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# Biculturalism and Adjustment: A Meta-Analysis

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## Abstract

Biculturalism (having two cultures) is a growing social phenomenon that has received considerable attention in psychology in the last decade; however, the issue of what impact (if any) biculturalism has on individuals' adjustment remains empirically unclear. To answer this question, we conducted a meta-analysis that included 83 studies, 322 rs, and 23,197 participants. Results based on the random-effects approach show a significant, strong, and positive association between biculturalism and adjustment (both psychological and sociocultural). This biculturalism-adjustment link is stronger than the association between having one culture (dominant or heritage) and adjustment. Thus, our results clearly invalidate early sociological accounts of this phenomenon, which portrayed bicultural individuals as “marginal” and stumped between two worlds. Analyses also indicate that the association between biculturalism and adjustment is moderated by how acculturation is measured, the adjustment domain, and sample characteristics.

## Keywords

biculturalism, acculturation, cultural orientation, adjustment, adaptation

Globally, the frequency and extent of intercultural contact and intercultural interactions are increasing rapidly with advances in technology (e.g., Skype), ease of travel, the spread of culture via media and the Internet, immigration, and economic globalization. As a result, many individuals are exposed to and internalize more than one culture and become bicultural or multicultural (Benet-Martínez, in press; Hong, Morris, Chiu, & Benet-Martínez, 2000; Nguyen & Benet-Martínez, 2007). These bicultural individuals may be immigrants, refugees, sojourners (e.g., international students, expatriates), indigenous people, ethnic minorities, those in interethnic relationships, and mixed-ethnic individuals (Berry, 2006a; Padilla, 2006). In the United States alone, 13% of the population is foreign-born, 34% is non-White, and 20% speaks a language other than English at home (U.S. Census Bureau, 2006). In addition, in countries such as Canada and Australia, more than one-fifth of the population is foreign-born, and in Singapore, an astonishing two-fifths of the population is foreign-born (United Nations Statistics Division, 2011).

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Moreover, these numbers do not include the children and grandchildren of foreign-born migrants, as well as individuals who have lived extensively abroad, who may also be considered bicultural. Because of its societal importance, biculturalism has received considerable attention in psychology in the last decade (Nguyen & Benet-Martínez, 2007); however, the issue of what effect (if any) biculturalism has on individuals' adjustment remains unclear. Although some sociological and clinical accounts of this phenomenon have linked biculturalism to the experience of marginality and maladjustment (e.g., Gordon, 1964; Rudmin, 2003; Vivero & Jenkins, 1999), several acculturation studies report important benefits for biculturalism (e.g., Berry, Phinney, Sam, & Vedder, 2006; Phinney, Horenczyk, Liebkind, & Vedder, 2001). This significant yet unanswered question is the focus of our meta-analytic study.

### *Acculturation and Biculturalism*

Biculturalism and acculturation are tightly intertwined, with biculturalism being one of four ways to acculturate; therefore, we briefly review acculturation theories and the definition of biculturalism from an acculturation standpoint before delving further into our discussion of biculturalism. Acculturation is the *process* of learning and adapting to a new culture (Berry, 2003). In the last 25 years, a wealth of acculturation studies has supported the conceptualization of acculturation as a bilinear (rather than unilinear), two-directional (rather than one-directional), multidomain, complex process (Flannery, Reise, & Yu, 2001; Miller, 2007; Ryder, Alden, & Paulhus, 2000; Tsai, Ying, & Lee, 2000; for a review, see Sam & Berry, 2006; Schwartz, Unger, Zamboanga, & Szapocznik, 2010). In other words, rejecting one's heritage (or ethnic minority) culture and replacing it with the dominant culture is not the only way to acculturate.

The bilinear, multidimensional models of acculturation propose that acculturating individuals face two central issues (Berry, 1980; Polgar, 1960; Sue & Sue, 1971): (1) the *dominant* cultural orientation (sometimes referred to as the acculturation outcome; Kim & Abreu, 2001; Miller, 2007), reflecting the extent to which acculturating individuals are involved with the host or mainstream culture, and (2) the *heritage* cultural orientation (sometimes referred to as the enculturation outcome; Kim & Abreu, 2001; Miller, 2007), capturing the extent to which they are involved with their ethnic minority or nondominant culture. These two cultural orientations apply to multiple dimensions or domains: language use or preference, social affiliation, daily living habits, cultural traditions, communication style, cultural identity/pride, perceived discrimination/prejudice, generational status, family socialization, and cultural knowledge, beliefs, or values (Zane & Mak, 2003). More broadly, acculturating individuals may be involved in both, either, or neither cultures with regard to their behaviors or practices, values and beliefs, or identity [i.e., Boski's (2008) "integration" as partial/functional specialization; Berry, 2003; Mariño, Stuart, & Minas, 2000; Miller, 2007; Schwartz et al., 2010].

The interaction of the dominant and heritage cultural orientations results in four possible distinct acculturation strategies: integration<sup>1</sup> (orientation to both cultures, that is *biculturalism*), assimilation (orientation to the dominant culture only), separation (orientation to the heritage culture only), or marginalization (orientation to neither cultures). Thus, biculturalism is one of four possible acculturation strategies, where acculturating individuals integrate the behaviors, values, and identities pertaining to each of their two cultures. However, bicultural individuals do not comprise a homogenous group; bicultural individuals (or individuals using the integration strategy) may differ in *how* they negotiate and combine their two cultures. More specifically, some bicultural individuals may have alternating versus blended or fused cultures (LaFromboise, Coleman, & Gerton, 1993; Phinney & Devich-Navarro, 1997), or harmonious and blended versus conflictual and compartmentalized cultures [i.e., Boski's (2008) "integration" as competence

and frame-switching and “integration” as cultural fusion; Benet-Martínez, Leu, Lee, & Morris, 2002; Huynh, Nguyen, & Benet-Martínez, 2011].

Historically, acculturation has been measured unilinearly, bilinearly, and typologically (see Nguyen & Benet-Martínez, 2007, for a review of these issues). When acculturation is measured unilinearly, low scores represent separation, and high scores represent assimilation. Middle scores represent either equal engagement in both cultures (i.e., biculturalism) or equal disengagement in both cultures (i.e., marginalization); thus, unilinear scales confound biculturalism and marginalization. Bilinear acculturation measures (e.g., Donà & Berry, 1994; McFee, 1968; Szapocznik, Kurtines, & Fernandez, 1980; Ward & Kennedy, 1994) include two separate scales representing each cultural orientation, thus accurately reflecting the bilinear nature of acculturation. With this method, moderate to high scores on both subscales represent biculturalism. Lastly, the typological approach taps into each of the four acculturation strategies separately; higher scores on the integration subscale, as compared to other three subscales, represent biculturalism. (Note that we use “typological” to refer to measures with four subscales that directly assess each of the four acculturation strategies and not to bilinear measures. Although scores on bilinear measures could be used (via midpoint- or median-split, cluster analysis, or latent class analysis) to indicate in which of the four acculturation strategies respondents are engaged, these bilinear measures do not directly evaluate each of the strategies like typological measures do.) The main limitations of the typological approach have been lack of scale independence due to the use of categorical forced-choice responses with one option for each acculturation strategy [e.g., Unger, Gallaher, Shakib, Ritt-Olson, Palmer, & Johnson’s (2002) Acculturation, Habits, and Interests Multicultural Scale of Adolescents; see Rudmin, 2009; for a review] and the fact that these scales [e.g., Berry, Kim, Power, Young, & Bujaki’s (1989) Acculturation Attitudes scale] tend to assess attitudes and preferences regarding acculturation [i.e., Boski’s (2008) “integration” as attitudinal preferences] instead of actual acculturative changes.

### *Acculturation, Biculturalism, and Adjustment*

As mentioned earlier, acculturation is an important and pervasive psychological phenomenon affecting a considerable portion of the world’s population. Acculturation may also affect a wide range of outcomes, from mental health to interpersonal relations (Berry, 2006b). Two commonly examined outcomes in the acculturation literature are psychological and sociocultural adjustment (Schwartz et al., 2010). Psychological adjustment refers to psychological and emotional well-being, whereas sociocultural adjustment refers to behavioral competence (Ward & Kennedy, 1994). Psychological adjustment may include life satisfaction, positive affect, and self-esteem, as well as (low) alienation, anxiety, depression, loneliness, and negative affect. Conversely, sociocultural adjustment may include academic achievement, career success, and social skills, as well as (low levels of) behavioral problems, such as delinquency and risky sexual behaviors. From a review of the literature, we identified a third possible adjustment domain: health-related adjustment. Health-related adjustment may include (low levels of) somatic symptoms (e.g., headaches, back pains) as well as (high levels of) physical activity and healthy eating (e.g., Carvajal, Hanson, Romero, & Coyle, 2002; De Coteau, Hope, & Anderson, 2003; Schmitz, 1992b).

Some researchers have contended that biculturalism, relative to other acculturation strategies, is the most ideal, leading to greater benefits in all areas of life, including adjustment (e.g., Bankston & Zhou, 1997; Berry, 1997; Berry et al., 2006; Phinney et al., 2001; Suinn, Rickard-Figueroa, Lew, & Vigil, 1987). Bicultural individuals are likely to be the most well adjusted because they are competent in navigating both the dominant and heritage cultures (LaFromboise

et al., 1993), they have social support networks from both cultures (Mok, Morris, Benet-Martínez, & Karakitapoglu-Aygun, 2007), and the process of negotiating two cultures may translate to greater integrative complexity, intellectual flexibility, and creativity (Benet-Martínez, Lee, & Leu, 2006; Tadmor, Tetlock, & Peng, 2009). However, others have argued that this is not always the case, in that the process of dealing with two cultures places a burden on the individual and can lead to stress, isolation, and identity confusion (e.g., Gordon, 1964; Rudmin, 2003; Vivero & Jenkins, 1999). Empirical studies have shown that adjustment relates to acculturation in some way—either to one or both cultural orientations, or to one or more acculturation strategies (e.g., Neto, Barros, & Schmitz, 2005; Szapocznik, Kurtines, & Fernandez, 1980; Ward & Kennedy, 1994). For example, in a sample of over 5,000 acculturating adolescents across 13 countries, the integration strategy was positively associated with both psychological and sociocultural adjustment (Berry et al., 2006).

