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CHILD DEVELOPMENT

EMPIRICAL ARTICLE

Understanding adjustment profiles among Mexican-origin adolescents over time: A focus on cultural risk and resilience factors

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Abstract

This study used a three-wave longitudinal dataset to: identify adjustment profiles of U.S. Mexican-origin adolescents based on their physical, academic, and psychosocial health adjustment; track adjustment profile changes throughout adolescence; and examine the associations between cultural stressors, family obligation, and adjustment profile membership over time. Participants were 604 Mexican-origin adolescents (54% female, M_{age} = 12.41, SD = 0.97) in Texas (Wave 1: 2012–2015; Wave 2: 2013–2016; Wave 3: 2017–2020). Three concurrent profiles (*Well-adjusted*, *Moderate*, and *Poorly-adjusted*) emerged at each wave, whereas three transition profiles (*Improved*, *Stable well-adjusted*, and *Overall poorly-adjusted*) were identified across three waves. The results suggest that cultural stressors pose risks for Mexican-origin adolescents' adjustment, and family obligation values play a protective role in these associations.

Although Mexico is the largest source of the U.S. foreign-born population, Mexican-origin adolescents in the U.S. have long been prejudiced against (Piña-Watson et al., 2019) and have consistently shown vulnerability to maladjustment in their physical, academic, and psychosocial health (Noe-Bustamante et al., 2020; Zaky, 2016), which are all important indicators for Mexican-origin adolescents' development into adulthood (Ross et al., 2020). Therefore, it is important to identify which Mexican-origin adolescents are at risk by considering multiple realms of adjustment and to investigate potential risk and protective precursors to adolescents' adjustment. As posited by the integrative risk and resilience model (Suárez-Orozco et al., 2018), cultural stressors (e.g., acculturative stress) are common risk factors for immigrant-origin youth that can harm their adjustment. For example, past literature has consistently shown that experiencing cultural stressors is associated with

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; GPA, grade point average; LMRT, Lo-Mendell-Ruben test; LPA, latent profile analysis; LTA, latent transition analysis.

anxiety/depressive symptoms, physical illness, and lower academic achievement (Cariello et al., 2020; Molina et al., 2019; Williams, 2018).

Cultural stressors and Mexican-origin adolescent adjustment are well understood, however, gaps in the literature persist. Although theory highlights the necessity of identifying which Mexican-origin adolescents are at risk for maladjustment based on their physical health, academic outcomes, and psychosocial adjustment (Ross et al., 2020; Suárez-Orozco et al., 2018), existing research has mainly adopted variable-centered approaches that examine each adjustment realm on its own. Furthermore, previous studies have usually examined adolescent adjustment at a single time point, overlooking the dynamism and complexity of adolescents' adjustment across time (Zaky, 2016). Due to the scarcity of research adopting person-centered approaches to understand adolescent adjustment, it also remains unknown how risk factors, such as cultural stressors, may shape the development of adolescent subgroups with various levels of adjustment concurrently, prospectively, and over time. Additionally, although family obligation values may serve as a cultural asset in Mexican-origin adolescent adjustment (Telzer et al., 2014), whether family obligation values protect adolescents from the negative impacts of cultural stressors over time is still an understudied question. Thus, this study seeks to use a person-centered approach to (1) identify adjustment profiles of Mexican-origin adolescents in terms of their physical, academic, and psychosocial health; (2) test how their adjustment profile changes throughout adolescence; (3) examine the associations between cultural stressors and adjustment profile membership over time; and (4) investigate the protective role of family obligation values in these links.

A person-centered approach to understanding Mexican-origin adolescent adjustment

Mexican-origin adolescents, as the largest subgroup of the Hispanic/Latinx population in the U.S., are a particularly vulnerable population with regards to their physical health, academic outcomes, and psychosocial adjustment (Araque et al., 2017; Cariello et al., 2020; Isasi et al., 2016). For example, Hispanic/Latinx adolescents, including those of Mexican-origin, are among the most at risk for mental health, such as depression (Hooper et al., 2016) and have the highest high school dropout rates (7.7%) among ethnic groups in the U.S. (Araque et al., 2017). Additionally, adolescent obesity prevalence in the U.S. is the highest among Hispanic/Latinx adolescents, who are four times more likely to be obese compared to their peers (Isasi et al., 2016). However, existing research has typically examined each of these realms of adjustment separately (e.g., Gonzales-Backen et al., 2017), limiting the ability to pinpoint adolescents who are most in need of interventions. In line with the concerns about examining each aspect of adolescent adjustment on its own, recent perspectives suggest that adolescent adjustment is a composite of physical health, academic outcomes, and psychosocial adjustment, and that all three realms of adjustment should be examined simultaneously (Ross et al., 2020). Latent profile analysis (LPA) is an ideal person-centered approach to identify subgroups within a population based on individuals' similarities and differences across indicators (Howard & Hoffman, 2018). Thus, for a comprehensive understanding of Mexican-origin adolescents' adjustment the current study identified subgroups of adolescents based on indicators from all three dimensions of adjustment (i.e., physical health, academic outcomes, and psychosocial adjustment).

To indicate physical health adjustment, we included *physical functioning* (ability to participate in sport activities) and *sleep quality* (effectiveness of one's sleep), both of which reflect individuals' physical well-being (Ohayon et al., 2017) and are notable correlates of physical health measures such as obesity (Black et al., 2021). To indicate academic adjustment, we measured school connectedness (sense of belonging to school), school engagement (involvement in academic/extracurricular activities), GPA (grade point average), and effortful control (the ability to discipline oneself to achieve goals), which collectively contribute to an adolescent's academic adjustment (Kim et al., 2015). Finally, we included two negative indicators (anxiety and depressive symptoms) as well as two positive indicators (life meaning and resilience), following the dual-factor model for youth mental health (Suldo & Shaffer, 2008), to gain a comprehensive picture of Mexican-origin adolescents' psychosocial adjustment. Specifically, life meaning reflects individuals' well-being based on their perception of their lives and resilience represents individuals' psychosocial capability to withstand and recover from stressors.

Adolescence is a transitional stage marked by rapid changes in physical, cognitive, academic, and psychosocial development. During this period, Mexican-origin adolescents face a heightened risk of school failure (Roosa et al., 2010), increased susceptibility to depression and anxiety (Van Zalk et al., 2020), and reduced sleep quality (Gillis & El-Sheikh, 2019), all of which are associated with greater maladjustment in later adulthood (Copeland et al., 2021). Yet, the trajectories of these adjustments are dynamic and various. For instance, some adolescents experience a decline in their depression (Burstein et al., 2010), whereas other adolescents see no change (McLaughlin & King, 2015), or even a worsening depression across adolescence (Ge et al., 2006). Furthermore, distinct subtypes and developmental histories may exist during adolescence (Moffitt, 1993). Therefore, to track the shifts in various subgroups based on adolescents' multiple adjustment indicators throughout adolescence,

latent transition profile analysis (LTA) serves as an optimal statistical approach to investigate the stability and change of individuals' profiles over time (Asparouhov & Muthén, 2014). For example, studies on Chinese/Chinese American adolescents have demonstrated evidence for both stability and change in adolescent adjustment profiles (Kim et al., 2015; Wang et al., 2021). Although the majority of Chinese/Chinese American adolescents tend to stay in the same adjustment group over time (e.g., the *Stable* group), some demonstrated improvement, transitioning from the group characterized by the worst psychological and behavioral outcomes (e.g., the *Maladjustment* profile) to the group with moderate levels of psychological and behavioral well-being (e.g., the *Moderate Adjustment* profile). Whereas a growing body of longitudinal research has investigated latent transition profiles over adolescence, no study, to our knowledge, has captured the dynamic picture of Mexican-origin adolescents' developing adjustment across adolescence by using LTA, which may provide potential contributions to the development of adjustment-promoting interventions (Wang et al., 2021).

Cultural stressors and adolescent adjustment

The integrative risk and resilience model posits that immigrant-origin adolescents experience an acculturative process alongside their normal developmental tasks (Suárez-Orozco et al., 2018). Stressful experiences in the acculturation process, such as cultural stressors (e.g., discrimination), can have adverse effects on immigrant-origin adolescent adjustment (Berry et al., 2006; White et al., 2015). Indeed, for Mexican-origin individuals, experiencing cultural stressors has been separately associated with diverse negative outcomes (depressive symptoms; Huynh, 2012; vulnerability to physical illness; Cariello et al., 2020; academic maladjustment; Santiago et al., 2014). Nonetheless, limited attention has been devoted to exploring the role cultural stress may play in adolescents' adjustment across multiple domains and its potential negative impacts on the stability/change of adolescents' adjustment profiles over the course of adolescence, resulting in a notable research gap that necessitates further investigation. For example, among adolescents who experienced cultural stress in early adolescence, some may persistently exhibit maladjustment over time (i.e., the *Overall poorly-adjusted* profile). Conversely, those who initially show well-adjusted outcomes may encounter cultural stressors and then transition to a maladjusted profile later. Thus, it is crucial to examine the association between cultural stress and Mexican-origin adolescents' adjustment profiles, as well as the stability or change in adolescent adjustment profiles from early to late adolescence, which may provide implications for early intervention to promote better adjustment across time.

