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Validating the Multidimensional Measure of Cultural Identity Scales for Latinos Among Latina Mothers and Daughters

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Abstract

The psychometric properties of the Multidimensional Measure of Cultural Identity Scales for Latinos (MMCISL; Félix-Ortiz, Newcomb, & Myers, 1994) have never been examined in an adult Latina sample representing various levels of nativity and nationality. The rationale for the study was to confirm the factor structure and psychometric properties of the MMCISL with a predominantly immigrant sample of Latina mothers and daughters ($n = 316$). Adequate reliability estimates were found for 6 of the original 10 scales. Confirmatory factor analyses provided evidence of construct validity for the reliable scales. The Preferred Latino Affiliation scale was the only scale to meet strict measurement invariance criteria across mothers and daughters. Criterion validity was evidenced by relations between the Familiarity with Latino Culture scale and all criterion variables. Implications for acculturation and cultural identity research involving the MMCISL are discussed.

Keywords

Latina; acculturation; cultural identity; measurement; invariance

Acculturation is one of the most investigated topics in research involving culturally diverse samples. At the individual level, theorists generally describe acculturation as either a person's

state (i.e., the amount of adapted values, beliefs, and behaviors of a different culture) or a complex process in which an individual adapts to the values, beliefs, and behaviors of a different culture (Berry, 2003). Although social scientists have been examining acculturation for decades (e.g., Graves, 1967; Redfield, Linton, & Herskovitz, 1936; Szapocznik, Scopetta, & King, 1978), it has been acknowledged as the most prominent construct in psychological research involving multicultural populations (Ponterotto, Baluch, & Carielli, 1998).

Despite its status in the literature, some psychological studies of acculturation report contradictory findings (Castillo, Conoley, Brossart, & Quiros, 2007; Félix-Ortiz & Newcomb, 1995). For instance, seminal work in the substance abuse field cites positive associations between acculturation to American culture and substance abuse among Latino youth and their families (e.g., De La Rosa, 2002; Szapocznik, Santisteban, Kurtines, Perez-Vidal, & Hervis, 1984; Vega & Gil, 1998). Other acculturation studies similarly indicate positive relationships with psychological distress (Quintana, Vogel, & Ybarra, 1991). Yet acculturation also relates negatively with psychological distress, and some researchers contend it relates in a curvilinear fashion to psychological distress (Rogler, Cortes, & Malgady, 1991). That is, an individual's ability to maintain adherence to native and host cultural beliefs and behaviors (biculturality) is posited to yield a favorable mental health situation.

Possible explanations for the inconsistent results concerning acculturation are the varying psychometric properties of acculturation measures and the divergent theories of acculturation from which they are derived. There is no shortage of measurement scales to assess acculturation among Latinos in the United States. In a 2001 review of the acculturation literature, Kim and Abreu (2001) found 27 measures for Latino groups. Most of these acculturation measures are based on one of two contemporary conceptualizations of acculturation. The first is a *unidimensional* conceptualization, or the zero-sum process (Berry & Annis, 1974; Cuellar, Harris, & Jasso, 1980; Szapocznik et al., 1978). According to this model, when individuals adopt host culture behaviors and values, they abandon these attributes from their original culture. Unidimensional measures of acculturation are considered by some to be limited in their ability to assess *true biculturation* (Cortes, Rogler, & Malgady, 1994). Most of the unidimensional measures assess a limited range of cultural domains (e.g., language only; Félix-Ortiz, Newcomb, & Myers, 1994; Kim & Abreu, 2001). Few measures incorporate Latino/Hispanic and American values. Most rely on a limited assessment of cultural knowledge, asking the respondent to identify historical figures of a particular Latino/Hispanic country or assessing whether or not the respondent eats food unique to a particular Latino/Hispanic subculture. Thus, unidimensional measures (a) fail to fully assess both Latino and host-culture dimensions separately and (b) do not capture an individual's acculturation and cultural identity as they vary across several domains of language, knowledge, behaviors, and values.

In response to these criticisms, a second model of acculturation has emerged in the literature. It conceptualizes the acculturation process as *bidimensional*, that is, occurring on at least two different dimensions with each dimension representing a level of orientation to one specific culture. Thus, measures based on the bidimensional model assess acculturation to original and host cultures simultaneously, yet independently. These measures allow for the identification of an individual's level of acculturation to the host culture and different aspects of biculturality.

The Multidimensional Measure of Cultural Identity Scales for Latinos (MMCISL; Félix-Ortiz, Newcomb, & Myers, 1994) has been developed to address the limitations of the acculturation measures based on the unidimensional model. The MMCISL allow for a multidimensional measurement of two cultures (Latino/Hispanic and American) across several domains such as language, knowledge, behaviors, and values. As such, they yield a profile of cultural identity rather than a global acculturation score. The term *cultural identity* replaced acculturation during the development of these scales because the scales represent a distinct process that occurs as

part of personality formation versus a process that occurs between groups (Félix-Ortiz et al., 1994). The instrument was designed to assess an individual's (a) sense of familiarity with both American and Latino cultures, (b) American and Latino values and attitudes, such as feminism, *respeto*, and perceived discrimination; (c) Spanish/English language proficiency and preference, and (d) behavioral indicators of cultural identity, such as affiliation and activism.

The purpose of the current study is to replicate and confirm the factor structure and psychometric properties of the MMCISL—a scale originally developed with a predominantly U.S.-born adolescent/young adult Latino sample—with a predominantly immigrant sample of Latina mothers and daughters. The MMCISL has shown satisfactory psychometric properties, including construct validity, via exploratory factor analyses as well as evidence of reliability and criterion validity in an initial scale development study with an adolescent/young adult Latino sample (Félix-Ortiz et al., 1994). However, the original scale development study was conducted with a limited sample in terms of size ($n = 130$), age (young adult college students), socioeconomic status (higher than average), generation status (mostly second generation), and nationality (Mexican American). The psychometric properties of the MMCISL have not been examined in an adult Latina sample of mothers and daughters who represent various levels of nativity and nationality. Latino populations are heterogeneous in terms of geographic location, years in the United States, history of acculturation, and other key variables (Amaro & Iguchi, 2006). To ensure psychometrically sound scales, measurements of substantive Latino concepts such as acculturation and cultural identity require adequate validation with various samples representing the within-group variability of U.S. Latinos.