Not surprisingly, given the diversity of measurement choices and samples, findings on the biculturalism-adjustment relationship are mixed with regard to the direction and magnitude of this association. In fact, Rogler, Cortes, and Malgady (1991) reviewed 30 acculturation studies with Hispanic participants and found that the relationship between acculturation and mental health is inconclusive, with half the studies reporting positive relationships and the other half reporting negative relationships. They suggested that a meta-analysis be conducted. In response, Moyerman and Forman (1992) conducted a meta-analysis on acculturation and adjustment and concluded that the acculturation-adjustment relationship across different categories of adjustment (e.g., anxiety/stress, self-esteem, psychosocial/health problems) is inconsistent. The major weakness of the above literature review and meta-analysis (and a possible reason for the inconclusive findings for the acculturation-adjustment relationship) is that both studies conceptualized acculturation as unilinear (ranging from separation to assimilation), thus confounding (via juxtaposition) the dominant and heritage cultural orientations. In addition to the inaccurate unilinear conceptualization of acculturation, the use of typological measures may also yield misleading results as indicated by Rudmin's (2003) review of acculturation studies. He found that 28 out of 33 reported effect sizes for the biculturalism-maladjustment relationship were nonsignificant when typological measures were used. To more accurately review acculturation research, Yoon, Langrehr, and Ong (2011) conducted a meta-analysis on the relation between bilinear acculturation and psychological adjustment. They obtained nonsignificant results, probably due to the small number of studies included in the analyses ( $4 \leq k \leq 12$ ). The studies included in their meta-analyses were limited to those published in five major counseling journals.

Given the societal importance of biculturalism and these crucial empirical gaps, we sought to reconcile seemingly inconsistent findings in acculturation research by conducting a comprehensive meta-analysis of the biculturalism-adjustment literature based on the bilinear acculturation framework and with the inclusion of all three domains of adjustment (psychological, sociocultural, and health-related). Meta-analysis is a quantitative method for reviewing and synthesizing empirical findings (Rosenthal & DiMatteo, 2001). Moreover, it is useful for determining moderating variables of the relationship under investigation. Researchers have identified many possible moderators, such as demographic characteristics (e.g., gender, age, race or ethnicity, religion, and socioeconomic status or SES; Berry, 2006b; Moyerman & Forman, 1992; Phinney et al., 2001; Rotheram-Borus, 1990; Schwartz et al., 2010), factors relevant to migration (e.g., generation status, length of residence in host country, age of migration, voluntary vs. involuntary migration, and personality; Berry, 2006b; Boneva & Frieze, 2001; Nguyen & Benet-Martínez, 2010; Phinney et al., 2001; Rogler et al., 1991; Schwartz et al., 2010), and contextual factors relating to the host culture (e.g., ethnic composition of community, national policies, dominant group's attitudes toward acculturating individuals, experiences of discrimination, and similarity to heritage culture; Berry et al., 2006; Phinney et al., 2001; Rudmin, 2003; Schwartz et al., 2010;

Umaña-Taylor, Yazedjian, & Bamaca-Gomez, 2004; Yoon et al., 2011). Unfortunately, many of these possible moderator variables are not often measured. For example, out of 138 acculturation studies reviewed by Yoon et al. (2011), only four included information about social context (e.g., ethnic composition of community, school, or work).

In order to ensure enough studies with which to conduct analyses, we only included the most commonly measured moderating variables in our meta-analysis. That is, in addition to including the measurement of biculturalism and adjustment domain as possible moderators, we also explored the moderating role of host country (an indicator of social context), race, age, gender, and country of birth (an indicator of generation status) in our meta-analysis on biculturalism and adjustment. In summary, with the present meta-analysis, we aimed to answer the following questions:

1. How (positively, negatively, or not at all) and to what degree (weak, moderate, or strong) is biculturalism related to adjustment? Is biculturalism more strongly related to adjustment than is either cultural orientation (dominant or heritage) alone?
2. Is the biculturalism-adjustment relationship moderated by factors such as how biculturalism is measured (unilinearly, bilinearly, or typologically), adjustment domain (psychological, sociocultural, or health-related), and sample characteristics (host country, race, age, gender, and country of birth)?

## Method

### Search Strategy

We searched the psychological literature for empirical studies that investigated biculturalism and adjustment. Using the PsycINFO database, we searched for “bicultura\*” as a keyword and “integrat\* AND acculturat\*” as keywords. This bottom-up search strategy allowed us to review all empirical literature on biculturalism and to determine whether an adjustment variable was examined. In addition, using the most cited literature on biculturalism, we conducted forward searches (i.e., identified publications that cited those seminal biculturalism publications) and backward searches (i.e., identified the publications that were cited in those seminal biculturalism publications). These searches were conducted in July 2008.

**Inclusion/exclusion criteria.** From the PsycINFO search results, we only examined empirical studies written in English, research not relating to deaf-hearing biculturalism, and publications other than dissertations. As mentioned above, positive, negative, and null relationships between biculturalism and adjustment have been published in the literature with little indication of bias toward reporting only positive relationships; therefore, we chose not to seek out and include unpublished studies in our meta-analysis (see Limitations section below for a discussion of the file drawer problem and our fail-safe *N*).

Upon further examination of the PsycINFO results, we decided to not include studies in which the dominant and heritage cultures were unclear. Specifically, these were studies with Hong Kong Chinese participants and participants who are repatriates from the Former Soviet Union. In the study with Hong Kong Chinese participants (Cheung-Blunden & Juang, 2008), the two cultural orientations measured were Chinese and Western cultures; however, Chinese could be considered both the dominant and the heritage culture. In the studies with repatriates from the Former Soviet Union (e.g., Finnish from the Former Soviet Union in Finland; Eshel & Rosenthal-Sokolov, 2000; Jasinskaja-Lahti, Liebkind, Horenczyk, & Schmitz, 2003; Tartakovsky, 2002), the terms *dominant* and *heritage* culture would reference the same culture (e.g., Finnish).

In addition, we could only review studies that statistically analyzed and reported the association between acculturation (or cultural orientations) and adjustment. In some cases, correlations

(i.e., effect size  $r$ s) or  $t$  statistics, from which  $r$  could be calculated, were reported. If a study reported an omnibus  $F$  test, it must have also reported the means for each group, from which  $r$  could be calculated, to be included in this review. Similarly, if a study reported an omnibus  $\chi^2$  test, it must have also reported the counts or percentages for each group, from which  $r$  could be calculated, to be included in this review. A total of 159 studies that met the inclusion/exclusion criteria were found. (Note that “studies” refers to samples, not publications, such that one publication may consist of multiple studies and that one study may be described in multiple publications.)

### Organization of Studies

Most ( $k = 146$ ) studies provided data for two or more  $r$ s as an index of the relationship between acculturation and adjustment. Some studies measured acculturation using more than one scale, measured more than one dimension (e.g., behavior, values, identity) of acculturation, or measured more than one type of adjustment (e.g., life satisfaction, grades); therefore, more than one  $r$  was offered per study. The 159 studies yielded a total of 1,306  $r$ s. Because the topic of this meta-analysis is biculturalism, we excluded  $r$ s for associations between adjustment and the other acculturation strategies.<sup>2</sup> However, for comparison purposes, we included  $r$ s for the associations between adjustment and dominant and heritage cultural orientations. Thus, a total of 141 studies (935  $r$ s) were included in this meta-analysis. (See Table 1 for the distribution of the 141 studies across cultural orientation, measurement, and adjustment domain.)

The 159 studies (1,306  $r$ s) on acculturation and adjustment can be partitioned into 83 studies (322  $r$ s) on biculturalism (as compared to other acculturation strategies), 64 studies (262  $r$ s) on a dominant cultural orientation, and 71 studies (351  $r$ s) on a heritage cultural orientation. These numbers sum to more than the total number of studies because some studies examined biculturalism, a dominant cultural orientation, and a heritage orientation. Meta-analytic results involving acculturation strategies other than the integration strategy (i.e., the assimilation, separation, and/or marginalization strategies; 371  $r$ s) are not reported in this article.

Regarding the operationalization of acculturation, the 83 studies (322  $r$ s) on biculturalism can be divided into 33 studies (133  $r$ s) that measured cultural orientations bilinearly, 27 studies (108  $r$ s) that measured cultural orientations unilinearly, and 23 studies (72  $r$ s) that measured acculturation typologically or assessed acculturation strategies directly without using cultural orientations [e.g., using Berry et al.’s (1989) Acculturation Attitudes scale]. (See Appendix A for a list of the acculturation scales used in these studies.) The remaining 9  $r$ s (from 4 studies) involved acculturation measured by neither cultural orientations nor acculturation strategies, but in another way such as with self-reported ethnic labels. These numbers sum to more than the total number of studies because some studies operationally defined acculturation in multiple ways. All studies on a dominant and/or a heritage cultural orientation measured cultural orientations bilinearly.

In terms of adjustment, there were 52 studies (119  $r$ s) on the relationship between biculturalism and psychological adjustment, 51 studies (170  $r$ s) on the relationship between biculturalism and sociocultural adjustment, and 18 studies (31  $r$ s) on the relationship between biculturalism and health-related adjustment. [In reviewing the literature, we discovered that some researchers assessed adjustment via somatic symptoms (e.g., headaches, back pain), physical activity, healthy eating, etc.; therefore, we created a category called “health-related adjustment.”] The remaining 2  $r$ s (from 2 studies) involved adjustment measured as either a combination of psychological and sociocultural adjustment or a combination of psychological and health-related adjustment. These numbers sum to more than the total number of studies because some studies measured more than one type of adjustment. See Appendices B, C, and D for more information on the organization and characteristics of each study.

