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Montclair State University

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**The impact of acculturative stress on internalizing problems among racially and ethnically
minoritized adolescents and young adults in the U.S.: A systematic review and meta-
analysis**

A DISSERTATION

Submitted to the Faculty of
Montclair State University in partial fulfillment
of the requirement
for the degree of Philosophy

by

Petty Tineo, M.A.

Montclair State University

Upper Montclair, NJ

July 2023

Dissertation Chair: Dr. Jazmin Reyes-Portillo

MONTCLAIR STATE UNIVERSITY
THE GRADUATE SCHOOL
DISSERTATION APPROVAL

We hereby approve the Dissertation

The Impact of Acculturative Stress on Internalizing Problems Among Racially and Ethnically
Minoritized Adolescents and Young Adults in the U.S.: A Systematic Review and Meta-Analysis

of

Petty Tineo

Candidate for the Degree:

Doctor of Philosophy

Graduate Program:

Clinical Psychology Ph.D.

Certified by:

[Redacted Signature]

Dr. Kenneth Sumner
Associate Provost for Academic Affairs and
Acting Dean of the Graduate School

7/27/23

Date:

Dissertation Committee:

[Redacted Signature]

Dr. Jazmin Reyes-Portillo
Dissertation Chair

[Redacted Signature]

Dr. Michael Bixter

[Redacted Signature]

Dr. Sally Grapin

[Redacted Signature]

Dr. Lillian Polanco-Roman

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Abstract

Due to demographic changes of the U.S. population in the past few decades, more attention has been placed on understanding the sociocultural factors that have an impact on racially and ethnically minoritized (REM) groups and mental health outcomes. One of the factors that has been gaining increased attention in the past few years is acculturative stress.

Acculturative stress is associated with various mental health outcomes, such as depression, anxiety, psychological distress, and suicide ideation (SI). However, the magnitude of this association remains unclear. A systematic review and meta-analysis were conducted to provide a comprehensive review of the impact of acculturative stress on depression, anxiety, psychological distress, and suicidal ideation among racially and ethnically minoritized youth. We also aimed to explore whether sociodemographic variables (i.e., race/ethnicity, generational status, sex/gender, and age) moderate the relationships between acculturative stress and mental health outcomes.

Forty-three studies met inclusion criteria and were included in this systematic review and meta-analysis. A positive relationship of moderate size between acculturative stress and depression, anxiety, psychological distress, and suicidal ideation was found. Moderation analyses also revealed that the impact of acculturative stress on depression may be greater among those who are older and for first-generation immigrants. Results also suggested that the impact of acculturative stress on psychological distress may be greater among men compared to women. These findings highlight the importance of making sure clinicians assess for acculturative stress when working with REM youth, as well as factors that may be contributing to the individual's acculturative stress level.

Keywords: acculturative stress, immigration, mental health, acculturation

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Chapter One: Introduction

In the United States (U.S.) today, approximately 40% of the population is made up of individuals belonging to racially and ethnically minoritized (REM) groups (any group other than non-Hispanic White alone) (U.S. Census Bureau, 2019). It is projected that by 2044, more than half of the U.S. population will belong to a REM group, with a large proportion of that group being children and adolescents (American Psychiatric Association, 2017; National KIDS COUNT, 2021). Due to the enactment of the Immigration and Nationality Act in 1965, the U.S. saw a major demographic shift. The Immigration and Nationality Act of 1965 abolished previous policies that included a federal national origins quota system that prohibited almost all Asian and African immigrants from settling in the U.S. and severely restricted the number of people from outside Western Europe entering the U.S. (U.S. House of Representatives, n.d.). The previous policy reserved approximately 70% of visas solely for immigrants coming from Great Britain, Ireland, and Germany (Tichenor et al., 2016). However, with the enactment of the Immigration and Nationality Act of 1965, a new preference framework was established. This framework is similar to the one still seen in U.S. immigration today, that gives highest priority to immigrants with family ties in the U.S., followed by occupational skills, and political refugee status (Tichenor et al., 2016). Therefore, as a result of this enactment, the U.S. saw an increase in immigrants coming from Latin America, Asia, the Middle East, and the Caribbean (Yoon et al., 2013). This change led to a surge in research on acculturation in the psychological community, as well as investigations of the impact of acculturative stress on the mental health outcomes of REM individuals, including those that identified as African American (Hwang & Ting, 2008).

Historically, the prevalence of mental health disorders for REM adolescents and young adults (youth) was lower relative to White youth (Vega & Rumbaut, 1991). However, rates have

noticeably increased for REM youth in the past few years, (Centers for Disease Control and Prevention, 2019). For example, according to the 2022 National Healthcare Quality and Disparities Report from the Agency for Healthcare Research and Quality, although the percentage of youth ages 12-17 with a major depressive episode who received treatment was lower for Hispanic youth than for non-Hispanic White youth, there was a 21% increase in treatment for Hispanic youth, notably higher than the 17% increase seen for non-Hispanic White youth between 2008 and 2019. Given the increasing rates of mental health disorders among REM adolescents and young adults, a greater understanding of cultural factors that may have contributed to this shift is needed. This paper will explore how acculturative stress might explain the change in the prevalence of internalizing problems among REM adolescents and young adults, as well as elucidate the magnitude of the relationship between acculturative stress and internalizing problems in this population. The following sections of this chapter will review the prevalence of mental health problems among REM youth and provide an overview of the acculturation process and acculturative stress.

Prevalence of Mental Health Problems Among REM Youth

Compared with White youth, REM adolescents are at greater risk of mental disorders and internalizing problems. Specifically, data from the most recent Youth Risk Behavior Survey (YRBS) in 2021 found that Hispanic (46%) and Multiracial (49%) youth were more likely to have persistent feelings of sadness or hopelessness than White youth (41%) (Centers for Disease Control and Prevention, 2021). The YRBS data also shows that similar to White youth, over the past 10 years, the percentage of REM youth that reported persistent feelings of sadness or hopelessness increased from 2011 to 2021 across all REM groups (i.e., American Indian or Alaska Native, Asian, Black, Hispanic, Native Hawaiian or Pacific Islander, and Multiracial)

(Centers for Disease Control and Prevention, 2021). Increases in anxiety among REM adolescents and young adults have also been observed over the past few decades. For example, in a longitudinal study conducted by Louie and Wheaton (2018), three distinct birth cohorts were used to assess for black-white differences in mental disorders across cohorts. Findings from this study revealed that the lifetime prevalence of anxiety disorders doubled from the oldest cohort (adults born between 1957-1969) to the youngest cohort (adolescents born between 1983-1991), increasing from 16.3% to 33.4% (Louie & Wheaton, 2018). Additionally, the size of the increase in anxiety disorders among blacks overall exceeded the rate seen for whites over the same period (17.1% for blacks vs. 4.5% for whites) (Louie & Wheaton, 2018). Similarly for Hispanic/Latinx youth, data from the National Comorbidity Survey—Adolescent Replication Supplement, which assessed for lifetime prevalence of mood/anxiety disorders among English-speaking households, revealed that Hispanic/Latinx youth were at the highest risk for mood/anxiety disorders compared non-Hispanic White adolescents (Georgiades et al., 2018). As evidenced, depression and anxiety are among the most common mental health problems among REM youth (Auerbach et al., 2016; Merikangas et al., 2010) and major risk factors for suicidal ideation and behavior (Galaif et al., 2007).

While suicide is the second leading cause of death among those aged 10-34 (Centers for Disease Control and Prevention, 2019), evidence suggests that suicidal ideation and attempts are higher among REM youth, such as those that identify as American Indian or Alaskan Native (AI/AN), and multiracial individuals. For example, the 2021 YRBS found that AI/AN (27%) and Multiracial youth (24%) were more likely to have seriously considered attempting suicide compared to White youth (23%). Additionally, AI/AN youth had the highest prevalence of suicide attempts across all racial/ethnic groups (Centers for Disease Control and Prevention,

2021). The percentage of Black adolescents who attempted suicide also increased from 2011 to 2021. Black adolescents currently have the second highest prevalence of suicide attempts among REM youth, while Hispanic youth have the third highest rate (Centers for Disease Control and Prevention, 2021). More specifically, according to the YRBS, Black youth (14%) and Hispanic youth (11%) were more likely to attempt suicide than White youth (9%). Among Asian adolescents, the YRBS did not find that the percentage of Asian adolescents who seriously considered attempting suicide changed between 2011 and 2021 (Centers for Disease Control and Prevention, 2021). However, according to the mortality data reported in the CDC's National Vital Statistics Report in 2021, suicide is the first leading cause of death among Asian Americans between the ages of 15-24, which is not the case for any other racial/ethnic group in this age range in the U.S. (National Center for Health Statistics, 2021).

Similar increases in the rates of internalizing problems are also seen among the REM young adult population. Recently, Lipson et al. (2022) examined the prevalence of mental health problems among college students using data from the Healthy Minds Survey from 2013-2021. Their sample included over 300,000 participants across 373 college campuses. Findings revealed that the prevalence of depression, anxiety, suicidal ideation, and having one or more mental health problems most significantly increased for REM college students (Lipson et al., 2022). For example, over the last 10 years, depression has increased by 602.24% for AI/AN students, 108.8% for Multiracial students, 106% for Latinx students, 68.8% for Arab American students, and 44.7% for Black students, compared to a 163% increase for White students. Similarly, anxiety has increased by 781.7% for AI/AN students, 170.6% for Black students, 98.5% for Multiracial students, 83.6% for Latinx students, and 43.2% for Arab American students, compared to a 119.3% increase for White students. Significant increases in suicidal ideation

were also found, with the increase being 238.4% for AI/AN students, 92.5% for Arab American students, 71.3% for Multiracial students, 54.7% for Latinx students, and 52.3% for Black students compared to a 69% increase for White students (Lipson et al., 2022). Similarly, findings from SAMHSA's 2018 National Survey on Drug Use and Health (NSDUH), which includes non-college attending young adults, also found increases in mental health problems among a non-college sample of REM young adults from 2015-2018 (SAMHSA, 2018). For example, some of their findings revealed that major depressive episodes increased from 12.6% to 15.1% among Latinx/Hispanic adults between the ages of 18-25, and suicidal thoughts increased from 6.0% to 9.5% among African Americans in the same age range (SAMHSA, 2018). As noted above, the increasing prevalence of mental health problems among the REM youth is well-documented. In order to address this issue, an understanding of possible factors that might explain this shift in this population is necessary.

The Acculturation Process and Gaps in the Literature

Due to the change in the demographics of the U.S. population in the past few decades, more attention has been placed on understanding social and cultural factors that have an impact on REM groups and their mental health outcomes. This has led to greater focus on the acculturation process. More specifically, mounting research demonstrates that acculturation and the acculturative stress that may stem from that process, can be major factors contributing to adverse mental health outcomes, especially for REM youth (Kafsiaticas et al., 2013).

