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Acculturation and Internalizing Problems among Latino Youth: A Meta-Analytic Review

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Acculturation and Internalizing Problems among Latino Youth: A Meta-Analytic Review

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by

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Abstract

Some studies have found acculturation to be a positive predictor of internalizing problems (i.e., anxiety and depression) in Latino youth (Gonzales et al., 2002), whereas other studies have revealed no relation or a negative relation between acculturation and internalizing problems (Smokowski, Buchanan, & Bacallao, 2009). Narrative reviews of this literature exist (Gonzales et al., 2002; Gonzales et al., 2009) but a quantitative synthesis of the literature has not been conducted. After a systematic literature search that identified 38 studies meeting inclusionary criteria, a meta-analysis was performed to estimate the size and direction of the relation between acculturation and internalizing problems. The measurement of acculturation, youth characteristics (age, gender, & country of origin), and environmental context (socioeconomic status, documentation status) were examined as possible moderators. Results revealed no significant relation between acculturation and internalizing problems. When measurement of acculturation was examined as a potential moderator, results revealed three patterns. There was no relation between acculturation and internalizing problems when studies used a proxy measure of acculturation. When studies used a discrepancy score to assess acculturation, a negative relation was found; when studies used a direct measure of acculturation, a positive relation was found. However, the effect sizes for these differences were small and susceptible to publication bias. Results also revealed studies with a greater percentage of Mexico-born participants showed stronger positive associations between acculturation and internalizing problems. Other youth characteristics (age, gender, US as the country of origin) were not significant moderators. Environmental context variables could not be analyzed because studies often did not provide this information. I discuss how the present findings fit within the

larger body of research examining acculturative processes affecting the mental health of Latino youth and discuss the implications for future research and practice.

Keywords: acculturation, internalizing problems, meta-analysis, Latino youth

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Dedication

Mi tesis doctoral es dedicada a mis padres, María Estela Hernández y Juventino Hernández López. Mis éxitos son un reflejo de su dedicación, disciplina, y espíritu humilde.

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Introduction

Studies that have examined the relation between acculturation and internalizing problems among Latino youth in the United States (US) have produced inconsistent findings. These findings have led researchers to question the merit of assessing acculturation. A systematic literature search and meta-analysis could help the field move forward by providing an estimate of the overall effect size between these variables. The present study reports the findings of a meta-analysis of all peer-reviewed studies that have examined the association between acculturation and internalizing problems in Latino youth.

Latino Youth in the United States

Latinos are the largest and fastest growing ethnic minority group in the US (Ennis, Ríos-Vargas, & Albert, 2011). The US Census Bureau (2016) reported between the years 2014 and 2015, Latinos comprised nearly half of the people added to the total US population. In particular, Latinos under the age of 18 comprised nearly half of the US Latino population (Pew Research Center, 2016). It has been estimated that by 2050 Latino children in the US will be the numerical majority in comparison to non-Latino White children (Fry & Gonzales, 2008).

Latino youth demonstrate the highest risk for depression compared to other ethnic groups (Céspedes & Huey, 2008; Joiner, Perez, Wagner, Berenson, & Marquina, 2001; Roberts, Roberts, & Chen, 1997). For example, using state-wide data from California, Mikolajczyk et al. (2007) found that Latino adolescents were two times more likely than non-Latino White adolescents to report depressive symptoms. Similarly, research studies suggest high rates of anxiety disorders in Latino youth (Ginsburg & Silverman, 1996). For instance, several independent studies using outpatient data have demonstrated that Latino youth are more likely

than non-Latino White children to be diagnosed with Separation Anxiety Disorder (Piña & Silverman, 2004; Varela et al., 2004). Given that Latino youth comprise a large fraction of the total population of children in the US, and that they are at risk for internalizing problems, it is essential to understand what factors place Latino youth at risk for maladjustment. There are many cognitive, behavioral, genetic, and environmental factors that might place Latino youth at risk for future difficulties, such as poverty and stress (e.g., Velez, Johnson, & Cohen, 1989). From a culturally-informed developmental perspective, risk factors are anchored within a developmental framework that emphasize the importance of culture (Garcia Coll et al., 1996). Acculturation is a particularly salient cultural variable that might impact how Latino youth develop internalizing problems.

Acculturation and Internalizing Problems

Within psychology, *acculturation* is examined as an individual-level process of psychological and cultural change that takes place as a result of contact between two or more distinct cultures (Graves, 1967; Redfield, Linton, & Herskovits, 1936). Acculturation is considered a multidimensional construct that encompasses three overarching domains: behavioral acculturation, value acculturation, and identity-based acculturation (see Schwartz et al., 2010 for a review). Behavioral acculturation focuses on cultural practices such as language use, media preferences, social affiliations, and cultural traditions. Value acculturation refers to values that typically characterize an ethnic group, such as individuation or collectivism. Identity-based acculturation captures the extent to which individuals affiliate with their culture of origin and the mainstream culture.

Acculturation has been linked to numerous adjustment problems in Latino youth. For instance, Gonzales et al. (2002) conducted a narrative review of studies published between 1980

and 2000 that examined the association between acculturation and mental health and substance use. Their search yielded 34 studies, 13 examined the relation between acculturation and self-esteem, 10 on externalizing problems (behaviors that are overt, disruptive, can harm others, and can violate societal norms; Keil & Price, 2006), 9 on substance use, 7 on internalizing problems (distress that is associated with the inability or difficulty to regulate one's emotional and cognitive states; Cicchetti & Toth, 1991), and 3 on eating disorder symptoms. The bulk of studies (53%) focused on Mexican American samples. Gonzales et al. (2002) concluded that studies generally find a positive pattern between acculturation and externalizing problems and substance use. However, the relation between acculturation and internalizing problems was less clear. In their review, the investigators discovered two studies found no relation between acculturation and depressive symptoms (Hovey & King, 1996; Katragadda & Tidwell, 1998). These two studies used a predominately Mexican American sample and measured acculturation with the ARSMA (Cuellar et al., 1980). Another two studies, though, found a positive association between acculturation and depressive symptoms (Knight, Virdin, & Roosa, 1994; Rasmussen, Negy, Carlson, & Burns, 1997). These two studies also used a predominately Mexican American sample. In a different study the results revealed a negative association between acculturation and depressive symptoms (Dumka, Roosa, & Jackson, 1997). Gonzales et al. (2002) concluded, "The acculturation-depression link, if it exists, is not straight forward." (p. 54). They also speculated differential outcomes might reflect uncontrolled factors such as socioeconomic status and immigrant status. Gonzales et al. (2009) conducted a follow-up narrative review that focused on possible pathways that connect acculturation to adjustment. Their review primarily focused on externalizing problems because it continued to be unclear what the relation, if any, was between acculturation and internalizing problems.

Recently, there has been an increased focus on acculturation and internalizing symptoms; however, findings continue to be inconsistent. For instance, Lorenzo-Blanco et al. (2012) found that greater levels of acculturation were predictive of future levels of depressive symptoms for girls. Their sample (N = 1,124; 54% female) consisted of predominately Mexican-origin (86%) youth. Lorenzo-Blanco et al. (2012) measured acculturation using the ARSMA-II (Cuellar et al., 1995) and the Way of Life Scale (Oetting & Beauvais, 1990). Dawson and Williams (2008) found similar results: acculturation, as measured by birth country, was positively predictive of future levels of internalizing symptoms in grade school children.

Glover et al. (1999) found acculturation, as measured by primary language, reading and writing ability, and birth country, positively predicted levels of anxiety symptoms in Mexican-American adolescents (7^{th} to 12^{th} graders). Glover et al. (1999) also examined whether acculturation and anxiety differed between two samples of Mexican-American adolescents, those who lived in a metropolis city with a diverse range of socioeconomic statuses and those who lived in an impoverished city. Glover et al. (1999) found that youth who lived in the impoverished city reported more anxiety symptoms than those who lived in the metropolis city. Additionally, results revealed younger children, especially those living in the impoverished city, reported more anxiety symptoms than older children.

Though some studies show a positive association between acculturation to the US culture and internalizing problems, other studies find a negative relation or no relation. For instance, Smokowski, Chapman, and Bacallao (2007) found higher endorsement of acculturation to the US was significantly related to lower levels of internalizing symptoms in a sample of predominately Mexican-origin youth (66%) who were born outside the US. The investigators measured acculturation using the Bicultural Involvement Questionnaire (BIQ; Szapocznik,

Kurtines, & Fernandez, 1980). Smokowski et al. (2009) found no relation between acculturation and self-esteem, hopelessness, and anxiety in a sample of Latino adolescents living in North Carolina and Arizona; most of the sample was of Mexican origin (58%). Schwartz et al. (2007) found similar findings; US acculturation was not related to self-esteem.

Theories and Measurements of Acculturation

A possible reason why there has been mixed findings regarding whether and how acculturation relates to internalizing symptoms in Latino youth is because of the way acculturation has been conceptualized and measured. The conceptual anchoring of acculturation has changed throughout the years. Within psychology, acculturation was thought to be a phenomenon where individuals who identify with the host culture would lose identification with their heritage culture (Gordon, 1964; Gordon, 1995). Acculturation was seen as a unidimensional construct that assumed the acculturative process was on a single continuum, ranging from not acculturated to the host culture to completely acculturated to the host culture. This framework used a zero-sum approach — the more individuals identified with the host culture, the less they identified with the heritage culture, and vice-versa. Measures that have utilized this framework often measured youth's acculturation through a discrepancy score between youth's orientation to their culture of origin and their orientation to the US. According to this model, acculturation to the US might be beneficial to Latino youth because as they acculturation they might increase their sense of belonging and similarity to their peers. On the other hand, acculturation to the US might also be detrimental to Latino youth in that they might not feel connected to their parents and their general cultural upbringing.

Critics of this approach have argued that the acculturative process is comprised of two processes that are relatively distinct. Berry (1980, 1997, 2005) proposed individuals could

strongly relate to their heritage culture (i.e., enculturation) *and* simultaneously relate to the host culture (i.e., acculturation). Berry (1980) uses the term *enculturation* to describe the maintenance of the heritage culture and *acculturation* to describe the adopting of the host culture. Conceptually, participation in either the heritage culture or the host culture could range from complete rejection to complete acceptance. Berry proposed acculturation could be derived by either examining the acculturation and enculturation processes independently, or by using the two processes in order to form four different acculturation orientations. An *assimilation* orientation consists of strongly relating to the host culture and weakly relating to the heritage culture. A *separation* orientation consists of strongly relating to the heritage culture and weakly relating to the host culture. An *integration* orientation consists of strongly relating to both the heritage and host culture. Finally, a *marginalization* orientation consists of weakly relating to both the heritage and host culture.

Berry's four acculturation orientations have received criticisms because the cut-offs of the four categories are arbitrary. For example, the marginalization orientation suggests that individuals have no cultural orientation, which has been argued to not be theoretically possible (Rudmin, 2003). Empirical studies have found partial support for Berry's model. Schwartz and Zamboanga (2008) surveyed 436 Latino college students about their orientation to their heritage culture and US culture. Using latent class analysis, these investigators extracted six cultural orientations, including three orientations that were proposed by Berry (1980). Berry's marginalization orientation did not emerge in this study. Other studies using empirically-based clustering and confirmatory methods have also failed to replicate Berry's four acculturation orientations (Knight et al., 2014; Schwartz et al., 2010; Stossel, Titzmann, & Silbereisen, 2014; Unger et al., 2002). Recently, researchers have recommended the field to move away arbitrary

cut-offs and instead focus should be on the two continuum processes (Schwartz et al., 2010; Dourcerain, Ryder, & Segalowitz, 2016).

Acculturation is often measured in accordance with these frameworks (Doucerain et al., 2016; Nguyen & Benet-Martinez, 2007). Measures using the unidimensional framework tend to assess acculturation across various behavioral, cognitive, and attitudinal domains but use a discrepancy score. For example, the Acculturation Rating Scale for Mexican Americans (ARSMA; Cuellar, Harris, & Jasso, 1980) is a scale with five domains: language use, ethnic identity, cultural heritage, ethnic behaviors, and ethnic interactions. On one end of the scale is the culture of origin and on the other end of the scale is the mainstream culture (e.g., US culture). A total score is produced when the five domains are summed. Generally, low scores represent strong affiliation to the heritage culture and high scores represent strong affiliation to the host culture. Middle scores represent either equally strong affiliation to both cultures (i.e., integration) or equally weak affiliation to both cultures (i.e., marginalization). Thus, when acculturation is measured with a discrepancy score, it confounds integration and marginalization acculturation orientations. Other measures that use the unidimensional framework (e.g., the Short Acculturation Scale for Hispanics; Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987) follow similar procedures.

Measures that use the bidimensional framework also assess acculturation across various domains but include two separate scales — an enculturation scale and an acculturation scale, with the supposition that acculturation is more directly captured by two independent scores than a single discrepancy score. For example, the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II; Cuellar, Arnold, Maldonado, 1995) is a scale that captures Mexican orientation and Anglo orientation on two separate scales. The two scales can be used independent of each

other to describe how acculturated or enculturated a person is or can be used in combination to categorize respondents into one of the four orientations proposed by Berry.

Although both unidimensional and bidimensional measures of acculturation can be considered direct measures of acculturation, they differ in whether acculturation and enculturation are considered ends of a single continuum or relatively independent processes. Measuring acculturation from a unidimensional framework using a discrepancy score versus using individual scores for acculturation and enculturation may account for some of the inconsistent findings in research evaluating acculturation and internalizing problems. For instance, Koneru et al. (2007) conducted a narrative review of all published studies that explored the effects of acculturation on stress, alcohol and drugs, eating disorders, and depression. The authors found heterogeneity across study findings, with the greatest inconsistencies in studies that used discrepancy measures of acculturation.

The main limitation of direct acculturation measures has been the lack of scale independence between ethnic and mainstream cultural orientation. Kang (2006) argued the responses from direct measures of acculturation are likely not independent. Instead, some domains are likely to have a direct relationship. For example, if a participant is asked, "What percentage of your time do you speak English?" and "What percentage of your time do you speak Spanish?," answers to these two questions are likely to be related. From a conceptual standpoint, this is an issue because bidimensional frameworks assume acculturation and enculturation are independent processes. Other limitations, which are also observed in the discrepancy models, include the lack of contextual factors that may influence the acculturative process. For instance, Shaw et al. (2012) argued that where recent immigrants live can influence their acculturation process. Kulis, Marisglia, Sicotte, and Nieri (2007) used a convenience

sample of 3,721 Latino seventh graders to examine how neighborhoods influenced alcohol and substance use. Using multi-level modeling, Kulis et al. (2007) discovered that living in neighborhoods with high proportions of recent Latino immigrants reduced the likelihood of youth drinking alcohol and smoking cigarettes and marijuana.