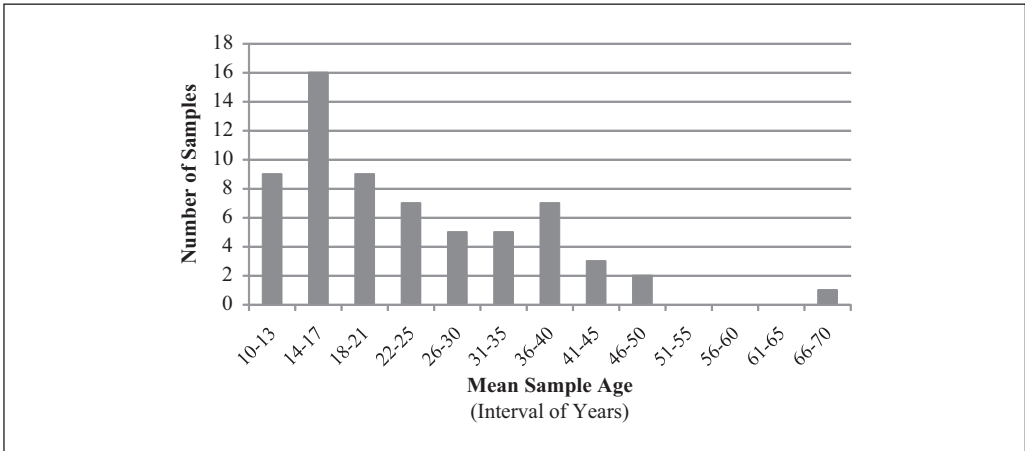
**Table 1.** Summary of the Meta-Analysis on the Association Between Acculturation and Adjustment Benefits

Acculturation and Moderator Variables	N of Studies		Total N of Subjects	Weighted Median <i>r</i>	Unweighted Median <i>r</i> and Range	Fixed-Effects: Weighted Mean <i>r</i>	Fixed-Effects: Unweighted Mean <i>r</i> and Confidence Interval	Random-Effects: Unweighted Mean <i>r</i> and Confidence Interval
	<i>k</i>	N of Effect Size <i>r</i> s	<i>N</i>	<i>Md</i>	<i>Md</i> (Min., Max.)	<i>M</i>	<i>M</i> [95% CI]	<i>M</i> [95% CI]
Biculturalism	83	322	23,197	.04	.07 (-.78, .87)	.05	.10 [.09, .12]	.51 [.48, .54]
Measurement of biculturalism								
Bilinear measures	33	133	6,578	.10	.11 (-.60, .75)	.11	.14 [.11, .16]	.70 [.68, .73]
Unilinear measures	27	108	12,395	.03	.05 (-.76, .87)	.02	.10 [.08, .12]	.54 [.49, .58]
Typological measures	23	72	4,007	.08	.01 (-.78, .63)	.08	.05 [.02, .08]	.21 [.12, .30]
Adjustment domain								
Psychological adjustment	52	119	11,195	.11	.11 (-.60, .48)	.08	.10 [.08, .12]	.48 [.44, .52]
Sociocultural adjustment	51	170	16,278	.04	.05 (-.78, .87)	.04	.11 [.09, .12]	.49 [.45, .53]
Health-related adjustment	18	31	3,724	-.02	-.02 (-.27, .34)	.02	.01 [-.02, .04]	.05 [-.04, .13]
Host country								
United States	53	234	17,989	.04	.11 (-.76, .87)	.04	.12 [.10, .13]	.62 [.59, .64]
Other countries	29	86	5,110	.08	.05 (-.78, .63)	.08	.07 [.04, .10]	.32 [.25, .39]
Sample race								
Latin samples	33	137	11,610	.04	.11 (-.78, .87)	.06	.12 [.10, .13]	.60 [.56, .64]
Asian samples	20	95	3,519	.07	.07 (-.42, .64)	.08	.10 [.07, .13]	.52 [.46, .58]
European samples	10	24	1,844	.08	.03 (-.18, .45)	.06	.06 [.02, .11]	.33 [.20, .44]
African samples	5	17	705	-.02	-.02 (-.23, .31)	.00	.00 [-.07, .08]	.01 [-.20, .21]
Indigenous samples	2	12	2,497	-.09	-.04 (-.14, .00)	-.08	-.04 [-.08, .00]	-.71 [-.89, -.32]
Dominant cultural orientation	64	262	18,406	.10	.13 (-.53, .72)	.11	.13 [.11, .14]	.62 [.60, .65]
Heritage cultural orientation	71	351	20,082	.05	.10 (-.25, .62)	.09	.11 [.10, .13]	.56 [.53, .59]

Note: Positive *r*s represent a positive relationship between biculturalism and adjustment benefits. Nine *r*s ( $k = 4$ ) involved biculturalism measured by neither cultural orientations nor acculturation strategies, but in another way such as with self-reported ethnic labels. Two *r*s involved adjustment measured as either a combination of psychological and sociocultural adjustment ( $k = 1$ ) or a combination of psychological and health-related adjustment ( $k = 1$ ). Two *r*s ( $k = 1$ ) involved samples from multiple countries, including the United States. Thirty-seven *r*s involved either a racially diverse sample ( $k = 12$ ) or a Middle Eastern sample ( $k = 1$ ).

### Statistical Analysis

All analyses were based on sample size ( $N$ ) and effect size ( $r$ ). Effect size  $r$ s were either reported in the studies or calculated from data provided in the studies (Rosenthal & Rosnow, 1991). If it was not possible to use either of these methods,  $r_{\text{equivalent}}$  was calculated using the sample size and exact  $p$  (Rosenthal & Rubin, 2003). In cases where neither effect sizes nor exact  $p$ s were provided, a  $p$  of .05 was used for significant results and a  $p$  of .50 was used for nonsignificant results (a conservative approach).



**Figure 1.** Distribution of Mean Age in Years Across Samples

Effect size  $r$  is an index of the direction and magnitude of the association between biculturalism and adjustment. Positive  $r$ s represent a positive relationship between biculturalism and adjustment benefits (e.g., positive adjustment, lack of maladjustment). So that no study affects the meta-analytic results more than other studies, all  $r$ s were weighted by the inverse of the number of  $r$ s per study. For example, if a study offered 2  $r$ s, each  $r$  would be weighted  $\frac{1}{2}$ , or 0.50, resulting in a study weight of 1.00. Consequently, all studies, regardless of whether multiple effect sizes were reported, had a weight of 1.00, and the assumption of independence of data was not violated. For each group of studies, the unweighted mean and median effect size  $r$ s as well as the median weighted by the number of participants were computed using Fisher’s  $z$  transformation of  $r$ s (Rosenthal & Rosnow, 1991). In addition, 95% confidence intervals around the mean effect size across studies were calculated to determine whether effect size  $r$ s were significantly different from 0.

To investigate the potential moderating effect of measurement type, adjustment domain, host country, and sample race on the biculturalism-adjustment relationship, each  $r$  was coded for whether (1) acculturation had been measured bilinearly, unilinearly, or typologically; (2) the adjustment domain was psychological, sociocultural, or health-related; (3) the host country was the United States versus “other”; and (4) samples consisted of Latin, Asian, African, Indigenous, or European participants.<sup>3</sup> (See Table 1 for the distribution of studies in host country and race categories.)

Mean effect size  $r$ s were computed separately for each level of the moderator variable. Contrast analyses (Rosenthal & Rosnow, 1991) based on previous research findings and our research questions were conducted to compare effect sizes among studies at each level of a moderator variable. To investigate the moderating effect of sample characteristics (other than race, which is a categorical variable), we computed Pearson product-moment correlations between the average  $r$  for each study and the mean age, percentage of female participants, and percentage of participants born outside the host country for each study. (See Figures 1, 2, and 3 for the distribution across studies of mean age, percentage of female participants, and percentage of participants born outside the host country.) A significant finding would indicate that the variable moderates the biculturalism-adjustment relationship.

**Fixed vs. Random Effects**

For these analyses, we chose a random-effects approach over a fixed-effects approach (Rosenthal & Rosnow, 1991). That is, we reported our results based on the random-effects approach;



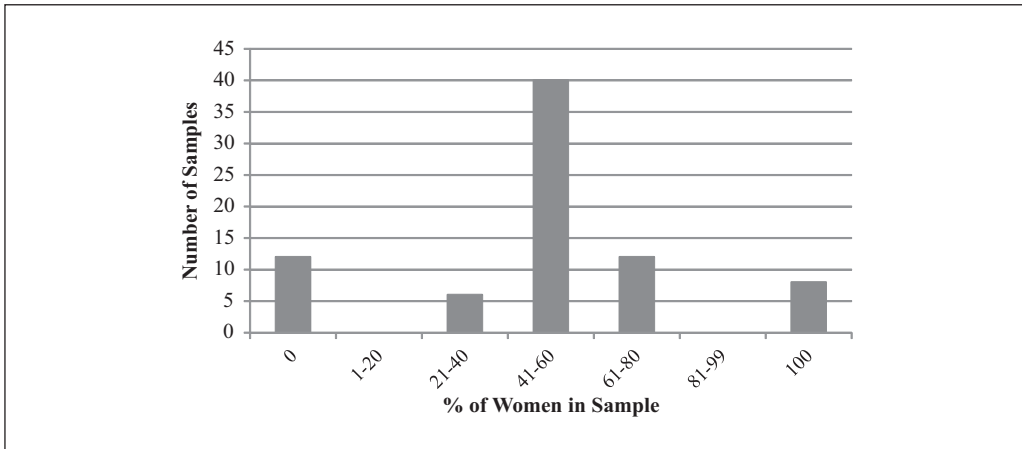


Figure 2. Percentage of Female Participants Across Samples

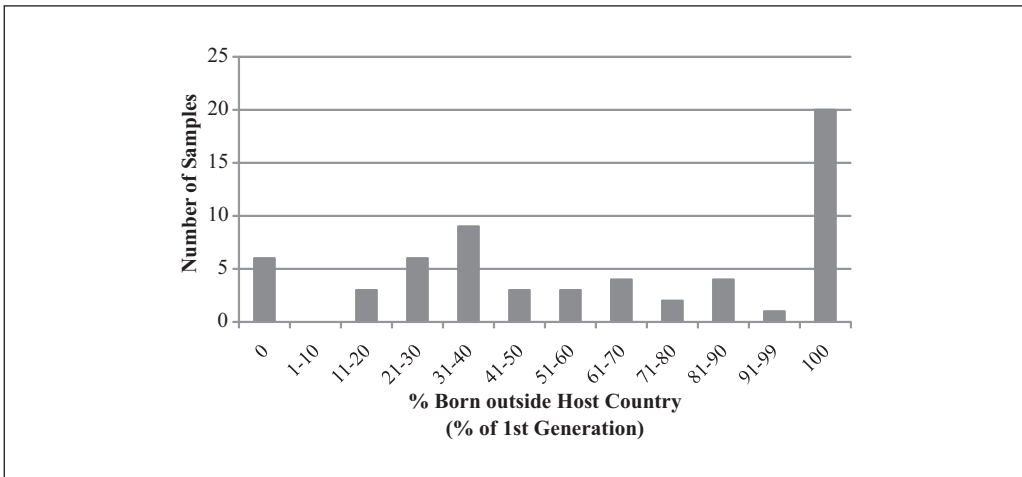


Figure 3. Across Samples, Percentage of Participants Born Outside Host Country (i.e., First-Generation Participants)