Acculturation has been defined as a bidirectional process involving psychological and cultural change that occurs as a result of contact between two or more cultural groups. This involves acquisition of the cultural norms and characteristics of the host country that the individual migrates to, as well as retention of the norms of the individual's culture of origin

(Berry, 2005; Flannery et al. 2001). Research has shown that acculturation may affect an individual's values, behaviors, attitudes, cultural orientation, cognitions, and personality (Berry, 2005). These acculturative changes are affected by the ecological systems an individual is embedded in, such as the microsystem (e.g., family, school) and ecosystem (e.g., local government). For instance, at the family level, acculturation-related discrepancies between parent and child may affect the child's acculturation outcome (e.g., marginalization versus assimilation), while at the institutional level, a child's school may affect their acculturation trajectory (i.e., rate and course of acculturation). Lastly, at the societal level, policies, attitudes, and prejudice can lead to stressors that also affect the acculturation experience and influence an individual's sociocultural and psychological adaptation (Ward & Geeraert, 2016).

Thus far, the research on acculturation and its impact on mental health has produced mixed findings. Some research has found that those with lower levels of acculturation are at increased risk for psychological maladjustment, such as increased anxiety, depression, and somatization symptoms (Yeh, 2003). In contrast, findings from other studies suggest that more acculturated individuals have less optimal mental health outcomes, such as increased depression symptoms and substance use problems than those who are less acculturated. This phenomenon has been called "The Immigrant Paradox" (Calzada & Sales, 2019; Bui, 2013). Some researchers hold that the post-1965 immigration reform following the enactment of the Immigration and Nationality Act could explain the mixed findings, since drastic changes in ethnicities, languages, cultures, and colors of families occurred following the enactment (Marks et al., 2014). These changes precipitated shifts not only in U.S. demographics, but also the way in which immigrants acculturate to the U.S. (Hernandez, 2004 as cited by Marks et al., 2014). The majority of immigrants in the early-to-mid-twentieth century were racially White and from different

European ethnicities. The white skin color of most European immigrants allowed them to blend in and acculturate more quickly into U.S. society, differing from the adaptation patterns seen from more recent immigrants who are mostly people of color (REM individuals) (Marks et al., 2014). It is possible that REM immigrants may experience greater minority stress due to these differences from earlier waves of migration. One minority stressor that may explain the mixed acculturation findings in the extant literature is *acculturative stress*, since a person's level of acculturation may not correspond to amount of stress that they experience in the process of adapting to a new culture (Hovey & King, 1996). Thus, in the last few decades researchers have posited that a better measure of an individual's risk for adverse mental health outcomes due to maladjustment to a new host culture is their level of acculturative stress (Hwang & Ting, 2008).

Acculturative Stress

Acculturative stress refers to the emotional reaction to life events related to acculturation, such as adapting to the beliefs and values of a dominant or host culture (Chun et al., 2003). Researchers have posited that an individual's level of acculturative stress is partly dependent on the distance or dissimilarity between an individual's culture of origin and the new host culture. Greater distance between the two cultures can not only make it harder for an individual to achieve integration but can also increase their acculturative stress (Ward & Geeraert, 2016). Past research has also shown the effects of acculturative stress on mental health symptoms, including depression, anxiety, and posttraumatic stress (PTSD) among minoritized populations, including in REM groups (Kartal et al., 2018; Xu & Chi, 2012; Revollo et al., 2011). This is due to acculturative stress arising from the individual's struggle to join the culture of origin with the host culture (Berry, 1994). During the acculturation process, the majority of immigrants face major changes in various aspects of their lives (e.g., separation, homesickness, alienation,

anxiety about a new cultural environment). Other factors involved in the acculturation process are difficulties such as having a poor social network (i.e., boredom and solitude), socioeconomic and political instability (i.e., unemployment; immigrant policies), and communication struggles (i.e., not knowing host language). These changes and experiences can lead to acculturative stress which involves the emotional hardship of adapting to a new culture, which can in turn disrupt psychological functioning (Chung & Epstein, 2014). Unfortunately, acculturative stress may continue to adversely affect immigrants across time as they become more acculturated and even across immigrant generations due to factors such as continued experiences with discrimination and intergenerational family conflict (Hwang & Ting, 2008).

While there are a few similarities between first- and second-generation youth, there are also some notable differences. First-generation immigrants are defined as individuals who were born outside of the U.S. to parents who were also born outside of the U.S. Second-generation immigrants are defined as individuals born in the U.S. with at least one parent born outside of the U.S. Similar to their parents, first-generation immigrant youth may struggle with adjusting to the cultural expectations of a new country. Often times, they must also learn a new language which hinders their ability to easily communicate their thoughts while they are going through a difficult transition (Mendoza, Javier, & Burgos, 2007; Rumbaut, 2004). On the other hand, for the second generation, acculturative stress may be more focused within the home when youth are ready to take on many of the practices of the new host country, while their parents may strive for them to retain the language and practices of the culture of their country of origin (Katsiaficas et al., 2013; Portes & Hao, 1998; Suárez-Orozco & Suárez-Orozco, 1995; Suárez-Orozco et al., 2008).

A unique characteristic of second-generation REM youth is that they are born and raised in the culture of origin and host culture simultaneously and are more likely to identify with

having a bicultural identity since they are learning and adapting behaviorally and psychologically to two cultures. While having a bicultural identity has been found to be related to positive mental health outcomes (Tikhonov et al., 2019), these youth also experience acculturative stress (Huynh et al., 2018). Second-generation bicultural youth may experience psychological pressure and stress in the process of attempting to integrate the values of their culture of origin with those of the host culture. The difficulty they may experience in reconciling the two different cultures can lead to the development of cultural prejudices toward the host culture and result in their being less proficient in the language of the host culture (Bae, 2020). Other research has shown that compared to first-generation immigrants, acculturative stress is more likely to play a role in the psychological adjustment of second-generation bicultural individuals due to their perception of cultural conflict (Huynh et al., 2018).

Acculturative Stress Construct Validity

As evidenced, researchers have identified the importance of further investigating how acculturative stress impacts the psychological functioning of REM youth, understanding the complexities of this relationship (i.e., factors that impact this relationship), and how acculturative stress may play a role in the development and/or exacerbation of mental health symptoms. There are currently many measures designed to assess acculturative stress and research has found it to be a unique construct that is distinct from general stress. For example, Joiner and Walker (2002) examined the construct validity of the Social, Attitudinal, Familial, and Environmental Acculturative Stress Scale (SAFE; Padilla et al., 1985) among a sample of African American college students. The SAFE Acculturative Stress Scale is the most commonly used measure of acculturative stress, and the SAFE items are designed to assess perceived discrimination, feelings of isolation, communication difficulties, conflicts between the individual's values and goals and

their family's expectations, etc. (Joiner & Walker, 2002). The authors found that the relationships between acculturative stress and depression and anxiety remained significant even after controlling for general life stress, indicating that there are distinct differences between experiences of acculturative stress and life stress in general (Joiner & Walker, 2002). Therefore, knowledge on how this unique factor impacts mental health symptoms in REM youth is necessary, especially for clinicians, researchers, and policymakers involved with this population. The following section will review the extant literature on the impact of acculturative stress on mental health among REM individuals.

Chapter Two: Literature Review and Current Study

Acculturative Stress and Internalizing Problems in REM Adults

Previous research has investigated the relationship between acculturative stress and various mental health symptoms (e.g., depression, anxiety, psychological distress, suicidal ideation) among REM adults. For instance, Xu and Chi (2013) investigated the relationship between acculturative stress and psychological functioning among Asian immigrants (ages 18-95) and found a significant link between acculturative stress and depressive symptoms. They also found that social support had a buffering effect on the impact of acculturative stress on depressive symptoms (Xu & Chi, 2013). Similar results have been found in Hispanic or Latinx populations (Revollo et al., 2011; Thoman & Suris, 2004). More specifically, Thoman and Suris (2004) examined the association between acculturative stress and psychological distress after controlling for demographic variables (i.e., age, gender, educational attainment, marital status, and race/ethnicity, and SES) using a sample of Hispanic psychiatric patients (ages 18-69). They found that acculturative stress was predictive of psychological distress beyond the effects of the

demographic variables. Similarly, Hovey (2000) found that acculturative stress was significantly associated with depression and suicidal ideation among a sample of Mexican immigrants (ages 17-77). Acculturative stress has also been found to be a significant correlate of anxiety among Latin American immigrants (ages 18-65), with results showing that South American adults had higher levels of anxiety than Central American and Caribbean adults, possibly due to cultural characteristics of the latter groups (Revollo et. al. 2011). Additionally, some research provides evidence of a significant association between acculturative stress and depression and suicidal ideation among Asian American and African American college students, independent of general life stress (Hwang & Ting, 2008; Polanco-Roman & Miranda, 2013). Similar findings have also been evidenced among adolescents and young adults. The following section will review some of the extant literature examining the relationship between acculturative stress and mental health symptoms among REM youth.

Acculturative Stress and Internalizing Problems in REM Youth

In recent years, research investigating the impact of acculturative stress on mental health symptoms in youth has been on the rise, with findings showing similar results to adult populations. For example, Sirin et al. (2013) explored the role of acculturative stress on the trajectories of internalizing mental health symptoms, such as depression, anxiety, and somatic symptoms, using a sample of immigrant adolescents (mean age=16.20 years) living in the U.S. in a two-year longitudinal study. Most participants identified as either Latino, Asian, African, African American, or West Indian. While overall mental health symptoms declined over time, this trend was moderated by acculturative stress such that greater exposure to acculturative stress significantly predicted more somatic, depression, and anxiety symptoms. Additionally, first-generation immigrants reported higher levels of depression than second-generation youth (Sirin

et al., 2012). This is consistent with prior research specifically focused on first-and-second generation adults showing that acculturative stress is related to depression, anxiety, and other mental health symptoms (Alegria et al., 2007; Boyce & Fuligni, 2007). Similarly, Park (2009) found that acculturative stress was associated with depression among Korean-American adolescents (ages 12-18). However, in contrast to Sirin et al., 2013, U.S. born adolescents in the sample had a higher level of acculturative stress than Korean-born adolescents (Park, 2009). Acculturative stress has also been linked to increased suicidality among REM adolescents (Hovey, 1998). Hovey (1998) examined the relationship between acculturative stress, depression symptoms, and suicidal ideation among Mexican-American adolescents (mean age=16.8 years) and found a significant association between high levels of acculturative stress and depression and suicidal ideation (Hovey, 1998).

An association between acculturative stress and elevated symptoms of depression, anxiety, and suicidal ideation among REM college students has also been found (Zvolensky et al., 2016; Crockett et al., 2007). For instance, Crockett et al. (2007) found acculturative stress to be significantly associated with higher levels of anxiety and depressive symptoms in Mexican American college students (ages 18-30). While the pattern of findings was similar for men and women, the overall effect of acculturative stress was more robust for depression than for anxiety (Crockett et al., 2007). Similarly, among REM students (i.e., African-American, Hispanic, Asian, and other minoritized ethnic groups) who experience high levels of experiential avoidance, or an unwillingness to remain in contact with negative external experiences, the experience of acculturative stress is related to greater levels of suicidal symptoms (Zvolensky et al., 2016).

