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The Multidimensional Measure of Internalized HIV Stigma in English and Spanish: Measurement Invariance and other Psychometric Properties

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THE MULTIDIMENSIONAL MEASURE OF INTERNALIZED HIV STIGMA IN ENGLISH AND SPANISH: MEASUREMENT INVARIANCE AND OTHER PSYCHOMETRIC PROPERTIES

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For Levi, my greatest support.

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ABSTRACT

Efforts to increase the quality of life of people living with HIV/AIDS (PLWHA) as well as prevention efforts have recently focused on HIV-related stigma. Sayles et al. (2008) developed the Multidimensional Measure or Internalized HIV Stigma (MMIHS), a measure of HIV-related stigma that is sensitive to minorities, women, and people with limited income. This study evaluated the four-factor structure presented by Sayles et al. (2008) on data collected from 269 HIV-positive individuals, and also validated a Spanish translation of the measure using a measurement invariance method. In addition to stigma, this study also collected information regarding depressive symptoms, HIV disclosure, attitudes towards disclosure and perceived social support. Concurrent validity was assessed by correlating the MMIHS with a measure of depression and yielded a significant and positive relationship in both languages. The fourth factor proposed by Sayles et al. (2008) was not identified in this sample in either language. The proposed four-factor structure was found to be a good fit for the Spanish group and a slightly bad fit for the English one. The Spanish version of the MMIHS was found invariant to the original English version.

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INTRODUCTION

The Multidimensional Measure of Internalized HIV Stigma in English and Spanish: Measurement Invariance and Other Psychometric Properties

It is estimated that there are 1.1 million people in the United States currently living with HIV/AIDS (CDC, 2011). This situation has launched a series of programs dedicated to the prevention of further cases, as well as the improvement of care for people currently living with HIV/AIDS (National HIV/AIDS Strategy, 2010). Although it is reported that the number of new cases per year has remained stable, this number is still estimated to be a staggering 48,200 to 64,500 (CDC, 2011). Furthermore, HIV/AIDS has been reported to affect Latinos at a startling rate. In their 2011 Health Disparities and Inequalities Report, the Centers for Disease Control (CDC) reported that new infections for Latinos are 2 times higher than those of non-Hispanic Whites.

Efforts to enhance care and improve the lives of people living with HIV and AIDS (PLWHA) have precipitated research about the factors related to wellbeing as well as efforts to prevent further cases. It has been shown that PLWHA experience stigma due to their diagnosis (Herek & Glunt, 1988). Furthermore, stigma has been known to be associated with reduced disclosure of diagnosis, especially in the case of Latinos (Clark, Lindner, Armistead, & Austin, 2003; Zea, Reisen, Poppen, Echeverry, & Bianchi, 2004). Lower reports of disclosure have also been associated with higher reports of depression among PLWHA (Zea, Reisen, Poppen, Bianchi, & Echeverry, 2005). Therefore, in order to offer effective interventions for this population, Gonzales, Hendriksen, Collins, Duran, and Safren (2009) suggested that the intervention should be culturally sensitive for PLWHA by

addressing HIV treatment adherence, psychological distress such as depression, substance use, health literacy, and access to care to improve health outcomes.

In the realm of HIV prevention, there has been a shift from prevention efforts focused on changing the behavior of HIV-negative individuals to preventing PLWHA from participating in risky behaviors that can lead to further transmission of the virus (CDC, 2011; National HIV/AIDS Strategy, 2010). One way to reduce further cases of HIV is to encourage the disclosure of serostatus of PLWHA (Simbayi et al., 2007). However, as mentioned above, stigma can lead to less disclosure and more transmission of the virus (Clark et al., 2003). It has also been found that 2 out of 3 men fear getting tested for HIV because of fear of being stereotyped as gay or drug users if they are positive (Herek & Glunt, 1988; Stall et al., 1996). This negative stereotype and further evidence suggest that stigma is a relevant factor in the health and lives of PLWHA.

HIV-Related Stigma

Stigma in PLWHA has been known to be associated with more depressive symptoms as well as HIV symptoms (Sowell et al., 1997), lower adherence (Rintamaki, Davic, Skripkauskas, Bennet, & Wolf, 2006; Stirratt et al., 2006; Vanable, Carey, Blair, and Littlewood, 2006), and poor access to medical health care (Kinsler, Wong, Sayles, Davis, and Cunningham, 2007). Thus, it is possible that interventions targeting HIV-related stigma could address both the issues of prevention and improvement of care for PLWHA.

The definition of stigma that is most used in the literature is based on the work of Goffman (1963) which defines internalized stigma as something that occurs when an individual internalizes cultural stereotypes and attitudes that identifies them as a member

of a deviant group, therefore assuming a spoiled identity. Stigma can also be described as a "mark of shame" for an individual or group. However, it is important to focus on the situations or relationships in which this mark is perceived as shameful (Earnshaw & Chaudoir, 2009; Goffman, 1993; Herek & Glunt, 1988). This definition of stigma makes it evident that social groups, as well as individuals, experience stigma in different ways (Sayles et al., 2008). It is because of this complexity that measuring stigma requires careful consideration of all relevant factors.

Herek and Glunt (1988) suggested that stigma is deeply rooted in society, which means that it is a social reaction to the HIV epidemic and those who suffer from it. Their work proposed two distinct sources of AIDS-related stigma. First, there is a reaction to the fact that HIV is an incurable, progressive, and transmissible illness that can cause death. This anxiety towards death leads people to fear those who are infected because they are seen as presenting risk of contagion. It is also hypothesized that some people may not know how HIV is contracted, so they prefer to avoid contact with those who are living with HIV completely.

Second, HIV/AIDS have been strongly associated with already stigmatized groups such as gay men, intravenous drug users (IDU), and others. This association leads to the transfer of the negative reactions that already existed towards marginalized groups to PLWHA. This layering with pre-existing stigma can exacerbate the situation of PLWHA. For example, an HIV-positive diagnosis may lead to the disclosure of a gay man's sexual orientation to others (Herek & Glunt, 1988). HIV is related not only to stigmatized groups, but also to corresponding risky behaviors that are already stigmatized, such as men having

sex with men or drug use. These existing negative stereotypes lead to the belief that people who are HIV-positive should be blamed for their infection (Herek & Glunt, 1988).

In order to better understand stigma, it is important to look at the individual conceptualization as well as the societal one. At the individual level there are processes of stigma that drive the way that stigma is experienced or adopted by persons. Earnshaw and Chaudoir (2009) proposed the mechanisms of stigma for both the person who is stigmatized and the person who stigmatizes. For those who stigmatize, the mechanisms are prejudice, stereotypes, and discrimination, with outcomes such as increased social distancing, decreased willingness to be tested for HIV, and decreased likeliness to support policy on HIV. For those who are stigmatized, the mechanisms are enacted, anticipated, and internalized stigma, with negative outcomes on mental health, social support, and HIV symptoms (Earnshaw & Chaudoir, 2009).

The study of stigma mechanisms among PLWHA can help predict their outcomes. "Enacted stigma" is how much PLWHA perceive they have experienced prejudice and discrimination, and it has been associated with psychological distress and poor health (Aggleton & Parker, 2002). "Anticipated stigma" is how much a person expects to experience prejudice and discrimination in the future, and it has been linked to non-disclosure of HIV-positive status (Derlega, Winstead, Geene, Serovich, & Elwood, 2004). "Internalized stigma" is how much PLWHA accept negative beliefs and feelings about themselves, and it has been associated with poor mental health (Mak, Poon, Pun, & Cheung, 2007). According to this model of stigma, it is possible to measure the mechanisms of stigma in an individual and predict outcomes.