however, to provide a complete picture of the data, we provided results based on the fixed-effects approach in the footnotes. A fixed-effects approach uses participants as the unit of analysis and allows for generalization to other participants in the studies sampled, whereas a random-effects approach uses studies as the unit of analysis and allows for generalization beyond the studies sampled, such as future studies. Because the fixed-effects approach uses a larger sample size (number of participants rather than number of studies), this approach is more powerful and yields more significant results than the random-effects approach. When variability among effect sizes is low, fixed- and random-effects approaches tend to yield mean effect sizes of similar magnitude. However, when variability among effect sizes is high, the random-effects approach tends to yield stronger mean effect sizes because it treats variability among effect sizes as expected, whereas the fixed-effects approach treats it as error.<sup>4</sup> Because the random-effects approach allows for generalization to studies yet to be sampled, it is typically the preferred approach in meta-analysis (Rosenthal & DiMatteo, 2001); therefore, our interpretation of results will be based on the random-effects approach.

## Results

### General Biculturalism Results

Effect size  $r$ s for the 83 (of 141) studies examining only the biculturalism-adjustment relationship ranged from  $-.78$  to  $.87$ , with a mean of  $.51$  (95% confidence interval from  $.48$  to  $.54$ ).<sup>5</sup> This suggests a significant, strong association between biculturalism and positive adjustment, where participants who are more bicultural tend to be better adjusted, or better adjusted participants tend to report being more bicultural. (See Table 1 for a summary of mean and median  $r$ s and their 95% confidence intervals by cultural orientation, measurement, and adjustment domain.)

To appropriately compare the degree of association between adjustment and biculturalism with the association between adjustment and dominant or heritage cultural orientation, all three acculturation variables should be measured similarly. Because dominant and heritage cultural orientations were measured independently in every study (in accordance with the bilinear model of acculturation), only  $r$ s based on biculturalism measured bilinearly were included in the following analysis. To test whether the relationship with adjustment was stronger for biculturalism than for either dominant or heritage cultural orientation, we conducted contrast analyses with  $\lambda$  weights of  $+2$  for biculturalism,  $-1$  for dominant cultural orientation, and  $-1$  for heritage cultural orientation. The biculturalism-adjustment association was significantly stronger than the association between each cultural orientation and adjustment,  $r_{\text{alerting}}(166) = .92, p < .0001$  (biculturalism: unweighted mean  $r = .70$ , dominant cultural orientation: unweighted mean  $r = .62$ , heritage cultural orientation: unweighted mean  $r = .56$ ).<sup>6</sup> This suggests that bicultural individuals tend to be significantly better adjusted than those who are oriented to only one culture, or perhaps acculturating individuals who are better adjusted are more likely to be bicultural as opposed to being oriented to only one culture.

### Measurement of Biculturalism

Contrast analyses were also conducted to determine whether the biculturalism-adjustment relationship varied as a function of how acculturation was measured. Specifically, we tested whether the relationship was stronger when acculturation was measured bilinearly ( $\lambda = +2$ ) versus unilinearly ( $-1$ ) or typologically ( $-1$ ). Results indicated that the biculturalism-adjustment association was significantly stronger when biculturalism was measured bilinearly,  $r_{\text{alerting}}(81) = .81, p < .0001$  (bilinear cultural orientations: unweighted mean  $r = .70$ , unilinear cultural orientations: unweighted mean  $r = .54$ , and typological acculturation strategies: unweighted mean  $r = .21$ ).<sup>7</sup> This suggests that the bilinear measurement of biculturalism tends to reveal stronger associations between biculturalism and adjustment than unilinear measurements (which confound biculturalism and marginalization) or typological measurements (which assess attitudes and preferences, not behaviors that might be more directly related to the adjustment domains examined).

### Adjustment Domains

Using contrast analyses, we next examined whether the biculturalism-adjustment link was stronger for the psychological domain ( $\lambda = +1$ ) than for the sociocultural domain ( $-1$ ). Null results,  $t(101) = -.46, p = .32$  (psychological adjustment: unweighted mean  $r = .48$ , sociocultural adjustment: unweighted mean  $r = .49$ ), suggested that bicultural individuals tend to be as psychologically adjusted (e.g., have high self-esteem, low anxiety) as they are socioculturally adjusted (e.g., have good academic performance, few behavioral problems).<sup>8</sup> We also tested whether the

biculturalism-adjustment relationship was stronger for the psychological (+1) and sociocultural domains (+1) versus the health-related domain (-2). Results showed that the association was significantly stronger for the psychological and sociocultural domains than for the health-related domain (unweighted mean  $r = .05$ ),  $r_{\text{alerting}}(119) = 1.00, p < .0001$ .<sup>9</sup>

### Sample Characteristics as Moderators

We conducted contrast analyses to test whether the biculturalism-adjustment association was stronger for participants living in the United States ( $\lambda = +1$ ) versus those in other countries (-1). Results indicated a significantly stronger effect for U.S. samples,  $t(80) = 9.71, p < .0001$  (United States: unweighted mean  $r = .62$ , "other" unweighted mean  $r = .32$ ).<sup>10</sup> This suggests that biculturalism and adjustment are more strongly related for participants in the United States than for those in other countries. Additional contrast analyses also revealed stronger effect sizes for the biculturalism-adjustment relationship for Latin (+2), Asian (+2), and European (+2) samples compared to African (-3) and Indigenous (-3) samples,  $r_{\text{alerting}}(68) = .84, p < .0001$  (Latin: unweighted mean  $r = .60$ , Asian: unweighted mean  $r = .52$ , European: unweighted mean  $r = .33$ , African: unweighted mean  $r = .01$ , Indigenous: unweighted mean  $r = -.71$ ).<sup>11</sup> This suggests that the positive adjustment correlates of biculturalism are more likely to exist for Latin, Asian, and European participants than for African or Indigenous participants. See Table 1 for a summary of these findings along with the median  $r$ s, 95% confidence intervals around the  $r$ s, and central tendency statistics.

Lastly, Pearson product-moment correlations were computed to determine whether the biculturalism-adjustment relationship varied as a function of a sample's mean age, percentage of female participants, and percentage of participants born outside the host country. Results showed that none of these variables were significantly correlated with the strength of the biculturalism-adjustment association [mean age:  $r(62) = -.06, p = .32$ ; percentage of female participants:  $r(76) = .17, p = .07$ ; percentage of participants born outside the host country:  $r(59) = .13, p = .16$ ], suggesting that they do not moderate the biculturalism-adjustment relationship.

## Discussion

This meta-analysis is a much-needed quantitative review and synthesis of existing empirical studies exploring the biculturalism-adjustment relationship. Results based on the random-effects approach reveal a significant, strong, and positive association between biculturalism (high orientation to both dominant and heritage cultures) and adjustment, and this biculturalism-adjustment link is significantly stronger than the association between each cultural orientation (dominant or heritage) and adjustment. Furthermore, moderator analyses revealed that the biculturalism-adjustment association is stronger when biculturalism is measured bilinearly, for the psychological and sociocultural adjustment domains, for individuals living in the United States, and for people of Latin, Asian, and European descent (vs. unilinear or typological acculturation scales, health-related adjustment, participants living outside the United States, and African and Indigenous samples, respectively).

The positive relationship between biculturalism and adjustment may be due to a variety of factors internal and external to the acculturating individual. The competencies and flexibility (social and cognitive) that bicultural individuals acquire in the process of learning and using two cultures may make bicultural individuals more adept at adjusting to various people or situations in either of their cultures and possibly in other cultures (Benet-Martínez et al., 2006; Gonzales,

Knight, Birman, & Sirolli, 2004; Leung, Maddox, Galinsky, & Chiu, 2008; Szapocznik, Santisteban, Kurtines, Perez-Vidal, & Hervis, 1984). In addition, this flexibility, along with their social support networks in both cultures, may buffer them from the psychological maladjustment (e.g., anxiety, loneliness) or sociocultural maladjustment (e.g., interpersonal conflicts, intercultural miscommunication) that they might have otherwise suffered as a result of challenging acculturation experiences. It is possible that being oriented to only one culture rather than both has some adjustment costs, resulting from rejection from or lack of belongingness with members of the other culture (Roccas, Horenczyk, & Schwartz, 2000; Rogler et al., 1991; Ross, Xun, & Wilson, 2002). Note that the findings of this meta-analysis suggest that involvement in *any* culture (dominant, heritage, or both) is positively related to adjustment; however, biculturalism is *more* strongly related to adjustment.

