Title

U.S. Mexican-Origin Young Adults' Mental Health Relative to Interpersonal Stressor Transitions From Childhood to Adolescence

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U.S. Mexican-origin young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence

--Manuscript Draft--

Manuscript Number:	CDP-2021-1111R1
Full Title:	U.S. Mexican-origin young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence
Abstract:	Objectives: This study sought to describe latent transitions in developmentally and culturally salient interpersonal stressors from late childhood to late adolescence and examine whether different transition patterns predicted early adult mental health problems. Methods : Data from four waves (grades 5, 7, 10, 12) of a study of 749 U.S. Mexican-origin youth were used for a latent transition analysis of family, peer, and community stressors; distal outcomes of externalizing and internalizing problems were measured five years after grade 12. Latent Class Analysis (LCA) and Latent Transition Analysis (LTA) were conducted for investigating underlying subgroups of interpersonal stress at each wave and transitions between subtypes over waves. Results: For the LCA, two latent classes emerged at all four waves, representing low and high interpersonal stress. The LTA model with two classes at all waves was conducted with good fit. Six prominent transition classes emerged and related to young adult internalizing and externalizing problems. Transition class related to young adult internalizing and externalizing problems, such that youth who consistently had exposure to interpersonal stress or who had transitions from low to high exposure had more internalizing and externalizing problems. Conclusions: Findings are discussed relative to the developmental salience of these transitions and opportunities to intervene during adolescence to mitigate later mental health problems.
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Dear Dr. Juang,

Thank you very much for your and the reviewers' feedback on our manuscript "U.S. Mexican young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence." We modified the title to "U.S. Mexican-origin young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence" so that the term of Mexican-origin youth is consistent throughout the manuscript. The comments were very thoughtful and addressing them has certainly enhanced the quality of the manuscript. Below we outline each issue raised by the reviewers and how these concerns were addressed in the revised manuscript. Changes to the manuscript are highlighted in grey color. We essentially shortened and streamlined the introduction and made room for additional text that addressed the comments. We have also added the short statement intended for the educated public regarding the importance of the findings (pg. 1-2).

Reviewer 1

1. *Authors reference Mexican-origin Latinx, U.S. Mexican and other Latinx, and U.S. Latinx and Mexican populations. There should be consistency in terminology used. Additionally, it would be helpful for authors to define Latinx to help orient the reader to the population of interest.*

> To stay within the word limit and be consistent in terminology, instead of defining Latinx, we have consistently used the term "U.S. Mexican-origin" (at first mention) and "Mexican-origin" youth, adolescents, or individuals throughout the manuscript.

2. *Were there specific hypotheses regarding the different typologies of stressors? Did authors expect that unique combinations of particular stressors might distinctly impact study outcomes?*

> We added a statement on pg. 7 that we did not have specific hypothesis about the typology of stressors or the patterns of transitions over time, although we expected to find that 1) at a given assessment point some adolescents were higher or lower on all four stressor types, whereas others experienced variability across stressors and 2) across assessments, some would experience stability in their exposure to stressors from late childhood to late adolescence, some would transition to lower stress context, and some would transition to higher stressor context. We were interested in whether the number of years exposed to interpersonal stressors as well as whether the timing of a transition into and out of interpersonal stress would impact later mental health. We employed latent class analysis (LCA) and latent transition analysis (LTA) to explore the typology and transition patterns.

3. *The introduction is missing the justification and hypotheses for demographic correlates and links to study variables. In particular, what is the role of youth's biological sex, country of birth, economic hardship, as well as parent gender and age on latent classes, transitions, and study outcomes?*

> We specify the reason for including demographic and family variables (e.g., child nativity, family income, parent education, household structure (one vs. two parents), economic hardship, family stress, parent depression, and neighborhood quality) as auxiliary variables for conducting multiple imputations for missing data used in the LCA and LTA analysis (pg. 11). Including these variables related to family participations in follow-up (i.e., W2-W4) assessments would facilitate the imputation accuracy stochastically. We removed the section

related to attrition analysis. Although we found that mother's nativity (i.e., born in America vs. born in Mexico) and family income related to the W6 assessment, we included these two variables and the rest of key demographic and family variables as auxiliary variables. The attrition analysis per se had no consequence in our main analysis (see Graham & Donaldson, 1993) and including this section in the results added confusion. However, we briefly mentioned in the discussion section that youth who dropped out of the W6 assessment were more likely to have mothers who were born in Mexico and have families with lower family income.

We expanded on the rationale on pg. 8 for including youth's biological sex, country of birth, economic hardship as control variables in studying the effects of interpersonal stress to internalizing and externalizing problems. Previous work has shown that studies have identified youth sex, nativity, and economic hardship as risk factors that related to interpersonal stress (Bascio et al., 2013; Bolger et al., 2008; Dinh et al., 2020) or behavioral problems for general or Mexican-origin youth (Gonzales et al., 2012; Zahn-Waxler et al., 2008; Zeiders et al. 2013). We thus controlled for these potential confounders for the association between interpersonal stress to internalizing and externalizing problems.

4. *The phrase on p. 4, "with subgroups more and less likely to exhibit..." is not clear.*

We removed this sentence for conciseness and clarity.

5. *How many latent classes were expected? Next, regarding LTA, authors expected 3 transitions (stability, high to low, low to high). Given the multiple timepoints in the data, did authors have expectations for multiple patterns of transitions in stressors (e.g., low, high, low, high), which might indicate instability or inconsistency in self-reported experiences? Has prior work found that instability or consistency in stressors impacts outcomes?*

As stated in our response in #2, we did not have specific hypotheses about the number of latent classes at each assessment and the patterns of transitions across assessments. However, originally, we expected at least two latent classes at each assessment (i.e., pg. 7 -- "we expected that there would be variability in exposure to family conflict, peer conflict, discrimination from peers, and language hassles, such that some adolescents may be higher or lower on all four stressor types, whereas others may experience variability across stressors"). In addition, although we expected that there would be at least two patterns of transition across assessments (i.e., pg. 7-8 "youth who remained in higher interpersonal stress profiles across late childhood to late adolescence … youth who remained in lower interpersonal stress profiles", we did not hypothesize the patterns of transitions of various interpersonal stress profiles.

As far as we know, this is the first study of using longitudinal data to examine dynamic experience of various transition patterns of sociocultural-specific stress over time. The reviewer raised an important question regarding various transition patterns indicating instability or inconsistency in self-reported experiences. It is impossible for us to tease this hypothesis out with the current sample. We include this as a limitation of this study and suggest future replication studies (pg. 20).

6. *Data were collected from 47 schools via random sampling. Did authors consider accounting for this recruitment procedure in the analytic model?*

We did not account for the school clustering effect. We clarify the reason we did not on pg.11: the intraclass correlations (ICC) were low for the studied variables (M_{icc} = .02), and many students did not remain in the same middle or high schools across the assessment points. Additionally, prior work on residential mobility within this sample demonstrates substantial movement and decreased geographic clustering across the developmental period (White et al., 2014, 2022), a pattern that is expected to continue into early adulthood. By W4, in addition to normative changes from elementary to middle and high school, 83.2% of the sample had experienced at least one residential move (White et al., 2014, 2022). It is not feasible, or necessary given low ICCs, to address cross-classification clustering for this study.