Internalized stigma has been the focus of much research in the past few years. Internalized stigma has been described as assuming a "spoiled identity," or internalizing the cultural norms that identify a person as a member of a deviant group (Goffman, 1963; Sayles et al., 2008). It has also been called "self-stigma" in the literature and described as triggering negative attitudes towards the self (Herek, Gillis, & Cogan, 2009). All of these definitions conclude that internalized stigma occurs when individuals accept the negative view of the society toward them and integrate it into their view of themselves. As stated above, this type of stigma has been associated with poor mental health, therefore making it a relevant focus of study.

Measurement of Stigma

Earnshaw and Chaudoir (2009) proposed that the measurement of stigma should focus on three key components in order to avoid the inconsistency seen in the past regarding the conceptualization of stigma. The three concepts are: the measure target (stigmatized group member or not), the three mechanisms of stigma (enacted, anticipated, and internalized), and what the measure predicts. A majority of HIV stigma measures in the past have targeted HIV-negative people, though recently there has been a move to target PLWHA also. The mechanisms of stigma have been measured by using specific questions. Internalized stigma items include questions such as "being HIV positive makes me feel dirty" (Simbayi et al., 2007). For enacted stigma items include statements such as ''I feel some friends have rejected me because of my illness'' (Fife & Wright, 2000). Anticipated stigma is measured by items like "most employers would not employ me because I am HIV+" (Visser, Kershaw, Maskin, & Forsyth, 2008).

Multidimensional Measure of Internalized HIV Stigma

An appropriate measure of stigma in PLWHA needs to be sensitive to issues frequently relevant to PLWHA. These include issues of ethnicity, SES, sexual orientation, and education level, as well whether or not the individual is a parent (Sayles et al., 2008). In 2008, Sayles and colleagues published a measure of stigma for PLWHA. This measure was developed based on data collected from focus groups, interviews, and previous research. The sample of 202 HIV-positive adults used for standardization included women, minorities, and people with limited income.

Based on the data from the focus groups, four domains of "internalized" stigma were identified: (1) confronting blame and stereotypes, (2) encountering fear of contagion, (3) renegotiating disclosure of stigmatized role, and (4) renegotiating social relationships. These observed factors were then used to develop the original 78 items for the measure. Ten cognitive interviews were used to determine any issues with the wording and meaning of the questions, based upon which 26 items were eliminated. The 52 items left were given in a survey to the sample, and these data were used for an exploratory factor analysis.

Based on the eigenvalues and the scree plot from the exploratory factor analysis using principal components, four underlying factors were identified. An oblique rotation of the four factors demonstrated that the first three factors were composed of items from the first three hypothesized domains. However, the domains "social relationships" and "fear of contagion" collapsed into the third factor. The fourth (not hypothesized) factor included items related to comfort with HIV diagnosis and was therefore labeled "self-acceptance."

Standardized regression coefficients showed that each factor made unique variance contributions to the overall construct of HIV stigma. Each item loading was greater than .30 and each item loaded on only one of the factors. Twelve items loaded on the first factor, 5 items loaded on the second factor, 7 items loaded on the third factor, and 4 items loaded on the fourth factor (Sayles et al., 2008).

Although the measure's name indicates that it measures internalized stigma, the MMIHS measures other stigma mechanisms as well. In their stigma measure review, Earnshaw and Chaudoir (2009) noted that the MMIHS measured all three of their recommended mechanisms of stigma. According to their review on the content of stigma measures, the first factor measures enacted stigma, the third factor measures both enacted and anticipated stigma, and the fourth factor measures internalized stigma (Earnshaw & Chaudoir, 2009).

Hypotheses

The primary goal of this study is to examine the psychometric properties of the MMIHS Spanish translation. Given that Latinos are one of the groups that are disproportionately burdened by HIV/AIDS, it is important to have a measure of HIV-related stigma readily available in Spanish. The English language skills of the Latino population in the U.S. are highly variable, and it is often necessary to collect data in both English and Spanish from different members of the same sample. Therefore, it is vital to understand the measurement equivalence of the original instrument and its translation. This issue is especially important when studying correlates that may covary or be confounded with language skill, such as acculturation or education. The secondary goal of the current study

is to replicate the factor structure of the MMIHS measure. Sayles et al. (2008) found a four-factor structure in this measure using exploratory factor analysis, and for the current study the investigator analyzed the data collected to assess the four-factor structure.

H1. There will be a positive and significant association between depressive symptoms measured by the BDI and internalized HIV stigma scores from the MMIHS.

H2. Confirmatory factor analysis will show the four-factor structure identified by Sayles et al. (2008) to be a good fit for the data from the current sample.

H3. The latent means of the MMIHS will be the same across both the Spanish and English groups.

METHOD

Participants and Recruitment Strategy

All participants were recruited from Centro de Salud Familiar la Fe CARE Center in El Paso, Texas. La Fe CARE center is a community clinic that provides services to HIV-positive patients. This sample was recruited as part of a larger study approved by the Institutional Review Boards from both the University of Washington and UTEP.

Participants were recruited by using flyers, posters, and handouts that were available in the lobby of La Fe CARE Center. Participants were also recruited by staff at the clinic, who were financially compensated with five dollars per patient referred to recruitment. Inclusion criteria for the study required participants to be at least 18 years of age, HIV positive, and to have been on HIV medications for at least one month. The sample consisted of both English and Spanish speakers of varying degrees of fluency.

Procedure

Individuals interested in participating in the study filled out an information slip. Qualified individuals were contacted to schedule a time to complete the survey. Participants were offered refreshments when they arrived at the office. During the session, the door was closed to maintain confidentiality. The measures were given in English or Spanish. Therefore, each person was asked before participation in which language they were dominant, or which one they preferred. The research assistants first provided the participants with a copy of the consent form and covered the main sections regarding confidentiality. After consent, the research assistant interviewed the participant and completed the initial part of the survey. The initial interview gathered information

concerning the participant's demographics, sexual orientation, drug use, and disclosure information. After the initial interview, participants continued to complete the rest of the measures on their own. One limitation of the survey is that all the measures were given in the same order to all participants; therefore this study could not control for any potential order effects. The entire survey took an average of one hour to one and one-half hours to complete, after which the participants were compensated for their participation with twenty dollars.

Measures

Demographics. Data were collected on demographic information in the survey packet. Participants were asked to report their date of birth, gender, employment status, and date of first HIV diagnosis, along with other information. Demographic questions were delivered in interview form to the participants, along with other measures.

HIV-Related Stigma. Data were collected using the Multidimensional Measure of Internalized HIV Stigma developed by Sayles et al. (2008) and described above. The measure was given to the participants in a survey packet to be completed on their own, together with other measures. The measure consists of 28 items to which responses are given on a 5-point Likert-type scale with the following options: "none of the time," "a little of the time," "some of the time," "most of the time," or "all of the time." Some of the items are reverse-scored. To get the total score, a weighted average is calculated for each of the four subscales and then summed together. Total scores are linearly transformed to a 0-100 range by multiplying the added averages by 5. Lower scores indicate fewer perceptions and experiences of internalized stigma, and higher scores indicate higher levels of stigma. The

measure has shown good internal consistency, α=.93 (Sayles et al., 2008). Construct validity is also good, with significant Pearson product-moment correlations with constructs such as shame (r = .58, p <.01), social support (r = -.43, p < .01), and mental health (r = -.50, p < .01).

