**Testing the construct validity and empirical distinctiveness of the Multicultural Identity Styles Scale (MISS) and the Bicultural Identity Integration Scale (BIIS-2)**

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Abstract

The Bicultural Identity Integration Scale (BIIS-2) and the Multicultural Identity Styles Scale (MISS) were designed to assess different aspects of bicultural identity. The BIIS-2 captures characteristics of a bicultural identity in the domains of affect (Harmony vs Conflict) and cognition (Blendedness vs Compartmentalization). The MISS measures two distinct strategies (Hybrid and Alternating Identity Styles) used to achieve and maintain a bicultural identity. The aims of the present study were to investigate the factor structures of MISS and BIIS-2 scores using confirmatory factor analysis and to examine potential construct overlap between the two measures using exploratory structural equation modeling (ESEM). Measures were administered twice (11 days apart) to a sample of 836 Hispanic young adults in the United States. Confirmatory factor analytic results supported the two-factor structure of the MISS. The BIIS-2 items patterned onto four factors: Harmony, Conflict, Blendedness, and Compartmentalization. Configural, metric, and scalar equivalence of the factor structures of both measures were established across time. The ESEM indicated no salient cross-loadings between the MISS and the BIIS-2 subscales, and this independence was consistent across time. Inter-factor correlations indicated a strong, positive relationship between the Hybrid Identity Style and BII-Blendedness subscales. Scores on the Alternating Identity Styles subscale were positively related to the BII-Conflict, BII-Compartmentalization, and BII-Blendedness subscales. Overall, findings provide evidence for the construct validity of the MISS and its empirical distinctiveness from the BIIS-2 and suggest a 4-factor structure for the BIIS-2.

*Keywords: Alternating identity style; Blendedness vs Compartmentalization; CFA; construct validity; discriminant validity; ESEM; Harmony vs Conflict; Hybrid identity style*

**Public Significance Statement:** The study suggests that the Multicultural Identity Styles Scale (MISS) and the Bicultural Identity Integration Scale (BIIS-2) assess distinct aspects of a bicultural identity. Additionally, findings confirm the construct validity of the MISS with a sample of Hispanic young adults and indicate a potential 4-factor structure for the BIIS-2.

**Testing the construct validity and empirical distinctiveness of the Multicultural Identity Styles Scale (MISS) and the Bicultural Identity Integration Scale (BIIS-2)**

Decades of research have indicated that biculturalism, i.e., the integration of multiple cultural streams into one’s behavioral repertoire, value system, and identity, is associated with psychosocial benefits (Nguyen & Benet-Martínez, 2013). Several measures have been developed to describe, assess, and unpack biculturalism in the domains of behaviors, values, and identity (see Celenk & van de Vijver, 2014 for an overview). However, when new measures are introduced, it is crucial to determine their empirical distinctiveness from existing instruments to avoid construct proliferation (i.e., the accumulation of seemingly different measures that assess identical constructs). The present study focuses on examining construct overlap between two assessment tools, the Bicultural Identity Integration Scale-2 (BIIS-2; Huynh, Benet-MartÍnez, & Nguyen, 2018) and the Multicultural Identity Styles Scale (MISS; Ward, Ng Tseung-Wong, Szabo, Qumseya, & Bhowon, 2018), both of which were developed to assess aspects of biculturalism in the identity domain.

Haritatos and Benet-Martínez (2002) introduced Bicultural Identity Integration (BII) as an overarching framework to explore “individual differences in the way biculturals perceive the intersection between their mainstream and ethnic cultures” (pp. 599). BII includes two dimensions: cultural harmony versus conflict and cultural blendedness versus compartmentalization. Cultural harmony versus conflict represents an affective evaluation of cultural identities as being harmonious and compatible as opposed to dissonant and incompatible. Cultural blendedness versus distance refers to a cognitive appraisal of cultural identities as being integrated and overlapping rather than separated and compartmentalized.

More recently, Ward et al. (2018) have discussed the importance of distinguishing between two aspects of bicultural identity integration: the ‘what it is’ (i.e., content) and the ‘how it is achieved’ (i.e., process). Identity content refers to the domains of identity that are developing, encompassing core issues, concerns and topics that relate to one’s sense of self and identity. Identity process, on the other hand, represents the ways in which people engage with these specific issues, concerns and topics when they consider their sense of self and identity (McLean, Syed, & Shucard, 2016; Yip, Seaton, & Seller, 2016). Extending theorizing by LaFromboise, Coleman, and Gerton (1993), Ward et al. (2018) operationalized hybridizing and alternating as two strategies (or identity styles) that may be used to create and maintain a bicultural identity. The hybrid identity style denotes the process of innovatively combining elements of multiple cultures, whereas the alternating identity style may be used to accentuate elements of one culture or the other depending on the context. Ward and colleagues have argued that BII captures the structural and emotional characteristics of an integrated bicultural identity (e.g., concerns of compatibility and overlap between cultural identity aspects), whereas the MISS elucidates how it might be achieved and maintained (e.g., through activities that promote hybridizing or alternating).

Although the BII and the hybridizing-alternating frameworks describe conceptually different aspects of bicultural identity development (content versus process), evidence regarding the discriminant validity of the measurement tools designed to capture an integrated bicultural identity (i.e., BIIS-2) and cultural identity styles (i.e., MISS) is limited to correlational (Ward et al., 2018) and cross-lagged (Schwartz et al., 2019) analyses of scale scores. Whereas the alternating identity style has been shown to evidence no or weak relationships with both BII components, previous studies have consistently found a positive, moderately strong correlation (*r*s ranging from .45 to .62) between the hybrid identity style and BII-Blendedness.

