive Emotions	−.22	**.69**	.24	−.11	.15	−.23	**.68**	.27	.13	.14	.96
Openness facets											
O1 Fantasy	.06	.20	**.65**	−.08	−.12	.06	.20	**.65**	.00	−.13	.93
O2 Aesthetics	.09	.09	**.74**	.07	.18	.10	.04	**.74**	.11	.16	.99
O3 Feelings	.19	**.46**	.36	−.16	−.01	.19	**.48**	.37	.01	−.02	.94
O4 Actions	−.12	.13	.32	−.19	−.04	−.12	.17	.33	−.13	−.04	.92
O5 Ideas	−.17	−.02	**.69**	−.03	.35	−.16	−.04	**.70**	−.02	.34	.97
O6 Values	−.28	.04	**.55**	.00	−.02	−.27	.02	**.55**	.02	−.03	.93
Agreeableness facets											
A1 Trust	−.17	**.53**	.19	.34	.08	−.18	.38	.20	**.50**	.06	.94
A2 Straightforwardness	.00	.08	−.04	**.74**	.10	−.01	−.17	−.05	**.73**	.08	.97
A3 Altruism	−.12	**.63**	.12	.38	.25	−.13	**.46**	.14	**.57**	.23	.97
A4 Compliance	−.09	.15	−.09	**.70**	−.04	−.10	.09	−.10	**.71**	−.06	.98
A5 Modesty	.24	−.09	−.06	**.53**	−.26	.24	−.25	−.08	**.47**	−.27	.90
A6 Tender-Mindedness	.19	**.44**	.03	.31	.19	.18	.31	.04	**.45**	.18	.90
Conscientiousness Facets											
C1 Competence	−.37	.23	.16	−.03	**.67**	−.37	.21	.19	.06	**.66**	.99
C2 Order	.00	−.03	−.12	−.17	**.59**	.00	.03	−.10	−.16	**.60**	.96
C3 Dutifulness	−.12	.15	.14	.23	**.71**	−.12	.06	.16	.29	**.70**	.97
C4 Achievement Seeking	−.07	.20	.07	−.18	**.76**	−.07	.24	.10	−.08	**.76**	1.00
C5 Self-Discipline	−.32	.12	.04	−.06	**.77**	−.32	.12	.06	.00	**.77**	.98
C6 Deliberation	−.28	−.07	.08	.26	**.61**	−.28	−.16	.09	.24	**.60**	.97
Coefficients of congruence[b]	.97	.91	.94	.91	.97	.97	.97	.94	.96	.97	.96

Note. Factor loadings greater than or equal to .40 in absolute value are shown in bold. N, Neuroticism; C, Conscientiousness; E, Extraversion; A, Agreeableness; O, Openness to Experience.

[a] Facet congruence.

[b] Factor congruence coefficients computed with corresponding factors in American normative sample (Costa & McCrae, 1992).

In Table 3, we show the mean factor congruence coefficients between best-matched factors in our two subsamples for solutions varying in the number of factors or components. We examined successive factor solutions ranging from one factor to a number of factors that was one more than reported by the test authors. In Table 3, we have annotated with a superscript ("a") the "optimal" number of factors for each instrument as determined by

Table 2
Alpha reliabilities of indigenous Mexican measures as scored by original test authors

Instrument (authors)	Test authors' sample size	Scales	α	
			Test authors' sample	Current study
Multidimensional self-concept scale				
La Rosa and Díaz-Loving (1991)	$n = 2626$	Affiliative Sociability	.85	.84
		Emotional States	.85	.84
		Expressive Sociability	.85	.89
		Interindividual Feelings	.81	.89
		Occupational	.80	.80
		Emotional Health	.76	.76
		Ethical	.77	.75
		Initiative	.71	.70
		Accessibility	.65	.72
Multidimensional self-concept scale				
Valdez-Medina (1994)	$n = 368$	Social Expressive	.78	.80
		Social Normative	.78	.80
		Expressive Affective	.77	.85
		Ethical Moral	.77	.74
		Intellectual Work	.71	.69
		Rebelliousness	.68	.79
Multidimensional self-concept inventory				
Díaz-Loving et al. (2002)	$n = 2270$	Social Expressive	.90	.93
		Ethical Normative	.86	.78
		Socio-Emotional Intelligence	.82	.78
		External Negative Passive Control	.82	.85
		Social Affiliative	.86	.88
		Emotive Negative-Self-Affirming	.77	.85
		Instrumental Constructive	.82	.88
		Emotional Vulnerability	.58	.68
		Depressive	.59	.67
Instrumentality and expressivity scale				
Reyes-Lagunes (1999)	$n = 576$	Androgyny	.99	.94
		Negative Expressivity	.76	.89
		Negative Instrumentality	.89	.90
		Normative Positive Expressivity	.88	.85
Scale of expressive and instrumental traits				
Díaz-Loving et al. (2004)	$n = 639$	Instrumental Cooperative	.90	.84
		Instrumental Focused on Achievement	.84	.71
		Instrumental Egocentric	.67	.69
		Instrumental Machismo	.85	.81
		Instrumental Authoritarian	.77	.79
		Instrumental Social Rebellious	.63	.69
		Affiliative Affective	.67	.84
		Romantic Dreamer	.67	.76

Table 2 (*continued*)

Instrument (authors)	Test authors' sample size	Scales	α	
			Test authors' sample	Current study
		Egocentric Negative Emotive	.83	.75
		Emotional Vulnerable	.76	.75
		External Negative Passive Control	.71	.75
Flexibility scale				
Melgoza-Enríquez and Díaz-Guerrero (1990)	$n = 80$	Agreeableness	.75	.57
		Obligingness	.56	.43
		Flexibility	.74	.61
Multidimensional scale of assertiveness				
Flores-Galaz (1989)	$n = 2231$	Indirect Assertiveness	.86	.89
		Non-Assertiveness	.85	.88
		Assertiveness	.80	.82
Abnegation scale				
Avendaño-Sandoval et al. (1997)	$n = 850$	Family Centered Abnegation	.77	.65
		Social Conduct Centered Abnegation	.72	.69
		Sensitive or Cautious Abnegation	.69	.68
Personal strength scale				
Díaz-Guerrero and Melgoza-Enríquez (1994)	$n = 236$	Personal Strength	.74	.64

our replication criterion. All replicable factors were interpretable. In Table 4 we report our factor labels, alpha reliabilities, and sample high loading terms for the replicable factors in each inventory. Alpha reliability estimates were obtained by scoring each item on the factor where it loaded highest in absolute value. Complete factor matrices are available from the corresponding author.