7. *The resulting 2-class typology does not offer much in the way of pattern associations beyond the variable-centered approach. It would be helpful to provide regression analyses that illustrate the potential differences across key study variables on outcomes. This would help determine if any particular stressor has a stronger impact on internalizing/externalizing symptoms within the study, adding to the narrow findings of high and low groups.*

The unique feature of this study is to examine the transitions in the classifications related to the adolescent experience of the four sociocultural stressors all together over a 7-year period (grades 5, 7, 10, and 12). Although two classes emerged at each assessment point, high stressor group vs. low stressor group, the distributions of each variable for high or low group across each assessment were different (i.e., not all at 50:50 split). That is, based on the variable scores across the four sociocultural indicators before the LCA/LTA analyses, we could not differentiate whether an individual belonged to high or low classification at each assessment. Consequently, we could not estimate the patterns of transitions using the variable-centered approach.

It could be interesting to examine if any particular stressor, based on its growth pattern using latent growth curve modeling or growth mixture modeling, has a stronger impact on internalizing/externalizing symptoms. However, such approach addresses different research questions and is beyond the scope of the study.

8. *Finding from links between covariates and latent classes/ transitions should be included, perhaps as a Table as well.*

We have included the results related to baseline covariates and transition patterns based on the LTA in the supplemental materials as well as briefly summarized and interpreted the findings on pg. 15. We did not include their association with the latent classes on the LCA. They were not included as predictors of LCA, and in this study the LCA analysis was done as a preliminary analysis to facilitate the LTA. In addition, we included regression coefficients of their effects on internalizing and externalizing behaviors in Table 3.

9. *Organize the Discussion section to align with Results section using subheadings (e.g., LCAs, LTAs, covariate).*

The Results section has three headings: LCA, LTA, and relation of LTA with covariates and mental health. The Discussion section has two of the three headings: LTA and relation of

LTA with mental health. We did not add an LCA heading to the discussion because this was a statistical step on the way to the LTA, not a separate research question.

10. *Missing the interpretation of associations between covariates and LCAs, LTAs, and outcomes.*

Please see the response for #8.

11. *Based on the typologies and transition patterns (as well as covariate associations), which groups are most likely to benefit from intervention, and when would this be most beneficial developmentally?*

We discussed who benefit from intervention on pg. 19 "Our findings are consistent with the possibility that youth would benefit from intervention programs that alleviate interpersonal stress – including family conflict, peer hassles, language hassles, and exposure to ethnic discrimination – alongside programs that prevent exposures to these interpersonal adversities. Such interventions are particularly important to consider given the central role of the family, language fluency, acceptance from peers, and exposure to cultural stressors that are pertinent to the everyday experiences of Mexican-origin youth. Importantly, youth will likely benefit most when interventions occur in early and middle adolescence, a potentially critical period for healthy relationships in terms of later emotional wellbeing."

12. *What do study findings contribute to cumulative stress models?*

We emphasized the importance of the findings related to cumulative stress models on pg. 3 " Greater understanding of the cumulative role and timing of stress for U.S. Mexican-origin youths' mental health is vital because, in theory, alleviation of these stressors should mitigate the impact on later mental health issues"; on pg. 16 "The relation between young adult mental health and membership in the subpopulations with various patterns of interpersonal stress replicates, to some degree, prior work on the cumulative nature of stress (Zeiders et al., 2016)"; and on pg. 17 "We moved beyond the cumulative model by examining transitions in interpersonal stress. For youth who experienced a transition in interpersonal stress, the number of years exposed to stress did not directly link to severity of young adult mental health symptoms; that is, it was not a simple dose-response cumulative relationship."

Reviewer 2

1. *The "research in community-based settings" sentence could benefit from some references to specific studies that examine mitigation and intensification.*

This is the first study, to our knowledge, that addresses normative (outside the context of an experimental trial) transitions (including mitigation or intensification). Thus, we cannot provide specific references to this kind of work. We can, however, point to community-based trials and general principles of prevention science to support this statement. Citations to individual trials (e.g., Stewart et al, 2020), to summaries of existing evidence supporting community-based prevention programs for mental health problems (National Research Council & Institute of Medicine, 2009), and to basic prevention science principles regarding the ways in which basic developmental science can inform the development of preventive interventions (National Research Council & Institute of Medicine, 2009) have been added (pg. 6).

2. *P. 4 the "for example, during middle…" sentence read as a sentence fragment. Please consider rewording for increased readability.*

   We reworded the sentence as suggested (pg. 3).

3. *P.4-5 the last sentence of this paragraph reads as a run-on. Maybe consider making into 2 distinct sentences or using a semicolon to separate the two independent clauses.*

   We added a semicolon to separate the two independent clauses as suggested (pg. 4).

4. *Add additional subheadings to further organize the introduction. For example, a subheading noting where you make the transition from variable-centered study of risk factors to person-centered work towards the end of page 5.*

   To make room for additional text, we reorganized and streamlined the introduction section. We now included subheadings, including "Stressors and Mental Health among Mexican-origin youth" (pg. 3)," and "Cross-sectional and Longitudinal Person-centered Approaches of Youth Stressors (pg. 4)". We believe the revised organization makes the introduction flow more smoothly.

5. *Toning down the language (i.e., 'problematic') on p.6. The single time point person-centered studies are not as 'problematic' as they are limited in their ability to paint a realistic picture of stress and its effects across time.*

   We agree with the reviewer that single time point person-centered studies have their merits. We revised the text and stated its limitation for this study, "(pg. 5) The single-point-in-time approach limits our understanding of dynamic experience of stressors over time and its impact given that normative and socio-cultural stressors will change across youth development …"

6. *Are internalizing and externalizing symptoms calculated as means? Sums? Something else? What is the response scale (i.e., binary yes no, 4-point likert, etc)?*

   We specified on pg. 10 that internalizing and externalizing symptoms at W6 (five years post high school) were calculated as the sum of the items using a 3-point Likert scale (0 = not true, 1 = somewhat true, 2 = very true).

7. *P. 11 " We described the procedures of conducting the LTA and test hypothesis in the following." - hypotheses? Following section?*

   It should be the 'following section'. However, we restructured the analytical plan and removed this sentence.