An alternative to direct measures of acculturation are proxy, or indirect, measures. Proxy measures index acculturation through some other variable thought to reflect individuals' level of acculturation (Cabassa, 2003). Generational status is sometimes used as a proxy measure. Generational status often refers to questions about whether individuals are first-, second-, or third-generation immigrants in the US. First generation refers to individuals who were born outside the US. Second generation refers to individuals whose parents were born outside the US, and the individual was born within the US. Third generation refers to individuals who themselves and whose parents were born in the US. Though typically operationalized in this way, generational status categories are often defined idiosyncratically by researchers, which has led to hybrid categories (Rumbault, 2004). For example, immigrants who arrived between the ages of six and twelve are sometimes labeled as belonging to the 1.5 generation because they received some formal education in their country of birth, but mostly received their formal education in the US. Spoken language is often used as a proxy measure of acculturation. Questions can be related to language preference or their language. For youth born outside the US additional proxy measures are often used. Time in the US is sometimes used as a proxy where individuals are asked how long they have resided in the US, or whether the individuals immigrated to the US as children or as adults. Immigration status, whether individuals are undocumented or have an authorized visa to be living in the US, is another proxy measure. Place of birth is another proxy measure that is used in lieu of multi-item, direct acculturation measures.

Proxy measures are often used to index acculturation because they are convenient and quick to administer (Cruz, Marshall, Bowling, & Villaveces, 2008). Proxy measures are thought to provide snapshots that may relate to outcome variables (Doucerain, Segalowitz, & Ryder, 2016). In fact, most studies that assess acculturation use a proxy variable (Thomson & Hoffman-Goetz, 2009). Although the usage of proxy measures is abundant, scholars have questioned their predictive utility (Hunt, Schneider, & Comer, 2004; Thomson & Hoffman-Goetz, 2009). Proxy variables have been criticized because they are insufficiently precise to capture the phenomenon of acculturation. Scholars have argued proxy measures do not directly assess acculturation and might be tapping into another construct (Matsudaira, 2006; Thomson & Hoffman-Goetz, 2009). For example, language preference may be associated with acculturation, but it may also be associated with access to education. Proxy measures have also been questioned for their failure to distinguish between the *process* and *consequences* of acculturation (Alegria, 2009; Lawton & Gerdes, 2014; Schwartz et al., 2010). For example, proxy measures fail to differentiate between language acquisition (process) and language preference (consequence). Also, proxy measures do not inform whether research findings are explained by a loss of one's native culture or the acquisition of the US culture. Another criticism is that, though proxy measures are related to various acculturation measures, the range of correlations is large. For instance, Thomson and Hoffman-Goetez (2009) found that the range in correlation coefficients between proxy measures of acculturation and multi-item, direct measures of acculturation were from .17 to .76.

Some scholars have argued for the utility of proxy measures (Alegria, 2009; Alegria et al., 2007; Cruz et al., 2008). Alegria (2009) reasoned proxy measures may be appropriate when multi-item measures of acculturation are impractical and time consuming. Alegria noted that epidemiological studies are likely to use proxy measures over multi-item direct measures of

acculturation. Similarly, Cruz et al. (2008) argued proxy measures (in particular, language spoken at home or during interview, proportion of life lived in the US, and generational status) have demonstrated validity and can be used alone when comprehensive assessments of acculturation are not feasible or available.

Potential Moderators

One possibility is that the association between acculturation and internalizing symptoms in Latino youth may depend on how acculturation was measured in the study. Scholars' operationalization of acculturation may play a moderating role in research on acculturation and internalizing problems because measures of acculturation may range in their methodological rigor and precision. Discrepancy measures do not separate acculturation and enculturation, potentially confounding participants who are marginalized with those who are integrated. Also, studies that use proxy measures may find little predictive utility because they lack precision.

Another possibility is that youth characteristics might influence the relation between acculturation and internalizing problems. Acculturation has been theorized to change as a function of age. For instance, Garcia Coll and Magnuson (2000) posited young children's acculturation, compared to that of adolescents, might be more closely related to parents' acculturation because children first learn about attitudes, values, and behaviors from their primary caregivers. Studies suggest Latino young children tend to identify themselves by their parents' country of origin (Garcia Coll & Marks, 2009). In contrast, adolescents' acculturation process is likely informed by parents but also their schooling, their friends, and the exposure they receive to US customs. Latino adolescents, compared to Latino young children, tend to identify themselves by their immediate context and by sets of ethnic-specific knowledge, attitudes, and behaviors (Bernal, Knight, Garza, Ocampo, & Cota; 1990; Ocampo, Knight, & Bernal, 1993).

Therefore, for younger children acculturation levels might be more reflective of parents' acculturation levels whereas for older children acculturation might be more reflective of their own internal processes and lived experience. Moreover, developmental models depict differences in cognitive skills and developmental tasks more broadly as children age; it would therefore stand to reason that the process of acculturation, which is fundamentally a cognitive task, would be different across age (Masten, Burt, & Coatsworth, 2006).

In addition to age, gender might moderate the relation between acculturation and internalizing problems. Compared to other ethnic groups, Latino families typically have stronger gender role divisions and more traditional gender views (Lac et al., 2011). This has been found to be particularly true for Latino adolescents because their developmental period is associated with an intensification of gender-related socialization (Hill & Lynch, 1983). Raffaelli and Ontai (2004) posited gender role socialization interacts with Latino cultural values. These investigators argued that boys and girls are taught about culturally-based beliefs surrounding gender roles. For example, the idealized traditional feminine role involves being submissive, chaste, and dependent on others, whereas the traditional masculine role involves being dominant, macho, and independent. With regard to internalizing problems, research on gender differences has generally shown that Latino girls report more anxiety than boys (Ginsburg & Silverman, 2000; Varela et al., 2007). Research on gender differences in depression are typically not found for children, but are found in adolescent samples, with adolescent girls reporting more depression symptoms than boys (Nolen-Haeksema & Girgus, 1994). Thus, it seems possible that gender might also alter the relation between acculturation and internalizing problems.

Country of origin may also partially explain the variability in previous findings. There are differences in the political, economical, educational, and social contexts among various Latin

American countries (Cabassa, 2003). In addition, researchers have argued that there is great variability in how different Latino subgroups are perceived in the US (Portes & Rumbaut, 2006). The perception of certain subgroups might influence how Latinos are treated and thus might impact the way they orient to the US as well as their mental health problems. Youth from different Latin American countries may also experience different obstacles in migrating and acculturating to the US. For instance, Portes and Rumbaut (2006) reported Mexicans and Central Americans, compared to other Latino subgroups, were often unfavorably viewed and discriminated against in the US. Arcia et al. (2001) found Puerto Rican-origin and Mexican-origin youth varied in their ethnic affiliation. Puerto Rican-origin youth reported more biculturalism whereas only third-generation Mexican-origin youth reported biculturalism. Arcia et al. (2001) speculated differences were because Puerto Rican-origin youth have relatively more access and exposure to US customs than Mexican-origin youth. They noted Puerto-Rican youth might have more access to English language instruction than Mexican-origin youth, which may help them communicate with others. Additionally, Puerto Rican-origin youth have more mobility to travel to and from the US, giving them more opportunities to reconcile and integrate Puerto Rican culture and US culture.

Discrepant findings linking acculturation to internalizing problems might also be due to variability in socioeconomic status (SES). Latino families seem to be at particular risk for struggling economically compared to non-Latino Whites. Short (2011) estimated approximately one of every four Latino families residing in the US has lived below the poverty line. Families that live below the poverty line tend to reside in poor neighborhoods that lack physical and social resources (Costello, Compton, Keeler, & Angold, 2003). Children living in poverty also tend to report more socioemotional problems and to have more difficulties in school than children from

families with greater economic means (Goosby, 2007; Samaan, 2000). Moreover, SES has been theorized to influence the acculturative process such that less economic mobility relates to different health beliefs and health promotion behaviors (Barrayo & Jenkins, 2003; Lawton & Gerdes, 2014). Many researchers have also concluded SES confounds acculturation findings; since many immigrant families struggle economically, it has been difficult to distinguish the extent to which acculturation versus SES accounts for differences in internalizing problems in Latino youth (Hunt et al., 2004).

Documentation status might be another factor that may account for discrepant findings in studies examining acculturation and internalizing problems in youth. Undocumented youth have a unique set of environmental challenges across community, family, and individual levels. At the community level, undocumented youth may experience difficulties with belonging, discrimination, and geographic mobility (Stacciarini et al., 2014). For example, undocumented youth are able to receive K-12 education but are often not eligible to receive federal financial aid for higher education (US Department of Education, 2015). As adults, undocumented youth are unable to vote, legally work, and, in most states, obtain a driver's license. Thus, adolescent youth might feel stymied and may have a bleak perspective on the future. At the family level, family dynamics may be negatively impacted by documentation status (Stacciarini et al., 2014). Studies conducted with mixed families (i.e., families that contain both documented and undocumented family members) revealed youth and parents experienced elevated anxiety symptoms compared to documented families (Potochnick & Perreira, 2010), and reported fears surrounding deportation (Mangual Figueroa, 2012; Suárez-Orozco, Yoshikawa, Teranishi, & Suarez-Orozco, 2011). At the individual level, undocumented youth may experience difficulties with social isolation and depression (Potochnick & Perreira, 2010; Stacciarini et al., 2014).

Meta-analysis

Meta-analysis is a quantitative method for systematically reviewing and synthesizing empirical findings (Rosenthal & DiMatteo, 2001). Meta-analysis permits researchers to achieve more accurate conclusions by recognizing that repeated results in the same direction across multiple studies are a stronger indicator of the strength of a relation between two variables than the results of a single study. Meta-analysis also allows for the inclusion of moderating variables of interest. There are distinct advantages of using meta-analysis over narrative reviews. One advantage of meta-analysis is that conclusions are quantifiable. Another advantage is that precision is needed in order to extract meaningful information from studies. A meta-analysis requires a) gathering of published, and often unpublished, studies in a systematic fashion; b) specifying inclusion and exclusion criteria; c) operationalizing independent and dependent variables; and d) identifying moderating variables. Meta-analysis also has the capability to reduce bias in findings. For example, publication bias is when studies with statistically significant results are more likely to be published than studies with null findings (Rosenthal, 1979). There are several techniques to detect publication bias in meta-analysis.

To date, no meta-analysis has been conducted that has explored the relation between acculturation and psychosocial adjustment in Latino youth residing in the US. Narrative reviews, though, have been conducted. As reviewed above, Gonzales et al. (2002) found mixed results in studies that examined depression and self-esteem and critiqued the inconstancies in the conceptualization and measurement of acculturation. Moreover, they noted studies rarely account for effects related to socioeconomic status and country of origin. Gonzales et al. (2009) conducted a follow-up narrative review, concluding that the relation between acculturation and internalizing problems continued to be inconsistent across studies.

Although no meta-analyses have been conducted with respect to acculturation and internalizing problems in Latino youth, there are published meta-analyses that examine the relation between acculturation and psychosocial adjustment in adults. Nguyen and Benet-Martinez (2013) examined biculturalism and adjustment across various ethnic groups and found that individuals who endorsed biculturalism tended to be better adjusted than those who endorsed only one culture. The investigators also found that the correlation between biculturalism and adjustment was stronger when biculturalism was measured using an acculturation-only measure as opposed to a discrepancy or categorical measure. Although Nguyen and Benet-Martinez found evidence for the biculturalism-adjustment link, they concluded that other relevant factors need to be explored in future research. They noted that SES, contextual factors (e.g., documentation status), and experiences of discrimination might influence the relation between biculturalism and adjustment.

Yoon et al. (2013) conducted a meta-analysis that examined relations among acculturation, enculturation, and mental health in various ethnic groups (Latino Americans, Asian Americans, African Americans, European Americans, Europeans). Yoon et al. (2013) found that acculturation negatively related to mental health (i.e., anxiety, depression, psychological distress). They also examined the moderating effects of researchers' conceptualization and operationalization of acculturation. They found that both discrepancy and direct measures of acculturation were negatively related to mental health. The investigators found no differences in the relation between acculturation and mental health by gender, participant race/ethnicity, or voluntariness of residency (i.e., immigrants vs. refugees). They did find a moderating effect of age such that the negative relation between acculturation and mental health was stronger for older participants than for younger participants. Yoon et al. (2013)

concluded that acculturation was related to favorable outcomes, generally. Notably, Yoon et al. (2013) noted although they examined broad contextual factors, they did not examine ethnic-specific contextual factors given the variety of ethnic groups in their study.

Present Study

Narrative reviews of the relation between acculturation and internalizing problems in Latino youth reveal mixed findings, with some studies finding the relation between acculturation and internalizing problems is positive whereas other studies find the relation to be negative (Gonzales et al., 2002; Gonzales et al., 2009). Needed are studies that can quantify the association between these variables and test factors that might explain mixed findings. This study had two aims. The first aim was to conduct a systematic review and synthesis of studies that examine the relation between acculturation and internalizing problems among Latino youth. Because prior reviews have found both positive and negative associations between these variables, no hypothesis was made. The second aim was to examine variables that might moderate the association between these variables. I first examined whether the method of measuring acculturation (i.e., discrepancy, direct measure, proxy) altered the relation between acculturation and internalizing problems. I hypothesized that the mean effect size would vary by the type of acculturation measure. Because previous studies have been mixed, I made no hypothesis on the direction and strength of the association. I then explored whether youth characteristics (i.e., age, gender, country of origin) and contextual factors (i.e., socioeconomic status, documentation status) altered the overall effect size.

Method

Literature Search

A systematic literature search was conducted in the following electronic databases: Academic Search Complete, ERIC, Google Scholar, Medline, Psycharticles, and PsycINFO. The

search terms were: Accult*; Latin* or Hispanic* or Mexican*; youth or child* or adole*; and internalizing or anxi* or depress*. 'Mexican' was included as a search term because the majority of published studies on acculturation have focused on Mexican-origin youth (Gonzales et al., 2002). All studies that were published by August 2017 were included in this review.

Study Inclusion/Exclusion Criteria

Studies that measured acculturation were included in the meta-analysis. For the purpose of this study, acculturation was defined as an individual-level process of psychological and cultural change that takes place as a result of contact between two or more distinct cultures. Acculturation may result in changes in an individual's beliefs, values, behaviors, identities, and language use. A definition of acculturation was not needed for inclusion purposes; however, acculturation had to have been indexed or measured in some way. Proxy measures of acculturation included: time in the US, immigration status, generational status, place of birth, and spoken languages. When acculturation was measured directly via self-report questionnaire, it had to have been completed by the youth. Studies were excluded if only parent acculturation was examined.

