

**Profile Analysis of  
Intercultural Sensitivity**

by

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## Abstract

Bennett (1986) theorized that preferences for specific worldviews about cultural difference (ranging from ethnocentric to ethno-relative) influence the degree to which trainees benefit from or resist cross-cultural training. Measured by the Intercultural Development Inventory (IDI; Hammer & Bennett, 2001), a single intercultural sensitivity score has been criticized because it may overestimate preference for the intermediate worldview of Minimization and may mask preferences for multiple worldviews. In this study, the normative IDI profile patterns are explored and validated in two military samples using profile analysis via multidimensional scaling (PAMS; Davison, 1994; Kim, Frisby, & Davison, 2004). Two dimensions were revealed, one largely supportive of an intercultural sensitivity dimension peaking at Acceptance (Profile 1) and a second that indicates significant preference for the Minimization worldview coupled with a lack of preference for the Reversal worldview (Profile 2). In a test of Bennett's (1998) resistance-to-training hypothesis, PAMS parameters were used to predict change in cultural knowledge as a result of instruction. Profile 1 was not related to greater gains in cultural knowledge, while there was a relationship between Profile 2 weights and change in learning. The results suggest that Minimization is a construct not intermediate in the intercultural sensitivity continuum but separate from it, yet that has an influence on receptiveness to learning culture-general concepts.

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## Introduction

The final two chapters of the Handbook of Intercultural Training (3<sup>rd</sup> edition) describe a chasm between cross-cultural training practitioners and researchers (Landis & Bhawuk, 2003; Renwick, 2003). Renwick encourages trainers to respond to the idiosyncrasies of their students by creating "integrated" instructional designs. These designs deliberately mix methods (e.g., didactic, experiential, culture-general and culture-specific; Paige, 1993), address multiple learning outcomes (knowledge, skills, and attitudes), and take as their starting point not the program of instruction, but the group of *individuals* who arrive for training. Practitioners endeavor to provide students, all having unique histories and experiences, the best opportunities to develop inter-culturally within the context of a single training course or across a lifetime of learning.

Unlike other work-related training, intercultural training is affectively demanding. It often asks students to suspend judgment about the values and beliefs of other cultures, as well as engage in self-reflection about their own cultural values and beliefs. Given this, a central premise in the intercultural training community is that students should be presented with appropriate supports and challenges that match their readiness to learn (Sanford, 1966). A person's level of intercultural sensitivity is seen as an indicator of that readiness to learn (Bennett, 1993).

Intercultural sensitivity is defined by Milton Bennett (1986, 1993) as an increasing ability to recognize and deal with cultural differences. This aptitude exists along a spectrum from ethnocentrism (in which one's own culture is central to reality) to ethno-relativism (in which

interactions are understood in the context of the other culture), and is composed of attitudinal and motivational elements. Janet Bennett (Bennett, 1986) proposed that students who embrace ethnocentrism will resist learning about other cultures, and benefit from instruction only when it is provided in a non-challenging way. Those who embrace ethno-relativism, on the other hand, are willing and prepared to change their own behavior to meet the demands of the cultural situation. Over the course of several decades, Milton and Janet Bennett have developed a theory surrounding the stages of intercultural sensitivity (the Developmental Model of Intercultural Sensitivity; DMIS) and coached intercultural trainers to diagnose where their students fall along the intercultural sensitivity continuum, so that the instructors may provide the appropriate supports and challenges. In Bennett's own words, "We need to understand how groups might differ predictably in their likely interpretations of [program] elements so we can change our approach when necessary" (p. 179). The DMIS is similar in formulation to Kohlberg's (1969) theory of moral development and Piaget's (1928) theory of cognitive development. Individuals are thought to develop through sequential, qualitatively different stages, typically in one direction (from ethnocentrism to ethno-relativism).

Organizations likewise desire to diagnose prospective students, but are motivated by several other concerns. Similar to the practitioner, but conscious of the significant cost of preparing employees for overseas assignments, organizations want to ensure that the training is properly designed, reaches as many students as possible, and can be shown to have a good return on investment. Organizations want to ensure that they are selecting employees who are most likely to benefit from the training, and seek to identify those motivated to continue learning while in their overseas assignments (Caligiuri, 2000). Yet the nomothetic (variable-oriented) research that provides a view of training effectiveness does not provide the ideographic (person-

centered) information valuable to trainers. This is the heart of the practitioner/researcher rift described by Landis and Bhawuk (2004).

Landis and Bhawuk point out that most researchers consider the world of the trainer a "messy place" that confounds methods and models, and that stymies generalizations and theory building. One could contend that this perception is rooted in a failure of cross-cultural researchers to adopt methodologies more common in developmental and clinical psychology that are decidedly person-centered, but also focus on providing evidence for the three "Ps" imminently useful to the trainer: prediction, prescription, and process (Youngstrom, 2008). From both a clinical and training perspective, placing an individual into a category based on observable and subjective indicators (diagnosis) is a prerequisite for determining an appropriate intervention (prognosis). Measurement instruments can be developed to serve such a purpose, but must be subjected to construct validity research that supports the intended use of the scores (Messick, 1995, p. 741).

The Intercultural Development Inventory (IDI; Hammer & Bennett, 2001) is a measurement instrument created to support the DMIS. Instead of trainers attempting to classify trainees based on objective and subjective indicators in the classroom, the IDI self-assessment can be completed before training begins, which is an attractive option for trainers. Students respond to Likert-style items indicating their preference for various "worldviews" or stages of intercultural sensitivity. The average for each worldview/stage score is then combined in a proprietary weighted score that is meant to indicate the trainees' predominant worldview or stage of development (Hammer, 2011). The literature about the IDI diverges with regard to the interpretation of scales as either "developmental stages" or "worldviews", with implications for how one should interpret the results of the IDI.

As indicated by its name, Bennett's model was meant to describe the development of intercultural sensitivity. When formulating the DMIS, Bennett collected statements from sojourners and trainers over the course of 15 years. The statements described the manifestations of behavior and attitudes about cultural difference, which in turn indicate an ever-increasingly complex representation of cultural differences (Bennett, 1993). Wohlwill (1963) calls this process of data collection the qualitative "dimensionalization" of a developmental model.

The DMIS implies a disjunctive rather than cumulative development (Wohlwill, 1977), although Bennett did not specifically characterize his theory in this way. Disjunctive stages are discrete and qualitatively different. Behaviors and attitudes present in one stage are displaced by the next stage. For instance, a concept that one's own culture is the only "correct" one is manifested in one stage only (Defense), and is displaced by a concept that there are more commonalities among people than differences (Minimization). The attitudes and behaviors of an earlier stage are incompatible with the cognitive framework of cultural difference found at higher stages of development. In contrast, cumulative development implies that old behaviors and attitudes are retained and new ones added.

Unlike most cognitive models of development, which are assumed to represent the natural life-span maturation of individuals, intercultural sensitivity development is contingent on intercultural contact. In other words, instead of simple maturation, only those who engage in meaningful intercultural contact are presumed to have the potential for development. Implicit in this formulation is the idea that *intercultural experience* is a key developmental variable, akin to the way age is treated in other developmental paradigms. Time spent overseas, while not a completely acceptable surrogate for intercultural experience (as people can isolate themselves from cultural contact even when overseas), has been shown to have small but significant

relationships to intercultural sensitivity and competence (Staffron, 2003; Abbe, Gulick, & Herman, 2007).

Empirical research has not tested the ordering of the stages proposed by Bennett, or whether the stages demonstrate expected relationships with other developmental variables (like intercultural experience). As a consequence, this study does not make the assumption that the stages are ordered, or that development proceeds in one direction. An alternative view of the DMIS, consistent with Bennett's conception above without the assumptions of development, treats each worldview as a unique mental model about cultural difference, composed of attitudinal and behavioral elements. The term worldview is commonly used in anthropology to describe an individual's concept of reality, or mental model of how the world works. Specifically, Bennett's (1993) theory is concerned about the mental model of cultural difference, which he believes changes over time as one becomes more experienced with other cultures. People are assumed to have preferences for particular worldviews that best match their underlying conception of cultural difference. This interpretation leaves open the possibility that people may endorse more than one worldview, and makes no assumptions about the order in which the worldviews occur.

This study contributes to (1) an understanding of the worldview scores associated with the IDI, and (2) the consequences of score interpretation, two of six construct validity concerns discussed by Messick (1995). An alternative method of analysis will be described that capitalizes on the demonstrated validity of the IDI (content validity and nomothetic span), while providing two advantages over a single weighted scale score in common use (the Developmental Orientation score). This method, called Profile Analysis via Multidimensional Scaling (PAMS; Davison, Gasser, & Ding, 1996), establishes the number and nature of normative profiles in the

data based on dimensions extracted from multidimensional scaling analysis. PAMS then estimates person-level parameters to describe the degree to which each student adheres to a specific profile. These person parameters are used to test the theory that high levels of ethnocentrism can cause resistance to training, while high levels of ethno-relativism can facilitate knowledge gains—a test that adds to the body of validity evidence for both the DMIS and the IDI together.

The following literature review fully describes the Developmental Model of Intercultural Sensitivity, outlining the premises of the theory. Next, the development and validation of the Intercultural Development Inventory will be described. A review of the literature will establish that the worldviews appear to be arrayed along an underlying intercultural sensitivity dimension (with the exception of one, Minimization), have expected relationships within a nomological net of other intercultural variables, and that the IDI is extensively used in intercultural training.

### **The Developmental Model of Intercultural Sensitivity**

The DMIS describes the progression of cognitive development that results from interaction with members of other cultures, specifically the ability to discriminate and experience relevant cultural differences (Hammer et al., 2003). Bennett (1986) provided guidance to trainers on how to diagnose their students' predominant worldview based on behaviors and communication in the classroom, arrayed on a continuum from ethnocentrism to ethnorelativism. Ethnocentrism is a term commonly used in anthropological literature to describe the view that one's own culture is central to reality, and other's are judged by the standards of one's own culture.

Ethnocentrism, as a stand-alone construct, has been studied using other instruments than the IDI. Sumner (1911) is often attributed with coining the term, and his definition includes both

positive in-group evaluations and negativity to the out-group. Bizumic, Duckitt, Popadic, Dru and Krauss (2009) conceptualize ethnocentrism as multidimensional itself, having both intragroup and intergroup expressions, with each of these expressions reacting differently to different kinds of threats (Howle & Bizumic, 2011), and having different relationships with other attitudes. In-group positivity (conceptually related to the Denial worldview) and out-group negativity (related to the Defense worldview) have been shown to exist independently of each other in empirical studies (Bizumic & Duckitt, 2012; Brewer, 1999) instead of along one dimension as proposed by other scholars (Levine & Campbell, 1982).

Bennett (1983) coined the term “ethnorelativism” to describe the opposite ended of his proposed intercultural sensitivity continuum, in which behaviors and beliefs are viewed from the perspective of the other culture. In the early articulation of the model, Bennett proposed 7 stages—4 ethnocentric stages: Denial, Defense, Reversal, and Minimization; and 3 ethnorelative stages: Acceptance, Adaptation, and Integration, described more fully below.

**Denial.** The worldview of "denial of cultural difference" describes a perspective that one's own culture is the only "real" culture, and other cultures are un-differentiated ("foreign", "immigrant"; Hammer et al., 2003). This is likely the worldview of a person who has not had exposure to other cultures, either by lack of opportunity or by deliberate avoidance. People holding the Denial worldview are often not blatantly negative about other cultures, but instead demonstrate ignorance about cultural differences, assuming that everyone else shares their values and beliefs.

**Defense.** The worldview of "defense against cultural difference" is when one's own culture is viewed as the only "correct" culture. People with this worldview have a tendency to negatively judge or stereotype other cultures. It is the natural and perhaps unavoidable reaction

to the acknowledgement of cultural differences. This is the most tenuous worldview to develop beyond, requiring careful instructor facilitation that supports student progression, without confronting the student with value challenges to which they might react negatively. Bennett and Bennett (2004) suggest that cultural self-awareness—achieved by having students reflect on their own culture using the same categorizations as they would for other cultures—reduces ethnocentrism and can potentially move a student out of Defense toward more ethnorelative worldviews. For instance, by asking students to describe their own culture in the domains of religion, kinship, gender-roles, etc., they come to see that their own behavior as culture-bound and as mystifying to explain as the behaviors of another culture's members.

**Reversal.** A form of Defense, Reversal is the view that the other culture is superior to one's one. The values and beliefs of the other culture are held in high regard. Students who prefer the Reversal worldview will therefore tend to denigrate their own culture, and completely immerse themselves in the other culture. Reversal is not considered a worldview that all people necessarily progress through (Bennett, 1993). For those that do experience it, Bennett considers Reversal one of the most difficult ethnocentric stages to progress past, because people with this worldview consider themselves quite culturally sensitive. Their positive views of the other culture are not the same as having a deep understanding of the other culture, so behavioral missteps are likely to occur.

**Minimization.** In the Minimization worldview, considered either the final ethnocentric stage (Bennett, 1993), or a breakover stage between ethnocentrism and ethnorelativism (Hammer, 2011), cultural differences are acknowledged, and not denigrated, but subordinated to perceived similarities among humankind. In this way it is neutral on the issue of whether cultural difference is negative (ethnocentric) or positive (ethnorelative). Bennett described two forms of



Minimization. In the first form, people believe that there are basic universal rules by which humans abide. A person with a preference for the Minimization worldview may consider that having an understanding of "human behavior" will result in successful cross-cultural interaction. Inevitably, however, the forms of behavior considered universal will conform to the person's own culture-bound perceptions, and result in cultural missteps. The second form of Minimization is described as "transcendent universalism". This view supports religious, political and psychological forms of idealized universality, in which all people are assumed to be derived from a single supernatural force, are subject to the same economic and political forces, or have the same basic needs. Minimization, like Reversal, tends to be described with positive (or at-least non-negative) behaviors and attitudes.

Minimization has its strongest conceptual links to the concepts of self-transcendence. Self-transcendence consists of universalism—defined as understanding, appreciation, tolerance and protection for the welfare of all people and for nature—and benevolence, defined as caring for the welfare of the people with whom one is in frequent personal contact (Schwartz, 1992). Stroink and DeCicco (2011) described these two as facets of metapersonal self-construal and interdependent self-construals respectively, and hypothesized that religious groups would differ in universalism. They did not find this to be the case however, with matched samples of Buddhist and Christian students showing significant differences on the overall metapersonal self-construal construct (which included values of tradition, spirituality, and universalism) but not on the sub-facet of universalism itself.

**Acceptance.** This is the first worldview within the larger dimension of ethno-relativism in which cultural difference is recognized and respected. Bennett hypothesized that within this stage are two smaller sequential worldviews—one in which language, communication style and

nonverbal patterns of another culture are accepted, and a second in which cultural values and belief differences are accepted. With this worldview, people are more likely to see cultural differences as process differences, rather than static manifestations. In other words, cultural reality is construed in the moment and seen as changeable.

**Adaptation.** "Adaptation to cultural difference" implies a person believes he or she can engage in cognitive frame shifting and behavioral code switching to adapt to their particular cultural situation. Frame shifting relates to the cognitive frame or knowledge structure one uses to interpret cultural information (Bennett & Bennett 2004). Being able to shift cultural frames is indicative of increased intercultural sensitivity because it implies that the person has multiple knowledge structures to bring to bear in interpreting the environment. Molinsky (2007) describes code switching as "the act of purposefully modifying one's behavior, in a specific interaction in a foreign setting, to accommodate different cultural norms for appropriate behavior" (p. 623). The worldview of adaptation closely resembles the behavioral adaptability that defines intercultural sensitivity for Bhawuk and Brislin (1992). Their Intercultural Sensitivity Inventory contains behaviors that would be most appropriate to demonstrate in either collective or individualistic cultures. Intercultural sensitivity as measured by this instrument is related to time spent abroad and willingness to engage with members of other cultures.

**Integration.** The last stage of ethno-relativism involves cultural identity. Integration implies that a person is able to accept cultural differences, and operate effectively within other cultures—doing so because he or she has integrated that culture into his or her own identity. Because Integration is not fully represented in the Intercultural Development Inventory, it will not be further discussed here. The discussion above relates each of the worldviews to supporting research that describes unique relationships to intercultural variables. In addition to this

worldview approach, the following section describes intercultural variables that have been found to be related to intercultural sensitivity and other important intercultural outcomes.

### **The Nomological Net of Intercultural Sensitivity**

Several personality and experiential variables have been related to intercultural sensitivity in previous literature. Self-efficacy is the confidence that people have in their ability to accomplish tasks (Bandura, 1986). In cross-cultural contexts it may refer to a person's generalized feeling of competence, or reflect a feeling of competence specifically related to social interactions (which may be considered a task-specific form of self-efficacy; Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982). General self-efficacy, which results from past experiences of success or failure across situations, has been shown to explain performance in ambiguous or unfamiliar circumstances (Sherer et al., 1982). Harrison et al. (1996) found that general self-efficacy was related to competence for cross-cultural adjustment. American students have been shown to have higher levels of social self-efficacy compared to Japanese students, with no gender effects (Kiuchi, 2006). In that same study, a small positive correlation ( $r = .26$ ,  $p < .01$ ) was found between intercultural sensitivity as measured by the Intercultural Sensitivity Inventory (Bhawuk & Brislin, 1992) and general self-efficacy (but not social self efficacy).