MMIHS Translation. For the present study, a committee that consisted of two certified English-Spanish translators, two bilingual content experts, and two monolingual English content experts was involved in the translation of the MMIHS. First, a certified translator translated the measure into Mexican Spanish appropriate to the U.S.-Mexico border region. Then, a second certified translator who was blind to the original measure content back-translated the measure into English. Afterward, several committee meetings were held to resolve issues with the back translation and content of the measure by consensus.

Beck Depression Inventory. Depressive symptoms were measured using the BDI-1A, which is a revised version of the original BDI developed in 1961 by Beck, Ward, Mendelson, Mock, and Erbaugh (Beck, Rush, Shaw, & Emery, 1979; Beck & Steer, 1993). The self-report measure consists of 21 multiple-choice items that measure depressive symptoms over the past week. Items represent cognitive, affective, and somatic symptoms of depression. The cognitive and affective items ask the participant about feelings of sadness, hopelessness, worthlessness, and guilt. The somatic items ask about loss of appetite, disturbances in sleep, fatigue, and loss of energy. Each item is rated from 0-3 in terms of intensity. The measure is scored by adding the ratings from all the items (Beck, Steer, & Garbin, 1988). Scores can range from 0 to 63. The instrument has demonstrated

adequate internal consistency, with a mean α=.86 for psychiatric populations and α=.81 with non-psychiatric populations (Beck et al., 1988). It was also found that the BDI has good stability over time, and concurrent validity with a number of other depression inventories (Beck et al., 1988).

The Spanish translation of the BDI-IA has shown similar psychometric properties to the English counterpart. The translated measure has shown internal reliability ranging from .83 to .88 (Bonicatto, Dew, & Soria, 1998; Sanz & Vazquez, 1998; Vazquez & Sanz, 1997). The Spanish translation has also shown convergent validity with other depression inventories (Bonicatto et al., 1998).

Disclosure. Disclosure was measured by the HIV Disclosure Scale developed by Duran (1998). This measure, delivered in interview form, asks participants to report to how many individuals they have disclosed their HIV diagnosis from a list of 11 potential targets. The targets include: main partners, mother, father, children, brothers, sisters, aunts, uncles, cousins, close friends, and casual sex partners. In the original measure by Duran (1998), the last target group was romantic/sex partners. This last group was divided into casual sex partners and main partners for the purposes of the current study. Each participant is asked how many individuals belong to each group, and then to how many of them have they disclosed. The total score for the measure is a ratio of total people who have been disclosed and the total number of people in the targeted groups.

Attitudes. The attitude scale developed by Crites, Fabrigar, and Petty (1994) was used to measure participants' attitudes towards disclosure of their HIV diagnosis. This measure was developed to be flexible to measure overall attitudes, affectively-based

attitudes, and cognitive attitudes about any topic. It also allows measurement of attitudes towards disclosing to different target groups such as family, friends, main partners, and casual sex partners. The scale is divided into three sections: general (good or bad), affectively-based (annoyed, tense, or disgusted), and cognitive attitudes (wise, beneficial, or healthy). Each statement asked the participant to indicate where in the spectrum between the two choices they fall in regarding that targeted group. For example, the statement "please indicate your attitude toward disclosing your HIV serostatus to a romantic partner" will be followed by two anchors on a continuum (Wise __ __ __ __ __ Foolish). The participant would then indicate which anchor matched their attitude. The middle of the spectrum indicated a neutral response between the anchors. Each of the three scales for this measure have exhibited high reliability (α = .95 for general, α = .94 for affective, and α = .91 for cognitive).

Social Support. Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet, Dahlem, Zimet, and Farley (1988). The measure is a brief self-report that measures subjective social support. The MSPSS has three subscales labeled Family, Friends, and Significant Other. There are 12 items, and responses are recorded on a 7 point Likert-type scale with anchors ranging from *strongly disagree* (1) to *strongly disagree* (7). The three-factor structure has been confirmed (Zimet et al., 1988 : Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Reliability has been reported to be good, with Cronbach's α ranging from .85 to 91 for the three subscales and the measure as a whole in a sample of college undergraduates (Zimet et al., 1988). In a following study with a more diverse population including pregnant women, students, and

pediatric patients, reliability was also found to be good for the subscales and measure as a whole (α ranging from .81 to .98; Zimet et al., 1990).

Data Analysis

Power Analysis. A power analysis was conducted to identify the minimum sample size required to conduct confirmatory factor analysis. The analysis was conducted using the online utilities provided by Preacher & Coffman (2006). Desired power was set at β=.90, significance was set at α=.05, null RMSEA was set at .05, and alternative RMSEA was set at .01. Based on these specifications, the minimum sample size required was 106 participants. Since confirmatory factor analysis will be comparing the English and Spanish groups, 106 participants are needed per group. This analysis provides a minimum requirement for sample size, and does not account for the use of non-normal data. The data collected were found to be non-normal and therefore a larger sample size is necessary for this study. This limitation was addressed by using a parceling method to conduction CFA and measurement invariance.

Parceling Method. Due to limitations in sample size, parceling was used to analyze the data. Item parceling refers to using the sum or average of several items assumed to be conceptually similar as an observed variable or indicator of a latent variable (Bandalos, 2002). In a recent review, it was found that 19.6% of SEM or CFA studies employed the use of parcels in their analyses. The use of item parceling can be beneficial to reduce standard errors of estimated factor structure from small samples, and has been shown to have negligible effects on parameter bias (Nasser & Wisenbaker, 2006). Researchers from the fields of psychology and educational testing have suggested that using item parcels in

confirmatory factor analysis and structural equation modeling (SEM) addresses issues with non-normal data, large sample size requirements, and unreliability (Bandalos, 2002; Nasser & Takahashi, 2003; Nasser & Wisenbaker, 2006; Thompson & Melancon, 1996). Furthermore, the combination of items into parcels can lead to more stability of parameter estimates.

Item parceling reduces the number of parameters to be estimated, without having an impact on the number of items of the MMIHS (Thompson & Melancon, 1996). Reducing the number of parameters to be estimated will be useful to deal with the ratio between sample size and number of items. In order to avoid bias in the creation of parcels, the items to be included in one parcel must be unidimensional or conceptually similar (Bandalos, 2002). It is therefore recommended that exploratory factor analysis be used to identify items that load on one factor before they are averaged into a parcel (Yuan, Bentler, & Kano, 1997).

The current study based the parcel formation on the EFA conducted by Sayles et al. (2008) on the MMIHS. Based on the item pattern matrix, items that loaded on the same factor were combined to create a parcel corresponding to that factor. There were a total of nine parcels created from the items of the MMIHS (shown in Table 1). The number of items per parcel ranged from 2 to 4 items. The first factor, labeled "Stereotypes," was divided into three parcels of four items each. The second factor, labeled "Disclosure," was divided into two parcels of two and three items respectively. The third factor, labeled "Social Relationships," was divided into two parcels of three and four items. Lastly, the fourth factor, labeled "Self-acceptance," was divided into two parcels of two items each. Each

parcel was then formed from items that are conceptually similar, and have been found to load on the same factor.

It has also been shown in the literature that the particular results from analysis using parcels are dependent upon the combination of items that make up a parcel (Sterba & MacCallum, 2010). That is, it is possible that results will vary depending on the items that make up a parcel, and differences could be expected if the parcels had been formed in a different item combination. This limitation of the parceling method could be addressed in future studies by methods developed by Sterba and MacCallum (2010), which simulate the outcome of different item combinations to use parcels.