This study operationalizes Mexican-origin adolescents' cultural stress as instances of *discrimination*, *cultural estrangement*, and *foreigner stress* (Corona et al., 2017; McCord et al., 2019; Piña-Watson et al., 2019). From these constructs, a latent variable of *cultural stressors* was adopted to capture the stressful cultural experiences that are specific to Mexican-origin adolescents in the U.S. (Cano et al., 2015). Discrimination refers to unfair or differential treatment and can be based on one's social position, such as being an immigrant or identified as belonging to a minority group (Williams et al., 1997). Two forms of discrimination were included in Mexican-origin adolescents' reports of their perceptions of discrimination. Non-specific discrimination included experiences of discrimination in any social identity domain (e.g., gender or age), whereas racial/ethnic discrimination included experiences of discrimination that seem racially/ethnically founded. Despite the recognition in previous studies that both racial/ethnic and non-specific discrimination can be risk factors for youth development (Corona et al., 2017; Kim et al., 2018; Williams, 2018), few studies have taken both types into consideration simultaneously. In fact, the development of Mexican-origin adolescents is negatively influenced by not only non-specific discrimination, but also ethnic/racial discrimination which is becoming increasingly prevalent in the current political climate. Incorporating these two forms of discrimination will help us better understand the different forms of discrimination and how together they create experiences of marginalization and oppression that are unique to this population.

Cultural estrangement and foreigner stress are also significant aspects of cultural stress for Mexican-origin adolescents, given that identity formation and the desire to "fit in" are critical tasks during this developmental period (Suárez-Orozco et al., 2018). Cultural estrangement can be defined as a feeling of cultural alienation or a sense of disconnection due to the way one dresses, speaks, or other characteristics related to their ethnicity (Corona et al., 2017). Foreigner stress is the experience of stress resulting from one's perceived foreigner status, which includes feeling excluded, stigmatized, and/or devalued because of their race/ethnicity (Corona et al., 2017). Mexican-origin adolescents may face cultural stress in the form of cultural estrangement and also experience foreigner stress due to conflicting values and developmental goals between their ethnic and host cultures. They often must tackle acculturative tasks, adopting and consolidating potentially conflicting cultures to develop a sense of ethnic identity (i.e., learning the host culture while retaining the heritage culture), all while endeavoring to complete the normative developmental tasks that reflect the dominant expectations and standards for adolescent behavior and achievement set by the U.S. mainstream culture. As Mexican-origin adolescents strive to complete their acculturative tasks and developmental tasks simultaneously they are likely to

experience cultural stress, which will likely impact their corresponding adjustment (Suárez-Orozco et al., 2018).

The moderating role of family obligation values

The integrative risk and resilience model posits that family collectivistic values can serve as a salient cultural asset for Mexican-origin adolescent developmental adaptation (Suárez-Orozco et al., 2018). Within Mexican-origin families, a significant emphasis is placed on the value of family obligation (Hardway & Fuligni, 2006). They consider family as the primary unit of society and the responsibility of taking care of the family is shared among all members. Family obligation, a core aspect of the traditional Latina/o/x cultural value of *familismo*, is defined as cultural beliefs and behaviors focused on providing material and emotional support, showing respect, and making contributions to one's family (Fuligni et al., 1999). Previous literature has shown that the association between family obligation and adolescent outcomes may vary by distinct aspects of family obligation: values (e.g., one's psychological sense of respecting, supporting, and caring for family; Suárez-Orozco & Suárez-Orozco, 1995) and behaviors (e.g., taking care of siblings, language brokering for their parents; Telzer et al., 2014). For instance, valuing family obligations can foster family bonds, impart a sense of purpose, and provide a feeling of self-esteem. Such values have been consistently linked to Mexican-origin adolescents' decreased internalizing/externalizing symptoms (Stein et al., 2014; Telzer et al., 2014) and to improvements in their well-being, such as increased resilience and life meaning (Yan et al., 2021). Conversely, excessive family assistance behaviors might be associated with feelings of being overburdened, leading to negative impacts on Mexican-origin adolescents' psychosocial and academic outcomes (Stein et al., 2014; Telzer et al., 2014). In addition, although family obligation behaviors can pose challenges for adolescents, the intrinsic value of these family obligations is critical in counteracting the adverse effects of offering family assistance by promoting feelings of unity, being supported, and belonging in the family (Telzer et al., 2014). Thus, based on the tenets of the integrative risk and resilience model, it is possible that a strong sense of family obligation values may buffer the negative effects of cultural stressors on adolescents' developmental adjustment (Neblett Jr. et al., 2012). In addition, by examining the interaction between contextual elements like cultural stress and individual aspects such as family obligation values, this study aims to offer a holistic view of the adaptation and development of Mexican-origin adolescents within their cultural context.

Existing literature has documented that family obligation can function as a culturally-protective resource that may attenuate the negative effects of perceived risk (e.g., stress and discrimination) on child outcomes. For instance, among Mexican-origin adolescents, who tend to report strong familial connections, traditional Mexican familism values served as a protective factor, safeguarding against the negative effects of discrimination on adolescents' risky behaviors and depression (Umaña-Taylor et al., 2011). Nonetheless, family obligation has not been specifically examined alongside the experience of cultural stressors and adolescent adjustment profiles, and the change or stability of these profiles throughout adolescence (Cheng et al., 2016; Corona et al., 2017). Adolescents' sense of family obligation may serve as a protective factor against the negative effects of cultural stress on concurrent, prospective, and transitional adjustment profiles. For example, adolescents with a stronger sense of family obligation are less likely to be identified in the poorly-adjusted profile and more likely to remain in the stable well-adjusted group, in the context of cultural stress. Furthermore, it is possible that adolescents who were negatively affected by cultural stress during early adolescence and were initially classified as poorly-adjusted, may transition to a well-adjusted state in late adolescence with the support and protection provided by their family obligation values.

The current study

In light of limited research on adjustment profiles of Mexican-origin adolescents across time and informed by the integrative risk and resilience model (Suárez-Orozco et al., 2018), we aimed to conduct an exploratory examination of the following aims. Using a 3-wave longitudinal dataset of U.S. Mexican-origin adolescents, the first aim of this study was to utilize a person-centered approach (i.e., LPA) to identify profiles of adjustment based on adolescents' physical health, academic outcomes, and psychosocial health (Figure 1). Building on a prior study with a similar approach, but which examined different domains of adjustment and a different ethnic group (Kim et al., 2015), we hypothesized that there would be at least three adjustment profiles at each wave (i.e., well adjusted, moderate, and relatively poorly adjusted groups). Second, we aimed to examine how individual adjustment profiles changed over time using LTA (Figure 1). Based on previous studies (Kim et al., 2015; Wang et al., 2021), we hypothesized that most adolescents would remain stable over time, but some would exhibit improvement, changing from worse to better adjustment profiles. Further, those with maladjusted profile memberships would be more likely to transition to moderate profiles, whereas only a very few individuals would transition from a better-adjusted profile to a worse one. The third aim was to examine the link from the experience of cultural stressors in early adolescence to adjustment profiles concurrently (Wave 1) and prospectively (Wave 3), as well as to investigate how cultural stress related to the movement between profiles across the three waves