Finally, the impact of acculturative stress has also been noted in African American youth. While some assert that African Americans have seemingly adopted the “American” culture,

other researchers, such as Walker (2007), posit that acculturative stress can occur in the context of race-related incidents that cause feelings of discomfort to arise during an African American individual's interaction with a White individual. Walker (2007) argues that the combined experience of racism, bi-cultural identity development, and acculturative stress may increase risk for suicide among African Americans young adults. To test this hypothesis, Walker et al. (2008) conducted a study examining whether acculturative stress moderated the association between depression and suicide ideation among African-American and European-American college students (mean age=20.88 years). Acculturative stress significantly moderated the relationship between depression and suicide ideation for African American students, but not European-American students. These findings suggest that acculturative stress may be a unique risk factor for suicidal ideation for African American students with elevated depression (Walker et al., 2008).

Current Study

The findings of the aforementioned studies suggest that acculturative stress is associated with various mental health problems among youth and adults, including symptoms of depression, anxiety, psychological distress, and suicidal ideation and behavior (Hovey, 2000; Revollo et al., 2011; Crockett et al., 2007; Zvolensky et al., 2016; Walker et al., 2008). However, an important question that remains is how big of an effect does acculturative stress have with internalizing problems. Depression and anxiety symptoms are highly prevalent among REM youth and increase risk for suicide ideation and behavior (Auerbach et al., 2016; Merikangas et al., 2010; Goldston et al., 2009). A greater understanding of the magnitude of the relationship between acculturative stress and internalizing problems may help clarify whether acculturative stress should be an important variable to target in mental health interventions for REM youth. To this

end, we aim to conduct a systematic review and meta-analysis to provide a comprehensive review of the impact of acculturative stress on depression, anxiety, psychological distress, suicidal ideation and suicidal behavior among REM youth. To date, no existing systematic reviews or meta-analyses have been conducted examining the relationship between acculturative stress and internalizing problems in REM youth. The literature on this topic has increased in the past few years. For instance, a search on the PsycINFO database revealed that before 2011, there were 469 articles related to acculturative stress, compared to 843 articles since 2011). The current study is among the first to provide a summary of the existing literature. This study also aimed to identify whether the extant literature has produced consistent or inconsistent results. Lastly, this study also aimed to explore whether sociodemographic variables moderate the relationship between acculturative stress and mental health outcomes. As noted above, findings have been found to vary according to demographic characteristics, such as generational status. Therefore, we also examined whether variables such as race/ethnicity, generational status, sex, and age moderate the association between acculturative stress and mental health outcomes (i.e., depression, anxiety, psychological distress, and suicidal ideation).

Chapter Three: Methodology

In order to identify all relevant papers that examined the impact of acculturative stress with mental health outcomes, a comprehensive search of the Academic Search Complete, PsycINFO, CINHALL, and PubMed databases was performed for articles published on or before January 1, 2022. The search strategy used was based on the combination of three key variables: (1) acculturative stress; (2) mental health outcomes (i.e., depression and anxiety symptoms, psychological distress, suicidal thoughts and behaviors); and (3) youth (i.e., adolescents and young adults). The key words used in the search can be found in Table 1. This study follows the

Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines (Page et al., 2020) and is prospectively registered with PROSPERO (CRD42021252700).

Inclusion and Exclusion Criteria

The title, abstract, and/or full paper were assessed to determine which studies met the following criteria: (1) contained an empirical analysis of the relationship between acculturative stress and mental health outcomes (i.e., depression and anxiety, psychological distress, or suicidal thoughts or behaviors); (2) included a measure of acculturative stress; (3) included a measure of the mental health outcomes of interest (i.e. depression and anxiety, psychological distress, and/or suicidal thoughts or behaviors); (4) used a sample that was predominantly made up of racially/ethnically minoritized individuals with a mean sample age between 13-29 years old; (5) used a sample of participants that currently live in the U.S.; and (6) published in an English-language, peer-reviewed journal.

Articles were excluded based on the following criteria: (1) the mean age of the sample was under the age of 13 or over the age of 29; (2) the sample included participants that lived outside of the U.S.; and (3) the publication is a thesis, dissertation, unpublished manuscript, conference presentation, book, editorial, review, or protocol paper. The reference sections of included articles were also hand-searched to identify other relevant studies.

Data Extraction and Coding

All articles that met the inclusion criteria were downloaded into EndNote. Two coders (P.T. & L.T.) extracted the following information: study authors, study design, sample mean age, the proportions for sex/gender, race/ethnicity, and generational status, recruitment of participants, types of mental health outcomes reported, acculturative stress measures used,

mental health outcome measures used, and effect size estimates. Google Sheets was used to record study data. Each study was assessed for risk of bias using the critical appraisal tool from BMJ Open (Downes et al., 2016) that is designed for use with cross-sectional studies. The tool consists of a twenty-item checklist where items are rated as yes (1), no (0) or don't know (0). Items are summed to generate a quality score out of 20. While this tool allows each study to be assigned a score, the interpretation of these scores is left to the researcher's discretion. In the current study, the quality score was interpreted using the following definitions: low quality score (1-7); medium (fair) quality score (8-14); high (good) quality score (15-20). These definitions are based on previous studies that have used this tool (Casale & Banchi, 2020; Moor & Anderson, 2019). Two coders (P.T. & L.T.) independently rated the quality of all included studies and Cohen's kappa was used to assess inter-rater reliability. In the case of disagreements, a third coder (J.R.) was used to resolve disagreements. This systematic review adhered to the PRISMA-P guidelines.

Effect Size

The Pearson Correlation Coefficient (r) describing the relationships between acculturative stress and mental health outcomes was the effect size index of the current meta-analysis. According to Cohen's criteria, Pearson r values between 0.10-0.30 represent a small effective size, values between 0.30-0.50 represent a medium effect size, and values between 0.50-1.0 represent a large effect size (Cohen, 1992). Additionally, for studies that reported multiple correlations, for example between multiple subscales of an acculturative stress measure and depression, the average of all relevant correlations was used (Cooper et al., 2009). Similarly, for studies that reported individual effect sizes based on gender/sex, the weighted average of both correlations was used.

Statistical Analyses

The meta-analysis was conducted using *R* (R Core Team, 2021) with *metafor* package (Viechtbauer, 2010). The meta-analysis was conducted with random effects models to account for between-study heterogeneity (Kisamore & Brannick, 2008). Following recommendations by Lipsey and Wilson (2001), correlation coefficients were converted to Fisher's z s since correlation coefficients ranging from -1 to +1 are not normally distributed. These statistics were then combined using meta-analysis, and the pooled z statistic was converted back to pooled r where it could then be interpreted as common correlation coefficients. To assess for publication bias, the following indices were calculated: Begg and Mazumdar Rank Correlation Test, Egger's Regression Test, funnel plot symmetry, and Duval and Tweedie's Trim and Fill Test. This was done to impute effect size estimates for a projected number of missing studies in order to provide an unbiased effect size estimate (Quintana, 2015). Lastly, moderation analyses were conducted in order to determine the degree to which different sociodemographic variables moderate the variability in effect size estimates. Moderation was investigated using the proportions of first-generation immigrants, women, each racial/ethnic category (Latinx, Asian, Black/African, Middle Eastern/North Africa/Turkey [MENAT], Other), as well as age.

Chapter Four: Results/Findings

The database search resulted in 1,329 potentially relevant citations. Removal of all duplicates resulted in 724 potentially relevant citations. Review of titles and abstracts resulted in 153 full text articles to be considered for possible inclusion. Thirty-nine articles met the inclusion criteria. Four additional articles from the hand search met inclusion criteria (See Figure 1. for the PRISMA-P flow diagram of our search history). Of the 43 total articles found via the database search and hand search, 44 effect sizes were extracted and included in this

meta-analysis.¹

Description of Included Studies

A summary of the main characteristics according to mental health outcome (e.g., span of publication years, sample size range, and number of adolescent samples) for the 43 studies can be found in Table 2. Additionally, the information extracted from each study (e.g. study authors, study design, types of mental health outcomes reported, acculturative stress measures used, and effect size estimates) is listed in Table 3. Across studies, the acculturative stress measure most commonly used was the Social, Attitudinal Familial, and Environmental Acculturative Stress Scale ($n=20$) (SAFE; Fuertes & Westbrook, 1996), and most studies used well validated measures of acculturative stress. There were 40 articles that focused on acculturative stress and depression, 13 articles that focused on anxiety, five that focused on psychological distress, and seven that focused on suicidal ideation. Six of the 43 articles used a longitudinal research design in which assessments were conducted at multiple time-points. The 43 studies described 44 samples ranging in size from 26 to 1488 (mean sample size = 322.79) and representing a total number of 22,047 participants. There were 35 samples that were recruited from school/university settings, three recruited from the community, and five recruited from both school/university and community settings. Eighteen studies had samples with a mean age under 18 years old, while the remaining included samples with mean ages between 18-29 years old. The racial/ethnic backgrounds of the participants were highly diverse, including Latinx, MENAT, Black/African, and Multiracial, with the Latinx group having the greatest representation in this meta-analysis.

¹ It is important to note that two studies (Zvolensky et al., 2016; Mayorga et al., 2018) may have had some overlap in participants based on the data collection dates reported in both articles. Efforts were made to contact authors and receive clarification. Both articles were ultimately included in the meta-analysis due to there being enough difference between both samples overall to treat them as two separate studies.

Methodological Quality

Each study was assessed for risk of bias by two reviewers (P.T. & L.T.) using the critical appraisal tool from BMJ Open (Downes et al., 2016). As shown in Table 4, 38 studies were rated fair (1-4, 6-11, 13, 15-20, 22-33, 35-43), meaning their total score ranged between 8-14. Many of these studies used convenience sampling to recruit participants, which limited the generalizability of findings. Some also did not report whether a power analysis was conducted, raising the question of whether some of these studies were underpowered. A few of these studies also lacked information on how missing data was handled. Lastly, five studies were rated good (5, 12, 14, 21, 34), meaning their total score ranged between 15-20. These studies included the most complete information, such as how missing data was handled, addressed and categorized non-responders, and/or provided sample size justification, which allowed for better chances of replication. Regarding interrater reliability, the kappa coefficient obtained in the study was 0.671, which represents substantial agreement (McHugh, 2012).

Mental Health Outcomes

Studies on depression. Forty studies examined the relationship between acculturative stress and depression symptoms and a total of 41 effect sizes that represented this relationship were analyzed. Of the 40 studies, four of them were rated “good” in their methodological quality and the rest were rated “fair”. See Figure 2a. for the effect sizes and confidence intervals per individual study. The findings showed a significant average effect size of $r_z = .37$ (95% CI [0.32, 0.41], $Z = 16.12$, $p < .0001$), indicating a medium positive relationship between acculturative stress and depression according to Cohen’s criteria (Cohen, 1992). This suggests that higher acculturative stress is associated with higher levels of depression. Regarding indices of heterogeneity between studies, results showed considerable heterogeneity ($Q(40) = 246.02$,

$p < .0001$, $t^2 = .0181$ [0.0113-0.0370], $I^2 = 85.78\%$). From this, it can be concluded that non-random between-study differences account for 85.78% of the variability between studies.

Additionally, the prediction interval based on this sample of studies was $r = .12$ to $.57$. This indicates that there is a 95% probability that similar future studies will have effects that fall within this prediction interval.

