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MEASUREMENT EQUIVALENCE OF ENGLISH AND SPANISH VERSIONS OF THE CAMPBELL INTEREST AND SKILL SURVEY

by

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DISSERTATION

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Psychology Department

THE UNIVERSITY OF TEXAS AT EL PASO

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DEDICATION

For Luis, Rodolfo, and Silvia.

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ABSTRACT

This study illustrates an application of the item response theory (IRT)-based differential functioning of items and tests (DFIT; Raju, van der Linden, & Fleer, 1995) framework to assess the fidelity of a Spanish translation of the Campbell Interest and Skill Survey (CISS; Campbell, Hyne, & Nilsen, 1992) across three culturally- and linguistically-different groups: (a) English-speaking Anglo-Americans, (b) English-dominant Hispanic-Americans, and (c) Spanish-speaking Mexican nationals. A two-parameter logistic dichotomous model (Birnbaum, 1968; Hambleton & Swaminathan, 1985; Hulin, Drasgow, & Parsons, 1983; Lord, 1980) and the DFIT framework were used to evaluate differential functioning (DF) at both the test and item levels. DFIT provided two indices of DF at the item level [i.e., a noncompensatory differential item functioning (NCDIF) and a compensatory differential item functioning (CDIF)], and one index at the test or scale level [i.e., the differential test functioning (DTF)]. Across the three two-group comparisons, an average of 7.6% of the items were identified as DF using the CDIF index and an average of 40% were identified as DF using the NCDIF index. The difference in the number of DF found using the CDIF and the NCDIF indices highlights the benefits of allowing items to compensate for each other's DF.

Using Hofstede's (1980, 1991) uncertainty avoidance dimension, predictions were made regarding which items would exhibit DF. The scales that were expected to show DF (i.e., Organizing and Creating orientations) did not show a greater proportion of DF than the remaining scales, suggesting no support for using cultural differences to

hypothesize DF items. Finally, as expected, the number of items identified as functioning differentially using the CDIF index was greater in the different-language comparisons (i.e., Anglo versus Mexican and Hispanic versus Mexican) than in the same-language comparison (i.e., Anglo versus Hispanic). Post hoc examinations of several NCDIF items provide information about the probable sources of DF (i.e., translation errors, differences in cultural relevance across groups, or both). Benefits of using the DFIT framework over traditional DIF assessment methods in future measurement equivalence studies are discussed.

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CHAPTER 1

INTRODUCTION

Interest inventories are the most widely used assessment instruments in career counseling (Fouad, 1993). It is estimated that four to six million copies of interest inventories are sold annually in the United States (Rounds & Tracey, 1996). Interest inventories are used to match an individual's interest with careers, and matching can take place at various stages in an individual's career. For example, individuals use inventories to choose a college major, select an occupation, or as a guide to make mid-life changes. In addition, organizations also use interest inventories to evaluate career interests in personnel selection and placement. Interest inventories are predictive of employee adjustment to and longevity in a profession (Reeves & Booth, 1979). Even after initial selection, interest inventories may facilitate career development, i.e., advancement and movement to the right job within a career (Super, 1983).

Holland's Vocational Interests Model

Holland (1973, 1985) proposed a model of vocational interests that has served as the basis of several interest inventories, e.g., the Career Decision-Making (Harrington & O'Shea, 1976), the general occupational themes of the Strong Interest Inventory (Campbell & Hansen, 1981; Hansen & Campbell, 1985a, 1985b), and the orientation scales for the Campbell Interest and Skill Survey (Campbell et al., 1992).

Holland's model suggests that most individuals and environments are dominated by one of six general interest types: Realistic (R), Influencing (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C), referred to by their acronym RIASEC (see Table 1 for a summary of each type).

However, rather than classifying individuals as being a single type, each person is ranked on his/her standing on all six types. For example, a profile might reflect that a person resembles a Social type the most, an Artistic type next, followed by the remaining types in descending order. Similarly, environments are usually dominated by one type, but each is a combination of all six types. Some individuals and environments are more clearly defined than others. Thus, a person or environment may strongly resemble one type and show little resemblance to any other types. Alternatively, a person or an environment may resemble many types and would be labeled undifferentiated or poorly defined.

Holland's theory postulates that the six types are related to each other in a hexagonal structure and that types that are most proximate to each other are more similar than the types that are distant (e.g., Realistic and Influencing types are more similar to each other than Artistic and Enterprising; see Figure 1). The hexagon defines levels of person-environment congruency by assuming that individuals "flourish" or do well in an environment with the same type as their personality type. For instance, the highest level of congruency for a Social person would result from working in a Social environment, and the lowest level of congruency would result from working in a Realistic environment.