Studies also needed to measure internalizing problems to be included in the meta-analysis. Internalizing problems were defined as depression or anxiety symptoms. The DSM-5 characterizes depression as, "the presence of sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly affect the individual's capacity to function" (American Psychiatric Association, 2013, p. 155). Depression symptoms included: low mood, diminished pleasure or interest in activities, significant weight loss or gain, sleep difficulties, psychomotor difficulties, fatigue or loss of energy, feelings of worthlessness or excessive guilt, concentration difficulties, and recurrent thoughts of death or suicide. The DSM-5 characterizes

anxiety as, " excessive fear and anxiety and related behavioral disturbances…fear is the emotional response to real or perceived imminent threat, whereas anxiety is anticipation of future threat" (American Psychiatric Association, 2013, p. 189). Anxiety symptoms included: anxiety, worry, avoidance of specific objects or situations, panic attacks, and rumination. A study did not have to measure both anxiety and depression. If a study included anxiety or depression but not both, the study was still included. Self-, teacher- and parent-report of internalizing problems were included. Studies were excluded if there were no quantitative results examining the link between youth's acculturation and internalizing problems.

Studies also needed to contain Latino youth participants who, at the time of data collection, were in the United States or US territories. Youth was defined as individuals who are above 5.0 years of age but less than 18.0 years of age. In cases where age of participants was not reported, youth was defined as individuals who were in school (K-12) but had not graduated high school. In longitudinal studies, participants who were adults (i.e., 18 of age and above) at the time of follow-up were still included as long as at baseline the participants were youth. Latino was defined as a person who self-identified as coming from a Latin American origin or descent. Studies were excluded if they did not contain youth participants who were in the United States at the time of data collection. Adults were also not included.

All quantitative studies were included in meta-analysis, including studies that utilized mixed-method approaches. However, all studies must have used quantitative analyses (e.g., correlations, regression, structural equation modeling) among the variables of interest. In addition, studies were excluded if researchers used a data set that had already been published and was already included in the review. In such cases, the oldest study was included in the meta-analysis. Finally, dissertation studies and unpublished studies were excluded because the main

focus of this study was on published, peer-reviewed studies. In addition, researchers have suggested that dissertations often do not influence the results of meta-analyses, especially when published findings are mixed (Vickers & Smith, 2000).

The Pearson correlation coefficient, *r*, effect-size statistic was used. If other effect-size statistics (e.g., Cohen's *d*) were provided, they were converted to *r*. Similarly, if an effect-size statistic was not provided, then attempts were made to calculate an *r* effect size. The first attempt included examining presented values and determining whether an effect size could be calculated. If an effect size could not be calculated, then the corresponding author was contacted. Cohen's (1988) effect size guidelines were used to appraise the magnitude of effect sizes.

If a study included more than one indicator of acculturation or internalizing symptoms, only one outcome variable was used. This decision was made to not violate the assumption of independence. If more than one indicator was present, the indicator that was most reliable was used. If reliability could not be determined, then the selected indicator was randomly selected. If both a proxy variable and a direct measure of acculturation were provided, then the direct measure was used as the indicator. If studies included both cross-sectional and longitudinal correlations, the cross-sectional correlations were used. Preference was given to cross-sectional correlations over longitudinal correlations because this study was most focused on the relation between acculturation and internalizing symptoms at one time point.

Data Coding

After studies were identified youth, study, statistical, and measurement characteristics were coded. The codebook and sample codebook sheets are located in the appendix. The following youth characteristics were coded: a) average age, b) % girls, c) % US-born and % Mexico-born, d) generation status, e) documentation status, f) language spoken at home, g) state

sample was collected, and h) socioeconomic status (SES). Study characteristics included a) sample size, b) sample recruitment strategy (e.g., passive sample, prevention sample, outpatient sample) and c) whether the study was cross-sectional or longitudinal. Statistical characteristics that were coded included a) adjustment for multiple comparisons, b) results reported for each outcome, and c) missing data strategy (e.g., list-wise deletion, full information maximum likelihood). Finally, measurement characteristics included: a) acculturation and internalizing symptoms measure name, b) reporter of acculturation and internalizing symptoms, c) psychometric properties, and d) effect size. After the systematic literature search was conducted, acculturation measures were coded into one of three categories: proxy, discrepancy, and direct measure of acculturation. Similarly, internalizing measures were coded into one of three categories: anxiety, depression, and broadband internalizing.

Interrater reliability. All studies were coded by either the present author (senior coder) or a doctoral student in the Department of Psychological Science at the University of Arkansas. The senior coder provided training to the second coder. Training consisted of learning about the rationale of the study, using the coding sheets, and practicing coding. Independently, the senior coder and the second coder coded five sample studies. Training was complete after accuracy was over 90%. Once coding begun, the senior coder and the other coder met weekly for two hours to discuss codes. In addition, the senior coder performed a reliability check on 10% of the total studies that were coded by the second coder. Agreement was calculated using the kappa statistic. Using Cohen's (1960) guidelines, interrater reliability coefficients were categorized as none-to-slight (0.01-0.20), fair (0.21-0.40), moderate (0.41-0.60), substantial (0.61-0.80), and almost perfect (.81-1.00) agreement. Using recommendations by McHugh (2012), only ratings substantial or above indicate adequate agreement for healthcare research. Interrater reliability on

initial codes was .90. Inconsistences between the coders were discussed until 100% agreement was reached.

Analytic strategy

SPSS 23 and macros written by Lipsey and Wilson (2001) were used to analyze the extracted *r* correlations. Before the mean effect size was calculated, correlations were adjusted for small sample bias and correlations were analyzed for outliers (Lipsey & Wilson, 2001). After adjustments, correlations then were converted to Fischer's *z* to normalize the *r* distribution. In addition, Fischer's *z* transformations yielded weighted and unweighted summary effects and confidence intervals for the effect size (Borenstein et al. 2009; Rosenthal & DiMatteo, 2001). Fischer's *z* values were then converted back to *r* correlations for ease of interpretation.

Studies were weighted with the following formula, as recommended by Lipsey and Wilson, 2001.

$$W_{zr} = n - 3$$

(W_{zr} = Weighted effect size of each study, n = Sample size)

Studies were weighted because studies may vary in their precision. Precision has been found to be related to standard error and sample size. Studies with larger sample sizes, compared to smaller sample sizes, have smaller standard errors and are more likely to yield an accurate effect size. Therefore, the above formula provides more weight to studies with larger sample sizes.

A homogeneity analysis was conducted to determine whether the mean effect size value was representative of the population effect size (Rosenthal & Rubin, 1982). In a homogeneous distribution, the effect sizes around their mean are no greater than expected from sampling error alone. If the effect sizes are heterogenous, it indicates that the mean effect size is not a good estimate of the population effect size and it is possible that study characteristics might explain

variability (Borenstein, Hedges, Higgins, & Rothstein, 2009). Homogeneity was tested with the *Q* statistic. If the homogeneity test is statistically significant, then the conclusion is that there is variability between studies above what is expected from sampling error and moderator analyses should be performed. Moderator analyses test whether study and sample characteristics partially explain the variability between studies. Moderator analyses were performed using either the analog to the one-way ANOVA (for categorical moderators) or a weighted regression analysis (for continuous moderators).

Meta-analysis can be analyzed with either a fixed or random effects model. A fixed effects model assumes that each study measures the same parameter and that variability beyond subject-level sampling error is random and cannot be attributed to study characteristics (Hedges & Vevea, 1998; Overton, 1998). Thus, a fixed effects model assumes the mean effect size is representative of the population effect size. In contrast, a random effects model assumes that study effect sizes include subject-level sampling error and variability due to other sources of variability, like study characteristics. A random effects model is recommended when *a priori* hypotheses exists for potential moderating variables. A random effects model is also recommended when it is reasonable to assume that studies might reflect more than one population. Thus, a random effects model was used for this study.

There are three common methods to estimate a random effects model. These estimation techniques are: method of moments (MM; also known as the DerSimonian and Laird method), full information maximum likelihood (FIML); and restricted maximum likelihood (REML). Each estimation technique has its advantages and disadvantages. The MM is the most conservative method, which makes no assumption about the distribution of random effects. However, this method may lead to type-II error when the number of studies in the meta-analysis

is small (Higgins, Thompson, & Spiegelhalter, 2009). If effect sizes are normally distributed, then FIML or REML can be used. The advantage of FIML and REML over MM is that estimates are more precise and robust. Between FIML and REML, FIML tends to be more precise but may be more biased, whereas REML tends to be less biased but also less precise. Borenstein, Hedges, Higgins, and Rothstein (2015) recommend FIML when the number of studies in the meta-analysis is small. In this study, I determined prior to data collection that if effect sizes were normally distributed then FIML would be used, whereas if effect sizes were not normally distributed, then MM would be used. Normality was assessed by examining Shapiro-Wilk's normality test and skewness and kurtosis values. Normality was also assessed graphically by examining a standardized residual histogram and a Q-Q plot.

Because this meta-analysis was exclusive to published studies, there was a possibility of an upward bias of the mean effect size. Rosenthal (1979) described this as a "file drawer problem" because studies are more likely to be published if they demonstrated statistically significant results, while studies showing null findings end up in a "file drawer". In order to test for publication bias, three techniques were used. First, Owrin's (1985) fail-safe *N* was calculated to determine the number of studies with an effect size of zero that would be needed to reduce the mean effect size to zero. This version of the fail-safe *N* performs best with correlational data (Lipsey & Wilson, 2001). A scatter plot was also graphed to visually inspect the relation between a study's effect size relative to its sample size. This scatter plot is referred to as a funnel plot (Card, 2012). Publication bias would be evident in this funnel plot if it was asymmetrical. In addition to a visual inspection, Egger's test was conducted to formally evaluate whether the plot was symmetrical (Egger, Smith, Schneider, & Minder, 1997; Sterne, Gavaghan, & Egger, 2000). If the model intercept differs significantly from zero, the plot is asymmetric. Finally, a trim and

fill procedure as proposed by Duval and Tweedie (2000a; 2000b) was used. This procedure trims (i.e., removes) studies that yield an asymmetric funnel plot to estimate an adjusted mean effect size from the remaining studies. Then, this procedure adds the trimmed studies back and also fills (i.e., imputes) studies to make a symmetrical funnel plot. A visual display of the funnel plot with observed and imputed effect sizes can demonstrate how much a mean effect size shifts. The adjusted mean effect size can also be compared to the unadjusted mean effect size. When the shift is small, it suggests that the mean effect size is likely not impacted by publication bias. Meta-essentials 1.4 (Suurmond, van Rhee, & Hak 2017) was used to assess publication bias.

Results

Literature Search

A flowchart with study selection criteria is displayed in Figure 1. The systematic literature search yielded 593 studies. After removing dissertations (k = 116), 477 studies remained. The titles and abstracts of the remaining studies were reviewed to exclude studies that were not related to acculturation and internalizing symptoms. After excluding these studies (k = 271), 241 studies were eligible for a full text review. A full text review revealed 84 studies were eligible to be included in the meta-analysis. These remaining studies were reviewed to determine whether a data set was used more than once. After these studies were removed (k = 31), 53 studies remained. Of the remaining studies, 15 studies were missing effect sizes and could not be calculated from the information available in the text. The corresponding authors for these studies were contacted and a request was made for the bivariate or point-biserial correlation between acculturation and internalizing symptoms. A total of three authors responded and all declined the request. Therefore, a total of 38 studies were included in the meta-analysis.

Participant Characteristics

Table 1 includes descriptive information of participants included in the meta-analysis. As a whole, the samples included a total of 13,343 Latino youth (mean sample size = 351; range of participants was between 40 and 3,022). The percentage of participants that were female ranged from 8.5% to 100% (*M* = 56.67% female, *SD* = 20.41% female). The age range of participants was from 7.32 to 16.81 years old (*M* = 13.88 years, *SD* = 2.17). Twenty-four of the 38 studies (63.2%) included participants born in the US. The proportion of participants born in the US ranged from 16.3% to 100%; only 5 studies included only US-born participants. Fifteen studies (39.5%) included participants born in Mexico; the proportion of Mexican-born participants ranged from 7.1% to 70%. Only six studies included participants born elsewhere. Percentage of participants born in other countries ranged from 1% to 66.1%. Regarding documentation status, only one study included information on whether participants in the sample were documented. In that study, 28.63% of their participants (*n* = 73) had no legal documentation to be in the US.

A total of 18 studies (47.4%) provided information on participants' generational status. Seventeen studies included participants who were 1st generation Latino youth. The proportion of participants ranged from 10% to 100%, with five studies exclusively containing 1st generation participants. Seven studies included 2nd generation participants (proportion of participants ranged from 47% to 82.7%) and two studies included 2.5 generation participants. Only three studies included 3rd generation participants, with the proportion of participants ranging from 12.5% to 18.5%.

A total of 14 studies provided information on participants' language preferences. Most of these studies (*k* = 13) included participants who spoke English. The proportion of participants ranged from 8.8% to 100%; however, only one study included only English-speaking Latino

youth. Fewer studies included participants who spoke Spanish (k = 10; 1.4% to 43.9%) and spoke English and Spanish (k = 4; 11.6% to 78.8%).

Study Characteristics

Details of the acculturation and internalizing problems measures are displayed in Table 2. Acculturation was assessed with proxy measures (k = 14), as well as discrepancy (k = 4) and direct acculturation rating scales (k = 19). Proxy variables included nativity (k = 5), language preference (k = 5), years in the US (k = 2), generational status (k = 1), and documentation status (k = 1). Studies that used a direct measure of acculturation most often used the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II; Cuellar, Arnold, Maldonado, 1995). The Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977) was most used to measure depression (k = 14) while the Youth Self-Report (YSR; Achenbach, 1991) broadband internalizing problems scale was most often used to measure internalizing problems (k = 9). Only one study measured anxiety symptoms. Similarly, only one study used parent-report for internalizing problems. Most often studies used self-report questionnaires to assess internalizing problems.

Most studies (k = 30) provided information on the state or geographic region where data were collected. Most studies collected data in California (k = 13), "Southwest US region" (k = 7), and North Carolina (k =3). Few studies (k = 9) provided information on the socioeconomic status of participants and their families. Six studies reported yearly income (range: $14,353 to $37,770), and one study reported the percentage of children living in poverty (25%). Two studies reported the percentage of children who had free or reduced lunch, which was 90% and 100%, respectively.

The majority of studies were cross-sectional (k = 28). There were four occurrences when a study provided both cross-sectional and longitudinal data. A substantial proportion of studies, 35 out of 38 studies, used passive approaches to recruiting participants. Passive recruitment strategies included newsletters and flyers and large-scale screening processes (e.g., school-wide assessments). The missing data strategy that studies employed varied considerably. Ten studies reported using a basic missing data strategy (e.g., list-wise deletion, pair-wise deletion) and 12 studies reported using an advanced missing data strategy (e.g., multiple imputation). Fourteen studies did not report a missing data strategy. Only two studies reported no missing data.

Aim 1: What was the average magnitude of the association between acculturation and internalizing problems?