As both the BIIS-2 and the MISS are newly developed instruments, limited empirical research is available on their construct validity in different contexts and ethno-cultural groups. The current study was conducted with a sample of Hispanic young adults living in Miami, a highly bicultural city where 70% of the population are Hispanic. Miami is a unique context within the United States (US) characterized by strong Hispanic cultural practices, values, and identifications that are simultaneously influenced by US cultural forces (Aranda, Hughes, & Sabogal, 2014). Consequently, the first aim of the study was to demonstrate that the two instruments were functioning as expected in this particular context and ethno-cultural group before investigating any potential item overlap. We examined the factor structure of the MISS and the BIIS-2 separately, using confirmatory factor analysis. Construct validity was further investigated by testing the longitudinal equivalence of the factor structure (configural equivalence), the regression weights (metric equivalence), and the intercepts (scalar equivalence).

The second aim of the study was to explore the extent to which the BIIS-2 and the MISS items assess distinct phenomena of bicultural identity, using exploratory structural equation modelling (ESEM). ESEM is an integration of exploratory and confirmatory factor analysis that allows for free estimation of cross-loadings and yields more accurate parameter estimates and factor intercorrelations (Asparouhov & Muthén, 2009). ESEM can be a useful technique not only for testing the structure of multidimensional constructs, but also for examining item overlap and empirical distinctiveness of established measures. ESEM thus provides information about discriminant validity. It was expected that if the BIIS-2 and the MISS would be found to assess separate constructs and that items would load on their respective target factors without any salient cross-loadings.

**Method**

**Procedure and Participants**

Data were drawn from the first and last day assessments within a 12-day diary study (Meca et al., 2018). Participants self-identifying as Hispanic or Latina/o were recruited from a psychology department participant pool at a public university in Miami where approximately 65% of students were Hispanic. Data were collected across ten weekly cohorts of approximately 90 participants each. Data for the present article are taken from the first (Day 1) and last (Day 12) assessments for each cohort, when the full measures were administered. These assessments took approximately one hour to complete. Participants received course credit in exchange for their participation. The study was approved by the Institutional Review Board at the Florida International University. The current sample included 836 Hispanic college students (75.8% female) with an average age of 21 years (*SD* = 3 years; range: 18-29). Respondents were a mix of first (35%), second (38%), and later (27%) generation immigrants of Hispanic descent. Participants, or their families, originated from 20 different countries in Latin America including Cuba (41%), Colombia (13%), Nicaragua (7.5%), Venezuela (7%), the Dominican Republic (6.5%), and other Hispanic countries (25%). Students from all college levels participated: 27.6% freshmen, 15% sophomores, 30.3% juniors, and 27.1% seniors. We asked participants to describe their ethnicity in their own words and 70% self-identified as Hispanic, 15% stated their nationality (e.g., Cuban), 3% identified as Latino/a/x, and 12% provided an abstract definition (e.g., human). Additional demographic information on socioeconomic status, language proficiency, and skin tone1 is reported in the supplementary files. Most participants responded to questions on both Day 1 and Day 12 (*n* = 682; 82% of the total sample), but there was a small minority of students who responded only on Day 1 (n = 94; 11% of the total sample) or on Day 12 (n = 60; 7% of the total sample). Students who provided responses on Day 1 only were included in analyses conducted on data from Day 1 (682 + 94 = 776). Students who provided responses on Day 12 only were included in analyses conducted on data from Day 12 (682 + 60 = 742). Consequently, the sample sizes for analyses on Day 1 and Day 12 are *n* = 776 and *n* = 742, respectively.

**Measures**

Both measures used a 5-point scale (anchored using 1 = strongly disagree and 5 = strongly agree). The *Multicultural Identity Styles Scale* (MISS) assesses hybrid and alternating identity styles with seven items each (Ward et al., 2018). Sample items include ‘For me being Hispanic and being American are intermingled’ and ‘I alternate between being Hispanic and American depending on the circumstances’. The MISS was developed and validated with ethno-cultural groups in New Zealand (Chinese, Greek, Arabic), Israel (Arabic), and Mauritius (Hindu, Muslim and Creole). Reliability on Day 1 was ω = .898 for the Hybrid Identity Style scores and ω = .843 for the Alternating Identity Style scores. Reliability on Day 12 was ω = .931 for Hybrid Identity Style scores and ω = .875 for Alternating Identity Style scores.

The *Bicultural Identity Integration Scale* (BIIS-2) assesses bicultural identity blendedness (7 items) and bicultural identity harmony (10 items; Huynh et al., 2018). Sample items include ‘I cannot ignore the Hispanic or American side of me’ (Blendedness) and ‘I feel torn between Hispanic and American cultures’ (Harmony). The BIIS-2 was developed and validated with a diverse sample of bicultural university students in the United States, with Asian Americans consisting of more than 47% of the total sample and Latinos/as accounting for around 27%. The BIIS-2 consists of both positively and negatively phrased items. Reliability on Day 1 was ω = .697 for Blendedness and ω = .666 for Harmony. Reliability on Day 12 was ω = .764 for Blendedness and ω = .762 for Harmony. Items from both scales are reported in the Supplementary Files.