Researchers often assume that adequate reliability estimates among groups is sufficient to obtain equivalent measurement of a construct, like acculturation, between groups. A particular measurement instrument may appear equally reliable in two populations yet provide a misleading basis for comparing those populations because of measurement inequivalence (Bingenheimer, Raudenbush, Leventhal, & Brooks-Gunn, 2005). The measurement invariance of each MMCISL scale across mothers and daughters is examined as part of the current study to determine whether each scale score is on the same measurement scale or whether they differ in interpretable ways between mothers and daughters.

The assumption underlying group comparisons is that the scales considered have a common metric across groups. That is, the scales have equivalent psychometric properties (measurement invariant). Lack of measurement invariance can occur on several levels (Meredith, 1993; Widaman & Reise, 1997). For instance, the measurement properties of the measurement of acculturation by a scale may differ across groups on the basis of nationality, age, or generation status. Some groups may experience acculturation differently than others or use different criteria to identify it. These differences may or may not be captured by the items of a particular scale. When this occurs, measurements of acculturation may be found as reliable across groups but have limited validity in some groups and adequate validity in other groups. That is, the measure will not uniformly assess acculturation across all groups. For example, if the items used to measure acculturation do not represent the acculturation experience in one group (e.g., recently immigrated U.S. Latinos), estimates for that group will be misleading (Crockett, Randall, Shen, Russell, & Driscoll, 2005).

Multicultural researchers are considering the important implications of measurement invariance. Theorists stress the importance of examining measurement invariance when conducting research with racial and ethnic diverse populations (Knight & Hill, 1998). Many recent studies report findings related to measurement invariance of instruments across various groups on the basis of race, ethnicity, gender, and socioeconomic status, as well as across different language versions of scales (e.g., Bingenheimer et al., 2005; Mitrani, Feaster, McCabe, Czaja, & Szapocznik, 2005; Schwartz, Adamson, Ferrer-Wreder, Dillon, & Berman,

2006; Whiteside-Mansell, Bradley, & Rakow, 2001). Despite the burgeoning literature on measurement invariance, to our knowledge no studies have examined the measurement invariance of acculturation and cultural identity among Latino family members. Family-based research typically assumes invariance of measures when measures are administered to separate members of the same family. Thus, as part of this validation study of the MMCISL, the measurement invariance across Latina mothers and their daughters is of interest.

Furthermore, in accordance with the reviewed literature and the need for additional multidimensional measures of acculturation and cultural identity, this study determines reliability estimates of the MMCISL scales. The study also attempts to confirm the previously reported factor structure with the current sample. Estimates of reliability of the 10 MMCISL scales (Spanish Proficiency, English Proficiency, Spanish Language Preference, Familiarity with U.S. Culture, Familiarity with Latino Culture, Preferred Latino Affiliation, Perceived Discrimination, Respeto, and Feminism) are determined first, because in order to be considered valid, scales must be reliable, but reliability does not guarantee validity (Nunnally & Bernstein, 1994). Next, a confirmatory factor analysis is performed to attempt to confirm the evidence of construct validity by replicating the factor structure reported in a previous study (Félix-Ortiz et al., 1994). Estimates of criterion validity of the scales are established by comparing MMCISL scale scores with five criterion validity measures: (a) length of time in the United States, (b) generation status, (c) nativity, (d) education in the United States, and (e) visits to country of origin (or family's country of origin). On the basis of previous MMCISL research (Félix-Ortiz et al., 1994), participants reporting more time in the United States, a higher generation status, U.S. nativity, more education in the United States, and fewer visits to the country of origin are expected to indicate more English Language Proficiency, Familiarity with U.S. Culture, Feminism, and Perceived Discrimination as well as less Respeto, Spanish Language Preference, Latino Activism, Spanish Language Proficiency, Familiarity with Latino Culture, and Preferred Latino Affiliation.

Method

Participants

The study included 158 self-identified Latina mother-daughter dyads ($n = 316$). Table 1 provides a summary of demographic variables for mothers, daughters, and the total sample including descriptions of participants' age, nativity, level of assistance with immigration, family of origin, socioeconomic status, personal income, education level, employment status, generation status in the United States, percentage of time in the United States, number of years of education in the United States, and number of visits to country of origin. Analyses of variances (ANOVAs) and chisquare tests were conducted to test for mother-daughter differences on demographic variables. Results are included in Table 1.

Procedures

This study is part of a larger project that explores the quality of relationships between Latino mothers and their daughters and the effect of their relationship on their substance abuse and other health-risk behaviors. The study was approved by, and conducted in compliance with, the Institutional Review Board of Florida International University. Mother-daughter dyads were recruited according to four drug-use categories: (a) drug-abusing mothers and daughters ($n = 80$); (b) drug-abusing mothers and nonabusing daughters ($n = 38$); (c) nonabusing mothers and drug-abusing daughters ($n = 102$); and (d) nonabusing mothers and daughters ($n = 96$). All study participants were administered a one-time, face-to-face interview. Participants were recruited using the "snowball" sampling (chain referral) method (McCracken et al., 1997). Participant recruitment strategies included recruitment at community health fairs, visiting health clinics, radio announcements on local Spanish stations, TV channels, and an

advertisement in an alternative newspaper. Strategies also included soliciting potential participants at outpatient, women-only, substance abuse treatment programs; at substance abuse support groups such as Narcotics Anonymous (NA) and Alcoholics Anonymous (AA) meetings; and at the Miami–Dade County Drug Court Program. Consenting participants were given the choice of interview language (i.e., English or Spanish) and location. The questionnaire took 2–3 hr to complete.