The biculturalism-adjustment relationship found in this meta-analysis may also be reflective of an adjustment  $\rightarrow$  biculturalism effect (rather than a biculturalism  $\rightarrow$  adjustment effect) or the effect of a third variable. For example, it is also possible that better adjusted individuals (e.g., those with higher self-esteem) find it easier to be bicultural or are able to use resources, which would have been used to cope with maladjustment, to participate in both cultures and to interact with people from either culture, thus becoming more bicultural. The biculturalism-adjustment relationship may also be due to a third variable, such as the dominant group's attitudes toward acculturation. For example, a host country with multicultural policies and a dominant group that is accepting and nondiscriminatory toward acculturating individuals may allow acculturating individuals to become bicultural as well as to attain high levels of adjustment. Another possible third variable may be SES, where individuals of higher SES have greater adjustment as well as more opportunities to be bicultural (Moyerman & Forman, 1992). For example, when immigrants and refugees arrive in the host country, they may be focused on achieving success in school and/or work, contexts that require a high dominant cultural orientation. After attaining those achievements (as indicated by high SES), immigrants and refugees may have time and resources to reconnect with their heritage culture. As a result, these successful and well-adjusted individuals are likely to be highly oriented to both cultures, or bicultural.

Perhaps not surprisingly, stronger biculturalism-adjustment associations were found when biculturalism is measured bilinearly. When biculturalism is measured unilinearly, the association between adjustment and biculturalism may be attenuated because biculturalism is confounded with marginalization. Marginalization, lack of or low orientation to both cultures, may have a weaker, null, or negative relationship with adjustment. Typological approaches to biculturalism, which typically assess acculturation preferences and attitudes (vs. actual acculturative changes; e.g., Berry et al., 1989; Neto et al., 2005), also weaken the biculturalism-adjustment relationship. It is possible that one's ideal acculturation strategy may not correspond to the acculturation strategy that one uses in reality; therefore, these measures may not be valid indicators of one's bicultural orientation. Whereas all the typological scales included in this meta-analysis (with the possible exception of one scale for which little information was provided) assessed acculturation preferences and attitudes, all but two studies using bilinear measures of biculturalism assessed actual acculturative changes or cultural orientation. Therefore, it is possible that the stronger biculturalism-adjustment association may be due to scale content (i.e., acculturation preferences vs. actual acculturative changes) as well as scale type (i.e., bilinear, linear, vs. typological).

It is also not surprising that the relationships between biculturalism and psychological and sociocultural adjustment were stronger than that between biculturalism and health-related adjustment. First, the relationships between biculturalism and psychological and sociocultural

adjustment have been theoretically and empirically supported by Ward and Kennedy (1994) among others. Second, the definition of health-related adjustment used in our study may be problematic. For example, not all individuals manifest maladjustment somatically through health problems. In addition, within each culture, there are both healthy beliefs and behaviors (e.g., emphasis on exercise) and unhealthy ones (e.g., reliance on fast food or frozen food). Bicultural participants, who are involved in two cultures, vary in terms of which health beliefs and behaviors they adopt from each culture. Third, individuals in different cultures may have different conceptions of health (Chin, 2009; Rothstein & Rahapaksa, 2003). For example, what is considered healthy, what health entails, and how somatic symptoms are evaluated and experienced may differ across cultures. Because of these variations, the direction of the relationship between biculturalism and health-related adjustment may not be consistent, leading to an almost null correlation coefficient.

The stronger association between biculturalism and adjustment found for participants in the United States versus other countries may be due to several factors. First, many acculturation measures (e.g., Cuéllar, Harris, & Jasso, 1980: Acculturation Rating Scale for Mexican Americans; Szapocznik et al., 1980: Bicultural Involvement Questionnaire; and Tsai et al., 2000: General Ethnicity Questionnaire) were developed in the United States for American samples. Therefore, these measures may capture an acculturation process that is unique to the United States. Second, host countries differ in their histories as settler countries, their immigration policies, and the dominant group's attitudes toward acculturation (Berry et al., 2006), which may affect the level of biculturalism, level of adjustment, or biculturalism-adjustment relationship for acculturating individuals in those countries. Therefore, the importance of one's level of biculturalism to one's adjustment (or vice versa) may differ from country to country.

Relatedly, many of the existing acculturation measures were developed specifically for Latin and Asian samples, therefore more adequately capturing biculturalism and better detecting biculturalism-adjustment associations for these groups than it is the case for African or Indigenous samples. Furthermore, the history or status of these groups may also affect the strength of the biculturalism-adjustment association. Specifically, the largely immigration-based biculturalism experience of Latin and Asian samples is undoubtedly different from that of Indigenous samples (e.g., American Indian). For example, the recent migration of Latinos and Asians may facilitate acculturating Latin and Asian individuals' involvement with their heritage culture (Phinney & Devich-Navarro, 1997; Yoon et al., 2010). Moreover, the historical tensions between American Indians and the dominant culture coupled with the institutional neglect of American Indian history and culture may prevent American Indians from successfully being bicultural (Schwartz et al., 2010). Furthermore, most of the Latin and Asian samples were in the United States, whereas 4 of the 5 African samples consisted of African immigrants or refugees in Europe. In addition to differences in host countries (see above discussion regarding host country as a moderator), the African samples included in this meta-analysis may differ from samples of other races because of their history of forced migration to and slavery in Western countries, and the colonization of African countries by Westerners. These contextual and historical factors are likely to influence the biculturalism experience of African acculturating individuals. Finally, because "race" is socially constructed (Sellers, Smith, Shelton, Rowley, & Chavous, 1998), its moderating effect on the biculturalism-adjustment may be due to a variety of factors not available for analysis in this study, including phenotype (Betancourt & Lopez, 1993) and how racial minorities are perceived by others (Phinney, 1996) as well as culture, identity, and minority status (Phinney, 1996).

## Limitations

There are several potential limitations of meta-analyses such as this one. First, it is possible that not all empirical publications investigating biculturalism and adjustment were identified via PsycINFO or backward and forward searches. Second, not all biculturalism-adjustment studies are published. Therefore, due to the file drawer problem (where significant results are more likely to be published than nonsignificant results; Rosenthal, 1979), the mean effect sizes estimated in this meta-analysis may be inflated. However, unidentified or unpublished studies are unlikely to change the current meta-analytic results. It would require 340 studies (more than four times the number of studies identified for this meta-analysis) with a null relationship ( $r = 0$ ) between biculturalism and adjustment to decrease the observed strong mean effect size ( $r = .51$ ) for the biculturalism-adjustment relationship to a weak or trivial effect size ( $r = .10$ ; see Orwin, 1983, for the fail-safe  $N$  formula).

Third, because meta-analyses use studies as the unit of analyses, the limitations of the individual studies also become the limitations of the meta-analysis. For example, many of the studies in this meta-analysis were conducted in the United States with Latin or Asian samples; therefore, the overreliance on Latin and Asian samples in the United States is a limitation of the current meta-analysis. Furthermore, we could not investigate a greater number of potential moderating variables because we were restricted to the variables measured by the studies included in our meta-analysis. Relatedly, although analysis of moderators within studies is preferred because it reduces error variance and increases power, in meta-analyses, moderators can only be examined across studies.

Lastly, a limitation that deserves special attention is that the studies examined in this meta-analysis were correlational and cross-sectional; therefore, directionality and causal inferences cannot be made. Although it is possible that increased biculturalism causes better adjustment, it is also possible that better adjustment allows one to be more bicultural. Furthermore, a third variable may have caused an individual to be more bicultural and better adjusted. Further research is needed to answer these questions about directionality and causality.

## Implications and Future Directions

Because this meta-analysis includes a diverse sample of studies and utilizes the random-effects approach, there is high external validity to our findings. That is, it can be stated with confidence that there is a significant, strong, and positive association between biculturalism and adjustment. This biculturalism-adjustment relationship has important implications at the interpersonal, group, national, and global levels (Nguyen & Benet-Martínez, 2007). For example, it is possible that the processes that allow bicultural individuals to resolve cultural differences within themselves and experience greater adjustment could be implemented to resolve interpersonal cultural conflict (Ting-Toomey, Gao, Trubisky, & Yang, 1991). At the national level, if a causal relationship exists between biculturalism and adjustment, then the adoption of multicultural policies by host countries might lead to greater national success and well-being (Schwartz, Montgomery, & Briones, 2006). Furthermore, the social and cognitive flexibility and competencies that bicultural individuals possess might increase their intercultural sensitivity and ethnorelativism [i.e., Boski's (2008) "integration" as constructive marginality; J. M. Bennett, 1993; M. J. Bennett, 1986] and make them ideal cultural mediators for intercultural conflicts or for multinational corporations' business negotiations.

Meta-analyses are useful for suggesting hypotheses and recommendations for future studies. Thus, based on the current meta-analytic results, future studies should employ bilinear acculturation measures in order to better reveal possible correlates of biculturalism. There is an abundance of existing bilinear acculturation scales from which to choose. In addition to the over 25 bilinear scales used in the studies on biculturalism and adjustment (see Appendix A), there are other bilinear scales that were used in the studies on each cultural orientation and adjustment, including the Northern Plains Bicultural Inventory (Allen & French, 1994), Vancouver Index of Acculturation (Ryder et al., 2000), General Ethnicity Questionnaire (Tsai et al., 2000), Stephenson Multigroup Acculturation Scale (Stephenson, 2000), Language, Identity, and Behavior Acculturation Scale (Birman & Trickett, 2001), Khmer Acculturation Scale (Lim, Heiby, Brislin, & Griffin, 2002), and Multidimensional Acculturation Scale II (MAS II; Rodriguez, Mira, Paez, & Myers, 2007). Future studies should also examine the ways in which an individual's two cultures have a multiplicative versus an additive effect. Moreover, it is necessary to better understand the psychological processes behind our finding that the interaction of two cultural orientations (biculturalism), as compared to each cultural orientation by itself, is more strongly related to adjustment.