**Statistical Analysis**

First, we tested the construct validity and longitudinal invariance (configural, metric, and scalar) of the BIIS-2 and the MISS, using confirmatory factor analysis (CFA) in Mplus7 (Muthén & Muthén, 2017). Model fit was evaluated using the following cut-off values for acceptable fit: .95 for the Comparative Fit Index (CFI), .06 for the Root Mean Square Error of Approximation (RMSEA), and .08 for the Standardized Root Mean Square Residual (SRMR; Tabachnick & Fidell, 2007). Although the chi-square test is reported, we did not use this index to inform decisions about model fit, as it has been shown to be overpowered in large samples and complex models (Davey & Savla, 2010). Longitudinal equivalence (configural, metric, and scalar) from Day 1 to Day 12 was tested by comparing increasingly restricted models. Models were compared based on differences in the CFI, RMSEA, and SRMR indices between days. A decrease of .01 or more in the CFI and an increase of .01 or more in the RMSEA and SRMR were considered as indicating substantial decline in model fit (Little, 2013).

Next, construct overlap between the measures was examined using ESEM. Models including both the BIIS-2 and MISS items were estimated using oblique geomin rotation (Asparouhov & Muthén, 2009). To compare solutions with differing numbers of factors, we estimated two models for each comparison: (a) a more parsimonious model with *k* factors and (b) a more complex model with *k*+1 factors. Although all items were allowed to freely load on all factors, cross-loadings larger than .30 were considered as salient (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Longitudinal invariance tests were conducted to examine the configural, metric and scalar equivalence of the ESEM structure over time. Model fit was evaluated using the same criteria used in the CFA. Missing data were handled using full information maximum likelihood estimation so that all cases could be included in all analyses.

**Results**

**Research Aim 1: Construct Validity of the BIIS-2 and the MISS**

The 2-factor structure for the BIIS-2 fit the data poorly (Table 1), and modification indices suggested multiple pairs of error terms with large intercorrelations. The BIIS-2 subscales consist of both positively and negatively phrased items, which can be associated with method effects (Brown, 2015). Further, Huynh et al. (2018) have reported evidence for the separation of Conflict and Harmony factors but argued they can be considered as parts of a higher order factor. Therefore, we tested four alternative models sequentially, and compared them against each other: (a) a 2-factor model accounting for correlated uniqueness (CU) among positively and negatively phrased items; (b) a 2-factor model with method factors underlying the positively and negatively phrased items; (c) a 4-factor model of harmony, conflict, blendedness and distance; and (d) a 4-factor model with two higher order factors representing affect (consisting of conflict and harmony) and cognition (consisting of blendedness and compartmentalization). Although each model yielded improved fit compared to the original 2-factor model, the 4-factor model (model c) provided the best overall fit to the data across days. Whereas the 2-factor model with underlying method factors provided virtually the same fit as the 4-factor model on Day 1, the 4-factor model provided a significantly better fit on Day 12. The 4-factor model also demonstrated configural, metric, and scalar equivalence over time (Table 1).

The 2-factor (hybrid and alternating) structure of the MISS yielded acceptable fit to the data (Table 2). Although the CFI was slightly below the recommended threshold of .95, all other fit indices were in the expected range. The 2-factor MISS model demonstrated acceptable configural, metric, and scalar equivalence over time (Table 2).

**Research Aim 2: Construct Overlap Between the BIIS-2 and the MISS**

On Day 1, the fit of the ESEM including both the BIIS-2 and MISS items improved up until the 6-factor model (Table 3). Standardized factor loadings are reported in Table 4. Hybrid and Alternating Identity Style items loaded saliently on their respective target factors without salient secondary loadings. Positively and negatively phrased items from the BII-Harmony and BII-Blendedness subscales separated into distinct factors indicating factors for BII-Harmony, BII-Conflict, BII-Blendedness, and BII-Compartmentalization.

On Day 12, the fit of the ESEM including both the BIIS-2 and MISS items improved up until the 5-factor model (Table 3). The 6-factor model did not converge due to a large negative residual variance involving one of the BII-Compartmentalization items (BII17). In the 5-factor model, Hybrid and Alternating Identity Style items loaded saliently on their respective target factors without salient secondary loadings. Positively and negatively phrased items from the BII-Harmony subscale separated into distinct factors of BII-Harmony and BII-Conflict. Positively phrased items from BII-Blendedness separated into a distinct factor, whereas negatively phrased items (BII16 and BII17) loaded on the BII-Conflict subscale. Standardized factor loadings are reported in Table 4.

