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Acculturative Stress and Mental Health: A Systematic Review and Meta-Analysis

DISSERTATION

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DOCTOR OF PHILOSOPHY

in Psychological Science

by

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DEDICATION

To my family. We are together in everything, always.
Esto se lo dedico a mi familia. Estamos juntas en todo, siempre.

And to all the academic trail blazers who came before me who lit the way for me to reach this career milestone. To all my fellow first-generation college students- power to you and yes we can be champions of change! Last, but not least, to my doctoral mentors Ilona Yim and Belinda Campos and the numerous professors that have supported me throughout my academic journey.

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I am forever grateful.

VITA

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ABSTRACT OF THE DISSERTATION

Acculturative Stress and Mental Health: A Systematic Review and Meta-Analysis

by

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Doctor of Philosophy in Psychological Science

University of California, Irvine, 2022

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Acculturative processes are a common experience among ethnic minority groups and are proposed as important contributors to health disparities (Berry, 2007). *Acculturation* is a process of cultural adaptation that occurs with exposure to cultural context that differs from one's own, involving measurable changes in values, beliefs, and behaviors. *Acculturative stress* is the stress associated with the acculturation process and is experienced when coping challenges exceed coping resources (Berry, 2007; Smart & Smart, 1995). The present meta-analysis integrates and reconciles findings and moderators across the growing literature about the correlation between acculturative stress and mental health in the U.S. Greater acculturative stress was statistically significantly related to greater adverse mental health outcomes. A greater percentage of first-generation participants within a sample and a lower state diversity index were associated with an increased magnitude of the correlation between acculturative stress and adverse mental health outcomes. These findings expose vulnerabilities among affected groups, and future studies should focus on why that is the case and what can be done to help through culturally sensitive interventions.

Introduction

Acculturative Stress and Mental Health: A Systematic Review and Meta-Analysis

The ethnic and cultural composition of the United States (U.S.) is changing, and ethnic minority groups are a large percentage of the U.S population (U.S. Census Bureau, 2018). According to U.S. Census Bureau population estimates of 2018, Latinos are currently 18.1% of the population, followed by 13.4% of Black or African-Americans, and 5.8% of Asian descent (U.S Census Bureau, 2018). Ethnic minority groups are disproportionately affected by negative health outcomes (NASEM, 2017). As these groups acculturate into U.S. society, it becomes increasingly important to investigate factors contributing to health disparities in ethnic minority groups. The *Healthy People 2010 and 2020* health promotion and disease prevention agenda of the Center for Disease Control and Prevention, the National Institutes of Health, and other health promotion efforts emphasize the need for culturally sensitive health care services in order to address health disparities among ethnic minorities in the U.S. (Koh et al., 2011; Sondik et al., 2010). The recommendations include efforts to better understand protective and risk factors that may be related to health disparities.

Acculturative processes have long been proposed as important potential contributors to health disparities in ethnic minority groups in the U.S. (Berry, 2007). Individuals from ethnic minorities in the U.S. face unique sociocultural adaptive processes such as *acculturation*. *Acculturation* is a process of cultural adaptation when one is immersed in two or more cultures, involving measurable changes in values, beliefs, and behaviors to reflect those of the host culture, heritage culture, or both. This is an experience that is not limited to ethnic minority groups but includes other cultures more broadly, including for example, recent immigrants of European descent and other cultural groups that are adapting to a different culture. It is now also

recognized that acculturation can involve *acculturative stress* (Smart & Smart, 1995). *Acculturative stress* results when coping challenges from inter- and intrapersonal pressures associated with acculturation exceed coping resources (Berry, 2007; Smart & Smart, 1995). More recently, researchers have proposed that acculturative stress and not acculturation alone increases the propensity for adverse health outcomes in ethnic minority groups (Caplan, 2007).

Models of Acculturation

Early models of acculturation were unidimensional, reflecting only a progression towards assimilation, and failing to account for orientation to one's heritage culture (Cuellar, Harris, & Jasso, 1980). More recently, acculturation is recognized to be a bidirectional and multidimensional process affecting both the individual and interacting groups. Acculturation is not necessarily static as levels of acculturation can fluctuate throughout the lifespan (Berry, 2007; Campos, Dunkel-Schetter, Walsh, & Schenker, 2007; Romero & Piña-Watson, 2017).

Berry (2007) proposed there are different acculturation orientations, which can lead to differing adaptation outcomes. At the two extremes are assimilation and separation. Assimilation involves rejecting one's heritage culture and adopting a host or mainstream culture orientation, whereas separation entails holding on to one's heritage culture and rejecting the host culture. The model suggest that the most adaptive orientation is integration, which involves maintaining one's heritage culture, while still adopting the host culture. On the other hand, perhaps the least adaptive outcome is marginalization, which involves isolation from and rejection of both the heritage culture and the host culture (Berry, 2007). It is important to note that these outcomes are not necessarily voluntary and are sometimes forced by the host culture or heritage culture, as in segregation, which involves rejection by the mainstream culture (Ruiz, 2010).

Acculturative Stress

Berry (1970) coined the concept of *acculturative stress*, which evolved from the culture shock literature (Berry, 2007; Oberg, 1960). This distinction is important because, while culture shock holds a negative connotation related to distress, the term acculturative stress also reflects the adaptive function of the stress experience and draws from the broader stress and coping literature. That literature suggests that when one experiences a challenge or stressor, if one's coping resources are sufficient, it can buffer against further stress and negative effects on health. In the process of adaptation, coping abilities and resources can be gained, which is adaptive (Berry, 2007; Lazarus & Folkman, 1984). Thus, it is proposed that *acculturative stress* is experienced when coping challenges associated with acculturation exceed coping resources (Smart & Smart, 1995). Acculturative stress involves both intra-and inter-personal pressures associated with acculturation. It is also multifactorial and includes experiences of inter- and intra-group discrimination, internal and familial cultural conflict, economic/occupational stress, language competency pressures, pressures for and against acculturation, and cultural isolation (Romero & Piña-Watson, 2017). It is a likely experience for racial/ethnic minorities in the U.S. as they navigate between the dominant U.S. host culture and their culture of origin. For example, Asian and Latinos may experience acculturative stress as they navigate settings where norms reflect individualism that is dominant in the U.S. culture. It involves feeling that, for example, individuals from one's culture of origin do not understand one's values, beliefs, or behaviors when one is more acculturated to the host culture. On the other hand, it can also involve feeling one is not accepted and not given the same opportunities as others from the host culture (Mena, Padilla, & Maldonado, 1987).

Acculturative processes can be particularly challenging and stressful with greater cultural distance, when the differences between one's culture of origin and one's culture of adaptation is

greater, as from collectivism to individualism because they are at opposite ends in the spectrum of being culturally centered on the self versus the group. The U.S. and Western cultures emphasize individualism, which focuses on the preferences of the self and independence from others, including close others. On the other hand, Eastern, Latino, and other ethnic minority cultures are typically based on collectivism, which emphasizes group harmony and interdependence (Campos & Kim, 2017; Triandis, 2004). Therefore, there is a greater difference in values, beliefs, and behaviors for someone who is adapting from a collectivistic culture to an individualistic culture, which can exacerbate inter- and intra-personal conflict linked to acculturative stress. Thus, the acculturation process may be challenging and can contribute to acculturative stress. Acculturative stress, via physiological or behavioral stress responses, can contribute to adverse health outcomes (Berry, 2007; Caplan, 2007).

Acculturative Stress and Health

***The Immigrant Health Paradox*.** U.S. acculturation has been more extensively studied than acculturative stress, and interesting patterns have emerged relevant to U.S. acculturation in the context of the *Latino health paradox*. The *Latino health paradox* is the phenomenon that recent Latino immigrants have equal or better mortality outcomes than their European American counterparts, despite having a greater health risk profile, including lower socioeconomic status (Abraído-Lanza et al., 1999; Markides & Coreil, 1986; Ruiz, Steffen, & Smith, 2013). Although the Latino health paradox suggests that Latinos have equal or better health outcomes than European Americans in the U.S, this health advantage is noticeably reduced with indicators of greater U.S. acculturation (Hovey, 2000; Koya & Egede, 2007; Ortega et al., 2000). For example, while the process of plaque formation in arteries or atherosclerosis progression is related to socioeconomic status (SES) in European Americans, disease progression is associated

with greater acculturation among Latinos in the U.S. instead (Diez Roux et al., 2005). In a study among pregnant and postpartum Latinas, greater U.S. acculturation is associated with a greater risk for perinatal depression (Davila, McFall, & Cheng, 2009). However, results are equivocal. In some studies, greater U.S. acculturation is linked to better self-reported health (Lee, Chen, He, Miller, & Juon, 2013). Findings of the Asian American Quality of Life (AAQoL) survey, for example, suggest that Asian American individuals with a strong orientation toward both the U.S. mainstream culture and their culture of origin report the best physical and mental health outcomes among individuals of Asian descent in the U.S. (Jang, Park, Chiriboga, & Kim, 2017).

Perhaps because of the observed decrease in the health advantage with greater U.S. acculturation in the Latino health paradox, the relation between U.S. acculturation and adverse health outcomes has been extensively studied in different ethnic minority groups. The literature on U.S. acculturation and health includes reviews and meta-analyses about the association between acculturation and overall physical health (Salant & Lauderdale, 2003; Suinn, 2010; Wallace, Pomery, Latimer, Martinez, & Salovey, 2010) and mental health (Rogler, Cortes, & Malgady, 1991; Yoon et al., 2013), including specifically, depressive symptoms (Gupta, Leong, Valentine, & Canada, 2013) and hypertension (Steffen, Smith, Larson, & Butler, 2006). Both greater U.S. acculturation (D'Anna-Hernandez, Garcia, Coussons-Read, Laudenslager, & Ross, 2016) and lower U.S. acculturation (Gupta et al., 2013) have been associated with adverse health outcomes. It is in disambiguating these findings, by taking the mediating role of acculturative stress into account, that the distinction between acculturation and acculturative stress has gained particular importance (See Figure 1).

More recently, studies suggest that acculturative stress and not the process of U.S. acculturation itself is what contributes to the development of adverse health outcomes (Caplan,

2007). Thus, acculturative stress is increasingly considered as a mediator of the relation between U.S. acculturation and adverse health outcomes (Hwang & Ting, 2008; Park & Rubin, 2012). The relation between acculturative stress and health outcomes is an area of research that has gained research interest, as minority populations in the U.S. continue to grow.