Our results also suggest the need to explore the role of other relevant variables, such as SES, personality, type of migration, ethnic composition of community, experiences of discrimination, and national policies, in the biculturalism-adjustment relationship. As mentioned above, SES may be a third variable, driving the relationship between biculturalism and adjustment. Another possible third variable associated with both biculturalism and adjustment is personality (Benet-Martínez & Haritatos, 2005; Chen, Benet-Martínez, & Bond, 2008). Meta-analyses have found that personality, especially neuroticism, is associated with psychological adjustment (e.g., subjective well-being; Steel, Schmidt, & Shultz, 2008) and psychological maladjustment (e.g., anxiety, depression; Kotov, Gamez, Schmidt, & Watson, 2010). Furthermore, it is possible that immigrants have different personalities from nonimmigrants (e.g., stronger work orientation, higher achievement motivation, higher power motivation; Boneva & Frieze, 2001). Voluntary migration (e.g., by immigrants, international students, and expatriates) versus involuntary exposure to the host culture (e.g., by refugees seeking asylum, indigenous or colonized peoples, slaves and their descendents) might influence the biculturalism experience. For example, refugees may strongly adhere to their heritage culture for fear of losing it, while resisting deep involvement in the dominant culture in the hopes of returning to their host country (Nguyen & Benet-Martínez, 2010; Sadowsky, Lai, & Plake, 1991). Conversely, immigrants, whose goal is to succeed in the dominant culture, may be highly motivated to involve themselves in the dominant culture.

The social contexts surrounding acculturating individuals (e.g., a neighborhood's ethnic composition, a country's immigration policies, a dominant group's attitudes toward acculturation) may also influence their biculturalism experience (Birman, 1994; Phinney et al., 2001; Rotheram-Borus, 1993; Umaña-Taylor et al., 2004). For those living in ethnic enclaves or those facing a great deal of discrimination from dominant group members, it may be easier, and even beneficial for their adjustment, to be highly oriented to their heritage culture (Schwartz et al., 2010). On a larger scale, it may be easiest and most beneficial for acculturating individuals and their adjustment to adopt the integration strategy when living in a country with multicultural national policies (Phinney et al., 2001).

To address some of the limitations of the current meta-analysis, future research is needed to test the generalization of our findings to other samples and other countries, and to determine

whether the biculturalism-adjustment association is causal and, if so, the direction of causality. With increasing intercultural contact and travel, there are acculturating individuals from varying heritage cultures living in many different host countries. To reflect the current global reality, future studies should continue examining the biculturalism of Latin and Asian samples but also include samples from other ethnic groups, especially those in countries other than the United States. For example, future studies may focus on the biculturalism experiences of Iraqi refugees in Denmark, i-Kiribati migrants to Australia, Korean expatriates in Viet Nam, and Libyan refugees in Tunisia. To address a limitation of both this meta-analysis in particular and of the acculturation field in general, future studies should consider further employing research designs beyond those involving survey methods and correlational and cross-sectional data. For example, more longitudinal studies should be conducted, especially those examining changes in cultural orientation levels and adjustment levels over time. In addition, studies could be designed to simulate public policies, manipulating participants' ability to identify with neither, one, or both cultures, and to measure that effect on participants' immediate, state-level adjustment responses. Another possibility is to conduct field studies of immigrants' adjustment before and after they migrate, taking into account individual personality differences, characteristics of their new cultural setting, and institutional factors that could affect the acculturation process and immigrant adjustment.

Finally, future studies should expand on our finding that biculturalism is positively related to adjustment by exploring variations in biculturalism. That is, more research is needed to examine whether the biculturalism-adjustment association is moderated by the dimensions in which acculturation occurs or by the type of bicultural individual. For example, is biculturalism in particular acculturation dimensions (e.g., language fluency, cultural pride, cultural practices) more important or relevant to adjustment than biculturalism in other dimensions? Recognizing that the acculturation process may occur differently for different dimensions, Birman (1994) labeled individuals who are bicultural in their behaviors but marginalized in their identity as "instrumental bicultural" (see Birman, 1994, for other categories of bicultural individuals). Relatedly, future research should examine the issue of whether the biculturalism-adjustment relationship is stronger for individuals who perceive the experience of being bicultural as positive and conflict-free (i.e., those with high levels of bicultural identity integration) compared to individuals who experience conflict between their cultural orientations (i.e., those with low levels of bicultural identity integration). All in all, because the majority of acculturating individuals are bicultural (van Oudenhoven, Ward, & Masgoret, 2006), it is imperative to further understand this sizeable population.

## Conclusion

One of the major questions within the field of acculturation has been how cultural involvement is related to adjustment, and specifically whether bicultural individuals are better adjusted than other acculturating individuals. With this meta-analysis on the biculturalism-adjustment relationship, we sought to provide an answer: Biculturalism is positively related to adjustment, and this relationship is stronger than those between adjustment and either dominant or heritage cultural orientation. Furthermore, this review provides additional quantitative evidence for the superiority of bilinear measures of acculturation. In conclusion, this meta-analysis contributes to the understanding of bicultural individuals and their adjustment, which is especially crucial in a plural society like the United States and in today's increasingly interconnected and globalized world.



**Appendix A***List of Acculturation Scales Used in Studies on Biculturalism and Adjustment*

Acculturation Scale (Original or Adapted)	Measurement of Biculturalism	Computation of Biculturalism Score	Use of Scale		
			N of Studies (k)	Host Country	Sample Race or Ethnicity
Acculturation Attitudes (Berry et al., 1989)	Typological	High Score on Integration Subscale	9	France, Norway, Portugal, United States	Chinese, Indian, Portuguese, Turkish, Vietnamese, diverse sample
Multi-Cultural Ideology Scale (Schmitz, 1987)	Typological	High Score on Integration Subscale	9	Germany	Central and South American, Eastern and Southern European, German, Indian, North African
Bicultural Involvement Questionnaire (Szapocznik et al., 1980)	Bilinear or unilinear	Bilinear: Sum of Subscale Scores, or High Scores on Both Subscales Unilinear: Difference between Subscale Scores	8	United States	Cuban, Indian, Mexican, diverse Latin sample
Bicultural Involvement Questionnaire—B (Birman, 1991)	Bilinear	Product of Subscale Scores, or High Scores on Both Subscales	4	United States	Latin
Suinn-Lew Asian Self-Identity Acculturation scale (Suinn et al., 1987)	Unilinear	Middle Score	3	United States	Asian
Acculturation Rating Scale for Mexican Americans (Cuéllar et al., 1980)	Unilinear	Middle Score	2	United States	Latin
ARSMA-II (Cuéllar, Arnold, & Maldonado, 1995)	Bilinear or unilinear	Bilinear: High Scores on Both Subscales Unilinear: Difference Between Subscale Scores	2	United States	Indian, Mexican

*(continued)*

**Appendix A (continued)**

Acculturation Scale (Original or Adapted)	Measurement of Biculturalism	Computation of Biculturalism Score	Use of Scale		
			N of Studies (k)	Host Country	Sample Race or Ethnicity
Short Acculturation Scale for Hispanic Youth (Barona & Miller, 1994)	Unilinear	Middle Score	2	United States	Mexican
Psychological Acculturation Scale (Stevens et al., 2004)	Bilinear	Latent Class Analysis	2	The Netherlands	Moroccan
Immigrant Acculturation Scale (Bourhis Moïse, Perreault, & Sénécal, 1997)	Typological	High Score on Integration Subscale	1	France	North African
Acculturation Scale (Burnam et al., unpublished)	Unilinear	Middle Score	1	United States	Mexican
Puerto Rican Biculturality Scale (Cortés, Rogler, & Malgady, 1994)	Bilinear	Used Unilinearly: Difference Between Subscale Scores	1	United States	Puerto Rican
Cultural Awareness and Ethnic Loyalty Scale (Keefe & Padilla, 1987)	Unilinear	Middle Score	1	United States	Mexican
Acculturation Scale (King & Keane, 1992)	Typological	High Score on Integration Subscale	1	United States	American Indian
Acculturation Scale (Kosic, 1998)	Bilinear	High Scores on Both Subscales	1	Italy	Polish
Hispanic Acculturation Scale—Short Version (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987)	Unilinear	Middle Score	1	United States	Latin
Multigroup Ethnic Identity Measure and Other-Group Orientation (Phinney, 1992)	Bilinear	High Scores on Both Subscales	1	United States	Asian

(continued)

## Appendix A (continued)

Acculturation Scale (Original or Adapted)	Measurement of Biculturalism	Use of Scale			
		Computation of Biculturalism Score	N of Studies (k)	Host Country	Sample Race or Ethnicity
Biculturalism Inventory (BI; Ramirez, Castaneda, & Cox, 1977)	Unilinear	Middle Score	1	United States	Mexican
Acculturation Attitude Scale (Sam, 1995)	Typological	High Score on Integration Subscale	1	Norway	Diverse sample
American-International Relations Survey (Sodowsky & Plake, 1992)	Unilinear	Middle Score	1	United States	Latin
Acculturation Index (Ward & Kennedy, 1994)	Bilinear	High Scores on Both Subscales	1	Nepal	Diverse sample
Acculturation Scale (Zagefka & Brown, 2002)	Bilinear	High Scores on Both Subscales	1	Germany	Diverse sample

Note: Listed above are acculturation scales that were developed prior to the publication of the studies in which they were used. For approximately 25% of the studies in this meta-analysis, the authors developed their own acculturation scale (i.e., the scale was described and/or included in the same publication as the results of the biculturalism-adjustment relationship):

- Barry (2005)
- Carvajal et al. (2002)
- Cheung (1995)
- Chia & Costigan (2006)
- Donà & Berry (1994)
- Eyou et al. (2000)
- Fraser et al. (1998)
- Harmon et al. (1996)
- Herman-Stahl et al. (2002)
- Jang et al. (2006)
- Lay et al. (1998)
- Lee et al. (2003)
- Neto et al. (2005)
- Ramirez (2007)
- van de Vijver et al. (1999)
- Ward & Kennedy (1994)
- Ying et al. (2000)
- Ying (1995)
- Yip & Cross (2004)
- Zheng et al. (2004)