4.2. Replicable indigenous dimensions

La Rosa and Díaz-Loving (1991) preferred a structure of nine dimensions for their Multidimensional Self-Concept Scale (mean congruence = .67; see Table 3), but our replication criterion suggested only four replicable factors (mean congruence = .96), which are labeled and described in Table 4. Valdez-Medina (1994) preferred a structure of six dimensions for his Multidimensional Self-Concept Scale, but our replication criterion suggested five replicable factors (mean congruence = .94; see Tables 3 and 4). Although Valdez-Medina originally reported a six-dimensional structure, Valdez-Medina, González, Jiménez, and Canas (1996) subsequently reported a five-factor solution that is similar to the one identified in the present study. The Multidimensional Self-Concept Inventory (Díaz-Loving et al., 2002) is an integration of the two previous self-concept measures, so we might expect similar dimensions to emerge. The test authors selected a

Table 3
Mean coefficients of congruence for successive factor solutions

Scale	Number of factors											
	1	2	3	4	5	6	7	8	9	10	11	12
Multidimensional self-concept scale La Rosa and Díaz-Loving (1991)	.99	.98	.87	.96[a]	.84	.82	.73	.82	.67	.53		
Multidimensional self-concept scale Valdez-Medina (1994)	.99	.99	.95	.69	.94[a]	.76	.77					
Multidimensional self-concept inventory Díaz-Loving et al. (2002)	.99	.97	.86	.85	.84	.79	.92[a]	.89	.75	.72		
Expressivity and instrumentality scale Reyes-Lagunes (1999)	.98	.96	.95	.93[a]	.84							
Scale of Expressive and instrumental traits Díaz-Loving et al. (2004)	.96	.97	.85	.94[a]	.77	.84	.82	.73	.82	.75	.75	.69
Flexibility scale Melgoza-Enríquez and Díaz-Guerrero (1990)	.98[a]	.89	.90	.73								
Multidimensional scale of assertiveness Flores-Galaz (1989)	.99	.96	.96[a]	.89								
Abnegation scale Avendaño-Sandoval et al. (1997)	.85	.81	.92[a]	.74								
Scale of personal strength Díaz-Guerrero and Melgoza-Enríquez (1994)	.99[a]	.99										

[a] Optimal factor solution based on replication criteria.

nine-dimensional structure, but our factor replication criterion suggested seven replicable factors (mean congruence = .92; see Tables 3 and 4).

Reyes-Lagunes (1999) reported a four-dimensional structure for the Instrumentality and Expressivity Scale. Our replication criterion confirmed four replicable factors (mean congruence = .93; see Table 3), but they were not identical to those reported by the test author. In particular, we labeled the first broad factor Positive Valence, because all positively valenced traits had a moderate to high loading on this factor (see Table 4). Díaz-Loving et al. (2004) reported an 11-dimensional structure for the Scale of Expressive and

Table 4
Replicable factors in Mexican inventories: Congruence coefficients, alphas, and sample high loading items

Mexican Inventory Replicable factors	α	Sample high loading terms or items
Multidimensional self-concept scale La Rosa and Díaz-Loving (1991)		
Conscientiousness/ Competence (.96)	.89	responsible, capable, efficient, hardworking, honest, intelligent, -unreliable
Inhibition/Introversion (.98)	.89	timid, quiet, reserved, introverted, solitary, fearful, passive, -uninhibited, -sociable
Warmth (.96)	.87	sentimental, affectionate, romantic, warm, tender, loving, amiable, -disagreeable
Temperamentalness (.93)	.76	aggressive, temperamental, impulsive, conflictive, resentful, -stable, -tranquil
Multidimensional self-concept scale Valdez-Medina (1994)		
Conscientiousness(.94)	.84	applied, responsible, studious, hardworking, orderly, strict, obedient, tidy
Agreeableness (.91)	.82	honest, respectful, amiable, loyal, sincere, self-giving, attentive, accommodating
Rebelliousness (.98)	.79	aggressive, rebellious, liar, stubborn, angry, disobedient, volatile, faultfinding
Playfulness (.95)	.80	mischievous, talkative, jokester, prankish, friendly, nice
Affection (.92)	.85	romantic, sentimental, affectionate, sensitive
Multidimensional self-concept inventory Díaz-Loving et al. (2002)		
Social Expressive (.97)	.92	cheerful, fun-loving, lively, friendly, sociable, content, agreeable, talkative, - solitary
Temperamentalness (.94)	.88	dominant, temperamental, angry, faultfinding, authoritarian, stubborn, rebellious
Conscientiousness/ Competence (.94)	.85	orderly, studious, reliable, applied, hardworking, punctual, efficient, tidy, - lazy
Affection (.96)	.94	romantic, sentimental, tender, loving, affectionate, warm, sensitive, melancholic
Honesty–Humility (.85)	.80	honorable, false, honest, loyal, sincere, well-mannered, respectful, -false, -corrupt
Inhibition (.85)	.80	nervous, submissive, timid, slow, sad, inept, -self-confident, - intelligent
Equanimity (.90)	.77	tranquil, serene, calm, peaceful, relaxed, reserved, tolerant, simple, stable
Expressivity and instrumentality scale Reyes-Lagunes (1999)		
Positive Valence (.96)	.92	able, capable, competent, reliable, firm, tenacious, hardworking, understanding
Hostility (.95)	.93	violent, abusive, conflictive, coarse, aggressive, arrogant, envious, selfish
Neuroticism (.89)	.86	insecure, hesitant, weak, fearful, resigned, worrisome, unstable, negligent
Warmth (.92)	.91	affectionate, loving, sweet, sensible, tender, warm, emotional, warmhearted
Scale of expressive and instrumental traits Díaz-Loving et al. (2004)		
Conscientiousness/ Competence (.93)	.84	dependable, responsible, reliable, organized, competent, hardworking, determined
Neuroticism (.91)	.83	fearful, weak, bashful, teary, hesitant, submissive, crier, worrisome, -bold, -brave

(*continued on next page*)

Table 4 (*continued*)

Mexican Inventory		
Replicable factors	α	Sample high loading terms or items
Warmth (.94)	.88	sentimental, affectionate, tender, sensible, loving, sweet, emotional, visionary
Hostility (.97)	.88	manipulative, aggressive, troublemaker, dominant, bossy, violent, bully, rude
Flexibility scale Melgoza-Enríquez and Díaz-Guerrero (1990)		
Flexibility (.98)	.74	Malleable, pleasing, tolerant, friendly, cooperating, accommodating, generous
Multidimensional scale of assertiveness Flores-Galaz et al. (1987)		
Indirect Assertiveness (.97)	.89	I can accept that I made a mistake more easily on the phone than personally
Non-Assertiveness (.97)	.88	I am not able to openly express what I wish
Assertiveness (.94)	.82	I ask for help when I need it
Abnegation scale Avendaño-Sandoval et al. (1997)		
Family Centered Abnegation (.97)	.65	I like overworking if it is for my family; Even if I am tired, I attend to my family.
Social Conduct Centered Abnegation (.81)	.69	I am typically very friendly; Generally I am attentive.
Sensitive Abnegation (.97)	.68	It embarrasses me to say no; I have a hard time saying no.
Personal strength scale Díaz-Guerrero and Melgoza-Enríquez (1994)		
Personal Strength (.99)	.64	Has patience to help friends with their emotional problems (item abbreviation)

Note. Factor congruence coefficients computed between the two subsamples are shown in parentheses after each factor label.