8. *The missing data section could be broken into 2 paragraphs to aid readability. Are the 'child behavioral variables' used as auxiliary variables in MI the internalizing and externalizing symptoms covariates referenced on p.10-11? It would be helpful to know exactly which variables were being used to increase the accuracy of MI. P.11 it took me a couple reads to get what the authors were saying about using the (rounded and standardized) version of the*

combined dataset averaging across all 100 derived from MI. I think this part of the paragraph could be shortened and organized in a way that is more clear from the get-go, e.g. referencing:

We followed the reviewer's advice and reorganized the missing data section in the following order (pg. 11-12):

a. Generate 100 datasets using SAS multiple imputation procedure and create a combined dataset.
b. With the combined dataset, categorical and count variables were rounded to the nearest integer and continuous variables were standardized.
c. Use combined dataset for the LCA and LTA because the conventional MI method of computing coefficients in each dataset and averaging the findings across the imputed datasets could lead to issues of different sized classes with different characteristics, precluding any meaningful interpretation

9. *"we assigned the youth to the most likely class based on the estimated posterior probabilities (Asparouhov & Muthén, 2013; Clark & Muthén 2009)" mean that the authors used the BCH procedure to still account for the uncertainty of profile membership while examining distal outcomes? If they did, it would be useful this explicitly here and in the analysis plan. If not, I question whether assigning participants to their most likely class is appropriate given that entropy, or classification quality, at every wave of the LCA is below the cutoff of .80 and the entropy of the LTA itself is only at the same minimum cutoff of .80. Given that classification quality is maybe adequate at .80 but certainly not high, ignoring the uncertainty in class membership by not accounting for the sampling weight in the analysis may produce bias in your estimates in the relation between LTA class membership and young adult mental health section. Here is a link to an Asparouhov & Muthen (2021) report that may be useful (particularly pages 17-22 if your outcomes are continuous): https://www.statmodel.com/examples/webnotes/webnote21.pdf*

We appreciate the reviewer's suggestion of using the BCH method to estimate distal outcomes (i.e., internalizing and externalizing problems 5 years after 12th grade). However, we could not apply the BCH method for this study. We clarified that we did not account for the uncertainty for assigning class membership (i.e., BCH method; Asparouhov & Muthén, 2021) and specified in the text that we used the "SAVE=CPROBABILITIES" command to save the most likely class membership with the highest posterior probability for each individual (pg. 14-15). Although we had considered and tried the BCH method to study the effects of the transition patterns and the outcome, we encountered two obstacles. First, we were unable to compare the means of internalizing and externalizing problems across the six classes that had class sizes at least 5% of the sample or even the 16 possible latent transition combinations. Because a few of the transition combinations had samples that were fewer than .5% of the sample (i.e., $n < 2$), we encountered error messages such as 'THE ESTIMATED COVARIANCE MATRIX FOR THE Y ARIABLES IN CLASS 14 COULD NOT BE INVERTED. … THIS MAY BE DUE TO A ZERO ESTIMATED VARIANCE, THAT IS, NO WITHIN-CLASS VARIATION FOR THE VARIABLE.' As a result, the estimates could not be trusted, the standard errors could not be estimated, and the comparisons of the means of distal outcomes across the six classes could not be performed. In addition, we applied multiple regression to compare the means of the distal outcomes (i.e., comparing the means of each of the classes to the reference group of "stable high interpersonal stress" through dummy coding regression – see Table 3) controlling for the

baseline covariates. We could not directly do such multiple regression through the LCA and the BCH method. We have included in the results section that this study was unable to account for the uncertainty of classification.

10. *As a reader, I would appreciate seeing the beta's and p-values in the final section of the results when detailing effects of membership and transition on distal outcomes in 12th grade.*

    We have added the standardized regression coefficients as well as unstandardized regression coefficients, standard errors, and p values for each of the predictors in predicting the distal outcomes (5 years after 12th grade) in Table 3 (see also pg. 15).

11. *The authors findings, particularly around the timing of transitions for later mental health were very interesting. I was left wondering whether there were any variables that predicted the transition from one class to another, not just whether transitions predicted later functioning as the authors examined. I would understand if these analyses were judged to be beyond the scope of this paper, but, nonetheless, I think some discussion of these possibilities is important, as predicting who transitions and when are potentially powerful way of using LTAs*

    We agree with the reviewer that this is an interesting question. These analyses were indeed judged to be beyond the scope of this paper, but we have added a line in future directions. (pg. 21).

15. *A concluding paragraph succinctly summing up the study and key findings would be helpful.*

    As suggested, we added a summary of the study and key findings at the end of manuscript.

Again, we thank you and the reviewers for your thoughtful feedback and hope that our revisions addressed your concerns. We look forward to hearing from you.

Cover letter

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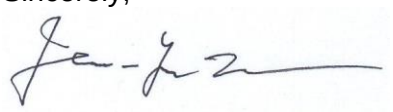
August 19, 2021

Dear Dr. Kim,
We wish to submit the manuscript entitled, "*U.S. Mexican young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence*," for consideration for publication in *Cultural Diversity & Ethnic Minority Psychology*. We confirm that the aforementioned study is original work and has not been published elsewhere nor is it currently under consideration for publication elsewhere. All authors played a significant role in the development and production of this manuscript.

We believe that the present study is an excellent fit for your journal because it makes a substantial contribution to our understanding of the effects of some U.S. Mexican youth transitioned into and out of higher levels of interpersonal stress, the effects of transition processes to young adult internalizing and externalizing problems, and the implications of opportunities to intervene during adolescence to mitigate later mental health problems

Thank you for considering our manuscript for publication. I and my co-authors, Alexandria S. Curlee, Ph.D., Rebecca M. B. White, Ph.D., Gustavo Carlo, Ph.D., Nancy A. Gonzales, Ph.D., and George P. Knight, Ph.D., very much look forward to your feedback.

Sincerely,



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Title page with All Author Information AND word count

U.S. Mexican young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence

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Key Words: Latent transition analysis, Interpersonal stressors, mental health, adolescent, US Mexican youth

Word Count: 5996

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U.S. Mexican-origin young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence

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U.S. Mexican young adults' mental health relative to interpersonal stressor transitions from childhood to adolescence

ABSTRACT

Objectives: This study sought to describe latent transitions in developmentally and culturally salient interpersonal stressors from late childhood to late adolescence and examine whether different transition patterns predicted early adult mental health problems.

Methods: Data from four waves (grades 5, 7, 10, 12) of a study of 749 Mexican-origin youth were used for a latent transition analysis of family, peer, and community stressors; distal outcomes of externalizing and internalizing problems were measured five years after grade 12. Latent Class Analysis and Latent Transition Analysis were conducted for investigating underlying subgroups (i.e., latent profiles) of interpersonal stress at each wave and transitions between subtypes over developmental periods.

Results: For the LCA, two classes emerged at all four waves, representing low and high interpersonal stress. The LTA model with two classes at all waves was conducted. Six prominent transition classes emerged and related to young adult internalizing and externalizing problems. As expected, some U.S. Mexican youth transitioned into and out of high levels of interpersonal stress. Moreover, transition class related to young adult internalizing and externalizing problems, such that youth who consistently had exposure to interpersonal stress or who had transitions from low to high exposure had more internalizing and externalizing problems.