Meade and Kroustalis (2006) reported that there are limitations concerning the use of parceling strategies in the testing of measurement invariance. They found that the use of parcels may mask lack of invariance in a measure, and they recommended individual items be used for this analysis. However, due to the sample size restrictions of the current study, the use of parcels is necessary to increase reliability and communality. Researchers in the field have recommended that when parcels need to be used for conducting measurement invariance analyses two things must be kept in mind: 1) the structural aspects of the measure are the primary focus for the analysis and not the measurement properties, and 2) the parcels to be used must be created from items that are unidimensional (Bandalos & Finney, 2001; Meade & Kroustalis, 2006). For the current study, parcels were used in the measurement invariance analysis as a way to establish the structural invariance of the English and Spanish versions of the MMIHS.

Table 1
Item-Parcel distribution

Factor	Parcel	Item	Factor	Parcel	Item
1. Stereotypes	IA	1		2C	15
		2			16
		3			17
		4	3. Social Relationships	3A	18
	1B	5			19
		6			20
		7		3B	21
		8			22
	1C	9			23
		10			24
		11	4. Self-Acceptance	4A	25
		12			26
2. Disclosure	2A	13		4B	27
		14			28

Factor Structure. The current study tested the factorial structure of the MMIHS using confirmatory factor analysis. Sayles et al. (2008) reported a factor structure consisting of 28 items loading on four factors. Confirmatory factor analysis (CFA) was used on the variance-covariance matrix and means of the parcels created from the items of the measure to compare against the proposed model. The investigator used the software package LISREL (Jöreskog & Sörbom, 2006) to conduct the CFA analysis using the maximum likelihood estimation method. Before conducting a CFA analysis, the investigator tested the assumption of normality in the data by testing for kurtosis and skewness of the items. The results from the analysis were used to derive fit statistics, which indicated how well the proposed model fit the data collected.

Three different indices of fit were considered to assess the proposed model. The comparison fit index (CFI) and the non-normed fit index (NNFI) were used to compare the proposed model's absolute fit to that of a baseline, or null, model. The third fit index that was used is the root mean square error of approximation (RMSEA), which takes into account the complexity of the model and sample size. According to current rules, CFIs above .95, NNFIs above .95, and RMSEAs below .06 are considered to indicate a good fit of the model to the data (Bentler, 1990; Hu & Bentler, 1999).

Reliability. The current study assessed the reliability of each factor for both the Spanish and English samples. McDonald's ω and Cronbach's α were used as indices of reliability to assess the internal consistency among the items of each factor. Coefficient ω expresses the ratio of the variance due to the common factor between items and the total variance of Y (McDonald, 1999). Analysis of reliability were conducted for the English and

Spanish samples. Reliability indices of ω and α larger than or equal to .90 and .70 respectively were considered to show appropriate reliability (Nunnally & Bernstein, 1994).

Construct Validity. In order to assess construct validity, the total scores of the MMIHS were correlated with the BDI scores of the sample. As mentioned earlier, it is expected that there is a positive relationship between the internalized stigma scores and depression scores. Validity was established for the English and the Spanish version of the MMIHS.

Convergent and Divergent Validity. Each of the four factors from the MMIHS were analyzed for convergent and divergent validity using Pearson Product-Moment Correlations. The investigator used measures given to the participant sample for the concepts of disclosure, social support, and health care satisfaction. It was theorized that the second factor, labeled "Disclosure," would be more highly correlated with measures of disclosure than with the other measures, and that actual disclosure would correlate more strongly with the second factor than with other factors. The third factor, labeled "Social Relationships," was theorized to have a significant correlation with scores on the social support measure.

Measurement Invariance. This study examined the Spanish translation of the MMIHS to assess if it is invariant from the English version. It is important to establish measurement invariance in order to be able to attribute observed group differences to actual differences in the groups and not to a bias in the measure. If the measure is found to be biased, it would mean that two participants with equal amounts of internalized stigma would score differently in the measure only because of the language of the measure they completed (Holland & Wainer, 1993). Measurement invariance determines if the factor

structure is equivalent between the two versions of the MMIHS by testing the fit of several increasingly restrictive models to the data through CFA. Measurement invariance was tested by following steps using statistical software LISREL (Jöreskog & Sörbom, 2006):

1. ***Configural Invariance.*** Configural invariance was tested by fitting a model to the data that assumes that both versions of the MMIHS have equal factor loading patterns. An identical pattern of loadings would mean that each parcel in the measure loads in the same factor across groups. This model was assessed according to the RMSEA, CFI, and NNFI indices of fit. If the model is found to be parsimonious and a good fit for the data, analysis advances to the next step.
2. ***Metric Invariance.*** Metric invariance, also called weak invariance, was tested by fitting a more restrictive model to the data. This model assumes that loadings are identical across groups. This assumption estimates only one loading per parcel across both groups, and therefore has fewer degrees of freedom. The model was assessed for goodness of fit like the previous model. Weak invariance is established if this second and more restrictive model also provides a good fit for the data and is found to be more parsimonious according to the change in CFI. It has been recommended that if CFIΔ is larger than .01 in favor or the less restrictive model, the model with more restrictions should be rejected (Cheung & Rensvold, 2002). If metric invariance is found, analysis move on to strong invariance.
3. ***Scalar Invariance.*** Scalar invariance, also called strong invariance, assesses if the latent intercepts vary across the versions of the MMIHS. A third, even more restrictive model, assumes that the intercepts are invariant across groups. In order

to establish strong invariance, this model needs to be found to be a good fit of the data according to the fit indices mentioned above.

Latent Means Analysis. After measurement invariance was examined, this study compared latent means across groups by performing a latent means analysis (LMA). This technique examined the hypotheses related to the latent construct of internalized HIV-related stigma instead of the variables measured by the MMIHS. This method is preferred to avoid measurement error. LMA was used to assess differences between the groups based on structural equation modeling (SEM). By comparing latent means we can evaluate if the Spanish version group varies from the group that took the measure in English. If a difference is found, it may be attributed to actual differences in the groups on internalized stigma.

Effect Size of Latent Means. Cohen's *d* was calculated to estimate the size of the difference between the latent means of the two groups. Cohen's *d* represents the difference between means divided by a pooled standard deviation for those means. Cohen (1988) proposed arbitrary guidelines for the classification of effect sizes: $d = .20$ is considered "small," $d = .50$ is considered "medium," and $d = .80$ is considered "large." Since these guidelines are considered to be arbitrary, it is always important to place effect size in relevant context. In a recent study, it was suggested that a $d = .09$ is clinically significant in regards to stigma change (Hosek, Lemos, Harper, & Telander, 2011).

RESULTS

Demographics

A total of 269 participants were recruited for this study, of which 48.3% (n= 130) took the survey in English and 51.7% (n=139) in Spanish. There were 21.3% (n= 57) females and 78.7% (n= 211) males in this sample. The participants' ages ranged from 19 to 73 years with a mean age of 47.5 and a standard deviation of 10.2. Participants reported a mean of 11.3 years since their first HIV-positive diagnosis, with a standard deviation of 7.0 years. The majority of the sample, 81.3 % (n= 218), reported being of Mexican descent. Regarding employment, 11.2% (n=30) of participants reported working full-time and an equal amount reported working part-time, 15.7% (n= 42) reported working odd jobs, and 61.9% (n= 166) reported being unemployed. Table 2 shows the demographic information separately for the English and the Spanish samples to show a comparison of the groups.