Instrumental Traits, but our replication criterion suggested four replicable dimensions (mean congruence = .94; see Tables 3 and 4).

Melgoza-Enríquez and Díaz-Guerrero (1990) favored a three-dimensional structure for the Flexibility scale. A three-factor solution was indeed replicable across our two subsamples (mean congruence = .90; see Table 3), but our factors did not correspond to those reported by the test authors. The test authors' small sample size ($N = 80$) might have contributed to unstable factors and weak simple structure. Given these findings, and the higher replicability and interpretability of one general factor (mean congruence = .98), we adopted the one-factor solution. Although we retained the authors' Flexibility label, a broader label such as Congeniality might be appropriate, given the content of the highest loading items (see Table 4).

Flores-Galaz (1989) reported a three-dimensional structure for the Multidimensional Scale of Assertiveness. We replicated the test authors' Indirect Assertiveness, Non-Assertiveness, and Assertiveness dimensions (mean congruence = .96) and thus retained the test authors' scoring for these dimensions. Avendaño-Sandoval et al. (1997) reported a three-dimensional structure for the Abnegation scale. We replicated this structure (mean congruence = .92) and retained the test authors' labels and scoring for the three dimensions. Finally, Díaz-Guerrero and Melgoza-Enríquez (1994) reported a single dimension for the Personal Strength Scale. The mean congruence coefficients in Table 3 suggested that either one- or two-dimensional solutions were replicable (mean congruence = .99 for both solutions). However, there are only four items in this scale so we adopted the test authors' one-dimensional solution and scoring key.

To summarize, our replicable dimensions corresponded to the test authors' original dimensions for only six of nine inventories. Our replicable factors were often high-order blends of the test authors' dimensions. Not surprisingly, given their greater length, the replicable dimensions were generally substantially more reliable than the scales reported by the test authors.

4.3. Relating indigenous Mexican dimensions to the Five-Factor Model

We related the indigenous dimensions to the NEO-PI-R domain scores using both regression and joint factor analyses. For ease of interpretation, we reversed the test authors' scoring keys in some cases, so that high scores always corresponded to more, not less, of the trait described by the scale label.

4.4. Regression analyses

Table 5 shows the Pearson correlations relating each of the test authors' indigenous scales to the Big Five domain scores. For those instruments for which we derived a different set of replicable dimensions, we also report correlations between the factor scores for those dimensions and the Big Five domain scores. We also show the multiple correlations obtained when we regressed each Mexican dimension onto all Big Five dimensions simultaneously.

If we use a multiple correlation of less than .40 to identify test author scales that are relatively distinct from the Big Five, then only two scales qualify, Family Centered Abnegation and Social Conduct Centered Abnegation. In addition, six of the replicable dimensions derived in the present study—one Agreeableness dimension (Valdez-Medina, 1994), Affection (in two different self-concept measures; Valdez-Medina, 1994; Díaz-Loving et al., 2002), Honesty–Humility, Equanimity (Díaz-Loving et al., 2002), and one of the Warmth dimensions (Reyes-Lagunes, 1999)—are rather distinct or unique.

If we consider a Pearson correlation of at least .40 to indicate a marker of a Big Five dimension, then four of the Big Five dimensions are represented by multiple indigenous scales. Good indigenous markers of Big Five Neuroticism include (a) the test authors' scales measuring Emotional Health (inversely), External Negative Passive Control (in two instruments), Emotional Vulnerability, Depressive, Negative Expressivity, Non-assertiveness, Assertiveness (inversely), and Personal Strength (inversely); and (b) our replicable factors measuring Inhibition and Neuroticism. Good indigenous markers of Big Five Extraversion include (a) the test authors' scales measuring Emotional States, Expressive Sociability, Initiative, Social Expressive, Androgyny, and Non-Assertiveness (inversely); and (b) our replicable factors measuring Inhibition/Introversion (inversely), Playfulness, and Social Expressiveness. Good indigenous markers of Big Five Agreeableness include (a) the test authors' scales measuring Rebelliousness, Emotive Negative Self-Affirming, Negative Instrumentality, Instrumental Machismo, and Instrumental Authoritarian (all inversely); and (b) our replicable dimensions measuring Warmth and, all inversely, Rebelliousness, Temperamentalness, and Hostility. Good markers of Big Five Conscientiousness include (a) the test authors' scales measuring Occupational, Ethical, Social Normative, Ethical Moral, Intellectual Work, Ethical Normative, Instrumental Constructive, Normative Passive Expressivity, Instrumental Cooperative, and Instrumental Focused on Achievement; and (b) our replicable dimensions measuring Conscientiousness and/or

Table 5
Pearson and multiple correlations relating indigenous Mexican dimensions to the Five-Factor Model

Mexican dimensions	N	E	O	A	C	R
Multidimensional self-concept scale La Rosa and Díaz-Loving (1991)						
Affiliative Sociability	−.27	.34	.13	.34	.38	.50
Emotional States	−.52	.57	.18	.17	.42	.65
Expressive Sociability	−.36	.57	.26	−.05	.15	.61
Interindividual Feelings	−.10	.32	.18	.35	.21	.45
Occupational	−.36	.30	.15	.11	.60	.60
Emotional Health	−.44	.19	.07	.34	.33	.54
Ethical	−.28	.25	.19	.26	.43	.49
Initiative	−.47	.52	.24	−.07	.34	.60
Accessibility	−.26	.37	.19	.25	.30	.44
Conscientiousness/Competence[a]	−.31	.16	.14	.06	.56	.56
Inhibition/Introversion[a]	.41	−.62	−.22	.12	−.17	.71
Warmth[a]	.04	.28	.13	.40	.04	.50
Temperamentalness[a]	.37	−.09	.05	−.31	−.24	.64
Multidimensional self-concept Valdez-Medina (1994)						
Social Expressive	−.29	.63	.29	.06	.24	.63
Social Normative	−.27	.31	.11	.13	.63	.64
Expressive Affective	−.10	.36	.29	.23	.26	.45
Ethical Moral	−.22	.29	.20	.30	.42	.51
Intellectual Work	−.28	.30	.25	.05	.56	.58
Rebelliousness	.29	.00	.08	−.40	−.15	.51
Conscientiousness[a]	−.21	.16	.00	−.03	.62	.66
Agreeableness[a]	−.14	.15	.17	.30	.25	.38
Rebelliousness[a]	.31	−.06	.07	−.40	−.15	.51
Playfulness[a]	−.32	.61	.23	−.05	.10	.66
Affection[a]	.03	.21	.21	.21	.06	.33
Multidimensional self-concept inventory Díaz-Loving et al. (2002)						
Social Expressive	−.38	.62	.22	.15	.30	.63
Ethical Normative	−.27	.32	.15	.27	.40	.48
Socio-Emotional Intelligence	−.31	.16	.10	.20	.38	.43
External Negative Passive Control	.45	−.28	−.09	−.29	−.41	.54
Social Affiliative	−.09	.34	.18	.26	.16	.40
Emotive Negative Self-Affirming	.27	.03	.08	−.47	−.22	.57
Instrumental Constructive	−.41	.39	.19	.07	.61	.64
Emotional Vulnerability	.51	−.42	−.06	−.20	−.29	.58
Depressive	.51	−.20	.03	−.04	−.24	.51
Social Expressiveness[a]	−.34	.59	.11	.10	.10	.64
Temperamentalness[a]	.28	.00	.17	−.48	−.13	.60
Conscientiousness/Competence[a]	−.21	.13	−.03	.02	.56	.60
Affection[a]	.00	.19	.17	.21	.03	.34
Honesty–Humility[a]	−.00	.06	.14	.24	.13	.31
Inhibition[a]	.46	−.25	−.25	.20	−.26	.56
Equanimity[a]	−.16	−.10	.11	.06	.11	.31
Expressivity and instrumentality scale Reyes-Lagunes (1999)						
Androgyny	−.30	.47	.25	.14	.39	.52
Negative Expressivity	.50	−.22	−.06	−.29	−.39	.59
Normative Passive Expressivity	−.34	.35	.13	.15	.50	.53
Negative Instrumentality	.28	−.05	−.01	−.50	−.25	.57
Positive Valence[a]	−.32	.30	.19	.02	.47	.49
Hostility[a]	.15	−.10	−.09	−.53	−.17	.61