Abbe et al. (2007) developed a three item measure of intercultural efficacy that describes a person's perception of effectiveness with regard to negotiating, communicating and relating to members of other cultures. As such, it could be viewed as a task-specific versus a general measure of self-efficacy in intercultural contexts. In a study of U.S. Army personnel, these researchers found that intercultural self-efficacy significantly related to self-reported cultural intelligence, cultural empathy, open-mindedness, social initiative, emotional stability and

flexibility as measured by the Cultural Intelligence Scale (Early & Ang, 2003) and Multicultural Personality Questionnaire (van der Zee & van Oudenhoven, 2000).

Two experiential variables are commonly studied with regard to intercultural sensitivity, although their influence on intercultural sensitivity is likely complex. According to the DMIS model, experiences overseas provide opportunities for a person to develop the complex cognitive schema that characterizes intercultural sensitivity, as well as provides the skills necessary to modify behavior in context. This is not always the case, however. In a review of prior international experience as an antecedent of cross-cultural competence, Abbe et al. (2007) point out that the relationships between prior international experience and intercultural outcomes (such as adjustment and job performance) are typically low. In many contexts (particularly in the military and sometimes in the case of student sojourners) time spent overseas may be relatively bereft of meaningful cross-cultural contact. This might happen when a military member spends his/her time on a military installation, or when students interact only with their American peers while overseas. There is consistent support, however, that prior international experience is related to self-reported measures of intercultural communication and self-awareness (Martin, 1987), suggesting that even if competence has not improved via overseas assignment, the person's attitudes and self-perception may be influenced positively.

Likewise, foreign language learning appears to have a consistent positive relationship with intercultural sensitivity (Paige, Jacobs-Cassuto, & Yershova, 2003), but might do so through mechanisms other than the facilitative effect of communicating in the same language as the cultural other. It appears that the willingness to engage in foreign language learning is related to an interest in other cultures, and a further willingness to communicate with members of the other culture (Mendenhall & Oddou, 1985). Through this interaction, a person builds a cognitive

schema of cultural differences. It has been suggested that dispositional open-mindedness may underlie the relationships of both foreign language and prior experience to intercultural sensitivity (Graf, 2004; Abbe et al., 2007).

The discussion of relevant intercultural variables above leads to the first research question of the study: **Will Profile Analysis via Multidimensional Scaling of the Intercultural Development Inventory result in profiles that are meaningfully related to intercultural efficacy, time spent abroad, and foreign language learning, consistent with previous literature?** This question is supported below by a thorough description of the development and validation of the Intercultural Development Inventory.

### **The Intercultural Development Inventory**

To create the Intercultural Development Inventory, Hammer and Bennett (2001) used structured interviews of 40 diverse subjects to illicit statements reflecting each of the orientations (a list of interview questions can be found in Hammer et al., 2003, p 426). Three hundred-fifty statements were then extracted from the 40 interview transcripts. These were reviewed for clarity, and a subset of 200 were subjected to content coding by 4 independent coders familiar with the DMIS into the "six stages and 13 forms of the DMIS" (Paige et al., 2003, p. 472). A second set of seven subject matter experts then reviewed and coded the statements. This process resulted in a further subset of 145 items that could be reliably coded (Cohen's kappa greater than .60; Paige et al., 2003) into the six DMIS stages. Unlike the "dimensionalization" undertaken by Bennett to develop the theory, this classification task is meant to generate evidence that the statements are coherent for a certain worldview, and do not provide any direct tests of stage ordering, or provide for the possibility that the worldviews described by the theory completely covered the domain of intercultural sensitivity. The inter-rater reliability was reported as

sufficient (Cohen's kappa between .66 and .68; Hammer et al., 2003). Any items that did not fit the classification system were eliminated from consideration instead of being incorporated into the theoretical model.

**Validation of IDI Version 1.** Version 1 of the IDI consisted of 145 statements that were to be responded to on a 7-point Likert-style scale (strongly disagree to strongly agree). The principle aim of the first validation effort was to ensure that the worldviews described by the DMIS were represented adequately in the inventory as one-dimensional scales (Hammer et al., 2003). Factor analysis of the 145-item instrument in a sample of 226 respondents revealed six factors corresponding to Denial, Defense, Minimization, Acceptance, Cognitive Adaptation, and Behavioral Adaptation. Items related to Reversal and Integration did not load onto discrete factors (Hammer, 2011). Items with factor loadings less than .55 (i.e. those that did not comply with the theorized model) were not retained. Two scales were renamed as a result of their foci to Cognitive and Behavioral Adaptation, representing the larger Adaptation stage of the DMIS.

Example items<sup>1</sup> in the inventory include "Society would be better off if culturally different groups kept to themselves" (Denial); "My culture's way of life should be the model for the rest of the world" (Defense); "People are the same, we have the same needs, interests and goals in life" (Minimization); "I generally enjoy the differences that exist between myself and people from other cultures" (Acceptance); "I feel there are advantages in identifying with more than one culture" (Adaptation; all items cited in Paige et al., 2003).

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<sup>1</sup> The IDI is a proprietary instrument and the property of the IDI LLC. As a consequence, the example items presented here are only those that have appeared in other published literature and are included here.

Through separate factor analyses for each worldview scale, this validation effort supported an interpretation of the IDI as representing multiple unique dimensions whose internal consistencies were adequate (all scales had reliability indices ranging from .80 to .91).

**Additional Validation and Creation of a Developmental Score.** In the Paige et al. (2003) validation study with a sample of 353, the authors reconfirmed the scale reliabilities, with two falling slightly below .80 (Acceptance -- .77, Behavioral Adaptation -- .74). A 5-factor solution was found to best fit the data: 1) an ethnocentric worldview combining Defense and Denial items, 2) a Minimization worldview revolving around physical commonalities of people, 3) a second Minimization worldview revolving around transcendent commonalities, 4) an Adaptation worldview that carried some items of both Behavioral and Cognitive Adaptation, and 5) a second Adaptation worldview that carried only Behavioral Adaption items.

At this stage in the development of the IDI, the ordering purpose of the DMIS ("diagnos[ing] the 'level' of individuals" along the intercultural sensitivity spectrum; Bennett, 1986, p. 180) did not receive attention. However, Paige et al. (2003) did provide a graphic depiction of the un-rotated factor loadings along two dimensions (Paige et al., 2003, p. 478, reproduced in Figure 1). Unlike what would be expected for a stage sequential model (Davison, Robbins, & Swanson, 1978) the stage factor loadings did not fall along a semi-circular arc in the sequence described by the DMIS. There appears to be support for ethnocentric and ethno-relative stages falling on opposite ends of Dimension 1 (which Paige et al. label Ethnorelativism), consistent with the DMIS. Minimization clearly does not assume its hypothesized position as the midpoint between ethnocentrism and ethnorelativism stages, and appears instead on the axis furthest from the apex of the semi-circle.

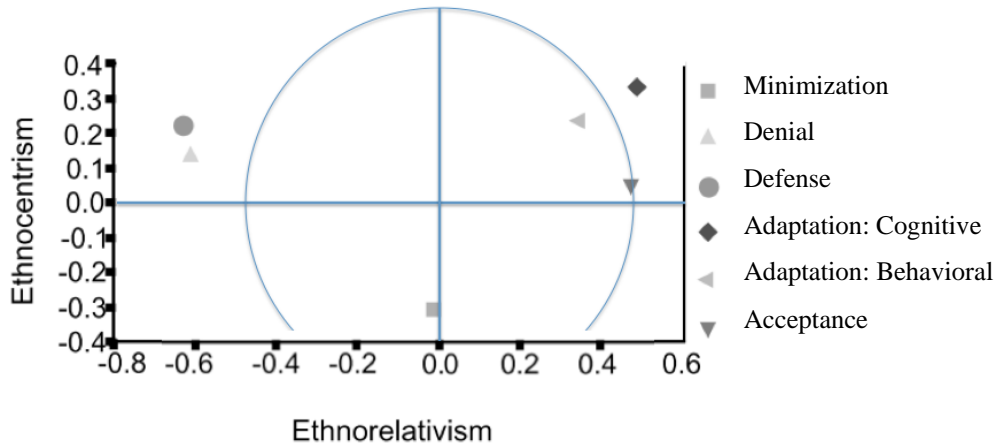


Figure 1. Two-dimensional plot of mean factor loadings of IDI un-rotated solution (N = 353) from Paige et al., 2003.

While the other stages had near-zero correlations with the Marlow-Crowne Social Desirability Index, Minimization was correlated .21 with Social Desirability. The factor loadings and differing relationships to other variables suggest that Minimization might not be part of the developmental continuum as described by Bennett, or alternatively, as measured by the IDI.

One purpose of the Paige et al. (2003) study was to create a single weighted intercultural sensitivity score that reflected a person's predominant orientation, the Developmental Score. The criteria for the scale score is that it would "take all stages into account, adding a greater weight to the larger theoretical gap between Minimization and Acceptance, and negatively weight the ethnocentric scores" (Paige et al., 2003, p. 479). The weighted score relies upon a linear transformation of the worldview sub-scales, with each given a weight derived from the theoretical model (weights are Denial = -3, Defense = -2, Minimization = -1, Acceptance = 1, Cognitive Adaptation = 2, and Behavioral Adaptation = 3). After adjusting for scale range restriction induced by the weighting scheme, the developmental score ranged from .5 to 6.5.



Using a series of one-way analyses of variance, the authors reported that intercultural development (operationalized as the Developmental Score described above) explained significant variance in prior intercultural experience, prior language/culture coursework, having friends from other cultures, socializing with members of other cultures, and age as anticipated. Gender was not associated with the Developmental Score.

This linearly weighted single scale score should be interpreted with caution for several reasons. First, aside from convenience there is little rationale for assuming that the IDI items form an interval scale (Cliff & Keats, 2003). In the absence of confirmation that the scales are interval, statistical procedures (such as linear transformations) should not be undertaken (Stevens, 1946). Second, the previous validation studies provided sufficient evidence that the IDI is composed of related but psychometrically distinct sub-scales. Classical test theory assumes that scales, like the items which create them, will have approximately equal correlations with each other and with other relevant variables if they represent the same underlying construct (DeVellis, 2003). For instance, the Cultural Intelligence Scale created by Ang, Van Dyne and Koh (2004) is composed of four subscales (Metacognitive CQ, Cognitive CQ, Behavioral CQ and Motivational CQ) that all have significant and stable correlations to one another (ranging from .21 to .45; Van Dyne, Ang, & Koh, 2007). Cultural intelligence subscales also demonstrate consistently strong relationships to other relevant variables such as interactional adjustment and emotional intelligence (Van Dyne, Ang, & Koh, 2007). When such a condition exists, the scales may be validly combined to create a composite score to represent the underlying latent variable. Neither of the validation studies tested a general factor model for fit that would justify a single one-dimensional interpretation.

**Validation of Version 2.** Findings from Version 1 of the IDI seemed to have caused some modifications to the theory underlying the DMIS. In an apparent explanation of the data, Hammer et al. (2003) allowed for “only occasional” reversals from more to less complex worldviews and unresolved preference for specific worldviews (i.e. preferring more than one worldview simultaneously). Hammer et al. (2003) changed the response scale from a 7- to a 5-point response scale (1 = disagree, 2 = disagree more than agree, 3 = disagree some and agree some, 4 = agree more than disagree, and 5 = agree), commenting that the authors felt the 5-point scale was more appropriate. A second review of the 145 original items generated 122 items to be administered in the second validation effort. The authors added items believed to better represent Bennett's concept of Reversal (associated with Defense) and Encapsulated Marginality (part of the Integration stage beyond Acceptance) orientations. The authors tested a 2-factor (ethnocentrism and ethno-relativism), 7-factor (the six developmental orientations plus Reversal), and 5-factor model replicating the factor structure found by Paige et al. (2003). Confirmatory factor analysis of new data resulted in a 5-factor model having the best fit over a 2-factor (ethnocentrism versus ethno-relativism) and a 7-factor model, using 52 items. As had been found by Paige et al. (2003), Defense and Denial items loaded together on one factor, Acceptance and Adaptation items loaded together on one factor, Minimization items loaded on one factor, and the new scale items for Reversal and Encapsulated Marginality loaded each on a factor. Two items were later dropped because they did not accurately characterize the underlying worldview they were meant to represent, leaving 50 items on the final IDI V2.

In the validation of Version 2 of the IDI, the worldview subscales were shown to have different relationships to the World-mindedness Scale (Sampson & Smith, 1957) and the Intercultural Anxiety Scale (modified from the Social Anxiety scale developed by Stephen and

Stephen, 1985). These varying correlations do not provide strong support that each scale is a proxy for the underlying latent variable (DeVellis, 2003). Tellingly, neither Reversal nor Minimization was significantly related to World-mindedness or Intercultural Anxiety (exact correlation coefficients were not reported for these two stages). The other stages (Defense/Denial, Acceptance/Adaptation, and Cultural Marginality) had significant relationships with the two intercultural scales. The direction of correlation for Defense/Denial and Acceptance/Adaptation were consistent with the notion that these scales lay on opposite ends of an underlying intercultural sensitivity continuum.

Similar to the weighted scale score developed for Version 1, Version 2 of the IDI saw the introduction of a new single weighted score called the Developmental Orientation Score that combined the Defense/Denial, Reversal, Minimization and Acceptance/Adaptation scale scores using a formula that "produced a standardized score with a mean of 100 and a standard deviation of 15" (Hammer et al., 2003, p. 440). The authors pursued the development of a single scale score in order to provide a ready means of correlating intercultural sensitivity to other salient variables. In practice, however, trainers use the single developmental score to diagnose their trainees' stage of intercultural sensitivity development.

The authors provided no additional detail about the weighting of this score except to say that it was "consistent with the developmental continuum specified in the DMIS" (Hammer, 2011, p. 477). However, Romano, Cummings, Coraggio & Kromrey (2007) used multiple regression analysis to disclose the following weights of the scales when regressed on the Developmental Score (with the contribution of that scale to the overall DO score in parentheses): Defense/Denial 12.87 (33.2%), Reversal 12.87 (33.3%), Minimization 8.57 (22.2%), Acceptance/Adaptation 4.29 (11.1%), and EM scale 0 (0%). The Developmental Score achieved

a reliability of .83 in a sample of 766 respondents. The range of scores defining the stages replicates the normal distribution of responses, with 2.28% scoring in Denial (55 to 70 points), 13.59% scoring in Defense/Reversal (71 to 85 points); 68.26% of the population scoring in Minimization (86 to 115 points), 13.5% scoring in Acceptance (116 to 130 points) and 2.8% scoring in Adaptation (131 to 145 points).

Bennett (2009) has criticized the Developmental Score for masking the variability of individuals and their separate standing on each of the DMIS worldviews. Second, he proposed that the Developmental Score appears to overestimate the Minimization Stage, while underestimating the higher and lower stages, and suggests that this is an artifact of the manner in which the Developmental Score is normalized. Combining the different worldviews into a single score has two problematic features. It is not possible to know how each dimension is contributing to the total score, and the single composite score can reflect any number of different combinations of the underlying scales (Strauss & Smith, 2009). For example, if both Reversal and Defense are given equal weight in the proprietary formulation, a person may be High Reversal/Low Defense, Low Reversal/High Defense, or moderate on both—all of which would add the same increment to the overall Developmental Score. Yet Reversal and Defense worldviews have different correlates (further described below), and consequently a person's standing on each should be theoretically important.

**Validation of Version 3.** Unlike earlier validation studies, using data from a sample of 4763, Hammer (2011) provided evidence that a 7-factor model of the IDI (corresponding to the original 5 orientations, plus Reversal and Cultural Disengagement) was a better fit than the 2-factor (ethnocentrism/ethno-relativism) and 5-factor (Defense/Denial, Minimization, Reversal, Acceptance/Adaptation) models. In this study, the Developmental Score described in the

previous section obtained a reliability of .83, but the other worldview scales demonstrated suboptimal reliabilities across multiple high school student samples, church samples and Non-governmental Organizations (as low as .38, with all seven scales below the 0.80 rule of thumb for the total sample).

Hammer also reported for the first time the correlations between the worldview subscales. Minimization displayed very weak or non-existent correlations with all other scales of the IDI (ranging from -.033 to .144). Aside from Minimization, the correlations do provide some suggestion that the subscales are related to each other as described by the underlying intercultural sensitivity continuum. For instance, Defense and Denial at the ethnocentric end of the intercultural sensitivity continuum were strongly and positively related to each other and to the Reversal scale, and negatively and significantly related to the Acceptance and Adaptation scales. The correlation table is reproduced from Hammer (2011, p. 481) below. Although not an ideal simplex-like pattern of correlations, if Minimization is excluded, there is some evidence of a single continuum for the remaining scales.

Table 1.  
Correlations among seven latent variable from Hammer (2011, p. 481).