BII-Harmony and BII-Blendedness were strongly and positively intercorrelated (Day 1: *r* = .55, *p* < .001; Day 12: *r* = .55, *p* < .001). BII-Harmony evidenced moderately strong, negative correlations with BII-Conflict (Day 1: *r* = -.33,*p* < .001; Day 12: *r* = -.29, *p* < .001) and BII-Compartmentalization (Day 1: *r* = -.35, *p* < .001; Day 12: N/A). BII-Blendedness correlated weakly and negatively with BII-Conflict (Day 1: *r* = -.15, *p* < .001; Day 12: *r* = -.17, *p* < .001) and moderately strongly and negatively with BII-Compartmentalization (Day 1: *r* = -.49, *p* < .001; Day 12: N/A). The MISS-Hybrid Identity Style was moderately and positively associated with BII-Harmony (Day 1: *r* = .36, *p* < .001; Day 12: *r* = .48, *p* < .001), and strongly and positively associated with BII-Blendedness (Day 1: *r* = .68, *p* < .001; Day 12: *r* = .76, *p* < .001). Further, the MISS-Hybrid Identity Style was negatively and moderately strongly related to BII-Compartmentalization (Day 1: *r* = .37, *p* < .001; Day 12: N/A) and showed no systematic correlation with BII-Conflict (Day 1: *r* = -.03, *p* = .478; Day 12: *r* = -.17, *p* < .001). The MISS-Alternating Identity Style was very weakly and negatively related to BII-Harmony (Day 1: *r* = -.10, *p* < .020; Day 12: *r* = -.09, *p* = .033), but showed moderately strong, positive associations with BII-Conflict (Day 1: *r* = .36, *p* < .001; Day 12: *r* = .37, *p* < .001) and weak, positive correlations with BII-Compartmentalization (Day 1: *r* = .18, *p* < .001; Day 12: N/A) and BII-Blendedness (Day 1: *r* = .14, *p* < .001; Day 12: *r* = .10, *p* = .022). The MISS- Alternating and MISS-Hybrid Identity Style scores were weakly and positively intercorrelated (Day 1: *r* = .28, *p* < .001; Day 12: *r* = .21, *p* < .001).

**Discussion**

**Construct Validity of the BIIS-2 and the MISS**

Findings provide evidence for the construct validity of the MISS in a sample of Hispanic university students studying in Miami. The CFA confirmed the two-factor (Hybrid and Alternating Identity Styles) structure of the MISS and supported a conclusion of longitudinal invariance. These findings suggest that the MISS functioned as intended in this sample and context. Furthermore, the relationship between the latent hybrid and alternating identity style constructs and their manifest indicators was invariant over a short follow-up period.

Results also suggested that the BIIS-2 may be characterized by a more complex structure than the two-factor interpretation of Harmony vs Conflict and Blendedness vs Compartmentalization. Specifically, as negatively and positively phrased items in each domain loaded on different factors, Blendedness was distinguished from Compartmentalization, and Harmony was distinguished from Conflict, with weak to moderate negative intercorrelations between each pair. These distinctions are not without precedent. Huynh et al. (2018) initially reported a three-factor solution (Blendedness, Harmony, and Conflict) in the development and validation of the BIIS-2; however, a two-factor solution was recommended on conceptual grounds, i.e., that Harmony and Conflict can be viewed as subfactors of a higher order dimension. We tested this alternative explanation, along with models accounting for correlated uniqueness and method factors underlying the positively and negatively phrased items. However, our analyses consistently supported the 4-factor model.

Overall, these findings suggest that harmony versus conflict and blendedness versus compartmentalization are not necessarily opposite endpoints of the same dimension. They may operate somewhat independently and capture qualitatively different aspects of bicultural identity. Further, it does not appear that this distinction can be solely attributed to measurement error. These findings provide new insights into the factor structure of the BIIS-2, which have important implications for BII theorizing. However, it is important to note that data were collected from a group of Hispanic young adults (with a limited age range), who live in the Miami area and attend a university with predominantly Hispanic students. It is possible that this nuanced distinction between different aspects of BII is specific to highly diverse and multicultural contexts. The young adult period may also be distinctive, as it is marked by a focus on developing one’s sense of identity – both cultural and personal (Umaña-Taylor et al., 2014). Furthermore, the 6-factor ESEM did not converge on Day 12 because of a large negative error variance, and this could be a result of Compartmentalization being assessed with only two items, leading to problems with model identification (Kline, 2011). The compartmentalization items loading with the conflict items on Day 12 might reflect a method effect, although this was not supported by the CFA results. It is also important to note that BIIS-2 originally included more compartmentalization items (Huynh, Nguyen, & Benet-Martínez, 2011), which were removed from the scale over time (Huynh et al., 2018). Therefore, we advise the reader to interpret these findings with caution, and we recommend that future studies investigate the factor structure of the BIIS-2 in different contexts and samples.

**Construct Overlap Between the BIIS-2 and the MISS**

In the ESEM, the MISS demonstrated a simple factor structure, with no salient secondary loadings on any of the BII factors (Sass & Schmitt, 2010). This provides support for the empirical distinctiveness between the MISS and the BIIS-2. We suggest the essence of the distinction is the BIIS-2’s measurement of the characteristic *features* of a bicultural identity and the MISS’s assessment of the *strategies* used to maintain a bicultural identity. While they manifest conceptually and empirically distinct aspects of a bicultural identity, the factor correlations indicate that they are co-occurring constructs. For example, someone who perceives their cultural identities as overlapping is much more likely to use a hybridizing strategy for maintaining this identity. In contrast, someone whose cultural identities are perceived to be incompatible is more likely to use alternating as an identity strategy.

Beyond the factor structure of scores generated by the two measures, we also examined the relationship between the BIIS-2 and MISS factors. The relationship between the hybrid identity style and Blendedness replicates previous research reporting a strong positive correlation between the two constructs (Ward et al., 2018). The positive association between the hybrid identity style and Harmony has also been previously demonstrated by Schwartz et al. (2019). They have suggested that the tendency to perceive cultural identities as blended and to feel that they are in harmony is likely to produce a bicultural self through mixing and merging. This type of bicultural self is associated with a more consolidated bicultural identity and greater psychological well-being (Ward et al., 2018).