Table 1.: *Description of Holland's Personality and Environmental Typology*

Holland's type or environment	Description	Sample occupations
Realistic	Preference for ordered or systematic manipulation of objects, tools, or animals. Aversion to educational or therapeutic activities.	Carpenter, truck operator, baker
Influencing	Preference for observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena. Aversion to persuasive, social, and repetitive activities.	Psychologist, microbiologist, economist
Artistic	Preference for ambiguous, free, unsystematic activities that entail the manipulation of physical, verbal, or human forms to create art. Aversion to explicit, systematic, and ordered activities.	Musician, interior designer, philosopher

Table 1.: *Description of Holland's Personality and Environmental Typology (cont.)*

Holland's type or environment	Description	Sample occupations
Social	Preference for activities that involve informing, training, developing, or curing. Aversion to explicit, ordered, systematic activities involving materials, tools, or machines.	Counselor, clergy member, politician
Enterprising	Preference for activities that involve attaining organizational goals or economic gain. Aversion to observational, symbolic, and systematic activities.	Lawyer, retail store manager, sales person
Conventional	Preference for ordered, systematic manipulation of data, such as keeping records, filing or reproducing materials, organizing written and numerical data, operating business machines and data processing machines to attain organizational or economic goals. Aversion to ambiguous, free, or exploratory activities.	Production editor, bookkeeper, office worker

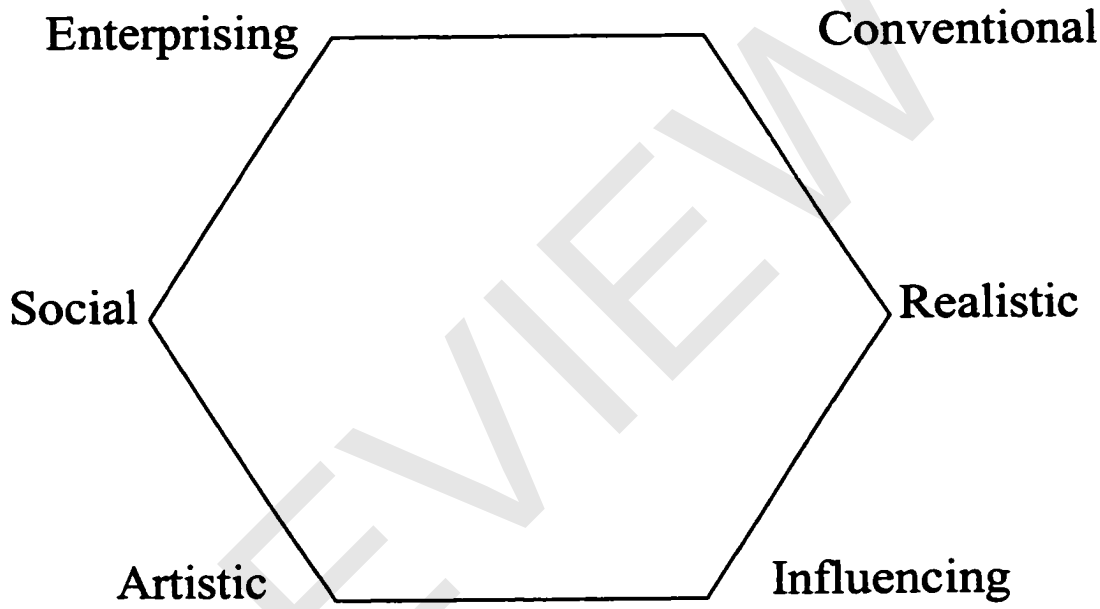

Figure 1.: Holland's hexagonal model showing the relationship among the six vocational types.

Theoretically, the level of person-environment congruency can be used to predict outcomes, such as job satisfaction or job performance.

Vocational Interests Across Cultures

As with many other tests, interest inventories are frequently administered to different cultural and linguistic groups. Because most vocational theories and inventories were developed for Anglo-American English-speaking populations (Day, Rounds, & Swaney, 1998; Lattimore & Borgen, 1999), researchers have questioned whether these theories and inventories are appropriate measures of career interests for other ethnic groups. Specifically, researchers have questioned whether the vocational interests of minorities are different from those of Anglo-Americans.

Research has examined whether Holland's (1973, 1985) interest model is applicable to Spanish-speaking students living in the U.S. Harrington and O'Shea (1980) asked 267 Spanish-speaking students of Mexican, Puerto Rican, Cuban, and other South American backgrounds to complete the Spanish version of a Holland's model-based inventory, the Career Decision-Making (CDM; Harrington & O'Shea, 1978). Using a matrix of intercorrelations, the authors found that the CDM scales have the same hexagonal relationship than Holland's model and that the inverse relationships between distances and the size of correlations between types are similar to the ones proposed by Holland. The study confirmed the construct validity of the Spanish version of the CDM and suggested that Holland's vocational types are valid for Spanish-speaking populations (Harrington, 1986).