Correlations among seven latent variables.

	Denial	Defense	Reversal	Minim	Accept	Adapt	Cul. Disengage
Denial	1.000						
Defense	.830	1.000					
Reversal	.358	.367	1.000				
Minim	-.033	.062	.036	1.000			
Accept	-.169	-.111	.012	.014	1.000		
Adapt	-.185	-.084	.124	.144	.638	1.000	
Cul. Disengage	.227	.110	.433	.007	-.073	.033	1.000

**Use of the IDI in Education/Training Contexts.** The IDI was developed to be used as a diagnostic tool for trainers and educators, with the supposition that understanding a person's level of intercultural sensitivity will assist the trainer in anticipating how a student will respond

to training, and to tailor the training to the individual. Published research has not focused on this use directly. Instead, previous work on the IDI has followed three trajectories – identifying subgroup differences, correlating intercultural sensitivity with other salient variables, and conducting analysis of intercultural sensitivity change as a result of interventions.

Given the concerns with the use of a single developmental score to describe a predominant worldview and the lack of developmentally oriented testing of the IDI, the use of the IDI as a metric of change will not be reviewed here. Readers are pointed to the works of Altshuler (2003), Engle and Engle (2004), Medina-Lopez-Portillo (2004), Paige, Cohen and Shively (2004), Anderson, Lawton, Rexeisen and Hubbard (2006), Jackson (2009) and Vande Berg, Connor-Linton, Paige (2009) and Pederson (2010), for examples.

Despite the popularity of the IDI, of the published empirical studies only a handful have provided stage score standard deviations that allow for independent sample mean comparisons. The few that do are described in this section, providing insight into typical response patterns and levels of self-reported intercultural sensitivity. These studies represent diverse adult populations: Chinese teachers (Yuen and Grossman 2009), U.S. Army officer and enlisted soldiers (Abbe, et al. 2010), and U.S. college undergraduates (Romano et al., 2007).

A pattern emerges across these three studies based on sample means. Minimization stage attitudes and beliefs are endorsed to a greater extent than any of the other stages, which contributes to the belief that a predominant segment of the overall population places in this intermediate stage of development (Hammer, 2011). However, with the exception of the Romano's et al. (2007) undergraduate sample, there is very little difference between the endorsement of Minimization and Acceptance/Adaptation items (the combination of the first two

ethno-relative stages) across the three samples, clustering around 3.5 (between "agree some and disagree some" and "agree more than disagree").

There are some notable differences between how Chinese and American samples (Army and undergraduate) respond to the Defense/Denial and Reversal scales. Two of three Yuen and Grossman's (2009) Chinese teacher samples endorsed Denial/Defense items to a greater degree than Reversal items, a pattern that is reversed in U.S. samples. However, these differences may not reflect any practical significance given the underlying response scale. In other words, across samples, the means for both Defense/Denial and Reversal hover around "disagree more than agree" (2.0). The response patterns are depicted graphically for Chinese teacher, U.S. Army, and U.S. undergraduate samples in Figure 2. The overall consistency in the pattern of responses across samples suggests the first research question for this study: **Will a meaningful pattern arise using Profile Analysis via Multidimensional Scaling that is invariant across two military samples?**

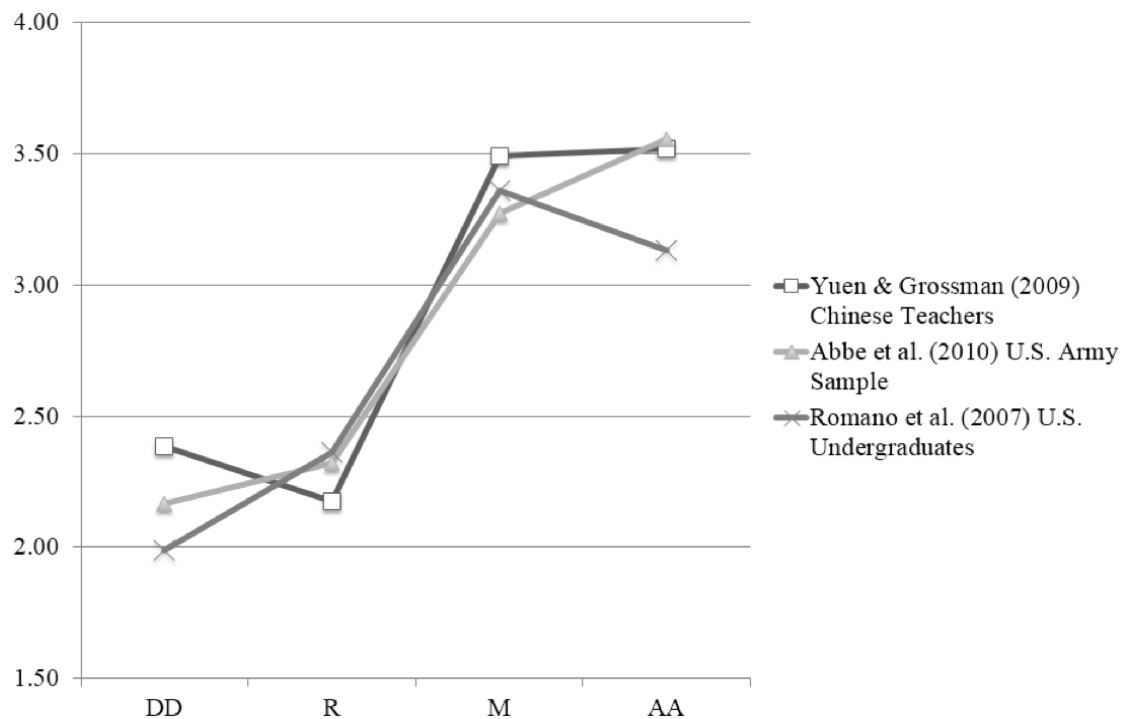


Figure 2. Response patterns in three studies of the Intercultural Development Inventory (DD – Defense/Denial, R – Reversal, M – Minimization, AA – Acceptance/Adaptation.)

Abbe, Geller and Everett (2010) contributed to an understanding of intercultural sensitivity in U.S. Army samples, as well as provided convergent validation of the IDI. Like the Yuen & Grossman (2009) study, Abbe et al. (2010) found significant subgroup differences in the worldview scales. In this case, Non-commissioned Officers (NCOs) showed significantly different means than Officers on all worldview scales, in some cases higher (Defense/Denial, Reversal, and Minimization) and in others lower (Acceptance/Adaptation). While the mean comparisons above help describe overall response patterns across people, they do not reveal person-centered response patterns that may well differ from the means.

**Relationships of IDI scores to other variables.** There are mixed results in previous literature regarding whether or not men and women endorse specific worldviews differently. In Hammer et al. (2003) men endorsed the Defense/Denial scale significantly more highly than



women, but there were no mean differences for any other worldviews. Altshuler (2003) found that females had lower pre-training Defense/Denial scores and higher Acceptance/Adaptation scores than males. Not surprisingly given the heavier weight of the Defense/Denial scores in the calculation of the Developmental Orientation Score, this too was found to be lower for men than for women in a large-scale study of students abroad (Vande Berg, 2009).

IDI worldview scales were shown by Abbe et al. (2007) to relate in expected ways to demographic variables such as time lived abroad, level of intercultural interaction and foreign language proficiency, largely replicating findings by Paige et al. (2003) and Altshuler (2003). Acceptance/Adaptation was positively related to all three demographic variables, with correlations ranging from .22 to .39. Defense/Denial was significantly negatively correlated to time lived outside the United States and to foreign language proficiency for both the Cadet and Active Duty samples.

Abbe et al. (2010) assessed the correlations between the IDI worldview scales and the Cultural Intelligence subscales (Metacognitive CQ, Cognitive CQ, Motivational CQ, Behavioral CQ, and Total CQ; Ang, Van Dyne, Koh, & Ng, 2004), the Multicultural Personality Questionnaire subscales (Cultural Empathy, Open-mindedness, Social Initiative, Emotional Stability, Flexibility; van der Zee & Oudenhoven, 2001). Defense/Denial showed significant negative correlations with all subscales of the Cultural Intelligence Scale (correlations ranging from -.17 to -.37), while neither Reversal nor Minimization was related to Cultural Intelligence. Acceptance/Adaptation was significantly and positively related to all Cultural Intelligence subscales (correlations ranging from .51 to .66). Similarly, Defense/Denial showed significant negative correlations to most subscales of the Multicultural Personality Questionnaire. Reversal and Minimization showed no significant correlations to the MPQ, and Acceptance/Adaptation

showed significant positive correlations (with the exception of Emotional Stability, for which Acceptance/Adaptation was correlated at a non-significant .10). Notably, Abbe et al. did not consider the Developmental Score in their analyses. With regard to the inter-correlations between stages, similar to the Hammer (2011) validation, Abbe et al. (2010) found only the relationship between Defense/Denial and Reversal was significant ( $r = .37, p < .01$ ), and all other correlations between worldviews were non-significant.

**Summary of the IDI.** The IDI was developed using a qualitative, content-based methodology. Validation studies have focused on the dimensionality of the worldviews/stage scales, and the relationship of the IDI to other relevant intercultural variables. The IDI has not been tested as a developmental metric per se, since it has not been subjected to validation studies that describe the scaling and hierarchical ordering of the stages. The inconsistent relationships between the Minimization and Reversal scores to each other and to other variables suggest that they may not reflect an underlying intercultural sensitivity continuum, but instead reflect more than that single dimension. This leads to the second research question to be answered in this study: **To account for the inconsistent relationships of Minimization and Reversal to the other IDI worldviews, will more than one dimension be necessary to fit the IDI data?**

### **Exploring Dimensionality using Multidimensional Scaling (MDS)**

In the context of the IDI, respondents indicate their preference for specific worldviews by indicating how much they agree or disagree with the items within each worldview scale. Exploratory factor analysis has repeatedly demonstrated that the items of the IDI load onto factors that correspond to the appropriate IDI worldviews and the average inter-item correlations within scales are sufficiently high to consider them reliable across individuals. However, the necessary next step for IDI analysis is to describe the number of dimensions necessary to

represent the profile of worldview scores collectively. In other words, a different analysis is necessary to provide information on the degree to which multiple worldviews are preferred simultaneously, or whether some patterns of response endorsement across worldviews occur more frequently than others. Multi-dimensional scaling (MDS) has an advantage over factor analysis in that it approaches this task from an ideographic perspective, assessing the degree to which the scores differ within-person and then summing these differences between-persons to describe a sample.

For MDS, direct proximity judgments can be obtained by having subjects rate the degree of difference or similarity between the stimuli on a numerical scale (e.g., 1 – very similar to 7 – very different). Proximity measures can also be derived from other sorts of subject responses, such as adjective lists, correlation matrices, or profile scores. An IDI profile is simply a set of worldview scores for each individual. A profile dissimilarity measure used in MDS analysis is computed as the sum of squared differences between each worldview, resulting in a dissimilarity matrix (Arabie & Boorman, 1973).

In addition to an ideographic orientation, MDS has the ability to incorporate specific response models for the data. For instance, the simple vector model of preference assumes that the stimuli are equally salient for all individuals, and that there is a monotonic relationship between the stimuli and the underlying dimensions (i.e. if a little of something is good, even more must be better). Alternatively, using different dissimilarity formulas, the researcher can model different assumptions about the response patterns, such as allowing for individual differences in the salience of dimensions (the weighted Euclidean model).

Despite concerns about Bennett's intercultural sensitivity model as a stage-sequential developmental model, its usefulness as an intercultural construct should not be dismissed.

Treating the IDI variables as worldviews instead of sequential stages is not inconsistent with Hammer and Bennett's literature surrounding the IDI. A configural approach may better account for the phenomena in which people appear to endorse several worldviews simultaneously (described by the IDI authors as having "trailing issues"). A configural treatment of the IDI may in fact allow for a better understanding of intercultural sensitivity, as each worldview may be influenced differently by training and experience. As early as the 1950s, Meehl (1953) suggested the use of configural analysis of clinical test scores, noting that the predictive ability of scores is augmented in some cases when considered together rather than separately.

Latent Class and Latent Profile Analysis have been used in clinical and educational contexts for just such differential prediction. Latent Class Analysis (LCA) and Latent Profile Analysis (LPA) are similar in many ways, with LCA addressing categorical variables, and LPA continuous variables. Broadly, profile analysis seeks to use a collection of scale scores to classify people in meaningful ways. Carroll (2000) characterizes profile analysis as a statistical method for identifying patterns of test scores that might be predictive of distinctly different behavioral outcomes (p. 453). This is largely the approach taken by the Minnesota Multiphasic Personality Inventory (MMPI; Dahlstrom, Welsch, & Dahlstrom, 1975), which uses a configural interpretation of subscales to characterize psychopathy. Clinical researchers have shown subtest patterns of intelligence (measured by the WISC-R and WAIS-R) that are unique to groups of clinically identified non-normals and learning disabled. There are many statistical methods that perform this function, including Modal Profile Analysis (Skinner & Lei, 1980), Configural Frequency Analysis (von Eye, 2002; Stanton & Reynolds, 2000), MANCOVA (Tabachnick & Fidell, 1996), Latent Class Analysis (Wang & Hanges, 2009), and Profile Analysis via Multidimensional Scaling (PAMS; Davison et al., 1996).

The profile, or pattern approach (Foti & Hauenstein, 2007), has received renewed attention in the leadership emergence and person-environment fit literature, as well. Typically, this has taken the form of determining what collection of individual differences lead to various leadership outcomes, such as advancement or promotion (McClelland & Boyatzis, 1982). For instance, Smith and Foti (1998) predicted task performance (initiating structure) with a profile of attributes consisting of intelligence, dominance and self-efficacy. In a later study, Foti and Hauenstein (2007) demonstrated that three profile patterns of dominance, self-efficacy, and self-monitoring (high-high-high, low-low-low, and mixed; step 2 of a hierarchical regression) provided incremental explanation of variance in the prediction of peer ratings and performance evaluations above that of the variables entered separately (step 1).

Profile analysis is often considered an ideographic or person-oriented approach, since each person is viewed as a unique complex system of interacting variables. One of the principles of ideographic analysis is that there exist constellations of variables that are characteristic of individuals (i.e. types, configurations, or profiles) in a population (Bergman, Magnusson, & El Khouri, 2003). Profile analysis attempts to classify people according to those constellations, and determine the degree to which particular constellations are prevalent in a population. Profile analysis treats each dimension as a prototypical response profile in the population, and represents the variables on the x-axis, and the scale values (which always have a mean of zero) on the y-axis (see example from Ding, 2007 in Figure 3).

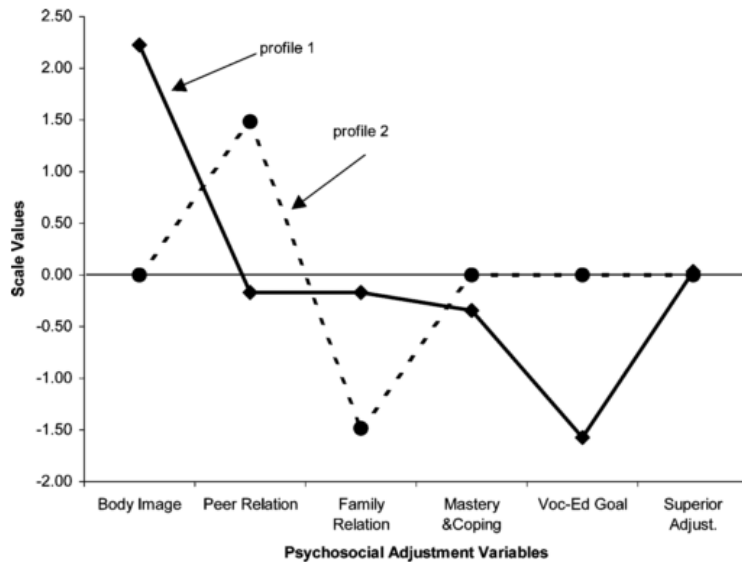


Figure 3. Example profile analysis depiction from Ding, 2007.

PAMs, a method of analysis first proposed by Davison (1994), estimates the degree to which each person’s constellation of attributes or subtests correspond to one of the typical profiles in the population. The resulting parameters may then be used to predict other outcomes. Ding (2007), for example, used PAMs to explore the constellation of psychosocial variables (body image, peer relations, family relations, mastery/coping, vocational goals and superior adjustment) that predict psychological well-being. Two profiles emerged, one characterized by high body image and low vocational goals (profile 1 in Figure 3), and one characterized by high peer relations and low family relations (profile 2 in Figure 3). The three parameters estimated by PAMs (a level score representing the mean response across variables, and dimension weights which describe the level of fit between the person’s score and each prototypical profile) were used in a regression to predict depression, psychological loneliness, and life satisfaction. In this case, Profile 1 significantly predicted non-depression and life satisfaction, but not psychological loneliness, while Profile 2 significantly predicted non-psychological loneliness. Level scores,

which may be interpreted as general response tendencies in self-report measures, also significantly predicted the three self-reported outcome measures.