With respect to the alternating identity style, previous studies have found a negative relationship with the Harmony-Conflict dimension (Ward et al., 2018; Schwartz et al., 2019), but our results suggest that this finding was likely driven by the alternating style’s positive association with Conflict. This differential association provides further support for the uniqueness of Harmony and Conflict as separate factors. The alternating style was also associated with Compartmentalization, suggesting that alternating involves separating one’s cultural identities. This is a novel finding that links alternating identities to the compartmentalized identity configuration, characterized by a fragmented sense of self and lack of coherence between cultural identity aspects, proposed by Yampolsky, Amiot, and de la Sablonière (2016). At the same time, the alternating style evidenced a weak, positive relationship with blendedness. Earlier research, however, using Blendedness versus Compartmentalization as opposite poles has found no relationship between AIS and Blendedness (Schwartz et al., 2019; Ward et al. 2018). These results together indicate that the role of alternating might be more complex. Although alternating is strongly linked with conflict and compartmentalization as suggested by Roccas and Brewer (2002), it is also associated with blending (albeit this relationship was much weaker), suggesting that alternating may provide a means of maintaining two cultural identities without having to choose between them (LaFromboise et al., 1993). These seemingly contradictory findings are consistent with the assumptions of process-focused identity theory, suggesting that identity processes can be positively or negatively related to psychosocial outcomes depending on how successfully they are implemented by the individual (Meca, Eichas, Schwartz, & Davis, 2020).

**Limitations**

The sample has limitations that need to be considered when interpreting and generalizing our findings to other populations. First, the study included participants who identified as Hispanic and it is possible that the utilization of the term Hispanic discouraged participants who identify as Latino/a/x from participating. Women (76%) were overrepresented in the sample. While common in research conducted with undergraduate students (Dickinson, Adelson, & Owen, 2012), this gender bias limits the generalizability of findings. Further, as discussed above, the study was carried out in a context that is highly diverse and unique within the United States. Replication of the results reported in this manuscript is needed and we encourage readers to test the factor structure of the measures in different contexts and ethno-cultural groups. Finally, longitudinal assessments were conducted 11 days apart, which is considered a short-term follow-up, and students were completing a daily diary on their experiences in between. Future research should investigate how a longer follow-up period would impact longitudinal invariance and to what extent participation in a daily diary study might influence repeated assessments.

**Conclusions**

We investigated the construct (factor structure and longitudinal invariance) and discriminant validity of the BIIS-2 and the MISS. Overall, the study supports the factor structure of the MISS and its empirical distinctiveness from the BIIS-2. The two instruments assess different aspects of bicultural identity. Our findings confirmed the factor structure of the MISS in a sample of Hispanic university students, which was consistent with results obtained from community samples of a range of ethnic groups across three countries. This strengthens existing evidence regarding the cross-cultural applicability and use of the measure with participants of diverse backgrounds. Further, results provide new insights into the factor structure of scores generated by the BIIS-2, suggesting that harmony vs. conflict and blendedness vs. compartmentalization do not necessarily represent opposite ends of the same continuum. Instead, they might denote different qualities of bicultural identity. More research is needed to unpack the complexity of the BIIS-2 and to probe the 4-factor structure with diverse samples and in multiple contexts. However, if confirmed, the 4-factor model of the BIIS-2 would open a fruitful avenue for revising and advancing theory on bicultural identity. This could bring us closer to construct an integrative framework that includes both the process and outcomes of bicultural identity integration.

**Footnotes**

1. The concept of race is not well established within the Hispanic/Latino community. A report by the Pew Research Center indicated that two thirds of those with Hispanic ancestry see being Hispanic as part of their racial background (Parker, Horowitz, Morin, & Lopez, 2015). As a result, Hispanics do not often identify with any racial classification. As seen in the 2010 and 2000 census reports, 37% and 42% of individuals with Hispanic ancestry selected “Other” for Race and wrote in options such as “Mexican”, “Hispanic”, or “Latin American” (Humes, Jones, & Ramirez, 2011). For that reason, we asked participants to identify themselves across a skin tone continuum.