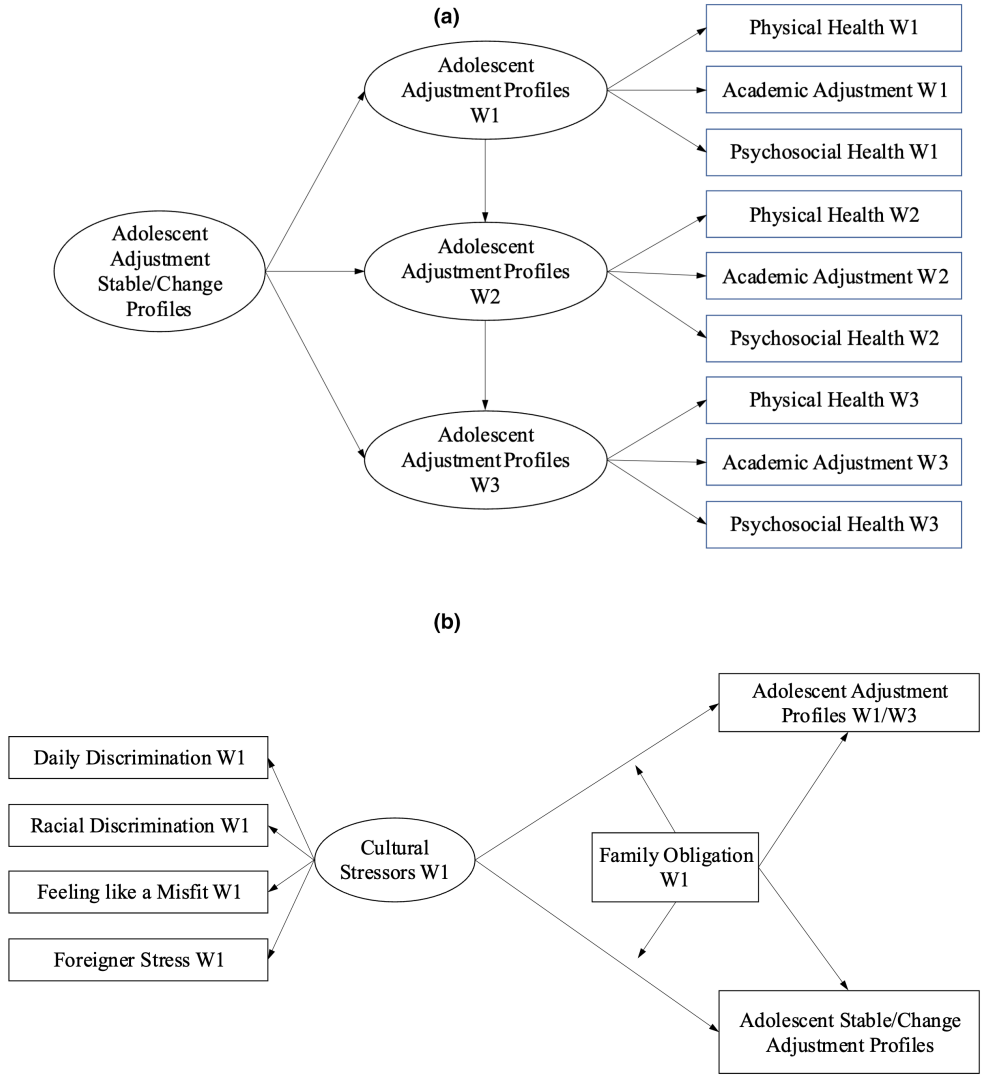

FIGURE 1 Conceptual model. Conceptual model for (a) stable/change profiles as represented by adjustment profiles with indicators of physical health, psychosocial health, and academic adjustment, and (b) association between latent construct of cultural stressors at Wave 1 and adjustment profiles at Waves 1 and 3, as well as the stable/change adjustment profiles across three waves among Mexican-origin adolescents. W1 = Wave 1, W2 = Wave 2, W3 = Wave 3.

(Figure 1). The study of both concurrent and prospective associations offers valuable insights for crafting effective interventions and policies. These can be tailored to address immediate needs (informed by concurrent associations) and long-term goals (guided by prospective associations), thereby promoting the adjustment of Mexican-origin adolescents. We hypothesized that higher levels of cultural stressors would be associated with a higher likelihood of being in worse adjustment profiles, concurrently (Wave 1) and prospectively (Wave 3). Adolescents with higher levels of cultural stressors would also be more likely to be identified as belonging to the stable poorly-adjusted profile, relative to other profiles across three waves. The last aim of the study was to examine how the interplay between contextual factors (e.g., cultural stress) and individual factors (e.g., family obligation values) relates to adolescent adjustment. We proposed that family obligation values may serve as a protective/resilient buffer to counteract the negative effects of cultural stressors on concurrent, prospective, or transition adjustment profiles (Figure 1).

METHOD

Participants and procedure

Data were collected from a three-wave longitudinal study (W1: 2012–2015; W2: 2013–2016; W3: 2017–2020) that targeted adolescents in Mexican immigrant families in the U.S. Participants at Wave 1 consisted of 604 adolescents (54% female; grades 6th through 8th), and their ages ranged from 11 to 15 years old (M_{age} = 12.41, SD = 0.97). The data collection for Wave 1 was administered consecutively over the course of the first 3 years, without involving separate cohorts. At Wave 2, 80%

($N = 483$) of adolescents continued participating in the study, whereas at Wave 3, 334 adolescents (55% of Wave 1 participants, 69% of Wave 2 participants) remained in the project. The majority of adolescents were born in the United States (75%), and those who were born in Mexico had been living permanently in the United States since an average age of 3.99 (SD = 2.62). Attrition analyses were conducted to determine whether there were any significant differences in the key study variables (e.g., adjustment indicators, cultural stress indicators, and family obligation) and demographic variables between families who participated at each wave and those who left the project. The results showed that families with higher levels of maternal education were more likely to remain at Wave 2 ($t_{meduc}(591) = 2.41$, $p < .05$) and families with younger adolescents at Wave 2 were more likely to stay in the study at Wave 3 ($t_{age}(481) = 2.96$, $p < .01$). Considering that maternal education level and adolescent age, while not the primary focus of this research, could potentially influence adolescent adjustment, this study has incorporated these two variables as covariates in the analysis.

The parents of these families were of Mexican origin and at least one child was in middle school, qualifying that adolescent for participation. Recruitment for target individuals was conducted through accessing public records, in-school presentations, and community-wide outreach from 2012 to 2015 in the central Texas area. An initial family visit was completed if the family decided to participate, with parents providing consent and adolescents providing their assent to participate in the study. Adolescents completed questionnaires, with the questions being asked aloud by a bilingual interviewer in the adolescent's preferred language (English or Spanish). The information on language(s) used to administer the questionnaires during the interview at Waves 1, 2, and 3 was collected using one question: "What language(s) was/were used to conduct the home visit/family visit (survey)?" The interviewers responded to the question based on the languages used by the participants (1 = *Spanish*, 2 = *Spanish and English*, *but mostly Spanish*, 3 = *English and Spanish*, *but mostly English*, and 4 = *English*) following the completion of the interview. This was part of a separate assessment of the participant-interviewer interaction by the interviewer. The percentage for each of the four types of responses at different waves (Table S1) showed that most adolescents preferred to use English during family visits across three waves. Study participants were compensated with $60, $90, and $90 separately for Waves 1, 2, and 3.

Measures

Adjustment profiles

Adolescents' physical health outcomes (i.e., physical health functioning problems, sleep quality), academic outcomes (i.e., adolescents' grades, effortful control, school engagement, and school connectedness), and psychosocial health outcomes (i.e., resilience, life meaning, anxiety and depressive symptoms) were included as measures in the adjustment profiles. To ensure that constructs have the same meaning and are interpreted similarly across different time points, longitudinal measurement invariance analysis (i.e., configural, metric, and scalar invariance) was conducted across three waves of data for all (applicable) scales of adolescent adjustment. All measures achieved scalar invariance, with the exception of school engagement and effortful control for which partial scalar was established (see more details in supplemental materials; Table S2).

Physical health outcomes

Physical health functioning problems

Adolescents' physical health functioning was measured at Waves 1, 2, and 3 with three items adopted from the Physical Functioning subscale of the Pediatric Quality of Life Inventory Version 4.0 (Varni et al., 2001). Adolescents were asked how much of a problem they experienced in completing three different tasks over the past month: (1) walking more than one block, (2) running, and (3) participating in sport activities or physical functioning. They then reported on a scale of 1 (*Never a problem*) to 5 (*Always a problem*), with higher mean scores indicating more physical functioning problems ($\alpha = .744$ at W1; $\alpha = .800$ at W2; $\alpha = .768$ at W3). This scale has been validated for use with Mexican American adolescents in a prior study (Hou et al., 2018).

Sleep quality

Adolescents' sleep quality was measured at Waves 1, 2, and 3 with one question taken from the Pittsburgh Sleep Quality Index (Buysse et al., 1989). Adolescents were asked, "During the past month, how would you rate your sleep quality overall?" and they responded on a rating scale from 1 (*Poor*) to 5 (*Excellent*), with higher mean scores indicating better quality sleep.

Academic outcomes

Academic outcomes—including adolescents' grades, effortful control, school engagement, and school connectedness—were assessed at Waves 1, 2, and 3. Adolescents' grade point average (*GPA*) was measured on a scale ranging from 1 (*Excellent*) to 5 (*Very below average*). The average mean scores were reverse coded so that higher scores indicated better academic performance. *Effortful control* was measured using four items adopted from the Early Adolescent Temperament Questionnaire (Valiente et al., 2008; $\alpha_{W1} = .717$; $\alpha_{W2} = .758$; $\alpha_{W3} = .622$). A sample item is, "I am good at

self-discipline." *School engagement* was assessed using four items adopted from Hou et al.'s study (2018). A sample item is, "I am motivated to get good grades in school" (α_{W1} = .762; α_{W2} = .769; α_{W3} = .704). *School connectedness* was measured using five items from the National Longitudinal Study of Adolescent Health (Anderman, 2002; Loukas et al., 2009; α_{W1} = .822; α_{W2} = .815; α_{W3} = .788). A sample item is, "I feel like I am part of my school." Participants responded to all measures on a scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*), with higher mean scores indicating better academic outcomes. Previous studies have validated these scales for use with Mexican American adolescents (Kim et al., 2020; Yan et al., 2021).