Measures

Demographics—A demographics form assessed (a) mother and daughter age, (b) nativity, (c) assistance with immigration, (d) length of time in the United States, (e) generation status, (f) socioeconomic status of family of origin, (g) current personal income, (h) education level, (i) education in the United States, (j) visits to country of origin (or family’s country of origin), and (k) employment status. See Table 1 for summary of participant demographic responses and results.

MMCISL—Items across 10 distinct scales measuring 10 dimensions of cultural identity from the MMCISL (Félix-Ortiz et al., 1994) were administered to participants. Estimates of criterion validity and internal consistency from a past study (Félix-Ortiz et al., 1994) are summarized in Table 2 for all 10 original scales.

Data Analytic Strategy

Reliability—The reliability of the MMCISL scales was examined by calculating internal consistency estimates for each MMCISL scale with mother-only, daughter-only, and total samples using the Statistical Package for the Social Sciences (SPSS; version 15 for Windows, 2006).

Construct validity—A confirmatory factor analysis (CFA) model of the reliable MMCISL scales was estimated using MPlus (version 5; Muthén & Muthén, 1998–2008) and the corresponding item sets and factor structure from the original MMCISL scale development study (Félix-Ortiz et al., 1994). Three CFA models were estimated for the entire sample and with subgroups of mothers and daughters separately. We evaluated models using the comparative fit index (CFI), for which values above 0.90 reflect adequate fit (Kline, 2005) and values above 0.95 represent excellent fit (Tomarken & Waller, 2005), and the root-mean-square error of approximation (RMSEA), for which values below 0.08 represent adequate fit (Quintana & Maxwell, 1999) and values below 0.05 represent excellent fit (Hancock & Freeman, 2001). The 90% confidence interval (CI) for the RMSEA index provides added confidence in model fit, especially if most or all of the interval is below 0.08 (MacCallum, Browne, & Sugawara, 1996). The chi-square statistic is reported but is not used in the interpretation, because it is vulnerable to inflation with large sample sizes.

Measurement invariance—We tested measurement invariance following a procedure introduced by Widaman and Reise (1997). We used MPlus (version 5; Muthén & Muthén, 1998–2008) for all measurement invariance analyses. Measurement invariance requires that the observed scale items or indicators have identical quantitative relationships with the latent variable (factor) for each group (Meredith, 1993). A common approach is to test whether the same pattern of fixed and free loadings of items on factors holds across groups. This is a form of invariance termed *configural invariance*. It is problematic because it evaluates only the similarity of latent variables (factors) across groups. It does, however, have use as a baseline model against which to assess models testing forms of metric invariance.

Metric invariance has three forms: weak, strong, and strict (Meredith, 1993). These forms are hierarchically nested, because strict invariance imposes constraints on strong invariance, which

imposes constraints on weak invariance. We followed procedures presented by Widaman and Reise (1997), which are best illustrated through the following multigroup structural equation:

$$M_g \cong \widehat{\tau}_g \widehat{\tau}_g' + \widehat{\Lambda}_g (\widehat{\alpha}_g \widehat{\alpha}_g' + \widehat{\Psi}_g) \widehat{\Lambda}_g' + \widehat{\Theta}_{\epsilon g} = \widehat{M}_g \quad (1)$$

Here M is the moment matrix. The vector of intercepts is represented by τ . The matrix Λ represents the loadings of the measured indicators on the latent variables (factors). The vector of means is represented as α . The matrix Ψ represents the matrix of covariance among the latent variable (factor) scores, and Θ represents the matrix of covariance among the measurement residuals. Note that the subscript g is used to show that the element varies across groups.

To test weak invariance, we set the loadings of the measured indicators equal across groups, and this is represented by removing the g subscript from Λ . If weak invariance is accepted, then factor loadings of items in the measure are invariant across the groups. Strong invariance can then be tested. To test strong invariance, first the conditions for weak invariance are invoked. Next, the intercepts (τ) are set equal across groups (g is removed from τ). If strong invariance is accepted, then scale items assess the same level, amount, or degree of the construct in both groups (Hui & Triandis, 1985). Once strong invariance is established, strict invariance can be tested. The test for strict invariance constrains the measurement residuals to be equal across groups (g is removed from Θ). If strict invariance is accepted, any group differences in the means and variances on the measured variables (items) are a function of differences in means (α) and covariances (Ψ), because the unique parts of the equation (Λ , τ , and Θ) have been constrained to be equal across groups. In other words, all group differences on the measured variables are indicated by, and attributable to, group differences on the common factors (Widaman & Reise, 1997).

The mother–daughter dyads in the current study also require the analysis to account for the statistical nonindependence that is characteristic of dyadic data. The structural equation model (SEM) approach we used for the invariance analyses allows specification of the correlations among the measured variables characteristic of dyadic data (Olsen & Kenny, 2006). Furthermore, we examined the measurement invariance of each MMCISL scale independently because of limitations in sample size to the parameter estimates ratio in the overall model and to facilitate the identification of potential sources of measurement inequivalence at each scale level.

In testing differences in fit between the types of invariance, we used two standard indices: the difference in chi-square values ($\Delta\chi^2$) and the difference in CFI values (ΔCFI). In each model comparison conducted, for the null hypothesis of invariance across groups to be statistically rejected, two criteria had to be met: $\Delta\chi^2$ significant at $p < .05$ (Byrne, 2001), and $\Delta\text{CFI} > .01$ (Cheung & Rensvold, 2002).

Criterion validity—Using structural equation modeling and MPlus (version 5; Muthén & Muthén, 1998–2008), we calculated latent factor scores for each of the MMCISL scales for use in the validity analyses. Estimates of criterion validity of the scales were then established by using SPSS (version 15 for Windows, 2006) to calculate correlation coefficients between the MMCISL latent factor scale scores with five criterion validity measures: (a) length of time in the United States, (b) generation status, (c) nativity, (d) education in the United States, and (e) visits to country of origin (or family's country of origin).