***Pathways from Acculturative Stress to Health*.** The processes through which acculturative stress is associated with health have not been extensively studied. Acculturative stress experiences, like other forms of stress, have implications for physiological systems. One way to conceptualize acculturative stress is as a type of chronic stressor. Chronic stress consists of the accumulation of persistent, prolonged, or repeated day-to-day stresses (McEwen, 1998). Culture affects everyday lives, the way one views the world, values, beliefs, behaviors and perceptions of our interactions and relationships with others, the community, and institutions in one's context (Ruiz et al., 2010; Schwartz & Unger, 2017). Early evidence in the area of acculturative stress points to dysregulation of the physiological stress response, more specifically hypothalamic-pituitary-adrenal (HPA) axis functioning and, specifically, cortisol release as a mechanism that contributes, at least in part, to adverse health consequences. The physiological stress response, in general, is an adaptive process meant to help one effectively react to stressors. However, with repeated exposure to stressors, as with chronic stress, physiological stress response systems may become dysregulated and pathophysiological processes can occur (McEwen, 2007; McEwen & Lasley, 2007).

There are four patterns of cortisol dysregulation involving: 1) repeated activation, 2) failure to adapt or habituate, 3) failure to shut off the stress response leading to chronic elevations in cortisol (as in hypercortisolism), and 4) an inadequate or blunted stress response in which cortisol levels fail to rise in response to a stressor (as in hypocortisolism; McEwen, 1998;

McEwen & Gianaros, 2011; McEwen & Lasley, 2007). The result of dysregulation is an imbalance in multiple systems, including but not limited to the cardiovascular, autonomic nervous system (ANS), HPA axis, immune system, and metabolic processes. McEwen (2007) suggests that repeated exposure to stressors results in chronic physiological changes, ultimately leading to adverse health outcomes.

There is a small emerging area of literature on cultural stressors and their relation to HPA axis functioning with mixed findings. However, most studies suggest blunted cortisol patterns (the fourth pattern described above) in association with cultural stressors (D'Anna-Hernandez et al., 2012; Garcia, Wilborn, & Mangold, 2017; Torres, Mata-Greve, & Harkins, 2017; Squires et al., 2012). Chronic cultural stressors, including chronic experiences of discrimination are associated with blunted cortisol output, including a flatter diurnal cortisol slope with lower cortisol awakening response and higher evening cortisol levels (Busse, Yim, Campos, & Marshburn, 2017; Miller, Chen, & Zhou, 2007).

Similarly, blunted cortisol patterns are observed in association with U.S. acculturative processes and indicators of acculturation, such as acculturative stress, years in the U.S., and bicultural identity integration. Flatter cortisol trajectories were observed among male Latino immigrants (Squires et al., 2012), Latinas experiencing acculturative stress (Torres, Mata-Greve, & Harkins, 2017), pregnant women of Mexican decent (D'Anna-Hernandez et al., 2012), and Mexican-American adults with a greater level of U.S. acculturation (Mangold, Wand, Javors, & Mintz, 2010). In another study, the authors confirmed and extended the findings of previous studies, suggesting the association between greater acculturative stress and poorer self-reported health outcomes is mediated by a blunted cortisol awakening response (Garcia, Wilborn, & Mangold, 2017). Similarly, individuals scoring low on the cultural harmony subscale of

bicultural identity integration had more perceived stress and higher salivary cortisol levels in response to an acute laboratory stressor (Yim et al., 2019). No studies investigating if these findings generalize to other ethnic minority groups have been identified.

Another pathway through which acculturative stress may relate to health outcomes is through health behaviors. Social, economic, and cultural factors are important contributors to the development and maintenance of health behaviors that can foster health or illness (Glanz & Bishop, 2010). Acculturation spurs a process of adaptation and changes in knowledge of how to function in society, which can be stressful and lead to increased disease risk (Dressler, 2004). A mechanism that may explain, at least in part, how this could occur is through loss of protective culture of origin factors and adoption of health damaging strategies for coping with stressors. In line with this argument, high U.S. acculturation (e.g., more time in the U.S.) is associated with adverse health behaviors and markers such as obesity, smoking, alcohol use, and worsening pregnancy outcomes (Heileman, Frutos, Lee, & Kury, 2004; O'Brien et al., 2014; Zambrana et al., 1997).

It is thus possible that health disparities are, at least in part, an outcome of the social context and related experiences of acculturative stress. Latinos and Asians are the two most studied ethnic minority groups in the acculturative stress and health literature in the U.S., and for both, health worsens with more time in the U.S. (Kimbro, Gorman, & Schachter, 2012). Latinos are disadvantaged in greater prevalence and have higher mortality from certain diseases, such as cancer and diabetes (Arellano-Morales, Elder, Sosa, Baquero, & Alcántara, 2016; Yanez, McGinty, Buitrago, Ramirez, & Penedo, 2016).

Similar patterns are observed in relation to mental health outcomes. The majority of studies on the relation between acculturative stress and health in the U.S. focus on mental health

outcomes. For example, particular subgroups of Asian descent such as Southeast Asian refugees have high rates of Post-Traumatic Stress Disorder (PTSD), which may worsen as they experience acculturative stress (Sue, Cheng, Saad, & Chu, 2012).

Further, for various reasons including a lack of health insurance, individuals from ethnic minorities in the U.S. tend to delay treatment from traditional primary care until their conditions have reached a greater severity, compared to European Americans (Reynaga-Abiko & Schiffner, 2016; Yanez et al., 2016). Given these health disparities, it is important to investigate risk and protective factors.

The aim of this proposed meta-analysis is to integrate and reconcile the literature investigating the question: To what extent is acculturative stress associated with adverse mental health outcomes, including symptoms and clinical diagnosis among ethnic minority groups in the U.S.? Answering the aforementioned question involves investigating risk enhancing and protective moderators that, as discussed in the next sections, are theoretically and methodologically important such as the role of age, ethnicity, time period, diversity of geographic location, generation, and type of health outcome. It is hypothesized that greater acculturative stress will correlate with worse mental health outcomes (See Table 1 for moderator hypotheses).

Moderators

Generation status. In the U.S., citizenship is a birthright. Immigrants often face unique stressors such as a sense of loss of social ties and the social environment of the country of origin, which are not as relevant to individuals born in the U.S. and may contribute to exacerbating acculturative stress (Fuligni & Perreira, 2009). Immigrants may also face additional challenges such as fear of deportation, depending on their documentation status in the host country

(Schwartz & Unger, 2017). There is evidence to suggest that both immigrants (Fuligni & Perreira, 2009) and U.S.-born individuals can face poor health outcomes (Bowen & Ruch, 2015). However, the predominant view according to the Latino Health Paradox is that among ethnic minority groups, those who have been in the U.S. for longer have worse health outcomes than recent immigrants (Abraidao-Lanza et al., 1999; Ruiz et al., 2016). Perhaps this is due to a loss of culture of origin protective factors such as supportive social ties or to identification as a member of a marginalized ethnic minority group (Torres, 2010).

Ruiz (2010) proposes that first-generation immigrants are at greater risk of experiencing acculturative stress because they are exposed to the greatest challenges in cultural adaptation and more salient gaps between their culture of origin and new host culture. A study assessing generational differences in acculturative stress experience across three generational groups suggests that first-generation Latinos report more acculturative stressors than third-generation Latinos. Second-generation individuals report more acculturative stress due to family acculturation conflicts. However, despite experiencing greater acculturative stress, first generation Latinos have less mental health symptoms than all later generation Latinos in the U.S. (Cervantes, Padilla, Napper, & Goldbach, 2013). Other studies including Latinos and Asian samples find that greater acculturative stress among first-generation immigrants in the U.S. is linked to greater internalizing symptoms among adolescents (Katsiaficas, Suárez-Orozco, Sirin, & Gupta, 2013) as well as anxiety and depressive symptoms among college students (Crockett et al., 2007). However, in both studies the relation between acculturative stress and mental health outcomes among first-generation immigrants is mediated by perceptions of poor peer, family, and academic social support (Crockett et al., 2007; Katsiaficas, Suárez-Orozco, Sirin, & Gupta, 2013). On the other hand, having good quality relationships can be protective (Schofield et al.,

2008).

Hypothesis. Regarding generational status, it was hypothesized that the effect size between high acculturative stress and more adverse mental health outcomes will be greater for those who are the first generation in the U.S.

State diversity index. According to the 2020 Census, the state diversity index is the probability that if two individuals in a state are randomly selected, they will be from two different ethnicities. The country diversity index of the U.S. as a whole is a 61.1% (U.S. Census, 2020). State diversity indices range from 18.5% in Mfaine to 76.0% in Hawaii. There are no prior studies on the relation between state diversity index and acculturative stress nor mental health. However, there is evidence that areas with greater concentrations of immigrants tend to have more favorable attitudes towards other immigrants and individuals from ethnic minority groups (Zarate & Shaw, 2010). This may lead to lessened feelings of cultural isolation, and this may be particularly salient for recent immigrants. According to Benet-Martinez and Haritatos (2005), cultural isolation includes feelings that there is a lack of people from one's ethnicity or cultural background in ones living environment, a lack of cultural richness, and feelings of being isolated because one is ethnically/culturally different. Experiences of cultural isolation can be chronic and overt reminders of one's status as a member of a minority group and can impact one's experience of acculturative stress and ability to cope with it (Benet-Martinez & Haritatos, 2005).

Hypothesis. Given early evidence that cultural isolation is an important contributor to acculturative stress, it is hypothesized that the relation between acculturative stress and adverse mental health outcomes will be stronger for those living in states with a low diversity index than those living in states with a higher diversity index.

Age. The majority of studies on acculturative stress and health focus on adult populations. Among young adult college students, past studies have linked acculturative stress with elevated anxiety (Chavez & French, 2007; Crockett et al., 2007) and depressive symptoms (Constantine et al., 2004; Crockett et al., 2007). American universities are predominantly middle-class environments with strong norms for cultural independence, which often creates a cultural mismatch for ethnic minority students' interdependent self and motives and perpetuates achievement gaps (Fryberg, Covarrubias, & Burack, 2013; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). According to the New York City Academic and Social Engagement Study, these academic cultural mismatch coping challenges are linked to greater acculturative stress as well as elevated anxiety and depressive symptoms (Rogers-Sirin, Ryce, & Sirin, 2014). Among college students, parental support can play a particularly protective role. For example, in a study of Mexican-American college students, greater acculturative stress was related to poorer psychological functioning only among college students reporting low levels of parental support (Crockett et al., 2007). Similarly, among non-college adults of Latino origin who are more acculturated and U.S.-born individuals, acculturative stress is associated with more depressive symptoms and anxiety. Evidence suggests this may be due, at least in part, to loss of protective culture of origin factors such as the utilization of social support (Torres, 2010).

There is a large body of literature on adults and college students and some on adolescents, but less on children. Youth, including children and adolescents, are a particularly important age-group to study. Latinos who migrate to the U.S. at a later age, past childhood at 12 years or older, have lower lifetime rates of disorders, particularly psychiatric disorders (Alegria et al., 2007). These findings may be due, at least in part, to cultural and social norms and differences in family structure in the host country that are particularly protective and learned

during childhood. Moreover, migrating at an earlier age can lead to challenging socialization processes such as experiences of marginalization and exclusion that may have long-lasting consequences for self-schemas and family and peer relations (Alegria et al., 2007).