Psychosocial health outcomes

Four aspects of adolescents' psychosocial health outcomes were included in the study: resilience, life meaning, anxiety, and depressive symptoms. Adolescents' *resilience* was measured using an adapted version of the Connor-Davidson Resilience Scale (Connor & Davidson, 2003). Three items were used, for example, "I tend to recover easily after an illness or hardship." Adolescents rated their experiences on a scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*), and higher mean scores reflected a greater sense of resilience (α = .644 at W1; α = .730 at W2; α = .773 at W3). Adolescents' perception of their *life meaning* was measured with three items adopted from the Meaning in Life Questionnaire (Steger et al., 2006). Examples of the included items are, "I understand my life's meaning" and "My life has a clear sense of purpose." Adolescents self-reported their sense of life meaning on a scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*), with higher mean scores indicating a greater sense of life meaning (α = .868 at W1; α = .900 at W2; α = .881 at W3). Adolescent *anxiety* was measured by four items adapted from prior studies (Reynolds & Richmond, 1997; Spitzer et al., 2006). The measure used had adolescents self-report how often they experienced the following: feeling nervous, worrying about what is going to happen, trouble relaxing, and becoming easily annoyed or irritable. Adolescents rated their experiences on a scale of 1 (*Not at all*) to 5 (*Nearly daily*), with higher mean scores reflecting greater levels of anxiety (α = .750 at W1; α = .822 at W2; α = .811 at W3). Adolescents' *depressive symptoms* were measured using the 20-item Center for Epidemiologic Studies of Depression Scale (Radloff, 1977) at Wave 1, 2, and 3. Across waves, the scale had adolescents self-report how often they experienced depressive symptoms by asking questions such as, "[I am] Bothered by things [I am] usually not bothered by." The rating of this scale ranges from 1 (*None of the time*) to 4 (*Most or all of the time*), and a higher mean score indicates more depressive symptoms (α = .833 at W1; α = .844 at W2; α = .866 at W3). Previous studies have validated these scales for use with Mexican American adolescents (Hou et al., 2018; Yan et al., 2021).

Cultural stressors

A latent variable of cultural stressors was examined using confirmatory factor analysis, based on four indicators assessed at Wave 1: non-specific discrimination, ethnic discrimination, foreigner stress, and cultural estrangement. Adolescents' experiences of *non-specific social discrimination* in any social identity domains (e.g., race/ethnicity, gender, sex orientation, age, religion, socioeconomic status) were measured with nine items from the Chronic Everyday discrimination scale (Kessler et al., 1999). An example item is, "I am called names or insulted." Adolescents self-reported their ratings of non-specific social discrimination on a scale of 1 (*Never*) to 4 (*Frequently*), with higher mean scores indicating higher levels of non-specific social discrimination (α = .882). Adolescents' perceptions of *racial/ethnic discrimination* were measured using nine adapted items, also from the Chronic Everyday Discrimination Scale (Kessler et al., 1999). Adolescents responded on a scale of 1 (*Never*) to 4 (*Frequently*) to items such as, "I am treated with less courtesy than other people because I am Mexican." Higher average scores on this measure indicate more experiences of racial discrimination (α = .830). Adolescents' perceptions of *foreigner stress* were measured using three items adapted from Kim et al. (2018), with items such as, "When people look at me, they see a foreigner." Adolescents self-reported their experiences of foreigner stress on a scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*), with higher mean scores indicating higher levels of experienced foreigner stress (α = .669). Adolescents' *sense of cultural estrangement* was measured with four items from the Cultural Estrangement Inventory (Cozzarelli & Karafa, 1998). An example is, "I feel as though most U.S. Americans do not understand me." Adolescents self-reported cultural estrangement on a scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*), with higher mean scores indicating more experiences of cultural estrangement (α = .853). These measures have been tested and validated for use with samples of adolescents from Mexican immigrant families (Hou et al., 2018).

Family obligation values

Adolescents' family obligation values were assessed using Fuligni et al.'s (1999) measure of familial obligation

at Wave 1. Individuals responded on a scale of 1 (*Not at all important*) to 5 (*Very important*) to 13 items gauging their attitudes and values towards their families. A sample item is, "How important is it to you that you treat your parents with respect?". Higher mean scores on this measure indicate a higher degree of family obligation ($\alpha = .879$). This scale has been validated for use with Mexican American adolescents in a prior study (Yan et al., 2021).

Covariates

Adolescent age, gender (female vs. male), nativity status (Mexico- vs. U.S.-born), and mother's highest level of education were included as covariates in the current study. The covariates were centered by subtracting their mean values.

Analytic strategy

The analyses for the current study were conducted in four steps in Mplus 8.3, and all missing data were handled by full information maximum likelihood (Muthén & Muthén, 2017). First, latent profile analyses were conducted to identify Mexican-origin adolescent adjustment profiles at Waves 1, 2, and 3, separately, using 10 indicators of adjustment (i.e., physical functioning, sleep quality, school connectedness, school engagement, GPA, resilience, life meaning, effortful control, anxiety, and depressive symptoms). At each wave, five LPA models (i.e., 1 to 5 classes) were conducted and compared based on model fit indices (e.g., AIC, BIC, adjusted BIC, and Lo-Mendell-Rubin Adjusted Test *p* value; Nylund et al., 2007), and conceptual meanings of profiles to determine the optimal latent class solution at each wave. Second, building on the LPA results, latent transition analysis (LTA) was used to identify the stable/change profiles of adolescents' adjustment across the three waves. The LTA profile membership results were outputted and meaningful groups with similar transition patterns were grouped together due to the small sample size of some groups. Third, multinominal logistic regression was used to examine the link between cultural stressors and family obligation at Wave 1 to adolescents' adjustment profiles at Wave 1 and Wave 3 (i.e., LPA profiles), as well as their stable/change profiles across the three waves (i.e., LTA profiles), respectively. Fourth, the moderating role of family obligation in the Step 3 models was explored. The interaction term was specifically created using the "XWITH" command in Mplus, as demonstrated by the syntax "int | family obligation XWITH cultural stress." To compare each pair of profiles with regard to the influence of cultural stressors on adolescent adjustment, reference profiles were rotated in each multinomial regression model. The detailed analytic strategy is included in Table S3.

RESULTS

Descriptive information and correlations

The correlations and descriptive information of study variables are shown in Table S4. Overall, the indicators of cultural stressors at Wave 1 were significantly related to lower levels of physical health and poorer psychosocial health for Mexican-origin adolescents at each wave. Cultural stressors at Wave 1 were significantly related to poorer academic outcomes at Waves 1 and 2.

Latent profile analysis: Mexican-origin adolescent adjustment profiles

After a holistic evaluation of the meanings of each adolescent adjustment profile and the AIC, BIC, adjusted BIC, Lo-Mendell-Ruben Adjusted Test *p* value, and the distribution of each profile solution, shown in Table 1, the 3-profile solution was determined to be the optimal solution for Mexican-origin adolescents at Waves 1 and 2. The three adjustment profiles that emerged were the *Well-adjusted* (19% at Wave 1 and 29% at Wave 2), *Moderate* (60% at Wave 1 and 50% at Wave 2), and *Poorly-adjusted* (21% at Wave 1 and 12% at Wave 2) (Figure 2; Figure S1). At Wave 3, the 2-profile solution was determined to be optimal (the *Well-adjusted*: 82%; the *Poorly-adjusted*: 18%) (Figure 2; Figure S1).

The mean values and standard deviations of all indicators in each emerged profile at Waves 1, 2, and 3 are reported in Table S5. In general, adolescents in the *Well-adjusted* group exhibited the best adjustment, followed by those in the *Moderate* group, whereas the *Poorly-adjusted* group showed the worst adjustment. The *Well-adjusted* group at Waves 1 and 2 scored the best on all adjustment indicators overall. In comparison to the *Well-adjusted* group, the *Moderate* group at Wave 1 scored worse on all aspects of adjustment, except physical functioning. At Wave 2, the *Moderate* group scored worse than the *Well-adjusted* group on all aspects of adjustment. Compared to the *Well-adjusted* group, the *Poorly-adjusted* group at Wave 1 and Wave 2 scored worse on all aspects of adjustment. In comparison to the *Moderate* group, the *Poorly-adjusted* group scored worse on all aspects of adjustment across Waves 1 and 2, except for school connectedness and school engagement at Wave 2. At Wave 3, the two adjustment profiles that emerged were the *Well-adjusted* (82%) and *Poorly-adjusted* (18%). The *Well-adjusted* group scored

TABLE 1 Model fit indices for latent profile analysis of adolescent adjustment at each wave.

	AIC	BIC	Adjusted-BIC	Entropy	LMRT *p* value	Distribution
Adjustment W1 (N=604)						
1 profile	12,208.2	12296.3	12232.8			
2 profile	11,412.1	11548.6	11450.2	0.738	.023	40% 60%
3 profile	**11,055.4**	**11240.3**	**1107.0**	**0.813**	**.017**	**21% 60% 19%**
4 profile	10,844.8	11078.2	10909.9	0.837	.477	17% 9% 19% 55%
5 profile	10,681.4	10963.2	10,760	0.866	.152	21% 1% 52% 18% 8%
Adjustment W2 (N=483)						
1 profile	9795.8	9879.4	9815.9			
2 profile	9156.1	9285.7	9187.3	0.744	.031	43% 57%
3 profile	**8877.4**	**9052.9**	**8919.6**	**0.817**	**.019**	**12% 50% 29%**
4 profile	8751	8972.5	8804.3	0.856	.101	2% 13% 57% 28%
5 profile	8653.1	8920.6	8717.5	0.823	.821	5% 23% 2% 21% 49%
Adjustment W3 (N=334)						
1 profile	6361.8	6438	6374.5			
2 profile	**5987.6**	**6105.8**	**6007.4**	**0.897**	**.017**	**18% 82%**
3 profile	5867.5	6027.5	5894.3	0.891	.333	2% 72% 25%
4 profile	5763.1	5965.1	5797.0	0.817	.186	20% 2% 58% 19%
5 profile	5697.0	5940.9	5737.9	0.855	.370	3% 19% 57% 19% 2%

Note: The optimal solution is bolded.