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Table 1. *Confirmatory factor analysis and longitudinal invariance of the BIIS-2*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Models | χ*2* | *df* | *χ2/df* | *CFI* | *RMSEA (90%CI)* | *SRMR* | Comparison | Δ*CFI* | *ΔRMSEA* | *ΔSRMR* |
| **Day 1** |  |  |  |  |  |  |  |  |  |  |
| M1: 2-factor model | 1113.78 | 118 | 9.43 | .714 | .105 (.099; .110) | .133 |  |  |  |  |
| M2: 2-factor model (CU positive & negative items) | 335.22 | 88 | 3.81 | .929 | .060 (.054; .067) | .100 | M1 vs M2 | .215 | -.045 | -.033 |
| M3: 2-factor model with method factors | 240.08 | 101 | 2.38 | .960 | .042 (.035; .049) | .054 | M2 vs M3 | .031 | -.018 | -.046 |
| M4: 4-factor model | 238.42 | 113 | 2.11 | .964 | .038 (.031; .045) | .049 | M3 vs M4 | .004 | -.004 | -.005 |
| M5: 4-factor model with 2 higher order factors | 378.47 | 116 | 3.26 | .925 | .054 (.048; .060) | .101 | M4 vs M5 | -.039 | .016 | .052 |
| **Day 12** |  |  |  |  |  |  |  |  |  |  |
| M1: 2-factor model | 1405.72 | 118 | 11.91 | .676 | .122 (.116; .128) | .195 |  |  |  |  |
| M2: 2-factor model (CU positive & negative items) | 434.67 | 88 | 4.94 | .913 | .073 (.066; .080) | .133 | M1 vs M2 | .237 | -.049 | -.062 |
| M3: 2-factor model with method factors | 300.47 | 101 | 2.97 | .950 | .052 (.045; .059) | .072 | M2 vs M3 | .037 | -.021 | -.061 |
| M4: 4-factor model | 244.57 | 113 | 2.16 | .967 | .040 (.033; .047) | .059 | M3 vs M4 | .017 | -.012 | -.013 |
| M5: 4-factor model with 2 higher order factors | 499.81 | 116 | 4.31 | .904 | .067 (.061; .073) | .132 | M4 vs M5 | -.063 | .027 | .073 |
| **Longitudinal invariance of the 4-factor model** |  |  |  |  |  |  |  |  |  |  |
| MC: Configural | 809.14 | 482 | 1.68 | .964 | .029 (.025; .032) | .052 |  |  |  |  |
| MM: Metric | 827.36 | 495 | 1.67 | .964 | .028 (.025; .032) | .053 | MC vs MM | <.000 | -.001 | .001 |
| MS: Scalar | 878.03 | 512 | 1.71 | .960 | .029 (.026; .033) | .054 | MM vs MS | -.004 | .001 | .001 |

*Note.* CU = Correlated Uniqueness; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence interval; SRMR = Standardized Root Mean Square Residual

Table 2. *Confirmatory factor analysis and longitudinal invariance of the MISS*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Models | χ*2* | *df* | *χ2/df* | *CFI* | *RMSEA (90%CI)* | *SRMR* | Comparison | Δ*CFI* | *ΔRMSEA* | *ΔSRMR* |
| **Day 1** |  |  |  |  |  |  |  |  |  |  |
| 2-factor MISS | 263.62 | 76 | 3.47 | .942 | .057 (.049; .064) | .061 |  |  |  |  |
| **Day 12** |  |  |  |  |  |  |  |  |  |  |
| 2-factor MISS | 281.27 | 76 | 3.70 | .944 | .061 (.053; .068) | .064 |  |  |  |  |
| **Longitudinal invariance** |  |  |  |  |  |  |  |  |  |  |
| MC: Configural | 775.11 | 330 | 2.35 | .949 | .040 (.037; .044) | .059 |  |  |  |  |
| MM: Metric | 803.00 | 342 | 2.35 | .947 | .040 (.037; .044) | .062 | MC vs MM | .002 | .000 | .003 |
| MS: Scalar | 835.84 | 356 | 2.35 | .945 | .040 (.037; .044) | .062 | MM vs MS | .002 | .000 | .000 |

*Note.* CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence interval; SRMR = Standardized Root Mean Square Residual

Table 3. *Exploratory structural equation model fit indices (Day 1 and Day 12)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Models | χ*2* | *df* | *χ2/df* | *CFI* | *RMSEA (90%CI)* | *SRMR* | Δ*CFI* | *ΔRMSEA* | *ΔSRMR* |
| **Day 1** |  |  |  |  |  |  |  |  |  |
| 1-factor | 6230.58 | 434 | 14.36 | .491 | .131 (.128; .134) | .159 |  |  |  |
| 2-factor | 2943.23 | 404 | 7.29 | .777 | .090 (.087; .093) | .062 | .286 | -.041 | -.097 |
| 3-factor | 1909.89 | 375 | 5.09 | .865 | .073 (.069; .076) | .043 | .088 | -017 | -.019 |
| 4-factor | 1253.46 | 347 | 3.61 | .920 | .058 (.055; .061) | .032 | .055 | -.015 | -.011 |
| 5-factor | 839.17 | 320 | 2.62 | .954 | .046 (.042; .050) | .024 | .034 | -.012 | -.008 |
| 6-factor | 583.28 | 294 | 1.98 | .975 | .036 (.031; .040) | .019 | .021 | -.010 | -.005 |
| 7-factor | 465.17 | 269 | 1.73 | .983 | .031 (.026; .035) | .017 | .008 | -.005 | -.002 |
| **Day 12** |  |  |  |  |  |  |  |  |  |
| 1-factor | 7313.51 | 434 | 16.85 | .511 | .146 (.143; .149) | .179 |  |  |  |
| 2-factor | 3544.63 | 404 | 8.77 | .777 | .102 (.099; .105) | .071 | .266 | -.044 | -.108 |
| 3-factor | 1977.70 | 375 | 5.27 | .886 | .076 (.073; .079) | .040 | .109 | -.026 | -.031 |
| 4-factor | 1235.52 | 347 | 3.56 | .937 | .059 (.055; .062) | .031 | .051 | -.017 | -.009 |
| 5-factor | 807.76 | 320 | 2.52 | .965 | .045 (.041; .049) | .021 | .028 | -.014 | -.010 |
| 6-factor | No convergence | | | | | | | | |
| 7-factor | No convergence | | | | | | | | |