FIML was selected as the estimation technique for these analyses because the distribution of effect sizes was normal. This was evaluated through various methods. Shapiro-Wilk's normality test was non-significant (.98, p = .65), and skewness (.06) and kurtosis (-.46) were in an acceptable range. A standardized residual histogram demonstrated residuals followed a normal distribution (see Figure 2). A Q-Q plot also demonstrated that the effect sizes were normally distributed (see Figure 3). Also, correlations were analyzed for outliers and none were found.

Effect sizes for each study are displayed in Table 3. A forest plot graphing the effect sizes is illustrated in Figure 4. The mean effect size was .02 (95% confidence interval (CI) = -.01 – .06, p = .25) and the range of effect sizes was from -.19 to .24. Twenty-three effect sizes reflected a positive association between acculturation and internalizing problems whereas 14 studies reflected a negative association. A positive association indicated that the closer youths' acculturation was aligned with US culture, the greater their internalizing symptoms. A negative

association indicated that the closer their acculturation aligns with US culture, the less their internalizing symptoms.

To test whether the distribution of effect sizes was similar to the population effect size, a test of homogeneity was conducted. Results revealed significant variability in the distribution of effect sizes, $Q = 129.12$, $p < .001$, indicating moderator analyses are warranted.

Publication bias techniques revealed the risk of publication bias was minimal. Orwin's (1983) fail-safe *N* was not applicable for this aim because the effect size was not statistically significantly different from zero. A visual inspection of the funnel plot indicated a symmetrical pattern such that studies that were included in the meta-analysis ranged in their findings (see Figure 5). Egger's test confirmed the visual inspection findings. Finally, the fill and trim procedure did not suggest studies needed to be imputed. In addition, the adjusted effect size was identical to the combined effect size.

Aim 2: Does the association between acculturation and internalizing problems differ by study characteristics?

A series of analog to the analysis of variance and weighted regression analyses were conducted to determine whether the association between acculturation and internalizing problems was moderated by study characteristics, youth characteristics, and contextual factors.

Measure of acculturation. The first analog to the analysis of variance focused on the measurement of acculturation. Results revealed a significant effect of measurement of acculturation on estimated effect size, $Q\ (2) = 6.80$, $p = .03$. Proxy variables were not associated with internalizing problems, $r = .02$ (CI = -.03 – .07), $p = .36$, $k = 13$. The range of effect sizes was from -.12 to .14. Discrepancy measures were negatively associated with internalizing problems, $r = -.10$ (CI = -.20 – 0), $p = .05$, $k = 4$, whereas direct measures were positively

associated with internalizing problems, r = .05, (CI = 0 – .09), p = .05, k =19. Even though analyses using discrepancy and direct measures were statistically significant, the reported effect sizes were small to negligible, and the confidence interval included zero. For discrepancy and direct measures, Orwin's (1983) fail-safe N revealed that only one study was needed to make each overall mean effect size not statistically different from zero. Egger's regression test indicated that the funnel plots for proxy (t-test = -0.50, p-value = .62), discrepancy (t-test = -0.91, p-value = .46), and direct (t-test = -0.03, p-value = .98) measures of acculturation were symmetric.

Age. A weighted regression analysis was used to examine whether the strength of the association between acculturation and internalizing symptoms depended on the average age of youths in the sample. Results revealed age was not a significant moderator of this association, β = .14, p = .47.

Gender. Next, I examined whether gender was a significant moderator of the acculturation-internalizing problems association. Similar to age, gender (specifically, the percentage of participants in the study sample that was female), was not a significant moderator of the association, β = -.05, p = .76.

Birth country. I then explored whether country of origin moderated the relation between acculturation and internalizing problems. The percentage of study participants who were born in the United States was not a significant moderator of the association between acculturation and internalizing problems, β = -.23, p = .26. However, studies that had higher percentages of Mexican-born participants were more likely to report a positive association between acculturation and internalizing problems than studies that had lower percentages of Mexican-born participants, β = .54, p = .02. See Figure 6 for a graphical representation of the association

between percent Mexican-born and average effect size per study. I also considered whether being born outside of the US, regardless of the country, moderated the relation between acculturation and internalizing problems. As a post-hoc analysis, another weighted regression analysis was performed, which revealed that being born outside of the US was a not a significant moderator of the acculturation-internalizing symptom association, $\beta = .11$, $p = .63$.

Internalizing problem type. The type of internalizing measure (anxiety, depression, or internalizing) was also considered as a potential moderator to the acculturation-internalizing symptom association. Because only one study utilized a measure of anxiety (Martinez et al., 2012), an analog to the analysis of variance was used to compare studies that utilized a depression measure ($k = 25$) to studies that utilized a broadband internalizing measure ($k = 11$). Results revealed that effect sizes did not significantly differ by type of internalizing measure, Q (1) = 0.04, $p = .85$.

Study design. Study design was also considered as a potential moderator. An analog to the analysis of variance was utilized to compare studies that used a cross-sectional design ($k = 28$) to studies that used a longitudinal design ($k = 10$). Results revealed that effect sizes did not significantly differ by study design, Q (1) = .02, $p = .34$.

Unexamined moderators. Socioeconomic status and documentation status were also selected as possible moderators; however, these analyses could not be performed. Socioeconomic status could not be analyzed because only nine studies reported socioeconomic status and what was reported was similar across studies. For example, the range of yearly income was from $14,353 to $37,770. Documentation status could not be analyzed because only one study reported this information (Potochnick & Perreira, 2010). Finally, I considered whether the rater of internalizing measure mattered; however, youth were the reporters of their internalizing

problems in all except one study (Schofield et al., 2009). Therefore, a moderator analysis could not be performed.

Discussion

The purpose of this study was to examine quantitively the relation between acculturation and internalizing problems in Latino youth. Given Latino youth are more likely to exhibit internalizing symptoms than youth from other racial or ethnic groups (Céspedes & Huey, 2008; Joiner, Perez, Wagner, Berenson, & Marquina, 2001; Roberts, Roberts, & Chen, 1997), exploring potential reasons for elevated risk is important. Acculturation, a process of adapting to a new culture, can be a source of stress for Latino youth since they may be navigating multiple aspects of values, beliefs, and identity that may put them at odds with majority culture peers (Schwartz et al., 2010). Because prior studies have found both positive and negative associations between these two variables, my first aim was to find an overall effect size. My second aim tested whether youth and study characteristics moderated the overall effect size. I expected effect sizes to differ by how acculturation was measured.

I found no statistically significant relation between acculturation and internalizing problems, and the mean overall effect size (.02) was small according to Cohen's (1988) effect size guidelines. I also found that the measurement of acculturation explained significant variability in the average effect size. When acculturation was measured with a proxy measure, there was no relation between acculturation and internalizing problems. When acculturation was measured with a discrepancy measure, the relation was negative such that youth who were more acculturated reported fewer internalizing problems than youth who were less acculturated. However, a different pattern emerged when a direct measure of acculturation was used. Studies that used a direct measure tended to find that youth who were more acculturated reported more

internalizing problems than youth who were less acculturated. In addition, moderator analysis revealed studies that had higher percentages of Mexican-born participants were more likely to report a positive association between acculturation and internalizing problems than studies that had lower percentages of Mexican-born participants. Other youth and study characteristics did not alter the relation between acculturation and internalizing problems.

One reason why acculturation and internalizing problems might not be associated with each other is because measures of acculturation, regardless of the way it was measured, assessed only one domain of acculturation. In the 38 studies reviewed, acculturation was assessed with 14 different measures. Some measures, like those using proxy measures, focused on one specific domain of acculturation such as years living in the US or language preference. Other measures, such as the ARSMA-II (Cuellar et al., 1995), predominately tapped into behavioral acculturation. Specifically, language ("I enjoy reading in English") and social and relational ("I associate with Mexicans and/or Mexican Americans") acculturation. This is in line with Schwartz et al. (2010), who argued acculturation is multidimensional and that too often studies capture only one domain of acculturation. A major issue of assessing only one specific domain is that the findings can provide a misleading picture of the acculturation process. It could be that aggregating studies that used different measures of acculturation to compute an overall effect size might have led to non-significant findings.

Another potential reason why the overall relation between acculturation and internalizing problems was near zero is because acculturation might be a rather distal factor in the process leading to heightened levels of internalizing problems. In other words, there might be more proximal, intervening variables that link acculturation and internalizing problems that are better predictors of youth adjustment than acculturation itself. Lawton and Gerdes (2014) argued that

several pathways likely link acculturation to adjustment problems. Individuals factors, such as acculturative stress and coping styles, and family factors, such as parent-child relationship and family conflict, potentially mediate the relation between acculturation and internalizing problems. Environmental factors, like discrimination, might also serve as possible consequences of the acculturation process. Similarly, it could be possible that some aspects of acculturation increase risk, while others decrease risk, leading to a net effect near zero (Hayes, 2009). In sum, acculturation might be a contributing risk factor for internalizing problems but may have little predictive utility once more proximal variables are considered.

A key finding from my study is that that the relation between acculturation and internalizing patterns differed when the method of measuring acculturation was considered. Studies that used proxy measures yielded, on average, a near zero effect size, suggesting no relation between acculturation and internalizing. As stated previously, proxy measures might only capture limited aspects of acculturation (Schwartz et al., 2010), especially if indexed using a single item. Also, studies reviewed here used five different proxy measures. Redfield et al. (1936) defined acculturation as "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups." This definition highlights the intricacies involved in assessing acculturation. An adequate measure of acculturation would need to assess level of change and directionality of change. Because acculturation involves groups, change would also need to be assessed at the individual level and the group level. My findings suggest proxy measures are insufficient to capture the construct of acculturation and are likely to have limited predictive utility with Latino youth.

I found that when discrepancy measures of acculturation were used, their relation to internalizing problems was negative. One reason why this might be the case is that discrepancy scales might be capturing the internal struggle or felt tension that Latino experience when thinking about their cultural allegiance. If true, youth with a strong affiliation with US culture might have less psychological distress than youth who experience the conflict of having ties to both cultures. It is difficult to ascertain what this finding means because of the methodological limitations inherent in discrepancy measures of acculturation. A main criticism of discrepancy measures of acculturation is that the culture of origin and the host culture are cast at opposite ends of the same spectrum. When individuals respond to these questionnaires, they are forced to choose an arbitrary point between the two cultures. Also, discrepancy measures have an issue where youth who are highly acculturated and encultured are mathematically the same to youth who are low on acculturation and low on enculturation. More recently, acculturation researchers have moved away from discrepancy measures to avoid the conflation of acculturation and enculturation. In fact, there is evidence that acculturation, how receptive individuals are to their host culture, is generally unrelated to enculturation, how they affiliate and identify with their culture-of-origin (Ryder & Paulhus, 2000). Although my findings found a negative association between discrepancy measures of acculturation and internalizing problems, the mean effect size was small (-.10) and based on only four studies. More research is needed to better understand the implications of using a discrepancy measure of acculturation.

A different pattern emerged with studies that used a direct measure of acculturation. As youths' affiliation with US culture increased, so did their reports of internalizing problems. This finding is concordant with studies that find acculturation is a risk factor for mental health problems. For example, affiliation to the US is associated with higher rates of delinquency

(Samaniego & Gonzales, 1999), substance and alcohol use (Ebin et al., 2001; Gil et al., 2000) and risky sexual behavior (Ebin et al., 2001). Although it is possible that acculturation places children at risk for internalizing problems, it is unclear whether levels of enculturation might alter children's risk. As mentioned previously, one of the strengths of utilizing direct measures of acculturation is that researchers can assess acculturation and enculturation separately; however, this study only focused on acculturation. Therefore, little can be discerned about the possible role of enculturation. Overall, the average effect size in studies using a direct acculturation measure was small (.05), suggesting the predictive utility of acculturation is low and that other more proximal factors, including level of enculturation and acculturative stress, might lead to a clearer picture of how acculturative processes are connected to youths' adjustment.

Outside of the measurement of acculturation, the only other moderator that significantly influenced the association between acculturation and internalizing problems was the percentage of the study sample that was born in Mexico. The strength between acculturation and internalizing problems was stronger in studies that included more Mexican-born youth compared to studies that had fewer Mexican-born youth in their samples. It is possible that Mexican-born children are struggling to fit in with their peers and their family as they acculturate to the US. In school, it might that children are identifying as more American but are being rejected by their peers and teachers and thus, they begin to develop internal distress. It could also be that as these children begin to strongly identify with being American they might be actively rejected at home or might feel like that they don't belong. It is also possible that this association reflects a different variable, such as documentation status. In general, Mexican immigrants are more likely to be undocumented than any other region of Central and South America (Pew Research Center, 2016). Given other moderation analyses of birth region (e.g., percentage of youth born in the US

vs percentage of youth who were foreign-born) revealed no significant association between birth region and the acculturation-internalizing problems effect size strength, suggesting there may have been something unique about Mexico-born youth samples. Unfortunately, documentation status could not be directly analyzed because only one study reported on it.

Limitations

There are several limitations to this meta-analysis. First, it is possible that not all published studies investigating acculturation and internalizing problems were identified through the literature search. Acculturation is a research topic that is studied in many disciplines, and it is possible that the literature search that was conducted missed an important database that was outside the knowledge of the researcher. That said, the initial search yielded over 500 studies. Second, the mean effect sizes estimated in this meta-analysis may be inaccurate because unpublished studies were not screened, and an effect size could not be obtained for 28% of the studies otherwise identified as meeting inclusion/exclusion criteria. Third, most studies in this meta-analysis were cross-sectional; therefore, directionality and causality cannot be inferred. Fourth, this study does not capture acculturation as a multilevel phenomenon. Meta-analyses often use a univariate approach to understand the relationship between two variables. As mentioned previously, acculturation is a multidimensional construct that encompasses several domains. Recently, multilevel meta-analytic frameworks have been proposed where researchers can consider the context in which two variables interrelate (e.g., Van Den Noortgate & Onghena, 2003). However, given that most studies in this review also examined acculturation through one or two domains (e.g., language, values), it would be difficult to conduct such analysis. Finally, this study can only speak about acculturation and not enculturation. Although a bidimensional

framework lends itself to assess acculturation and enculturation separately, this meta-analysis only focused on acculturation.

Implications and Future Directions

This meta-analysis has notable strengths. It included a diverse sample of studies, suggesting the findings have high external validity. It used a random-effects approach to model for sampling error and systematic variability. Overall, these findings suggest that acculturation and internalizing problems are likely not directly related to each other. Rather, acculturation and internalizing problems might be related to each other only under certain conditions and contexts. Recent conceptualizations of acculturation highlight that it is a multilevel phenomenon (Sam & Berry, 2006; Schwartz et al., 2010). Context is key to understanding acculturation. For example, if Latino youth are undocumented or part of family where caregivers are undocumented, it likely impacts the way they view their culture-of-origin and US culture. Experiences with discrimination and perceptions of discrimination also are likely related to how youth acculturate and deal with discriminatory experiences. Social and political context can also impact youths' identity development and how they view themselves fitting in. Future research studies need to appreciate the multilevel nature of acculturation. From a methodological standpoint, this can be achieved by using measures of acculturation that capture the various domains of acculturation as well as including variables that provide depth and context. If single domain measures are used, the limitations of these variables should be understood and acknowledged. From a theoretical standpoint, research questions related to acculturation need to have a clear, theoretical framework. This is especially needed when examining how acculturation is related to health outcomes. There should be a rationale for why acculturation is the best predictor compared to other predictors.