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; LMRT, Lo-Mendell-Ruben Test.

better than the *Poorly-adjusted* group on all aspects of adjustment except GPA.

Latent transition analysis: Stability and change in adolescent adjustment profiles

Based on the across-wave change patterns of adolescent adjustment, the latent transition profiles were grouped into three meaningful stable/change profiles (i.e., *Stable well-adjusted*, *Overall poorly-adjusted*, and *Improved*), as reported in Table 2. Participants in the Stable well-adjusted group remained in the *Well-adjusted* group across all three waves (17%), whereas participants in the *Overall poorly-adjusted* group (16%) either remained in the *Poorly-adjusted group* across three waves or transitioned between the *Poorly-adjusted* and *Moderate* groups between Waves 1 and 2, ultimately ending in the *Poorly-adjusted* by Wave 3. Individuals who transitioned from a worse adjustment profile to a better adjustment profile from Wave 1 to Wave 3 were clustered into a single *Improved* group (62%). For example, the *Improved* group included individuals who began in the *Poorly-adjusted* group at Wave 1, changed to the *Moderate* group at Wave 2, and then transitioned to the *Well-adjusted* group at Wave 3. A small portion of participants who did not show a clear stable or change pattern were excluded from further comparisons (N=14; 4%), resulting in a final sample size of 320 individuals.

Measurement model of cultural stress

The measurement model for cultural stress had good model fit ($\chi^2(1)=0.242$, $p=.623$, RMSEA=0.001. 90% CI=[0.000, 0.085], CFI=1.000). The factor loadings of the latent variable, cultural stress, were 0.709, 0.931, 0.370, and 0.452, as estimated from non-specific social discrimination, ethnic discrimination, foreigner stress, and cultural estrangement, respectively.

The Main effects of cultural stress and family obligation on adjustment profiles

Latent profiles at waves 1 and 3 as outcomes

Overall, the multinominal logistic regression analyses revealed that early-adolescent cultural stress functioned as a risk factor and early-adolescent family obligation served as a protective factor in the development of adjustment profiles at Wave 1 and Wave 3 (see the results in Table 3; Tables S6 and S7). In terms of adjustment profiles at Wave 1, more experiences of cultural stressors at Wave 1 were associated with a greater likelihood of being in the *Poorly-adjusted* profile (b=5.683, SE=1.047, p<.001, OR=293.830) or the *Moderate* profile (b=3.388, SE=0.873, p<.001, OR=29.607), compared to being in the *Well-adjusted* profile (Model 1 in Table 3). More experiences of cultural stressors at Wave 1 were associated with a greater likelihood of *Poorly-adjusted* profile membership (b=2.295,

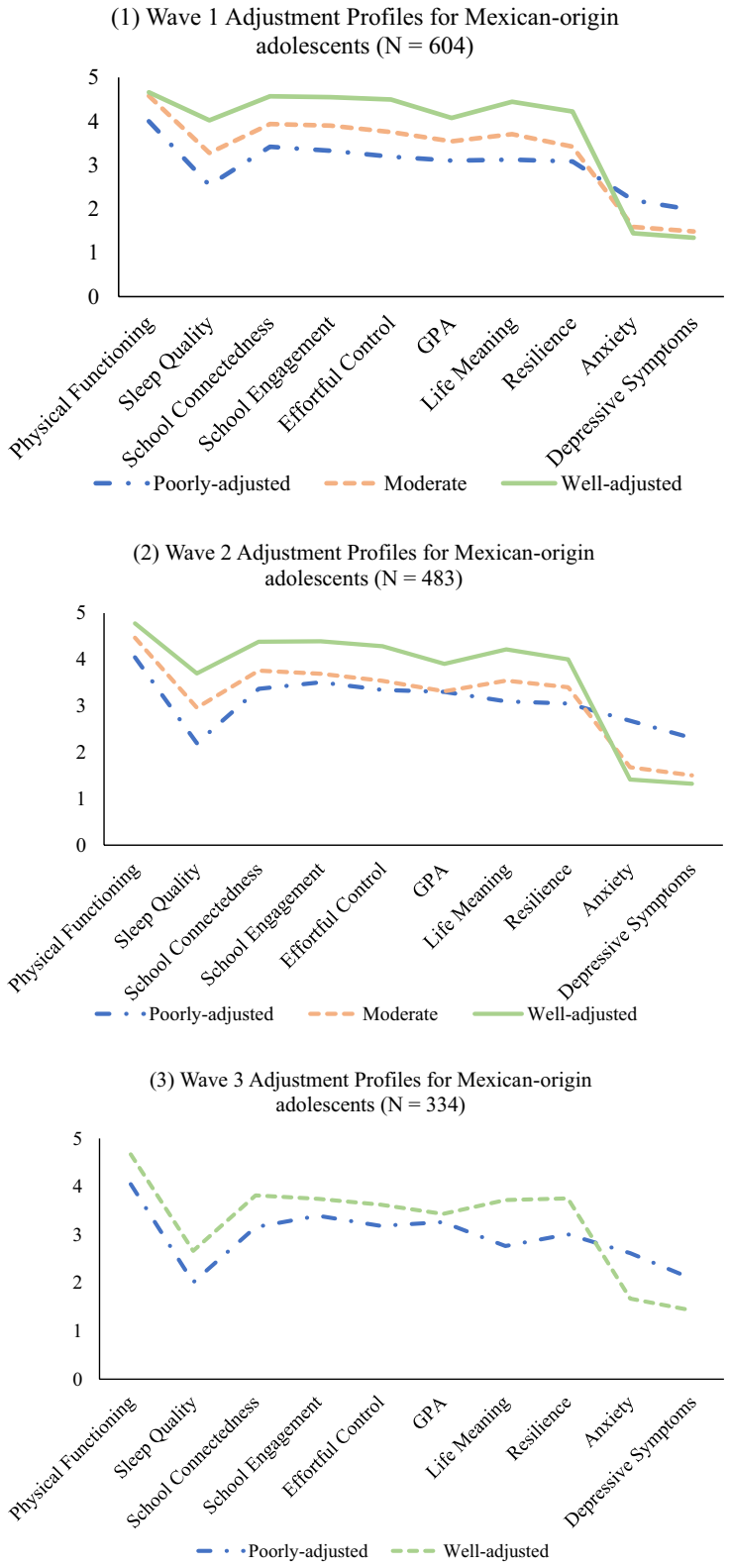

FIGURE 2 Adjustment profiles among Mexican-origin adolescents at three waves.

SE=0.491, $p<.001$, OR=9.924), compared to being in the *Moderate* group (Model 1 in Table S6). In predicting Wave 3 adjustment profiles, more experiences of cultural stressors at Wave 1 were associated with a greater likelihood of being in the *Poorly-adjusted* profile ($b=1.252$, SE=0.423, $p=.003$, OR=3.497) than the *Well-adjusted* profile at Wave 3 (Model 1 in Table S7).

In terms of family obligation values, the results showed that adolescents who had a stronger sense of family obligation at Wave 1 were less likely to be

TABLE 2 Stability and change in adolescent adjustment profiles across waves 1, 2 and 3.

Change profiles of adolescent adjustment (wave 1-wave 2-wave 3)	*N*	%
Stable well-adjusted (*N* = 57, 17%)		
Well-well-well	57	17%
Overall poorly-adjusted (*N* = 54, 16%)		
Poor-poor-poor	20	6%
Poor-moderate-poor	10	3%
Moderate-poor-poor	8	2%
Moderate–moderate-poor	16	5%
Improved (*N* = 209, 62%)		
Poor-poor-well	6	2%
Poor-moderate-well	28	8%
Moderate–moderate-well	131	39%
Moderate-well-well	44	13%
Dropped participants (*N* = 14, 4%)		
Moderate-well-poor	2	—
Moderate-poor-well	5	1%
Well-well-poor	2	—
Well-moderate-well	3	—
Well-moderate-poor	1	—
Well-poor-well	1	—

Note: The adjustment profiles at each wave were presented in sequential order (e.g., the notation "poor-moderate-well" indicates that participants were initially identified in the Poor adjustment profile at Wave 1, transitioned to the *Moderate* profile at Wave 2, and then transitioned to the *Well adjustment* profile at Wave 3). Participants who showed unclear transition patterns were excluded, resulting in a final sample size of 334 for the stable/change profiles. For example, two individuals began in the *Moderate* group at Wave 1, changed to the Well-adjusted group at Wave 2, and then transitioned to the Poorly-adjusted group at Wave 3. Dashes indicate percentages lower than 1%. AIC = 17,594.630, Adjusted BIC = 17,620.832, Entropy = 0.846.

in the *Poorly-adjusted* ($b = -3.681$, SE = 0.473, $p < .001$, OR = 0.025) or *Moderate* profile ($b = -2.273$, SE = 0.424, $p < .001$, OR = 0.103), compared to being in the *Well-adjusted* profile (Model 1 in Table 3), and less likely to be in the *Poorly-adjusted* profile than the *Moderate* profile ($b = -1.407$, SE = 0.217, $p < .001$, OR = 0.245; Model 1 in Table S6). Family obligation reported at Wave 1 was not associated with adjustment profile membership at Wave 3.

