Vocational interest structures for Asian Americans, Middle-Eastern Americans and Native Americans on the 2005 Strong Interest Inventory

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This study examined whether the vocational interests of Asian Americans, Middle-Eastern Americans, and Native Americans, as measured by the 2005 Strong Interest Inventory (SII), followed Holland's (1997) calculus hypotheses for a *RIASEC* ordering. The structures of interests of these three racial/ethnic groups were examined for fit with two structural models: (1) a less-stringent model requiring a circular *RIASEC* ordering and (2) a more stringent model requiring equal distances between adjacent interest types. Individuals who completed the 2005 Strong Interest Inventory were included in the sample (N = 22,394), and the overall sample was divided between racial/ethnic groups, gender, and professional status (i.e. student and employed adults). Results from randomization tests of hypothesized order and circular unidimensional scaling analyses found that a circular *RIASEC* order is applicable to Asian American, Middle-Eastern American and Native American students and employed adults, regardless of gender, when measured by the 2005 Strong Interest Inventory. Results from this study indicate that the current version of the Strong Interest Inventory measures vocational interests in a manner that strongly aligns with Holland's calculus hypothesis for both men and women.

1. Introduction

Holland's (1997) theory of person–environment fit is an influential model within the field of vocational psychology (Tracey, 2008) and is one of the most commonly researched theoretical frameworks in career counseling (Fouad, 2007; Swanson & Gore, 2000). Holland's theory is based on the premise that career choices and decision-making are expressions of a person's personality. Holland argues that a reciprocal relationship exists between both people and their environments. Therefore, people with certain personalities and interest types are drawn to certain types of environments, and in turn, environments help shape people's interests. According to Holland's theory, both people and environments are categorized into six interest types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional, or otherwise known as *RIASEC* interest types.

Although research has examined several of Holland's propositions (e.g. congruence), the most attention and research within vocational psychology have focused on empirically examining Holland's hexagonal hypothesis. Holland's hexagonal hypothesis asserts that the six interest types are ordered in a hexagonal structure, with interests organized around the hexagon in a *RIASEC* ordering. Specifically, the physical proximity of types within the hexagon reflects the level of similarity between types. Interest types that are adjacent to one another on the hexagonal structure (e.g. Realistic and Investigative) are more similar than interest types that are opposite from one another (e.g. Artistic and Conventional). Further, Holland's calculus hypothesis argues that interest types are equidistant from one another on the hexagonal structure.

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Vocational psychologists have investigated Holland's calculus hypothesis by examining two models related to this proposition: (1) a circular order model without equal distances between interest types and (2) a hexagonal model with equal distances between interest types. The circular model is a less restrictive model when compared to the hexagonal model and only assumes that adjacent interest types are more similar to one another than to opposite interest types, whereas a hexagonal model requires that interests types are equidistant from one another. For example, a hexagonal model would possess a structure in which Investigative interests are as similar to Artistic interests as they are to Realistic interests and are as dissimilar to Social interests as they are to Conventional interests. Past research has investigated which model truly reflects vocational interests, and in general, much of the research on the pattern of vocational interests has found more support for a circular model when compared to an equidistant model across various interest inventories (Armstrong, Hubert, & Rounds, 2003; Kantamneni & Fouad, 2011; Tracey & Rounds, 1993).

Much of the early research examining Holland's theory with cross-cultural populations focused on examining mean differences between cultural groups (Fouad & Kantamneni, 2009). However, more of the recent research on the applicability of Holland's model with diverse populations has focused on examining between group differences in relation to Holland's calculus hypothesis, investigating whether vocational interests follow a circular and equidistant pattern across various racial/ethnic samples. Research has examined both the circular and hexagonal hypotheses with varying samples and with a range of interest inventories. Considerable support has been found for the circular *RIASEC* ordering across racial/ethnic groups using a variety of statistical techniques. For example, using randomization tests of hypothesized order, Fouad, Harmon, and Borgen (1997) found the predicted *RIASEC* ordering for African American, Asian American, Latino(a) and White samples in the normative group of the 1994 version of the Strong Interest Inventory. Using more sophisticated analyses, Armstrong et al. (2003) examined the vocational interests of the same sample and also found general support for the circular ordering of the six occupational themes for all racial/ethnic groups.