Although the mean effect size was near zero it is possible that some youth characteristics left unexamined in the current study might moderate the relation between acculturation and internalizing problems. Because studies did not provide sufficient information on some youth characteristics, it was not possible to test whether most of these variables shifted the association between acculturation and internalizing problems. Future studies should include detailed information so more specific meta-analysis can be conducted. For example, 32 out of the 38 studies were missing information on family SES. Given Latino families living in the US are overrepresented among those living near or below the poverty line, SES might be a key contextual factor that places children at risk for internalizing difficulties (Short, 2011). Another key contextual variable is documentation status. In the studies reviewed, only one study collected information on documentation status. Research suggests children who are undocumented may struggle with positive youth development and may develop internalizing problems (Yoshikawa, Suarez-Orozco, & Gonzales, 2016). Even documented youth who have undocumented parents have been shown to have an increase in anxiety and fear compared to youth where all caregivers have documentation status (Suarez-Orozco, Yoshikawa, Terainishi, & Suarez-Orozco, 2011). Although undocumented youth and families are a highly vulnerable and hard-to-reach population, innovative methods have been developed that allow for the gathering of information while protecting confidentiality (Hernández, Nguyen, Casanova, Suarez-Orozco, & Saetermoe, 2013; Suarez-Orozco & Yoshikawa, 2013).

In recent years, there has been much focus on the relation between acculturation and mental health outcomes. Less focus has been placed on why these phenomena might be related to each other. Understanding how these phenomena are connected might yield more precise operationalizations of acculturation as well as stronger predictive models, which have been two

of the main criticisms of acculturation research (Hunt et al., 2004; Thomson & Hoffman-Goetz, 2009). Several researchers have used a diversity science lens to better understand how these constructs are connected. For instance, Doucerain et al. (2016) argued that language proficiency might serve as a mediating mechanism between acculturation and mental health such that understanding idioms and colloquial language may aid in youth feeling connected and accepted to their community at large, which may in turn be related to their mood.

In addition, there is a paucity of research that integrates acculturation research and developmental psychopathology. Often studies tend to focus on either acculturation constructs or developmental psychopathology constructs without appreciation for each other. Needed are integrated frameworks that identify risk and protective factors for a specific group of children and then examine potential mechanisms that can be targeted with prevention and intervention programs. Some scholars have begun to assess the unique contributions of acculturation and psychopathology risk factors. For example, Stein et al. (2012) examined the role of culturally-based stressors (i.e., discrimination and acculturative stress) within Hankin, Abramson, and Siler's (2001) hopelessness model of depressive symptoms in sample of primarily Mexican-origin adolescents. Stein et al. (2012) found that discrimination and acculturative stress predicted greater depressive symptoms even when controlling for parent-child conflict and economic stress.

Conclusion

The findings of this meta-analysis suggest there is still much to learn about the effects of acculturation on youth well-being. One issue that has been consistently brought up in the literature is that the way acculturation is measured might influence the overall association between acculturation and internalizing problems in Latino youth. The findings from this study suggest that the measurement of acculturation in itself does not significantly influence the size or

direction of the mean effect size. Rather, the findings suggest that there needs to be an appreciation for the multidimensionality of acculturation. Equally important is a general respect for the context in which children live and develop for the context might be the key to disentangling the mixed findings in the literature. There have been calls in the literature to suspend the use of acculturation measures because of vague operationalizations and lack of predictive utility (Hunt et al., 2004). Although this criticism is warranted, it does not mean that there is no place for acculturation research. In the last two decades, there has been increased attention to address these criticisms. Some researchers have built integrative models, others have tested parts of these models, and others have used techniques, such as meta-analysis, to get a pulse of where progress has been made and where gaps still lie. My hope is that this meta-analysis can serve as a launching pad to innovative, empirically-sound research questions that can help researchers better understand the role of acculturation on youth development.

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Appendix

Tables and Figures

Table 1

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Ansary et al. 2013	78	Cross-sectional	16.05	55.2%	US = 62	---	1st Generation = 38
Archuleta et al. 2016	55	Cross-sectional	14.83	44.6%	Cuba = 36 Guatemala = 8 Mexico = 4 Puerto Rico = 1 Spain = 1	---	1st Generation = 55
Bámaca-Colbert et al. 2010	160	Cross-sectional	15.21	100%	US = 160	---	---
Bámaca-Colbert et al. 2012	271	Cross-sectional	12.26	100%	US = 168	---	---
Bauman 2008	229	Cross-sectional	11.89	58.1%	---	English = 73% Spanish = 27%	---
Bauman et al. 2009	56	Cross-sectional	7.32	49.0%	---	---	---

Table 1 (Cont.)

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Burrow-Sánchez et al. 2015	205	Cross-sectional	16.23	52.2%	---	English = 98% Spanish = 2%	---
Burrow-Sánchez et al. 2017	106	Cross-sectional	15.30	8.5%	Mexico = 67	---	---
Cano et al. 2015	302	Longitudinal	14.51	46.7%	Colombia = 9 Cuba = 92 Dominican Republic = 12 Guatemala = 9 Honduras = 9 Mexico = 106 Nicaragua = 11 Spain = 14	---	1st Generation = 302
Cespedes et al. 2008	130	Cross-sectional	14.92	70.0%	US = 101	Spanish = 33%	---
Chithambo et al. 2014	395	Cross-sectional	15.25	51.0%	US = 308	---	---

Table 1 (Cont.)

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Derlan et al. 2015	204	Longitudinal	16.81	100%	US = 131	---	---
Gonzales et al. 2006	175	Cross-sectional	12.94	51.0%	Mexico = 66 US = 107	---	---
Gonzales-Backen et al. 2017	338	Cross-sectional	12.27	13.7%	US = 210	English = 11.6% Spanish = 43.9% Bilingual = 11.6%	1st Generation = 115 2nd Generation = 165 3rd Generation = 58
Greenman et al. 2008	1661	Cross-sectional	16.05	51.0%	US = 1030	English = 35.0%	1st Generation = 631 2nd Generation = 1030
Gudiño et al. 2011	164	Longitudinal	11.35	56.1%	Mexico = 38 Spain = 13 US = 106	---	2nd Generation = 110
Kapke et al. 2017	50	Cross-sectional	12.14	52.5%	Mexico = 33 Puerto Rico = 3 US = 8	English = 8.0% Spanish = 21.3% Bilingual = 78.8%	---
Lopez et al. 2016	3022	Longitudinal	14.20	49.6%	US= 3022	English = 100%	---

Table 1 (Cont.)

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Lorenzo-Blanco et al. 2011	1124	Longitudinal	14.00	54.0%	US = 967	English = 72.3%	---
Martinez et al. 2012	133	Cross-sectional	11.90	43.3%	US = 112	---	2nd Generation = 110
Perez et al. 2011	187	Cross-sectional	11.60	60.0%	Dominican Republic = 60 Guatemala = 17 Honduras = 10 Mexico = 70 Nicaragua = 2 Spain = 28	---	1st Generation = 187
Polo et al. 2009	163	Cross-sectional	13.20	50.3%	Mexico = 79 US = 84	English = 81% Spanish = 29%	1st Generation = 79
Potochnick et al. 2010	254	Longitudinal	13.94	53.2%	Mexico = 178	---	1st Generation = 254
Rasmussen et al. 1997	242	Cross-sectional	13.69	57.4%	---	---	---
Rogers-Sirin et al. 2012	97	Cross-sectional	15.60	59.0%	US = 46	---	1st Generation = 51 2nd Generation = 46

Table 1 (Cont.)

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Romero et al. 2003	994	Cross-sectional	10.09	45.7%	US = 765	English = 21.7% Spanish = 11.4% Bilingual = 64.8%	1st Generation = 186
Schofield et al. 2008	132	Longitudinal	10.00	55.0%	Mexico = 22 US = 110	---	---
Sharkey et al. 2010	103	Cross-sectional	15.98	41.0%	---	---	---
Sher-Censor et al. 2011	134	Longitudinal	10.83	54.5%	Mexico = 24 US = 110	English = 94% Spanish = 6%	1st Generation = 24 2nd Generation = 72 2.5 Generation = 39
Sirin et al. 2013	332	Cross-sectional	16.20	56.0%	US = 173	---	1st Generation = 159 2nd Generation = 173
Smokowski et al. 2007	100	Cross-sectional	15.00	54.0%	Caribbean = 1 Central America = 14 South America = 22 US = 60	English = 10% Spanish = 33% Bilingual = 56%	1st Generation = 100
Smokowski et al. 2009	288	Longitudinal	15.00	54.5%	US = 95	---	1st Generation = 193
Spears et al. 2010	245	Cross-sectional	16.51	100%	---	---	---

Table 1 (Cont.)

Demographic Information of Participants Included in the Meta-analysis (K = 38)

Citation	N	Study Design	Mean Age	% Female	Country of origin	Language %	Generation Status
Telzer et al. 2016	428	Cross-sectional	15.02	50.2%	Mexico = 54 US = 374	English = 98.6% Spanish = 1.4%	1st Generation = 54 2.5 Generation = 295 3rd Generation = 79
Umaña-Taylor et al. 2011	204	Cross-sectional	16.23	100%	Mexico = 72 US = 132	English = 61.4%	1st Generation = 72
Umaña-Taylor et al. 2015	219	Cross-sectional	14.35	---	US = 144	---	---
Wiesner et al. 2015	40	Cross-sectional	13.42	50.0%	---	---	1st Generation = 4 2nd Generation = 31 3rd Generation = 5
Zeiders et al. 2013	323	Longitudinal	15.31	49.5%	Mexico = 84 US = 233	---	---

Note. US = United States

Table 2

Information about acculturation and internalizing problems measures

Acculturation			Internalizing problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Ansary et al. 2013	Proxy	Years in US α = not reported	Depression	Behavior Assessment System for Children – 2nd Edition – Self Report-Adolescent – Depression Subscale (BASC-2-SRP-A; Reynolds & Kamphaus, 2004) α = .88
Archuleta et al. 2016	Direct	Hispanic Acculturation Index (HAI; Archuleta, 2012) α = .77	Depression	Center for Epidemiological Studies (CES-D; Radloff, 1977) α = .85
Bamaca-Colbert et al. 2010	Direct	Bidimensional Acculturation Scale (BAS; Marin & Gamba, 1996) α = .91	Depression	CES-D α = .91
Bamaca-Colbert et al. 2012	Proxy	Nativity α = not reported	Depression	CES-D α = .90

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

Acculturation			Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Bauman 2008	Direct	Acculturation Rating Scale for Mexican Americans-II (ARSMA-II; Cuellar, Arnold, Maldonado, 1995) $\alpha = .75$	Depression	Child Depression Inventory (CDI; Kovacs, 2010) $\alpha = .81$
Bauman et al. 2009	Direct	ARSMA-II $\alpha = .79$	Depression	CES-D $\alpha = .90$
Burrow-Sanchez et al. 2015	Direct	ARSMA-II $\alpha = .90$	Depression	Beck Depression Inventory-II (BDI-II; Beck et al. 1996) $\alpha = .83$
Burrow-Sanchez et al. 2017	Direct	ARSMA-II α = not reported	Depression	BDI-II $\alpha = .87$
Cano et al. 2015	Proxy	Years in US α = not reported	Depression	CES-D $\alpha = .93$

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

Acculturation			Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Cespedes et al. 2008	Direct	ARSMA-II α = .56	Depression	Researcher index derived from Reynolds Adolescent Depression Scale -2(RADS-2; Reynolds, 2002) and Columbia Suicide Screen (CSS; Shaffer et al. 2004) α = .81
Chithambo et al. 2014	Direct	Acculturation, Habits, and Interests Multicultural Scale (AHIMSA; Unger et al. 2002) α = not reported	Internalizing	Researcher index derived from CES-D and RADS-2 CES-D α = .79 RADS-2 α = .79
Derlan et al. 2015	Direct	ARSMA-II α = .76	Depression	CES-D α = .91
Gonzales et al. 2007	Direct	Latent construct derived from ARSMA-II α = .92	Depression	CDI α = .78
Gonzales-Backen et al. 2017	Direct	BAS α = .85	Depression	CES-D α = .90

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

Acculturation			Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Greenman et al. 2008	Proxy	English-Speaking α = not reported	Depression	CES-D α = not reported
Gudino et al. 2011	Proxy	Nativity α = not reported	Internalizing	Researcher index derived from Youth Self-Report (YSR; Achenbach, 1991) Affective Problems and Anxiety Problems Affective Problems α = .75 Anxiety Problems α = .63
Kapke et al. 2017	Direct	ARSMA-II α = .86	Internalizing	YSR Internalizing Problems α = not reported
Lopez et al. 2016	Proxy	English-Speaking α = not reported	Depression	CES-D α =.74
Lorenzo-Blanco et al. 2011	Direct	ARSMA-II α = .74	Depression	CES-D α = .88
Martinez et al. 2012	Proxy	English-Speaking α = not reported	Anxiety	Multidimensional Anxiety Scale for Children (MASC; March, 1997) α = not reported

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

Acculturation			Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Perez et al. 2011		Researcher created index α = .74	Depression	Researcher index derived from DSM-IV Psychological Symptom Scale (Suarez et al. 2006) and Symptom Checklist-90 (SCL-90; Derogatis & Cleary, 1977) α = .85
Polo et al. 2009	Proxy	Nativity α = not reported	Internalizing	YSR Internalizing Problems α = .87
Potochnick et al. 2010	Proxy	Documentation status α = not reported	Depression	CDI α = .85
Rasmussen et al. 1997	Discrepancy	Acculturation Rating Scale for Mexican Americans (ARSMA; Cuellar, Harris, & Jasso, 1980) α = .82		BDI α = .85
Rogers-Sirin et al. 2012	Proxy	English-Speaking α = .73	Internalizing	YSR Internalizing Problems α = .76

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

Acculturation			Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Romero et al. 2003	Proxy	English-Speaking α = not reported	Depression	Self-report questionnaire derived from the DSM-IV criteria α = .93
Schofield et al. 2008	Discrepancy	Short Acculturation Scale for Hispanic Youth (SASH-Y; Barona & Miller, 1994) α =.83	Internalizing	Child Behavior Checklist (Achenbach, 1991) α = .82
Sharkey et al. 2010	Direct	ARSMA-II α =.87	Internalizing	YSR Internalizing Problems α = .92
Sher-Censor et al. 2010	Discrepancy	SASH-Y α =.83	Depression	CDI α = .80
Sirin et al. 2013	Proxy	Generation Status α = not reported	Internalizing	YSR Internalizing Problems α = .78
Smokowski et al. 2007	Direct	Bicultural Involvement Questionnaire (BIQ; Szapocznik et al. 1980) α = .89	Internalizing	YSR Internalizing Problems α = .89
Smokowski et al. 2009	Direct	BIQ α = .91	Internalizing	YSR Internalizing Problems α = .88

Table 2 (Cont.)