## Appendix B

### Studies on Biculturalism and Adjustment

Publication	N of Studies (k)	N of Effect Sizes rs	Total N of Subjects (N)	Measurement of Biculturalism				Type of Adjustment			Average Effect Size (r)
				Bilinear Cultural Orientations	Unilinear Cultural Orientations	Acculturation Strategies	Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment		
Barry (2005)	1	5	115		✓		✓				-.04
Bautista de Domanico et al. (1994)	1	4	62		✓		✓		✓		.28
Benet-Martinez & Haritatos (2005)	1	10	133	✓		✓					-.02
Birman (1998)	1	5	123	✓			✓				.13
Buriel et al. (1998)	1	3	122	✓			✓				.24
Burnam et al. (1997)	1	8	1,195		✓		✓				.00
Caetano et al. (2008)	2	8	956		✓		✓				-.01
Carvajal et al. (2002)	1	19	584	✓			✓		✓		.00
Cheung (1995)	1	1	223		✓		✓				.07
Chia & Costigan (2006)	1	2	123		✓		✓				-.03
Chung (2001)	1	3	320		✓		✓				-.08
Coatsworth et al. (2005)	1	6	315	✓			✓		✓		.11
Donà & Berry (1994)	1	2	93	✓			✓				.17
Eyou et al. (2000)	1	3	427	✓			✓		✓		.09
Farver, Bhadha et al. (2002)	1	9	85	✓			✓				.26
Farver, Narang et al. (2002)	1	3	180	✓			✓		✓		.05
Fernandez-Barillas & Morrison (1984)	1	7	23		✓				✓		.17
Fraser et al. (1998)	1	6	116		✓		✓				.01
Gil et al. (1994)	2	10	4,296		✓				✓		.04
Glass & Bieber (1997)	1	4	48			✓			✓		.00
Gomez & Fassinger (1994)	1	4	241	✓					✓		.03

(continued)

## Appendix B (continued)

Publication	N of Studies (k)	N of Effect Sizes (r)	Total N of Subjects (N)	Measurement of Biculturalism					Type of Adjustment			Average Effect Size (r)
				Bilinear Cultural Orientations	Unilinear Cultural Orientations	Acculturation Strategies	Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment			
Griffith (1983)	1	3	208	✓			✓					-.09
Gutiérrez & Sameroff (1990)	1	2	40		✓					✓		.17
Harmon et al. (1996)	1	1	566		✓						✓	-.14
Herman-Stahl et al. (2002)	1	8	2,449		✓					✓		-.09
Ho (2008)	1	9	80		✓				✓			.23
Jang et al. (2006)	1	4	452	✓					✓		✓	.16
Kosic et al. (2006)	1	2	162	✓					✓			.24
Krishnan & Berry (1992)	1	1	76			✓					✓	.34
Lay et al. (1998)	1	1	63						✓			.45
Lee & Davis (2000)	1	1	41	✓							✓	.47
Lee et al. (2003)	1	2	356	✓						✓		.07
Lopez & Contreras (2005)	1	1	54		✓				✓			.27
Love & Burriel (2008)	2	2	246		✓				✓			.18
Miranda et al. (1998) and Miranda & Umhoefer (1998)	1	3	282		✓				✓			.47
Miranda et al. (2000)	1	4	187		✓						✓	.20
Neto (1995)	1	1	519			✓			✓			.12
Neto (1996)	1	5	313			✓			✓			.05
Neto et al. (2005)	1	4	118						✓		✓	.04
Pfäferott & Brown (2006)	1	2	281		✓				✓		✓	.19
Pham & Harris (2001)	1	1	138					✓	✓			.25
Phinney et al. (1992)	2	2	640			✓			✓			.09
Ramirez (2007)	1	2	212					✓			✓	.00

(continued)

## Appendix B (continued)

Publication	N of Studies (k)	N of Effect Sizes <i>r</i> s	Total N of Subjects (N)	Measurement of Biculturalism				Type of Adjustment				
				Bilinear Cultural Orientations	Unilinear Cultural Orientations	Acculturation Strategies	Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	Average Effect Size ( <i>r</i> )		
Régner & Loose (2006)	1	4	183			✓			✓			.05
Rivera-Sinclair (1997)	1	3	254		✓				✓			.15
Rotheram-Borus (1990)	1	5	330		✓				✓			.03
Sam (1994) and Sam & Berry (1995)	1	7	568			✓			✓		✓	.15
Schmitz (1992a)	4	4	521			✓					✓	-.15
Schmitz (1992b)	5	31	237			✓			✓		✓	-.10
Schwartz et al. (2007)	3	12	610						✓		✓	.19
Smokowski & Bacallao (2007)	1	4	323	✓					✓		✓	.10
Stevens et al. (2007)	2	8	387	✓					✓		✓	-.02
Suarez et al. (1997)	1	2	138	✓					✓			.23
Sullivan et al. (2007)	1	5	338	✓					✓			.07
Szapocznik et al. (1980)	2	6	140	✓					✓		✓	.27
Tsai & Pike (2000)	1	12	90		✓				✓		✓	-.05
van de Vijver et al. (1999)	2	2	118					✓				.32
van Selm et al. (1997)	1	2	106			✓			✓		✓	.27
Virta et al. (2004)	1	3	407			✓			✓		✓	.08
Ward & Kennedy (1994)	1	2	98			✓			✓		✓	.40
Ward & Rana-Deuba (1999)	1	1	104			✓			✓		✓	.17
Ying (1995)	1	7	143			✓			✓			.11
Ying et al. (2000)	1	3	353						✓			-.02
Yip & Cross (2004)	1	9	96			✓			✓		✓	-.04
Zamanian et al. (1992)	1	2	159						✓		✓	.11
Zarate et al. (2005)	1	4	74		✓				✓			.28
Zheng et al. (2004)	1	1	157			✓			✓		✓	.31

Note: Positive *r*s represent a positive relationship between biculturalism and adjustment benefits.

## Appendix C

### Studies on a Dominant Cultural Orientation and Adjustment

Publication	N of Studies (k)	N of Effect Size rs	Total N of Subjects (N)	Type of Adjustment			Average Effect Size (r)
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Bankston & Zhou (1997)	1	1	402		✓		.08
Benet-Martinez & Karakitapoglu-Aygün (2003)	1	5	199	✓	✓		.09
Birman (1998)	1	5	123	✓	✓		.10
Cheung & Liu (2000)	1	22	170		✓		.10
De Coteau et al. (2003)	1	5	145	✓		✓	.08
Downie et al. (2004)	1	2	111	✓			.11
Farver, Narang et al. (2002) and Farver et al. (2007)	1	10	180	✓	✓		.19
Giang & Wittig (2006)	1	5	427	✓			.18
Gomez & Fassinger (1994)	1	4	241		✓		.03
Gong (2007)	3	6	206	✓			.20
Greenland & Brown (2005)	1	2	54			✓	-.09
Horgan (2000)	1	1	39		✓		-.43
Jasinskaja-Lahti & Liebkind (2007)	1	2	2,360	✓		✓	.16
Jeltova et al. (2005)	1	2	130		✓		.10
Kang (2006)	1	7	489	✓	✓		.19
Kim & Omizo (2005)	1	7	156	✓	✓		.23
Kim et al. (2006)	1	12	192	✓	✓		.00
Kulis et al. (2002)	1	9	425		✓		-.01
Lee & Davis (2000)	1	1	41		✓		.62
Lee et al. (2000)	2	4	347			✓	.07
Lew et al. (1998)	1	2	185	✓	✓		.11
Liebkind et al. (2004)	1	12	175	✓	✓		.07
Lim et al. (2002)	1	1	410	✓			.23

(continued)

**Appendix C (continued)**

Publication	N of Studies (k)	N of Effect Sizes	Total N of Subjects (N)	Type of Adjustment			Average Effect Size (r)
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Lopez & Contreras (2005)	1	1	54	✓			.15
Martinez (2006)	1	2	73		✓		-.23
Noels et al. (1996)	1	5	179	✓	✓		.11
Omizo et al. (2008)	1	7	112	✓	✓		.11
Ouarasse & van de Vijver (2004)	1	3	155		✓		.17
Pham & Harris (2001)	1	1	138	✓			.29
Phinney & Devich-Navarro (1997)	2	4	98	✓			.33
Rodriguez et al. (2007)	1	4	248	✓			-.05
Roytburd & Friedlander (2008)	1	1	108		✓		-.02
Rumbaut (1994)	1	3	5,127	✓	✓		.08
Ryder et al. (2000)	4	18	564	✓	✓	✓	.22
Safdar et al. (2003)	1	4	166	✓	✓		.14
Sanchez & Fernandez (1993)	1	2	164		✓		.19
Sasao & Chun (1994)	2	4	498	✓		✓	.08
Schwartz et al. (2007)	2	8	261		✓		.18
Schwartz et al. (2010)	1	7	773	✓	✓		.12
Smokowski & Bacallao (2007)	1	4	323	✓	✓		.09
Suarez et al. (1997)	1	1	138		✓		-.17
van de Vijver et al. (1999)	2	2	118		✓		.05
Vedder & Virta (2005)	2	12	395	✓	✓		.12
Virta et al. (2004)	1	3	407	✓			.02

(continued)



## Appendix C (continued)

Publication	N of Studies (k)	N of Effect Size <i>r</i> s	Total N of Subjects (N)	Type of Adjustment			Average Effect Size ( <i>r</i> )
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Ward & Kennedy (1994)	1	2	98	✓	✓		.23
Ward (1999) and Ward & Rana-Deuba (1999)	5	12	606	✓	✓		.20
Ying (1995) and Ying (1996)	1	14	143	✓			.12
Yip & Cross (2004)	1	10	96	✓		✓	.13
Zheng et al. (2004)	1	1	157	✓			.23

Note: Positive *r*s represent a positive relationship between a dominant cultural orientation and adjustment benefits. All studies measured acculturation bilinearly.