Likewise, Kim, Frisby and Davison (2004) used PAMs to describe how profile parameters estimated for the subtests of the *Woodcock-Johnson Psychoeducational Battery—Revised* related to external variables. The two dimensions that resulted were similar to clinical characterizations of profiles of academic ability and achievement found using other methods. Additionally, the level and dimension parameters estimated by PAMs significantly predicted academic achievement, accounting for 72% of the variance in achievement scores.

Despite an obvious interest in the characteristics and uniqueness of individual students on the part of trainers, cross-cultural training research has not utilized the person-oriented theories or methodologies originating in developmental and clinical psychology that are most appropriate for understanding individual intercultural sensitivity and how it might be influenced by training and experience. In recent years, there has been a call across several sub-disciplines within psychology to re-establish the person as the appropriate focus of analysis, including industrial/organizational psychology (Weiss & Rupp, 2002).

### **Summary of Research Questions**

In previous sections, the ability of the IDI to position a person on a one-dimensional latent intercultural sensitivity continuum or within a single stage of development has been called into question. The IDI instead appears to be composed of relatively distinct facets, some more closely related to intercultural sensitivity than others. If this multidimensional interpretation is valid, alternative methodologies might be applied that address the desire of researchers to understand the prototypical response patterns of the IDI in the population, and how these response patterns fit into a larger nomological net of cross-cultural performance. This leads to

two research questions presented early in the literature review: Are multiple dimensions necessary to provide a good fit to the IDI data using multidimensional scaling? Do the profiles that result have meaningful relationships to relevant intercultural variables such as intercultural efficacy, time spent abroad, and speaking foreign languages?

Three previous research studies (one U.S. undergraduate sample, one Chinese teacher sample, and one U.S. Army sample) were reviewed that suggest the pattern of responses may be relatively stable and generalizable across populations—with low defense/denial and reversal scores, with high minimization, acceptance and adaptation scores. Is this pattern of response invariant across the two samples (one consisting of enlisted Airmen, and one of officer candidates) in this study?

Finally, the impetus behind profile analysis is to provide the trainer with an understanding a student's preference across worldviews, under the premise that those who endorse ethnocentric worldviews may resist training, while those who endorse ethnorelative worldviews will benefit from training. Will the profiles that emerge from PAMs have an influence on change in learning (i.e. will there be an interaction effect between pretest and dimension weights)?



## Methods

### **Setting**

In 2010 Air University developed two courses for enlisted and officer trainees to prepare trainees to operate effectively in cross-cultural contexts throughout their career. For enlisted personnel, the Community College of the Air Force launched a 45-contact hour distance-learning course with a strong focus on foundational knowledge about culture, using facilitators (professional intercultural trainers and educators) who monitored on-line discussions and graded students' posts. The curriculum developed for officer trainees attending Officer Training School (OTS) likewise focused on foundational knowledge and provided skills in dealing with culture shock, but contained only lecture and guided discussion totaling 7 hours.

### **Participants**

The first sample consisted of 434 Air Force enlisted personnel voluntarily enrolled in a CCAF distance-learning course during the spring of 2010 (previously described), offered in two versions, Flex (which allowed students to proceed at their own pace, and load their assignments for grading on their own timeline) and Interactive (in which assignments were due each week). Students requested either the Flex or Interactive versions of the course (215 and 225 respectively) based on their needs. The ages of participants were described categorically on the IDI measure, and were found to differ significantly between the Flex and Interactive courses, with Flex students slightly older (21% over the age of 40) than Interactive (13% over the age of 40). Gender and ethnic minority status did not differ between Flex and Interactive courses; 65.5% were male, and 23.5% considered themselves part of an ethnic minority. Most (76%) held

high school diplomas as their highest degrees, and grew up in North America (91.9%). Only 18% had never been overseas, over half (62.3%) had lived in another country for at least 1 year. The mean number of foreign languages spoken was 1.26. Since the IDI scores, intercultural efficacy, and willingness to engage (described further below) did not differ between samples, the two courses were combined to create one sample.

The second sample consisted of 470 officer trainees undergoing initial entry officer training in 2010. The predominant age group represented in the sample was between 22 and 30 years old (80.4%), significantly younger than the ITC students,  $F(2, 893) = 72.12, p = .001$ . 81.7% were male, 92% of the sample grew up in North America, and 15.9% described themselves as members of an ethnic minority. Overall, officer trainees had significantly less time living overseas than enlisted students,  $F(2, 285) = 25.826, p = .001$ , with a larger percentage having not lived outside the United States (37.2%) as compared to the enlisted sample. The mean number of foreign languages spoken was 1.33. Notably, 44% of the BOT sample had previously served as enlisted service-members.

## **Measures**

*Biographical Variables.* Biographical variables included rank, age range (18-21, 22-30, 31-40, 41-50, 51-60; Hammer et al. 2003), gender, ethnic affiliation (yes/no), time spent living abroad (never, less than 3 months, 3-6 months, 7-11 months, 1-2 years, 3-5 years, 6-10 years, over 10 years; Hammer et al. 2003), and number of foreign languages spoken at at least survival proficiency (Intercultural Language Roundtable level 0 or 0+).

*Intercultural Efficacy* (Abbe et al., 2010) is a three-item scale that asks participants to indicate the degree to which they are effective at communicating, influencing, and interacting with members of other cultures on a five-point scale (very effective to very ineffective). Abbe et

al. (2010) reported a reliability of .86 for this measure in an Army sample. This measure was taken prior to and at the conclusion of training for both samples.

*Willingness to Engage* is a three-item scale created for the program evaluation of the courses being conducted (Brittain, 2009). The items are meant to describe a participant's willingness to interact with members of other cultures voluntarily and proactively. The participant is asked to endorse the items on a five-point scale (strongly agree to strongly disagree). The three items were "I take an interest in other people's lives", "I enjoy hearing about other countries and cultures" and "I proactively seek out opportunities to interact with individuals from different cultures". Willingness to Engage should demonstrate positive relationships to the ethno-relative stages of the IDI, and negative relationships to the ethnocentric stages, with the exception of Reversal, since that ethnocentric stage implies a positive regard for other cultures. It is unclear if there will be any relationship to the Minimization stage.

*Intercultural Development Scales Version 3 (IDI)*. The IDI contained 50 items designed to measure the six worldviews according to the Developmental Model of Intercultural Sensitivity (Bennett 1986): Defense (7 items,  $\alpha = .72$ ), Denial (6 items,  $\alpha = .66$ ), Reversal (9 items,  $\alpha = .78$ ), Minimization (9 items,  $\alpha = .74$ ), Acceptance (5 items,  $\alpha = .69$ ), Adaptation (9 items,  $\alpha = .71$ ), and a scale that partially describes the worldview of Integration (Cultural Disengagement/Encapsulated Marginality—this scale was not used in this study; reliabilities reported in Hammer, 2011). Previous research has suggested that the IDI is resistant to socially desirable responding (Hammer, Bennett and Wiseman 2003). Response options ranged from strongly disagree (1) to strongly agree (5).

*Developmental Orientation*. The developmental orientation (DO) score is a weighted composite of the six IDI factors (Denial, Defense, Reversal, Minimization, Acceptance, and

Adaptation) meant to represent a person's predominant worldview orientation, and ranges from zero to 145 (Hammer, 2011). There has been some criticism that the developmental orientation score overestimates the worldview of Minimization (Bennett, 2009).

*Perceived Orientation.* The perceived orientation (PO) score is a non-weighted average of the six IDI factors (Denial, Defense, Reversal, Minimization, Acceptance, Adaptation), rescaled to a 1-145 points to match the DO scale. While the DO scale is meant to reflect a true level of intercultural sensitivity, the PO scale represents the person's own perceived level of intercultural sensitivity, and is always higher than the DO scale (Hammer & Bennett, 2001).

*Cultural Knowledge.* As part of the coursework, both the enlisted and officer trainees took a pretest and posttest to measure their knowledge of the key concepts included in the course. However, complete pretest and posttest scores were only available for the officer trainees, in the form of percent correct. The average pretest percent correct was .39 ( $SD = .18$ ), and the average posttest percent correct was .56 ( $SD = .14$ ).

The participants in both samples completed the Intercultural Development Inventory version 3 at the vendor's website, which is advertised as taking 20 minutes to complete. At a time of their choosing before the first class session, the Enlisted sample completed pre- and post-course surveys with additional biographical, attitudinal, and student reaction measures within the learning management system. The officer trainee sample completed the pre-post course surveys during an allotted class time using paper-and-pencil. These additional survey instruments also took 20 minutes to complete.

## **Analysis**

The responses of participants are screened first to eliminate participants who had zero variability on the instrument (i.e., selected the same response for all items). As with other

statistical analyses, multidimensional scaling cannot be performed if any row is invariant across variables.

Since previous research has not focused on the pattern of responses to the IDI worldview scales, these are described in detail based on the frequency of agreement to the items within a scale (selecting “agree” or “strongly agree” on the 5-point scale). This look at the pattern of responses serves two purposes. Since a pattern of endorsement that indicates a predominant worldview, with lesser endorsements of adjacent worldviews, is indicative of an ideal-point (unfolding) response model (Coombs, 1964), diagnosing this in advance of multidimensional scaling influences the type of proximity measure used in PAMS (Davison & Skay, 1986). Alternatively, response patterns that skip particular worldviews (e.g. endorse Reversal, skip Minimization, and then endorse Acceptance) might suggest that multiple dimensions will be needed to describe the prototypical response patterns in the population, such as a separate dimension that relates to the Minimization worldview apart from the others.

Profile Analysis via Multi-dimensional Scaling proceeds via the following steps: 1) estimate the number of prototypical profiles that exist in the population and estimate scale values for those profiles (dimensions); 2) estimate the individual profile match indices (person weights), fit indices (R-squared) and level estimates by regressing the observed values on the estimated scale values; and finally 3) study the association between the prototypical profiles and other relevant variables.

1) Step 1. ALSCAL is a multidimensional scaling algorithm created by Takane, Young & Lewyckyj (1979) that estimates coordinates (scale values) and disparities that minimize a measure of fit between distances and disparities (Davison, 1986). In this analysis, the disparity measure is the squared Euclidean distances between the mean scores of each worldview across

participants (Davison and Skay, 1986). The square matrix of proximities is used as input for the MDS scaling algorithm. Unlike individual differences MDS, this method assumes that all participants view the stimuli (worldviews) in similar ways, and place equal importance on any underlying dimensions. Non-metric MDS maintains only the rank order relationships between variables, and typically provides a solution of lower dimensionality than metric MDS. Euclidean MDS solutions have the advantage that they may be rotated without any change in the underlying configuration of distances. For instance, the solution achieved with one sample may be a mirror image of the solution achieved in a separate sample. Transformation and rotation allows for a better interpretation of the commonalities and differences between the two samples.

To determine the dimensionality represented by the data, Davison (1983) recommended that researchers consider an a priori number of dimensions ( $K$ ) based on theory, and then compare fit indices for  $K-3$  to  $K+3$  dimensions. In the case of the IDI, factor analysis has supported six factors in large samples. However, the number of parameters estimated by ALSCAL must be lower than the number of available proximities in order for the algorithm to converge. In the case of the IDI, the number of proximities available in the lower half of the square proximity matrix is 15. Since two dimensions require 12 parameters to be estimated (6 worldviews x 2 scale values each), 2 are the maximum number of dimensions that can be recovered. Researchers will generally select the fewest number of dimensions with STRESS(1) (Kruskal, 1964) below .10 where there is no further appreciable reduction of STRESS(1), as well as an RSQ (variance in observed distances accounted for by the proximities) of at least .80 (Davison, 1983). The model fit indices will explore the research question of whether more than one dimension is necessary to explain the pattern of responses to the IDI.

An initial step in the PAMs analysis will be to compare the ALSCAL scale values between the Enlisted and Officer Trainee samples to verify that IDI profiles generalize across samples. Should there be evidence that the MDS profiles are invariant the samples may be collapsed together and a single set of scale values may be used to compute person parameters, and further tests can proceed more efficiently. Since ALSCAL does not produce standard error estimates with which to conduct significance tests, a bootstrap method suggested by Kim (2010) is utilized. In this method, 1000 random samples (with replacement) are generated, and each subjected separately to ALSCAL analysis. At least 1000 samples are considered sufficient to create bootstrap empirical confidence intervals (BECIs) around each scale value (Efron & Tibshirani, 1993).

Bootstrapped standard errors may be used to determine whether the scale values themselves differ between the two samples (Kim, 2010) and answers the research question of whether the two samples are invariant. Here the average differences between all scale values are divided by the pooled mean standard error for each dimension. As in other  $z$ -tests, the 95% critical value is 1.96. The  $z$  values must be insignificant for all dimensions in order for the two samples to be considered truly invariant. Due to relatively large sample sizes, statistically significant differences in scale values may not be practically significant. In the event of small effect size, and a pattern of response that is similar for both samples, it may be appropriate to combine the samples (using their independently computed scale values) in order to determine their relationship to external variables.

The bootstrap scale values and standard deviations described above can also be used as the basis for testing whether each scale value is different than zero (Kim, Frisby, & Davison, 2004). Scale values not statistically different than zero do not provide any information above and

beyond the average across all worldviews, and thus should be interpreted with caution. This test is the conventional  $z$ -score test, with a critical value of 1.96. Each scale value will be tested to determine if it is significantly different than zero.

At the individual level, a person profile can be visually compared to normative profiles by standardizing the person’s observed scores to have a mean of zero and a standard deviation of 1 (Frisby & Kim, 2008). In this way, normative and person profiles can be represented in the same figure.

Step 2. Level scores ( $c_p$  below) are calculated as the unweighted average of all worldview scores. Observed scores ( $m_{pt}$  below) for each person are regressed onto the original scale values ( $x_{tk}$  below) using the Least Squares method to obtain ‘profile weights’ (Davison, Kim, & Ding, 2001). Profile weights ( $w_{pk}$  below) are similar to unstandardized regression coefficients. They indicate the degree of match between the observed score profile of the person and the observed profile (dimension) scale values estimated by ALSCAL for a specific subtest or attribute.

$$m_{pt} = c_p + \sum_{k=1}^K \omega_{pk} \cdot x_{tk} + \epsilon_{pt}$$

Finally, the  $R^2$  (percent of variance in the dimension scores accounted for by the observed scores) are calculated. Although there is no standard metric to judge an acceptable degree of fit, Ding (2007) suggested that indices below .20 might indicate that the person is developing ideographically (departs from all existing normative profiles) or that they carelessly responded to the survey instrument. The SPSS code for this analysis is provided in Appendix A.

Three configurations are often encountered in the PAMS literature. A “prototype match” is indicated by a high person-weight on one dimension, with negligible weights on other dimensions. A “mirror image” occurs when a person has a large but negative weight on a dimension—peaks and valleys of the prototype are reversed for this person. Lastly, a person may



be best represented by a linear combination of profiles, which would be indicated by moderate person-weights across dimensions.

Step 3. Finally, to demonstrate the validity of IDI profiles, person weights and levels will be related to other important intercultural variables, via correlation and regression. First, time spent abroad, number of foreign languages spoken and intercultural efficacy will be used to predict the dimension weights and levels, as all are likely antecedents to the development of intercultural sensitivity.

The second multivariate regression analysis will answer the research question of whether a person's intercultural sensitivity will influence the degree to which they benefit from intercultural training. In this case, pretest knowledge scores, person profile weights and levels will be used to predict posttest knowledge scores and posttest perceived intercultural efficacy. Bennett's premise that intercultural sensitivity supports intercultural learning would be supported by a finding that highly ethnorelative profiles (profile peaks in Acceptance and/or Adaptation) are associated with greater increases in scores and intercultural efficacy than those with high ethnocentrism (profile peaks in Defense, Denial, Reversal).

## Results

### Preliminary Analyses

One officer trainee was removed from the sample due to invariant responding across all IDI worldview scales. The demographic characteristics of the two samples are described in Table 2.

Table 2.  
Sample demographics.

	<i>N</i>	Enlisted 434	Officer 470
Gender			
Male		284	378
Female		164	85
Missing		4	7
Age			
18-21		16	2
22-30		180	372
31-40		162	89
41-50		67	0
51-60		7	0
Missing		2	7
Ethnic Affiliation			
Yes		51	75
No		164	389
Missing		0	6
Time Spent Abroad			
Never lived in another country		81	172
Less than 3 months		21	40
3-6 months		41	37
7-11 months		21	23
1-2 years		85	71
3-5 years		101	74
6-10 years		61	26
Over 10 years		22	21

Missing	1	6
Additional Languages		
No Language	109	329
1 Language	28	108
2 Languages	3	15
3 or more languages	1	5
Missing	293 <sup>2</sup>	13

To verify that the factor structure did not differ from that found by Hammer (2011), a confirmatory factor analysis was performed comparing the 4-factor (DD, R, M, AA; as found by Abbe et al., 2010) to the 6-factor model found to be the best fit by Hammer (2011). The 6-factor model was found to be the better fitting model, with acceptable RMSEA (less than .05) and  $\chi^2/df$  (less than 3.0). The goodness-of-fit indices are reported in the Table 3. Item-factor loadings are reported in Appendix B, replicating the results found by Abbe et al. (2010) in an Army sample.