Conclusions: Findings are discussed relative to the developmental salience of these transitions and opportunities to intervene during adolescence to mitigate later mental health problems.

Key Words: Latent transition analysis, Interpersonal stressors, mental health, adolescent, US Mexican youth

The transition to adolescence is often associated with increases in mental health problems, and some research suggests that approximately 20% of the population will be diagnosed with one or more mental, emotional, or behavioral disorders by age 25 (O'Connell et al., 2009). Several developmentally salient interpersonal stressors have been found to be reliable predictors of internalizing and externalizing problems across adolescence and across diverse groups, including family conflict (Ingoldsby et al., 2006), and problems in peer relationships (Parker et al., 2006). In addition to these normative stressors, youth of color and youth from immigrant families can face additional socio-culturally situated interpersonal stressors, including discrimination from peers based on one's race or ethnicity and/or language conflicts, or negative experiences associated with navigating settings with different language expectations (Nair et al., 2013). Greater understanding of the cumulative role and timing of stress for U.S. Mexicans' mental health is vital because, in theory, alleviation of these stressors should mitigate the impact on later mental health issues.

Research on both typically-occurring and culturally-specific stressors has tended to rely on variable driven approaches, which examine relations between measures of stress and behavioral problems (Cardoso et al., 2018; Landale et al., 2015; Nair et al., 2013). Among emerging person-centered approaches that incorporate both normative and socio-cultural stressors, most studies have captured only a single point in time (e.g., Kiang et al., 2018; Kim et al., 2018; Zeiders et al., 2013), which precludes examination of the dynamic experience of stressors over time. In combination, the reliance on variable-driven approaches and emerging point-in-time person centered approaches has left important gaps in the literature. For example, variable-driven approaches are unable to capture the cumulative nature of stress. Focusing on single stressors will often inaccurately represent the experiences of adolescents, whose lives

include multiple stressors, impeding understanding of the impact on mental health (Sameroff & Seifer, 1990; Zeiders et al. 2013). Furthermore, assessing stress at a single-point-in-time does not account for the dynamic nature of stress exposure and the fact that some youth experiencing heightened cumulative stress in earlier in life may continue to experience chronic stressors, whereas others may experience changes in their life circumstances. Additionally, to move beyond the cumulative stress model, research must explore the impact of the timing of changes in stress. Normative and socio-cultural stressors will change across youth development because of age-dependent social demands, such as the increasing importance of autonomy and peer approval, that may lead to greater family and peer conflict (Lerner & Steinberg, 2009; Rubin et al., 2006). Moreover, shifts in developmentally related social interactions across adolescence might indicate that the timing of increases or decreases in cumulative stress matters for later mental health.

With the advancement of modern person-centered analytical methods, specifically latent transition analyses (LTA; Lanza et al., 2013; Howard & Hoffman, 2018), we can address such gaps in prior research. This method allows for person-centered measurement across several time points and can test the effects of timing in increases or decreases in the accumulation of stress as it relates to later mental health. Understanding how transitions in stress over time predict later mental health outcomes is critical to test longstanding questions about early experiences and whether later experiences offer opportunities for corrective effects.

The current study uses LTA to address these gaps in a longitudinal study of U.S. Mexicans ranging from late childhood to early adulthood. Mexican-origin Latinx are the largest immigrant group in the U.S. (Census Bureau, 2018) and they are diverse on exposure to both typically-occurring and sociocultural-specific stressors (Zeiders et al., 2013) as well as levels of

internalizing and externalizing problems (Landale et al., 2015). Research in community-based settings that examines mitigation or intensification of stressors over developmental time among U.S. Mexican youth offers insight into the assumptions underpinning health, prevention, and evaluation research and further informs optimal timing of such interventions.

Youth Stressors and Early Adult Mental Health among U.S. Mexicans and Other Latinx

U.S. Latinx and Mexican populations display variability in adult mental health problems, with subgroups more and less likely to exhibit internalizing and externalizing symptomatology (Harris et al., 2005). Theoretically, adolescence may serve as a sensitive period in which exposure to stressors leads to internalizing and externalizing phenotypes in young adulthood (Del Guidice et al., 2011). Conflict or hassles within the family, peer, and school systems may be especially salient during this transition. Additionally, for ethnic and racial minority and immigrant youth, language hassles, or being treated differently because one does not speak Spanish or English well, and ethnic-racial discrimination from peers are important to consider in the context of U.S. systems of ethnic, racial, and immigrant stratification (Coll et al., 1996).

Prior work demonstrates that these interpersonal stressors predict later mental health problems for U.S. Mexican adolescents. For example, during middle adolescence exposure to conflict in the family system (Jensen et al., 2014) and hassles in peer relationships, like fights with close friends, teasing, and victimization, are associated with internalizing and externalizing symptoms (Cardoso et al., 2018). Language hassles in late childhood also positively predict early adolescent internalizing and externalizing problems (Nair et al., 2013). In addition, numerous studies demonstrate that youths' exposure to ethnic-racial discrimination has consequences for later mental health issues (see Umaña-Taylor, 2016), some research highlights ethnic-racial

discrimination from peers as particularly salient (Bellmore et al., 2012; Benner et al., 2018; White et al., 2014).

This work emphasizes that interpersonal stressors are consequential for later mental health problems. Over time, relational challenges can place U.S. Latinx or Mexican youth at heightened risk of maladjustment (Garza & Gallegos, 1985) and compromise youth development and wellbeing (Montero-Sieburth & Villarruel, 2000). Although research documents implications of chronic interpersonal stressors for mental health problems experienced by U.S. Mexican adolescents, this body of work often takes a variable-centered approach, which assumes that the associations of stressors and behavioral problems apply to all individuals in the group. In addition, much of it examines family, peer, or socio-cultural stressors independently, examining the degree to which each stressor affects adolescent behavioral and emotional problems. A more dynamic approach is to identify typologies or subpopulations based on their common experience of these stressors simultaneously and understand the associations of the subpopulation membership with mental health outcomes.

Some emerging work uses person-centered techniques to capture different patterns of stressors U.S. Mexican youth experience. Using latent class analysis (LCA), researchers have shown that ethnic and racial minority youth demonstrate diversity in their patterns of socio-culturally salient interpersonal stressors and in how different patterns relate to mental health problems. For example, using the same data of this study, Zeiders et al. (2013) found diverse patterns in risk profiles for U.S. Mexicans at the 5th grade characterized by family and cultural stressors, including some of the interpersonal stressors examined in the current study. The most common profile was a low-stressor/low-risk profile, wherein youth were low on conflict in the family system, peer conflict and hassles, and ethnic-racial discrimination; youth in this profile

had the lowest levels of internalizing and externalizing symptoms at the 7th grade, compared to youth in riskier profiles. Kim and colleagues (2018) also used person-centered approach to investigate the effects of sociocultural stressors among U.S. Mexican adolescents. They found that the groups exposed to the highest level of stressors displayed more delinquent behaviors, depression, and anxiety symptoms than those in lower-stress profiles. This work, overall, points to an accumulation of stressors as highly problematic for later mental health, but it does not examine transitions into or out of stressor profiles over time and does not examine relations to mental health outcomes during young adulthood.