## Appendix D

### Studies on a Heritage Cultural Orientation and Adjustment

Publication	N of Studies (k)	N of Effect Size <i>r</i> s	Total N of Subjects (N)	Type of Adjustment			Average Effect Size ( <i>r</i> )
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Bankston & Zhou (1997)	1	2	402		✓		.38
Benet-Martinez & Karakitapoglu-Aygün (2003)	1	5	199	✓	✓		.01
Birman (1998)	1	5	123	✓	✓		.05
De Coteau et al. (2003)	1	10	145	✓		✓	.05
Downie et al. (2004)	1	1	111	✓			.20
Farver, Narang et al. (2002) and Farver et al. (2007)	1	22	180	✓	✓		.07
Giang & Wittig (2006)	1	5	427	✓			.34
Gomez & Fassinger (1994)	1	4	241		✓		.02
Gong (2007)	3	3	206	✓			.49
Horgan (2000)	1	1	39		✓		-.09
Jeltova et al. (2005)	1	2	130		✓		.30

(continued)

**Appendix D (continued)**

Publication	N of Studies (k)	N of Effect Sizes	Total N of Subjects (N)	Type of Adjustment			Average Effect Size (r)
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Kang (2006)	1	7	489	✓	✓		-.06
Kim & Omizo (2005)	1	7	156	✓	✓		.10
Kim et al. (1998)	1	1	182	✓			.12
Kim et al. (2006)	1	12	192	✓	✓		.01
Kulis et al. (2002)	1	27	425		✓		.05
Kuo & Roysircar (2006)	1	4	201	✓	✓		.07
Lee & Davis (2000)	1	1	41		✓		.46
Lee et al. (2000)	2	4	347			✓	.03
Lew et al. (1998)	1	2	185	✓	✓		.01
Liebkind et al. (2004)	1	6	175	✓	✓		.10
Lim et al. (2002)	1	1	410	✓			-.13
Lopez & Contreras (2005)	1	1	54	✓			-.05
Noels et al. (1996)	1	5	179	✓	✓		-.04
Omizo et al. (2008)	1	7	112	✓	✓		.26
Ouarasse & van de Vijver (2004)	1	3	155		✓		.17
Pham & Harris (2001)	1	1	138	✓			-.09
Phinney & Devich-Navarro (1997)	2	2	98	✓			.11
Ramirez (1969)	1	5	100	✓	✓	✓	.26
Régner & Loose (2006)	1	4	183		✓		.00
Roberts et al. (1999)	2	12	1,992	✓			.12
Rodriguez et al. (2007)	1	5	248	✓	✓		.13
Roytburd & Friedlander (2008)	1	1	108		✓		-.13
Rumbaut (1994)	1	3	5,127	✓	✓		.01
Ryder et al. (2000)	4	18	564	✓	✓	✓	.01
Safdar et al. (2003)	1	4	166	✓	✓		.05

(continued)

## Appendix D (continued)

Publication	N of Studies (k)	N of Effect Sizes (rs)	Total N of Subjects (N)	Type of Adjustment			Average Effect Size (r)
				Psychological Adjustment	Sociocultural Adjustment	Health-Related Adjustment	
Sanchez & Fernandez (1993)	1	2	164		✓		-.06
Schwartz et al. (2007)	2	8	261		✓		.13
Schwartz et al. (2010)	1	21	773	✓	✓		.12
Smokowski & Bacallao (2007)	1	4	323	✓	✓		.02
Suarez et al. (1997)	1	2	138	✓	✓		.20
Umaña-Taylor (2004)	3	3	1,062	✓			.16
Umaña-Taylor et al. (2004)	2	6	846	✓			.24
van Oudenhoven & Eisses (1998)	1	2	191		✓		-.16
Vedder & Virta (2005)	2	24	395	✓	✓		.07
Virta et al. (2004)	1	3	407	✓			.16
Ward & Kennedy (1994)	1	1	98	✓			.35
Ward (1999) and Ward & Rana-Deuba (1999)	5	12	606	✓	✓		.04
Yasuda & Duan (2002)	2	2	118	✓			.30
Ying (1995) and Ying (1996)	1	13	143	✓			-.02
Yip & Cross (2004)	1	40	96	✓		✓	.05
Zarate et al. (2005)	1	4	74		✓		.24
Zheng et al. (2004)	1	1	157	✓			.18

Note: Positive *rs* represent a positive relationship between a heritage cultural orientation and adjustment benefits. All studies measured acculturation bilinearly.

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## Notes

1. In this article, “integration” refers to simultaneously high orientations to both the dominant and heritage cultures in terms of behaviors (e.g., competence, language), values and beliefs, and identity (including pride and loyalty). However, “integration” has assumed at least five distinct meanings (Boski, 2008). All five of the concepts that Boski identified are discussed in this article. To avoid confusion, Boski’s terminology for each type of integration is stated in parentheses. For example, we note that dimension- or domain-specific acculturation is considered “integration as functional (partial) specialization” (Boski, 2008, p. 147). In this use of “integration,” although an individual may be highly oriented to two cultures, cultural orientation is domain-specific in that he or she is only highly oriented to one culture (i.e., heritage culture) in one domain (i.e., home) and only highly oriented to another culture (i.e., dominant culture) in another domain (i.e., work).
2. Comparing the relationship between biculturalism and adjustment to the relationship between each cultural orientation (dominant and heritage) and adjustment is more useful and descriptive than comparing it to the relationship between other acculturation strategies and adjustment. Comparisons with cultural orientations are clearer because these orientations are independent. If the relationship between the dominant cultural orientation and adjustment is stronger than the relationship between biculturalism and adjustment, then it is clear that involvement in the dominant culture is more associated with adjustment than involvement in both cultures. Conversely, if the assimilation-adjustment relationship is stronger than the biculturalism-adjustment, then it is not clear whether involvement in the dominant culture *or* lack of involvement in the heritage culture contributes to the stronger association with adjustment. Moreover, it is not useful to compare the relationship between biculturalism and adjustment to the relationship between marginalization and adjustment because there is insufficient theoretical and empirical support for the existence of the marginalization strategy (Berry et al., 2006; del Pilar & Udasco, 2004; Rudmin, 2003). In short, it is not theoretically sound to include *r*s for associations between adjustment and acculturation strategies besides integration.
3. The “Other” category in the host country variable included all Western societies (e.g., European countries, Canada, Australia, and New Zealand) except one, which was Nepal. Also, most Latin and Asian samples were in the United States, and most European samples were in Europe. The African samples were mostly African immigrants or refugees in Europe, and the one African sample in the United States consisted of African Americans and Caribbean Islanders. All Indigenous samples were in the United States; thus, these Indigenous samples may also be considered American Indian.
4. In more concrete terms, using the fixed-effects approach, the mean effect size across studies is the straightforward arithmetic mean of the raw effect size from each study. Conversely, using the random-effects approach, the mean effect size across studies is the mean above (using the fixed-effects approach) adjusted using the variance of the raw effect sizes from each study. Therefore, these two approaches may yield different results when variability among effect sizes is high, with the random approach yielding stronger effect sizes, but those effect sizes would be more reflective of the actual association between variables as they exist in the population (rather than sample) of studies.
5. The unweighted fixed-effects mean effect size for the biculturalism-adjustment relationship was .10, with a 95% confidence interval from .09 to .12, indicating that this relationship was statistically significant. Note that this unweighted fixed-effects mean effect size ( $r = .10$ ) is much smaller than the random-effects mean effect size ( $r = .51$ ). As mentioned earlier, the reason for this discrepancy is because the

mean effect size computed based on the fixed-effects approach is merely the mean of the raw effect size from each study, whereas the mean effect size computed based on the random-effects approach takes into account the variability among the effect sizes across studies. Because the random-effects approach allows for generalization beyond the studies sampled (vs. the fixed effects approach, which allows for generalization to only other participants in the studies sampled), the random-effects, rather than the fixed-effects, results should be interpreted.

6. Based on the fixed-effects approach, biculturalism did not have significantly stronger correlations with adjustment,  $Z = 1.06$ ,  $p = .14$  (biculturalism: unweighted mean  $r = .14$ , dominant cultural orientation: unweighted mean  $r = .13$ , heritage cultural orientation: unweighted mean  $r = .11$ ). As noted before, due to issues of generalizability, the random-effects, rather than the fixed-effects, results should be interpreted.
7. Similar to the results of the random-effects approach, based on the fixed-effects approach, the biculturalism-adjustment association was significantly stronger when cultural orientations were measured bilinearly than when they were measured unilinearly or when acculturation strategies were measured instead,  $Z = 4.03$ ,  $p = .00003$  (bilinear cultural orientations: unweighted mean  $r = .14$ , unilinear cultural orientations: unweighted mean  $r = .10$ , acculturation strategies: unweighted mean  $r = .05$ ).
8. Similar to the results of the random-effects approach, based on the fixed-effects approach, there were no significant differences between the biculturalism-psychological adjustment correlations and the biculturalism-sociocultural adjustment correlations,  $Z = -.82$ ,  $p = .21$  (psychological adjustment: unweighted mean  $r = .10$ , sociocultural adjustment: unweighted mean  $r = .11$ ).
9. Similar to the results of the random-effects approach, based on the fixed-effects approach, the biculturalism-adjustment association was significantly stronger for psychological and sociocultural adjustment than for health-related adjustment,  $Z = 5.43$ ,  $p < .0000001$  (health-related adjustment: unweighted mean  $r = .01$ ).
10. Similar to the results of the random-effects approach, based on the fixed-effects approach, the biculturalism-adjustment relationship was significantly stronger in the United States than in other countries,  $Z = 2.89$ ,  $p = .002$  (United States: unweighted mean  $r = .12$ , "other": unweighted mean  $r = .07$ ).
11. Similar to the results of the random-effects approach, based on the fixed-effects approach, the biculturalism-adjustment relationship was significantly stronger for Latin, Asian, and European samples than for African or Indigenous samples,  $Z = 4.86$ ,  $p = .0000007$  (Latin: unweighted mean  $r = .12$ , Asian: unweighted mean  $r = .10$ , European: unweighted mean  $r = .06$ , African: unweighted mean  $r = .001$ , Indigenous: unweighted mean  $r = -.04$ ).

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