Table 5 (*continued*)

Mexican dimensions	N	E	O	A	C	R
Neuroticism[a]	.54	−.34	.13	.09	−.24	.58
Warmth[a]	.01	.35	.13	.24	−.02	.31
Scale of expressive and instrumental traits Díaz-Loving et al. (2004)						
Instrumental Cooperative	−.34	.32	.06	.06	.65	.66
Instrumental Focused on Achievement	−.31	.38	.33	−.03	.44	.53
Instrumental Egocentric	−.23	.37	.26	−.28	.07	.54
Instrumental Machismo	.21	−.08	.01	−.42	−.23	.48
Instrumental Authoritarian	.13	.06	.13	−.52	−.04	.57
Instrumental Social Rebellious	.30	−.28	−.19	−.38	−.33	.50
Affiliative Affective	−.15	.36	.20	.32	.25	.46
Romantic Dreamer	.03	.31	.39	.20	.13	.48
Egocentric Negative Emotive	.24	−.01	.05	−.32	−.30	.46
Emotional Vulnerable	.39	−.02	.04	.14	−.13	.44
External Negative Passive Control	.54	−.36	−.17	.14	−.37	.60
Hostility[a]	.16	.07	.16	−.51	−.19	.60
Warmth[a]	−.02	.37	.31	.24	.05	.48
Neuroticism[a]	.55	−.35	−.19	.12	−.21	.62
Conscientiousness/Competence[a]	−.24	.25	.12	.01	.63	.64
Flexibility scale Melgoza-Enríquez and Díaz-Guerrero (1990)						
Flexibility	−.20	.43	.21	.41	.23	.55
Multidimensional scale of assertiveness Flores-Galaz (1989)						
Indirect Assertiveness	.37	−.20	−.13	.01	−.27	.51
Non-assertiveness	.54	−.51	−.28	−.04	−.37	.62
Assertiveness	−.43	.38	.25	.13	.40	.51
Abnegation scale Avendaño-Sandoval et al. (1997)						
Family Centered Abnegation	.02	−.13	.03	.14	.10	.23
Social Conduct Centered Abnegation	.21	−.26	−.18	.23	.25	.36
Sensitive or Cautious Abnegation	.38	−.14	−.09	.23	.24	.47
Personal strength scale Díaz-Guerrero and Melgoza-Enríquez (1994)						
Personal Strength	−.44	.34	.21	.05	.33	.48

Note. N, Neuroticism; E, Extraversion; O, Openness to Experience; A, Agreeableness; C, Conscientiousness; as measured by the Revised NEO-PI-R domain scales. Correlations greater than or equal to .08 in absolute value are significant at $p < .05$; correlations greater than or equal to .10 in absolute value are significant at $p < .01$.

[a] Replicable dimensions derived in the present study.

Competence and Positive Valence. The only Big Five dimension that is not assessed well by any indigenous scale or replicable dimension is Openness to Experience. Only the Romantic Dreamer scale, and none of the replicable factors, showed some tendency to define this Big Five dimension.

It is of interest that the purest Mexican markers of Big Five Agreeableness assess the negative pole of the dimension. The many scales that might be expected to identify the positive pole of Big Five Agreeableness are moderately related to both Big Five Agreeableness and Extraversion; that is, they are interstitial traits between these two dimensions. These include the test authors' Affiliative Sociability, Interindividual Feelings, Social Affiliative, Affiliative Affective, and Flexibility dimensions, and the three replicable Warmth dimensions. Finally, only a few indigenous dimensions have gone unmentioned, including the test authors' Accessibility, Expressive Affective, Instrumental Egocentric, and Egocentric Negative Emotive scales, and one replicable Temperamentalness dimension and Agreeableness

dimension. These dimensions tended to have modest correlations with multiple Big Five dimensions, rather than exhibiting good one-to-one correspondence with particular Big Five dimensions. The test author scales in this list tended not to replicate well in the factor analyses reported earlier, so they may lack simple structure.

In summary, the regression analyses indicated that (a) only a small number of indigenous dimensions are not well subsumed by the FFM, and (b) only Openness to Experience is not well defined by multiple indigenous Mexican dimensions. These results do not provide evidence of Mexican inventory dimensions that are clearly culture-specific or unique.

4.5. Joint factor analyses

Joint factor analysis can also address the overlap between indigenous dimensions and the FFM (Cheung et al., 2001; Katigbak et al., 2002). We conducted a joint principal components analysis with varimax rotations on our replicable indigenous dimensions and the NEO-PI-R facet scales in the Mexican subsamples and total sample. The primary goal was to determine whether any replicable factors beyond the FFM would emerge, particularly factors defined primarily by indigenous dimensions. Accordingly, we examined factor solutions of five to eight factors. Mean factor congruence values across the two subsamples were similar for the five-factor (.85), six-factor (.83), and seven-factor (.86) solutions, but substantially lower for the eight-factor solution (.73).

Factors resembling each of the Big Five dimensions did not emerge until six or seven factors were extracted. In the five-factor solution, Extraversion and Neuroticism defined opposite poles of a single factor. In both the six- and seven-factor solutions, Conscientiousness, Neuroticism, Extraversion, Hostility, and Warmth/Affection dimensions replicated well across the subsamples. A partial Openness to Experience factor was replicated better in the seven-factor solution, which included an additional factor resembling Ashton and Lee's Honesty–Humility dimension (e.g., Ashton et al., 2004). In Table 6 we show the seven-factor solution in the total sample and the coefficients of congruence for each factor between the two subsamples. The lower congruence values for the Honesty–Humility and Openness to Experience factors are due, in part, to the relatively small number of scales or dimensions defining those factors.