Similarly, a study investigating the structural nature of interests between racial/ethnic groups in the 2005 version of the Strong Interest Inventory found a circular *RIASEC* ordering for the six occupational themes in tests of hypothesized order for African Americans, Latino(a)s, and Caucasians in the normative sample as well as student and employed adult samples (Kantamneni & Fouad, 2011). Circular unidimensional scaling also found support for the circular ordering of the six interest types with two exceptions; an *IRAESC* ordering was found for African American females in the General Representative Sample and *IRASEC* ordering was found for Latinos in employed adults. Additionally, two separate studies have investigated the structural nature of interests for samples of Latino(a) adults and South Asian American students; neither of these studies have found circular *RIASEC* orderings for certain samples (Flores, Spanierman, Armstrong, & Velez, 2006; Kantamneni & Fouad, 2011). Flores and her colleagues found a *RAISEC* ordering for adult Latinos, and Kantamneni and Fouad found an *IASREC* ordering for South Asian males.

Research has also examined Holland's equidistance hypothesis specifically with diverse samples. In general, more support has been found for the circular ordering when compared to the equidistant ordering of interest types (Armstrong et al., 2003; Rounds & Tracey, 1996). For example, Armstrong and his colleagues found that more variance was accounted for in the circular order model when compared to the equidistant model for African Americans, Asian Americans, Latino(a)s and Whites in the 1994 version of the SII. Conversely, the equidistant model fit better for Caucasian American males and females and Asian American females when compared to other racial/ethnic minority groups. Armstrong and his colleagues argue that the lack of support found for the hexagonal model in their study suggests that categorizing interests in an equidistant manner, as Holland proposes, may not be meaningful for all racial/ethnic groups. Similarly, Kantamneni and Fouad (2011) found that the structure of interests for African American, Caucasian, and Latino(a) students and employed adults who took the 2005 version of the SII fits better (i.e., more variance was accounted for) with a less restrictive circular model than a model requiring equal distances between adjacent interest types. Differences between the two models were particularly noticeable in African American females, Latino(a)s, and Caucasian females. Visual depictions of the *RIASEC* structures in both of the aforementioned studies highlighted orderings that deviate from equal distances between adjacent interest types. Flores et al. (2006) also found substantial differences between quasi-circumplex models (i.e., testing for a circular ordering of interests) and circulant models (i.e., testing for equidistant ordering of interests) in Mexican American high school students. Together, these studies highlight the possibility that a circular ordering rather than an equidistant hexagonal ordering may be a better fit for many racial/ethnic minority groups.

It is important to note that much of the research in this area has tested the models with certain racial/ethnic groups and often with the normative sample of the Strong Interest Inventories. This type of sampling has the potential to be problematic because some racial/ethnic groups may not be highly represented in normative samples. For example, the normative sample in the 2005 version of the Strong Interest Inventory did not include enough Asian Americans and Native Americans to run the appropriate structural analyses, thus previous investigations (i.e. Kantamneni & Fouad, 2011) were not able to examine their structural nature. In fact, much of the research examining the cultural applicability and validity of Holland's theory has paid more attention to some racial/ethnic groups (e.g., Latino(a)s) and less attention to other groups (e.g., Native Americans). For instance, to the author's knowledge, no study to date has examined the structural nature of interests of Middle-Eastern Americans, and little research has examined the structural nature of interests of Asian Americans and Native Americans using the most current assessment tools (e.g., the current version of the SII).

Gender and vocational interests have also received a great deal of attention within vocational psychology, particularly as it relates to interest assessment (Anderson, Tracey, & Rounds, 1997; Day & Rounds, 1998; Fouad & Kantamneni, 2009; Fouad et al., 1997). Meta-analyses examining gender differences in structural ordering across interest assessments have found no major differences between men and women (Anderson et al., 1997; Tracey & Rounds, 1993). Anderson and his colleagues conducted a meta-analysis on *RIASEC* ordering using data from the Strong Interest Inventory and found no significant differences between men and women in either the circular model or the equidistant, hexagonal model (i.e., circumplex model). However, individual studies have found gender differences (Flores et al., 2006; Fouad et al., 1997; Hansen, Collins, Swanson, & Fouad, 1993; Kantamneni & Fouad, 2011, 2013). Fouad