During adolescence, there is an increased focus on defining the self as well as an elevated preoccupation with others' perceptions of oneself (Erikson, 1968). There is also a heightened sensitivity of status and hierarchy. This may particularly predispose adolescents to experience acculturative stress. In youth, physiological systems are not fully developed and the stress impact of acculturative stress on these systems could have more lasting consequences. Past studies have found that acculturative stress among adolescents is associated with negative feelings about the self and greater depressive symptoms (Romero & Roberts, 2003).

Hypothesis. Acculturative stress in youth has the potential for pervasive long-lasting consequences for the way children view their social environment, relate to their family and peers, and develop cultural and self-schemas. Therefore, it was hypothesized that the relation between acculturative stress and health would be stronger for youth (children and adolescents) than adults.

Type of Mental Health Outcome. Acculturative stress is often conceptualized to be a negative aspect of psychological adaptation (Berry, 2017). The sense of loss and feelings of uncertainty that often accompany integrating to a new culture are associated with negative mental health outcomes such as symptoms of depression and anxiety (Berry, 2017; Schwartz et al., 2017). Theoretically, it would make sense to propose that acculturative stress may exert an influence on health through similar mechanisms as other chronic stressors (Smyth, Zawadzki, & Gerin, 2013). Acculturative stress is a type of chronic stressor involving culture, which influences everyday lives, including how one relates to others and social norms one follows.

Empirically, as with other chronic stressors, the effect of acculturative stress may be similar for different types of mental health outcomes, such as depressive symptoms and anxiety (Cohen, Janicki-Deverts, & Miller, 2007; Steptoe & Kivimaki, 2013).

Hypothesis. Given early evidence from the acculturative stress literature and from the larger chronic stress and health literature, no significant differences in the relation between acculturative stress and adverse health outcomes for different mental health outcomes were expected.

***Ethnicity*.** There are various challenges that different cultural and ethnic groups face in the dominant context of the host culture. For example, they often encounter and must navigate different norms from those of the culture of origin as well as having their cultural norms and cultural/ethnic identity devalued. Existing stereotypes about various ethnic groups lead to different forms, degrees, and experiences of discrimination and marginalization (Rogers-Sirin, Ryce, & Sirin, 2014). For example, the sociopolitical environment can sometimes create a negative environment of reception for Latinos in the U.S. (Zarate & Shaw, 2010). Similarly, immigrants from Asia face stereotypes such as the model minority stereotype, which intensifies pressure for a smooth adaptation to U.S. mainstream culture and undermines struggles and experiences with discrimination (Kiang et al., 2017; Sue & Sue, 2003). Even U.S.-born Americans from ethnic minority groups face acculturative stress, often in the form of institutional discrimination. Black Americans face institutional barriers and injustices such as in the legal system, schools, and in economics (Kelly & Varghese, 2018). In this area of research, it would also be important to investigate differences between different sub-groups of Latino or Asian descent. That is one factor that may account, at least in part, for inconsistent findings among studies (Xu, 2011).

Hypothesis. The majority of studies are conducted with Asian and Latino samples. Significant differences are not expected in the relation between acculturative stress and health among ethnicities. The type of acculturative stressors faced and adverse health outcomes can be different for the different ethnicities, but both Asians and Latinos are navigating individualism and collectivism, and they are all susceptible to the negative impact of acculturative stress on mental health.

Deferred Action for Childhood Arrivals (DACA) time period. DACA is a program that provides temporary protection from deportation and work permits for young adult immigrants who entered the U.S. undocumented before they turned 16 years of age (Pew, 2019). DACA was initiated in 2012, under President Obama's administration. Since then, it has been challenged. Notably, in 2016 and 2017, there have been legal challenges and attempts to terminate DACA, and it was rescinded (Pew, 2019). Although this program affects specific categories of individuals from ethnic minorities more than others, laws reflecting pro- and anti-immigrant sentiments can affect national and individual level sentiments of ethnic minority groups as being accepted or marginalized, and thus, can exacerbate acculturative stress and mental health vulnerabilities.

Hypothesis. It is hypothesized that the relation between acculturative stress and mental health will be stronger during the pre-DACA time and the more recent years in which it has been challenged than during mid- DACA time period from 2012 to 2015.

Method

Strategy for Searching the Literature

The main search strategy used to retrieve studies investigating the relation between acculturative stress and health involves searching four electronic databases. The search terms

"acculturative stress," "acculturation stress," "acculturat* stress," and "stress of acculturation" were used as the search term for abstracts and titles in health psychology related databases. *PsycINFO, PubMed,* the *Cumulative Index to Nursing and Allied Health (CINAHL),* and *Dissertations & Theses* were last searched on January 5th, 2020. The search retrieved 4,613 documents in *PsycINFO* and *Dissertation*s & Theses, 1,205 in *PubMed*, 501 in *CINAHL*, and 20 via the email search for a total of 6,339 documents (see Table 3 for search strategy). Qualifying full text documents were searched for inclusion and exclusion criteria. An email searching for relevant studies was sent to listservs of the Health Psychology division of the American Psychological Association, the National Latino Psychological Association, the Ford Foundation, the National Institute of Health (NIH) Society for Advancement of Chicanos and Native Americans in the Sciences (SACNAS) chapter, and the NIH Women of Color Research Network. Individual emails were sent to researchers who authored at least two publications about acculturative stress and health.

Inclusion and Exclusion Criteria

Eligibility criteria were determined with the PICOS (Participants, Intervention, Comparison, Outcomes, Study Design) framework (O'Connor, Green, & Higgins, 2008). To be inclusive, only a few restrictions were placed on study eligibility. However, to be eligible, documents had to report empirical research that is quantitative. There were no restrictions on participant characteristics (e.g., age or sex) or year of publication. Only studies conducted in the U.S. were collected because the majority of studies were conducted in the U.S. and including other countries with differing levels of collectivism and individualism, might obscure the correlation between acculturative stress and mental health.

To be eligible, studies had to include the variables of interest, acculturative stress and

mental health. Acculturative stress is typically assessed through self-report as a continuous variable, but no restrictions were placed on method of assessment or report. The comparison was between those with higher and lower levels of acculturative stress on a continuum or in categories, as reported. In the preliminary full text screening, it became evident that some documents claim to assess acculturative stress in the abstract but include only subscales of an acculturative stress inventory. In the interest of keeping this meta-analysis consistent in the measurement of acculturative stress as a multidimensional construct, only documents that include a full acculturative stress scale and not just one or more subscales were included.

The second variable of interest was mental health. Mental health includes any type of mental health outcome, such as symptoms and clinical diagnoses, with no restrictions to reporting method, language, or measure of type of mental health. Studies reporting solely on well-being and quality of life as outcomes with no mental health outcome were excluded, as they are ambiguous constructs including non-health related information. Health behaviors were excluded because, while they are important antecedents or risk factors to health outcomes, they are not health outcomes themselves and would be a topic suited for a separate meta-analysis. Self-report of symptoms is typically continuous, whereas clinical outcomes are typically dichotomous, but no reporting or assessment method was excluded. There were no restrictions on the study methodology, with all empirical quantitative study designs included and no restriction to setting (e.g., medical or community setting).

Abstract and Full Text Screening

Abstracts and full text documents were searched and retained if they met all of the following criteria. They *were*: 1) empirical research that is quantitative, not a systematic review, meta-analysis, theoretical, or qualitative, 2) include a full acculturative stress measure (not just

one or more subscales), 3) include a mental health outcome (such as depression or anxiety), including symptoms, not just well-being or quality of life or health behaviors, and 4) were conducted in the U.S. Well-being and quality of life are more ambiguous constructs often including information that is not strictly mental health, such as financial well-being or self-esteem (See Figure 1 for abstract and full text screening tool). Study selection is reported in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram (see Figure 2).

Procedure for Gathering Information about Studies

***Information Coded in Research Reports*.** Report characteristics (e.g., journal article, dissertation), setting characteristics (e.g., state, type of community), sample characteristics (e.g., average age, socioeconomic status), information about acculturative stress variable (e.g., type of measure, reliability), and about the mental health variable (e.g., type of measure, type of health outcome) were gathered from each study.

***Coding Procedure and Reliability*.** A codebook provided a template for extracting relevant information from each study (see Table 4 and Appendix A for the codebook and list of information coded in research reports). All categorical information gathered includes an option of "other" to satisfy the need for coding categories to be mutually exclusive and exhaustive (Cooper, 2010). The moderator variables were continuous or categorical; thus, codes to represent the information either way were included. Each study was independently coded by two raters, an undergraduate research assistant and the author of this dissertation. The percent disagreement in coding was 18%. The same two individuals discussed and resolved any discrepancies in the coding procedure, which evidence suggests results in highly reliable data (Rosenthal, 1987). The coding procedure was revised for items that led to a high percent of disagreement.

Method of Data Integration

***Effect Size Estimation*.** This meta-analysis investigates the relation between acculturative stress and mental health by quantifying that relation with a zero-order correlation coefficient, which is most appropriate for combining the expected results of qualifying studies (Cohen, Cohen, West, & Aiken, 2002). Both acculturative stress and mental health outcomes are typically reported as continuous variables, and their relation is typically quantified through correlations and regressions. In some cases, the presence or absence of mental illness was assessed thorough a *t-test* with *d-index.* In those cases, and others in which the relation was quantified differently, it was converted to a zero-order correlation coefficient by using available descriptive and inferential statistics such as mean, standard deviation, and subgroup sizes.

Meta-Analytic Approach

***Meta-regression*.** We used a multivariate meta-analysis approach with robust variance estimation (RVE) because there were often multiple effect sizes within a single study. RVE recognizes that those nested effect sizes within a study will be correlated with each other. The assumed correlation is the conventional .80. The analysis was conducted in R using random-effects meta-regression where effect size weights depended on the number of effect sizes for each study, the variance across effect sizes coming from the same study, and between study variability Tau-squared (τ^2). The variance between-studies after averaging dependent effect sizes within-study (τ^2) depends on the value of a common correlation.

***Modeling Error*.** Analyses were conducted under random effects assumptions. Because there are theoretical and methodological reasons why the true effect size may vary across studies, a random effects model is most appropriate. A fixed effects model would suggest that sampling or estimation error is the sole source of variation in effect sizes across studies. I expect that there

will be variation among effect sizes based on the moderators, and that there is not a single true effect size, but multiple true effect sizes. Therefore, a random effects model best aligns with the theoretical assumptions of the true effect size(s) of the relation between acculturative stress and mental health.

Calculating Mean Effect Sizes. Average correlations were calculated through a weighting procedure in order for effect sizes from larger samples to be given a greater weight because they more accurately estimate the population effect sizes.