Table 2

Demographics by language (N=269)

	English (n=130)					Spanish (n=139)					*t*	χ^2(df)	
Variable	n (%)		*M* (SD)	*Mdn*	Range	n (%)		*M* (SD)	*Mdn*	Range		Eng.	Spa.
Gender												208.33	134.43
Female	26	(20.2)				28	(20.1)					(3)**	(2)**
Male	101	(78.3)				109	(78.4)						
Transgender (Male to Female)	1	(.8)				2	(1.4)						
Transgender (Female to Male)	1	(.8)				0	(0)						
Ethnicity												14.33	112.41
Mexican Descent	86	(66.7)				132	(95.0)					(1)**	(1)**
Other	43	(33.3)				7	(5.0)						
Employment												116.05	84.17
Full-time	10	(7.8)				20	(14.4)					(3)**	(3)**
Part-time	17	(13.2)				13	(9.4)						
Odd-jobs	17	(13.2)				25	(18.0)						
Unemployed	85	(65.9)				81	(58.3)						
Marital Status												45.13	40.47
None	102	(79.7)				107	(77.0)					(1)**	(1)**
Spouse/Partner	26	(20.3)				32	(23.0)						
Age (year)			47	(9.8)	48	19 – 73			47.9	(10.6)	49	27 – 73	-.69
Years since Dx			12.3	(7.9)	11	1 – 56			10.4	(6.0)	10	1 – 29	2.17*
BDI			15.4	(11.3)	12	0 – 45			10.8	(9.1)	9	0 – 43	3.53*
MMIHS			53.6	(17.2)	49.3	23.8– 94.5			52.4	(15.5)	51.2	20 – 91.9	.61

* *t* test was significant .05 level, two tailed

** *t* test was significant at the .01 level, two tailed

Reliability

Indices of reliability were calculated for the items of each factor on each language. For the English sample, the first two factors showed good internal consistency (α= .91, 12 items; α= .95, 5 items). Factor 3 had lower internal consistency (α= .88, 7 items), and Factor 4 had poor internal consistency (α= . 43, 4 items). Regarding reliability, factors 1 and 2 showed good reliability (ω= .91 and ω= .95 respectively), factor 3 had lower reliability (ω= .88), and factor 4 had poor reliability (ω= .50).

The Spanish sample showed a similar pattern to the English sample. The first two factors showed good internal consistency (α = .92, 12 items; α= .95, 5 items). Factor 3 had lower, but still acceptable internal consistency (α= .87, 7 items), and Factor 4 had poor internal consistency (α= .49, 4 items). The same pattern was seen regarding the reliability index coefficient ω. Factors 1 and 2 exhibited appropriate reliability (ω= .92 and ω= .95 respectively). Factor 3 had lower reliability (ω= .88), and factor 4 had poor reliability (ω= .49).

Factorial Structure of the MMIHS

English MMIHS. A multivariate analysis of normality in continuous variables found that the data exhibit both skewness and kurtosis. The test for multivariate normality had significant results for skewness (12.698, z = 5.1, p < .01), kurtosis (10.446, z = 3.39, p < .01), and skewness and kurtosis (χ^2 = 37.02, p <.01). An asymptotic variance/covariance was used to conduct CFA. Also, the Satorra-Bentler Scaled χ^2 statistic was used, following the recommendations for non-normal data

(Satorra & Bentler, 1994). The CFA for this group showed that the model did not fit the English sample as well as the Spanish sample. Goodness-of-fit statistics for this group were Satorra-Bentler Scaled χ^2 (21) = 38.357 (p = .01), CFI = .963, NNFI = .935, and RMSEA = .08 (90 % C.I. = 0.04, 0.12). The RMSEA and NNFI indices of fit for this sample were not adequate, indicating that the model is not a good fit for the data.

Spanish MMIHS. Similar to the data from the English MMIHS, the Spanish sample tested positive for non-normal data. The data had significant results in the tests of skewness (18.175, z = 10.024, p < .01), kurtosis (21.734, z = 5.902, p < .01), and skewness and kurtosis (χ^2 = 135.319, p < .01). These results show that the data collected are non-normal. Just like with the English sample data, an asymptotic variance/covariance matrix was used to conduct CFA with non-normal data. The CFA analysis showed the model was a good fit for the data. The fit statistics for this model were Satorra-Bentler Scaled χ^2 (21) = 24.562 (p = .26), CFI = .981, NNFI = .967, and RMSEA = .035 (90 % C.I. = 0.0, 0.08).

Exploratory Factor Analysis. An EFA was performed on the MMIHS to explore the structure of the measure. Principal Components Analysis was used as the extraction method and the Promax rotation method was used to allow the factors to correlate. These specifications were identical to the ones reported by Sayles et al. (2008). Table 3 reports the standardized regression coefficients of the four-factor solution.

Most of the items from the first three hypothesized factors consistently loaded as anticipated. The items from the fourth factor, labeled “Self-acceptance,”

however, loaded on different factors. Items 25, 26, and 28 all loaded on the Disclosure factor with loadings ranging from 0.468 – 0.835. Item 27 loaded on Factor 3 with a loading of 0.730.

Other discrepancies found between the current analysis and the one presented by Sayles et al. (2008) were that two items from the hypothesized Stereotypes factor and two items from the hypothesized Social Relationships factor loaded highly on the fourth factor. Upon inspection of the items that loaded highly with the fourth factor, most were items pertaining to stigma conveyed by health care professionals. For example, Item 10 states "Medical providers assume people with HIV sleep around," and item 18 states "Nurses and doctors treat people who have HIV as if they are contagious."

Table 3

Four-factor pattern matrix (standardized regression coefficients) for MMIHS

Items		Factor			
		1	2	3	4
Factor 1. Stereotypes					
1.	HIV is different than other diseases like cancer because people with HIV are judged	.75			-.33
2.	People assume I have done something bad to get HIV	.80			
3.	Society looks down on people who have HIV	.78			
4.	People think that if you have HIV then you got what you deserve	.43			
5.	People blame me for having HIV	.65			.37
6.	People assume I slept around because I have HIV	.73			
7.	People think that if you have HIV you do not deserve to have children	.74			
8.	People are afraid to let someone with HIV adopt a child	.69			
9.	People think I am a bad person because I have HIV				
10.	Medical providers assume people with HIV slept around				.67
11.	People lose their jobs because they have HIV				.46
12.	People think you can't be a good parent if you have HIV	.47			
Factor 2. Disclosure concerns					
13.	I am concerned if I go to the HIV clinic someone I know might see me		.73		
14.	I am concerned if I have physical changes from the HIV medicines people will know I have HIV		.66		
15.	I am concerned if I go to an AIDS organization someone I know might see me		.73		
16.	I am concerned people will find out I have HIV by looking at my medical paperwork		.80		
17.	I am concerned that if I am sick people I know will find about my HIV		.71		
Factor 3. Social relationships					
18.	Nurses and doctors treat people who have HIV as if they are contagious				.91
19.	Nurses and doctors dislike caring for patients with HIV				.95
20.	I feel abandoned by family members because I have HIV			.91	
21.	People treat me as less than human now that I have HIV			.85	
22.	People avoid me because I have HIV			.76	

23.	People I am close to are afraid they will catch HIV from me		.68	
24.	I feel like I am an outsider because I have HIV		.49	
Factor 4. Self-acceptance				
25.	I feel ashamed to tell other people that I have HIV	.84		
26.	I am comfortable telling everyone I know that I have HIV	.47		-.42
27.	My family is comfortable talking about my HIV		.73	-.52
28.	It is important for a person to keep HIV a secret from co-workers.	.70	-.32	

MMIHS by Sayles et al. (2008)
Responses to each item are given on a 5-point categorical likert-type scale
Loadings below .3 were suppressed

Construct Validity: Participants who took the BDI in English reported a mean of 15.37 (SD= 11.26). The Spanish sample scored a mean of 10.83 (SD= 9.08). In regards to the MMIHS, the English sample scored a mean of 53.65 (SD= 17.21), and the Spanish sample scored 52.39 (SD= 15.54) out of 100. There was a significant positive association between the BDI and MMIHS scores for the English (r= .418, p < .01) and Spanish (r= .519, p < .01) versions.