Table 3.

Goodness-of-Fit Indicators of models for the Intercultural Development Inventory.

Model	$\chi^2$	<i>df</i>	$\chi^2/df$	$\chi^2 diff$	GFI	RMSEA
Four Factor	2999.58	939	3.19		0.86	0.049
Six Factor	2622.17	930	2.82	377.41**	0.878	0.045

Note. \*\* $p < .001$

Means, standard deviations and correlations are reported in Table 4. The reliabilities of most IDI worldview scales (except Minimization) and the Willingness to Engage scale are below the .80 rule of thumb. The relationships between the worldviews are largely consistent with previous findings, with ethnocentric and ethnorelative worldviews having negative correlations. Minimization is significantly related to both Acceptance ( $r = .102$ ) and Adaptation ( $r = .188$ ),

<sup>2</sup> The framing of this item (“In addition to English, how many languages do you speak proficiently?”) may have led a large number of Enlisted students to skip it. It is unclear why there were far fewer missing responses in the Officer sample.

much larger than the relationships found between these variables by Hammer (2011). With the exception of those two, Minimization had no significant correlations with non-IDI intercultural variables. Likewise, Reversal showed non-significant relationships with intercultural variables, with the exception of Ethnic Minority Status ( $r = -.100$ ). The small significant positive correlations between gender and Defense ( $r = .128$ ) and Denial ( $r = .165$ ) indicate that males are more likely to endorse these worldviews than females. The Developmental Orientation score (the score that weights and combines the individual worldviews) had near zero correlations with Intercultural Efficacy, Time Spent Abroad and Additional Languages Spoken, contrary to expectations. Perceived Orientation (the unweighted combination of worldview scores) as well was not related to Intercultural Efficacy, but was positively related to Time Spent Abroad and Additional Languages Spoken.

Table 4.  
Correlations, means, standard deviations, and reliabilities for study variables.

	M	SD	1	2	3	4	5	6	7
1 Denial	1.99	.62	(.68)						
2 Defense	2.12	.70	.56**	(.77)					
3 Reversal	2.45	.70	.31**	.34**	(.73)				
4 Minimization	3.44	.65	-.04	.06	.03	(.81)			
5 Acceptance	3.66	.73	-.16**	-.14**	.01	.10**	(.71)		
6 Adaptation	3.30	.62	-.14**	-.04	.07*	.19**	.51**	(.75)	
7 Perceived Orientation (PO)	119.24	5.83	-.59**	-.62**	-.66**	-.43**	.36**	.31**	--
8 Developmental Orientation (DO)	87.40	15.06	-.64**	-.68**	-.78**	-.37**	.17**	.09**	.96**
9 Intercultural Efficacy (IE) <sup>a</sup>	2.76	.72	-.10*	-.15**	.01	.01	.22**	.21	.01
10 Willingness to Engage (WE) <sup>a</sup>	3.02	.63	-.26**	-.15**	-.02	.01	.31**	.36**	.25**
11 Age (Cat.)	3.43	.70	-.06	-.12**	-.05	-.03	.06	.01	.10**
12 Gender (1 = Male)	.74	.44	.13**	.17**	.02	.04	-.07	.05	-.10
13 Ethnic Minority Status (1 = yes)	.20	.40	-.12**	-.15**	-.10**	.05	.08*	.07	.13**
14 Time Abroad (Cat.)	3.98	2.35	-.08*	-.10**	.04	.04	.22**	.22**	.11**
15 # Languages Spoken <sup>a</sup> (Cat.)	1.32	.58	-.12**	-.05	.03	.03	.18**	.26**	.12**

Note. \* $p < .05$ . \*\* $p < .001$ . Reliabilities are reported in parentheses along the diagonal. <sup>a</sup> Collected only from OTS and ITC Flex students,  $n = 568$ , all other correlation  $N = 904$ . Age (1 = 17 & under, 2 = 18-21, 3 = 22-30, 4 = 31-40, 5 = 41-50, 6 = 51-60, 7 = 61+); Time Abroad (1 = Never, 2 = Less than 3 mos., 3 = 3-6 mos., 4 = 7-11 mos., 5 = 1-2 yrs., 6 = 3-5 yrs, 7 = 6-10 yrs, 8 = 10+ yrs.); Additional Languages (1 = No language, 2 = 1 Lang., 3 = 2 Lang., 4 = 3+ Lang.)

Table 4 (continued).

Correlations, Means, Standard Deviations, and Reliabilities for Study Variables.

	8	9	10	11	12	13	14	15
1 Denial								
2 Defense								
3 Reversal								
4 Minimization								
5 Acceptance								
6 Adaptation								
7 Perceived Orientation (PO)								
8 Developmental Orientation (DO)	--							
9 Intercultural Efficacy (IE) <sup>a</sup>	-.02	(.85)						
10 Willingness to Engage (WE) <sup>a</sup>	.17**	.32**	(.65)					
11 Age (Cat.)	.10**	.23**	-.10*	--				
12 Gender (1 = Male)	-.11**	-.13**	-.12**	-.00	--			
13 Ethnic Minority Status (1 = yes)	.13**	.12**	.08	.03	-.19**	--		
14 Time Abroad (Cat.)	.05	.25**	.11**	.25**	-.01	.14**	--	
15 # Languages Spoken <sup>a</sup> (Cat.)	.06	.16	.27**	-.08	-.04	.13**	.19**	--

*Note.* \* $p < .05$ . \*\* $p < .001$ . Reliabilities are reported in parentheses along the diagonal. <sup>a</sup> Collected only from OTS and ITC Flex students,  $n = 568$ , all other correlation  $N = 904$ . Age (1 = 17 & under, 2 = 18-21, 3 = 22-30, 4 = 31-40, 5 = 41-50, 6 = 51-60, 7 = 61+); Time Abroad (1 = Never, 2 = Less than 3 mos., 3 = 3-6 mos., 4 = 7-11 mos., 5 = 1-2 yrs., 6 = 3-5 yrs, 7 = 6-10 yrs, 8 = 10+ yrs.); Additional Languages (1 = No language, 2 = 1 Lang., 3 = 2 Lang., 4 = 3+ Lang.)

A descriptive analysis of response patterns is presented in Appendix C, in which the frequency of endorsing a particular worldview (by selecting “agree” or “strongly agree” over 50% of the time) is displayed. Overall, 69% of the response patterns were supportive of the DMIS model, suggesting an “intercultural sensitivity” dimension that corresponds to an ever-increasing level of that construct as one moves from the ethnocentric worldviews to the ethnorelative worldviews. Very few (less than 1%) selected an ethnocentric stage as their single preferred worldview. Frequently, respondents endorsed the worldviews of Minimization, Acceptance and Adaptation, either singly or in combination with each other. Thirty percent of response patterns do not clearly support the model, primarily because participants failed to endorse intermediate stages of the IDI. This suggests that at least 1/3 of the sample would be best described by a profile of worldview scores other than the hypothesized intercultural sensitivity dimension.

### **Dimensionality and Scale Values**

In answer to research question of whether more than one dimension would be necessary to best fit the IDI data, the ALSCAL model fit indices for both a 1-dimensional and 2 dimensional models are reported. The 1-dimensional model fit the data (Enlisted: STRESS(1) = .02, RSQ = .998; Officer: STRESS(1) = .07, RSQ = .984) using the criteria of STRESS(1) < .10 and RSQ > .80 (Davison, 1986). The low STRESS value provides evidence that the scale values (representing the location of variables along a single dimension) accurately reflected the distances of the original data. However, the stress index for both samples improved considerably for the 2-dimensional model (Enlisted: STRESS(1) = .01, RSQ = .999; Officer: STRESS(1) = .01, RSQ = .999), so this model forms the basis for further analysis.

The original scale values for the Enlisted and Officer samples were inverted from each other, so a transformation was required to ensure that each Dimension “faced” in the same direction. Dimension 1 scale values were multiplied by -1, so that the worldviews proceeded from low (ethnocentric) to high (ethnorelative), left to right. Dimension 2 was multiplied by -1 for the Officer sample only so that its coordinates corresponded to the ITC sample. The two-dimensional plot of worldviews for both groups is displayed in Figure 4. As conjectured from a review of the literature, the displacement of Minimization from the other worldview scales is strikingly evident in this display. As well, there are notable differences in the location of scale scores for the two groups.

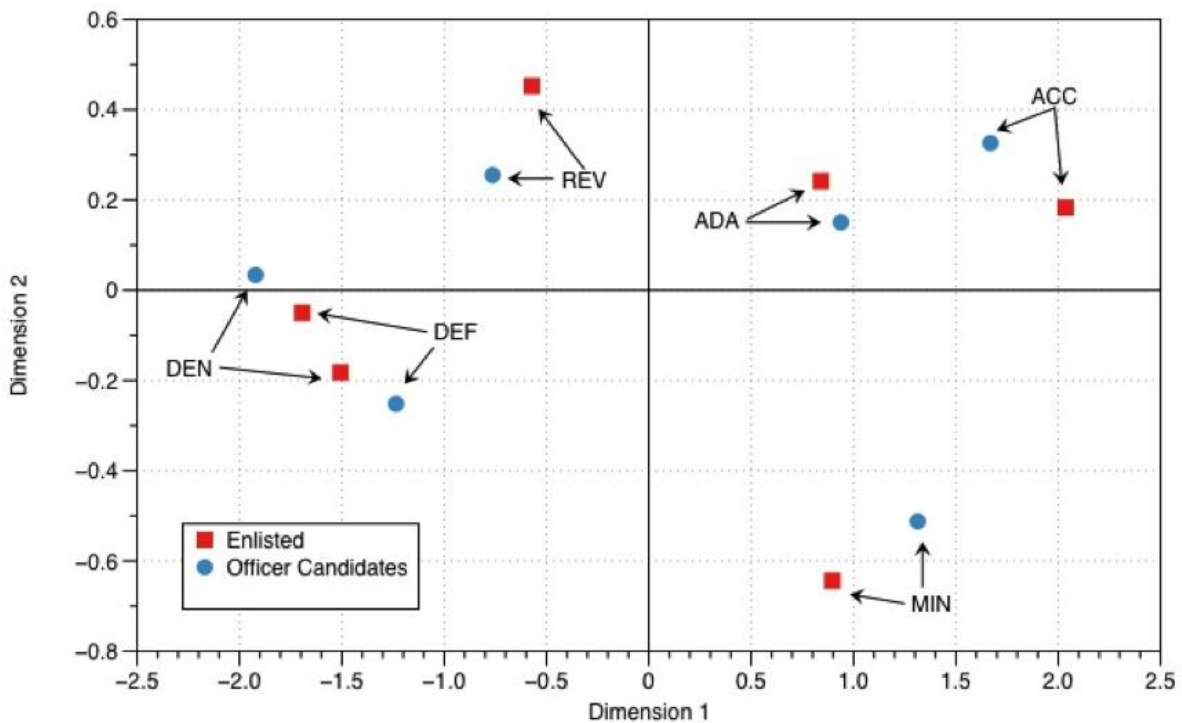


Figure 4. Worldview scale values on 2-Dimensional plot derived from ALSCAL.

In order to estimate standard errors for the scale values, needed for comparing the Enlisted and Officer Candidate samples, 1000 random samples (with replacement) were generated for the Enlisted and Officer Candidate samples, consisting of 434 and 470 participants



respectively in each random sample. Each random sample was then subjected to ALSCAL. This produced bootstrap scale values and standard deviation estimates shown in Table 5. Table 6 also shows the effect sizes for mean differences between Enlisted and Officer Trainee scale values. Profile configurations are displayed in Figure 5. The profiles are significantly different between the samples for Dimension 1 ( $z = 6.67$ ) but not for Dimension 2 ( $z = .898$ ). Despite the statistical differences, the profiles are very similar in shape and level. Complementary to the descriptive analysis of response patterns in Appendix B, Dimension 1 displays a high peak at the Acceptance worldview. Figure 4 shows that Dimension 1 arrays the worldviews largely along an underlying intercultural sensitivity dimension in the order predicted by the DMIS, with the small exceptions below: 1) for the Enlisted sample, Denial and Defense are reversed (with scale values of -1.50 and -1.69 respectively), 2) the Minimization scale values on Dimension 1 are nearly equal to Adaptation and 3) the Adaptation scale values place it behind Acceptance in the continuum. Since Dimension 1 largely complies with the hypothesized intercultural sensitivity continuum, the associated normative profile will be labeled as the *Intercultural Sensitivity Profile* (IS Profile).

Table 5.  
Original Scale Values.  
[for Enlisted ( $N = 434$ ) and Officer ( $N = 750$ ) Samples]

	<u>Enlisted Original Values</u>		<u>Officer Original Values</u>	
	<i>DIM1</i>	<i>DIM2</i>	<i>DIM1</i>	<i>DIM2</i>
Denial	-1.50	-.20	-1.92	.05
Defense	-1.70	-.06	-1.24	-.25
Reversal	-.58	.48	-.76	.21
Minimization	.90	-.68	1.30	-.67
Acceptance	2.05	.20	1.67	.42
Adaptation	.84	.26	.94	.25

Table 6.

Bootstrap scale values.

[and Standard Deviations for 1000 Random Enlisted ( $N = 434$ ) and Officer ( $N = 470$ ) Samples]

	<u>Enlisted Bootstrap Values</u>				<u>Officer Bootstrap Values</u>			
	<i>DIM1</i>	<i>SD</i>	<i>DIM2</i>	<i>SD</i>	<i>DIM1</i>	<i>SD</i>	<i>DIM2</i>	<i>SD</i>
Denial	-1.51*	.05	-.18	.09	-1.92*	.04	.03	.06
Defense	-1.69*	.04	-.05	.08	-1.23*	.04	-.25*	.10
Reversal	-.57*	.05	.45*	.17	-.76*	.05	.25*	.11
Minimization	.90*	.06	-.64*	.24	1.31*	.08	-.51	.40
Acceptance	2.04*	.03	.18	.09	1.67*	.05	.33	.27
Adaptation	.84*	.04	.24	.13	.94*	.05	.15	.14
	<u>Enlisted – Officer Effect Sizes (<i>d</i>)</u>							
	DIM1		DIM2					
Denial	.31		-.09					
Defense	-.36		.07					
Reversal	.13		.04					
Minimization	-.19		-.01					
Acceptance	.27		-.02					
Adaptation	-.07		.02					

Note.\* Scale values are significantly different than zero,  $p < .05$ . Effect sizes are Cohen's  $d$ , interpreted as small (<.20), medium (.50) and large (.80).

The second profile, Dimension 2, has scale values very close to zero, with only peaks/valleys for Reversal and Minimization. It may be unwise to interpret scale scores that do not differ from zero (Kim, Frisby & Davison, 2004), since this implies that profile scores do not provide additional information above and beyond the average endorsement across worldviews. In both samples, all scale values for Dimension 1 were significantly different than zero at the 95% confidence level. Correlational evidence from previous studies suggested that the Minimization worldview might exist on a second dimension. DIM2 Minimization was significantly less than zero for Enlisted ( $z = -2.09$ ), but not for Officers ( $z = -1.16$ ). Additionally, the DIM2 Reversal scale values were significantly greater than zero for both samples (Enlisted  $z = 2.15$ ; Officer Candidate  $z = 2.52$ ), and DIM2 Defense was significantly less than zero for Officer Trainees ( $z =$

-2.70). All other worldviews for this Dimension did not differ from zero. Since the Reversal worldview was significant for both samples, the normative profile for Dimension 2 is labeled the *High Reversal – Low Minimization Profile* (HiR-LoM Profile). These two profiles are depicted in Figure 5.