Assessment of publication bias for depression studies. Examination of a funnel plot of study effect sizes was used to assess whether publication bias was an issue for the included depression studies (see Figure 2b). Based on visual inspection of the funnel plot, it appeared that the results were more variable than one would expect based on random variation alone. In addition to assessing the funnel plot, Egger, Smith, Schneider, and Minder's (1997) regression test for funnel plot asymmetry was run and based on this test, it appeared that the results were influenced by publication bias ($z = 2.65$, $p = .008$). Additionally, the rank correlation test was also significant ($p = .047$) signifying that there is evidence of publication bias.

Duval and Tweedie's trim-and-fill method (2000) was then used to adjust the overall effect estimate based on potentially missing studies due to publication bias. Eleven values were imputed to simulate the unpublished studies (see Figure 2c). After the recalculation based on the imputed data, the results showed that the overall effect for depression was still significant ($r_z = .31$, $p < .0001$, 95% $CI = [0.25; 0.37]$), and was slightly smaller than the originally estimated effect size. Therefore, even after assessing for publication bias, the main effect for depression remains robust and significant.

Moderation effects for depression studies. Based on the observed variability, it can be concluded that the relationship between acculturative stress and depression symptoms is complex. To gain a better understanding of this association, mixed-effects analyses were

conducted to assess whether possible moderators (i.e., age, gender, race/ethnicity, and generational status) could account for the heterogeneity in effect sizes. The results showed a significant positive relationship between effect sizes and the mean age ($Q=5.727, p=0.017$) and proportion of first-generation immigrants ($Q=10.8186, p=0.001$) of the sample. This suggests that the impact of acculturative stress on depression may be greater among those who are older ($r_z = .01, 95\% CI [0.00, 0.03]$). Additionally, as the proportion of first-generation individuals increased in the study, the relationship between acculturative stress and depression was stronger ($r_z = .24, 95\% CI [0.10, 0.39]$). There was no significant association between effect sizes and proportion of women ($Q = 3.14, p = .076$) and no moderation was found based on the racial/ethnic groups (all p values $> .05$).

Studies on anxiety. Thirteen studies examined the relationship between acculturative stress and anxiety symptoms and a total of 14 effect sizes were extracted and analyzed testing this relationship. Of the 13 studies, all of them were rated “fair” in their methodological quality. See Figure 3a. for the effect sizes and confidence intervals per individual study. The findings showed a significant average effect size of $r_z = .35$ ($95\% CI [0.29, 0.41], Z = 10.00, p < .0001$). This indicated a medium positive relationship between acculturative stress and anxiety according to Cohen’s criteria (Cohen, 1992), meaning higher acculturative stress is associated with higher levels of anxiety. Indices of heterogeneity between studies showed considerable heterogeneity ($Q(13) = 51.44, p < .0001, I^2 = .0140 [0.005-0.050], I^2=78.78\%$). From this, it can be concluded that non-random between-study differences account for 78.78% of the variability between studies. Additionally, the prediction interval based on this sample of studies was $r = .12$ to $.54$.

Assessment of publication bias for studies on anxiety. Based on visual examination of the funnel plot (Figure 3b), it appeared that the results were not more variable than one would

expect based on random variation alone. In addition to assessing the funnel plot, the Egger et al. (1997) regression test for funnel plot asymmetry was conducted and showed that the results were not influenced by publication bias ($z = 1.34, p = .18$). Additionally, the rank correlation test was also not significant ($p = .67$) indicating that there was no evidence of publication bias.

Moderation effects for studies on anxiety. To obtain a better understanding of the association between acculturative stress and anxiety, mixed-effects analyses were conducted to assess whether possible moderators (i.e., mean age, gender, race/ethnicity, and generational status) could account for some of heterogeneity in effect sizes. None of the variables (e.g., mean age, gender, race/ethnicity, and generational status) explained a significant amount of variance. There was no significant relationship between effect sizes and participants' mean age ($Q = 0.18, p = .67$), racial/ethnic group (all p -values > 0.05), and proportion of women ($Q = 0.85, p = .36$) in the samples. Of the 15 articles, only 11 provided full information on the generational status of their sample. Using the sample of 11 articles, moderation analysis was run for proportion of first-generation immigrants and the results were also non-significant ($Q = 14.69, p = .20$).

Studies on psychological distress. Five studies examined the relationship between acculturative stress and psychological distress and a total of six effect sizes that represented this relationship were analyzed. See Figure 4 for the effect sizes and confidence intervals per individual study. The findings showed a significant average effect size of $r_z = .40$ (95% CI [0.33, 0.47], $Z = 9.71, p < .0001$, see Figure 4). This indicated a medium-to-large positive relationship between acculturative stress and psychological distress according to Cohen's criteria (Cohen, 1992), meaning higher acculturative stress is associated with higher levels of psychological distress. Regarding indices of heterogeneity between studies, results showed moderate heterogeneity ($Q(5) = 12.92, p < .05, \tau^2 = .0064$ [0.00-0.051], $I^2 = 57.77\%$). From this,

it can be concluded that non-random between-study differences account for 57.77% of the variability between studies. Additionally, the prediction interval based on this sample of studies was $r_z = .24$ to $.54$.

Assessment of publication bias for studies on psychological distress. It is recommended that there be a minimum of 10 studies used when assessing for publication bias by testing funnel plot asymmetry (Higgins et al., 2022). Therefore, publication bias was not assessed as there were only six studies in this meta-analysis examining psychological distress.

Moderation effects for studies on psychological distress. To obtain a better understanding of the association between acculturative stress and psychological distress, mixed-effects analyses were conducted to assess whether possible moderators (i.e., age, gender, race/ethnicity, and generational status) could account for some of heterogeneity in effect sizes. There was a significant negative relationship between effect sizes and the proportion of women ($Q=11.91, p < 0.001$) in the sample. This suggests that as the proportion of women decreased in the study, the relationship between acculturative stress and psychological distress became weaker ($r_z = -.43, 95\% CI [-0.68, -0.19]$). There was no significant relationship between effect sizes and mean age of participants ($Q = 0.0008, p = .98$), proportion of first generation immigrants ($Q = 0.0021, p = .96$), or race/ethnicity (all p -values > 0.05).

Studies on suicidal ideation. Seven studies examined the relationship between acculturative stress and suicidal ideation. A total of seven effect sizes that represented the relationship between acculturative stress and suicidal ideation were analyzed. See Figure 5 for the effect sizes and confidence intervals per individual study. The findings showed a significant average effect size of $r_z = .26$ ($95\% CI [0.23, 0.30], Z = 13.32, p < .0001$, see Figure 5). This indicated a small-to-medium positive relationship between acculturative stress and suicidal

ideation according to Cohen's criteria (Cohen, 1988). Greater acculturative stress is associated with higher suicidal ideation. Regarding indices of heterogeneity between studies, results were insignificant ($Q(6) = 5.00, p = .544, I^2 = .00 [0.000-0.0178]$ $I^2=0\%$). From this, it can be concluded that there is zero variability between studies due to non-random between-study differences. Additionally, the prediction interval based on this sample of studies was $r = .23$ to $.30$.

Assessment of publication bias and moderation effects of studies on suicidal ideation. It is recommended that there be a minimum of 10 studies used when assessing for publication bias by testing funnel plot asymmetry (Higgins et al., 2022). Given that only seven studies assessed suicidal ideation, we were unable to assess for publication bias. Due to the non-significant heterogeneity effects reported above, potential moderator variables were not assessed for this outcome.

Chapter 5: Discussion

Key Findings

This systematic review and meta-analysis aimed to provide a greater understanding of the association between acculturative stress and internalizing problems such as depression and anxiety symptoms, psychological distress and suicidal ideation by providing a comprehensive summary of the literature and quantifying the magnitude of these relationships. It also aimed to investigate whether potential moderators, such as age, sex/gender, generational status, and race/ethnicity also have an impact on the relationship between acculturative stress and internalizing problems. After a thorough review of the literature, 39 articles that met the inclusion criteria were identified, with an additional four being found via a hand-search of the reference sections of the included articles. The studies were independently coded by two

reviewers and correlations (Pearson's r) representing the relationship between acculturative stress and internalizing problems were extracted for each study. Overall, analyses indicated that acculturative stress was significantly associated with depression and anxiety symptoms, and the strength of these observed relationships was medium in size. Acculturative stress was also positively associated with psychological distress and suicidal ideation, and these effects were medium-to-large and small-to-medium, respectively. Therefore, this meta-analysis provides evidence to support the claim that there is an association between acculturative stress and internalizing distress.

The findings appeared particularly robust for depression and anxiety symptoms, and psychological distress. For instance, the medium effect size found for depression symptoms remained even after accounting for publication bias. This is not surprising given the reality and number of stressors that immigrants and subsequent generations experience while attempting to acculturate in a new country, including adopting new cultural norms, economic difficulties, learning a new language, undocumented status, isolation, prejudice, and discrimination. Even members of the third and fourth generation may still differ from the dominant culture in their customs, values, and behaviors. While acculturative stress may not be the sole factor affecting depression, anxiety, and psychological distress symptoms among REM youth, our results suggest acculturative stress is an important factor to consider among this population. Relatedly, models such as the Integrative Risk and Resilience Model by Suarez-Orozco and colleagues (2018) help to explain how in addition to navigating between home culture and host culture, there are also multiple levels of the environment that may impact immigrant youths' development (Suarez-Orozco et al., 2018). This includes factors at the individual level, within microsystems, and within political and social contexts (Suarez-Orozco et al., 2018). The findings of this systematic

review and meta-analysis are also aligned with the minority stress model (Meyer, 2003), which emphasizes the conflict and tension that can arise between the values of a minority group/culture and the dominant group/culture (Meyer, 2003). More specifically, the model holds that minoritized individuals experience greater incidents of stress related to their minoritized status (minority stress) in the form of discrimination, prejudice, or racism. As a result of these minority stressors, minoritized individuals experience greater negative health and mental health outcomes than majority group members. While this model was originally conceived to be used in the context of sexual/gender minority health, the framework can be expanded to other minoritized groups, such as REM youth, and helps to explain why unique cultural factors, such as acculturative stress, can play a role in the manifestation of mental health problems (Asnaani et al., 2022).

In regard to SI, the results indicated a small-to-medium positive relationship between acculturative stress and SI. While acculturative stress is associated with an increase in SI among REM youth, other factors may have a greater influence on the development of SI in this population. For example, psychiatric risk factors like depression have been found to be among the strongest predictors of SI and behavior (Bachmann, 2018). It is also possible that acculturative stress plays a more important role in the development of SI among REM youth as a moderator of other risk factors. In line with the cultural theory and model of suicide (Chu et al., 2010), cultural factors like experiencing acculturative stress can serve as stressful life events that precipitate suicide risk and can interact with psychiatric risk factors to increase suicidality. Further research is warranted to investigate whether acculturative stress may play a stronger role as a moderator in the relationship between other well-known risk factors (e.g., depression) and SI. It is also important to note that all studies that evaluated SI were rated fair in quality, which could have attenuated the overall magnitude of the relationship between SI and acculturative

stress. Another consideration is the possibility that the results may have been affected by the small number of studies ($n=7$) with most of those studies utilizing different SI measures.