In summary, the extant work on interpersonal stressors among U.S. Mexican youth suffers from several limitations. First, the work is mostly variable-centered and compartmentalized. The variable-centered approach studies the effect of one or multiple stressors on outcomes assuming the population is homogeneous; it identifies relations between the variables across all individuals. Much of it examines family, peer, or community stressors individually and with less attention to culturally salient stressors (e.g., language hassles) experienced by U.S. Mexican adolescents. Further, the work is capturing stressors at single-point-in-time, without consideration of stressor transitions. This is problematic given that youth are exposed to different levels of interpersonal stress throughout childhood and adolescence as community and family life can change and social demands increase through development (Lerner & Steinberg, 2009; Schmeelk-Cone & Zimmerman, 2003). Finally, the work is largely constrained to the developmental stage of adolescence and does not consider the impact of various combinations of stressors, alongside stressor transitions and the timing of these transitions, on early adult mental health, despite the theoretical salience of adolescent stressors for later adjustment (Del Guidice et al., 2011). These gaps raise questions about the importance

of developmental timing of interpersonal stress which has great implication on the effectiveness of intervention efforts and policies to alleviate them.

Current study

Using the person-centered longitudinal approach with LTA, we examined heterogeneous profiles of family, community, peer, and language conflict and hassles across multiple time points of youth development among U.S. Mexican youths. Specifically, we employed LTA to study whether individuals stay in the same latent typology or move to another typology of interpersonal stressors across late childhood to late adolescence and how transitions between the interpersonal stress subgroups across developmental time affect long term mental health outcomes. First, using LCA, we identified latent interpersonal stress subpopulations based on response patterns of observed variables (Lanza et al., 2013; Howard & Hoffman, 2018) at each assessment point from the 5^{th} to 12^{th} grades. We then used LTA to characterize discrete subgroups of interpersonal stress over time. LTA is a longitudinal extension of LCA that identifies latent profiles of diversity at each timepoint and traces the trend of change between these profiles across times (Lanza et al., 2013). Under LTA, multinomial logistic regression predicts current class membership from previous class membership. Furthermore, we investigated the relations among group characteristics based on the change in latent group status and mental health five years after grade 12.

We expected that there would be variability in exposure to family conflict, peer conflict, discrimination from peers, and language hassles, such that some adolescents may be higher or lower on all four stressor types, whereas others may experience variability across stressors. We further expected that, in a diverse community-based sample of U.S. Mexican youth, some would experience stability in their exposure to stressors from late childhood to late adolescence, some

would experience mitigation of stressors (transitioning to a lower stress context), and some would experience intensification of stressors (transitioning to a higher stressor context). Based on theory and research on the cumulative nature of stress (Zeiders et al., 2013), we expected that youth who remained in higher interpersonal stress profiles across late childhood to late adolescence would report the highest internalizing and externalizing symptom severity as young adults, whereas youth who remained in lower interpersonal stress profiles would have the lowest symptoms severity as young adults. For youth who transitioned into or out of high interpersonal stress profiles, we wondered if the number of years of interpersonal stress exposure would relate to young adult psychopathology symptoms in a dose-response relationship, such that more years exposed to interpersonal stress would link to greater symptom severity. Alternatively, we sought to understand if timing of the transition into and out of interpersonal stress was more impactful to later young adult mental health than total exposure to interpersonal stress, wherein the same transition during an earlier or later stage of adolescence would differentially impact internalizing and externalizing symptoms.

METHOD

Participants

Data for this study came from a larger longitudinal study investigating the role of family, culture, and context in the lives of Mexican-origin youth and their families. Using a stratified random sampling strategy, the youth were recruited from rosters of 47 schools that served ethnically and linguistically diverse communities (Roosa et al., 2008). Youth were eligible if the child was in the 5th grade and had no severe learning disability; both biological mother and father identified as Mexican or U.S. Mexican; and the child lived with the biological mother and both agreed to participate. This study consisted of 749 youth and their biological mothers. Most

mothers (74.4%) were born in Mexico and most youth (70.2%) were born in the U.S. At baseline, the mean age of the youth was 10.4 years (*SD* = .55) and 49% was female; the mean age of mothers was 35.9 years (*SD* = 5.81); annual family incomes ranged from <$5,000 to >$95,000 (median $25,001 – $30,000).

Procedure

The larger study included six waves of data collection between 2004 and 2018, but the 5th wave was designed primarily as a retention and engagement effort and did not collect any data relevant to the current study. The current study included five waves of data: when youth were in the 5th grade (W1; *N* = 749), 7th grade (W2; *n* = 710), 10th grade (W3; *n* = 641), 12th grade (W4; *n* = 636), and five years post high school (W6; *n* = 394). The retention rates were 95%, 85%, 85%, and 53%, respectively.

Assent (for youth younger than 18-year-old) and consent forms were given and read aloud to children and their parents, respectively, with all materials available in both English and Spanish. Each participating family member received $45, $50, $55, and $60 for participating in Waves 1–4, respectively. At Wave 6, youth received $75 for participating. Roosa et al. (2008) provided complete information regarding recruitment and other study procedures. All procedures were reviewed and approved by the university's institutional review board and conformed to American Psychological Association ethical standards.

Measures

Interpersonal stressors. At Waves 1–4, we used the Multicultural Events Scale for Adolescents (MESA; Gonzales et al., 2001) to assess culturally and developmentally salient domains of interpersonal stress: family, peers, and language. Participants indicated whether each stressful event *happened* or *did not happen* in the past three months. Each subscale was the sum

of events endorsed for the domain. There were five events for family conflict (e.g., "members of your family hit or hurt each other"), thirteen for peer conflict (e.g., "you were pressured against your will to join a gang"), and seven for language hassles (e.g., "a teacher put you down for not speaking English or not speaking it well").

Peer ethnic-racial discrimination was assessed based on five items adapted from Hughes and Dodge's (1997) Racism in the Workplace Scale and Klonoff and Landrine's (1995) Schedule of Sexist Events. Using a 5-point Likert scale (1 = Not at all true, 5 = Very true), youth rated how true was each statement (e.g., "kids at school called you names because you are Mexican or U.S. Mexican"). Cronbach's alphas ranged .76 to .78.

Internalizing and Externalizing Symptoms. At W6, we measured youth internalizing and externalizing problems using Young Adult Self-Report (Achenbach & Rescorla, 2003). Internalizing problems consisted of 39 items (e.g., "I feel lonely"; Cronbach's alpha was .92) and externalizing problems consisted of 35 items (e.g., "I get into many fights"; Cronbach's alpha was .88).