Convergent and Discriminant Validity: Mean scores for each of the hypothesized four factors of the MMIHS were correlated with measures of depression, disclosure, and social support to assess validity. Table 4 reports the correlation matrix between the factors and other measures by language. There were statistically significant negative correlations between the factor Disclosure and the measures of disclosure and attitudes toward disclosure, which shows good concept validity for this factor. The Self-acceptance factor, however, also had statistically significant negative correlations with the measure of disclosure and attitudes toward disclosure. The Self-acceptance factor correlated with the measure of Disclosure Ratio the most, indicating that it might be a measure of disclosure and not self-acceptance. The factor Social Relationships had a statistically significant positive correlation with the measure of social support. Social Relationships had the highest correlation with Social Support measure, indicating good construct validity. All of the factors had positive statistical associations with the measure of depression (BDI), which is consistent with the positive association found with the total score for the MMIHS.

Table 4

Pearson product-moment correlations between MMIHS factors and other concepts

	MMIHS							
	English				Spanish			
	Stereotypes	Disclosure	Social Relationships	Self-Acceptance	Stereotypes	Disclosure	Social Relationships	Self-Acceptance
BDI	.366**	.359**	.447**	.195*	.288**	-.414**	.516**	.365**
Disclosure Ratio	-.069	-.290**	-.115	-.438**	-.260**	-.289**	-.200*	-.339**
Attitude toward Disclosure	-.159	-.426**	-.269*	-.496**	-.110	-.414**	-.327**	-.283**
Social Support	.269**	.220*	.388**	.305**	.120	.306**	.425**	.182*

* Correlation is significant at the .05 level, two-tailed

** Correlation is significant at the .01 level, two-tailed

Measurement Invariance

Configural Invariance. To test for configural invariance the investigator fit the same model to the Spanish and English MMIHS. The models were stacked, with the Spanish model presented first, but were still treated as separate groups. The configural model assumes that the pattern of loadings is the same in both groups, but still allows those loadings to be free. The configural model indicated a good fit for the data: Satorra-Bentler Scaledχ^2 (42) = 52.42 (p = .13), CFI = .971, NNFI = .951, and RMSEA = .043 (90 % C.I. =0.0, 0.77). This model was used as a base model for the next step of measurement invariance.

Metric Invariance. The metric model is similar to the configural model, however, instead of allowing the loadings to be free it constrains them to equality between the groups. This model also indicated a good fit for the data: Satorra-Bentler Scaled χ^2 (47) = 60.63 (p = .09), CFI = .971, NNFI = .955, and RMSEA = .047 (90 % C.I. = 0.0, 0.78). Following the guidelines from Cheung and Rensvold (2002), the change in CFI was less than .01 so the metric model is considered to be more parsimonious than the configural model.

Scalar Invariance. The third step in measurement invariance is to constrict the intercepts of each parcel to equality, yielding a more restrictive model than the previous ones. The scalar model indicated a good fit for the data: Satorra-Bentler Scaled χ^2 (56) = 84.191 (p = .008), CFI = .955, NNFI = .942, and RMSEA = .061 (90 % C.I. = 0.315, 0.089). Since all of the indices of fit are within the acceptable restrictions, and the change in CFI is less than .01, the scalar model was considered to be more parsimonious than the previous model.

Table 5

Goodness-of-fit indices for CFA and Measurement Invariance

	Satorra-Bentler χ^2	df	*p*	RMSEA	NNFI	CFI
CFA						
Spanish	24.56	21	.26	.045	.967	.981
English	38.36	21	.01	.080	.935	.963
Measurement Invariance						
Configural	52.44	42	.13	.043	.951	.971
Metric	60.63	47	.09	.047	.955	.971
Scalar	84.19	56	.008	.061	.942	.955
Latent Means	69.65	52	.052	.050	.955	.967

Latent Mean Differences

Given that the assumptions of configural, metric, and scalar invariance hold for the two groups, the investigator examined the differences between latent means. In order to assess the difference between means of latent variables, one of the groups' variable is set to zero. This allows the investigator to examine the difference between the latent mean of the second group compared to the first one (Hancock, 1997). The mean for the Spanish sample was set to zero, and the mean for the English sample was allowed to vary. This model was fit to the data and indicated a good representation. The indices of fit were as follows: Satorra-Bentler Scaled χ^2 (52) = 69.646 (p = .052), CFI = .967, NNFI = .955, and RMSEA = .05 (90 % C.I. =0.0, 0.08). The change in CFI was less than .01 compared to the scalar model, so this model was considered to be more parsimonious.

The latent means for each factor on the English sample were assessed compared to the Spanish sample, set at zero. The mean for the Stereotype factor was -.055 (*SE* = .328), the mean for the Disclosure factor was -.015 (*SE* = .515), the mean for the Social Relationships factor was -.271 (*SE* = .305), and the mean for the Self-Acceptance factor was .173 (*SE* = .392).

Cohen's *d* was calculated for each factor to estimate the size of the difference between the latent means of each group. Cohen's *d* is calculated as the difference between latent means divided by a pooled variance term. For the first factor *d* = .07, for the second factor *d* = .01, for the third factor *d* = .39, and for the fourth factor *d* = .20. These differences are considered small by convention; however, the differences in the third and fourth factors are considered clinically significant changes in stigma

research (Hosek et al., 2011).

DISCUSSION

The current study aimed to investigate the psychometric properties of the MMIHS in both English and in Spanish. In addition to these properties, it was hypothesized that both versions of the MMIHS would show convergent validity. Also, this study sought to explore if the Spanish translation of the MMIHS was invariant from the English original version published by Sayles et al. (2008). To reach these goals, a mostly Hispanic sample was given the MMIHS as well as other measures in either English or Spanish.

The main goal for this study was to assess the appropriateness of the MMIHS as a measure of stigma in a sample of Hispanics living with HIV on the U.S./Mexico border. Stigma is a relevant component in the lives of PLWHA with effects on both the physical and mental wellbeing of the individual. Having a reliable measure of stigma can allow us to target interventions to improve the quality of life of PLWHA.

Reliability

A reliability analysis was conducted on each of the individual factors for both languages. It was found that the first two factors, stereotypes and disclosure, showed overall good internal consistency in both languages. The third factor, social relationships, presented lower internal consistency than the first two factors, though it was still acceptable. The fourth factor, self-acceptance, showed poor reliability and internal consistency in both languages. This last factor was not one theorized by the Sayles et al. (2008) team before analysis, and was first identified through EFA. It is possible that the small number of items for the factor contributed

to its poor reliability, however additional analyses showed further problems with this factor.

Factorial Structure of the MMIHS

The four-factor model demonstrated a good fit for the Spanish MMIHS sample. It was theorized by Sayles et al. (2008) that the measure consisted of four different factors to measure HIV-related stigma. The model was a good fit for the data from the Spanish sample but not for the English one. This difference could be due to a difference between the samples, which was found regarding depressive symptoms. The Spanish sample scored lower on depressive symptoms than the English sample, however, both samples scored relatively the same with regards to stigma (Table 2). This is an important difference because the literature indicated that depressive symptoms have an association with stigma. This association may be the reason why the Spanish sample fits the four-factor solution better than the English sample. It is also important to note that although the indices of fit for the English sample were not appropriate, the fit was not that poor and the indices of fit were very close to the previously mentioned guidelines of fit.