Results

Reliability of MMCISL Scales

Cronbach's alpha coefficients for the MMCISL scales are listed in Table 3. Measures with internal consistency estimates below 0.70 for mother, daughter, or total samples (i.e., Feminism, Respeto, Perceived Discrimination, and Latino Activism) were not included in subsequent analyses because of inadequate evidence of reliability in the current sample.

CFA

We estimated three CFA models of the remaining six scales with the entire sample and with subgroups of mothers and daughters separately. In all three CFAs, the results indicated good to excellent fit to the data: (a) in the total sample ($n = 316$), $\chi^2(168) = 261.7$, $p < .01$, CFI = 0.98, RMSEA = 0.04 (90% CI = 0.03 to 0.05); (b) in the sample of mothers ($n = 158$), $\chi^2(168) = 205.79$, $p = .02$, CFI = 0.98, RMSEA = 0.04 (90% CI = 0.01 to 0.05); and (c) in the sample of daughters ($n = 158$), $\chi^2(168) = 217.98$, $p < .01$, CFI = 0.98, RMSEA = 0.04 (90% CI = 0.02 to 0.06). Intercorrelated error terms were included in all CFA models. Where there is a correlation of error terms, variance for one item may be similar to that of the other item. These associations were based on modification indices and the researchers' judgment of plausibility for the latent factors.

Figure 1 presents the correlated error terms and standardized path coefficients modeled across mother, daughter, and total samples. The latent factors are represented by the circles in Figure 1. The indicators (scale items) of the latent factors are represented by rectangles. The correlated error terms are represented by the double-arrow-ended lines drawn between indicators. Latent factor score intercorrelations are symbolized by the double-arrow-ended lines drawn between factors. Factor score intercorrelations yielded small-sized (r ranging from $|.01|$ to $|.23|$), medium-sized ($r = -.37$, indicating a relationship between daughter's English and Spanish Language Proficiency), and large-sized ($r > .50$) correlation coefficients across samples (Cohen, 1988). Absolute values are used to indicate the strength of the relationships observed between factors regardless of the direction of the relationship (represented by a plus sign or a minus sign). Large-sized correlation coefficients were found between Familiarity with Latino Culture and Spanish Language Proficiency factors, and Familiarity with U.S. Culture and English Language Proficiency factors across samples. That is, mother and daughter participants' Familiarity with Latino Culture was highly related to their Spanish Language Proficiency, and their Familiarity with U.S. Culture was highly related to their English Language Proficiency. All latent factor score intercorrelations coefficients are reported in Table 4.

Measurement Invariance

Table 5 shows the results of the measurement invariance analysis. All of the scales met the criteria of similar factor-loading patterns across the mother–daughter groups (configural invariance) with the exception of the Spanish Language Preference scale. When the daughter group factor loading pattern was specified to be identical to the mother group factor loading pattern, the model failed to converge, and attempts to respecify the model failed (e.g., a nonpositive definite theta matrix). All other scales, with some modifications, passed the strict invariance criteria, except for English Language Proficiency.

Partial invariance was found for the strong criteria with the Spanish Language Proficiency scale. The intercept for the item, *How well do you write Spanish?*, had to be freely estimated between the mother and daughter groups. Once this respecification was made, the scale also met the strict invariance criteria. The English Language Proficiency scale met criteria for weak invariance, but the strong invariance model provided a poor fit to the data (CFI = 0.92, RMSEA

= 0.22), and attempts at respecification were unsuccessful. With the Familiarity with Latino Culture scale, weak invariance was met; we found strong partial invariance when items assessing familiarity with Latino art and familiarity with Latino history were freely estimated between mothers and daughters. Once this respecification was met, the scale met criteria for strict invariance. Weak invariance was found for the Familiarity with U.S. Culture scale. Freely estimating the intercepts for the item assessing familiarity with U.S. popular entertainers between mothers and daughters allowed the scale to meet criteria for partial invariance at the strong level. Once that adjustment was made, the scale met criteria for strict invariance. The Preferred Latino Affiliation scale met criteria for strict invariance without modification.

Criterion Validity

Since the Spanish Language Preference scale failed the configural (or similar factor pattern) analysis across mothers and daughters, it was not included in further analyses. The latent factor scores calculated for the remaining MMCISL scales also included correlated mother and daughter indicators of the same scales. This method accounted for the nonindependence of observations produced by the sampling protocol (mother–daughter dyads). The latent factor scores also accounted for the appropriate level of measurement invariance for each of the MMCISL scales. The latent factor scores were correlated with participant characteristics hypothesized to discriminate between Latino and U.S. culture affinity. The amount of time in the United States, nativity, the generation since immigration, years of U.S. education, and visits to the country of origin were expected to have a different directional association with Spanish Language Proficiency, Familiarity with Latino Culture, and Preferred Latino Affiliation than the direction of the correlation with English Language Proficiency and Familiarity with U.S. Culture.

Results indicated large-sized positive correlation coefficients (greater than $|.50|$; Cohen, 1988) between education in the United States and Familiarity with U.S. Culture and English Language Proficiency. Large-sized negative correlation coefficients were found between (a) nativity and English Language Proficiency; and (b) education in the United States and Spanish Language Proficiency and Familiarity with Latino Culture; as well as (c) generation status and Spanish Language Proficiency. Medium-sized positive correlation coefficients (between $|.30|$ and $|.50|$; Cohen, 1988) were found between (a) time in United States and Familiarity with U.S. Culture and English Language Proficiency, (b) generation status and English Language Proficiency, and (c) nativity and Familiarity with Latino Culture. Medium-sized negative correlation coefficients were found between (a) time in the United States and Spanish Language Proficiency and Familiarity with Latino Culture, (b) generation status and Familiarity with Latino Culture, and (c) visits to country of origin and Familiarity with Latino Culture. All other correlation coefficients indicated small to no relations between scales and criterion variables. Correlation coefficient values and directions can be found in Table 6.