Lastly, to gain more insight into potential reasons for the heterogeneity of results found in this meta-analysis, several moderators were tested. These moderators included race/ethnicity, age, sex/gender, and generational status.

We found that age and generational status had a moderating effect on the impact of acculturative stress on depression. Findings revealed that the impact of acculturative stress on depression may be greater among first-generation immigrants compared to second-generation immigrants. This result parallels previous research finding acculturative stress to be higher among first-generation individuals than second- and third-generation individuals, with acculturative stress decreasing across generations (Mena et al., 1987; Katsiaficas et al., 2013). These findings seem to conflict with evidence supporting The Immigrant Paradox (Salas-Wright et al., 2014). According to The Immigrant Paradox, first-generation immigrants show greater resiliency and adaptability compared to second-generation immigrants, leading to better health outcomes (Vitoroulis et al., 2022). For example, the prevalence of mood and anxiety disorders has been found to be significantly lower among first-generation immigrants than second-generation immigrants, despite the former reporting a greater number of risk factors for mental health problems such as lower income and education levels (Salas-Wright et al., 2014). However, some researchers caution against the over-generalization of The Immigrant Paradox and suggest that there are nuanced factors that can be at play for immigrants (John et al., 2017). For example, risk factors are not equally distributed across first-generation immigrants and research suggests that there are subsets of socially disadvantaged immigrants (i.e., individuals with limited language proficiency, undocumented and uninsured immigrants) at greater risk of

poor mental health outcomes than more socially advantaged first-generation immigrants (i.e., individuals with visas, insured immigrants) (John et al., 2012).

Research examining The Immigrant Paradox with regard to youth mental health problems has grown in recent years. For instance, Tilley et al. (2021) conducted a meta-analysis of 91 studies to assess the impact of immigrant generation status on youth internalizing and externalizing problems and found that the effect varied according to type of problem. More specifically, first-generation youth reported more internalizing problems (e.g., depression, anxiety) compared to second-generation youth. In contrast, second-generation youth reported significantly more externalizing problems relative to first-generation youth (Tilley et al., 2021). It is possible that first-generation youth may have a tendency to associate less with American-born peers, which may result in them experiencing less peer pressure to use substances or display other problematic externalizing behaviors (Tilley et al., 2021). Tilley et al. (2021) findings mirror our own with regard to generational status moderating the impact of acculturative stress on depression. It is possible that impact of acculturative stress may contribute to greater externalizing problems among second-generation youth than those of the first-generation. Future research should evaluate the association between acculturative stress and externalizing problems among youth, as well as the role of immigrant generational status in these relationships.

We also found that the association between acculturative stress and depression symptoms was stronger among older individuals. Previous research provides some evidence of a sensitive period of acculturation for individuals immigrating to a new (host) country, typically occurring before early adolescence (Cheung et al., 2011). For instance, Cheung et al. (2011) found that the younger participants in their sample were at the time of immigration (before approximately 14.5 years old), the more rapidly they came to identify with their host country (Cheung et al., 2011).

These findings suggest that acculturation occurs most rapidly at younger ages, and it is possible that the chances of experiencing acculturative stress increase the older one is at the time of immigration. Another possible explanation for the effect of acculturative stress on depression symptoms being stronger among older individuals may be due to perceived racial/ethnic discrimination. Adults may be more likely to perceive discrimination than children due to the accumulated exposure to these types of incidents over the course of their life (Latham-Mintus et al., 2022). Due to cognitive abilities and life experiences, children and adolescents may also not have the cognitive awareness nor the maturity to be able to detect more subtle forms of racism/discrimination (Brown, 2015). Additionally, children and adolescents are able to learn new languages more readily than adults (Suryantari, 2018). Previous research has shown a negative correlation between English language proficiency and perceived discrimination and adjustment difficulties in a new host country among first generation college-age immigrants (Duru & Poyrazli, 2011). Future research should aim to further understand the pathway between acculturative stress and mental health outcomes, by examining other sociocultural factors, such as language proficiency and discrimination experiences, and bring to light any group differences that may be observed across REM groups.

Additionally, we found that the impact of acculturative stress on psychological distress may be greater among boys/men compared to girls/women. Since psychological distress incorporates non-specific symptoms of stress, low well-being, anxiety, and depression, it is possible that boys/men tended to endorse items related to increased stress, hostility, or related symptoms that are not captured in specific depression or anxiety measures (Calvarese et al., 2015). Relatedly, we did not find that sex/gender moderated the relationship between acculturative stress and depression or anxiety. Future research is needed to better understand the

psychological stress reactions that boys/men tend to experience that may not be accurately captured in existing mental health measures, as well as explore the possibility that REM boys/young men may be underreporting symptoms due to other factors that have yet to be elucidated.

Finally, we did not find that race/ethnicity moderated the effect of acculturative stress on any of the mental health outcomes assessed. It is possible that acculturative stress may be a risk factor for internalizing symptoms across REM groups. Lastly, due to non-significant heterogeneity effects, moderation analyses were not conducted for the relationship between acculturative stress and SI.

Strengths and Limitations

There are some important strengths of the current systematic review and meta-analysis. This is among the first studies to synthesize the acculturative stress literature as it relates to internalizing symptoms in youth with a consideration for different demographic moderators. Other strengths include the exhaustive search that was conducted using multiple databases, and efforts to contact authors to obtain key data that would have otherwise been omitted. Lastly, through the systematic review of the existing research on this topic, gaps in the literature were identified, which informed suggestions for future research.

There are also several limitations that should be considered. One was the exclusion of studies taking place outside of the U.S., which decreases generalizability of findings to immigrants in other countries. Another limitation involved the moderator analyses. Although there were 44 effect sizes included overall, there were smaller sample sizes for each of the four mental health outcomes, particularly psychological distress ($n=6$) and suicidal ideation ($n=7$). Additionally, due to missing information, there were some moderator analyses that used a small

sample size which warrants cautious interpretation of the moderation results. Further, there are potentially important mechanisms that may moderate the relationship of acculturative stress and internalizing symptoms that were not examined due to an insufficient number of studies. For example, only a few studies examined the association between acculturative stress and mental health while also reporting participants' immigration status (documented vs. undocumented; e.g., Cabrera Tineo et al. 2022, Da Silva et al. 2017). Immigrant documentation status may be of relevance to the heterogeneity across studies, but most studies did not report participants' documentation status. Lastly, the results of the current study were limited by what was available in the existing published literature. Unpublished data was not included in this meta-analysis. Therefore, the current findings of publication bias may be an underestimate of the true publication bias present in this field although efforts were made to account for this in the meta-analysis.

Clinical Implications and Future Research

It is important to emphasize that while mental health problems often do arise during the acculturation process, negative mental health outcomes are not guaranteed. As Berry and Kim (1988) explain, the acculturation process may enhance an individual's life and mental health or it may also hinder an individual from moving forward, depending on the amount of acculturative stress experienced and on a variety of individual and group characteristics that are part of the acculturation process, such as protective factors. These protective factors can include but are not limited to social support and family cohesion (Vidal de Haymes, et al., 2011), as well as religiosity (Goforth et al., 2014). For clinicians working with individuals that are in the early stages of the acculturation process and/or experiencing difficulty throughout this process, it is important to assess factors that could potentially affect the client's acculturative stress level.

Some factors include: 1) stage of acculturation, 2) socioeconomic status, 3) social support, 4) the host country's tolerance of different groups (e.g., discrimination, hate crimes, etc.), 5) attitudes towards acculturation, 6) prior intercultural interactions of any kind, 7) values, and 8) self-esteem (Berry, 1984; Sirin et al., 2019). Given the findings of this meta-analysis, clinicians may want to more closely assess these factors especially if the REM individual presents with depression, anxiety, or psychological distress symptoms, since findings were most robust for these outcomes. Acculturation-related factors may also be important to assess for REM youth presenting with SI. Our results also showed some differences based on immigrant generational status. Therefore, clinicians may want to consider the role generational status may be playing in a client's presenting problem(s), while also making sure to not to make over-generalizations based on this factor. It may also be important for clinicians to help clients connect with culturally relevant resources (i.e., cultural student organizations, mentors of similar backgrounds, etc.) that may help ease some of the tension that they may be experiencing in trying to integrate or balance the host culture with their culture of origin. Additionally, because social support has been found to buffer the deleterious effects of acculturative stress on mental health symptoms, clinicians may also want to emphasize the importance of staying socially connected with others and building and maintaining a strong social support system (Lee et al., 2004). This might also be an effective way to increase resiliency among this population. Past research has shown that resilience can weaken the relationship between acculturative stress and somatization symptoms, which can often be anxiety-related (Cariello et al., 2020). Clinicians working with REM youth that are reporting experiences of acculturative stress and internalizing symptoms, may find it beneficial to integrate the client's cultural strengths into treatment in order to promote resiliency and improve mental health outcomes (Cariello et al., 2020).

When dealing with acculturative stressors, another important psychological variable involved is that of coping. Individuals deal with stressors in different ways, leading to highly variable mental health outcomes, appraisals of the situation, and personal adaptations (Berry, 1984). Of the 43 articles in this meta-analysis only three articles assessed for participant's coping strategies and attitudes towards the acculturation process (Crockett et al., 2007; Wei et al., 2012; Da Silva et al., 2017). For instance, Crockett et al. (2007) found that higher acculturative stress was associated with significantly higher anxiety levels for Mexican American college students who reported little use of active coping strategies. Relatedly, Da Silva et al., (2017) examined negative religious coping as a moderator between the relationship between acculturative stress and psychological distress. Negative religious coping refers to an individual's tendency to have an internal struggle with their faith and findings indicated that this coping style exacerbated the positive relationship between acculturative stress and psychological distress among Latina young adult immigrants (Da Silva et al., 2017). Additionally, Wei et al. (2012) assessed the impact of another form of coping called forbearance coping on the relationship between acculturative stress and psychological distress among Chinese international college students. Forbearance coping refers to an individual's tendency to minimize or hide problems in order to not burden others. Findings revealed a significant and positive relationship between forbearance coping and psychological distress when the student had a weaker identification with their heritage culture (Wei et al., 2012). Future research should work to assess how variables such as an individual's perception and attitudes regarding the acculturation process, along with specific coping strategies utilized, impact the relationship between acculturative stress and other mental health outcomes such as depression and SI.

The findings of this meta-analysis confirmed the significant relationship between acculturative stress and internalizing symptoms, but more research is needed to gain a better understanding of the actual mechanisms that may explain the relationships between acculturative stress and depression, anxiety, psychological distress, and SI. For example, researchers have examined the mediating roles of psychological need satisfaction (i.e., satisfaction with level of personal autonomy, relatedness, and competence) and psychological need frustration (i.e., dissatisfaction with personal level of autonomy, relatedness, and competence) in the relationship between acculturative stress and depression among youth in China (Ren & Jiang, 2021). They found that the relationship between high levels of acculturative stress and increased depression symptoms was mediated by low levels of psychological need satisfaction and high levels of psychological need frustration (Ren & Jiang, 2021). Examining different mediators such as these among REM youth in the U.S. may help to disentangle some of the different pathways that could explain the ways in which acculturative stress may lead to internalizing problems in this population, and fill some of the existing gaps in the literature. Additionally, to gain a more complete understanding of how acculturative stress experiences may contribute to adverse mental health outcomes, the utilization of a mixed methods approach (analyzing both quantitative and qualitative data) in future research may be useful in obtaining information that is not being captured in self-report measures alone.