Testing for Moderators. Heterogeneity analyses were conducted to explore the sources of significant variation among nested correlations across studies. A statistically significant Cochran's *Q* test in the overall model indicates that there is more variation around the average correlation than sampling or estimation error alone can explain. That variation may be due to moderators. A 95% confidence interval was calculated around the average correlation for each moderator category. Confidence intervals that do not include zero were considered statistically significant, and the null hypothesis that there is no association between acculturative stress and mental health was rejected for that moderator category.

Publication Bias

Publication bias reflects the tendency for significant findings to be more likely to be published than non-significant findings, leading to a biased sample of all relevant studies if looking at published ones alone -- likely resulting in systematic differences in effect sizes based on report characteristics (published vs. unpublished studies). Therefore, publication bias reflects a tendency for published studies to overestimate the true effect size, in this case the correlation between acculturative stress and mental health. As a result, several complementary strategies were adopted to overcome and evaluate publication bias in this meta-analysis.

Methodologically, qualifying studies were not restricted to published studies, but also included gray literature such as dissertations and other unpublished studies that were searched through listservs and by sending emails to authors with two or more studies on the topic.
A moderator analysis was conducted to evaluate if the correlation between acculturative stress and mental health varies based on publication status (published, unpublished). If that moderator analysis is statistically significant, it indicates publication bias in the primary studies (but not necessarily in the meta-analysis).

A funnel plot of the observed effect sizes was visually examined for asymmetry to assess publication bias (See Figure 3 for funnel plot). The results of these assessments suggest that while there is publication bias in the primary studies included in this meta-analysis, there is no concerning evidence of it impacting the results. The distribution of effect sizes in the funnel plot as well as the methodological steps we have taken suggest there is not publication bias operating at the meta-analytic level.

Results

Summary of Studies

This meta-analysis included 302 reports, with 288 independent samples and 349 effect sizes from a total of 124,585 unique participants. Four qualifying reports were removed from the meta-analysis because one included a sample of more than 20,000 participants that would risk drowning out the other studies especially in moderator analyses (Bohrer, 2015) and three included samples from the National Latino and Asian American Study (Devylder, 2013; Jagger, 2012; Villeda, 2011) that were duplicated in other qualifying reports.

Summary Correlation

The summary effect size across studies is positive and statistically significant [$r = 0.35$,

t(192) = 26.3, *p* = < 0.001, *95% PI* [.02, .69]], indicating that greater acculturative stress is related to greater adverse mental health outcomes. However, there is a significant amount of heterogeneity among effect sizes, [*Q* (248) = 2521.30, *p* < .001], where tau-squared at the study level is .15 and omega-squared at the effect size level is .08. The prediction interval around the summary effect size indicates that 95% of correlations appearing in the meta-analysis are between *r* = .02 and *r* = .69.

Covariates

Covariates were tested separately and together, with only statistically significant or marginally significant covariates retained for subsequent moderator analyses. In particular, publication status (published, unpublished) of the primary studies along with reliability (Cronbach's alpha) of both the acculturative stress and mental health measures were considered covariates. Publication status was a marginally significant covariate, [*F* (1, 247) = 3.19, *p* = .08]. The average effect size of published studies (*r* = .35) was about .02 units lower than that of unpublished studies [*r* = 0.36, *t* (1.55) = 1.93, *p* = 0.23, *b* = .02, *95 % CI* [-0.002, 0.03]]. Neither the reliability of the mental health measures [*F* (1, 207) = .02, *p* = 0.90] nor the acculturative stress measures [*F* (1, 223) = 0.88, *p* = 0.35] were statistically significant predictors. Taken together, the results of these models led to publication status (with published studies coded as 0) serving as the sole covariate in future models testing moderators of substantive interest described next.

Moderators

Percent first generation. We tested if the percent of first-generation participants in study samples moderates the relation between acculturative stress and adverse mental health outcomes, with publication status as a covariate, and the model was statistically significant [*F* (2, 114) =

4.81, p = .01]; See Table 5 for individual moderator category statistics). The model remained statistically significant after removing publication status as a covariate [F(1, 115) = 6.23, p = 0.01]. The percent of first-generation participants is a statistically significant, positive predictor of the correlation between acculturative stress and mental health, [b = 0.12, *95% CI* [0.04, 0.20], t (5.56) = 4.72, p = .004]. As the percent of first-generation participants in a sample increases, the strength of the correlation between acculturative stress and mental health also increases as hypothesized. Specifically, for every one percent increase in first-generation participants, there is a predicted .12 unit increase in the correlation between acculturative stress and mental health.

***State diversity index*.** State diversity index was tested as a moderator with publication status as the covariate, and this model was statistically significant [F(2, 129) = 3.42, p = 0.04]. After removing the covariate, the model became marginally significant [F(1, 130) = 3.45, p = 0.07]. State diversity index is a negative, marginally significant predictor of the relation between acculturative stress and mental health, [b = -0.43, *95% CI* [-0.86, 0.0002], t (24.1) = -2.20, p = .06]. As the state diversity index increases, the strength of the correlation between acculturative stress and mental health decreases as hypothesized. In particular, for every one percent increase in state diversity index, there is a predicted .43 decrease in the correlation between acculturative stress and mental health.

Ethnicity. Ethnic identity was tested as a moderator when the entire sample of participants in each study self-identified as either Latino, Asian, or consisting of multiple ethnicities. Ethnicity was not a statistically significant moderator in a model with publication status as a covariate [F (3, 245) = .18, p = .91]. The model was also not significant after removing the covariate [F(3, 245) = 0.18, p = 0.91]. Latinos (r = .33) did not differ statistically significantly from the categories of Asian [r = .34, b = 0.01, *95% CI* [-0.04, 0.07], t (164.7) =

.48, p = 0.63], other [r = .37, b = 0.04, *95% CI* [-0.08, 0.15], t (16.2) = .82, p = 0.42], nor multiple ethnicities [r = .36, b = 0.02, *95% CI* [-0.04, 0.07], t (67.8) = .49, p = 0.62]. Asians did not statistically significantly differ from other [b = 0.03, *95% CI* [-0.08, 0.14], t (15.92) = .75, p = 0.46] or multiple ethnicities [b = 0.03, *95% CI* [-0.005, 0.06], t (2.64) = 2.59, p = 0.45], nor other from multiple ethnicities [b = -0.004, *95% CI* [-0.11, 0.11], t (16.61) = .92, p = 0.92]; see Table 5).

Mental health outcome. Given the number of mental health categories (12) appearing in the primary studies and number of studies appearing in these categories (ranging from 1 to 177), only depression, anxiety, and general mental health were compared in this moderator analysis. The correlation between acculturative stress and mental health did not vary statistically significantly as a function of these three mental health categories [F(3, 218) = 1.67, p = 0.17]. Effect sizes for depression did not differ statistically significantly from those for anxiety [b = -0.02, *95% CI* [-0.07, 0.02], t (28.01) = -1.11, p = 0.27] nor general mental health [b = 0.003, *95% CI* [-0.01, 0.02], t (1.74) = .08, p = 0.94; See Table 5]. The majority of studies had depression-related (i.e., clinical depression, depressive symptoms) and anxiety-related outcomes. Therefore, depression-related mental health outcomes were also directly compared to anxiety-related mental health outcomes, with publication status as a covariate. The overall model was statistically significant [F(2, 172) = 9.00, p = 0.002], but effect sizes for depression (r = .36) did not differ statistically significantly from those of anxiety (r = .33) after the RVE adjustment [b = -0.03, 95%, CI [-0.07, 0.008], t (25.82) = -1.43, p = 0.17].

Life stage. We tested if life stage moderates the relation between acculturative stress and mental health. Children and adolescents up to age 18 years were collapsed into the youth category, whereas adults over 18 years of age and elderly adults were collapsed into the adults

category. Youth were compared to adults, with publication status as a covariate, and the overall model was marginally significant [F (= 2, 231) = 2.54, p = 0.08]. The model was not statistically significant after removing publication status [F(1, 232) = 1.51, p = 0.22] The correlation between acculturative stress and mental health did not differ statistically significantly between youth and adults.

In a second classification of life stage, college students were compared to all other groups (children, adolescents, non-college adults and elderly adults combined), with publication type as a covariate, and the overall model was not statistically significant [F (=2, 231) = 1.78, p = .17]. The model was also not significant after publication type was removed as a covariate [F(1, 232) = 0.00, p = 0.99]. The correlation between acculturative stress and mental health did not statistically significantly differ between college students and all other life stages.

DACA time period. We next tested if DACA time period moderates the relation between acculturative stress and mental health. The pre DACA years include studies before 2012, the mid-DACA years include studies between 2012 to 2016, and the late-DACA years from 2017 to 2020 include those when there was an attempt to terminate DACA. DACA time period was not a statistically significant moderator of the correlation between acculturative stress and mental health with publication status as a covariate [F (3, 245) = 1.23, p = .30]. The overall model was also not statistically significant after publication status was removed as a covariate [F(2, 231) = 1.78, p = 0.17]. The average correlation for the pre-DACA time period (r = .34) did not statistically significantly differ from mid-DACA (r = .36) or late-DACA (r = .32), nor did mid- and late-DACA differ from each other [b = -0.04, t (2.22) = -0.236, p = 0.8].

Explained and Unexplained Variation

Publication status, the percent of first generation participants, and the state diversity

index were statistically significant and together explained a nonsignificant portion of the variation among correlations [$F(3, 69) = 1.69$, $p = 0.18$]. However, a significant proportion of variation remains unexplained, [$Q(69) = 418.88$, $p < .0001$].

Discussion

The aims of the meta-analysis were to investigate the correlation between acculturative stress and mental health and disambiguate it by considering important health risk and protective moderators. As predicted, the overall correlation between acculturative stress and mental health was positive and statistically significant. Experiencing higher levels of acculturative stress was related to greater adverse mental health outcomes. The diversity index of the state in which the study was conducted and the percent of first-generation participants in the sample were statistically significant moderators of the relation between acculturative stress and mental health. Those living in states with a lower diversity index and who were first-generation in the U.S. were at higher risk for experiencing adverse mental health outcomes in the face of greater acculturative stress. Based on the literature these were medium effects. While these demographic risk factors are not necessarily modifiable, from a practical standpoint, this information can inform future mental health intervention and counseling services can target affected populations. Surprisingly, age, ethnicity, the DACA time period, and the type of mental health outcome did not moderate the association between acculturative stress and mental health. This is the first meta-analysis on acculturative stress and mental health to date. We found that health inequities exist in the relation between higher acculturative stress and adverse mental health outcomes, which can inform future studies about the vulnerabilities of first-generation participants and the development of interventions that can target demographic areas with low diversity and first-generation individuals.