We labeled the first factor Conscientiousness. Indigenous Conscientiousness and Competence dimensions, Positive Valence, and all six NEO-PI-R Conscientiousness facets, loaded highest on this factor. We labeled the second factor Neuroticism. Indigenous Neuroticism, Inhibition, Sensitive or Cautious Abnegation, and Non-assertiveness dimensions, and all six NEO-PI-R Neuroticism facets loaded highly here, although N2, Angry Hostility; and N5, Impulsivity loaded higher on the Hostility factor. We labeled the third factor Extraversion. Indigenous Social Expressiveness, Playfulness, Inhibition/Introversion, and Flexibility dimensions loaded here, as did all NEO-PI-R Extraversion facets except E3, Assertiveness; which loaded more strongly, in the negative direction, on the Neuroticism factor. We labeled the fourth factor Hostility because the positive pole was dominated by indigenous Hostility, Temperamentalness, and Rebelliousness dimensions. Two NEO-PI-R Neuroticism facets, N2, Angry Hostility; and N5, Impulsiveness; also defined the positive pole of this dimension, and two Agreeableness facets, A4, Compliance; and A2, Straightforwardness; defined the negative pole. We labeled the fifth factor Warmth/Affection because it was defined exclusively by five indigenous Warmth and Affection

Table 6
Joint principal components analysis of replicable Mexican dimensions and NEO-PI-R: Seven-component solution

Replicable dimensions and NEO-PI-R facet scales	C	N	E	Hs	W/A	H–H	O
Conscientiousness/Competence, Díaz-Loving et al. (2004)	**.80**	−.02	.11	.08	.08	.14	.07
Conscientiousness/Competence, Díaz-Loving et al. (2002)	**.80**	−.02	−.04	−.04	−.03	−.03	−.15
Conscientiousness, Valdez-Medina (1994)	**.79**	−.06	−.04	−.03	−.03	−.06	−.08
C5 Self-Discipline	**.74**	−.34	.09	−.16	.06	.00	.08
C4 Achievement-Striving	**.71**	−.21	.15	.07	.10	.10	.04
Conscientiousness/Competence, La Rosa and Díaz-Loving (1991)	**.66**	−.14	.00	−.04	−.03	.33	.10
C1 Competence	**.61**	−.33	.23	−.14	.00	.06	.28
C2 Order	**.59**	−.04	−.06	.01	.01	−.09	−.04
Positive Valence, Reyes-Lagunes (1999)	**.58**	−.05	.28	.02	−.10	.11	.29
C3 Dutifulness	**.58**	−.14	.08	−.19	.00	.39	.16
C6 Deliberation	**.47**	−.19	−.08	−.34	.03	.03	.25
Family Centered Abnegation, Avendaño-Sandoval et al. (1997)	.21	.06	.12	−.10	.10	.00	−.09
Neuroticism, Reyes-Lagunes (1999)	−.08	**.77**	−.14	.06	.06	−.06	.15
Neuroticism, Díaz-Loving et al. (2004)	.00	**.73**	−.24	.02	.10	−.05	−.02
Inhibition, Díaz-Loving et al. (2002)	−.08	**.68**	.01	−.08	−.01	.01	−.17
N4 Self-Consciousness	−.18	**.68**	−.20	.09	.02	.00	−.12
Sensitive or Cautious Abnegation, Avendaño-Sandoval et al. (1997)	−.15	**.60**	.10	−.07	.06	−.07	.01
N3 Depression	−.23	**.65**	−.23	.23	.03	.07	−.08
N1 Anxiety	−.02	**.62**	−.15	.22	.16	.16	−.20
N6 Vulnerability	−.30	**.59**	−.20	.19	.15	.08	−.31
E3 Assertiveness	.34	**−.53**	.30	.21	.05	−.12	.06
Non-Assertiveness, Flores-Galaz (1989)	−.15	**.49**	−.34	−.09	−.22	.19	.01
Indirect Assertiveness, Flores-Galaz (1989)	−.01	.38	.19	.06	.00	−.21	.00
A5 Modesty	−.28	.32	−.16	−.25	−.01	.28	−.12
O4 Actions	−.04	−.22	.14	.13	.10	.10	.09
Social Expressiveness, Díaz-Loving et al. (2002)	.01	−.20	**.79**	−.01	.01	−.06	−.08
Playfulness, Valdez-Medina (1994)	−.03	−.28	**.72**	.14	−.02	−.15	.00
E1 Warmth	.12	−.14	**.71**	−.15	.27	.13	.09
E2 Gregariousness	.04	−.02	**.65**	−.15	.17	.00	−.16
E6 Positive Emotions	.13	−.23	**.63**	−.02	.27	.07	.18
Inhibition/Introversion, La Rosa and Díaz-Loving (1991)	−.03	**.55**	**−.61**	−.21	.00	.09	.13
E5 Excitement-Seeking	−.01	−.10	**.54**	.21	.03	.10	.23
Flexibility, Melgoza-Enríquez and Díaz-Guerrero (1990)	.18	.06	**.52**	−.24	−.26	−.28	.11
A3 Altruism	.16	.01	**.51**	−.35	.28	.31	.15
A1 Trust	.05	.00	**.44**	−.31	.17	.10	.20
E4 Activity	.37	−.28	.38	.26	.12	.02	−.09
O3 Feelings	−.02	−.02	.32	.27	.27	.16	.18
Social Conduct Centered Abnegation, Avendaño-Sandoval et al. (1997)	.17	−.01	.31	−.16	.10	.33	.19
A6 Tendermindedness	.11	.21	.28	−.17	.16	.21	.09
Personal Strength, Díaz-Guerrero and Melgoza-Enríquez (1994)	.19	−.22	.27	−.06	.05	.15	.20
Temperamentalness, Díaz-Loving et al. (2002)	.03	.10	−.01	**.83**	−.04	−.07	.18
Hostility, Díaz-Loving et al. (2004)	−.09	.00	−.11	**.76**	−.16	−.28	.19
Rebelliousness, Valdez-Medina (1994)	−.05	.09	−.10	**.70**	−.02	.08	.03
Hostility, Reyes-Lagunes (1999)	−.03	−.04	.09	**.71**	−.07	**−.46**	.05
Temperamentalness, La Rosa and Díaz-Loving (1991)	−.07	.11	−.16	**.68**	.20	−.04	−.14
A4 Compliance	−.05	.25	.08	**−.67**	.13	−.09	.07

(*continued on next page*)

Table 6 (*continued*)