Researchers should also further assess the factors that might get in the way of REM individuals receiving mental health treatment. While the findings of this review suggest that acculturative stress may be an important factor to consider when providing mental health treatment for REM youth, current research shows that there are large treatment gaps for REM students (Lipson et al. 2022). For example, although Arab American students experienced a

22% increase in meeting criteria for at least one mental health disorder over the last 10 years, data shows that there was an 18% decrease in past-year treatment among this population (Lipson et al., 2022). It would be helpful to examine whether acculturative stress is playing a role in the treatment gaps and inequalities seen in mental health utilization among REM adolescents and young adults. Lastly, given that only five studies met criteria for a rating of good quality, future research should use more representative samples by using systematic sampling techniques, as well as conduct and report their power analyses in order to determine appropriate sample size needed to confirm whether their results are due to chance, or if they are indeed significant.

Conclusion

This meta-analysis is among the first to have synthesized the existing literature on acculturative stress and its association with internalizing symptoms among adolescents and young adults. Based on 43 studies and 44 effect sizes, the results indicated that overall, there is a moderate positive relationship between acculturative stress and depression, anxiety, and psychological distress. There is also a small-to-medium positive relationship between acculturative stress and SI. Male sex was found to significantly moderate the relationship between acculturative stress and psychological distress. Older age and first-generation status also appeared to magnify the impact of acculturative stress on depression. Clinical implications related to these findings show the importance of assessing acculturative stress when working with REM adolescents and young adults and examining specific demographic factors that may be contributing to their level of acculturative stress. Future research should assess how an individual's coping style may mitigate the impact of acculturative stress on mental health symptoms. Lastly, despite the increasing prevalence rate of mental health issues among REM youth, mental health utilization remains low among this population in comparison to their White

youth. Therefore, researchers should further explore the factors that may be playing a role in the treatment gaps and inequalities seen in mental health utilization among REM adolescents and young adults.

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Table 1. Terms used in the formal search

Acculturative Stress	Mental Health	Youth
Accultur*	Psychiatric*	Young adult*
Acculturation experiences	Depress*	College student
	Anxiety	Emerging adulthood
	Suicide	Teen*
	Suicidal Ideation	Adolescen*
	Suicidal Behavior	
	Psychological Distress	

(*): Symbol used to broaden search by including variations of the word stem

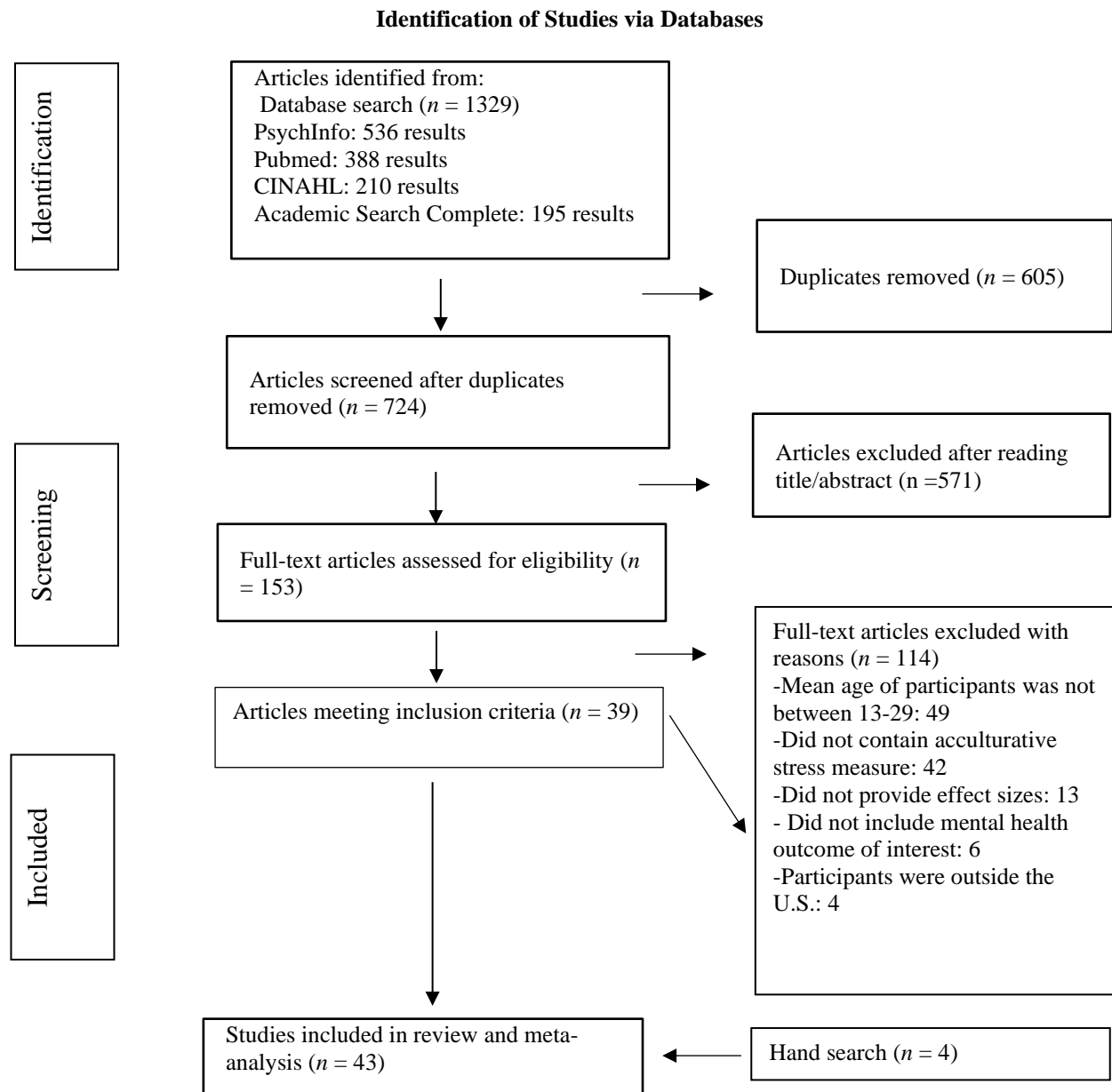


Figure 1. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) flowchart for database search

Table 2. Summary of study characteristics by mental health outcomes

Mental Health Outcome	Number of Articles	Span of Publication Years	Sample size range and mean sample size	Number of participants across all studies	Number of adolescent samples	Number of longitudinal studies	Number of studies for each racial/ethnic group
Depression	40	1996-2022	26-1488; M=355.25	14210	12	5	Latinx: 23; Asian: 7; MENAT: 1; Black/African: 2; Other races/ethnicities : 7
Anxiety	13	2002-2021	75-1095; M=307.2	3993	3	0	Latinx: 8; Asian: 1; MENAT: 1; Black/African: 0; Other races/ethnicities : 3
Psychological Distress	5	2011-2021	129-530; M=278.4	1392	2	0	Latinx: 2; Asian: 1; MENAT: 1; Black/African: 0; Other races/ethnicities : 1
Suicide Ideation	7	1996-2018	70-1095; M=350.29	2452	1	1	Latinx: 2; Asian: 0; MENAT: 0; Black/African: 2; Other races/ethnicities : 3

Table 3. Full description of included studies ^a

	Study Design	Sample Size	Mean Age	Female	Race/Ethnicity	First Generation	Mental Health Outcomes	Acculturative Stress Measure	Mental Health Measure(s)	<i>r</i>
Ahmed et al. (2011)	Cross-sectional	240	15.57	48.30%	100% MENAT	46.40%	Depression; Anxiety; PD	SAFE	CES-D; STAI; CBCL-YSR	Depression: 0.28; Anxiety: 0.36; PD: 0.45
Badiee & Andrade (2019)	Cross-sectional	403	22.12	82%	100% Latinx/Hispanic	14%	Depression; Anxiety	ASS	CESD-R; GAD-7	Depression: 0.20; Anxiety: 0.17
Cabrera Tineo et al. (2020)	Cross-sectional	530	20.81	100%	100% Latinx/Hispanic	100%	Depression	SAFE	BSI	0.28
Cano et al. (2014)	Cross-sectional	155	22.64	65.20%	100% Latinx/Hispanic	26.50%	Depression	SAFE	CES-D	0.56
Castillo et al. (2015)	Cross-sectional	1,488	20.45	75%	100% Latinx/Hispanic	23%	Depression	MASI	CES-D	0.24
Cheng (2022)	Longitudinal (cross-lagged)	173	23.05	74%	100% Latinx/Hispanic	11.00%	Depression	RASI	PHQ-9	0.25
Cheng et al. (2016)	Cross-sectional	207	26.57	71%	100% Latinx/Hispanic	16%	Depression	RASI	PHQ-9	0.34
Constantine et al. (2004)	Cross-sectional	320	23.63	59.40%	25.3% African, 42.5% Asian, 32.3% Latinx	100%	Depression	ASSIS	CES-D	0.69
Corona et al. (2017)	Cross-sectional	198	20.6	70.20%	100% Latinx/Hispanic	22%	Depression, Anxiety Psychological Functioning (Anxiety & depression)	RASI	DASS	Depression 0.33; Anxiety: 0.33
Crockett et al. (2007)	Cross-sectional	148	23.95	67%	100% Latinx/Hispanic	17%		SAFE	CES-D; BAI	Depression: 0.33; Anxiety: 0.17
Da Silva et al. (2017)	Cross-sectional	530	20.81	100%	100% Latinx/Hispanic	100%	PD	SAFE	BSI	0.29
Ellis et al. (2008)	Cross-sectional	135	15.4	37.80%	100% Black/African	100%	Depression	AHI	DSRS	0.35

					33% White, 29% Asian, 18% Latinx, 12% African- American/Carib bean-Islander, 8% other	30%, 100%					
Gomez et al. (2011)	Cross-sectional	969	18.8	68%			Depression	SAFE	PHQ-9	0.30	
Hale & Kuperminc (2021)	Cross-sectional	129	16.8	63.60%	100% Latinx/Hispanic	72.10%	PD	SAFE	WAI	0.47	
Hovey & King (1996)	Cross-sectional	70	16.76	57.10%	100% Latinx/Hispanic	89%	Depression, SI	SAFE	RADS; SIQ-JR	Depression: 0.32; SI: 0.38	
Hovey & Magana (2002)	Cross-sectional	75	29.01	50.70%	100% Latinx/Hispanic	60%	Depression, Anxiety	SAFE	CES-D; PAI	Depression: 0.53; Anxiety: 0.55	
Iturbide et al. (2009)	Cross-sectional	148	23.05	67%	100% Latinx/Hispanic	16%	Depression	SAFE	CES-D	0.33	
Joiner & Walker (2002)	Cross-sectional	248	21.87	60%	100% African- American Asian: 37%; White: 27%; Latinx/Hispanic : 15%, Black: 7%; Biracial: 6%; Other: 8%	0%	Depression, Anxiety, SI	SAFE	BDI, BAI, BSS	Depression: 0.36; Anxiety: 0.27; SI: 0.27	
Lane & Miranda (2018)	Cross-sectional	152	18.64	77%	21 (total sample)	27.60%	Depression, SI	SAFE	BDI; BSS	0.38	
Lantrip et al. (2015)	Cross-sectional	70 (Asian subsample)		63.1% (total sample)	100% Asian	41%	Depression	ASM 3 items based on what students reported on their experiences with acculturative stress	CES-D	0.45	
Lorenzo-Blanco & Unger (2015)	Longitudinal	1919	14.01	52%	100% Latinx/Hispanic	13%	Depression		CES-D	0.25	
Ma (2021)	Longitudinal	55	25.15	41.80%	100% Asian	100%	Depression	ASSIS	CES-D	0.41	