A state's diversity index emerged as a key contributor to the negative impact of acculturative stress on mental health. The diversity index likely captures factors that can exacerbate, but also mitigate, acculturative stress and adverse mental health outcomes. For example, contextual factors such as a state's diversity index may contribute to feelings of cultural and social isolation, factors that likely exacerbate feelings of acculturative stress. Feelings of cultural and social isolation are important contributors to adverse mental health outcomes (Benet-Martinez & Haritatos, 2005; NASEM, 2020). First generation individuals face unique circumstances as they navigate and reconcile the culture and social environments of both the country of origin and the U.S. For example, acculturation gaps between youth and older family members may be greater among first generation individuals. It can create conflict and can be particularly difficult to navigate. There may also be issues with communicating in the host country language that become less common in later generations. Coping mechanisms may be taxed or overwhelmed as first-generation individuals navigate their changing social contexts, family dynamics, and two different cultures. This may contribute, at least in part, to the increase in the magnitude in the relation between acculturative stress and mental health as the percent of first-generation individuals in a sample increase.

Ethnicity was also tested as a moderator. The majority of participants in the studies included in this meta-analysis were of Asian and Latino descent. Both Asians and Latinos are from collectivistic cultures of origin, whereas the U.S. mainstream culture is considered individualistic. Thus, the two may experience similar cultural distance between their collectivistic culture of origin and the individualistic U.S. mainstream host culture, which affects their acculturative stress experience. They may also engage in similar collectivistic coping strategies such as the utilization of social and family support. These variables may contribute, at

least in part, to similarities in the relation between acculturative stress and mental health between ethnicities.

Other categorical moderators tested lacked variability in comparison categories, had few effect sizes in some categories, or were mainly relevant for subgroups of the population. For example, the majority of participants were adults. The lack of studies among children hinders our understanding of how acculturative stress impacts mental health in critical periods for the development of ethnic identity and coping strategies. Also, because DACA was enacted in recent history, most of the studies were conducted in the pre-DACA period, and there were less studies conducted in the mid- and recent DACA periods. Also, DACA may be particularly relevant for subgroups of ethnic minorities, namely those who came to the U.S. undocumented as children. Investigating DACA in the full sample, may have obscured significant effects in the subsamples for which it is more relevant.

Similarly, while there was diversity in mental health outcomes, some could not be coherently classified for the moderator analysis apart from depression and anxiety. There were 12 categories of mental health outcomes, but the majority had few effect sizes in each category and did not fit coherently together as to group them, such as eating disorder symptoms and substance abuse disorders. The mental health outcomes investigated in the literature were overwhelmingly depression and anxiety, which are both internalizing outcomes, share similar pathways, and are often co-morbid. These mental health outcomes were likely investigated in the majority of studies because they are consistently linked in the literature on the effects of stress in general on mental health. Nonetheless, it would be important to investigate other mental health outcomes to better understand the relation of acculturative stress with other mental health

outcomes such as post-traumatic stress disorder, eating disorders, and substance abuse disorders to name a few.

Limitations

A main limitation of this meta-analysis is that there is significant heterogeneity among correlations that remains unexplained. That is after accounting for the heterogeneity among effect sizes explained by the statistically significant moderators of state diversity index and percent of first-generation participants.

A feature shared among meta-analyses is that they are limited by the extant literature, and for example, generalizations can be constrained by the demographic characteristics studied to date. However, such gaps in the literature can be identified through the present meta-analysis to be addressed in future studies. In particular, it is noted that there is a lack of variability in the age groups, ethnicities, and mental health outcomes studied to date, which limits the generalizations that can be made about the correlation between acculturative stress and mental health. It also limits the exploration of why the relation of interest and the correlations vary so much.

Future directions

In addition to the moderators investigated in the present meta-analysis, there are other important variables that should be considered in future studies of the relation between acculturative stress and mental health. Some of these namely gender and the acculturative stress scale used will be tested as moderators in a future update of the meta-analysis. There are a group of variables that were either not present in studies or effect sizes were not reported separately for different levels of the moderator as would be needed to conduct a moderator analysis within the meta-analysis. For example, social support was included in some studies, but effect sizes for the relation of acculturative stress and mental health were not reported separately for low and high

levels of social support, which would be necessary to conduct a moderator analysis. Moderators that are theoretically and practically important and should be considered in future studies include social support, active coping, having a positive ethnic identity, bicultural identity integration, immigrant type, socioeconomic status, and lifespan development.

Conclusion

Health promotion and disease prevention agendas of major health promotion agencies in the U.S. highlight the need to address health disparities among ethnic minorities in the U.S., through culturally sensitive health services (Koh et al., 2011; Sondik et al., 2010). The recommendations include aims to better understand health promoting and risk factors, such as acculturative stress, that are related to health disparities. Acculturative processes are important contributors to health disparities in minority groups. The results of this meta-analysis reveal that, overall, higher acculturative stress is associated with adverse mental health outcomes. The relation and its moderators have been partly disambiguated, with state diversity index and the sample's percent of fist-generation individuals in the U.S. uncovered as the only statistically significant moderators, thus far. There is substantial remaining heterogeneity in effect sizes of the relation between acculturative stress and mental health that can be further explored. In future studies, the field should also attempt to identify additional personal and contextual factors that strengthen or weaken the relation between acculturative stress and mental health.

The goal is isolating malleable mechanisms that help buffer or support the mental health of individuals who experience acculturative stress, especially as the percent of first generation increases and in states with a lower diversity index. Moderator results indicate these variables may be especially salient. As ethnic minority populations continue to grow in the U.S., it is pressing to investigate risk as well as protective factors associated with vulnerability to adverse

mental health outcomes in these populations. Based on the results of this meta-analysis, it is timely to investigate additional moderators in future studies. Theoretically and practically important moderators such as having a positive ethnic identity and protective coping mechanisms such as active coping and the utilization of social support have not been considered enough in the literature. The ultimate goal with this and future investigations is to make a theoretical and applied contribution to science by informing future studies and much needed culturally sensitive health services and interventions.

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Table 1

Hypotheses for Moderators of the Relation Between Acculturative Stress and Mental Health

Moderator	**Hypothesis**
Generation	The effect size will be greater for first generation than later generation than later generation individuals.
Life Stage	The strength of the relation will be greater for youth than adults.
DACA Time Period	The effect size will be greater for the period prior to DACA and when there was an attempt to terminate it in comparison to the mid-DACA years.
State Diversity Index	The effect size will be stronger for those from states with a lower diversity index than those with a higher diversity index.
Ethnicity	There will be no statistically significant difference in the effect sizes between ethnicities.
Type of Mental Health Outcome	There will be no statistically significant difference in the effect size between mental health outcomes.

Table 2

Description of Acculturative Stress Scales Commonly Used

Scale	Description
Societal, Attitudinal, Environmental, and Familial Acculturative Stress Scale (SAFE; Mena, Padilla, & Maldonado, 1987)	24 items No subscales Assesses societal, attitudinal, and familial acculturative stress in the realms of discrimination, language competency, family conflict, social isolation, pressures for and against acculturation
SAFE- Children (SAFE-C; Chavez, Moran, Reid, & Lopez, 1997)	36 items Subscales: General social stress, acculturation process oriented stress, discrimination stress
Hispanic Stress Inventory (HSI; Cervantes, Padilla, Salgado de Snyder, 1991)	59 items for non-immigrant version and 72 items for immigrant version Subscales: Occupational/economic stress, parental stress, family/cultural conflict, marital stress, immigrant stress
Acculturative Stress Scale for International Students (ASSIS; Sandhu & Asrabadi, 1994)	36 items Subscales: Discrimination, homesickness, perceived hate, fear, guilt, stress due to culture shock
Multidimensional Acculturative Stress Inventory (MASI; Rodriguez, Myers, Mira, Flores, & Garcia-Hernandez, 2002)	36 items Subscales: Spanish competency pressures, English competency pressures, pressure to acculturate, pressure against acculturation
Riverside Acculturative Stress Inventory (RASI; Benet-Martínez & Haritatos, 2005)	15 Items Subscales: Language stress, work stress, intercultural relations, discrimination, and cultural isolation

Table 3

Literature search procedures for electronic databases

Literature search	**Search terms**	**Search parameters**	**Electronic databases**	**Documents retrieved**
Variable name: January 2020	"acculturative stress," "acculturation stress," "acculturat* stress," and "stress of acculturation"	Abstract and title was searched using the ProQuest, EBSCO, and NLM search engines	*PsycINFO*, *PubMed*, *CINAHL*, *Dissertations & Theses*	6,319

Note. NLM = National Library of Medicine for PubMed; CINAHL = Cumulative Index to Nursing and Allied Health Literature

Table 4

List of information coded in research reports

Report characteristics

1. Author names
2. Year
3. Report type (e.g., journal article, conference paper, dissertation)

Setting characteristics

1. Country
2. State
3. Community type (e.g., urban, suburban, rural)

Sample characteristics

1. Sample identification number
2. Defining characteristics of overall sample (e.g., sex, SES)
3. Immigration status
4. Generation breakdown
5. Subgroups
6. SES of the sample
7. Average age
8. Median age
9. Age range
10. Ratio of males to females
11. Race/ethnicity breakdown
12. Average annual income
13. Percent living in poverty

Acculturative stress variable

1. Acculturative stress measure name
3. Acculturative stress measure citation
4. Was the measure created or adapted?
5. If so, how was the measure created or adapted?
6. Reliability of the acculturative stress measure

Health variable

1. Physical or mental health
2. Symptom, biomarker, or clinical diagnosis
3. Self-report or clinical/patient charts
4. Reliability of health measure

Effect size information acculturative stress and health

1. Correlation coefficient
2. Inferential Information
3. Sample size
4. Acculturative stress mean
5. Acculturative stress standard deviation
6. Health score mean

7. Health score standard deviation
8. Calculated effect size
9. Method of calculating the correlation

Moderator 1: social support

1. How social support was measured
2. Social support measure citation
3. Reliability of social support measure
4. Effect Size Index
5. Correlation Coefficient
6. Inferential information
7. Social support mean, standard deviation, n
8. Calculated effect size

Moderator 2: positive ethnic identity

1. How ethnic identity was measured
2. Ethnic identity measure citation
3. Reliability of ethnic identity measure
4. Effect Size Index
5. Correlation Coefficient
6. Inferential information
7. Ethnic identity mean, standard deviation, n
8. Calculated effect size

Note. Same variables collected for all potential moderators.

Table 5

Results of moderator analyses.