Demographic Covariates. Covariates were assessed at W1. Mothers reported on youth's biological sex and youth's country of birth (i.e., Mexico or not). Mother's report of economic hardship was used as an indicator of socioeconomic status and consisted of 20 items (Barrera et al., 2001). Questions pertained to inability to make ends meet, not enough money for necessities, economic adjustments and cutbacks, and financial strain. Participants were asked to rate each item on a five-point Likert scale. Cronbach's alpha was .83.

Internalizing and Externalizing Symptoms Covariates. At W1, mothers and children completed the Diagnostic Interview Schedule for Children (C-DISC– 4.0; Bravo et al., 2001; Shaffer et al., 2000), which is based on the Diagnostic Statistical Manual, 4th Edition. Symptom

counts were assessed based on the past 12 months. Followed the suggestion by the developers (Shaffer et al., 2000), we used the child and mother combined reports. Internalizing symptoms score was the sum of the anxiety, mood, trauma, and eating disorder symptom counts. Externalizing symptoms score was the sum of conduct and attention deficit disorder symptom counts.

Analytic Plan

We conducted attrition analysis on the key demographic variables (i.e., child gender, parent gender, parent age, family income) and child interpersonal stressors (i.e., family, peers, and language, and peer ethnic discrimination), internalizing symptoms, and externalizing symptoms to examine whether the scores differed by retention/dropout status. Chi-square tests were conducted to compare categorical variables and t-tests were conducted to compare continuous variables.

We applied LTA to explore the patterns of transitions in interpersonal stressors from late childhood to late adolescence. A longitudinal modeling technique, LTA is an extension of LCA, studying movement among latent classes over time. In general, to perform LTA, researchers first conduct LCA at each time point and then examine the probability of transitioning from each class at one time point to all other classes at the next time point. We described the procedures of conducting the LTA and test hypothesis in the following.

Missing Data. We used Mplus 8 (Muthén & Muthén, 1998-2017) to conduct LCA/LTA and examine the association of transition patterns and early adult internalizing and externalizing problems. Because of the limitation of LCA not being able to handle missing data with full information maximum likelihood (FIML) using Mplus, we handled missing data for the interpersonal stressor variables used in the LCA/LTA with multiple imputations (MI) using SAS

before the LCA and LTA were performed. As specified in Collins et al. (2001), an advantage of using MI to handle missing data for latent class modeling is that auxiliary variables (variables that are related to the probability of missingness but will not be included in the model) can be used in the imputation model to increase the accuracy of the imputation procedure. We included key demographic and child behavioral variables as the auxiliary variables. A total of 100 datasets were imputed, and a combined dataset with averages of each variable was produced for conducting LCA/LTA. In general, for the MI analysis, the hypothesized model is conducted with each imputed dataset and the estimates (coefficients and standard errors) are combined across all imputed datasets. However, it is not feasible to combine the results of MI analysis in a post-hoc fashion for LCA/LTA. If model selection is conducted within each imputed dataset, slightly different latent class models might be selected, leaving no logical way to combine results across imputations. We recognized that by conducting the LCA/LTA with the combined dataset, we only partially accounted for the uncertainty of parameter estimates. For the combined data, count variables were rounded to the nearest integer and continuous variables were standardized.

Latent Class Analysis (LCA). We first conducted LCA, which explored unobserved latent classes of youth with similar patterns of the scores on interpersonal stressors, separately for Waves 1–4. The results of the class solutions were then used to guide the number of classes to be used in the LTA. The interpersonal stress variables included three count variables (family conflict, peer conflict, language hassles) and one continuous variable (peer ethnic-racial discrimination). LCAs with 1- to 4-class model were performed, successively, at each grade. Sample adjusted Bayesian information criteria (saBIC; Sclove, 1987), Lo-Mendell-Rubin (LMR; Lo et al., 2001), and interpretability of classes were used to determine the optimal number of classes (Tein et al., 2013). In addition, entropy was used to gauge whether the latent

classes were highly discriminating (Nylund et al., 2007; Ram & Grimm, 2009).

Latent Transition Analysis (LTA). Based on the class solutions of separate LCAs from Waves 1–4, LTAs were conducted to investigate patterns of transitions between interpersonal stress subtypes over developmental periods. Number of classes at each grade were specified based on LCAs and, to avoid problems with model identification, variable means were constrained to be equal across grades (see Nylund et al., 2007).

Predicting Distal Outcomes. Last, we investigated whether transitions in and out of interpersonal adversity identified in the LTA model mattered for later young adult internalizing and externalizing symptoms, separately. This step consisted of multiple regression with LTA chronic stress class membership being a categorical (nominal) predictive variable and the stable high interpersonal stress group designated as the reference group. The models controlled for demographic covariates and W1 internalizing or externalizing problems. Missing data on the outcomes were handled with FIML and all predictors were allowed to correlate.

RESULTS

Attrition analysis showed that, compared to youth who took the W6 assessments, youth who dropped out from the study at W6 were from families whose mothers were more likely to be foreign born (79.4% vs. 69.8%) and had lower levels of total family income at W1 [7.42 (~$30,001-$35,000) vs. 5.96 (~ $25,001-$30,000)]. These variables were included in the missing data imputation for indicators of the LCA/LTA.

Latent Class Analyses

Fit statistics for LCAs with models of 1- to 4-class solutions and their proportions at each wave are shown in Table 1. At W2 and W4, the 2-class models were the optimal choice based on the combination of goodness-of-fit indices. At W3, although the LMR was significant for the 3-

class model, entropy decreased below .70; therefore the 2-class model was also chosen. At W1, both the 2- and 3-class models fit the data with similar LMR and entropy, so we examined the class characteristics for both. In the 2-class model, a low and high interpersonal stress group emerged. In the 3-class model, the low stress group remained whereas the high adversity group split; both high stress groups remained higher on all variables compared to the low stress group. The main difference between the two high stress groups was the level of peer conflict. The 2-class model was then selected at W1 for it being a more parsimonious model and being consistent with other three time points. Table 2 presents the model means of the four stressor variables for the low and high interpersonal stress classes for each wave. Table 2 also shows the percentage of participants in each class.

Latent Transition Analyses

Based on findings from the LCAs, the LTA model specified two classes at Waves 1-4, respectively. The means of the interpersonal stress variables were constrained to be the same across waves to reduce the number of parameter estimates and to obtain model stability. The resulting model had a class entropy of .80, an adequate level of certainty about class membership (Celeux & Soromenho, 1996). Consistent with our expectations, some U.S. Mexican youth transitioned into and out of high levels of family, peer, and community stressors. The percentage of participants in the low and high interpersonal stress classes at each wave determined by the LTA model was similar to the percentage of participants in these classes as determined by the separate LCAs, with discrepancies of less than 6%. Note that we examined LTA with alternative combinations of classes; the model with two classes at all waves remained the most optimal solution.