Replicable dimensions and NEO-PI-R facet scales	C	N	E	Hs	W/A	H–H	O
N2 Angry Hostility	−.13	.36	−.35	**.60**	.01	.06	−.18
A2 Straightforwardness	−.01	.12	−.10	**−.55**	.15	.39	−.09
N5 Impulsiveness	−.29	.39	.09	**.44**	.05	.01	−.03
Affection, Díaz-Loving et al. (2002)	.03	.08	.02	−.03	**.91**	−.03	.06
Warmth, Díaz-Loving et al. (2004)	−.02	.01	.29	.05	**.82**	.08	.12
Warmth, Reyes-Lagunes (1999)	−.06	.02	.29	−.02	**.82**	−.04	−.09
Warmth, La Rosa and Díaz-Loving (1991)	−.02	.01	.29	.05	**.82**	.08	.12
Affection, Valdez-Medina (1994)	.04	.05	.04	−.07	**.76**	−.03	.11
Honesty–Humility, Díaz-Loving et al. (2002)	.07	.00	.03	.02	.01	**.81**	.03
Agreeableness, Valdez-Medina (1994)	.12	.01	.18	−.12	−.02	**.67**	.20
Assertiveness, Flores-Galaz (1989)	.21	−.16	.23	−.16	.07	.30	.21
Equanimity, Díaz-Loving et al. (2002)	.09	.15	−.04	−.23	−.16	−.10	**.62**
O5 Ideas	.24	−.26	.03	.08	.05	.07	**.61**
O2 Aesthetics	.05	−.08	.04	.13	.27	.18	**.56**
O1 Fantasy	−.13	−.05	.16	.23	.23	.08	**.51**
O6 Values	−.05	−.27	.07	.03	.01	.19	**.45**
Coefficients of congruence	.97	.85	.93	.94	.91	.71	.68

Note. C, Conscientiousness; N, Neuroticism; E, Extraversion; Hs, Hostility; W/A, Warmth/Affection; H–H, Honesty–Humility; O, Openness to Experience. Factor loadings greater than or equal to .40 in absolute value are shown in bold. Coefficients of congruence were computed between matched factors in the two subsamples.

dimensions. We labeled the sixth factor Honesty–Humility. It was best defined by the indigenous Honesty–Humility dimension and by the Valdez-Medina (1994) Agreeableness dimension, which included a number of high loading terms referring to honesty, loyalty, and sincerity. The NEO-PI-R facets A2, Straightforwardness; and A5, Modesty also had secondary loadings on this factor; further supporting an Honesty–Humility interpretation. We labeled the seventh factor Openness to Experience because it was defined primarily by four Openness to Experience facets. However, O3, Feelings loaded moderately on the Extraversion factor; and O4, Actions; which had poor reliability, did not load well on any factor. The indigenous Equanimity dimension also loaded on the Openness to Experience factor, but split off to define its own factor in the eight-factor solution.

Indigenous psychologists may be interested in the factor structure of our replicable indigenous dimensions alone, without inclusion of the NEO-PI-R facet scales. When we conducted such an analysis (principal components analysis with varimax rotations), we found essentially the same results, with one key exception. No Openness to Experience factor emerged because the indigenous dimensions did not contain any Openness to Experience markers. Otherwise, in the six-factor solution, which replicated well across the two subsamples (mean congruence = .91), the six factors were interpretable as Warmth/Affection, Hostility, Conscientiousness, Extraversion, Honesty–Humility, and Neuroticism, in that order.

Of particular interest is whether the Warmth/Affection factor, which was not defined by any NEO-PI-R facets, represents a culture-specific dimension. Several considerations argue against cultural specificity. First, the three Warmth dimensions that defined this factor correlated between .36 and .39 with the E1, Warmth facet scale; which probably accounts for the modest secondary loadings of the three Warmth dimensions on the Extraversion factor in Table 6. Second, each Warmth dimension had a moderate relationship with Big Five Extraversion or Agreeableness in Table 5, indicating a degree of correspon-

dence or overlap. The Affection dimensions were more independent of the NEO-PI-R domain scales, however. Finally, there was considerable redundancy in the terms defining the Warmth and Affection dimensions across instruments. As a result, these five replicable dimensions were quite highly correlated with each other (r range = .54 to .83), which probably contributed to the emergence of a distinct Warmth/Affection factor.

Indeed, to determine whether the inclusion of nearly redundant Warmth and Affection dimensions may have distorted the factor structure and led to a distinct dimension, we conducted a follow-up analysis in which a five-factor varimax solution was Procrustes-rotated into alignment with the American normative factor solution for the FFM (Costa and McCrae, 1992).[2] Table 7 shows the resulting factor matrix. As seen in the table, the replicable dimensions assessing Warmth and Affection all loaded well on the Extraversion factor, indicating that their identification of a separate dimension in Table 6 was probably due to the amount of overlap among these dimensions. Thus, the distinct Warmth/Affection factor identified in the seven-factor solution does not reflect a culture-specific dimension.

In summary, the only indigenous dimension that did not overlap well with the Big Five domains in any of the regression or joint factor analyses was Family Centered Abnegation. A few replicable dimensions were not accommodated well by the five-factor solution in Table 7 (Indirect Assertiveness, Assertiveness, Equanimity, and Personal Strength), but these dimensions exhibited greater overlap with the NEO-PI-R domains in the regression analyses or in the seven-factor solution in Table 6.

5. Discussion

We used a combined emic–etic approach to investigate the replicability of Mexican personality dimensions, as captured by indigenous inventories, and to relate these dimensions to the FFM, one hypothesized universal model of personality structure. We did so in a collectivistic culture with a rich tradition of indigenous personality measurement. Two limitations of the study were the use of college student samples and the uncertain comprehensiveness of available Mexican inventories. For example, the imported personality dimensions measured by the NEO-PI-R might replicate less well in samples that are less educated or more concrete in their thinking (Piedmont, Bain, McCrae, and Costa, 2002; Toomela, 2003; however, see Allik and McCrae, 2004). In addition, even fairly broad multidimensional inventories might not cover the Mexican personality domain as completely as a comprehensive lexical approach would. We consider the second limitation further in the discussion below.

5.1. Replicability of the Five-Factor Model

As a necessary first step, the replicability of the NEO-PI-R structure was examined, which had not yet been directly demonstrated in Mexico. Overall, our results provided good support for the replicability of the FFM in Mexican self-rating data. A few

[2] This was accomplished by rotating the 62×5 matrix of varimax factor loadings for the combined NEO-PI-R facet scales and indigenous dimensions using the factor transformation matrix obtained by first rotating the 30×5 matrix of NEO-PI-R factor loadings from the joint factor solution to the American normative matrix. We thank Robert R. McCrae for his consultation in conducting this analysis.

Table 7
Five-Factor Joint Solution for NEO-PI-R and Replicable Mexican Dimensions after Procrustes Rotation to American Normative Solution for NEO-PI-R