Latent transition profiles as outcomes

In general, the results of multinomial logistic regression analyses indicated that early-adolescent cultural stress had adverse effects, whereas early-adolescent family obligation played a beneficial role in the change of adjustment profiles across the three waves (see the results in Table 4; Table S8). Specifically, more experiences of cultural stressors at Wave 1 predicted a greater likelihood of being in the *Overall poorly-adjusted* profile compared to the *Stable well-adjusted* profile ($b = 5.128$, SE = 1.374, $p < .001$, OR = 168.679; Model 1 in Table 4) or the *Improved* profile ($b = 1.228$, SE = 0.447, $p = .006$, OR = 3.414; Model 1 in Table S8) across waves. In addition, more experiences of cultural stressors at Wave 1 predicted a lower likelihood of being in the *Stable well-adjusted* profile compared to the *Improved* profile ($b = 3.901$, SE = 1.284, $p = .002$, OR = 49.452; Model 1 in Table) across waves.

Regarding family obligation, adolescents who reported higher levels of family obligation at Wave 1 were less likely to be grouped in the *Overall poorly-adjusted* ($b = -3.405$, SE = 0.679, $p < .001$, OR = 0.033) or *Improved* profile ($b = -3.117$, SE = 0.611, $p < .001$, OR = 0.044) compared to the *Stable well-adjusted* profile across waves (Model 1 in Table 4).

The moderating role of family obligation values

The interaction between cultural stressors and family obligation at Wave 1 was not significant for either Wave 1 or Wave 3 adjustment profiles. In terms of the transition profiles, interaction between cultural stressors and family obligation at Wave 1 was significant for being in the *Stable well-adjusted* group versus the *Overall poorly-adjusted* group ($b = -9.685$, SE = 3.809, $p = .011$), and for being in the *Stable well-adjusted* group versus the *Improved* group ($b = -9.936$, SE = 3.727, $p = .008$) (Model 2 in Table 4). As shown in Figure 3a, the positive association between cultural stressors at Wave 1 and the likelihood of being in the *Overall poorly-adjusted group* compared to the *Stable well-adjusted* group was stronger for adolescents who reported low levels of family obligation at Wave 1 ($b = 12.761$, SE = 3.832, $p = .001$) than for adolescents who reported high levels of family obligation at Wave 1 ($b = 5.119$, SE = 2.480, $p = .039$). Similarly, as presented in Figure 3b, higher levels of cultural stressors at Wave 1 were related to a lower likelihood of being in the *Stable well-adjusted* group than the *Improved* group, and this association was stronger among adolescents who reported low levels of family obligation at Wave 1 ($b = 15.704$, SE = 5.835, $p = .007$), compared to adolescents who reported high levels of family obligation at Wave 1 ($b = 2.321$, SE = 1.108, $p = .036$). Overall, these findings suggest that adolescents' sense of family obligation values may be more effective at buffering the negative effects of cultural stress on the *Stable well-adjusted* (versus the *Poorly-adjusted* and *Improved* groups). Despite experiencing cultural stress during early adolescence, adolescents with higher levels of family obligation were more likely to be identified in the *Stable well-adjusted* profile (versus the *Poorly-adjusted* and *Improved* groups) throughout their adolescence.

DISCUSSION

Drawing upon the integrative risk and resilience theory, the present study (1) identified which Mexican-origin

TABLE 3 Multinomial regression from cultural stressors and family obligation to adolescent adjustment profiles at wave 1 (reference is the Well-adjusted group).

	Model 1				Model 2		
Variables	**Coefficient**	**SE**	***p***	**Odds ratio**	**Coefficient**	**SE**	***p***
Outcome: Poorly-adjusted profile							
Cultural Stressors	5.683	1.047	<.001	293.830	6.134	1.290	<.001
Family Obligation	−3.681	0.473	<.001	0.025	−3.806	0.763	<.001
Cultural Stressors × Family Obligation	—	—	—	—	1.307	2.463	.596
Adolescent Age	0.159	0.191	.405	1.172	0.167	0.195	.392
Adolescent Gender (0 = Male, 1 = Female)	1.188	0.365	.001	3.281	1.220	0.362	.001
Nativity (0 = U.S., 1 = Mexico)	−0.130	0.405	.747	0.878	−0.134	0.408	.743
Mother's Level of Education	0.144	0.074	.051	1.155	0.145	0.076	.055
Outcome: Moderate profile							
Cultural Stressors	3.388	0.873	<.001	29.607	3.386	1.184	.004
Family Obligation	−2.273	0.424	<.001	0.103	−2.205	0.726	.002
Cultural Stressors × Family Obligation	—	—	—	—	0.189	2.411	.937
Adolescent Age	−0.048	0.138	.727	0.953	0.167	0.195	.392
Adolescent Gender (0 = Male, 1 = Female)	0.308	0.271	.256	1.361	1.220	0.362	.001
Nativity (0 = U.S., 1 = Mexico)	−0.205	0.308	.506	0.815	−0.134	0.408	.743
Mother's Level of Education	0.069	0.058	.236	1.071	0.145	0.076	.055

Note: Unstandardized coefficients were reported for the multinomial regression model. The Well-adjusted group is the reference group ($N = 604$).

TABLE 4 Multinomial regression from cultural stressors and family obligation to adolescent stable/change adjustment profiles (reference is the Stable well-adjusted group).

	Model 1				Model 2		
Variables	**Coefficient**	**SE**	***p***	**Odds ratio**	**Coefficient**	**SE**	***p***
Outcome: Overall poorly-adjusted profile							
Cultural Stressors	5.128	1.374	<.001	168.679	9.501	2.720	<.001
Family Obligation	−3.405	0.679	<.001	0.033	−6.778	1.711	<.001
Cultural Stressors × Family Obligation	—	—	—	—	−9.685	3.809	.011
Adolescent Age	−0.032	0.256	.901	0.969	−0.038	0.273	.888
Adolescent Gender (0 = Male, 1 = Female)	1.261	0.497	.011	3.529	1.300	0.527	.014
Nativity (0 = U.S., 1 = Mexico)	−0.679	0.588	.248	0.507	−0.704	0.617	.254
Mother's Level of Education	0.040	0.104	.700	1.041	−0.009	0.115	.940
Outcome: Improved profile							
Cultural Stressors	3.901	1.284	.002	49.452	8.322	2.661	.002
Family Obligation	−3.117	0.611	<.001	0.044	−6.438	1.651	<.001
Cultural Stressors × Family Obligation	—	—	—	—	−9.936	3.727	.008
Adolescent Age	−0.119	0.212	.577	0.888	−0.121	0.230	.597
Adolescent Gender (0 = Male, 1 = Female)	0.096	0.394	.808	1.101	0.153	0.422	.717
Nativity (0 = U.S., 1 = Mexico)	−0.460	0.438	.293	0.631	−0.489	0.463	.291
Mother's Level of Education	−0.071	0.084	.395	0.931	−0.115	0.094	.222

Note: Unstandardized coefficients were reported for the multinomial regression model. The *Stable well-adjusted* profile is the reference group ($N = 320$).

adolescents were at risk of maladjustment at each wave; (2) captured the longitudinal transitions of adolescent adjustment profiles encompassing physical health, academic outcomes, and psychosocial health collectively, from early to late adolescence; (3) explored the concurrent and prospective influence of cultural stress experienced in early adolescence on Mexican-origin adolescents' adjustment profiles at specific timepoints, and on their longitudinal stability and variability over time; and (4) investigated how family obligation can