Of the sixteen possible latent transition combinations (i.e., 2 x 2 x 2 x 2), six had class sizes at least 5% of the overall sample and together comprised 85% of the total sample (N = 634). Of the six classes, two consisted of stayers, participants who either stayed in low interpersonal stress across waves (n = 274) or participants who stayed in high interpersonal stress across waves (n = 110). These two groups accounted for 60% of the six classes. The remaining 40% of participants in the six classes were transitioners. Three groups transitioned to low interpersonal stress: 86 participants transitioned to low stress at W2, 42 transitioned to low stress at W3, and 76 transitioned to low stress at W4. One group of 46 participants transitioned to high stress at W3. The 634 youth under these 6 classes were retained for the analyses of predicting youth behavioral outcomes. The sample sizes for the rest of the classes were too small for reliable predictions. Giving the high entropy, we assigned the youth to the most likely class based on the estimated posterior probabilities (Asparouhov & Muthén, 2013; Clark & Muthén 2009).

Relation between LTA class membership and young adult mental health

We examined whether transitions between interpersonal stress impacted later mental health among U.S. Mexican youth. Controlling for the baseline covariates, standardized regression coefficients with internalizing or externalizing problems assessed at 5 years after grade 12 as the outcomes are presented in Table 3. There was a significant difference in young adult internalizing and externalizing symptoms between the high stable stress group and three other groups: low stable stress, high to low stress at grade 7, and high to low stress at grade 10. There was no significant difference between the high stable stress group and high to low stress at grade 12 as well as low to high stress at grade 10.

DISCUSSION

This study sought to uncover the latent transition typologies in developmentally and culturally salient interpersonal stressors from late childhood to late adolescence and explore whether transitions in interpersonal stress typology predicted young adult internalizing and externalizing symptoms.

Latent Transition Patterns of Interpersonal Stressors

Findings from this study suggest there is substantial diversity in U.S. Mexican youths' exposures to interpersonal stressors from late childhood to late adolescence. Approximately 17% of the sample were in relatively high stable stress profiles. A small proportion of U.S. Mexican youth (7%) started out in relatively low stress contexts and transitioned to relatively high stress contexts in middle adolescence. Yet, the largest group (43%) consisted of youth who remained in the low stress profiles across grades 5 to 12. Moreover, about one third (33%) of U.S. Mexican youth transitioned from high stress contexts to low ones, transitioning in either early, middle, or late adolescence. Altogether, approximately three quarters of the sample was categorized in the relatively low interpersonal stress class at grade 12, indicating the majority of the youth were reporting low levels of peer hassles, family conflict, language hassles, and ethnic-racial discrimination by late adolescence.

Relation between Interpersonal Stress Transitions and Young Adult Mental Health

The relation between young adult mental health and membership in the subpopulations with various patterns of interpersonal stress replicates prior work on the cumulative nature of stress (Zeiders et al., 2016). As expected, those in the consistently low stress LTA profile had the lowest young adult internalizing and externalizing scores, whereas those in the consistently high stress LTA profile had the highest scores. These relations emphasize the important impact of

adolescent interpersonal stress on wellbeing, not only during adolescence but many years later during young adulthood.

We moved beyond the cumulative model by examining transitions in interpersonal stress. For youth who experienced a transition in interpersonal stress, the number of years exposed to stress did not directly link to severity of young adult mental health symptoms; that is, it was not a dose-response relationship. Transitioning out of high interpersonal stress by grade 12 alone did not secure better mental health as a young adult. Our results suggest that early and middle adolescence may be a developmentally sensitive period in which experience a transition in interpersonal stress – whether that transition is good (toward lower interpersonal stress) or bad (toward higher interpersonal stress) – relates to later young adult mental health. Prior work suggests that early and middle adolescence is a time when youth are first exploring sexuality and romantic relationships and negotiating autonomy within family contexts, reflecting the key role of interpersonal skills and potential long-term impact of interpersonal stress (Steinberg & Morris, 2001). Transitions out of high interpersonal stress at grades 7 and 10 were beneficial for young adult mental health, with significantly lower symptoms compared to the high stable stress group. Unexpectedly, a similar transition at grade 12 had no benefit for young adult internalizing and externalizing symptoms, suggesting that timing of the transition is important for impact on mental health.

The group that transitioned into high interpersonal stress at grade 10 appears to have gained little benefit from prior years in low stress. Despite the fact that these youth started in low stress contexts in late childhood and early adolescence, their transition into high stress around middle adolescence was associated with having young adult internalizing and externalizing scores equal to their peers who remained in high stress contexts from grades 5 to 12.

Specifically, the transition at grade 10 into high interpersonal stress was so costly that youth did not experience any detectable benefit from their earlier years being characterized by low interpersonal stress. One possible explanation is that during early and middle adolescence, the importance of autonomy as well as the peer group continues to increase along with the subsequent necessity to navigate new interpersonal situations with peers, parents, and the larger community (Rubin et al., 2006), which leads to opportunities for developing cognitive schema regarding relationships. Cognitive schema are pervasive patterns of thinking about oneself and one's relationships with others that help organizing and interpreting information (Young et al., 2003; Calvete et al., 2013), and the development of less functional schema has been linked with long-term implications for mental health (Hawke & Provencher, 2011). Alongside these changes, adolescence is considered a sensitive period for changes to the stress response system and for altering life history strategies that could lead to internalizing and externalizing phenotypes (Del Guidice et al., 2011). Early and middle adolescence is an important time for these foundational experiences regarding relationships (Rubin et al., 2006) that could impact cognitive schema, life history strategies, and physiological responses.

For youth who transitioned into low interpersonal stress by grade 7 or grade 10, they have ample adolescent years left for new – less stressful – interpersonal experiences. On the other hand, for adolescents who remained in high interpersonal stress environments until late adolescence, many new, developmentally salient interpersonal experiences may have occurred within a stressful context leading to the formation of less functional beliefs regarding relationships. These less functional beliefs might have carried into young adulthood and manifested as mental health symptoms. Similarly, detrimental, transitioning to a high stress category at grade 10, with remaining years for experiencing new interpersonal situations, allows

for a multitude of opportunities to form conflict-related beliefs about oneself and relationships with others.

Family, school, and community interventions designed to support youth mental health by reducing various forms of interpersonal stressors (see Ellis 2019 for a discussion) or improving coping skills to manage unchangeable stressors, rest, in part, on the assumption that reduction of these stressors or more adaptive responses to stressors will promote better mental health (McLaughlin & Hatzenbuehler, 2009). Although extensive research has explored how changes in adaptive coping can impact mental health (Gu et al., 2015; Robinson et al., 2015), limited research has been able to test the assumption regarding changes in environmental stressors or to examine whether the timing of mitigation matters. Our findings are consistent with the possibility that youth would benefit from intervention programs that alleviate interpersonal stress – including family conflict, peer hassles, language hassles, and exposure to ethnic discrimination – alongside programs that prevent exposures to these interpersonal adversities. Such interventions are particularly important to consider given the central role of the family, language fluency, acceptance from peers, and exposure to cultural stressors that are pertinent to the everyday experiences of U.S. Latinx youth. Importantly, youth will likely benefit most when interventions occur in early and middle adolescence, a potentially critical period for healthy relationships in terms of later emotional wellbeing. However, it is also likely important to consider the timing of such interventions for U.S Latinx youth in the context of other transitions these youth might experience, such as when they immigrated to the U.S. or if their family had recently migrated to a new community.