Moderator	*F*	*df*	*p*	*r*	*df*	*t*	*p*	*95% CI*	*k*
Life stage	2.54	231	.08						234
Adults				.35	89.57	22.07	<.001	[0.31, 0.38]	
Youth				.30	31.68	10.29	<.001	[0.24, 0.37]	
DACA period	1.23	245	.30						249
Pre				.34	85.40	19.84	<.001	[0.31, 0.37]	
Mid				.36	42.43	15.53	<.001	[0.31, 0.41]	
Late				.32	1.99	1.92	.20	[0.11, 0.53]	
First generation (%)	4.81	114	.01	.37	43.27	20.96	<.001	[0.33, 0.40]	117
Diversity index (%)	3.42	129	.04	.33	48.1	12.61	<.001	[0.28, 0.38]	132
Ethnicity	1.58	244	.18						249
Latino				.33	72.73	15.37	<.001	[0.29, 0.38]	
Asian				.34	33.26	17.43	<.001	[0.29, 0.38]	
Multiple				.36	23.01	18.00	<.001	[0.32, 0.41]	
Other				.37	12.40	9.92	<.001	[0.26, 0.47]	
Health outcome	9.00	172	.0002						175
Depression				.36	72.46	17.03	<.001	[0.32, 0.39]	
Anxiety				.33	50.03	11.55	<.001	[0.28, 0.37]	

N participants = 124,585

Note. *r* = zero order correlation coefficient; *df* = degrees of freedom; *k* = number of effect sizes; CI = confidence interval; DACA = Deferred Action for Childhood Arrivals. Results are robust variance estimation adjusted.

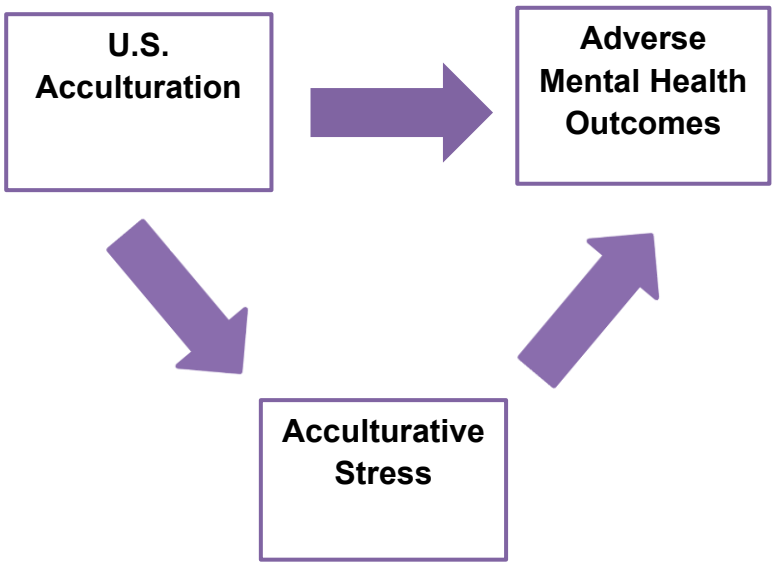

Figure 1. Model of acculturative stress as a mediator of the relation between acculturation and mental health

Abstract Screening Tool

For all questions below, answer "yes", "no", or "maybe/unsure".
Any question answered "no" is excluded.
Do not answer any further questions after the first "no".

1. **Empirical Quantitative Research**:
Is it empirical research that is quantitative (not a systematic review, meta-analysis, theoretical, or qualitative)?

2. **Acculturative Stress:**
Does it appear to include an acculturative stress measure?

3. **Health outcome:**
Does it appear to include some kind of health outcome measure (e.g., physical or mental health outcome, including symptoms)? Not just well-being, quality of life, or health behaviors.
4. **Was the study conducted in the U.S?**

Decision: **Keep** (all "yes" or "maybe/unsure" answers) or **Drop** (at least one "no" answer)

Full Text Screening Tool

For all questions below, answer "yes" or "no"
Any question answered "no" is excluded.
Do not answer any further questions after the first "no".

1. **Empirical Quantitative Research**:
Is it empirical research that is quantitative (not a systematic review, meta-analysis, theoretical, or qualitative)?

2. **Acculturative Stress:**
Does it include a full Acculturative Stress measure, not just one or more subscales?

3. **Health outcome:**
Does it include a health outcome measure? (e.g., physical outcomes such as hypertension, cardiovascular disease, diabetes, or cortisol; mental health outcomes such as depression or anxiety, including symptoms)? Not just well-being, quality of life, or health behaviors.
4. **Was the study conducted in the U.S?**

Decision: **Keep** (all "yes" or "maybe/unsure" answers) or **Drop** (at least one "no" answer)

Figure 2. Abstract and full text screening tool

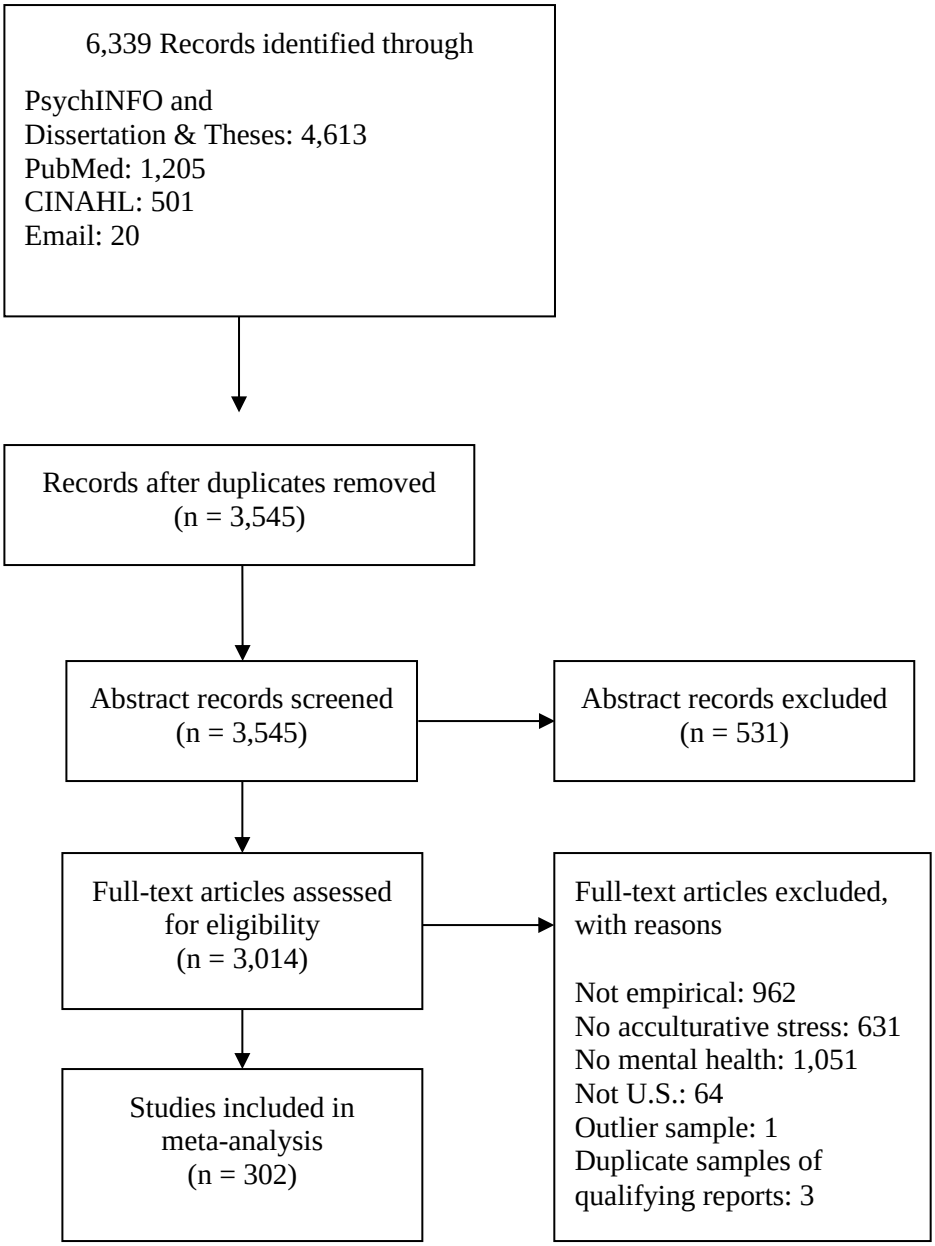

Figure 3. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of study selection (Moher, 2009) †

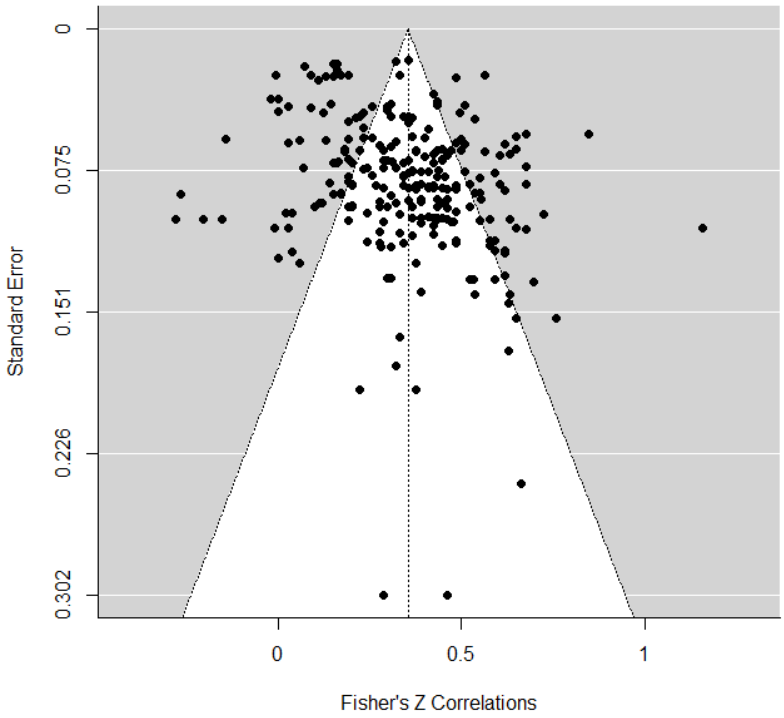

Figure 4. Funnel plot of z scores of correlations between acculturative stress and mental health. The symmetry and fit of the group of values in the funnel plot suggests there is not a problematic amount of publication bias.

Appendix A

Acculturative Stress and Health Coding Protocol

Report Characteristics
R1. What is the report ID number? (ID)
R2. What was the first author's last name? (NAME)
R3. What was the year of appearance of the report or publication? (YEAR)
R4. What type of report? (PUBTYPE) journal article book chapter dissertation MA thesis private report government report conference paper other (specify_____)
Setting Characteristics
S1. In what country was the study conducted? (COUNTRY) S.1.b. In what state was the study conducted? (STATE) S. 2. In what type of community was the study conducted? (COMMUNITY) urban - large (more than 500k) urban - small (500k or less) suburban rural multiple other (specify_____) S2b. Provide community name, if given. (COMMUNITY NAME) S.3. From what type of setting were the participants? (SETTING) Clinic Community College student Other (specify_____)

Participant Characteristics

P1. What is this sample ID number? (SAMPLE ID)

P2. Provide any "defining" characteristics of the sample.