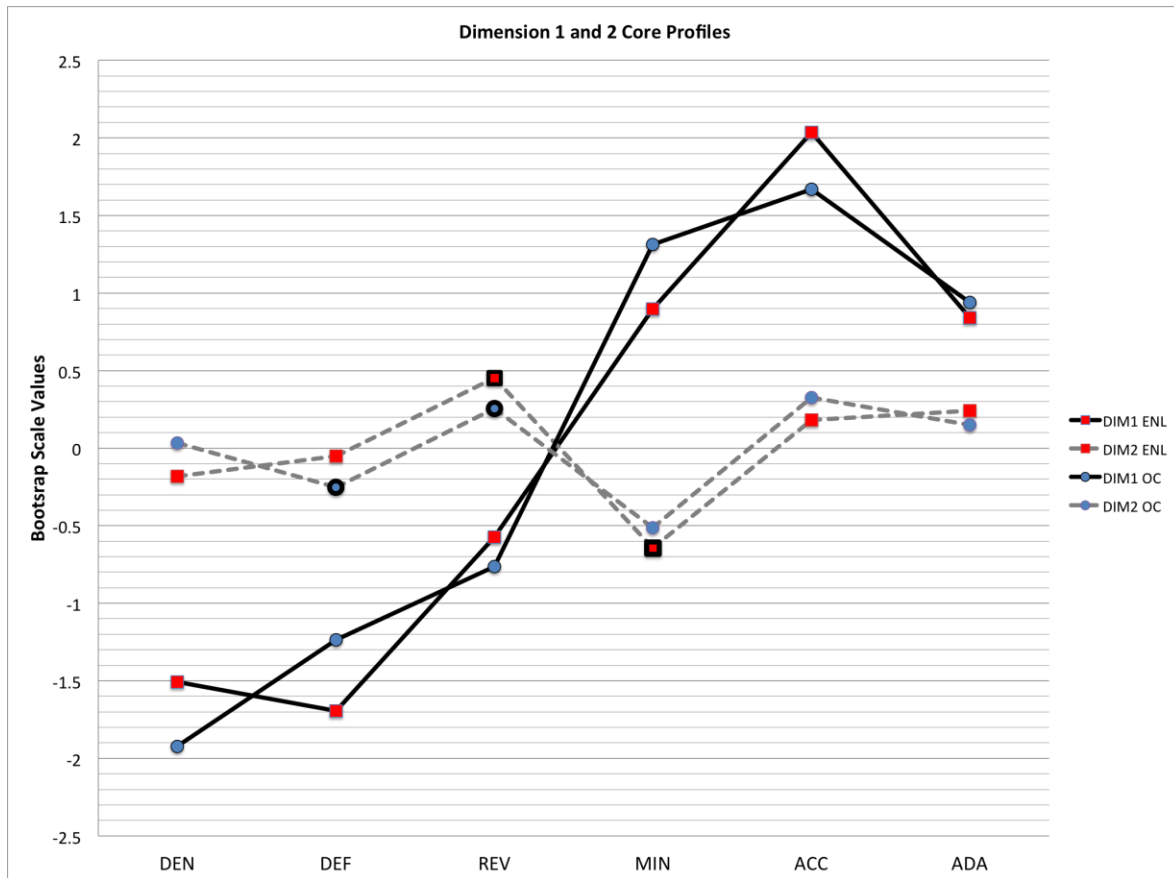


Figure 5. Profile Depiction of Dimension Scale Values [for Enlisted (ENL) and Officer Candidate (OC) Samples.]

### Person Parameters

Person profile weights, level scores and fit ( $R^2$ ) values were computed using the original (non-bootstrapped) scale values at the top of Table 5. The descriptive statistics for these indices are contained in Table 7. Level and dimension weights did not differ significantly for the two samples based on independent samples t-tests (DIM1  $t = -1.119$ , DIM2  $t = .696$ , Level  $t = -1.126$ ,

$df = 902$ ). The distributions of fit indices were strongly positively skewed. Only 2.8% of the Enlisted sample and 2.6% of the Officer sample had  $R^2$  values less than .20, a cut-off suggested by Ding (2007) to indicate idiosyncratic responding. The participants with fit indices less than .20 were characterized by standardized worldview scores that did not match the two profiles previously described, or had standardized scores very close to zero across all worldviews. However, participants with fit indices up to .30 also showed idiosyncratic responding (i.e. significant peaks and valleys on worldviews not consistent with the normative profiles), suggesting that the cut-off suggested by Ding (2007) is too low for this study.

Table 7.  
Descriptive statistics for person parameters in two samples.

	Enlisted ( $N = 434$ )				Officer ( $N = 470$ )			
	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Fit	.76	.23	.01	1.00	.78	.20	.03	1.00
Level	2.81	.34	1.66	4.08	2.83	.35	1.65	4.02
Dim 1 Weights	.48	.27	-.16	1.27	.50	.27	-.32	1.39
Dim 2 Weights	-.11	.69	-1.96	2.10	-.08	.73	-2.65	2.83

*Prototypical Profiles.* Participants in the sample are represented in the plot of Dimension 1 by Dimension 2 weights. Figure 6 demonstrates that, although two dimensions fit the data well, there are few purely prototypical Dimension 2 participants (HiR-LoM; those that are characterized by large positive weights on Dimension 2, with near-zero weights on Dimension 1), and only a handful of mirror image Dimension 2 participants (LoR-HiM; large negative weights on Dimension 2 with near-zero weights on Dimension 1). The greatest number of participants are best represented by the additive combination of Dimension 1 and Dimension 2 weights, within quadrants II and III on the graph. The shaded area of the graph represents between +/- 1 standard deviation from the mean weight for the normally distributed dimension weights.

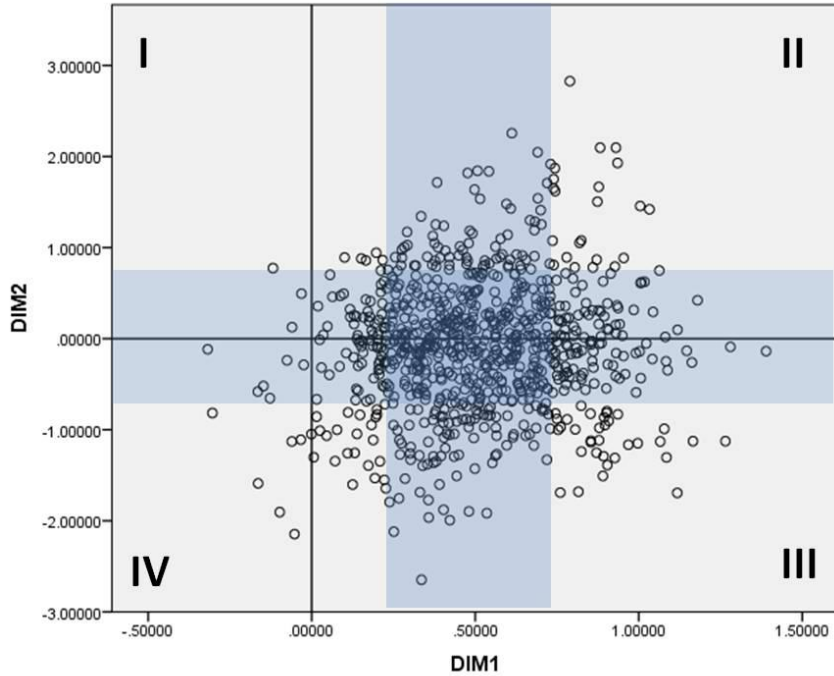


Figure 6. Scatterplot of participants by Dimension weights.

Figures 7 and 8 below describe pairs of officer and enlisted participants who are characterized as prototypical for DIM 1 and DIM 2 respectively.

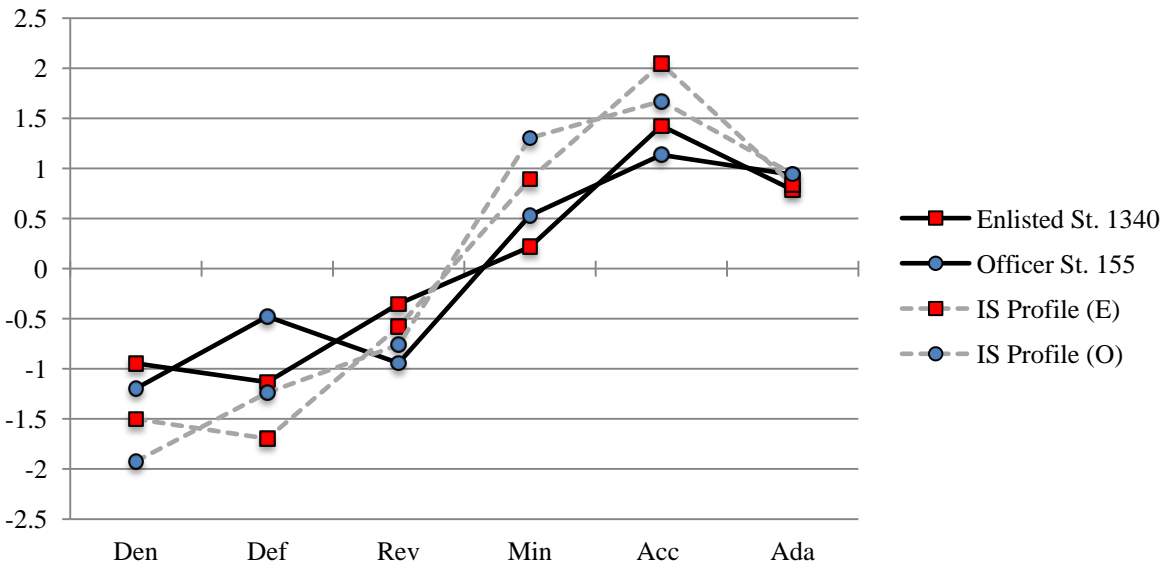


Figure 7. Prototypical Intercultural Sensitivity (DIM1) Profiles. [for an Enlisted Student (DIM1 wt = 1.02, DIM2 wt = .62, fit = .99) and Officer Student ((DIM1 wt = 1.04, DIM2 wt = .29, fit = .90)]

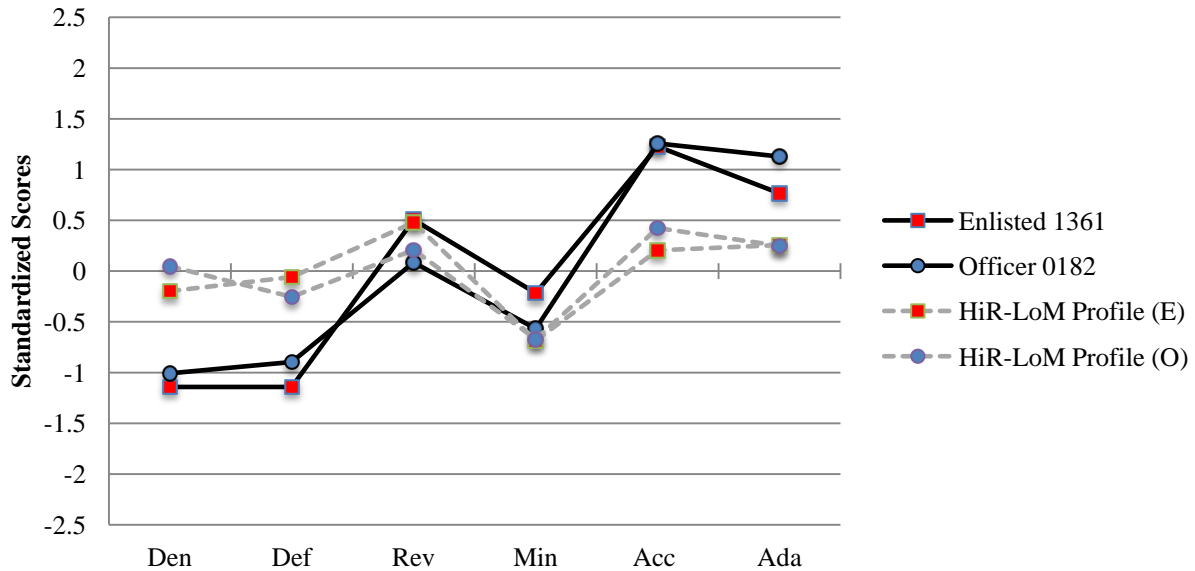


Figure 8. Prototypical High Reversal-Low Minimization (DIM2) Profiles. [for an Enlisted Student. (DIM1 wt = .67, DIM2 wt = 1.3, fit = .89) and Officer Student ((DIM1 wt = .70, DIM2 wt = 1.41, fit = .96)]

The inversion of Reversal and Minimization is the key difference in the profile features of Dimension 1 and Dimension 2. The inversion is also borne out by comparing the correlations between dimensions and original worldview scale values in Table 8. Reversal's relationship is negative to Dimension 1 weights and positive to Dimension 2 weights. Conversely, for Minimization the directions of the relationships are reversed, and highly significant. As was true for the scale values, the Officer student in Figure 8 appears to have Reversal scores that do not differ from his mean across all worldviews.

Table 8. Correlations of worldviews, levels and dimension weights for enlisted and officer samples.

	<u>Enlisted</u>			<u>Officer</u>		
	Dim1	Dim2	Level	Dim1	Dim2	Level
Denial	-.705	-.158	.507	-.704	-.059 <sup>ns</sup>	.491
Defense	-.693	-.072 <sup>ns</sup>	.614	-.623	-.224	.560
Reversal	-.360	.499	.601	-.382	.198	.583
Minimization	.226	-.680	.456	.425	-.644	.409
Acceptance	.696	.310	.395	.628	.572	.502
Adaptation	.463	.327	.486	.522	.420	.536

Note. <sup>ns</sup> Not significant at  $p < .05$ .

Mirror Image Profiles. Negative weights indicate that the person's profile is a mirror image of the prototypical profile. For Dimension 1, only 3.2% of the Enlisted sample and 2.3% of the Officer sample had negative weights, and these were for the most part negligible (ranging from  $-.16$  to  $-.32$ ). Few people show a pattern of response that proceeds from high Defense scores to low Adaptation scores, the mirror image of Dimension 1. Out of the 25 cases of negative Dimension 1 weights, 18 cases also had negative weights on Dimension 2. Two examples are illustrated in Figure 9.

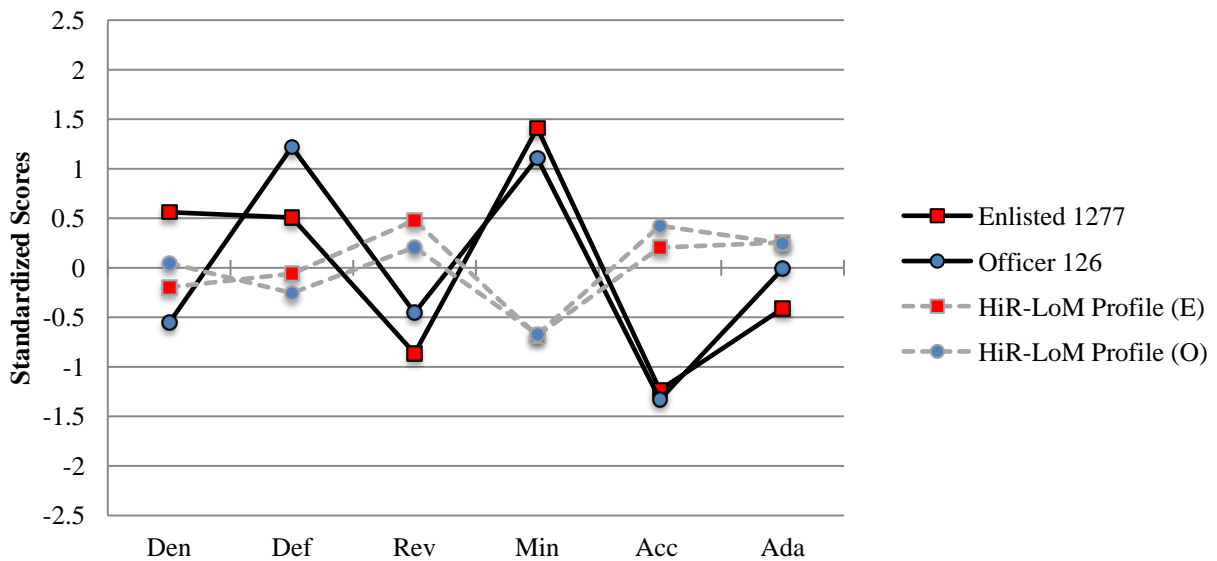


Figure 9. Combined Mirror Image Profiles.

[for an Enlisted Student (DIM1 wt =  $-.16$ , DIM2 wt =  $-1.59$ , fit =  $.94$ ) and Officer Student (DIM1 wt =  $-.05$ , DIM2 wt =  $-2.15$ , fit =  $.76$ )]

Conversely, *Low Reversal-High Minimization* pattern was somewhat more common in the two samples (participants with large negative DIM2 weights with near-zero DIM1 weights).

Figure 10 shows an example of a mirror image of the prototypical Dimension 2 profile, using both officer and enlisted participants with weights 2 standard deviations from the mean.

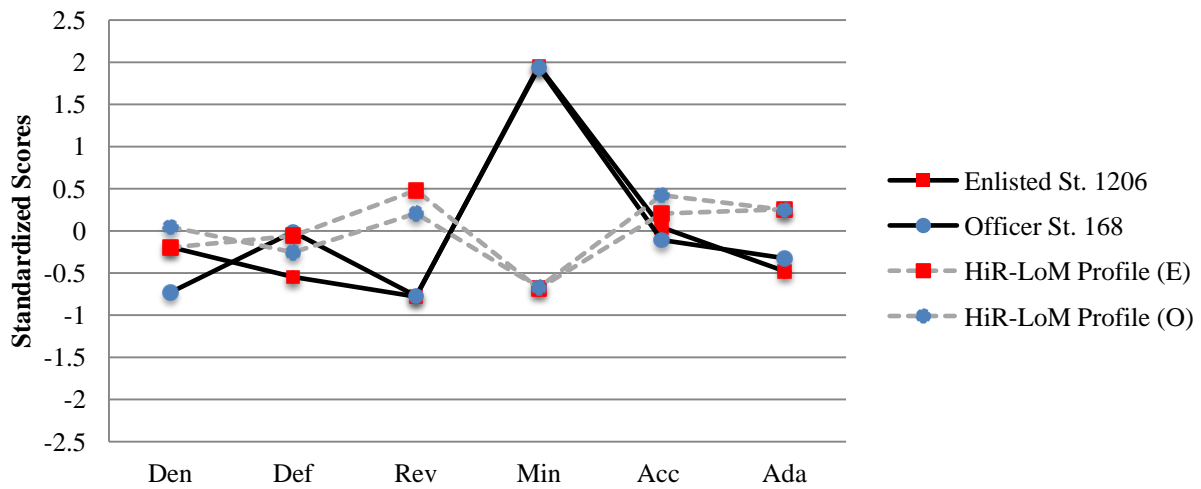


Figure 10. Dimension 2 Mirror Image Profiles.