Maiya et al. (2021)	Cross-sectional	475	24.8	60.80%	100% Latinx/Hispanic	11.10%	Depression	MASI	CES-D	0.46
Maldonado et al. (2018)	Cross-sectional	154	21.48	63.60%	100% Latinx/Hispanic	NR	Depression, Anxiety	SAFE	CES-D; STAI	Depression: 0.50; Anxiety: 0.55
Mayorga et al. (2018)	Cross-sectional	448	20.67	78.30%	100% Latinx/Hispanic	NR	Depression, Social Anxiety, Suicidality	SAFE	IDAS	Depression: 0.35; Social Anxiety: 0.34; Suicidality: 0.23
Park (2009)	Cross-sectional	260	15.27	51.40%	100% Asian	48.60%	Depression	ASAAA	DSRS	0.30
Polanco-Roman & Miranda (2013)	Longitudinal	143	18.55	80%	34% Asian, 29% White, 17% Latinx, 11% Black, 8% Other	42%	Depression, SI	SAFE	PHQ-9; BSS	Depression: 0.28; SI: 0.23
Polo & Lopez (2009)	Cross-sectional	161	13.2	50.30%	100% Latinx/Hispanic	48.50%	Depression, Social Anxiety	ASM	CES-D; SPAI-C	Depression: 0.51 Social Anxiety: 0.40
Ponciano et al. (2020)	Cross-sectional	748	19.6	100%	100% Latinx/Hispanic	22.10%	Depression	MASI	CES-D	0.29
Rice et al. (2012)	Cross-sectional	295	23.37	31.20%	100% Asian	100%	Depression	SAFE	CES-D	0.47
Roley et al. (2014)	Cross-sectional	26	14.48	65%	100% Asian	100%	Depression	SAFE	CES-D Mood and Feelings Questionnaire	Depression: 0.76; Anxiety: 0.40
Stein et al. (2012)	Cross-sectional	171	14.02	52.90%	100% Latinx/Hispanic 6.2% Latinx, 24.9% Asian Pacific American, 57.4% MENAT, 11.5% Black; 15.3% Other (Participants could select multiple ancestries)	40%	Depression	BSS		0.22
Tineo et al. (2021)	Cross-sectional	209	21.71	29.30%	100% Latinx/Hispanic	31.20%	Depression, Anxiety	SAFE	PHQ-9; GAD-7	Depression: 0.49; Anxiety: 0.54
Umana-Taylor et al. (2011)	Cross-sectional	207	16.23	100%	100% Latinx/Hispanic	35.30%	Depression	MASI	CES-D	0.29
Walker et al. (2008)	Cross-sectional	296 (African-American subsample)	20.88	56.80%	100% Black/African-American	0%	Depression; SI	SAFE	BDI; BSS	Depression: 0.34; Suicide Ideation: 0.29
Wang et al. (2022)	Cross-sectional	477	20.35	78%	100% Asian	39.60%	Depression	RASI	CES-D	0.22

Wasserman et al. (2021)	Cross-sectional	306	15.5	46.20%	100% Latinx/Hispanic	32.90%	Depression, Anxiety	MASI	CES-D; DASS	Depression: 0.34; Anxiety: 0.28
Wei et al. (2007)	Cross-sectional	189	27.97	51%	100% Asian	100%	Depression	ASSIS	CES-D	0.63
Wei et al. (2012)	Cross-sectional	188	26.6	51%	100% Asian	100%	PD	ASSIS	HSC	0.5
Wong et al. (2017)	Cross-sectional	306	21.63	83.30%	55.2% Hispanics/Latin x, 44.8% Asian	33.90%	Depression, Anxiety, PD	SAFE	BSI	Latinx/Hispanic: Depression: 0.38; Anxiety: 0.32; PD: 0.38; Asian: Depression: 0.30; Anxiety: 0.29; PD: 0.35
Wu et al. (2020)	Cross-sectional	532	15.79	47%	100% Latinx/Hispanic	19.90%	Depression	MASI	CES-D	0.27
Zeiders et al. (2015)	Longitudinal	204	16.8	100%	100% Latinx/Hispanic 15.1% African American (non-Hispanic, 45.3% Hispanic, 32.5% Asian, and 7.1% other	36%	Depression	MASI	CES-D	0.41
Zvolensky et al. (2016)	Cross-sectional	1095	21.92	78.10%	32.5% Asian, and 7.1% other	NR	Depression, Social Anxiety, Suicidality	SAFE	IDAS	Depression: 0.37; Anxiety: 0.36; Suicidality: 0.25

^a List of Acculturative Stress Measures: SAFE- Social, Attitudinal, Familial, and Environmental Acculturative Stress Scale; ASS - Acculturative Stress Scale; MASI - Multidimensional Acculturative

Stress Inventory; RASI - Riverside Acculturation Stress Inventory; ASSIS - Acculturative Stress Scale for International Students; AHI – Acculturative Hassles Inventory ; ASAAA - Adjustment Scale

for Asian American Adolescents; BSS – Bicultural Stress Scale ; ASM – Acculturative Stress Measure; List of Mental Health Outcome Measures: CESD-R - Center for Epidemiologic Studies

Depression Scale-Revised version; CES-D - Center for Epidemiologic Studies Depression Scale; PHQ-9 - Patient Health Questionnaire-9; DSRS - Depression Self-Rating Scale; BDI – Beck Depression

Inventory; BSI – Brief Symptom Inventory; RADS – Reynolds Adolescents Depression Scale; IDAS – Inventory of Depression and Anxiety Symptoms; GAD-7 – Generalized Anxiety Disorder-7; BAI

– Beck Anxiety Inventory; STAI – State Trait Anxiety Inventory; PAI – Personality Assessment Inventory (Anxiety subscale); SPAI-C - Social Phobia and Anxiety Inventory for Children; DASS –

Depression, Anxiety, and Stress Scale; BSI – Brief Symptom Inventory; HSC – Hopkins Symptom Checklist -21-item version; CBCL-YSR – Child Behavior Checklist – Youth Self Report; WAI –

Weinberger Adjustment Inventory; BSS - Beck Scale for Suicide Ideation; SIQ-JR – Suicidal Ideation Questionnaire - Junior

Table 4. Results of risk-of-bias assessment among studies that examined the relationship between acculturative stress and internalizing symptoms ^b

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Rating
1. Ahmed et al. (2011)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
2. Badiee & Andrade (2019)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
3. Cabrera et al., 2022	1	1	0	1	0	0	0	1	1	1	0	1	0	0	1	0	1	1	1	1	12
4. Cano et al. (2014)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	12
5. Castillo et al. (2015)	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	0	1	15
6. Cheng (2022)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	1	1	1	0	1	11
7. Cheng et al. (2016)	1	1	1	1	0	0	0	1	1	1	0	1	1	0	1	1	1	1	0	1	14
8. Constantine et al. (2004)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
9. Corona et al. (2017)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	1	1	1	1	1	1	13
10. Crockett et al. (2007)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	1	1	1	1	1	12
11. Da Silva et al. (2017)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
12. Ellis et al. (2008)	1	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	16
13. Gomez et al. (2011)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
14. Hale & Kuperminc (2021)	1	1	1	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	15
15. Hovey & King (1996)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
16. Hovey & Magana (2002)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
17. Iturbide et al. (2009)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	0	1	13
18. Joiner & Walker (2002)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
19. Lane & Miranda (2018)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13

20. Lantrip et al. (2015)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
21. Lorenzo-Blanco & Unger (2015)	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	15
22. Ma (2021)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
23. Maiya et al. (2021)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	1	12
24. Maldonado et al. (2018)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
25. Mayorga et al. (2018)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
26. Park (2009)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
27. Polanco-Roman & Miranda (2013)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
28. Polo & Lopez (2009)	1	1	0	1	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1
29. Ponciano et al. (2020)	1	1	0	1	1	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	12
30. Rice et al. (2012)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
31. Roley et al. (2014)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
32. Stein et al. (2012)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	0	1	1	1	1	13
33. Tineo et al. (2021)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
34. Umana-Taylor et al. (2011)	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	15
35. Walker et al. (2008)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	1	11
36. Wang et al. (2022)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
37. Wasserman et al. (2021)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
38. Wei et al. (2007)	1	1	0	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	1	1	13
39. Wei et al. (2012)	1	1	0	1	0	0	0	1	1	1	0	1	1	0	0	0	1	1	1	1	12
40. Wong et al. (2017)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	13
41. Wu et al. (2020)	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	14
42. Zeiders et al. (2015)	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	14
43. Zvolensky et al. (2016)	1	1	0	1	0	0	0	1	1	1	0	1	0	0	1	1	1	1	1	1	13

^bRisk of bias was assessed with the BMJ Open AXIS Critical Appraisal Tool for Cross-sectional Studies. Each criterion is assessed by the following questions (0=no, 1=yes), and an overall rating of quality is determined (low quality score (1-7); medium quality score (8-14); high quality score (15-20)): Q1. Were the aims/objectives of the study clear? Q2. Was the study design appropriate for the stated aims(s)? Q3. Was the sample size justified? Q4. Was the target/reference population clearly defined? Q5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation? Q6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation? Q7. Were measures undertaken to address and categorize non-responders? Q8. Were the risk factor and outcome variables measured appropriate to the aims of the study? Q9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialed, piloted or published previously? Q10. Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals) Q11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated? Q12. Were the basic data adequately described? Q13. Does the response rate raise concerns about non-response bias? Q14. If appropriate, was information about non-responders described? Q15. Were the results internally consistent? Q16. Were the results presented for all the analyses described in the methods? Q17. Were the authors' discussions and conclusions justified by the results? Q18. Were the limitations of the study discussed? Q19. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results? Q20. Was ethical approval or consent of participants attained?