Discussion

The MMCISL attempts to measure what is conceptually thought of as the multidimensional nature of cultural identity among Latinos living in the United States. Conventional psychometric theory suggests that an initial task in this process is to identify the domains of the construct and attempt to draw a comprehensive selection of the elements from each domain in an effort to arrive at a set of elements (items) that would be an adequate representation of the construct (Nunnally & Bernstein, 1994). The initial psychometric assessment of the MMCISL reported evidence of 10 domains that appeared to have an adequate level of internal consistency and construct validity (Félix-Ortiz et al., 1994). From the past study, it appeared as if the conceptual framework of a multidimensional cultural identity could be supported. However, as was noted earlier, the relative homogeneity of that sample with regard to age,

nationality, generation status, education, and socioeconomic status as well as the exploratory nature of the analysis argued for additional assessment of the psychometric properties of the MMCISL. Our results indicated differences in internal consistency and validity estimates for several of the original 10 MMCISL dimensions. Confirmatory factor analyses provided evidence of construct validity for six reliable MMCISL scales. Measurement invariance findings suggested uncertainty about the construct uniformity of MMCISL dimensions as perceived by Latina mothers in comparison with their daughters.

Our initial attempt to identify 10 dimensions within the MMCISL, as our results indicate, was unsuccessful. We report that 4 of the 10 dimensions—Feminism, Respeto, Perceived Discrimination, and Latino Activism—did not meet criteria for internal consistency reliability. There are a number of factors that could influence the poor performance of these scales in the present sample. The item sets representing each dimension were small, and since internal consistency reliability is in part a function of the number of scale items (Floyd & Widman, 1995), this feature could dampen reliability. It is also possible that the item sets formed a poor representation of the domains in which those items were members. In conjunction with small item sets and poor domain representation, the composition of the present sample was generationally distinct, older, and represented a greater number of ethnicities. From psychometric theory, the major source of error within a measure is due to the sampling of items (Nunnally & Bernstein, 1994). If, as appears to be the case here, the item sets poorly represent their respective dimensions, then the responses obtained from a sample with heterogeneous respondent characteristics is unlikely to adequately duplicate responses from a sample in which respondent characteristics are homogeneous. Future research is needed by enhancing the item sets of these theoretically salient constructs in the lives of Latinos in the United States to build on the efforts toward developing psychometrically sound, multidimensional cultural identity measures.

The results of the CFA conducted on the six reliable scales (Spanish Language Proficiency, English Language Proficiency, Familiarity with U.S. Culture, Familiarity with Latino Culture, Preferred Latino Affiliation, and Spanish Language Preference) were encouraging. The results support the factor structure obtained for these six scales in the earlier exploratory analysis (Félix-Ortiz et al., 1994). The replication suggests that these six scales may be robust across different Latino subgroups, a characteristic not often demonstrated in the acculturation or cultural identity literature on Latinos. Extending the confirmatory analysis results by evaluating the metric properties of the scales (invariance analysis) provides additional data to inform the assessment of the utility of the MMCISL as a widely applicable measure of cultural identity.

The assessment of invariance we conducted is a systematic examination that identifies whether a scale has psychometric properties, such that when scale scores are applied, there can be confidence that the score represents common elements between identified groups, in this case mothers and daughters. As was explained earlier, invariance is regarded as being formed by the nested hierarchy of configural, weak, strong, and strict invariance. The current assessment was limited to potential measurement variance between mothers and daughters because of a limited sample size to analyze other key variables potentially influencing measurement invariance between salient groups in cultural identity measurement (e.g., nationality and nativity). Future researchers are encouraged to conduct similar analytic procedures to ensure valid measurement across cultural and other salient groups.

Our results indicated that the Spanish Language Preference scale failed the configural or similar factor pattern analysis across mothers and daughters. Mothers and daughters were responding in different ways to the scale items, thereby affecting the theorized factor structures of the measurement model across the groups. This suggests that mothers and daughters potentially have preferences for use of Spanish that have a broader divergence than is captured by the scale

item set. The use of this scale, in its current form, is unlikely to provide reliable results in applications in which mixed generations are present. Improvements to the scale may include additional item generation or alterations to the item response set, and subsequent evaluation for more inclusive measurement. The English Language Proficiency scale also cannot be recommended for application. This scale met the configural invariance requirement but failed to meet the weak invariance criteria. Weak invariance is the first level of metric invariance and is the minimal desirable scale property (Meredith, 1993). The results suggest that the current item set may not adequately represent the range of what is interpreted as proficiency in English by mothers and daughters. This scale similarly may benefit from future efforts focused on additional item development to assess other aspects of English proficiency.

The Familiarity with Latino Culture scale and the Familiarity with U.S. Culture scale were both found to meet partial strict invariance. As was reported, each scale had different reasons for the partial invariance. With both scales, the weak invariance was met without adjustment. This indicates that item loadings on the factors are invariant across the mother and daughter groups. Partial invariance occurred at the test for strong invariance when the intercepts (of item means) were constrained to be equal. This result suggests that the item response sets for the measured variables might be too restrictive, producing differences in levels of the construct being measured by the items between mothers and daughters. Application of these scales can be recommended with caution in future research. If intergenerational participants or a wide age differential exist in the sample, attention should be given to possible differences at the strong invariance level.

The results for the Preferred Latino Affiliation scale indicate that the scale met the strict invariance criteria. This means that this scale provides a psychometrically valid assessment of the means and covariance of the responses. Although evidence of validity was limited, the use of the scale as is can be tentatively recommended. The expectation with an application of the scale is that the differences between identifiable intergenerational groups would reflect differences in Latino affiliation. Given the item set, future attempts at establishing criterion validity for this scale may involve conducting a predictive validity analysis to determine whether higher scores on this measure relate to choice of a Latino romantic partner for the respondents and their family members.