[for an Enlisted Student (DIM1 wt = .22, DIM2 wt = -1.55, fit = .93) and Officer Student (DIM1 wt = .29, DIM2 wt = -1.54, fit = .99)]

The final characterization is the profile that results from a linear combination of the two dimensions. Figure 10 displays the profile of an officer and enlisted student who have equivalent positive weights on the two dimension (.87/.87 and .40/.40 respectively), which has the effect of flattening the peaks and valleys of the profile, while still maintaining an generally upward trend consistent with the intercultural sensitivity profile (Figure 11).



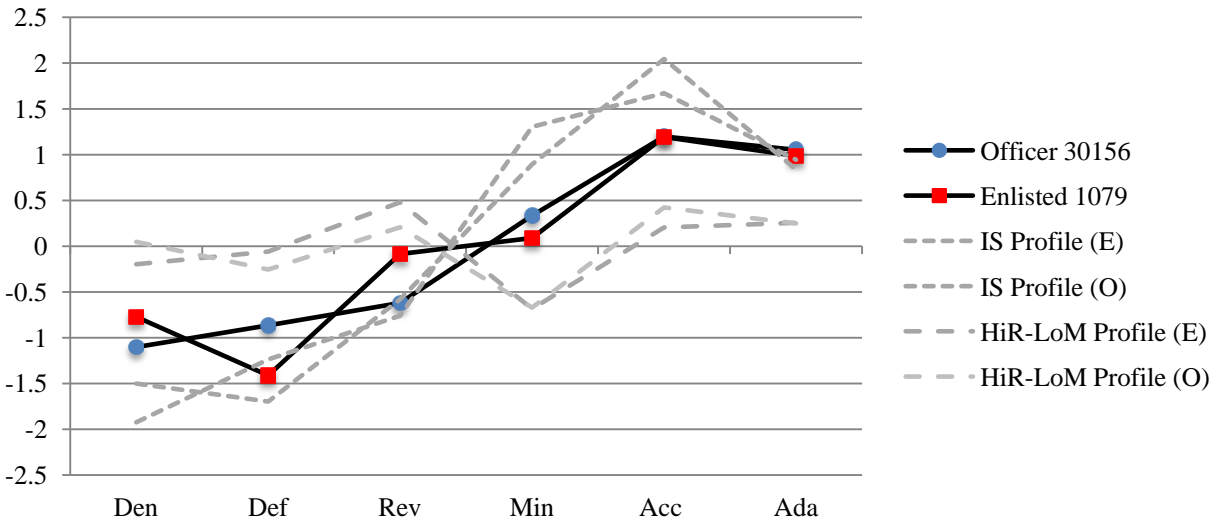


Figure 11. Linear Combination Profiles.  
[for Officer and Enlisted with Equal Dimensional Weights]

To summarize, two profiles emerged from the ALSCAL analysis, and for the two samples, the scale values did differ significantly based on bootstrap estimates. However, the differences were relatively small (effects ranging from .10 to .30 for Dimension 1 scale values, and near zero for Dimension 2 scale values), and the overall patterns of values were consistent across the two samples. For Dimension 1, worldviews had scale values that would be predicted by the DMIS, negative for ethnocentric worldviews (Denial, Defense, and Reversal) and positive for ethnorelative worldviews (Acceptance and Adaptation). Minimization takes a place intermediate in scale value to the ethnocentric and ethnorelative worldviews. Dimension 1 was labeled the Intercultural Sensitivity Profile. No cases in either sample showed a clear mirror image of the IS Profile (which would entail having appreciable negative weights on Dimension 1). In Dimension 2, Reversal was greater than zero, representing scale values higher than the average across worldview scores. Accompanying the elevation of Reversal scores were depressions of Minimization scores, so this profile was labeled High Reversal-Low Minimization. Unlike the IS Profile, which had no appreciable number of mirror images,

approximately half of the participants could be characterized as mirror images of DIM2, Low Reversal – High Minimization. A simple additive combination of weights produced profiles with suppressed peaks and valleys of Reversal and Minimization, bringing them close to zero, creating a relatively smooth upwardly trending profile of scores that peaked at Acceptance. For the combined sample, only 21 (2%) had fit indices lower than  $R^2 = .20$ , indicating idiosyncratic responding. Relaxing that criteria up to  $R^2 = .30$  increased the number of idiosyncratic responders to 42 (4.6%).

### External Analysis

A MANCOVA was performed with Level, DIM1 and DIM2 weights as dependent variables, predicted by Time Spent Abroad, Number of Foreign Languages Spoken, with Intercultural Efficacy as a covariate. Before conducting the analysis, Pearson correlations were calculated for the dependent variables (Table 8), and although significant, the relationships were below the moderate correlations suggested by Meyers, Gampst, and Guarino (2006) when conducting MANOVA. The Box’s M value of 96.187 was not significant, suggesting the covariance matrices were equal across the levels of the predictors.

Table 9.

Correlations of PAMS parameters.

	Level	DIM1	DIM2
Level	--		
DIM1	-.07*	--	
DIM2	.10**	.11**	--

The three-way multivariate analysis of variance (MANOVA) sought to answer the research question of whether Profile Analysis via Multidimensional Scaling of the Intercultural Development Inventory would result in profiles that are meaningfully related to intercultural

sensitivity, time spent abroad, and foreign language learning. A statistically significant MANOVA effect was obtained for time spent abroad (Pillais' Trace = .058,  $F(12, 1734) = 2.870$ ,  $p = .001$ ) and number of foreign languages spoken (Pillais' Trace = .043,  $F(6, 1154) = 4.225$ ,  $p < .001$ ). The multivariate effect size was estimated at .02, which implies that 2.0% of the variance in the canonically derived dependent variable was accounted for by number of foreign languages, time spent abroad, and intercultural efficacy.

Levene's F tests for homogeneity of variance for Level score, DIM1 weights and DIM2 weights were all non-significant (shown in Table 10). Since the homogeneity of variance assumption was satisfied, a series of one-way ANOVA's on each of the three dependent variables was conducted as follow-up tests to the MANOVA. As can be seen in Table 10 and 11, the ANOVA's were statistically significant for DIM1, with low effect sizes (partial  $\eta^2$ ) ranging from .01 to .03 for time spent abroad and number of foreign languages. Unexpectedly, mean differences were found for DIM2 by number of foreign languages and time spent abroad.

As one might expect, the Intercultural Efficacy scale, which was measured on the same 5-point agreement scale as the IDI, was significantly related to Level Scores (the mean response across IDI worldview scales), but unexpectedly was not related to either the IS Profile (DIM1) or the HiR-LoM Profile (DIM2) weights (see Table 12).

Table 10.

Univariate ANOVA's with PAMs person parameters as dependent variables and additional languages as independent variable.

	Levene's		ANOVAs			None		1 Foreign Lang		2 or more FL	
	<i>F</i> (14,579)	<i>p</i>	<i>F</i> (2,578)	<i>p</i>	$\eta^2$	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Level	.72	.76	3.12	.05	.01	2.75	.04	2.85	.02	2.87	.03
DIM1	1.45	.12	5.81	.00	.02	.50	.03	.50	.02	.59	.02
DIM2	1.15	.31	4.73	.01	.02	-.15	.08	-.09	.04	.12	.06

Note. Covariate Intercultural Self-Efficacy = 2.01.

Table 11.

Univariate ANOVA's with PAMs person parameters as dependent variables and time spent abroad as independent variable.

	ANOVAs			Never		Less than 1 yr		1 - 2 years		3 - 5 years		6 or more yr	
	<i>F</i> (4, 578)	<i>p</i>	$\eta^2$	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Level	2.91	.02	.02	2.79	.03	2.75	.04	2.80	.04	2.87	.04	2.91	.04
DIM1	4.36	.00	.03	.46	.03	.51	.03	.49	.03	.57	.03	.60	.03
DIM2	1.47	.21	.01	-.18	.07	-.02	.07	-.05	.08	-.03	.09	.08	.08

Note. Covariate Intercultural Self-Efficacy = 2.01.

Table 12.

Between-subject effects of intercultural efficacy.

	ANOVAs		
	<i>F</i> (1,578)	<i>p</i>	$\eta^2$
Level	6.50	.01	.01
DIM1	.31	.58	.00
DIM2	2.13	.15	.00

## Resistance to Learning Analysis

Pretests and posttests were available only for the Officer sample with some missing data, for an effective sample size of 426. An aptitude (intercultural sensitivity operationalized as DIM1 weights) by pretest knowledge score interaction would support the contention that intercultural sensitivity influenced the degree to which people benefited from or resisted intercultural training. Based on Bennett's (1986) theory, one would expect that scores reflecting a predominant worldview in ethnorelativism (high positive weights on DIM1) would benefit more from intercultural education. Given that the analysis resulted in a second dimension (High Reversal – Low Minimization), this profile was also tested to determine the degree to which it influenced intercultural learning.

A multiple regression analysis was performed predicting posttest knowledge with Pretest scores, Level, DIM1, DIM2, Pretest-by-DIM1 and Pretest-by-DIM2 interactions. The significance of the results did not change when excluding the 23 idiosyncratic students with fit indices below .30, so they were retained in the sample. Overall, PAMS person parameters were poor predictors of posttest knowledge scores after controlling for pretest scores ( $R^2 = .094$ ), but did add incremental variance above and beyond pretest scores ( $R^2\Delta = .048$ ,  $F(4,423) = 5.653$ ,  $p < .001$ ). The main effect for Level was not significant ( $B = .003$ ,  $t = .137$ ,  $p = .891$ ), but the main effects for DIM1 ( $B = .160$ ,  $t = 2.687$ ,  $p = .007$ ) and DIM2 ( $B = -.060$ ,  $t = -2.621$ ,  $p = .009$ ) weights were significant. Contrary to the effect hypothesized by Bennett for the DMIS, the interaction term of pretest percentages by DIM1 weights was not significant ( $B = -.139$ ,  $t = -1.007$ ,  $p = .315$ ). On the other hand, the DIM2 interaction term was significant ( $B = .108$ ,  $t = 2.166$ ,  $p = .031$ ).

To provide a simpler interpretation of the consequential (albeit small) role Minimization appears to play in knowledge change, each worldview score was entered as a potential moderator of knowledge change in a multiple regression. In this case, Minimization was the only worldview significantly related to change in intercultural knowledge (Table 13).

Table 13.  
Summary of regression analysis for IDI worldviews predicting  
posttest knowledge, controlling for pretest knowledge.

	<i>B</i>	<i>SE</i>	$\beta$
Constant	.379	.148	
Pre-declarative	.305	.425	.392
Minimization	.079	.026	.356 *
Minimization x pre-decl.	-.126	.058	-.635 *
Denial	-.060	.031	-.251
Denial x pre-decl.	.062	.074	.184
Defense	.003	.027	.014
Defense x pre-decl.	-.026	.065	-.091
Reversal	.006	.024	.030
Reversal x pre-decl.	.003	.054	.014
Acceptance	-.016	.028	-.081
Acceptance x pre-decl.	.010	.064	.051
Adaptation	-.004	.032	-.017
Adaptation x pre-decl.	.058	.072	.272

Note.  $R^2 = .09$ . \*  $p < .01$ .

Simple slope analysis for multiple regressions (Preacher, Curran, and Bauer, 2006) helps to reveal the nature of Minimization's moderation on the slope of knowledge change from pretest to posttest. All covariates (the other worldviews) were centered to assist in interpretation. Due to ceiling effects, those with high pretest scores tended to have negative change from pretest to posttest. Likewise those with low pretest scores made the greatest gains. Low Minimization scores, however, suppressed these effects. In other words, low Minimization scores were

associated with less negative change for high pretest scorers and less positive change for low pretest scorers. A plot of the slopes at the minimum pretest score (0%) and the maximum pretest score (88%) visually describe the simple slopes for the high, mean and low minimization levels in Figure 13.

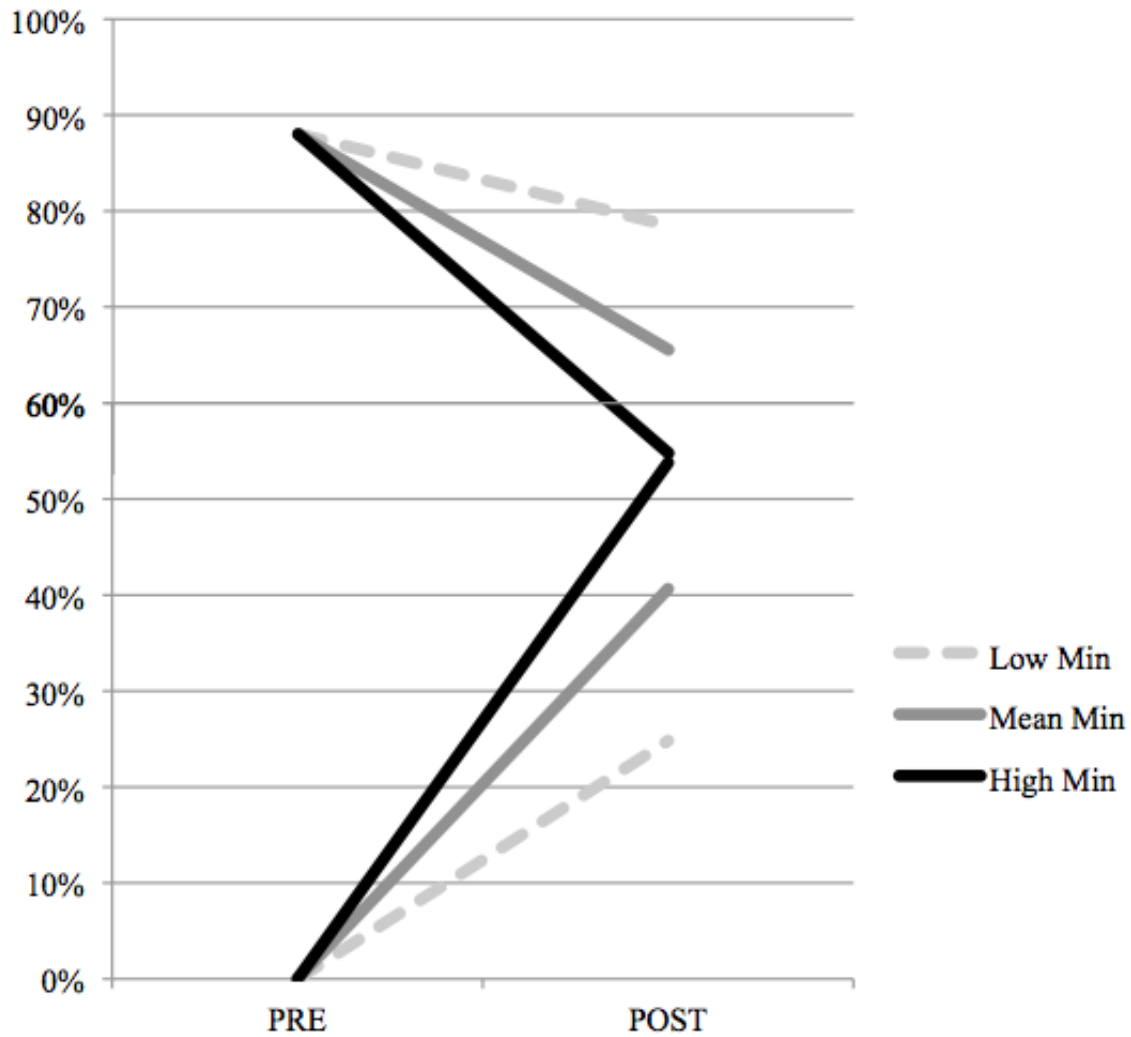


Figure 12. Slopes for knowledge change at high (88%) and low (0%) pretest scores. [for three levels of Minimization scale scores]

## Discussion

The following section highlights some important supports for and challenges to Bennett's DMIS theory (and to the Intercultural Development Inventory) uncovered by this analysis. PAMS as a tool for differential diagnosis and for intervention design is critiqued. The discussion then highlights the challenges of interpretation associated with the use of the PAMs method when a large majority of the students do not adhere strongly to a normative profile. Other methods that may have produced more parsimonious results are briefly described. Finally, the section ends with implications for trainers of intercultural sensitivity and study limitations.