Information about acculturation and internalizing problems measures

	Acculturation		Internalizing Problems	
Authors	Dimensionality	Measure used	Construct	Measure used
Spears et al. 2010	Discrepancy	ARSMA α = not reported	Depression	CES-D α = .84
Telzer et al. 2016	Direct	ARSMA-II α = .75	Internalizing	YSR Internalizing Problems α = .88
Umana-Taylor et al. 2011	Proxy	Nativity α = not reported	Depression	CES-D α = .93
Umana-Taylor et al. 2015	Direct	BAS α = .77	Depression	CES-D α = .68
Wiesner et al. 2015	Direct	ARSMA-II α = .78	Depression	CES-D α = .86
Zeiders et al. 2013	Proxy	Nativity α = not reported	Depression	CES-D α = .90

Table 3

Correlations, confidence intervals, and weights

Authors	Correlation	95% CI Lower Limit	95% CI Upper Limit	Weight (%)
Ansary et al. 2013	0.06	-0.17	0.28	1.60%
Archuleta et al. 2016	-0.06	-0.33	0.21	1.24%
Bamaca-Colbert et al. 2010	0.12	0.00	0.24	3.01%
Bamaca-Colbert et al. 2012	-0.13	-0.28	0.03	2.43%
Bauman 2008	0.22	0.09	0.34	2.83%
Bauman et al. 2009	0.06	-0.21	0.32	1.26%
Burrow-Sanchez et al. 2015	0.09	-0.05	0.23	2.71%
Burrow-Sanchez et al. 2017	0.12	-0.07	0.31	1.95%
Cano et al. 2015	-0.02	-0.13	0.09	3.13%
Cespedes et al. 2008	0.03	-0.14	0.20	2.18%
Chithambo et al. 2014	-0.07	-0.17	0.03	3.38%
Derlan et al. 2015	0.04	-0.10	0.18	2.71%
Gonzales et al. 2007	-0.10	-0.25	0.05	2.53%

Table 3 (Cont.)

Correlations, confidence intervals, and weights

Authors	Correlation	95% CI Lower Limit	95% CI Upper Limit	Weight (%)
Gonzales-Backen et al. 2017	0.01	-0.10	0.12	3.24%
Greenman et al. 2008	0.14	0.09	0.19	4.23%
Gudino et al. 2011	0.01	-0.14	0.16	2.46%
Kapke et al. 2017	-0.11	-0.38	0.18	1.15%
Lopez et al. 2016	-0.06	-0.10	-0.02	4.38%
Lorenzo-Blanco et al. 2011	0.08	0.02	0.14	4.08%
Martinez et al. 2012	0.01	-0.16	0.18	2.21%
Perez et al. 2011	-0.16	-0.30	-0.02	2.61%
Polo et al. 2009	0.05	-0.11	0.20	2.45%
Potochnick et al. 2010	0.08	-0.04	0.20	2.95%
Rasmussen et al. 1997	-0.17	-0.29	-0.04	2.89%
Rogers-Sirin et al. 2012	-0.01	-0.21	0.19	1.85%
Romero et al. 2003	0.09	0.03	0.15	4.02%

Table 3 (Cont.)

Correlations, confidence intervals, and weights

Authors	Correlation	95% CI Lower Limit	95% CI Upper Limit	Weight (%)
Schofield et al. 2008	-0.14	-0.31	0.03	2.20%
Sharkey et al. 2010	0.22	0.03	0.40	1.91%
Sher-Censor et al. 2010	-0.19	-0.35	-0.02	2.22%
Sirin et al. 2013	-0.04	-0.15	0.07	3.22%
Smokowski et al. 2007	0.24	0.04	0.42	1.88%
Smokowski et al. 2009	0.05	-0.07	0.17	3.08%
Spears et al. 2010	0.07	-0.06	0.19	2.91%
Telzer et al. 2016	0.03	-0.07	0.12	3.45%
Umana-Taylor et al. 2011	-0.03	-0.17	0.11	2.71%
Umana-Taylor et al. 2015	0.12	-0.01	0.25	2.79%
Wiesner et al. 2015	0.00	-0.32	0.32	0.96%
Zeiders et al. 2013	-0.12	-0.23	-0.01	3.19%

Note. CI = Confidence Interval.

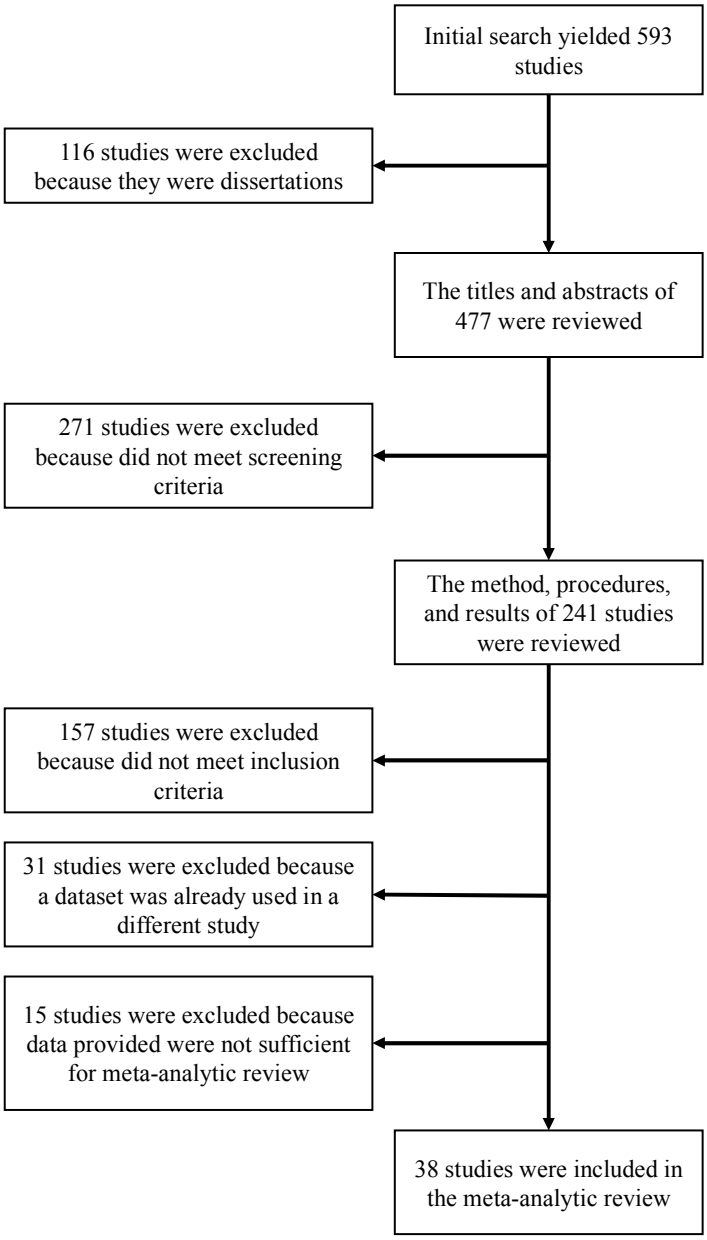

Figure 1. Study selection criteria.

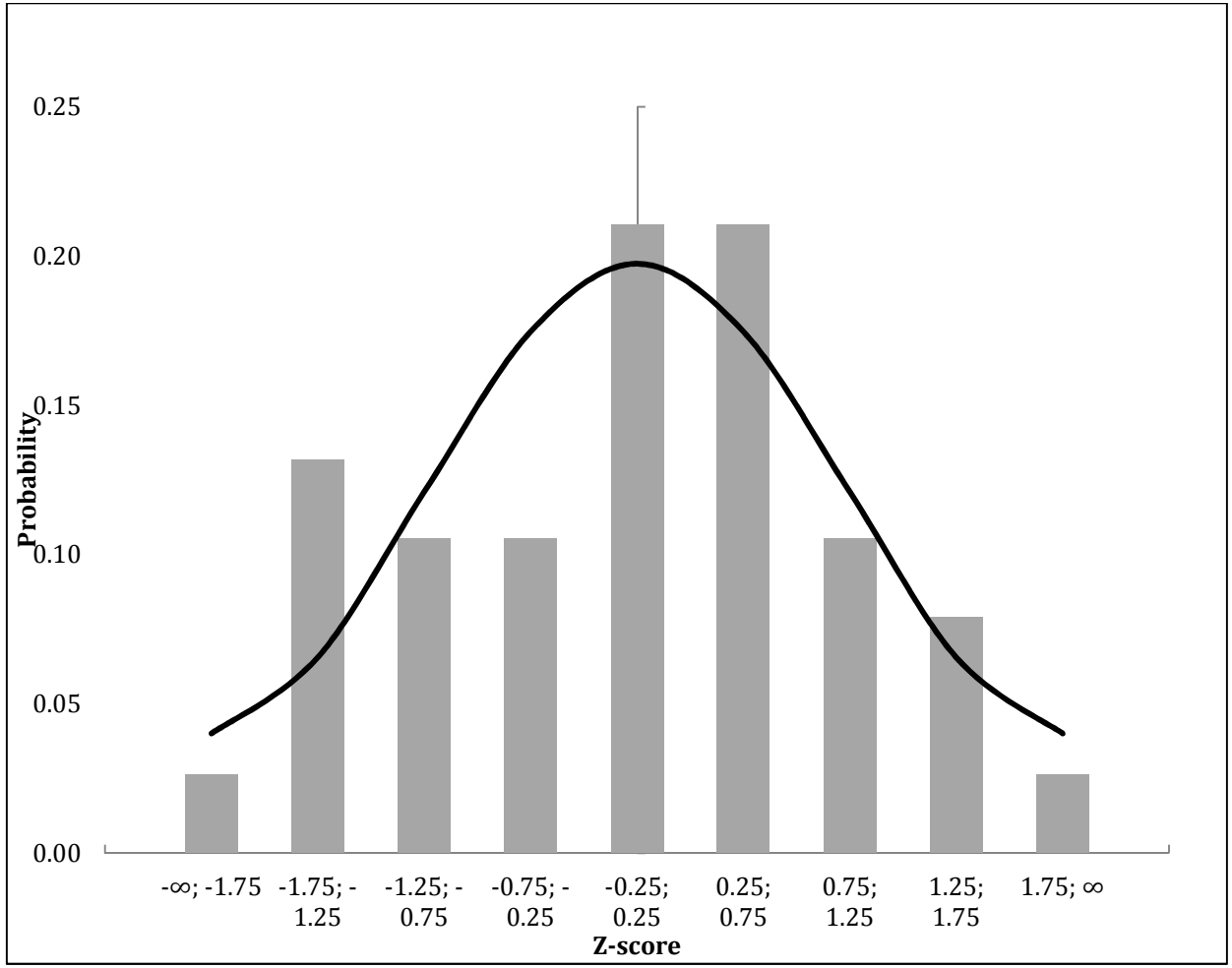

Figure 2. Standardized residual histogram of effect sizes.