Sex (DEFINING SEX)
(specify fraction (FRAC)_____ and %_____)
SES (DEFINING SES)
(specify fraction_____ and percent_____)
Other (DEFINING OTHER)
(specify fraction_____and percent_____)

2.b. What is the sample immigration status? (STATUS)
Other Immigrant (specify fraction_____ and percent_____)
Refugee (specify fraction_____ and percent_____)
Sojourner (specify fraction_____ and percent_____)
Born in host country (specify fraction_____ and percent_____)
Other (specify fraction_____and percent_____)

P3. Was the sample analyzed as subgroups? (SUBGROUP)

subgroup analysis of social support (specify_____)
subgroup analysis of ethnic identity (specify_____)
subgroup analysis of bicultural identity integration (specify___)
subgroup analysis of active coping (specify_____)
subgroup analysis of nativity (specify_____)
subgroup analysis of immigrant status (specify_____)
subgroup analysis of generational status (specify_____)
subgroup analysis of ethnicity (specify_____)
subgroup analysis of SES (specify_____)
subgroup analysis of age (specify_____)
subgroup analysis of gender (specify_____)
subgroup analysis of acculturative stress scale (specify_____)
subgroup analysis of type of outcome (specify_____)
*ex/physical, mental
subgroup analysis of how outcome was measured_____)
*ex/clinical, self-report

P3b-e. If subgroup analysis:

coded group label
coded group size
comparison group label
comparison group size

Other (specify_____)
P4. What is the socio-economic status of participants in the sample? (SES) low middle upper multiple Other (specify_____) P4b. Specify as authors describe SES of sample. (SES DESCRIBE)
P5. What was the average age of participants in the study? (AVERAGE AGE) (template: 12y, 6m or 12.5) P6. What was the median age of participants? (MEDIAN) P7. What was the youngest age of participants? (YOUNGEST) P8. What was the oldest age of participants? (OLDEST)
P9a. What is the proportion of males in the sample? (PROPMALES) P9b. What is the proportion of females in the sample? (PROPFEMALES)
P10a. What racial or ethnic groups were represented in the sample? (ETHNICITY) Specify the labels and percentages or proportions as reported.
P10b. What nativities were represented in the sample? (NATIVITY) Specify the labels and percentages or proportions as reported.
P10c. What generations were represented in the sample? (GENERATION) Specify the labels and percentages or proportions as reported.
P10d. What immigrant statuses were represented in the sample? (IMMIGRANT) Specify the labels and percentages or proportions as reported.
P. 11. What is the mean participant annual income? (INCOME-M) P. 11. b. What percent of participants are defined as living in poverty? (POVERTY)
ACCULTURATIVE STRESS VARIABLE
ACS1. Provide the authors' label of the acculturative stress (ACS) variable
ACS2. What is the name and citation of the acculturative stress measure? (ACS MEASURE) SRL3. Was the acculturative stress measure created or adapted for this study? (CREATE/ADAPT) no yes-created yes-adapted other_____ ACS2b. If created or adapted, specify how. (HOW)
ACS4a. Was evidence presented for the reliability of this measure? (RELIABILITY) yes no other_____

ACS3b. If yes, provide the type of reliability coefficient. (COEFFICIENT)
ACS4b. If yes, provide the reliability value (e.g ".70") (RELIABILITY VALUE)

ACS5. What type of measure was it (ACS TYPE)?

Self-report: forced response
Self-report: free response (e.g., structured interview)
Other (specify_____)

ACS7. When was this measurement taken? (WHEN MEASURED)

HEALTH VARIABLE

H1. What is the outcome ID number? (OUTCOME ID)

H2. What heath outcome was measured? (OUTCOME)
Physical health, specify _____
Physical health symptom, specify _____
Mental health, specify_____
Mental health symptom, specify_____
other (specify_____)

H3. How was this outcome measured? (OUTCOME MEASURED)

Clinical outcome (specify_____)
symptom (specify_____)
biomarker (specify_____)
other (specify_____)

H4. Was evidence presented for the reliability of this measure? (RELIABILITY)

yes (specify the kind of reliability, if given)
no

H4b. If yes, provide the type of reliability coefficient. (COEFFICIENT)

H4b. If yes, provide the reliability value (e.g ".70") (RELIABILITY VALUE)

H5. When was this outcome measured? (WHEN MEASURED)

H6. When was the health outcome measured in relation to the acculturative stress measurement? (RELATIVE)

same time
health before acculturative stress (specify the delay_____)
acculturative stress before health (specify the delay_____)
Other_____

EFFECT SIZE
E1. Effect Size Index (as labeled by authors; ES INDEX) E1b. Page Found
E2. Correlation Coefficient (CORRELATION) 2b. Page Found
E3. Inferential Information (INFERRENTIAL) E3b. Explain inferential information, ideally as reported by authors (EXPLAIN)
E4. Sample Size (SAMPLE SIZE) E4b. Page Found (PAGE) ** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).
E5a. Acculturative Stress mean (ACS-M) E5b. Acculturative Stress standard deviation (ACS-SD) E5c. N for acculturative stress variable (ACS-N)
E6a. Health mean (HEALTH-M) E6b. Health standard deviation (HEALTH-SD) E6c. N for Health (HEALTH- N)
E7. Calculated Effect Size (CALCULATED ES)
E8. Calculation Method (CALC METHOD)
E9. Initials of person calculating effect size (INITIAL ES)
Moderator 1
SS1. How was **social support** measured**?** (SUPPORT MEASURED) Self-report (specify_____) interview (specify_____) other (specify_____) SS.1.b. What is the name and citation of the social support measure (SS MEASURE)? SS.1.c. What is the reliability of this measure? (SS RELIABIITY)
SS2. Effect Size Index (as labeled by authors) (SS-ES) SS.2.b. Page Found (SS-PAGE) SS3. Correlation Coefficient (SS-CORRELATION)

SS.3.b. Page Found (SS-CORRELATION-PAGE)
SS4. Inferential Information (SS-INFERENTIAL)
SS.4.b. Explain inferential information, ideally as reported by authors
SS5. Sample Size (SS-N)
SS.5.b. Page Found (SS-PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).
SS6. SS mean (SS-M)
SS.6.b. SS standard deviation (SS-SD)
SS.6.c. N for SS variable (SS-N)
SS.6.d. Calculated Effect Size (SS-ES)
SS 6.e. Calculation Method (SS CALC METHOD)
SS 6.f. Initials (SS INITIALS)

Moderator 2

AC1. How was **active coping** measured? (AC MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

AC.1.b. What is the name and citation of the active coping measure (AC MEASURE)?
AC.1.c. What is the reliability of this measure? (AC RELIABIITY)

AC.2. Effect Size Index (as labeled by authors) (AC-ES)
AC.2.b. Page Found (AC-EI-PAGE)
AC3. Correlation Coefficient (AC-CORRELATION)
AC.3.b. Page Found (AC-CORRELATION-PAGE)
AC4. Inferential Information (AC-INFERENTIAL)
AC.4.b. Explain inferential information, ideally as reported by authors
AC5. Sample Size (AC-N)
AC.5.b. Page Found (AC-N- PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).
AC.6. AC mean (AC-M)
AC.6.b. AC standard deviation (AC-SD)
AC.6.c. N for AC variable (AC-N)
AC.6.d. Calculated Effect Size (AC-ES)
AC 6.e. Calculation Method (AC CALC METHOD)
AC 6.f. Initials (AC INITIALS)

Moderator 3

EI1. How was **positive ethnic identity** measured? (EI MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

EI.1.b. What is the name and citation of the ethnic identity measure (EI MEASURE)?
EI.1.c. What is the reliability of this measure? (EI RELIABIITY)

EI.2. Effect Size Index (as labeled by authors) (EI-ES)
EI.2.b. Page Found (EI-ES-PAGE)
EI3. Correlation Coefficient (EI-CORRELATION)
EI.3.b. Page Found (EI-CORRELATION-PAGE)
EI4. Inferential Information (EI-INFERENTIAL)
EI.4.b. Explain inferential information, ideally as reported by authors
EI5. Sample Size (EI-N)
EI.5.b. Page Found (EI-N- PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).

EI.6. EI mean (EI-M)
EI.6.b. EI standard deviation (EI-SD)
EI.6.c. N for EI variable (EI-N)
EI.6.d. Calculated Effect Size (EI-ES)
EI 6.e. Calculation Method (EI CALC METHOD)
EI 6.f. Initials (EI INITIALS)

Moderator 4

BI1. How was **bicultural identity integration**? (BII MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

BI.1.b. What is the name and citation of the bicultural identity integration measure (BII MEASURE)?
BI.1.c. What is the reliability of this measure? (BII RELIABIITY)

BI.2. Effect Size Index (as labeled by authors) (BI-ES)
BI.2.b. Page Found (BI-ES-PAGE)
BI3. Correlation Coefficient (BI-CORRELATION)
BI.3.b. Page Found (EI-CORRELATION-PAGE)
BI4. Inferential Information (BI-INFERENTIAL)
BI.4.b. Explain inferential information, ideally as reported by authors

BI5. Sample Size (BI-N)
BI.5.b. Page Found (BI-N-PAGE)
** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).
BI.6. BI mean (BI-M)
BI.6.b. BI standard deviation (BI-SD)
BI.6.c. N for BI variable (BI-N)
BI.6.d. Calculated Effect Size (BI-ES)
BI 6.e. Calculation Method (BI CALC METHOD)
BI 6.f. Initials (BI INITIALS)

Moderator 5

NAT1. How was **nativity** assessed? (NAT MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

Nativity group proportion (number/ out of total sample)
:_____
US
Other host country specify (_____)
Foreign
Other (specify_____)

NAT2. Effect Size Index (as labeled by authors) (NAT-ES)
NAT.2.b. Page Found (NAT-PAGE)
For:
US
Other host country specify (_____)
Foreign
Other (specify_____)

NAT3. Correlation Coefficient (NAT-CORRELATION)
NAT.3.b. Page Found (CORRELATION-PAGE)

For:
US
Other host country specify (_____)
Foreign
Other (specify_____)

NAT4. Inferential Information (NAT-INFERENTIAL)
NAT.4.b. Explain inferential information, ideally as reported by authors

For:
US
Other host country specify (_____)
Foreign
Other (specify_____)

NAT5. Sample Size (NAT-N)
NAT.5.b. Page Found (NAT-PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).