Other researchers have examined the vocational interest patterns across different minorities. Tomlinson and Evans-Hughes (1991) used the Strong-Campbell Interest Inventory (SCII; Hansen & Campbell, 1985b) to study the career interest patterns of 12 Anglo, 51 Black, and 14 Hispanic (of predominantly Puerto Rican descent) students. Because the SCII is based on Holland's (1973, 1985) vocational model, responses were analyzed by gender and ethnicity using Holland's six vocational types. A 2 (Gender) X 3 (Ethnicity) analysis of variance (ANOVA) was performed on each mean Holland type score. A significant main effect of gender was found for the Realistic scale only, with male students reporting higher Realistic interests than female students. There were no significant main effects for ethnicity; however, a significant interaction of gender and ethnicity indicated that Black females were less likely to prefer Artistic themes than Black males did. Tomlinson and Evans-Hughes concluded that "gender and ethnicity may serve to influence career interest and choice" (p. 155). However, due to the small sample sizes, the results of this study should be considered preliminary.

In a similar study, Davidson and Spokane (1999) asked middle school Anglo, Black, and English-dominant Hispanic students to complete the English version of the 1985 revision of the Strong Interest Inventory (SII; Hansen & Campbell, 1985a), and Spanish-dominant Hispanic students to complete the Spanish version of the same inventory (SII-S; Hansen & Campbell, 1985a). Using multivariate analysis of variance (MANOVA), they found that Spanish-speakers expressed significantly higher interests on the Influencing and Artistic themes than did Anglos and English-dominant Hispanics. Spanish-speakers also scored significantly higher than Anglos on the Social, Enterprising,

and Conventional themes. In addition, English-dominant Hispanics obtained higher interest scores than Anglos on the Conventional theme. With respect to gender differences, male students obtained higher scores on the Realistic theme than did female students, and female students scored higher on the Artistic, Social, and Conventional scales than male students.

Need for Interest Inventories in the Hispanic Community

Over the past few decades, the population of the United States has undergone radical demographic changes. By the year 2000, minorities constituted 31% of the total U.S. population (U.S. Census Bureau, 2001) with Hispanics being one of the most rapidly growing minorities. For example, from 1990 to 2000, the number of Hispanics rose from 22.4 million to 35.3 million, an increase of 58% (U.S. Census Bureau, 2001). Furthermore, from 1990 to 1998 the total labor force increased nine percent, while in the same time frame, the Hispanic labor force increased 37% (U. S. Census Bureau, 1999). Unfortunately, due to their educational status, Hispanics are more likely than Anglos to work in slow-growing or declining industries (i.e., occupations with low levels of employment opportunities), such as agriculture and manufacturing (Hawks & Muha, 1991; Okocha, 1994).

In order to reverse this trend of underemployment, appropriate culturally-sensitive career counseling must be available for the Hispanic population. In cases of recent immigrants, accurate assessment often entails testing individuals in Spanish. A variety of factors (e.g., SES, geographic region, number of generations in the United States) influence the rate at which individuals will shift from being Spanish-speaking to English-

speaking; however, the 1990 census (U.S. Census Bureau) reported that, when asked if they speak a language other than English at home, 17.3 million people in the U.S. said they speak Spanish.

Equivalence of Translated Tests

Researchers and test developers recognize the need for Spanish versions of interest inventories, as evidenced by the development of the Spanish versions of some of the best known interest surveys, e.g., the Career Decision-Making (CDM; Harrington & O'Shea, 1978) and several versions of the Strong-Campbell Interest Inventory (SCII; Campbell & Hansen, 1981; Hansen & Campbell, 1985a). However, the measurement equivalence of these interest inventories has not been adequately examined. Test developers must establish measurement equivalence across different-culture same-language groups (e.g., Anglo versus English-dominant Hispanic) and different-culture different-language groups (e.g., Anglo versus Spanish-speaking Mexican and English-dominant Hispanic versus Spanish-speaking Mexican).

Measurement equivalence exists "when individuals with equal standing on the trait measured by the test but sampled from different subpopulations have equal expected observed test scores" (Drasgow, 1987, p. 19). Lack of measurement equivalence in test translations or adaptations may be the result of (a) unintentional changes in the meaning of an item or errors in the translation process and/or (b) differences in the degree of relevance of an item in one cultural group or another (Budgell, Raju, & Quartetti, 1995).

Unless it is determined that the test items are equivalent across groups that differ linguistically and culturally, it is not certain whether group differences are due to true