Relationships of MMCISL scales with criterion variables yielded similar evidence of validity as the original study. An exception included number of years of education in the United States strongly relating with Familiarity with U.S. Culture in the current study but not in the original study. Differences could be due to more immigrant participants in the current study, or the greater variability of participants' years of education in the United States. It also is noteworthy that Preferred Latino Affiliation only related with visits to country of origin in the current study and that this relationship was small. This scale similarly did not associate with hypothesized criterion variables (length of time in the United States, years of education in the United States, and generation status) in the original study. The validity of the intended construct is questionable. As was previously noted, face validity suggests that Preferred Latino Affiliation items assess an individual's preference for a romantic partner or a family member's partner only. Therefore, additional research to modify the existing scale (e.g., develop additional items representing other areas of preferred affiliation) may be required to more comprehensively and accurately assess the construct.

Acculturation and cultural identity measurement is lagging behind the rapid theoretical and conceptual advances in the field. Nevertheless, advancements are emerging. For instance, the field appears to have shifted from the use of measures based on the unidimensional understanding of acculturation to a more multidimensional conceptualization and measurement framework with measures like the MMCISL. Although contemporary conceptualizations of

acculturation and cultural identity have introduced additional salient cultural dimensions, appropriate psychometric analyses are required to establish evidence of validity and reliability of the dimensions theorized to underlie these complex constructs. Multicultural researchers are encouraged to develop and refine instruments to consider the varying contextual factors that immigrant and U.S. Latinos encounter. Researchers could strengthen the state of the science by conducting confirmatory factor analyses and measurement invariance tests, in addition to validity and reliability analyses when implementing acculturation and cultural identity measures with the heterogeneous U.S. Latino population. Such efforts potentially will yield more psychometrically sound versions of existing scales and produce additional measures assessing new constructs concerning U.S. Latino mental health. The development and improvement of such measures are as critical as the interventions they assess and the research questions they attempt to answer. These measures are an important link between our theoretical models and the day-to-day experiences of Latinos in the United States. Therefore, ensuring the reliability and validity of these measures ultimately improves the science that eventually impacts the well-being of Latinos in the United States.

While the original conceptual framework of the MMCISL could not be completely supported in the current study, future research could build upon the findings through further scale development studies. For instance, future research is needed to further develop the Feminism, Respeto, Perceived Discrimination, and Latino Activism scales items because of their small existing item sets that inconsistently represent these important theoretical domains. Although the reliability estimates and factor structures of the English Language Proficiency and Spanish Language Preference scales were confirmed, these scales also cannot be recommended for use until future research develops a broader set of items to ensure construct validity across all potential participants. The Familiarity with Latino Culture scale and the Familiarity with U.S. Culture scale can be recommended for use as is, yet future researchers are encouraged to assess measurement invariance when investigating samples representing wide age ranges. Finally, the Preferred Latino Affiliation scale demonstrated the strongest reliability and construct validity estimates, yet weak criterion validity. Therefore future research again is recommended to increase the item set of this scale to ensure that cultural-identity researchers are measuring what they intend to measure when using the MMCISL.

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Figure 1. Confirmatory factor analysis model and results

Note: For standardized path coefficients, regular font = Mothers sample (n = 158) *italicized* font = Daughters Sample (n = 158) **bold** font = Mothers and Daughters sample (n = 316)

Table 1

Demographic Summary

Variable	Mothers (<i>n</i> = 158)	Daughters (<i>n</i> = 158)	Total (<i>n</i> = 316)	Mother-daughter group difference tests
Age	<i>M</i> = 52.30, <i>SD</i> = 9.87	<i>M</i> = 27.52, <i>SD</i> = 9.01	<i>M</i> = 39.91, <i>SD</i> = 15.59	$F(1, 315) = 543.58, p < .001, \eta^2 = .63$
Nativity				$\chi^2(1, N = 316) = 32.49, p < .001, \eta^2 = .10$
Caribbean	<i>n</i> = 65	<i>n</i> = 32	<i>n</i> = 97	
Central America	<i>n</i> = 19	<i>n</i> = 18	<i>n</i> = 37	
South America	<i>n</i> = 48	<i>n</i> = 35	<i>n</i> = 83	
United States	<i>n</i> = 26	<i>n</i> = 73	<i>n</i> = 99	
Assistance with immigration	Yes = 85, No = 44	Yes = 64, No = 22	Yes = 149, No = 66	$\chi^2(1, N = 316) = 1.76, p = .23, \eta^2 < .00$
Family of origin socioeconomic status ^a	<i>M</i> = 2.01, <i>SD</i> = 0.68	<i>M</i> = 2.01, <i>SD</i> = 0.53	<i>M</i> = 2.01, <i>SD</i> = 0.61	$F(1, 313) = 0.01, p = .99, \eta^2 < .00$
Personal income ^b	<i>M</i> = 2.94, <i>SD</i> = 2.21	<i>M</i> = 3.46, <i>SD</i> = 2.62	<i>M</i> = 3.19, <i>SD</i> = 2.43	$F(1, 313) = 3.59, p = .06, \eta^2 = .01$
Educational level ^c	<i>M</i> = 2.41, <i>SD</i> = 1.21	<i>M</i> = 2.53, <i>SD</i> = 1.10	<i>M</i> = 2.47, <i>SD</i> = 1.16	$F(1, 314) = 0.72, p = .40, \eta^2 < .00$
Employment status (percent employed)	44.00%	59.00%	52.00%	$\chi^2(1, N = 316) = 6.70, p = .01, \eta^2 = .02$
Generation status in the United States				$\chi^2(2, N = 316) = 31.59, p < .001, \eta^2 = .08$
Immigrant	<i>n</i> = 132	<i>n</i> = 86	<i>n</i> = 218	
1st generation	<i>n</i> = 13	<i>n</i> = 41	<i>n</i> = 54	
2nd generation	<i>n</i> = 2	<i>n</i> = 15	<i>n</i> = 17	
3 or more generations	<i>n</i> = 11	<i>n</i> = 16	<i>n</i> = 27	
Percentage of lifetime in the United States	47.29%	64.87%	56.08%	$F(1, 315) = 1939, p < .001, \eta^2 = .06$
Education in the United States ^d	<i>M</i> = 1.75, <i>SD</i> = 2.03	<i>M</i> = 3.46, <i>SD</i> = 1.91	<i>M</i> = 2.60, <i>SD</i> = 2.15	$F(1, 315) = 58.91, p < .001, \eta^2 = .16$
Visits to country of origin (or family's country of origin)	<i>M</i> = 1.00, <i>SD</i> = 1.34	<i>M</i> = 0.85, <i>SD</i> = 1.40	<i>M</i> = 0.93, <i>SD</i> = 1.37	$F(1, 315) = 0.89, p = .35, \eta^2 < .00$