*Note*. CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual

Table 4. *Standardized factor loadings (Day 1/Day 12)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Items | Harmony | Conflict | Blended | Compart. | Hybrid | Alternating |
| **Harmony** |  |  |  |  |  |  |
| BIIS 1 | **.76\*\*\*/.61\*\*\*** | .02/.00 | .01/.27\*\*\* | -.08/ NA | .11\*/.03 | -.02/-.02 |
| BIIS 2 | **.42\*\*\*/.54\*\*\*** | -.11\*/-.12\*\* | .01/-.01 | .08/ NA | .04/-.03 | -.02/-.02 |
| BIIS 3 | **.75\*\*\*/.69\*\*\*** | .00/.00 | .04/.18\*\* | -.12\*/ NA | -.01/.09 | -.01/.02 |
| BIIS 4 | **.57\*\*\*/.62\*\*\*** | -.24\*\*\*/-.03 | .03/.00 | .10\*/ NA | -.01/-.04 | -.01/.03 |
| BIIS 5 (R) | -.02/-.03 | **.75\*\*\*/.80\*\*\*** | -.04/.01 | .12\*\*/ NA | .04/-.01 | -.03/.01 |
| BIIS 6 (R) | -.07/.05 | **.42\*\*\*/.75\*\*\*** | .02/-.06 | .**34\*\*\***/ NA | .04/-.04 | -.04/.02 |
| BIIS 7 (R) | .10\*/.08 | **.55\*\*\*/.59\*\*\*** | .01/.08 | .03/ NA | .01/.07 | .05/-.01 |
| BIIS 8 (R) | -.02/-.02 | **.69\*\*\*/.81\*\*\*** | -.04/.09 | .10\*/ NA | .03/.08 | -.02/-.04 |
| BIIS 9 (R) | .10\*/.10\*\* | **.68\*\*\*/.73\*\*\*** | .04/-.08 | -.01/ NA | -.10\*/-.07 | .07\*/.11\*\* |
| BIIS 10 (R) | .04/-.02 | **.83\*\*\*/.88\*\*\*** | .00/.00 | -.04/ NA | -.03/.03 | .04/-.04 |
| **Blended** |  |  |  |  |  |  |
| BIIS 11 | .08/.01 | -.04/.01 | **.66\*\*\*/.75\*\*\*** | .04/ NA | -.05/-.08 | .07\*/.09\*\* |
| BIIS 12 | .05/.11\*\* | .01/-.04 | **.75\*\*\*/.78\*\*\*** | -.05/ NA | .08/.04 | -.03/.00 |
| BIIS 13 | .01/-.04 | .14\*\*/.21\*\*\* | **.55\*\*\*/.52\*\*\*** | .00/ NA | -.01/.12\* | .04/-.01 |
| BIIS 14 | -.04/-.01 | .00/-.02 | **.79\*\*\*/.86\*\*\*** | .00/ NA | .11\*/.04 | -.04/-.01 |
| BIIS 15 | .20\*\*\*/-.04 | -.02/-.01 | **.62\*\*\*/.82\*\*\*** | -.06/ NA | .02/.05 | .06\*/-.06\* |
| BIIS 16 (R) | .00/-.20\*\*\* | .01/**.44\*\*\*** | -.02/-.07 | **.81\*\*\*/** NA | -.05/-.16\*\* | .00/-.08\* |
| BIIS 17 (R) | -.02/-.20\*\*\* | .07/**.43\*\*\*** | -.07/.00 | **.68\*\*\*/** NA | -.03/-.19\*\*\* | .06/.18\*\*\* |
| **Hybrid** |  |  |  |  |  |  |
| MISS 1 | .14\*\*/.01 | -.02/.00 | -.08/.01 | .01/ NA | **.74\*\*\*/.82\*\*\*** | -.01/.05 |
| MISS 2 | .00/.01 | .05/.03 | .03/.05 | -.03/ NA | **.75\*\*\*/.83\*\*\*** | .03/-.02 |
| MISS 3 | .04/-.10\*\* | .01/.00 | -.02/-.05 | .01/ NA | **.83\*\*\*/.92\*\*\*** | .04/-.01 |
| MISS 4 | -.06/.08\* | .00/-.01 | .19\*\*\*/.06 | -.02/ NA | **.71\*\*\*/.78\*\*\*** | -.01/-.01 |
| MISS 5 | -.03/.04 | -.02/-.09\*\*\* | .11\*/.22\*\*\* | -.04/ NA | **.74\*\*\*/.62\*\*\*** | .01/.06\* |
| MISS 6 | .02/.03 | -.04/-.01 | .05/.15\* | .04/ NA | **.41\*\*\*/.35\*\*\*** | .21\*\*\*/.23\*\*\* |
| MISS 7 | .14\*\*/.00 | .04/.02 | .04/.10\* | -.03/ NA | **.61\*\*\*/.77\*\*\*** | .00/.02 |
| **Alternating** |  |  |  |  |  |  |
| MISS 8 | -.02/.04 | .01/-.07\*\* | -.05/.03 | -.11\*\*/ NA | .02/-.04 | **.83\*\*\*/.90\*\*\*** |
| MISS 9 | -.01/.08\* | -.04/-.09\*\* | .08/-.05 | .01/ NA | .20\*\*\*/.11\* | **.64\*\*\*/.80\*\*\*** |
| MISS 10 | -.02/-.06 | .07/.18\*\*\* | -.03/-.02 | .00/ NA | .01/.03 | **.65\*\*\*/.60\*\*\*** |
| MISS 11 | -.10\*/-.18\*\*\* | .18\*\*\*/.12\*\* | .05/.04 | .04/ NA | -.03/.01 | **.46\*\*\*/.57\*\*\*** |
| MISS 12 | .04/.06 | -.03/.04 | .02/-.04 | .10/ NA | .15\*\*/.21\*\* | **.45\*\*\*/.51\*\*\*** |
| MISS 13 | -.04/-.03 | .01/.05 | .04/-.04 | .03/ NA | -.02/.05 | **.64\*\*\*/.67\*\*\*** |
| MISS 14 | .06/-.09\* | .02/.05 | -.05/.14\*\* | -.01/ NA | -.01/-.06 | **.71\*\*\*/.69\*\*\*** |