Scale or Dimensions	N	E	O	A	C
N1 Anxiety	**.70**	−.06	−.08	.03	−.03
N2 Angry Hostility	.21	**−.44**	−.36	**−.48**	−.09
N3 Depression	**.68**	−.20	−.02	−.03	−.25
N4 Self-Consciousness	**.64**	−.20	−.15	.05	−.21
N5 Impulsivity	**.47**	.12	.14	−.21	−.33
N6 Vulnerability	**.67**	−.09	−.19	.02	−.32
E1 Warmth	−.23	**.64**	.18	.32	.13
E2 Gregariousness	−.16	**.54**	−.07	.24	.01
E3 Assertiveness	**−.42**	.38	.13	−.31	.32
E4 Activity	−.17	**.45**	.08	−.23	.35
E5 Excitement-Seeking	−.13	**.42**	**.41**	−.03	−.02
E6 Positive Emotions	−.26	**.62**	.26	.17	.14
O1 Fantasy	.07	.25	**.52**	.00	−.10
O2 Aesthetics	.07	.16	**.53**	.09	.10
O3 Feelings	.10	**.41**	.35	−.01	−.01
O4 Actions	−.12	.21	.20	−.06	−.02
O5 Ideas	−.20	.06	**.52**	−.03	.28
O6 Values	−.22	.03	**.48**	.07	.00
A1 Agreeableness	−.15	.32	.15	**.43**	.09
A2 Straightforwardness	.03	−.15	−.11	**.65**	.07
A3 Altruism	−.10	**.40**	.20	**.57**	.22
A4 Compliance	−.03	−.02	−.25	**.63**	−.04
A5 Modesty	.24	−.26	−.07	.38	−.24
A6 Tender-Mindedness	.12	.19	.13	.35	.13
C1 Competence	−.38	.17	.22	.07	**.63**
C2 Order	−.01	.01	−.12	−.13	**.57**
C3 Dutifulness	−.15	−.02	.23	.26	**.64**
C4 Achievement Striving	−.13	.22	.09	−.09	**.72**
C5 Self-Discipline	−.32	.13	−.02	.02	**.75**
C6 Deliberation	−.24	−.09	.05	−.22	**.52**
Neuroticism, Reyes-Lagunes (1999)	**.69**	−.17	.01	.13	−.10
Neuroticism, Díaz-Loving et al. (2004)	**.69**	−.20	−.15	.12	−.02
Sensitive or Cautious Abnegation, Flores-Galaz (1989)	**.45**	.01	−.09	.21	−.18
Inhibition, Díaz-Loving et al. (2002)	**.54**	−.11	−.20	.21	−.11
Indirect Assertiveness, Flores-Galaz (1989)	.27	.12	−.08	−.02	−.07
Warmth, Reyes-Lagunes (1999)	.23	**.74**	−.11	.27	−.03
Warmth, Díaz-Loving et al. (2004)	.26	**.71**	.12	.28	.03
Social Expressiveness, Díaz-Loving et al. (2002)	−.36	**.60**	.07	.04	−.03
Playfulness, Valdez-Medina (1994)	−.39	**.59**	.13	−.13	−.09
Affection, Díaz-Loving et al. (2002)	.38	**.59**	−.07	.28	.08
Inhibition, La Rosa and Díaz-Loving (1991)	**−.52**	**.58**	.09	−.26	.00
Warmth, La Rosa and Díaz-Loving (1991)	.28	**.57**	−.03	**.53**	.05
Non-Assertiveness, Flores-Galaz (1989)	.39	**−.51**	.00	.17	−.13
Affection, Valdez-Medina (1994)	.28	**.50**	−.03	.27	.09
Agreeableness, Valdez-Medina (1994)	−.01	−.03	**.48**	**.41**	.22
Honesty–Humility, Díaz-Loving et al. (2002)	.10	−.09	**.45**	.32	.18
Equanimity, Díaz-Loving et al. (2002)	−.05	−.23	.32	.20	.11
Assertiveness, Flores-Galaz (1989)	−.19	.13	.28	.28	.26
Personal Strength, Díaz-Guerrero and Melgoza-Enríquez (1994)	−.23	.21	.25	.12	.22
Hostility, Reyes-Lagunes (1999)	.11	.23	.08	**−.78**	−.14
Hostility, Díaz-Loving et al. (2004)	.13	.16	.31	**−.73**	−.18

Table 7 (*continued*)

Scale or Dimensions	N	E	O	A	C
Temperamentalness, Díaz-Loving et al. (2002)	.35	.12	.38	**−.67**	−.02
Temperamentalness, La Rosa and Díaz-Loving (1991)	.44	.16	.07	**−.53**	−.10
Rebelliousness, Valdez-Medina (1994))	.34	.03	.30	**−.53**	−.07
Flexibility, Melgoza-Enríquez and Díaz-Guerrero (1990)	−.04	**.42**	.19	**.47**	.21
Social Centered Abnegation, Avendaño-Sandoval et al. (1997)	−.07	.18	.29	.35	.22
Conscientiousness/Competence, Díaz-Loving et al. (2004)	−.02	.04	.12	−.09	**.80**
Conscientiousness/Competence, Díaz-Loving et al. (2002)	−.02	−.01	−.20	−.11	**.78**
Conscientiousness, Valdez-Medina (1994)	−.05	−.01	−.15	−.12	**.77**
Conscientiousness/Competence, La Rosa and Díaz-Loving (1991)	−.10	−.05	.20	.07	**.71**
Positive Valence, Reyes-Lagunes (1999)	−.13	.11	.29	.01	**.58**
Family Centered Abnegation, Avendaño-Sandoval et al. (1997)	.03	.14	−.12	.11	.20

Note. Factor loadings greater than or equal to .40 in absolute value are shown in bold. N, Neuroticism; E, Extraversion; O, Openness to Experience; A, Agreeableness; C, Conscientiousness.

qualifications should be noted, however. First, there is some uncertainty about whether the differences in factor alignment of the Extraversion and Agreeableness facets in varimax-rotated solutions represent meaningful, though minor, cultural differences in personality structure (Rolland, 2002). The finding of very good cross-cultural congruence in the Procrustes solutions indicates that the NEO-PI-R structure provides an acceptable, although not necessarily optimal, representation of Mexican personality structure. Second, several NEO-PI-R facet scales exhibited weak internal consistency. The lower reliability of some Openness to Experience facet scales is not unique to Mexican samples (Mastor, Jin, and Cooper, 2000; Piedmont and Chae, 1997) and may be due to the more abstract ideas represented by this domain (Piedmont et al., 2002). Nonetheless, further research—for example, using differential item functioning methods—could be done to determine whether some behavioral exemplars of particular trait facets are less relevant in Mexican culture. Third, a few cultural differences in primary factor loadings may reflect meaningful cultural differences in trait structure. For example, even in the Procrustes solution, E3, Assertiveness loaded more highly; in the negative direction, on Neuroticism than Extraversion. This may indicate that assertiveness is less healthy in Mexicans than Americans, where assertiveness is an indicator of extraversion or social confidence. This is noteworthy, given Mexican psychologists' considerable interest in the assertiveness construct (e.g., Flores-Galaz and Aguilar-Ortega, 1998; Flores-Galaz, Díaz-Loving, Guzmán-Pérez, Bárcenas, and Godoy, 1992).

A final qualification or limitation of our NEO-PI-R results is that they are based on an imposed-etic approach. Researchers have been successful in replicating several alternative structural models across cultures, including the HEXACO (Ashton et al., 2004), Big Seven (Benet and Waller, 1995), and Multi-language 7 (Saucier, 2003) models, among others. This indicates that imported measures do facilitate emergence of their embedded structure in new cultural contexts, which makes analyses of indigenous measures all the more important.