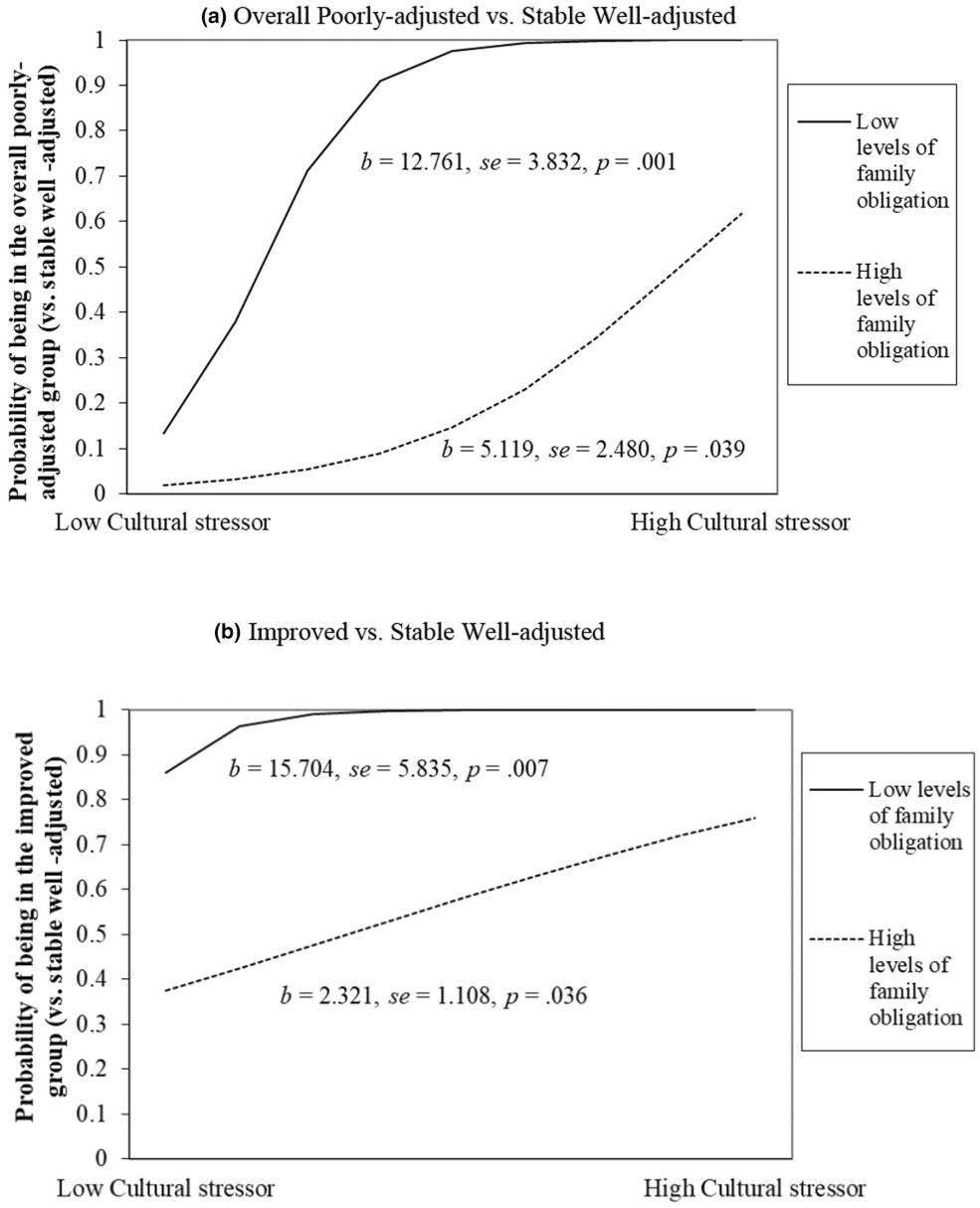

FIGURE 3 The association between cultural stress and stable/change profiles for adolescents with high versus low levels of family obligation values. The upper figure (a) represents the moderating role of family obligation values in the link between cultural stress and the *Overall poorly-adjusted* profile (reference group=the *Stable well-adjusted* profile). The bottom figure (b) represents the moderating effect of family obligation values in the association between cultural stress and the *Improved* profile (reference group=the *Stable well-adjusted* profile).

play a protective role in the association between cultural stressors and adolescent adjustment profiles throughout adolescence. The findings of the current study make notable contributions to the existing literature in four key ways. First, they shed light on distinct adjustment profiles that emerge at specific timepoints and span multiple domains of adjustment, providing a deeper understanding of the heterogeneity of Mexican-origin adolescents' adjustment. Second, they unveil the developmental trajectories of adjustment profiles, contributing to a nuanced understanding of the dynamic developmental pathways of adjustment from early to late adolescence. Third, the current findings reveal the negative impacts of cultural stress experienced at early adolescence on the developmental pathways leading to adolescent maladjustment. Last, they highlight family obligation as a cultural resilience factor that may buffer the negative impacts of cultural stress in youth adjustment trajectories. The study's investigation of cultural stress and family obligation may provide valuable insights for interventions and preventions, emphasizing the importance of incorporating culturally-relevant factors to foster positive adjustment among Mexican-origin adolescents throughout the full course of adolescence.

As expected, we identified three subgroups of adolescents characterized by distinct levels of physical, academic, and psychosocial adjustment at each wave, ranging from overall disadvantaged adjustment (i.e., the

Poorly-adjusted) to more favorable adjustment overall (i.e., *Well-adjusted*). The *Moderate* profile, the third profile, was characterized by average adjustment, which was more favorable than that exhibited by the *Poorly-adjusted* group but less favorable than the Well-adjusted group. Notably, the *Moderate* profile emerged only during earlier adolescence (Wave 1 and Wave 2) and did not persist into later adolescence (Wave 3). The instability of the *Moderate* profile could explain its disappearance in Wave 3. Previous studies have shown that the *Moderate* profile is relatively unstable, with most adolescents transitioning over time from the Moderate profile to other profiles (Wang et al., 2021). The shift from a 3-profile to a 2-profile solution in youth adjustment could be due to the distinct developmental stages from early to late adolescence. In the early stages of adolescence (e.g., Wave 1 and 2), youth start navigating identity exploration and facing challenges related to cognitive and pubertal development (National Academies of Sciences, Engineering, and Medicine, et al., 2019), leading to a more transient, moderate adjustment profile. By late adolescence (e.g., Wave 3), there's a trend towards stability in their developmental status. This period is marked by a consolidation of identity, resulting in more distinct and stable adjustment patterns (Bogaerts et al., 2021). The diminishing of the *Moderate* profile may reflect this transition, with individuals moving towards either more positive or more negative adjustment profiles in late adolescence.

The identification of the *Well-adjusted*, *Moderate*, and *Poorly-adjusted* profiles is in accordance with previous studies, which found *Good adjustment*, *Moderate*, and *Maladjustment* profiles (Kim et al., 2015; Wang et al., 2021). In contrast to previous research, which has unveiled ambivalence in adjustment profiles, such as the "Paradox profile"—which captures the unique experience of Asian Americans, who are often characterized by high academic achievement coupled with high levels of psychological distress (Hsin & Xie, 2014; Kim et al., 2015)—the current study recognized only relatively low, moderate, and high levels of adjustment. Thus, the findings of this study may reflect inherent characteristics of the Mexican-origin adolescents sampled, as evidenced by the clear distinctions in their profiles.

Additionally, our findings suggest that the various dimensions of adjustment in these adolescents tend to change in tandem over the course of adolescence. This is to say, adjustment indicators across different domains are likely interconnected, and adjustment as a whole may shift from early to late adolescence. For example, our findings show that favorable outcomes in physical health, academics, or psychosocial health also correspond to favorable outcomes in the other two realms of adjustment among Mexican-origin adolescents. High physical functioning corresponded to high school connectedness and low levels of depressive symptoms in the *Well-adjusted* profile at Wave 1, demonstrating favorable adjustment across all three domains, simultaneously. Indeed, the correlations at each wave between these indicators across adjustment domains further substantiate the interconnectedness of these adjustment indices (Table S3). An exception to this pattern was adolescents' sleep quality, which was relatively low in all waves, regardless of profile classification. Ultimately, these findings reaffirm how the seemingly separate domains of physical health, academic, and psychosocial adjustment are interconnected; they also suggest that sleep quality as an indicator of Mexican-origin adolescent adjustment should be further investigated (Ross et al., 2020).

The findings of the present study highlight the importance of taking a person-centered approach to explore the heterogeneity of Mexican-origin adolescents, by simultaneously considering physical health, academic outcomes, and psychosocial health. Although our findings might initially appear consistent with a variable-centered approach (i.e., poor, moderate, and well-adjustment), they offer valuable insights into the developmental patterns of adolescents by considering various multidimensional adjustment indicators simultaneously. These insights imply that comprehensive interventions targeting multiple domains could be necessary for Mexican-origin adolescents. Specifically, the current findings emphasize the crucial need to prioritize interventions for adolescents who are identified as exhibiting a *Poorly-adjusted* profile from early to late adolescence. These adolescents may require special attention, relative to those in other profiles, due to their heightened vulnerability and the challenges they may face in their adjustment development. To build upon our understanding, future research should consider more diverse samples and include additional indicators of adjustment, such as delinquent behaviors or substance use. Such an approach could reveal more nuanced subgroup profiles and enhance our grasp of the developmental heterogeneity among Mexican-origin adolescents over time.

Additionally, more experiences of cultural stressors in early adolescence acted as a risk factor, not only for adolescents' adjustment patterns concurrently and prospectively, but also for stability and change in adolescents' adjustment patterns over the course of adolescence. A stronger sense of family obligation may function as a culturally resilient factor, buffering the negative effects of cultural stress on youth adjustment over time. Interventions aimed at promoting Mexican-origin adolescents' adjustment by enhancing their sense of family obligation should focus on guiding adolescents to cope more effectively with cultural stressors.

Given that adolescence is a dynamic period of change and development, identifying patterns of transition in adjustment profiles over the course of adolescence is crucial to the development of adjustment-promoting interventions (Wang et al., 2021; Zaky, 2016). This study identified three stable/change adjustment profiles (*Stable well-adjusted*, *Overall poorly-adjusted*, and *Improved*) from Wave 1 to Wave 3. As we hypothesized,

some adolescents remained stable in their adjustment profile over time, either remaining well-adjusted over time (the *Stable well-adjusted* profile) or staying relatively maladjusted over time (the *Overall poorly-adjusted* profile). However, unlike our hypothesis proposing that the majority of adolescents would remain stable in their adjustment profile, only 33% of adolescents did so. Instead, 62% of adolescents belonged to the Improved adjustment profile, having transitioned to the Well-adjusted profile from a profile with worse adjustment from early to late adolescence, suggesting that adjustment is subject to change during adolescence. These results contradict findings from previous studies of adolescent adjustment, which documented relatively stable adjustment transition patterns for the most part (Kim et al., 2015; Wang et al., 2021). However, as different populations and indicators of adjustment were investigated to produce previous results (Kim et al., 2015; Wang et al., 2021), the difference in findings should be further investigated.