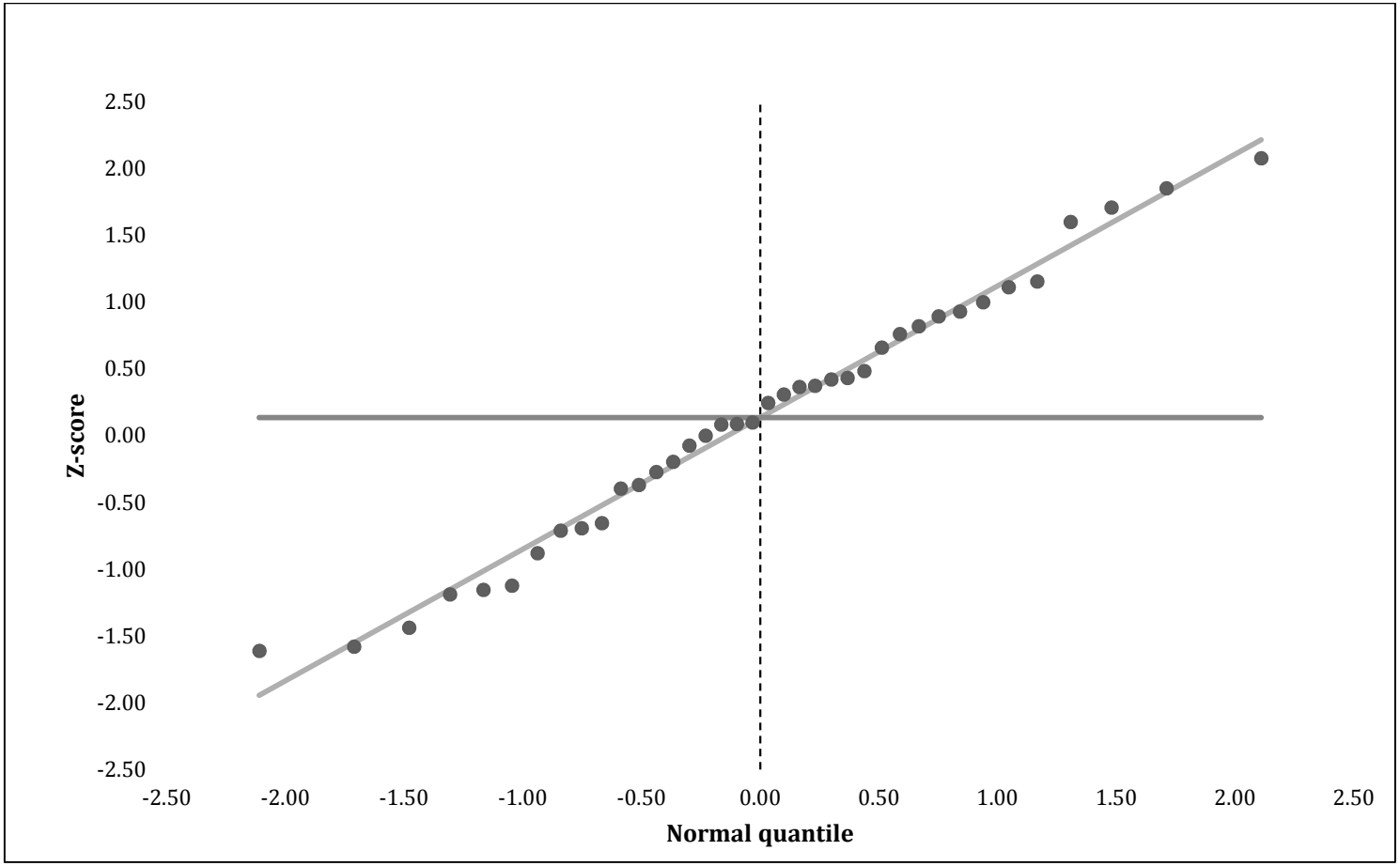

Figure 3. Normal Q-Q Plot of Effect Sizes

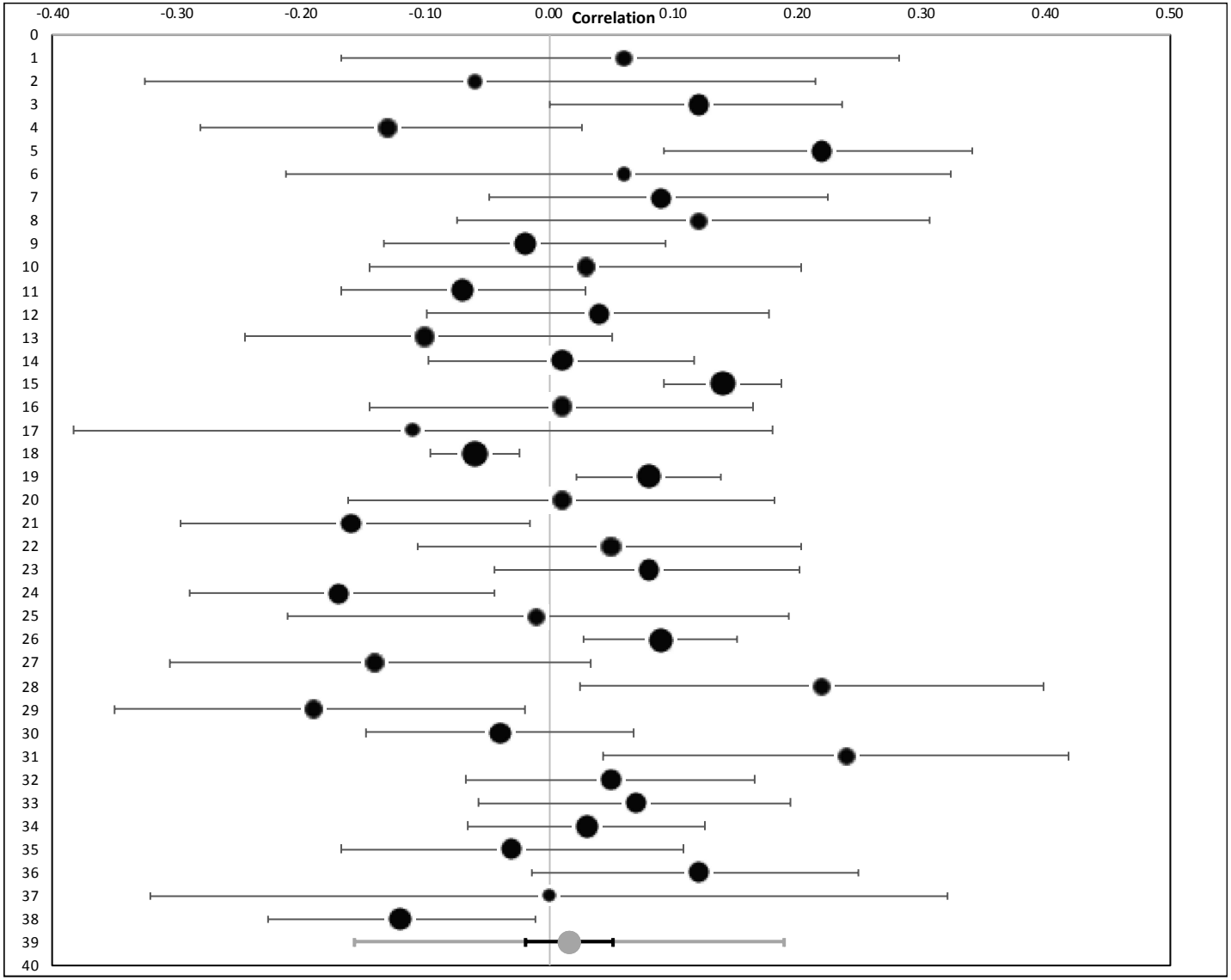

Figure 4. Forest plot of the mean effect size. The y-axis lists all studies in alphabetical order. The x-axis displays correlation values. Study 40 was the average effect size.

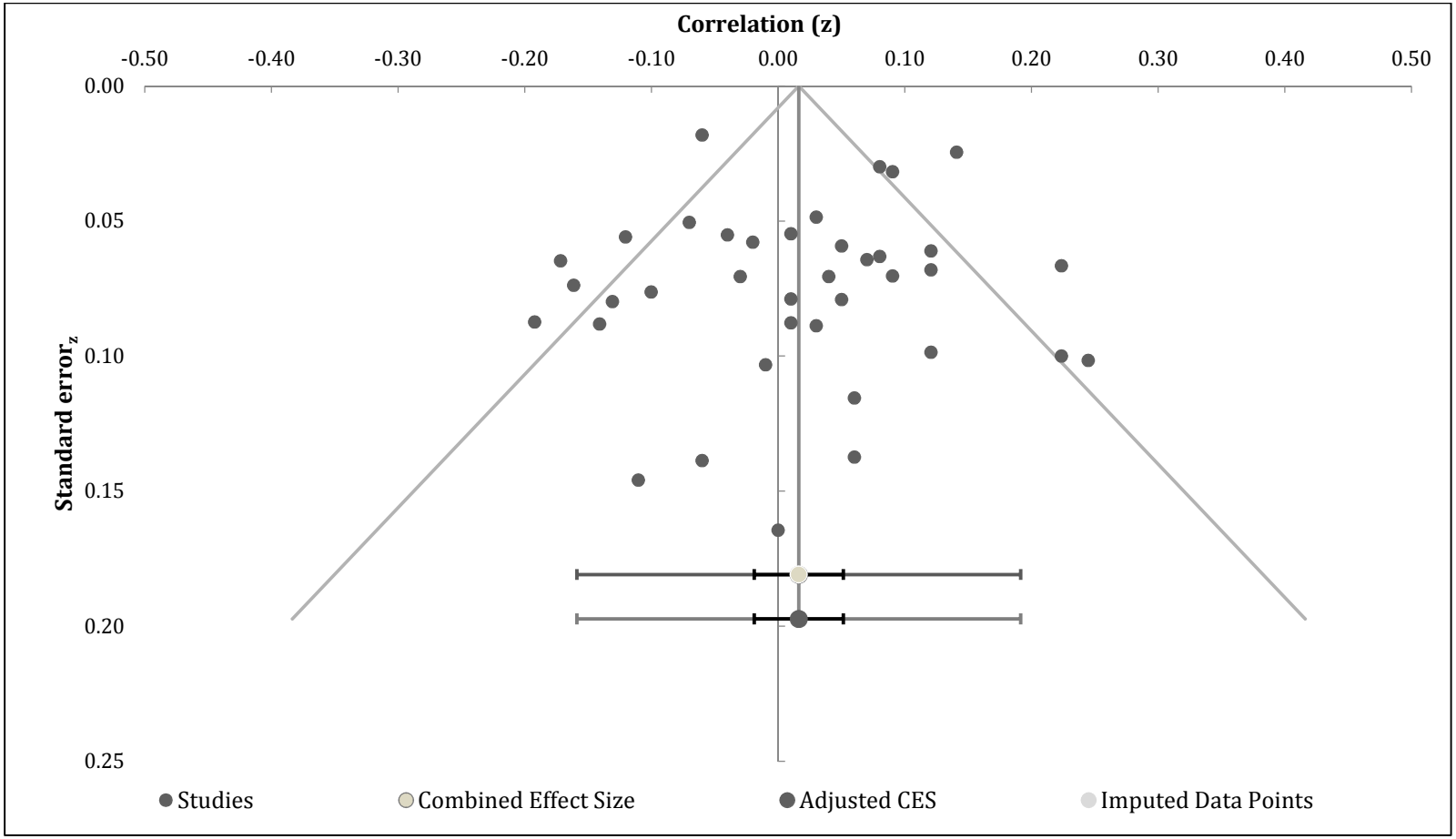

Figure 5. Funnel plot of the actual (dark grey) and imputed (light grey) effect sizes. The adjusted combined effect size (CES) was illustrated below the combined effect size.

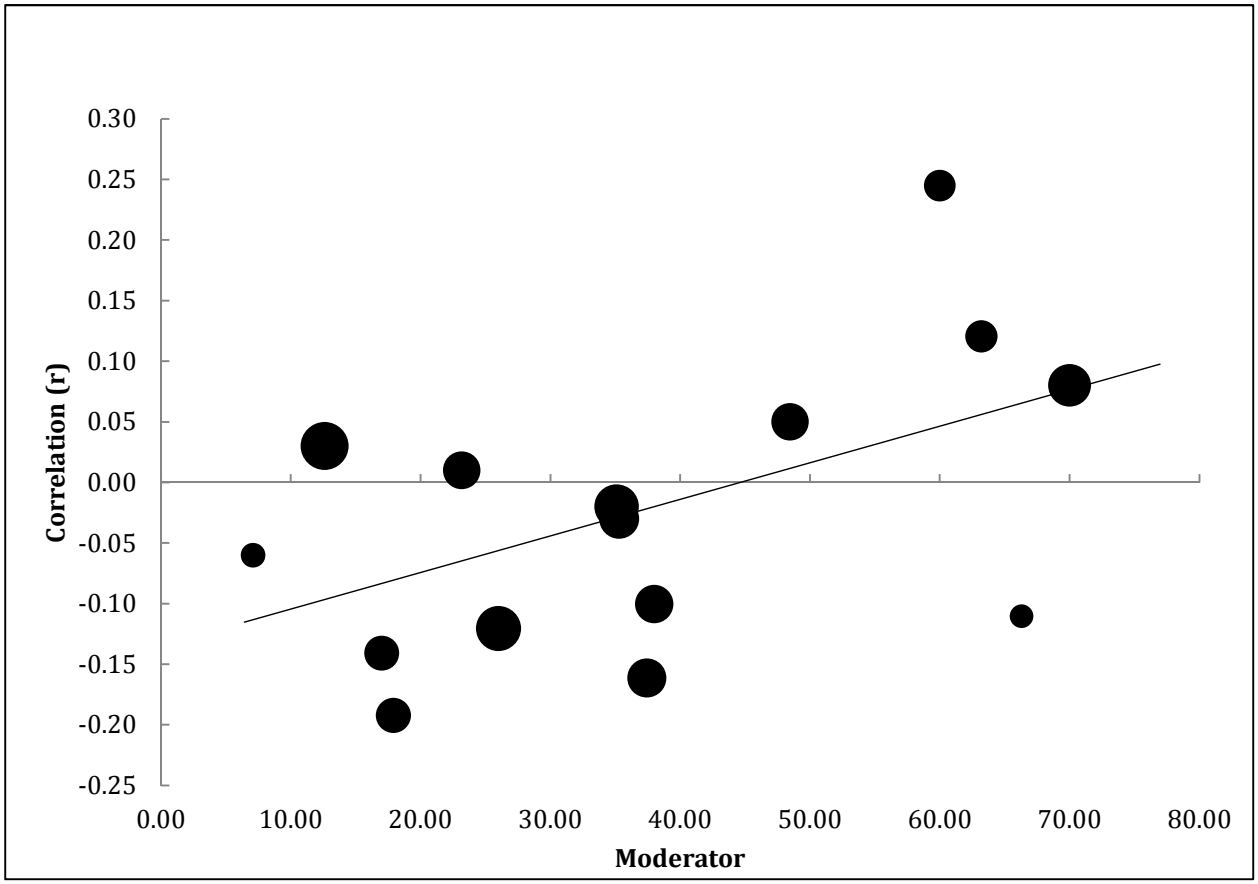

Figure 6. Regression of the correlation between acculturation and internalizing symptoms when the percentage of the sample is Mexican-origin is considered as a moderator.

Codebook for Meta-Analysis: Acculturation status and Internalizing Problems Among Latino Youth

STEP 1: SCREENING CRITERIA

This is the first step to determine which studies will be included in the meta-analysis. All studies will be coded using the criteria below. Studies approved for a given criteria are denoted with a "Y" and those that do not meet criteria are denoted with a "N." All studies will be coded by both Coder 1 (principal investigator) and Coder 2 (research assistant). When a discrepancy exists between the coders, we will discuss them until we reach a mutual agreement regarding whether or not the study should be included. Studies must meet all criteria to be included and to move on to Step 2.

CRITERIA	
1. Acculturation status	
Y =	Studies that measure acculturation status. Acculturation is defined as individual- and group-level process of psychological and cultural change that takes place as a result of contact between two or more distinct cultures. At the individual level, acculturation may result in changes in an individual's beliefs, values, behaviors, identities, and language use. At the group level, acculturation may result in changes of social structures, institutions, and cultural practices. A definition of acculturation is not needed for inclusion purposes; however, acculturation status must be measured to be included in the study. Acculturation status is typically measured with a self-report questionnaire but can also be measured with proxy variables. Proxy variables of acculturation status include: time in the US, immigration status, generational status, place of birth, and spoken languages. Time in the US often refers to questions about how many years individuals have resided in the US, or whether the individuals immigrated to the US as children or as adults. Immigration status often refers to questions about whether individuals are undocumented or have an authorized visa to be living in the US. Generational status often refers to questions about whether individuals are first-, second-, or third-generation immigrants in the US. Place of birth often refers to questions about whether individuals were born outside the US or inside the US. Spoken language often refers to questions about an individual's language preference, or their fluency in Spanish and English. For children, spoken language can refer to their parents' language preference or fluency. When acculturation status is measured via measure it must be youth-report.
N =	Studies that do not measure acculturation status. Studies that ask parents about youth acculturation status are included but studies that use parents' level of acculturation as a proxy to child acculturation are excluded. Studies that only examine enculturation should also be excluded. Enculturation is the maintenance of the heritage culture.
2. Internalizing Problems Outcome	
Y =	Studies that measure internalizing problems. Internalizing problems are defined as depression or anxiety symptoms. The DSM-5 characterizes depression as, "the presence of sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly affect the individual's capacity to function." Depression

	symptoms include: low mood, diminished pleasure or interest in activities, significant weight loss or gain, sleep difficulties, psychomotor difficulties, fatigue or loss of energy, feelings of worthlessness or excessive guilt, concentration difficulties, and recurrent thoughts of death or suicide. The DSM-5 characterizes anxiety as, " excessive fear and anxiety and related behavioral disturbances…fear is the emotional response to real or perceived imminent threat, whereas anxiety is anticipation of future threat." Anxiety symptoms include: anxiety, worry, avoidance of specific objects or situations, panic attacks, and rumination. A study does not have to measure both anxiety and depression. If a study includes anxiety or depression but not both the study will still be included. Self-, teacher- and parent-report of internalizing problems are included.
N =	Studies that do not measure internalizing problems. Often studies discuss depression or anxiety symptoms; however, they do not measure it. In these cases, those studies would not be included. Studies that are limited to academic performance or other outcomes will be excluded.
3.	*Youth in the United States*
Y =	Studies that contain Latino youth participants who, at the time of data collection, are in the United States or United States territories. Youth is defined as individuals who are above 5.0 years of age but less than 18.0 years of age. Youth is also defined as individuals who are in school (K-12) but have not graduated high school. However, the school definition will only be used if age is not reported. Sometimes participants may be adults (i.e., 18.0 years of age and above) at the time of follow-up. These studies will still be included as long as at baseline the participants were youth. Latino is defined as a person who self-identifies a Latin American origin or descent.
N =	Studies that do not contain youth participants who are in the United States at the time of data collection. Adults will be not included. Studies that involve child- and parent/other-report of acculturation or internalizing problems will be included.
4.	Quantitative study
Y =	Studies that are qualitative or mixed-method are acceptable. The studies must have quantitative analyses (e.g., correlations, regression, SEM) among the variables of interest.
N =	Studies that are qualitative are excluded.