*Note.* Salient loadings (> .30) in boldface; \**p* < .05, \*\**p* < .01, \*\*\**p* < .001; (R): reverse scored items; NA = not applicable

**Supplementary File**

Title: Testing the construct validity and empirical distinctiveness of the Multicultural Identity Styles Scale (MISS) and the Bicultural Identity Integration Scale (BIIS-2)

The Bicultural Identity Integration Scale–Version 2 items

|  |
| --- |
| **Harmony vs Conflict** |
| BIIS 01 I find it easy to harmonize Hispanic and American cultures. |
| BIIS 02 I rarely feel conflicted about being bicultural. |
| BIIS 03 I find it easy to balance both Hispanic and American cultures. |
| BIIS 04 I do not feel trapped between the Hispanic and American cultures. |
| BIIS 05 I feel torn between Hispanic and American cultures. (reverse-coded) |
| BIIS 06 Being bicultural means having two cultural forces pulling on me at the same time. (reverse-coded) |
| BIIS 07 I feel that my Hispanic and American cultures are incompatible. (reverse-coded) |
| BIIS 08 I feel conflicted between the American and Hispanic ways of doing things. (reverse-coded) |
| BIIS 09 I feel like someone moving between two cultures. (reverse-coded) |
| BIIS 10 I feel caught between the Hispanic and American cultures. (reverse-coded) |
| **Blendedness vs Compartmentalization** |
| BIIS 11 I cannot ignore the Hispanic or American side of me. |
| BIIS 12 I feel Hispanic and American at the same time. |
| BIIS 13 I relate better to a combined Hispanic-American culture than to Hispanic or American culture alone. |
| BIIS 14 I feel Hispanic-American. |
| BIIS 15 I feel part of a combined culture. |
| BIIS 16 I do not blend my Hispanic and American cultures. (reverse-coded) |
| BIIS 17 I keep Hispanic and American cultures separate. (reverse-coded) |

The Multicultural Identity Styles Scale (MISS) items

|  |
| --- |
| **Hybrid Identity Style** |
| MISS 01 For me, being Hispanic and being American are intermingled. |
| MISS 02 I see myself as a culturally unique mixture of Hispanic and American. |
| MISS 03 I am a “mélange” of American and Hispanic. |
| MISS 04 The Hispanic and American in me form one: Hispanic American. |
| MISS 05 I am a blend of Hispanic and American. |
| MISS 06 I am Hispanic in an American way. |
| MISS 07 For me, being Hispanic and being American come together in a culturally novel way. |
| **Alternating Identity Style** |
| MISS 08 I alternate between being Hispanic and American depending on the circumstances. |
| MISS 09 I can be Hispanic or American depending on the situation. |
| MISS 10 I have a Hispanic private self and an American public self. |
| MISS 11 Some situations make it hard to be Hispanic and American at the same time. |
| MISS 12 I am very Hispanic with my family compared with other people. |
| MISS 13 Who I am depends on the social context. |
| MISS 14 I am Hispanic at home and American at school/work. |

Demographic information on socioeconomic status and language proficiency

|  |  |  |
| --- | --- | --- |
|  | | % |
| *Father's educational background* | |  |
| Did not graduate from high school | | 13.2% |
| High school graduate | | 24.3% |
| Some college | | 24.3% |
| College graduate | | 24.2% |
| Master's degree | | 8.7% |
| Doctoral degree | | 5.2% |
| *Mother's educational background* | |  |
| Did not graduate from high school | | 7.4% |
| High school graduate | | 22.2% |
| Some college | | 29.2% |
| College graduate | | 26.4% |
| Master's degree | | 10.4% |
| Doctoral degree | | 4.5% |
| *Annual household income* | |  |
| Below $25,000 | | 15.3% |
| $25,000 to $49,999 | | 29.5% |
| $50,000 to $74,999 | | 22.4% |
| $75,000 to $99,999 | | 13.0% |
| $100,000 to $149,99 | | 11.7% |
| $150,000 to $199,999 | | 3.4% |
| $200,000 and above | | 4.8% |
| *Spanish language proficiency* | |  |
| Not at all | | 0.4% |
| I know some words | | 3.1% |
| I can have a basic conversation | | 10.1% |
| I speak it well, but I'm not fluent | | 23.3% |
| I am fluent | | 63.1% |
| *English language proficiency* | |  |
| Not native speaker | | 8.7% |
| Native speaker | | 91.3% |
| *Skin tone continuum* | |  |
| 1 (lightest color) | | 5.6% | | |
| 2 | | 22.4% | | |
| 3 | | 25.8% | | |
| 4 | | 20.1% | | |
| 5 | | 12.9% | | |
| 6 | | 6.4% | | |
| 7 | | 3.5% | | |
| 8 | | 2.7% | | |
| 9 | | 0.6% | | |
| 10 (darkest color) | | 0.0% | | |