Further exploration of the four-factor structure revealed that the items from fourth factor labeled Self-acceptance loaded on other factors (EFA results presented in Table 4). Sayles et al. (2008) indicated that the four items in the last factor represented personal comfort with the individual's HIV diagnosis. The language of these items, however, also represents issues with disclosure. For example, item 25 states "I feel ashamed to tell other people that I have HIV." Sayles et al. (2008)

interpreted this item to represent how comfortable people are with their HIV diagnosis; however, this item could also represent how comfortable people are disclosing their HIV diagnosis. This is the same case as items 26 and 28. The convergent/discriminant validity analysis showed that the fourth factor is significantly associated with the measures of disclosure and attitude towards disclosure, suggesting that most of its items are related to disclosure. Indeed, the "self-acceptance" factor was more closely related to self-reported disclosure than was the "disclosure" factor. Given that the fourth factor is mostly related to disclosure, its items could be included in the "disclosure" factor. This may yield a better factorial model to be tested in future research.

Construct Validity

Based on the results from the BDI scores, the Spanish sample on average reported fewer depressive symptoms than the participants who took the measure in English. Both samples, however, reported similar scores for the MMIHS, suggesting similar levels of internalized stigma. Evidence was found to support concurrent validity for the MMIHS. Correlations between the BDI total scores and the transformed scores for the MMIHS were calculated separately for the Spanish and English samples. Internalized stigma scores were found to be significantly associated with depressive symptoms reported on the BDI for the Spanish sample. There was also a positive and significant association found for the English sample. It was found that increased reported internalized stigma is associated with increased depressive symptoms, which supports the first hypothesis for the current study.

Measurement Invariance

The current study investigated whether the Spanish translation of the MMIHS was invariant compared to the English version of the measure. The two versions of the MMIHS exhibited configural, metric, and scalar invariance. The data from the two groups equally fit the proposed model. This is important because it tells us that language is not a factor in the relationship between item parcels and their respective theorized factors. Scalar invariance tells us that both groups interpreted the items in the measure the same way. Therefore, language did not affect the way participants interpreted or answered the items.

It can be concluded that the translation of the MMIHS into Spanish is invariant from the English original measure. The Spanish version of the MMIHS can be used to assess the reported HIV-stigma of Spanish speaking populations and results may be used interchangeably with those of the English measure. The current sample consisted primarily of individuals of Mexican descent, and therefore shows that the Spanish translation would be adequate for use with similar populations.

Latent Means

The differences in latent means of the groups were assessed after measurement invariance assumptions were met. A Cohen's *d* statistic was calculated for each of the factor means in order to estimate the size of the difference between means. The first and second factors did not show large differences between the means. The third factor (Social Relationships), and the fourth factor (Self-Acceptance) showed small and non-significant differences between the means.

Although the differences were found to be non-significant, the literature has considered these differences to be clinically significant in the context of stigma research in the past.

The differences found between the group means indicate that the Spanish group scored higher in the factor Social Relationships than the participants in the English sample. This is an interesting finding that may be used to study the differences in social relationships between the groups. There may be an inherent difference in the family cohesion or social dynamics of our samples that requires some study. It is also important to note that language of the measure was not randomly assigned to participants. Each participant indicated the language they preferred which suggests that acculturation may be a factor of difference between the English and Spanish populations. Acculturation could have an effect on the social and family dynamics of the participants, and could therefore be a future direction in the study of the differences found by the analyses reported here.

It was also found that the English participants scored higher than the Spanish sample in the "self-acceptance" factor. Due to the issues with this factor reported earlier, it is difficult to interpret the difference in means found between the groups. The differences may be a product of the low reliability and conceptual organization of this factor.

Strengths, Limitations and Future Directions

The current study tested the psychometric properties of a Spanish version of the MMIHS on a predominantly Hispanic population. This allowed the investigators

to test the two versions of the MMIHS on the same type of population. For example, even the English sample consisted mostly of individuals of Hispanic descent. The sample used for this study also consisted of individuals with low resources.

The sample sized available for the current study was a limitation for the research. Because of the limited sample size per group, it was not possible to calculate asymptotic variance/covariance matrices required for work with non-normal data. This made the use of a parcel strategy necessary. Although parcels have been proven to be a good strategy to deal with issues with sample size, as well as non-normal data, it still has been shown to improve fit of structural models compared to individual item analysis.

The use of parcel strategies has been seen as problematic in analyses of measurement invariance. If the parcels are not constructed to be unidimensional, there is potential to mask a lack of invariance in the measure. The use of parcels limited the current study from further studying the measurement properties of the MMIHS at the item level. However, it allowed for an assessment of the factorial structure of the two versions of the MMIHS.

In the future, a larger sample size would allow for the testing of measurement invariance using individual items. This would further expand our knowledge of how the measure works in the two different languages. Also, the factorial structure of the measure could be assessed by conducting CFA using individual items instead of parcels.

CONCLUSION

The current study provides a good foundation in the study and development of an HIV-stigma measure. In future studies, the structure of the MMIHS may be assessed taking into consideration the findings reported by this study. The fourth factor was found to be problematic, however, its items could be redistributed in the model to belong to the factor of disclosure, which they correlated with in the validity analysis. Furthermore, the items pertaining to health care professionals may have potential for forming a new factor in the measure of HIV-stigma.

Although the structure of the MMIHS was found to be problematic in the current sample, it was established that the Spanish translation of the measure is invariant to the original. It is therefore recommended for use with similar populations of PLWHA, though with caveats regarding the larger structural problems identified in this study. The difference in latent means found in this study has also further improved our understanding of how HIV-stigma affects Latinos.

RESOURCES

Aggleton, P., & Parker, R. (2002). *A conceptual framework and basis for action: HIV/AIDS stigma and discrimination.* Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS.

Bandalos, D. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling, 9*, 78-102.

Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides (Ed.), *New developments and techniques in structural equation modeling* (pp. 269-296). Mahwah, NJ: Lawrence Erlbaum.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression.* New York: Guilford Press.

Beck, A. T., & Steer, R. A. (1993). *Manual for the Beck Depression Inventory.* San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77-100.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246.

Bonicatto, S., Dew, A. M., & Soria, J. J. (1998). Analysis of the psychometric properties of the Spanish version of the Beck Depression Inventory in Argentina. *Psychiatry Research, 79*, 277-285.

Centers for Disease Control and Prevention (2011). *CDC Health Disparities and Inequalities Report.* Atlanta: United States Department of Health and Human Services.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255.

Clark, H. J., Lindner, G., Armistead, L., & Austin, B. J. (2003). Stigma, disclosure, and psychological functioning among HIV-infected and non-infected African American women. *Women & Health, 38*(4), 57-71.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Crites, S. L., Fabrigar, L. R., & Petty, R. E. (1994). Measuring the affective and cognitive properties of attitudes: Conceptual and methodological issues. *Personality and Social Psychology Bulletin, 6*, 619-634.

Derlega, V. J., Winstead, B. A., Geene, K., Serovich, J., & Elwood, W. N. (2004). Reasons for HIV disclosure/nondisclosure in close relationships: Testing a model of HIV-disclosure decision making. *Journal of Social and Clinical Psychology, 23*, 747–67.