^a 1 = poorer than most; 2 = about the same as others; 3 = richer than most.

^b 1 = \$0 to \$4,999; 2 = \$5,000 to \$9,999; 3 = \$10,000 to \$14,999; 4 = \$15,000 to \$19,999; 5 = \$20,000 to \$24,999; 6 = \$25,000 to \$29,999; 7 = \$30,000 to \$34,999; 8 = \$35,000 to \$39,999; 9 = \$40,000 to \$49,999; 10 = \$45,000 to \$49,999; 11 = \$50,000 or more.

^c 1 = less than high school; 2 = high school diploma or equivalent; 3 = post high school training; 4 = bachelor's degree; 5 = graduate degree.

d_0 = less than or equal to 1 year; 1 = 1.5 to 2.5 years; 2 = 3 to 4 years; 3 = 5–6 years; 4 = more than 7 years; 5 = all my education was in the United States.

Table 2
Multidimensional Measure of Cultural Identity for Latinos' Reliability and Validity Estimates

Scale	No. of items	Likert scale	Total score range	Interpretation of scores	Item content	α	Criterion validity
Spanish Language Proficiency	3	1 = <i>not at all</i> , 2 = <i>fair</i> , 3 = <i>good</i> , 4 = <i>excellent</i>	3–12	High scores indicate more proficiency in Spanish	Items ask how well a participant speaks, reads, and writes Spanish	.88	Correlated with acculturation scale ^a , $r = -.83$ generation status, $r = -.66$ number of years educated in the United States, $r = -.40$ length of time in the United States, $r = -.31$
English Language Proficiency	3	1 = <i>not at all</i> , 2 = <i>fair</i> , 3 = <i>good</i> , 4 = <i>excellent</i>	3–12	High scores indicate more proficiency in English	Items ask how well a participant speaks, reads, and writes English	.91	Correlated with acculturation scale ^a , $r = .21$ generation status, $r = .18$ number of years educated in the United States, $r = .20$ length of time in the United States, $r = .22$
Familiarity with Latino Culture	4	1 = <i>I don't know anything about these</i> , 2 = <i>I know very little about these</i> , 3 = <i>I know something about these</i> , 4 = <i>I know a lot about these</i>	4–16	High scores indicate more familiarity with Latino culture	Items assess participants' familiarity with (a) fine art and artists, (b) history and politics, (c) cultural legends and symbols, and (d) popular entertainers of their Latin American country	.77	Correlated with acculturation scale ^a , $r = -.45$ generation status, $r = -.23$ number of years educated in the United States, $r = -.40$ length of time in the United States, $r = -.39$
Familiarity with U.S. Culture	4	1 = <i>I don't know anything about these</i> , 2 = <i>I know very little about these</i> , 3 = <i>I know something about these</i> , 4 = <i>I know a lot about these</i>	4–16	High scores indicate more familiarity with U.S. culture	Items assess participants' familiarity with (a) fine art and artists, (b) history and politics, (c) cultural legends and symbols, and (d) popular entertainers of the United States	.69	Correlated with acculturation scale ^a , $r = .31$ length of time in the United States, $r = .20$
Perceived Discrimination	3	1 = <i>completely agree</i> , 3 = <i>neutral</i> , 5 = <i>completely disagree</i>	3–15	High scores indicate less endorsement of perceived discrimination	Items measure participants' perceptions of unfair treatment in educational, social, and general contexts	.72	Correlated with U.S. residency, $r = -.15$
Respeto	3	1 = <i>completely agree</i> , 3 = <i>neutral</i> , 5 = <i>completely disagree</i>	3–15	High scores indicate less endorsement of Respeto	Items measure participants' beliefs about the need for children to be obedient to and assist adults	.77	Correlated with acculturation scale ^a , $r = -.17$

Scale	No. of items	Likert scale	Total score range	Interpretation of scores	Item content	α	Criterion validity
Feminism	3	1 = <i>completely agree</i> , 3 = <i>neutral</i> , 5 = <i>completely disagree</i>	3–15	High scores indicate less endorsement of feminism	Items measure participants' attitudes regarding traditional sex roles in a marriage and family	.81	None
Spanish Language Preference	4	1 = <i>only English</i> , 3 = <i>both equally</i> , 5 = <i>only Spanish</i>	4–20	High scores indicate higher preference for Spanish than English language	Items ask the language participants prefer to use in different contexts (i.e., television viewing, radio listening, television and radio listening with friends)	.87	Correlated with acculturation scale ^a , $r = -.61$ generation status, $r = -.31$ number of years educated in the United States, $r = -.22$ length of time in the United States, $r = -.24$
Latino Activism	4	Two items (involvement in Latino political activities, involvement in minority school activities) use 1 = <i>all of the time</i> , 3 = <i>sometimes</i> , 5 = <i>never</i> ; two items (preferred ethnicity of teachers and doctors) use 1 = <i>accept only a Latino</i> , 3 = <i>have no preference</i> , 5 = <i>accept only a White</i>	4–20	High scores indicate less Latino activism	Items ask participants to indicate how active they are in Latino political activities, including general activities, school activities, and their preferred ethnicity of their teachers and doctors	.79	Correlated with U.S. residency, $r = -.15$
Preferred Latino Affiliation	3	1 = <i>accept only a Latino or Latina</i> , 3 = <i>have no preference</i> , 5 = <i>accept only a White</i>	3–15	Low scores indicate more affiliation with Latinos than with Whites	Items ask participants' preferred Latino or White affiliation in choosing (a) a boyfriend or girlfriend for themselves, (b) a boyfriend or girlfriend for a member of their family, and (c) a partner for marriage	.89	Correlated with acculturation scale ^a , $r = -.27$