5.2. Replicability of Mexican indigenous dimensions

For most of the indigenous instruments, our scoring of the test authors' preferred dimensions or scales resulted in reliability estimates that were acceptable and comparable

to those reported by the test authors. However, our replication criteria suggested that many of the indigenous instruments have been over-factored. Although additional factors can split off from larger dimensions in some samples, these additional dimensions apparently do not emerge in a reliable manner across samples. A strong case can therefore be made for scoring a fewer number of more replicable and reliable dimensions. Indeed, given their greater length, it is not surprising that the alpha reliabilities for our replicable dimensions were generally substantially higher than those reported for the test authors' original scales.

The Mexican psychologists who developed these instruments generally did not report specific criteria for selecting the number of factors. Understandably, they may have sought to identify as many personality distinctions as possible. In many cases, our replicable dimensions were blends of multiple factors identified by the test authors. One option would be to treat these "subfactors" as multiple facets of the replicable dimensions, in much the same way that the NEO-PI-R domain scales are divided into facets. The NEO-PI-R facets are conceptually meaningful, but do not typically replicate as distinct factors in item-level factor analyses (Church and Burke, 1994). Or, if indigenous researchers want to measure these multiple facets in a reliable and replicable manner, they may need to expand the number of items assessing each facet or better differentiate them conceptually.

5.3. Relating Mexican indigenous dimensions to the FFM

Both our regression and joint factor analyses lead us to conclude that most Mexican dimensions resemble or overlap dimensions of the FFM. Only one scale—Family Centered Abnegation—showed little overlap with the Big Five domains in all of the regression and joint factor analyses. The Family Centered Abnegation scale is probably better viewed as measuring family values than a personality trait (e.g., "I like for my family to be first."; "I like overworking if it is for my family."). Two scales containing Honesty content identified a distinct factor in the joint seven-factor solution, consistent with Ashton et al.'s (2004) contention that Honesty–Humility is relatively independent on the FFM. However, an Honesty–Humility dimension is not unique to Mexico (Ashton et al., 2004). Indeed, its emergence in the seven-factor solution suggests that it would be useful to replicate the present study using the HEXACO Personality Inventory as the imported measure (Lee and Ashton, 2004). The replicable Affection dimensions showed little overlap with the NEO-PI-R domain scales in the regression analyses, but had good loadings in the joint five-factor solution. In any case, the Affection dimensions are not culture-specific. They correspond well to the Loving (or *Amoroso*) dimension identified by Rodríguez and Church (2003) in a comprehensive lexical study of Mexican affect, but similar affective dimensions have also been identified in other cultures (e.g., Allik and Realo, 1997). Finally, the Equanimity dimension was weakly related to the FFM. This dimension resembles a Mexican affect dimension that Rodríguez and Church (2003) labeled Serene (or *Sereno*), but again, comparable affect dimensions have been identified in other cultures (e.g., Watson and Clark, 1992). In short, even the few replicable Mexican dimensions that were less well accounted for by the FFM do not appear to be culture-specific.

Confidence in our conclusions about the limited cultural specificity of Mexican dimensions will depend, or course, on the extent to which current Mexican inventories cover the entire Mexican personality domain. We included all indigenous personality measures we could identify in a thorough search of the literature and in consultation with Mexican

psychologists. Some of the instruments assess specific traits and do not purport to cover the entire personality domain. The multidimensional self-concept measures come closest to comprehensiveness in their attempt to incorporate the most salient trait concepts used by Mexicans to describe themselves. It is informative, then, that replicable dimensions resembling three or four of the Big Five dimensions emerged in each of the self-concept measures, although some of the dimensions were narrower in content than the corresponding NEO-PI-R domains. We should probably not expect indigenous measures of instrumental (masculine) and expressive (feminine) traits to encompass the entire personality domain. Nonetheless, both indigenous measures of instrumental and expressive traits included replicable factors that resembled Conscientiousness, Neuroticism, and inverse Agreeableness (Hostility), and a Warmth dimension that related to both Extraversion and Agreeableness. Overall, although recognizable Big Five-like dimensions emerged in the individual indigenous measures, the indigenous instruments also tended to divide up the personality domain a bit differently than the NEO-PI-R.

Most noteworthy was the absence of a Big Five Intellect or Openness to Experience dimension in the indigenous measures. Intellect or Openness to Experience concepts are apparently less salient in the self-descriptions of the Mexican samples generally used to derive the indigenous concepts. Cheung et al. (2001) also failed to obtain an Openness to Experience dimension in the first version of the Chinese Personality Assessment Inventory, which was based on Chinese literature and self-descriptions. However, indigenous inventories developed in a similar manner in the Philippines have included dimensions that resemble Big Five Intellect or Openness to Experience, so it is possible to identify such dimensions using indigenous inventory approaches (Guanzon-Lapeña, Church, Carlota, and Katigbak, 1998).

A comprehensive lexical approach that culled all trait terms from a comprehensive dictionary would be better able to determine whether an indigenous Openness to Experience dimension can be obtained in Mexican samples. There do seem to be relevant trait adjectives in the Spanish language (e.g., Benet and Waller, 1995). A lexical approach could also determine whether there are additional dimensions that are more culture-specific than the ones identified in this study of existing inventories. In the meantime, our results suggest that Mexican personality dimensions cover much the same territory as the FFM.

In the introduction, we noted that researchers should be open to the possibility that cultural differences will be reflected not in clearly unique dimensions, but in the relative salience or content of particular dimensions. Such differences are more difficult to quantify, but there were some plausible illustrations in our Mexican results. One example might be the prevalence of Warmth and Affection dimensions in the indigenous measures. This suggests that traits such as *loving*, *sentimental*, *romantic*, *tender*, and *affectionate* are quite salient in the open-ended self-descriptions used by Mexican psychologists to identify indigenous traits. Similarly, traits associated with self-sacrifice (i.e., abnegation), malleability and accommodation (i.e., flexibility), and indirect assertiveness also have a Mexican cultural flavor and are apparently viewed as important or "cardinal" traits by Mexican psychologists. The salience of these traits seems consistent with some of the literature on Mexican culture and personality, which describes Mexican tendencies to self-modify or adapt to the needs of others, to adopt less assertive coping strategies, and to emphasize affiliative and warm interpersonal behavior (e.g., Díaz-Guerrero, 1979; Díaz-Loving and Draguns, 1999). In short, apparent cultural differences in the present study did not involve the discovery of clearly culture-specific dimensions, but rather more subtle differences in

the salience or cultural flavor of particular traits. These results are comparable to those reported by other researchers who have investigated indigenous personality structure (Cheung et al., 2001; Katigbak et al., 2002).

Advocates of indigenous approaches, including the present researchers, might be more pleased to discover clearly culture-specific dimensions. However, even if culture-specific dimensions prove difficult to identify, it is important to keep in mind that there are many other ways that cultures can differ in regard to traits. These include the salience or centrality of various traits, mean trait levels, the behavioral exemplars of traits, trait-relevant behavioral consistency, the contexts in which particular traits are manifested, the predictive value of traits, and the role of traits in self-concepts, person descriptions, and causal inferences about behavior. We continue to advocate indigenous approaches and believe that they contribute significantly toward the development of a universal psychology.

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