STEP 1: SCREENING CRITERIA SHEET

CODER INITIALS:

STUDY REFERENCE:		
CRITERION	**Y/N**	**IF N, RATIONALE**
1. Acculturation Status		
2. Internalizing Problems		
3. Youth in the United States		
4. Quantitative study		
Continue to Step 2?*		

*If Y marked for all Criterion then mark Y.

STEP 2: STUDY-LEVEL CODING

The second step of meta-analysis includes coding important study characteristics that aid in the goal of identifying the magnitude and direction of outcome effects. Study characteristics include details about participants, outcome operationalization and measurement, and study design. All studies that met criterion in Step 1 will be coded. All studies will be coded by both Coder 1 (principal investigator) and Coder 2 (research assistant). When a discrepancy exists between the coders, we will discuss them until we reach a mutual agreement regarding whether or not the study should be included. Ideally, we will be able to assign a numerical code in each category below. Sometimes, though, a numerical code cannot be assigned with the information available within the research paper. In those cases we will have to locate the information in an older study or by contacting the author(s). If there are multiple research articles for the same study, then we will combine all information for those studies in one study-level code sheet.

STUDY-LEVEL CHARACTERISTICS OVERVIEW

Participant characteristics

I. Youth Age
II. Youth Gender
III. Sample size
IV. Nativity
V. Generational status
VI. Documentation status
VII. Language
VIII. Newer or older-receiving Latino community
IX. SES

Study design characteristics

I. Sample recruitment
II. Cross-sectional vs. longitudinal
III. Length of follow-up
IV. Peer review status

Statistical analyses characteristics

I. Adjustment for multiple comparisons
II. Results reported for each outcome measure
III. Missing data strategy

General Notes:

- Code percentages to the second decimal place.
- Code averages to the second decimal place.

Participant characteristics

I. Youth Age
   a. Average age of youth should be coded in years to the second decimal place.
      Example: 15.50 years of age.
   b. For studies that report age in days or months, convert age to years.
      Example: 100 months of age: 100/12 = 8.33 years of age.
   c. For studies that only provide grade-level information, use the following metric to convert to years of age.
      - Kindergarten = 5.00
      - 1st Grade = 6.00
      - 2nd Grade = 7.00
      - 3rd Grade = 8.00
      - 4th Grade = 9.00
      - 5th Grade = 10.00
      - 6th Grade = 11.00
      - 7th Grade = 12.00
      - 8th Grade = 13.00
      - 9th Grade = 14.00
      - 10th Grade = 15.00
      - 11th Grade = 16.00
      - 12th Grade = 17.00
   d. Missing data/Unknown = -999

II. Youth Gender
   a. Missing data/Unknown = -999

III. Sample Size
   a. Code the sample size
   b. Missing data/Unknown = -999

IV. Nativity
   a. Code percentage of sample that reported their country of birth.
      - % Mexico
      - % United States of America
      - % Central America (i.e., Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama).
      - % South America (i.e., Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela).
      - % Caribbean (i.e., Antigua and Barbuda, Barbados, Cuba, Dominica, Dominican Republic, France, Grenada, Haiti, Honduras, Jamaica, Kingdom of Netherlands, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago).
      - % Puerto Rico
      - % Unknown

- Missing data = -999

V. Generational Status
   a. Code percentage of sample that reported their generational status.
      - % First-generation
        - Definition: Foreign born; an individual who is born outside the US, Puerto Rico or other US territories and whose parents are not US citizens
      - % 1.5 generation
        - Definition: Foreign-born youths who have immigrated to the US before age 12.
      - % Second-generation
        - Definition: An individual who is a US citizen at birth (including Puerto Rico or other US territories) as well as those born elsewhere with at least one first-generation parent.
      - % 2.5 generation
        - Definition: An individual who is a US citizen at birth (including Puerto Rico or other US territories) to one first-generation parent and one foreign-born parent.
      - % Third-generation
        - Definition: An individual who is a US citizen at birth (including Puerto Rico or other US territories) with both parents US citizens
      - Missing data/Unknown = -999
      - Documentation Status
   b. Code percentage of sample that reported documentation status
      - % Undocumented
      - Undocumented is defined as not having the appropriate documents or licenses.
      - % Documented
      - Documented is defined as having the appropriate documents or licenses. Example: Lawful permanent resident (green card recipient), US Citizen
      - Missing data/Unknown = -999

VI. Language
   a. Code percentage of sample that reported their primary language
      - % English
      - % Spanish
      - % Portuguese
      - % Other language
      - % Bilingual (English and Spanish)
      - Missing data/Unknown = -999

VII. Newer- or older-receiving Latino community
   a. Code sample for state they are from at the time of data collection
      - Alabama = 1
      - Alaska = 2
      - Arizona = 3

- Arkansas = 4
- California = 5
- Colorado = 6
- Connecticut = 7
- Delaware = 8
- Florida = 9
- Georgia = 10
- Hawaii = 11
- Idaho = 12
- Illinois = 13
- Indiana = 14
- Iowa = 15
- Kansas = 16
- Kentucky = 17
- Louisiana = 18
- Maine = 19
- Maryland = 20
- Massachusetts = 21
- Michigan = 22
- Minnesota = 23
- Mississippi = 24
- Missouri =25
- Montana = 26
- Nebraska = 27
- Nevada = 28
- New Hampshire = 29
- New Jersey = 30
- New Mexico = 31
- New York = 32
- North Carolina = 33
- North Dakota = 34
- Ohio = 35
- Oklahoma = 36
- Oregon = 37
- Pennsylvania = 38
- Rhode Island = 39
- South Carolina = 40
- South Dakota = 41
- Tennessee = 42
- Texas = 43
- Utah = 44
- Vermont = 45
- Virginia = 46
- Washington = 47
- West Virginia = 48
- Wisconsin = 49

- Wyoming = 50
- Puerto Rico = 51
- Other U.S. Territories = 52
- Missing data/Unknown = -999
- If information is available but does not fit the above categories, please quote the sentences and include page number.

VIII. Socioeconomic status
   a. Code the families' SES. Some studies will include one or more index of SES. Record all indices and note the page number where value(s) were located. Some examples of SES include: Hollingshead, % in poverty, % reduced/free lunch, % Medicaid, and yearly income.
      - SES_1
      - SES_2
      - SES_3
   b. Missing data/Unknown = -999

Study design characteristics

I. Sample recruitment
   a. Provide percentage of how the sample was recruited. When sample is drawn from multiple recruitment strategies.
      - % Passive research
        - Examples: Participants who were not seeking or receiving treatment at the time of the study. Participants who were recruited via newsletters or advertisements. Or Participants recruited through a large-scale screening process. Examples include screening children from a local school district.
      - % Prevention sample
        - Examples: Participants recruited for possible prevention or treatment but not explicitly receiving services.
      - % Outpatient sample
        - Participants recruited from existing outpatient population (e.g., community mental health center, specialty clinic, school-based clinic).
      - % Inpatient sample
        - Participants recruited from existing mental health inpatient or residential service population (e.g., psychiatric hospital).
      - % Incarcerated sample
        - Participants recruited from existing juvenile detention facility sample.
      - % Missing data/Unknown

II. Cross-sectional vs. longitudinal
   a. Code whether the study used a cross-sectional or longitudinal design.
      - Is it cross-sectional?
        - YES
        - NO
      - If NO, provide length of follow-up.

III. Length of follow-up

a. Code the average length of Time 2 data, measured in years. Convert days or months of Time 2 to years (Days/365.25 or Months/12).
b. If Time 3 or beyond data was collected and measured

IV. Peer review status
a. Code for whether the manuscript was subjected to peer review
- Unpublished manuscript = 0
- Unpublished posters = 1
- Published, not peer reviewed = 2
  - Examples: Book chapters, open access journals, reports, etc.
- Published with peer review = 3
  - Examples: Journals, book chapters that explicitly state peer-reviewed

Statistical analyses characteristics

I. Adjustment for multiple comparisons
- Code for whether the investigators included a correction for experiment-wise error (Type I error). Examples include the Bonferroni or Scheffe method.
  - No, adjustments not performed or mentioned = 0
  - Yes, adjustments performed = 1
    - Write the name of the adjustment and the page number.

II. Results reported for each outcome measure
- Code for whether the study reported results for every outcome measure or whether the study was selective with their reporting (e.g., only reporting statistically significant outcomes).
  - No, selective reporting occurred = 0
  - Yes, all results were reported = 1

III. Missing data strategy
a. Code for whether the study reported the missing data strategy they used.
- No missing data strategy reported = 0.
- Missing data strategy reported, list-wise deletion, pair-wise deletion, mean substitution = 1.
  - List-wise deletion method excludes an entire record if missing any data.
  - Pair-wise deletion method excludes records that are missing data on a pair of variables.
  - In mean substitution method the mean value of a variable is used in place of the missing data value for that same variable.
- Missing data strategy reported, advanced technique =2.
  - Advanced technique includes: maximum likelihood (sometimes referred as full information maximum likelihood), multiple imputation, and regression-based imputation.
- No missing data in analyses = 3
  - Data weren't missing for analyses

STUDY-LEVEL CODE SHEET

Coder Initials:	
Study citation:	
PARTICIPANT CHARACTERISTICS	
Youth age (XX.XX)	
Youth Gender (% female)	
Sample size (n)	
Nativity (%)	
Generational status (%)	
Documentation status (%)	
Language (%)	
Newer or older-receiving Latino community	
SES	Index 1: Index 2: Index 3:
STUDY DESIGN CHARACTERISTICS	
Sample recruitment	
Cross-sectional (Y/N)? If no, provide length of follow-up.	
Peer review status	

STATISTICAL ANALYSES CHARACTERISTICS	
Adjustment for multiple comparisons	
Results reported for each outcome measure	
Missing data strategy	

STEP 3: MEASURE-LEVEL CODING

For each study, a measure-level code sheet needs to be completed. A study may have more than one measure-level code sheet if the study measured more than one acculturation method or if the study measured more than one internalizing outcome.

For each measure, code:

I. Acculturation: Measurement and Description
II. Internalizing: Measurement and Description
III. Information to calculate effect size

I. Acculturation
   a. Name of acculturation measure
   b. Brief description of measure
   c. How many items?
   d. Rater?
      i. Who was the respondent (child, parent)
   e. Reliability
      - List types of reliability (e.g., inter-item, test re-test, internal, etc.)
      - List reliability coefficients
      - Ratings
        - Cronbach's alpha
          - 0.90 and above = excellent
          - Between 0.80 and .89 = good
          - Between 0.70 and 0.79 = acceptable
          - Between 0.60 and 0.69 = questionable
          - Between 0.50 and 0.59 = poor
          - 0.49 or lower = unacceptable
        - (.35-1.00 = excellent, .21-.35 = good, .11-.2= adequate, <.11= limited).
        - Round values to the hundredth decimal point, when appropriate.
          - For example: 0.897 would be rounded up to 0.90. However, 0.894 would be rounded down to 0.89.

II. Internalizing
      - Name of internalizing measure
      - Brief description of measure
      - How many items?
   a. Reliability
      - List types of reliability (e.g., inter-item, test re-test, etc.)
      - List reliability coefficients
      - Ratings
        - Cronbach's alpha
          - 0.90 and above = excellent
          - Between 0.80 and .89 = good
          - Between 0.70 and 0.79 = acceptable
          - Between 0.60 and 0.69 = questionable
          - Between 0.50 and 0.59 = poor
          - 0.49 or lower = unacceptable
        - (.35-1.00 = excellent, .21-.35 = good, .11-.2= adequate, <.11= limited).

III. Information to calculate effect size
   a. Effect size reported?
      - Yes
        - Effect size type (z, β, ω^2, η^2,d, r, OR, kappa)
        - Page of article where effect size is reported

- No
    - If a study does not include effect sizes, move to B.

b. Calculate effect size (if one is not provided)
    - Type of analysis in study
        - Regression-based analyses
        - Analysis of variance
            - Including other analysis comparing means
        - Structural equation modeling
        - Chi-square tests
        - Descriptive statistics (e.g., correlations)
        - Non-parametric tests
        - NOTE: Create two lists that note whether the analysis was culled for effect size values
    - Record the following information (when applicable) along with page number where the number was found
        - Sample size
        - r correlation
        - Mean
        - Standard Deviation
        - Chi-Square
        - T-test value (only for independent t-tests)
        - F-test value (only for omnibus F-test values)

MEASURE-LEVEL CODE SHEET	
Coder Initials:	
Study citation:	
ACCULTURATION	
Acculturation measure name:	
Brief description of acculturation measure:	
How many items?	
Rater?	
Reliability:	Type of reliability: _____ Reliability coefficient: _____ Reliability rating: _____
Reliability #2: (if applicable)	Type of reliability: _____ Reliability coefficient: _____ Reliability rating: _____
INTERNALIZING ASSESSMENT	
Name of Internalizing Measure:	
Brief description of measure:	
How many items?	
Rater?	
Reliability:	Type of reliability: _____ Reliability coefficient: _____

	Reliability rating: _____
Reliability #2: (if applicable)	Type of reliability: _____ Reliability coefficient: _____ Reliability rating: _____
EFFECT SIZE	
Effect size: (if given)	
Information to calculate effect size:	Type of analysis in study (separate between analyses that were used to get values vs. analyses that were conducted but not with the variables of interest): _____ Sample size: _____ r correlation: _____ Mean: _____ Standard Deviation: _____ Chi-square: _____ T-test value: _____ F-test value: _____