Note. From Félix-Ortiz, Newcomb, and Myers (1994).

^aFrom Marin, Sabogal, Marin, Otero-Sabogal, and Perez-Stable (1987).

Table 3

Internal Consistency Estimates for the Multidimensional Measure of Cultural Identity for Latinos

Scale	α		
	Mother subsample (<i>n</i> = 158)	Daughter subsample (<i>n</i> = 158)	Total sample (<i>n</i> = 316)
Spanish Language Preference	.87	.83	.87
Spanish Language Proficiency	.90	.91	.91
English Language Proficiency	.94	.97	.96
Familiarity with Latino Culture	.82	.79	.80
Familiarity with U.S. Culture	.78	.80	.79
Feminism	.72	.68	.70
Respeto	.62	.64	.63
Perceived Discrimination	.66	.79	.73
Preferred Latino Affiliation	.82	.82	.81
Latino Activism	.47	.38	.42

Table 4
Correlations Between Multidimensional Measure of Cultural Identity for Latinos Factor Scores

Scale	Spanish Language Proficiency			English Language Proficiency			Familiarity with Latino Culture			Familiarity with U.S. Culture		
	I	II	III	I	II	III	I	II	III	I	II	III
Spanish Language Proficiency	1.00	1.00	1.00									
English Language Proficiency	0.08	-.37**	-.17**	1.00	1.00	1.00						
Familiarity with Latino Culture	.62**	.53**	.58**	-.16*	-.23**	-.21**	1.00	1.00	1.00			
Familiarity with U.S. Culture	.17*	-.21**	-.04	.54**	.63**	.57**	.23**	0.02	.12*	1.00	1.00	1.00
Preferred Latino Affiliation	0.03	-0.08	-0.02	0.03	0.11	0.07	-0.03	-0.04	-0.04	.02	-.01	.02

Note. Total $n = 316$. I = mother sample ($n = 158$); II = daughter sample ($n = 158$); III = total sample.

* $p < .05$.

** $p < .001$.

Table 5
Model Selection Indexes Comparing Types of Measurement Invariance

Scale	χ^2	df	$\Delta\chi^2$	Δdf	p	CFI	ΔCFI	RMSEA	$\Delta RMSEA$
Spanish Language Proficiency									
Configural	6.34	5				0.998		0.041	
Weak	8.15	7	1.81	2	0.41	0.998	0.000	0.032	-0.009
Strong	12.75	9	4.60	2	0.10	0.995	-0.003	0.052	0.02
Strict	14.77	12	2.02	3	0.57	0.996	0.001	0.038	-0.014
English Language Proficiency									
Configural	8.48	5				0.997		0.067	
Weak	11.64	7	3.16	2	0.10	0.996	-0.001	0.065	-0.002
Strong	103.88	12	92.24	5	0.00	0.921	-0.075	0.222	0.157
Strict	—	—	—	—	—	—	—	—	—
Familiarity with Latin Culture									
Configural	13.63	15				1.000		0	
Weak	21.87	18	8.24	3	0.04	0.991	-0.009	0.037	0.037
Strong	30.4	22	8.53	4	0.07	0.980	-0.011	0.05	0.013
Strict	34.9	24	4.50	2	0.11	0.975	-0.005	0.054	0.004
Familiarity with U.S. Culture									
Configural	24.6	13				0.970		0.076	
Weak	19.02	15	-5.58	2	0.06	0.990	0.020	0.041	-0.035
Strong	24.74	17	5.72	2	0.06	0.981	-0.009	0.054	0.013
Strict	40.2	25	15.46	8	0.05	0.967	-0.014	0.063	0.009
Preferred Latino Affiliation									
Configural	2.8	4				1.000		.000	
Weak	3.68	5	0.88	1	0.35	1.000	0.000	.000	.000
Strong	7.45	8	3.77	3	0.29	1.000	0.000	.000	.000
Strict	10.93	11	3.48	3	0.32	1.000	0.000	.000	.000

Note. CFI = comparative fit index; RMSEA = root-mean-square error of approximation.

Table 6
Correlations Between Multidimensional Measure of Cultural Identity for Latinos Factor Scores and Hypothesized Correlates

Variable	Familiarity with U.S. Culture	English Language Proficiency	Spanish Language Proficiency	Familiarity with Latino Culture	Preferred Latino Affiliation
Time in the United States	0.35**	0.34**	-0.31**	-0.35**	-0.01
Generation status	0.20*	0.34**	-0.75**	-0.49**	0.01
Nativity ^a	-0.22**	-0.85**	0.23**	0.30**	0.00
Education in the United States ^b	0.69**	0.80**	-0.52**	-0.52**	0.03
Visits to country of origin	0.26*	-0.06	0.08	-0.37**	-0.24*

Note. Total $n = 316$.

^a 0 = U.S. born, 1 = non-U.S. born.

^b 0 = less than or equal to 1 year, 1 = 1.5 to 2.5 years, 2 = 3 to 4 years, 3 = 5–6 years, 4 = more than 7 years.

5 = all my education was in the United States.

* $p < .05$.

** $p < .001$.