Duran, R. (1998) Differential consequences of serostatus disclosure in men and women. In: Paper presented at a symposium entitled "*Gender issues in HIV and AIDS Research-Informing prevention and treatment efforts*." The 1998

American Psychological Association Annual Convention, San Francisco, California.

Earnshaw, V. A., & Chaudoir, S. R. (2009). From conceptualizing to measuring HIV stigma: A review of HIV stigma mechanism measures. *AIDS Behavior, 13*, 1160-1177.

Fife, B. L., & Wright, E. R. (2000). The dimensionality of stigma: A comparison of its impact on the self of persons with HIV/AIDS and cancer. *Journal of Health and Social Behavior, 41*, 50–67.

Goffman, E. (1963). *Notes on the management of a spoiled identity*. New York: Simon & Schuster.

Gonzalez, J. S., Hendriksen, E. S., Collins, E. M., Duran, R. E., & Safren, S. A. (2009). Latinos and HIV/AIDS: Examining factors related to disparity and identifying opportunities for psychosocial intervention research. *AIDS Behavior, 13,* 582-602.

Herek, G. M., Gillis, J. R., & Cogan, J. C. (2009). Internalized stigma among sexual minority adults: Insights from a social psychological perspective. *Journal of Counseling and Psychology, 56*(1), 32-43.

Herek, G. M., & Glunt, E. K. (1988). An epidemic of stigma: Public reactions to AIDS. *American Psychologist, 43*(11), 886-891.

Holland, P. W., & Wainer, H. (1993). *Differential item functioning.* Erbaum: Hillsdale, NJ.

Hosek, S. G., Lemos, D., Harper, G. W., & Telander, K. (2011). Evaluating the acceptability and feasibility of Project Accept: An intervention for youth newly diagnosed with HIV. *AIDS Education and Prevention, 23*(2), 128-144.

Hu, L., & Bentler P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

Jöreskog, K.G. & Sörbom, D. (2006). LISREL 8.8 for Windows [Computer software]. Lincolnwood, IL: Scientific Software International, Inc.

Kinsler, J. J., Wong, M. D., Sayles, J. N., Davis, C., & Cunningham, W. E. (2007). The effect of perceived stigma from a health care provider on access to care among a low-income HIV-positive population. *AIDS Patient Care and STDS, 21*, 584–592.

Mak, W. W., Poon, C. Y., Pun, L. Y., & Cheung, S. F. (2007). Meta-analysis of stigma and mental health. *Social Science and Medicine, 65*, 245–61.

McDonald, R. P. (1999). *Test Theory: A Unified Treatment.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

Meade, A. W., & Kroustalis, C. M. (2006). Problems with item parceling for confirmatory factor analytic tests of measurement invariance. *Organizational Research Methods, 9*(3), 369-403.

Nasser, F., & Takahashi, T. (2003). The effect of using item parcels on ad hoc goodness-of-fit indexes in confirmatory factor analysis: An example using Sarason's RTT. *Applied Measurement in Education, 16*, 75-97.

Nasser, F., & Wisenbaker, J. (2006). A Monte Carlo study investigating the impact of item parceling strategies on parameter estimates and their standard errors in CFA. *Structural Equation Modeling, 13*(2), 204-228.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory.* New York: McGraw-Hill.

Preacher, K. J., & Coffman, D. L. (2006, May). Computing power and minimum sample size for RMSEA. Available from http://quantpsy.org/.

Rintamaki, L. S., Davic, T. C., Skripkauskas, S., Bennet, C. L., & Wolf, M. S. (2006). Social stigma concerns and HIV medication adherence. *AIDS Patient Care and STDs, 20*(5), 359- 368.

Sanz, J., & Vazquez, C. (1998). Fidelidad, validez y datos normativos del inventario para la depression de Beck [Reliability, validity, and normative data of the Beck Depression Inventory]. *Psychotema, 10,* 303-318.

Satorra, A., & Bentler, P. M. (1994). Correction to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variable analysis: Applications for developmental research* (pp. 339-419). Thousand Oaks, CA: Sage Publications.

Sayles, J. N., Hays, R. D., Sarkisian, C. A., Mahajan, A. P., Spritzer, K. L., & Cunningham, W. E. (2008). Development and psychometric assessment of a Multidimensional Measure of Internalized HIV Stigma in a sample of HIV-positive adults. *AIDS Behavior, 12*, 748-758.

Simbayi, L. C., Kalichman, S., Strebel, A., Cloete, A., Henda, N., & Mqeketo, A. (2007). Internalized stigma, discrimination, and depression among men and women

living with HIV/AIDS in Cape Town, South Africa. *Social Science & Medicine, 64,* 1823-1831.

Sowell, R. L., Seals, B. F., Moneyham, L., Demi, A., Cohen, L., & Brake, S. (1997). Quality of life in HIV-infected women in the south-eastern United States. *AIDS Care, 9*, 501–512.

Stall, R., Hoff, C., Coates, T., Paul, J., Phillips, K., Ekstrand, M., … Diaz, R. (1996). Decisions to get HIV tested and to accept antiretroviral therapies among gay/bisexual men: Implications for secondary prevention efforts. *Journal of Acquired Immune Deficiency Syndrome, 11*, 151–160.

Sterba, S. K., & MacCallum, R. C. (2010). Variability in parameter estimates and model fit across repeated allocations of items to parcels. *Multivariate Behavioral Research, 45*, 322-358.

Stirratt, M. J., Remien, R. H., Smith, A., Copeland, O. Q., Dolezal, C., & Krieger, D. (2006). The role of HIV serostatus disclosure in antiretroviral medication adherence. *AIDS and Behavior, 10*, 483–493.

Thompson, B., & Melancon, J. (1996, November). *Using item "testlets/parcels" in confirmatory factor analysis: An example using PPDP-78.* Paper presented at the annual meeting of the Mid-South Educational Research Association, Tuscaloosa, AL.

Vanable, P. A., Carey, M. P., Blair, D. C., & Littlewood, R. A. (2006). Impact of internalized HIV stigma on health behaviors and psychological adjustment among HIV-positive men and women. *AIDS and Behavior, 10*, 473–482.

Vazquez, C., & Sanz, J. (1997). Fidelidad y valores normativos de la version Espanola del inventario para la depression de Beck de 1978 [Reliability and normative data of the Spanish version of the 1978 Beck's Depression Inventory]. *Clinical y Salud, 8,* 403-422.

Visser, M. J., Kershaw, T., Maskin, J. D., & Forsyth, B. W. (2008). Development of parallel scales to measure HIV related stigma. *AIDS Behavior, 12*, 759–71.

White House Office of National AIDS Policy (2010). *National HIV/AIDS Strategy for the United States.* Available from http://www.whitehouse.gov/administration/eop/onap/nhas/

Yuan, K. H., Bentler, P. M., & Kano, Y. (1997). On averaging variables in a CFA model. *Behaviormetrika, 24*, 71-83.

Zea, M. C., Reisen, C. A., Poppen, P. J., Bianchi, F. T., & Echeverry, J. J. (2005). Disclosure of HIV status and psychological well-being among Latino gay and bisexual men. *AIDS and Behavior, 9*(1), 15-26.

Zea, M. C., Reisen, C. A., Poppen, P. J., Echeverry, J. J., & Bianchi, F. T. (2004). Disclosure of HIV-positive status to Latino gay men's social networks. *American Journal of Community Psychology, 33*, 107-116.

Zimet, G. D., Dahlem, N. W., Zimet, S. G. & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*, 30-41.

Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S. & Berkoff, K. A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *55*, 610-17.

CURRICULUM VITA

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