Regardless, our results are uplifting given that they suggest that Mexican-origin adolescents can improve their adjustment over the course of adolescence, which would presumably benefit their outcomes in adulthood. Furthermore, although previous studies found relative stability to prevail over changes in adjustment, some changes in profile membership were still observed, such as improving from poor adjustment to moderate adjustment, which supports our findings (Kim et al., 2015; Wang et al., 2021) and demonstrates plasticity or adaptability to one's circumstances in adolescents' potential to improve their adjustment over time. Previous research posits the critical role of plasticity in shaping development across adolescence as the brain attempts to learn by responding to stimuli in an adaptable, rather than unchanging manner (Fandakova & Hartley, 2020). The current findings complement the assertion that adolescence is a dynamic process (Ross et al., 2020) by revealing that many participants underwent transitions in their adjustment profiles, underscoring the dynamic nature of developmental processes across different stages of adolescence. By examining these profiles through a developmental lens, we gain insights into how Mexican-origin adolescents navigate and adapt to various life challenges and transitions. Future research is encouraged to investigate further the mechanisms underlying adolescents' transitions, particularly those cases in which there is a change from a profile of worse to better adjustment.

Echoing the integrative risk and resilience model, the findings of this study suggest that cultural stress (i.e., non-specific discrimination, ethnic discrimination, foreigner stress, and cultural estrangement) may negatively shape adjustment patterns among Mexican-origin adolescents over the course of adolescence (Suárez-Orozco et al., 2018). That is, experiencing cultural stressors in early adolescence was found to be associated with belonging to the *Well-adjusted* (Wave 1 and 3), *Moderate* (Wave 1), and *Poorly-adjusted* (Wave 1 and 3) profiles, in an ascending order of increasing likelihood. These findings are also consistent with prior research (e.g., Corona et al., 2017; White et al., 2015), which found that Mexican-origin individuals who experience more cultural stressors report more negative adjustment outcomes. Regarding their transitions in overall adjustment from early to late adolescence, those experiencing more cultural stressors in early adolescence were more likely to be identified in the *Overall poorly-adjusted* profile, followed by the *Improved,* and finally the *Stable well-adjusted* transitional profiles. Overall, our findings affirm our hypotheses that experiencing more cultural stressors would be associated with worse adjustment, concurrently, prospectively, and over the course of adolescence, reflecting how risks to Mexican-origin adolescent adjustment exist within the additional acculturative tasks they have to undertake beyond the normative developmental tasks of adolescence (Suárez-Orozco et al., 2018). Although adolescents who experienced more cultural stressors were more likely to be classified in the *Poorly-adjusted* or *Moderate* groups than the Well-adjusted group during early adolescence, not all of these adolescents were subject to remaining less well adjusted (i.e., *Overall poorly-adjusted*) throughout adolescence. Of the adolescents who started off with disadvantaged adjustment, those who experienced relatively less cultural stress were able to improve over time and transition to a better-adjusted profile (i.e., *Improved*). Our findings suggest that adjustment-promoting interventions should be developed for Mexican-origin adolescents, specifically for those identified in the *Moderate* and *Poorly-adjusted* groups during early adolescence, with the goal of helping more adolescents to improve in adjustment.

In addition to the significant main effects of cultural stressors on adolescent adjustment, our study sheds light on the resilient role of family obligation values in this relationship. Adolescents with high levels of family obligation (vs. low levels of family obligation) in early adolescence were more likely to remain in the *Stable well-adjusted* profile (i.e., high levels of academic, psychosocial, and physical adjustment) across adolescence even when they experienced cultural stressors. Indeed, adolescents who have a sense of family obligation in early adolescence may have strong feelings of belonging and support from their families, which can help individuals feel connected and cared for when they experience stressors (Kiang et al., 2013), and which are pivotal for maintaining well-being throughout adolescence. The stability of the *Well-adjusted* profile despite cultural stressors highlights how family dynamics (e.g., family obligation values), deeply rooted in cultural contexts, can significantly influence the trajectory of adolescent development in the developmental process.

For this reason, these adolescents will be more culturally resilient in the face of cultural stressors and thus may experience a lower risk of academic, psychosocial,

and physical maladjustment over time. Such findings enrich the theoretical framework of the integrative risk and resilience model (Suárez-Orozco et al., 2018), revealing that the sense of family obligation in early adolescence may play a protective role in buffering the negative impact of cultural stressors on adolescent adjustment over the course of adolescence. Furthermore, considering that the growing desire for autonomy and individuation from the family may affect adolescents' sense of family obligation (Stein et al., 2014; Updegraff et al., 2012), it is plausible that changes in adolescents' view of family obligation could subsequently influence their adjustment profiles from early to late adolescence. This potential association warrants further investigation. Given this beneficial effect of endorsing family obligation values, it is possible to develop culturally sensitive interventions to promote cultural resilience among Mexican-origin adolescents by enhancing their sense of family obligation. The aim of such programs would be to help Mexican-origin adolescents better navigate the challenges of cultural stressors, stay in the *Well-adjusted* or change to the *Improved* profile, and thrive over time. Additionally, although cultural interventions may promote coping and help reduce the risk of being maladjusted among Mexican-origin adolescents, addressing potential cultural stressors (e.g., systematic racism or discrimination) in the acculturation process and adopting policies to promote a healthy and safe environment for immigrant-origin youth are also of paramount importance (Suárez-Orozco et al., 2018).

Several limitations of the current study are worth noting. First, some profiles of adjustment and stable/change profiles of adjustment had a small number of participants. Future studies with larger samples may better capture the subgroups of adjustment and stable/change adjustment exhibited by the Mexican-origin adolescent population, and thus may be able to provide a more complete understanding of Mexican-origin adolescent adjustment. Second, all of our participants were recruited from central Texas. In other parts of the United States, there are Mexican-origin adolescents who may have distinct subcultures and practices. Hence, future studies should include Mexican-origin samples from different states in the United States to examine whether and how regional differences contribute to Mexican-origin adolescent adjustment profiles concurrently and over time. Third, although our study identified three distinct profiles (the *Well-adjusted*, *Moderate*, and *Poorly-adjusted* groups), it did not capture adolescents with actual low scores due to the limited sample size. Future research should sample a more diverse group of adolescents and replicate this analysis to see if our findings are applicable to broader populations. Finally, although our study used a latent variable approach to conceptualize cultural stress, it is important to acknowledge that this method does not dissect the distinct effects of each cultural stress indicator (Meca et al., 2019). Future research is encouraged to investigate the specific influences of individual cultural stressors on the adjustment patterns of Mexican-origin adolescents over time.

CONCLUSION

Considering the challenges encountered by Mexican-origin adolescents in their adjustment in the domains of physical health, academics, and psychosocial health, this study sought to identify which Mexican-origin adolescents were at risk for maladjustment, track how their adjustment changed across adolescence, and investigate the influences of cultural stressors and family obligation values on their adjustment profiles over time. The identification of distinct adjustment patterns among Mexican-origin adolescents highlights the necessity of adopting a person-centered approach to comprehensively explore the heterogeneity of Mexican-origin adolescents' overall adjustment across interconnected dimensions from early to late adolescence. Furthermore, experiencing cultural stressors during early adolescence was associated with a greater chance of remaining relatively poorly adjusted over the course of adolescence. However, despite encountering cultural stressors during early adolescence, adolescents demonstrated the potential to improve from a relatively unfavorable to a better adjustment profile, or even the ability to maintain good adjustment throughout adolescence. Additionally, adolescents' sense of family obligation may function as a protective factor that mitigated the negative impact of cultural stressors on their adjustment profiles across time. In general, our findings suggest that adolescence is a dynamic developmental period that allows adolescents the opportunity to transition to better profiles of adjustment. To promote better adjustment among Mexican-origin adolescents, particularly in the face of cultural risks such as cultural stressors, interventions aimed at fostering cultural resilience—such as by strengthening the sense of family obligation to cope with these stressors—may prove to be particularly effective.

AUTHOR CONTRIBUTIONS

JY conceptualized the study, participated in conducting statistical analyses, and drafted the manuscript. WW participated in conducting statistical analysis and participating in drafting the results section. JS participated in conducting statistical analyses, and drafted the manuscript and provided a critical review of the manuscript. AL participated in drafting the manuscript. E.L.-B. drafted the manuscript and provided a critical review of the manuscript and great insights on drafting the manuscript. YS provided a critical review of the manuscript. MZ participated in conducting statistical analyses and provided a critical review of the manuscript. SYK created the design of the larger project and was responsible for data collection and curation, project management, and supervision of the current research.

She also participated in the conceptualization of the current study and interpretation of the results and provided critical reviews of the manuscript. All authors contributed to the review of the manuscript and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

DATA AVAILABILITY STATEMENT

The data necessary to reproduce the analyses presented here are not publicly accessible. The analytic code necessary to reproduce the analyses presented in this paper is not publicly accessible. Materials are available from the first author.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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