For:
US
Other host country specify (_____)
Foreign
Other (specify_____)

The following for US, Foreign, Other host country (specify _____), Other (specify_____):

NAT6. NAT mean (NAT-M)
NAT.6.b. NAT standard deviation (NAT-SD)
NAT.6.c. N for NAT variable (NAT-N)
NAT.6.d. Calculated Effect Size (NAT-ES)
NAT 6.e. Calculation Method (NAT CALC METHOD)
NAT 6.f. Initials (NAT INITIALS)

Moderator 6

GEN1. How was **generation** assessed? (GEN MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

Generation group proportion (number/ out of total sample) :_____
For:
First
Second
Third
Fourth
Other (specify_____)

GEN2. Effect Size Index (as labeled by authors) (GEN-ES)
GEN.2.b. Page Found (GEN-PAGE)
For:

First
Second
Third
Fourth
Other (specify_____)

GEN3. Correlation Coefficient (GEN-CORRELATION)
GEN.3.b. Page Found (CORRELATION-PAGE)
For:
First
Second
Third
Fourth
Other (specify_____)

GEN4. Inferential Information (GEN-INFERENTIAL)
GEN.4.b. Explain inferential information, ideally as reported by authors
For:
First
Second
Third
Fourth
Other (specify_____)

GEN5. Sample Size (GEN-N)
GEN.5.b. Page Found (GEN-PAGE)
** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).
For:
First
Second
Third
Fourth
Other (specify_____)

The following for: First, Second, Third, Fourth, Other (specify_____)

GEN6. GEN mean (GEN-M)
GEN.6.b. GEN standard deviation (GEN-SD)
GEN.6.c. N for GEN variable (GEN-N)
GEN.6.d. Calculated Effect Size (GEN-ES)
GEN 6.e. Calculation Method (GEN CALC METHOD)
GEN 6.f. Initials (GEN INITIALS)

Moderator 7

IT1. How was **immigrant type (refugee, sojourner)** assessed? (IT MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)
Immigrant type group proportion (number/ out of total sample) :_____
For:
Sojourner
Refugee
Other (specify _____)

IT2. Effect Size Index (as labeled by authors) (IT-ES)
IT.2.b. Page Found (IT-ES-PAGE)
For:
Sojourner
Refugee
Other (specify _____)

IT3. Correlation Coefficient (IT-CORRELATION)
IT.3.b. Page Found (IT-CORRELATION-PAGE)
For:
Sojourner
Refugee
Other (specify _____)

IT4. Inferential Information (IT-INFERENTIAL)
IT.4.b. Explain inferential information, ideally as reported by authors
For:
Sojourner
Refugee
Other (specify _____)

IT5. Sample Size (IT-SS-N)
IT.5.b. Page Found (IT-SS-PAGE)
** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).
For:
Sojourner
Refugee
Other (specify _____)

The following information for: Sojourner, Refugee, Other (specify _____)

IT6. IT mean (IT-M)
IT.6.b. IT standard deviation (IT-SD)
IT.6.c. N for IT variable (IT-N)
IT.6.d. Calculated Effect Size (IT-ES)

IT 6.e. Calculation Method (IT CALC METHOD)
IT 6.f. Initials (IT INITIALS)

Moderator 8

SES1. How was **socioeconomic status** assessed? (SES MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

SES.1.b. What is the name and citation of the socioeconomic status measure (SES MEASURE)?
SES.1.c. What is the reliability of this measure? (SES RELIABIITY)

SES group proportion (number/ out of total sample) :_____
For:
low
middle
upper
continuous (specify_____)
other (specify_____)

SES.2. Effect Size Index (as labeled by authors) (SES-ES)
SES.2.b. Page Found (SES-ES-PAGE)
For:
low
middle
upper
continuous (specify_____)
other (specify_____)

SES3. Correlation Coefficient (SES-CORRELATION)
SES.3.b. Page Found (SES-CORRELATION-PAGE)
For:
low
middle
upper
continuous (specify_____)
other (specify_____)

SES4. Inferential Information (SES-INFERENTIAL)
SES.4.b. Explain inferential information, ideally as reported by authors
For:
low
middle
upper

continuous (specify_____)
other (specify_____)

SES5. Sample Size (SES-N)
SES.5.b. Page Found (N- PAGE)
** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).
For:
low
middle
upper
continuous (specify_____)
other (specify_____)

The following for low, middle, upper, continuous (specify_____), other (specify_____)
SES.6. SES mean (SES-M)
SES.6.b. SES standard deviation (SES-SD)
SES.6.c. N for SES variable (SES-N)
SES.6.d. Calculated Effect Size (SES-ES)
SES 6.e. Calculation Method (SES CALC METHOD)
SES 6.f. Initials (SES INITIALS)

Moderator 9

AG1. How was **age** assessed? (AGE MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

Age group proportion (number/ out of total sample) :_____
Children
Adolescent
Emerging Adult
College Student
Other Adult
Elderly Adult
Other_

AG.2. Effect Size Index (as labeled by authors) (AG-ES)
EI.2.b. Page Found (AG-PAGE)
Children
Adolescent
Emerging Adult
College Student
Other Adult
Elderly Adult
Other_

AG3. Correlation Coefficient (AG-CORRELATION)
AG.3.b. Page Found (AG-PAGE)
Children
Adolescent
Emerging Adult
College Student
Other Adult
Elderly Adult
Other_

The following for:
Children
Adolescent
Emerging Adult
College Student
Other Adult
Elderly Adult
Other_

AG4. Inferential Information (AG-INFERENTIAL)
AG.4.b. Explain inferential information, ideally as reported by authors

AG5. Sample Size (AG-N)
AG.5.b. Page Found (N- PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).

AG.6. AG mean (AG-M)
AG.6.b. AG standard deviation (AG-SD)
AG.6.c. AG minimum (AG-MIN)
AG.6.d. AG maximum (AG-MAX)
AG.6.e. N for AG variable (AG-N)
AG.6.f. Calculated Effect Size (AG-ES)
AG 6.g. Calculation Method (AG CALC METHOD)
AG 6.h. Initials (AG INITIALS)

Moderator 10

GDR1. How was **gender** reported? (GDR MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

Gender proportion (number/ out of sample)_____
For:

Male
Female
Other_____

GDR.2. Effect Size Index (as labeled by authors) (GDR-ES)
GDR.2.b. Page Found (GDR-ES-PAGE)
For:
Male
Female
Other_

GDR3. Correlation Coefficient (GDR-CORRELATION)
GDR.3.b. Page Found (GDR-PAGE)
For:
Male
Female
Other_

GDR4. Inferential Information (GDR-INFERENTIAL)
EI.4.b. Explain inferential information, ideally as reported by authors
GDR5. Sample Size (GDR-N)
GDR.5.b. Page Found (GDR-N-PAGE)
For:
Male
Female
Other_

** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).

The following for: Male, Female, Other_
GDR.6. GDR mean (GDR-M)
GDR.6.c. N for GDR variable (GDR-N)
GDR.6.d. Calculated Effect Size (GDR-ES)
GDR 6.e. Calculation Method (GDR CALC METHOD)
GDR 6.f. Initials (GDR INITIALS)

Moderator 11

HT1. How was **type of health outcome** assessed? (HT MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

HT.1.b. What is the name and citation of the health outcome measure (HT MEASURE)?
HT.1.c. What is the reliability of this measure? (HT RELIABIITY)

The following for:
Physical health
Mental health
Other, specify_____

HT2. Effect Size Index (as labeled by authors) (HT-ES)
HT.2.b. Page Found (HT-PAGE)
HT3. Correlation Coefficient (HT-CORRELATION)
HT.3.b. Page Found (HT-CORRELATION-PAGE)
HT4. Inferential Information (HT-INFERENTIAL)
HT.4.b. Explain inferential information, ideally as reported by authors
HT5. Sample Size (HT-N)
HT.5.b. Page Found (HT-PAGE)
** If the sample size presented in Results and Method section differ,
use sample size from the Results section (e.g., table or matrix).

HT6. SS mean (HT-M)
HT.6.b. SS standard deviation (HT-SD)
HT.6.c. N for SS variable (HT-N)
HT.6.d. Calculated Effect Size (HT-ES)
HT 6.e. Calculation Method (HT CALC METHOD)
HT 6.f. Initials (HT INITIALS)

Moderator 12

HR1. How was **self-report vs. clinical report outcome** determined? (HR MEASURED)

Self-report (specify_____)
Interview (specify_____)
Clinical_____
other (specify_____)

HR.1.b. What is the name and citation of the health measure (HR MEASURE)?
HR.1.c. What is the reliability of this measure? (HR RELIABIITY)

The following for:
Self report
Clinical report
Other, specify_____

HR2. Effect Size Index (as labeled by authors) (HR-ES)
HR.2.b. Page Found (HR-ES-PAGE)
HR3. Correlation Coefficient (HR-CORRELATION)
HR.3.b. Page Found (HR-CORRELATION-PAGE)
HR4. Inferential Information (HR-INFERENTIAL)
HR.4.b. Explain inferential information, ideally as reported by authors

HR5. Sample Size (HR-N)
HR.5.b. Page Found (HR-PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).

HR6. HR mean (HR-M)
HR.6.b. HR standard deviation (HR-SD)
HR.6.c. N for HR variable (HR-N)
HR.6.d. Calculated Effect Size (HR-ES)
HR 6.e. Calculation Method (HR CALC METHOD)
HR 6.f. Initials (HR INITIALS)

Moderator 13

ASU1. What **acculturative stress scale** was used? (ASU MEASURED)

Self-report (specify_____)
interview (specify_____)
other (specify_____)

Does is it relevant for the population being studied?
Explain_____
Yes
No
Other (specify, _____)

Scale used:
SAFE
SAFE-C
HSI
ASSIS
MASI
RASI
Other (specify_____)

ASU.1.b. What is the reliability of this measure? (ASU RELIABIITY)

ASU2. Effect Size Index (as labeled by authors) (ASU-ES)
ASU.2.b. Page Found (ASU-ES-PAGE)
ASU3. Correlation Coefficient (ASU-CORRELATION)
ASU.3.b. Page Found (ASU-CORRELATION-PAGE)
ASU4. Inferential Information (ASU-INFERENTIAL)
ASU.4.b. Explain inferential information, ideally as reported by authors
ASU5. Sample Size (ASU-N)
ASU.5.b. Page Found (ASU-PAGE)
** If the sample size presented in Results and Method section differ, use sample size from the Results section (e.g., table or matrix).

ASU6. ASU mean (ASU-M) ASU.6.b. ASU standard deviation (ASU-SD) ASU.6.c. N for ASU variable (ASU-N) ASU.6.d. Calculated Effect Size (ASU-ES) ASU 6.e. Calculation Method (ASU CALC METHOD) ASU 6.f. Initials (ASU INITIALS)
Coder and Coding Characteristics
C1. What are your initials? (INITIALS CODE)
C2. In minutes, approximately how long did it take you to code this study? (MINUTES)
C3. Provide any notes about the reports or concerns regarding your coding of it. (NOTES)+