### **Supports for and Challenges to the DMIS**

Although the common understanding regarding intercultural sensitivity is that a majority (68%) of the population are in the Minimization stage, the descriptive and ALSCAL analysis of IDI responses suggest that more commonly, participants who endorse ethnorelative worldviews will simultaneously endorse Minimization. Clearly, it is not an intermediate stage, but represents attitudes and beliefs that coexist with intercultural sensitivity, but are distinct from it. IDI proponents would likely argue that participants' IDI scores (i.e. their preference for worldviews) reflect an inflation of their "true" level of intercultural sensitivity (Hammer et al., 2003). That rationale led the developers to give higher weight to Minimization in the DO score, effectively masking the preference for the Acceptance worldview. As no empirical research has demonstrated the validity of this inflation assumption, the author suggests instead that worldview preferences ought to be interpreted directly from participants' responses to the instrument.



The descriptive analysis of the response patterns highlights several issues that are challenging to the DMIS theory. First, only 23% of the combined sample held a single predominant worldview. Bennett's original work on the developmental model did not include provision for multiple worldviews being held simultaneously. It was only after the implementation of the IDI that "trailing issues" (Hammer et al., 2003) were described. From a classification perspective, it is problematic that twice as many students prefer multiple worldviews, when each worldview is meant to imply a certain level of development and a unique set of attitudes, beliefs, and values. Davison and his colleagues' work with the Rest's Defining Issues test of Kohlberg's stages of moral development suggest that this is not uncommon for stage-sequential models, however. Allowing for the dispersion of preference across adjacent worldviews (which might indicate having not quite developed past the previous stage, or not quite entered the next stage), the descriptive analysis provides some validation. Sixty-nine percent of the combined sample displayed this response tendency.

Far fewer students in these samples endorse ethnocentric worldviews (3.87%) than the number suggested by the normally distributed Developmental Orientation score (16%), but it is possible that this finding is specific to the military samples in this study. In support for the DMIS theory, it was also a rare occurrence for students to endorse both ethnocentric and ethnorelative worldviews simultaneously, suggesting that these meta-concepts do fall on opposite ends of the intercultural sensitivity continuum. The most common 'error' of this sort, when it did occur (20 of 247 errors, 8%), was to not endorse the Minimization stage, while endorsing both Reversal (an ethnocentric stage) and Acceptance (an ethnorelative stage). This might be explained by the positive affect associated with both Reversal and Acceptance worldviews. Instead of being

sensitive to cognitive complexity as suggested by Bennett, this seems to imply that the instrument may array along an affective (positivity about other cultures) dimension instead.

PAMs resulted in person parameter estimates that had significant by very small relationships with relevant intercultural variables, similar to the findings of Hammer et al. (2003). The fairly robust sample sizes contributed to the significant findings. As has been found by other researchers (Abbe et al., 2007) the relationship between intercultural sensitivity and both foreign language learning and overseas experience is likely a complex one. In this case, intercultural efficacy was used as a likely covariate, and was found to relate to the Level parameter alone. This may be evidence of common method bias, as both the IDI and the intercultural efficacy scale were based on 5-point Likert-style items.

### **Minimization**

The ALSCAL analysis highlights an important second dimension in which higher than average Minimization scores are coupled with close-to-the-mean Reversal scores. As Minimization scores decrease toward the mean across worldviews, Reversal scores increase higher than the mean. This relationship between Minimization and Reversal has not been previously described, and requires further research to understand its implications. Both worldviews represent a form of intercultural sensitivity that is not affectively negative (unlike the ethnocentric worldviews), but perhaps not well informed. In the case of Reversal, students have a positive affect regarding the value of other cultures, but (Bennett claims) do not have the cultural knowledge necessary to correctly navigate cultural challenges. Likewise, students who prefer the Minimization worldview have a general positive regard for human kind, akin to benevolence

(Schwartz, 1992), but perhaps do not seek out culture-specific understanding since they believe that all people abide by universal laws of humanity.

Of all the worldviews, only Minimization seems to have any influence on the degree to which individuals benefit from intercultural training, and this effect is extremely small. This is contrary to Bennett's contention that ethnorelative students would most benefit from training, while those in the ethnocentric stages would resist training. After removing the unique and common effects of the other worldviews using regression analysis, the semi-partial correlation of the Minimization/Pre-Declarative Knowledge interactive effect with Post-Declarative Knowledge score is -.100. Simple slope analysis suggests that Minimization has a differential effect on high pre-test scorers and low pre-test scorers, seeming to suppress the degree of change experienced as Minimization decreases. There is no straightforward explanation of this effect, and none could be drawn from the existing literature. It must be noted that Minimization had the greatest range of scores amongst the worldviews, so the lesser amounts of variability within the ethnorelative worldviews may have hindered the ability to find significant effects for those worldviews.

### **Interpretation of PAMs at the Individual Level**

One of the promises of profile analysis is that it can provide differential diagnosis. This is only possible when students can be categorized as fitting or not fitting a particular profile that has known relationships to other important variables. Few authors using the PAMS methodology have called attention to the prevalence of 'additive' profiles, and it is unclear whether this is a common occurrence. Clearly, the lack of clear categorization of students may hinder both goals of differential diagnosis and of designing appropriate training interventions. It is possible that

when analyzing PAMs profiles for multi-test batteries such as the *Woodcock-Johnson Psychoeducational Battery* (Kim, Frisby, & Davison, 2004), students may be more readily categorized. The additive profiles (represented by the participants in the “fanning” center portions of quadrant II and III in Figure 6) have worldview scores that largely adhere to the Intercultural Sensitivity profile, but whose respective preference for Reversal and Minimization is the key discriminator. It remains to be seen whether this discriminator is related in any meaningful way to other intercultural variables of interest.

Clearly, a mirror image profile of intercultural sensitivity suggests a person who is decidedly ethnocentric. He or she has endorsed Denial and Defense highly, and failed to endorse the ethnorelative worldviews. To the extent that these types of students need special handling in the classroom to ensure they are afforded the appropriate supports and challenges, it is important to identify them. However, these students are relatively rare, based on this study. More problematic are the 118 students (13% of the combined sample) who did not endorse any worldview over 50%—effectively only using the lower end of the Likert response scale. A perhaps problematic feature of PAMs is that these students are treated like all others in the analysis, since their responses are not invariant. A person-mean is calculated for each student, and deviations from the person-mean come to represent an interpretable profile for that student, even though the original scale values may be located around “disagree some and agree some”. Although it did not seem justifiable (and would likely inflate type I error) to remove these students from the PAMs analysis, interpreting their profiles at the individual level would require special care.

Unlike cluster analysis and modal profile analysis, PAMs has the benefit of analyzing the influence of the overall ‘level’ of scores (means across worldviews) separately from the profile of scores (the deviations above and below the mean). With regard to self-report instruments, the level score may represent a generalized tendency in response to the scale, while in cognitive tests it is thought to represent ‘g’ (Kim, Frisby, & Davison, 2004). The overall response tendency represented by the Level score, in this case, was related to time spent abroad and to the number of foreign languages spoken.

### **Implications for Trainers**

For the trainer, other methods of analysis may produce more interpretable categorization of respondents that can lead to differential diagnosis. For instance, by using a criterion of 50% endorsement of scale items, instead of scale means, IDI data can be subjected to Configural Frequency Analysis (CFA; Van Eye, 2002). CFA would discretely categorize a person based on their preference for each worldview, and does not presume any underlying pattern of response (such as a single predominant stage, or preference for adjacent stages). As with MDS, predominance of each profile pattern can be tested for statistical significance. In this way, patterns can be characterized as either types or anti-types, each of which may have practical significance for trainers. For instance, the descriptive analysis here suggests that having a predominant Denial or Defense worldview is likely an anti-type, a profile that occurs less likely than expected in the population, while having a profile of Minimization-Acceptance-Adaptation endorsement occurs more often than what would be expected by chance (a “type”). However, CFA is limited to large sample sizes, because the six worldviews of the IDI results in 46,656 ( $6^6$ ) possible profile patterns.

Currently, IDI Developmental Orientation scores are calculated even for those students who failed to endorse any of the worldview scales (13% of the study sample). Clearly, students who have not expressed a preference for any worldview should not be categorized as “in Minimization”. Trainers should diagnose whether careless or indifferent responding occurs in their courses and gather additional diagnostic observations in the classroom to determine a student’s worldview preferences.

### **Study Limitations**

The response patterns of officer and enlisted samples largely resemble those found in other studies, but clearly the military samples cannot be thought of as representative of the larger U.S. population. For instance, a high number of participants had lived overseas for an extensive amount of time, compared to the average American. Forty percent of military members on active duty since 2001 have deployed at least once overseas through 2010 when the data were collected (Committee on the Initial Assessment of Readjustment Needs, 2010). Gunther (2013) found that both U.S. Army and Air Force samples differed from the validation sample of Hammer et al. (2003) in mean Defense/Denial and Acceptance/Adaptation scores based on 95% confidence intervals, and also found sub-group differences by rank cohort (senior/junior officer, senior/junior enlisted), similar to findings by Abbe et al. (2010). These rank groups differ in tenure and acculturation processes, and consequently might have different attitudes about intercultural contact that remain unexplored.

ALSCAL, the multidimensional scaling algorithm used in this study, required a larger number of proximity values than the parameters to be estimated. In the case of the IDI, only two dimensions could be reasonably extracted from the data when using scale values. An alternative

approach would have been to create a proximity matrix of all 50 items of the IDI, which would have resulted in a scaling solution that arrayed the items along multiple dimensions. Although this approach would lead to new information about the scaling of the instrument, it would be exceedingly complex to interpret as a person profile.

This study did not attempt to validate the developmental sequencing of stages, as described by the DMIS. In part, the short time period between two measurements of intercultural sensitivity did not provide the venue for detecting meaningful change. However, MDS methodology may fruitfully be applied in this arena, as Davison and his colleagues have provided evidence that developmental models produce data that take on a typical circumplex pattern (Davison, Robbins & Swanson, 1978; Davison & Skay, 1991). Although the descriptive analysis clearly points to participants endorsing multiple stages at one time, Davison has also recommended more formal tests to determine if the endorsement patterns are acceptable under disjunctive development theories, to include model-fit comparisons based on ideal point and unfolding models of preference (Davison, 1986). Even more ideal would be to gather IDI data over time in a controlled field experiment, linking the types of experiences that occur domestically and abroad to participants' change from one DMIS stage to the next. Such a study would lend insight into what venues (experience, culture-specific training, culture-general education) impact the development of intercultural sensitivity, and to what degree.

## **Conclusion**

Based on previous research, more than one dimension seemed necessary to explain the inconsistent relationship Minimization had to the IDI worldviews and other important intercultural variables. This was found to be the case, with a two-dimensional MDS model

proving to be a substantially better model than a 1-dimensional model. One dimension largely followed the Developmental Model of Intercultural Sensitivity in that ethnocentric and ethnorelative stages were arrayed properly along a continuum. A second dimension differentiates participants into those who endorse Minimization (while not endorsing Reversal) and those who endorse Reversal (while not endorsing Minimization). Given the relative consistency of response patterns in other samples, it was proposed that the profiles derived from ALSCAL would be invariant between the officer and enlisted samples here. This was not found to be the case, with bootstrap estimates of the scale values proving significantly different in each sample. However, the overall pattern of responses was quite consistent between the samples and the mean differences small. There was support for a relationship between the Intercultural Sensitivity Profile with time spent abroad and number of foreign languages after controlling for intercultural efficacy. The level parameter (representing the mean response across worldview scales) was the only significant predictor of intercultural efficacy, which may reflect common method bias. Unexpectedly, mean differences were also found for DIM2 by number of foreign languages and time spent abroad. Contrary to the DMIS, having an 'ethnorelative' profile (Intercultural Sensitivity Profile) does not appear to influence the degree to which students benefit from intercultural training, as theorized by Bennett (1994). Instead, Minimization has a small suppressive effect on change in intercultural learning.



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## Appendix A PAMs Syntax

```
PROXIMITIES Den_reverse Def_reverse Rev_reverse MIn_reverse Acc Ada
/PRINT NONE
/MATRIX OUT('/users/gunthkm/Documents/spssalsc.tmp')
/MEASURE=SEUCLID
/STANDARDIZE=NONE
/VIEW=VARIABLE.
ALSCAL
/MATRIX=IN('/users/gunthkm/Documents/spssalsc.tmp')
/OUTFILE = '/users/gunthkm/Documents/OTSsvalue.sav'
/LEVEL=ORDINAL
/CONDITION=MATRIX
/MODEL=EUCLID
/CRITERIA=CONVERGE(0.001) STRESSMIN(0.005) ITER(30) CUTOFF(0)
DIMENS(2,2).
ERASE FILE='/users/gunthkm/Documents/spssalsc.tmp'.
MATRIX.
GET M
/FILE = '/Users/katiegunther/Dropbox/OTSONLY Dissertation.sav'
/VARIABLES = Den_reverse Def_reverse Rev_reverse MIn_reverse Acc Ada.
GET X
/FILE = '/Users/katiegunther/Dropbox/OTSsvaluetrans.sav'
/VARIABLES = dim1 dim2.
COMPUTE R = NROW(X).
COMPUTE COL = MAKE(R,1,1).
COMPUTE X1 = {X,COL}.
COMPUTE M1 = TRANSPOS(X1)*X1.
COMPUTE M2 = TRANSPOS(X1)*TRANSPOS(M).
COMPUTE W = SOLVE(M1,M2).
COMPUTE TW = TRANSPOS(W).

COMPUTE M1 = TW*TRANSPOS(X1).
COMPUTE K = NCOL(M).
COMPUTE R = NROW(M).
COMPUTE COL = MAKE(1,K,1).
COMPUTE PVAR = RSSQ(M1 - (RSUM(M1)*COL)/K).
COMPUTE VAR = RSSQ(M - (RSUM(M)*COL)/K).
COMPUTE COL = PVAR/VAR.
COMPUTE W = {TW, COL}.
SAVE W
/OUTFILE = '/Users/katiegunther/Dropbox/OTSPAMsweightsDissertationtrans.sav'.
END MATRIX.
```

## Appendix B Confirmatory Factor Analysis

Table B.  
Standardized Regression Coefficients using Maximum Likelihood Estimation.

	Denial	Defense	Reversal	Minimization	Acceptance	Adaptation
Den6	.654					
Den7	.589					
Den2	.554					
Den5	.537					
Den3	.528					
Den4	.524					
Den1	.181					
Def5		.682				
Def2		.655				
Def3		.641				
Def4		.630				
Def6		.531				
Def1		.461				
Rev4			.675			
Rev2			.611			
Rev9			.595			
Rev7			.568			
Rev3			.563			
Rev8			.539			
Rev5			.530			
Rev1			.497			
Rev6			.494			
Min4				.631		
Min3				.529		
Min1				.526		
Min5				.524		
Min6				.476		
Min8				.459		
Min7				.442		
Min9				.398		
Min2				.376		
Acc2					.667	
Acc5					.649	
Acc1					.556	
Acc3					.532	
Acc4					.493	

Ada7	.621
Ada4	.611
Ada9	.586
Ada8	.583
Ada3	.552
Ada2	.496
Ada5	.470
Ada6	.368
Ada1	.315

---

## Appendix C Response Patterns of the IDI

Table C.  
Response Patterns Present in the Total Military Sample (N = 904).

	#	%
Single Endorsed Stage		
Denial (1)	2	0.22%
Defense (2a)	1	0.11%
Reversal (2b)	2	0.22%
Minimization (3)	84	9.29%
Acceptance (4)	85	9.40%
Adaptation (5)	31	3.43%
Encap. Marginality (6)	10	1.11%
Subtotal	215	23.78%
Adjacent Stages Endorsed		
Den/Def (1/2a)	1	0.11%
Def/Min/Acc (2/3/4)	2	0.22%
Rev/Min/Acc (2b/3/4)	6	0.66%
Def/Min (2/3)	4	0.44%
Rev/Min (2b/3)*	6	0.66%
Min/Acc (3/4)	95	10.51%
Min/Acc/Adap (3/4/5)	187	20.69%
Acc/Adap (4/5)	107	11.84%
Acc/Adap/EM (4/5/6)	4	0.44%
Ada/EM (5/6)	1	0.11%
Subtotal	413	45.69%
<b>Allowable Response Subtotal</b>	<b>628</b>	<b>69.47%</b>
Errors		
Non-adjacent worldviews endorsed		
Skip Def & Rev	5	0.55%
Skip Def & Rev & Min	4	0.44%
Skip Rev & Min	3	0.33%
Skip Def & Min	1	0.11%
Skip Min	20	2.21%
Skip Min & Ada	1	0.11%
Skip Def & Rev & Acc	1	0.11%
Skip Def & Rev & Ada	1	0.11%
Skip Acc	38	4.20%
Skip Acc & Ada	12	1.33%
Skip Ada	16	1.77%
More than 3 stages endorsed	51	5.64%
No stages endorsed >.50	118	13.05%
All stages endorsed >.50	5	0.55%
<b>Error Subtotal</b>	<b>276</b>	<b>30.53%</b>
Total	904	100.00%

*Note.* A stage was considered endorsed if greater than 50% of the stage items received a 4 (agree) or 5 (strongly agree) endorsement. \*Since Reversal is an alternate form of Defense, it was considered allowable for it to have adjacent endorsements with both Denial and Minimization.