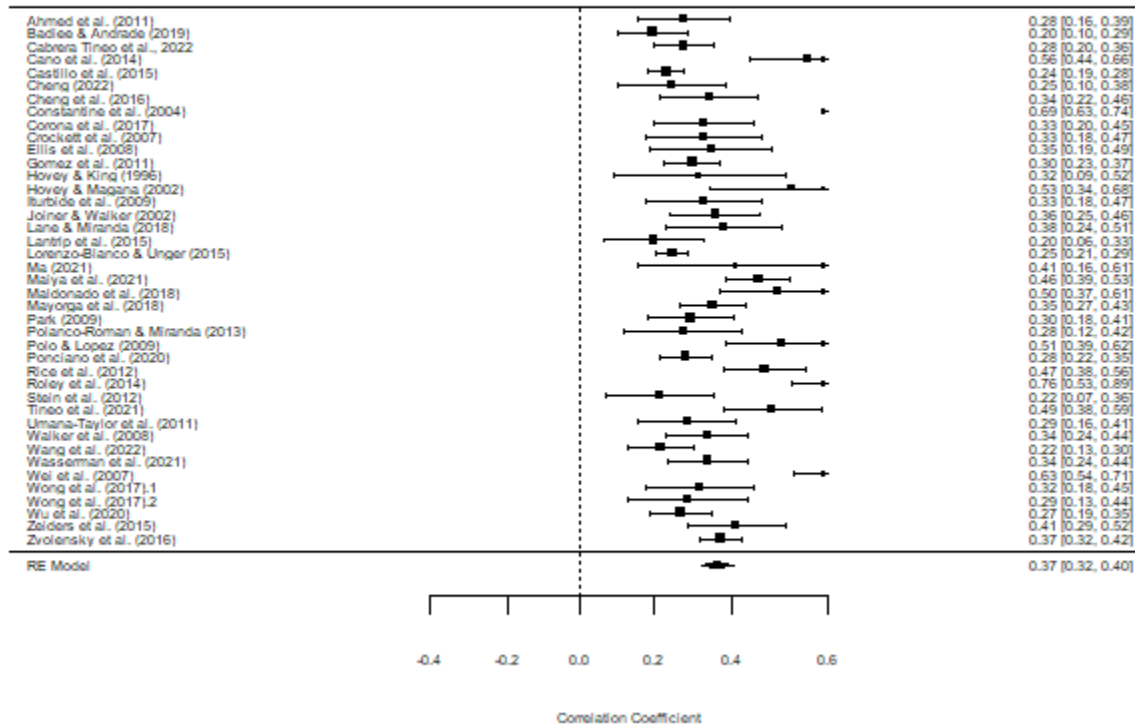


Figure 2a. A forest graph representing the average weighted effect size of acculturative stress on depression and the effect sizes and confidence intervals per individual study

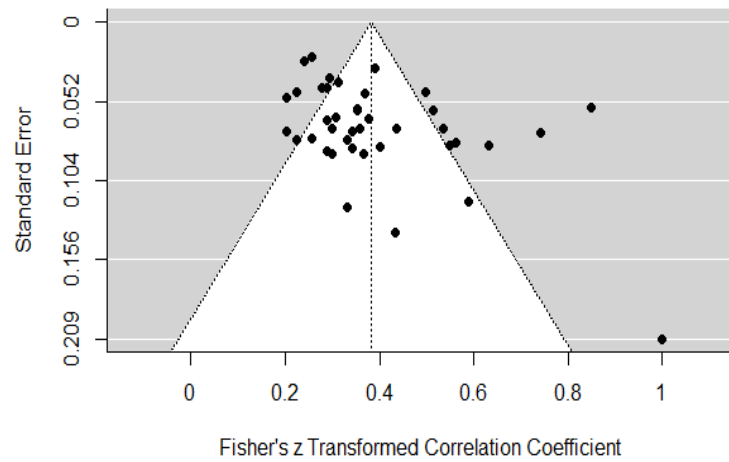


Figure 2b. Funnel plot for the effect of acculturative stress on depression

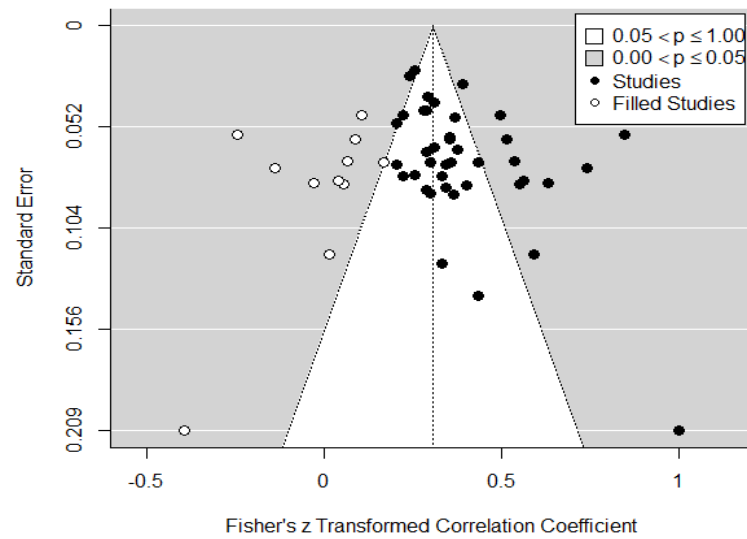


Figure 2c. Funnel plot with imputed values based on the trim and fill method for the effect of acculturative stress on depression

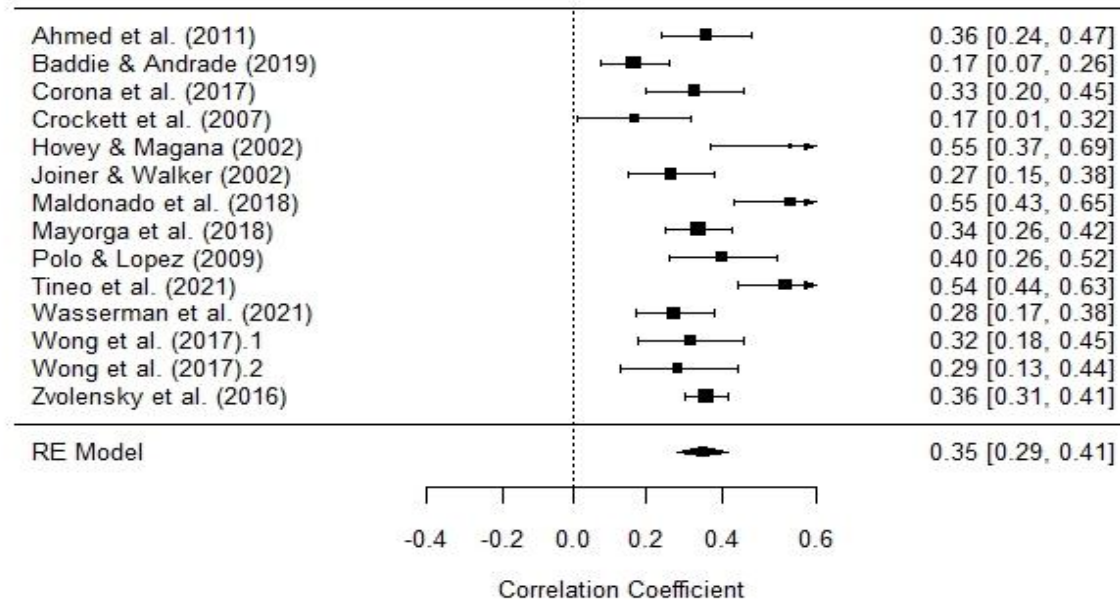


Figure 3a. A forest graph representing the average weighted effect size of acculturative stress on anxiety and the effect sizes and confidence intervals per individual study

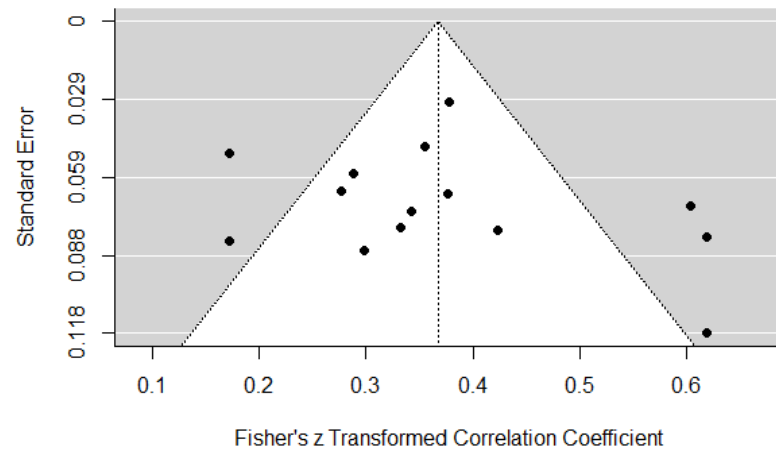


Figure 3b. Funnel plot for the effect of acculturative stress on anxiety

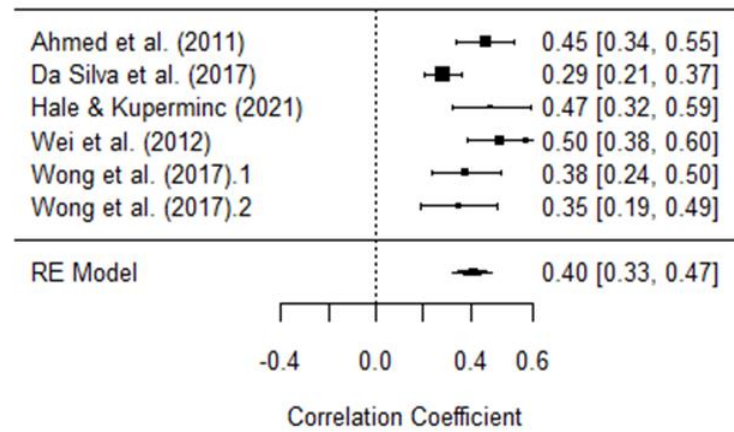


Figure 4. A forest graph representing the average weighted effect size of acculturative stress on psychological distress and the effect sizes and confidence intervals per individual study

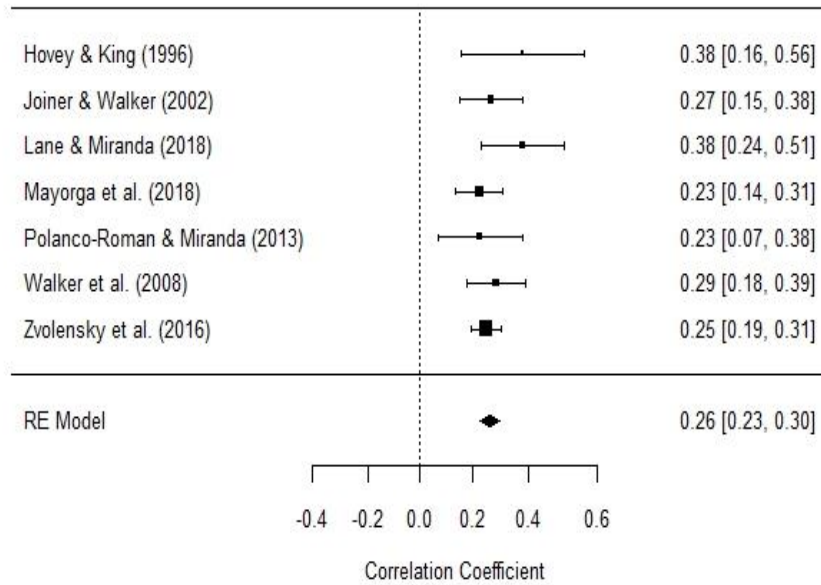


Figure 5. A forest graph representing the average weighted effect size of acculturative stress on suicidal ideation and the effect sizes and confidence intervals per individual study