Limitations and Future directions

Because some of the latent transition patterns consisted of small class sizes, we were limited to examining the effects on young adult internalizing or externalizing problems to six patterns. Future studies with larger sample sizes are necessary to replicate the findings and examine the effects of other transition patterns on long-term behavioral outcomes. Additionally, common to longitudinal studies, each individual wave represents a point-in-time assessment and additional transitions between waves would have been unobserved. Studies which allow for more frequent assessments would expand our understanding of transitions in interpersonal stress and could account for greater nuances in interpersonal stressor changes. Finally, substantial attrition occurred at W6 when youth entered young adulthood (i.e., age *mean* = 22.0, *SD* = .70), mainly due to the high mobility of U.S. Mexican families and the youth transitions outside of the family home, which made it more difficult to reach the young adult sample. The attrition analysis shows that youth who dropped out of the W6 assessment were more likely to have mothers who were born in Mexico and have families with more economic hardship. This differential attrition indicated that the missing data were more likely to follow the missing at random mechanism (Little, 1995; Tein, 2017). We conducted the regression analysis predicting W6 youth internalizing and externalizing behaviors with the full sample, applying FIML to deal with missing data. Simulation studies show that analyses based on listwise deletion (i.e., including only participants with no missing data) are more likely to be biased and not as efficient (i.e., a minimum variance unbiased estimator) as the maximum likelihood or multiple imputations methods (King et al., 2001; Schafer & Graham, 2002), even if the missing data reached 50%. If the assumption of the mechanism causing the attrition is correct, differential attrition accompanied with the modern method of dealing with missing data minimized the threat to validity. It was probable that the missing data in this study followed the missing at random

mechanism; however, we could not fully confirm the results were unbiased without having a definitive assumption of the missing data mechanism.

Important next steps in research would include modeling the impact of evidence-based interventions that promote stress reduction on transitions in interpersonal stress. In addition to interventions focused on skill building, current findings can be disseminated to aid with societal efforts, such as programs and policies, that alleviate interpersonal stress in early to middle adolescence. Future research should also examine factors that may mitigate the costs associated with experiencing high levels of interpersonal stress from late childhood to late adolescence such as religious participation, family closeness, or academic achievement. Finally, it is important to recognize that our modeling technique captured the extent to which levels of internalizing and externalizing were similar or different for those who had stable high exposures to interpersonal stressors, including discrimination from peers, and those in other groups. Such approaches are not capable of indicating if lower levels of exposure to discrimination are benign. Indeed, prior work would suggest that even lower levels of exposure to discrimination are problematic for health and well-being of U.S. Latinxs (Benner et al., 2018).

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Table 1

Fit statistics for separate-grade LCAs with 1- to 4-class solutions and posterior probability of sample in each latent class

	Classes	saBIC	saBIC diff	LMR *p*	Entropy	Class Proportion 1	2	3	4
	1	10473							
W1-	2	9664	809	0.00	0.73	0.51	0.49		
Grade 5	3	9513	151	0.00	0.74	0.43	0.38	0.19	
	4	9461	51	0.52	0.76	0.42	0.36	0.15	0.07
	1	9237							
W2-	2	8231	1006	0.00	0.75	0.62	0.38		
Grade 7	3	8074	158	0.16	0.78	0.53	0.40	0.08	
	4	7985	88	0.10	0.82	0.50	0.38	0.08	0.05
	1	9324							
W3-	2	8556	767	0.00	0.71	0.62	0.38		
Grade 10	3	8452	104	0.03	0.65	0.52	0.31	0.18	
	4	8403	49	0.05	0.72	0.48	0.33	0.15	0.05
	1	8436							
W4-	2	7553	883	0.00	0.79	0.73	0.27		
Grade 12	3	7423	130	0.06	0.68	0.45	0.44	0.12	
	4	7375	48	0.01	0.72	0.48	0.35	0.15	0.02

Note. saBIC = sample adjusted Bayesian information criteria. LMR = Lo-Mendell-Rubin test

Table 2

Model means of interpersonal stressors from separate wave LCAs for low r and high adversity classes.

	W1—5th		W2—7th		W3—10th		W4—12th	
	Low	High	Low	High	Low	High	Low	High
Family conflict	-0.1	1.6	-1.2	0.6	-0.5	0.7	-0.9	0.7
Peer conflict	0.3	0.5	0.0	1.6	0.4	1.6	0.2	1.5
Language conflict	-0.9	0.3	-2.1	-0.1	-2.6	0.0	-3.0	-0.3
Peer discrimination	-0.4	0.5	-0.3	0.4	-0.3	0.5	-0.3	0.7
	51%	49%	62%	38%	62%	38%	73%	27%

Note. Family conflict (5 items), peer conflict (13 items), and language hassles (7 items) were count scales; peer discrimination (5 items) was a standardized continuous scale score.

Note. Model means refer to the mean of a continuous, unlimited latent response variable so means can be less than lower censoring point

Table 3

Interpersonal stressor transition patterns and young adult internalizing and externalizing, N=634 (reference group = stable higher)

Latent Classes	n	W1-5th	W2-7th	W3-10th	W4-12th	Int YA β	Ext YA β
Low (stable)	274 (43%)	1	1	1	1	-.26*	-.37*
High » low at 7th	86 (14%)	2	1	1	1	-.19*	-.25*
High » low at 10th	42 (7%)	2	2	1	1	-.13*	-.19*
High » low at 12th	76 (12%)	2	2	2	1	.06	-.01
Low » high at 10th	46 (7%)	1	1	2	2	-.07	-.06
High (stable)	110 (17%)	2	2	2	2	-	-

Note. 1 = low interpersonal stressor group; 2 = high interpersonal stressor group; Int = internalizing; Ext = externalizing; YA = young adult; β for standardized regression coefficients

Note. Included in the model were the following grade 5 covariates: nativity, gender, economic hardship, and internalizing and externalizing, respectively

* significant at .05

ABSTRACT

Objectives: This study sought to describe latent transitions in developmentally and culturally salient interpersonal stressors from late childhood to late adolescence and examine whether different transition patterns predicted early adult mental health problems.

Methods: Data from four waves (grades 5, 7, 10, 12) of a study of 749 U.S. Mexican-origin youth were used for a latent transition analysis of family, peer, and community stressors; distal outcomes of externalizing and internalizing problems were measured five years after grade 12. Latent Class Analysis (LCA) and Latent Transition Analysis (LTA) were conducted for investigating underlying subgroups of interpersonal stress at each wave and transitions between subtypes over waves.

Results: For the LCA, two latent classes emerged at all four waves, representing low and high interpersonal stress. The LTA model with two classes at all waves was conducted with good fit. Six prominent transition classes emerged and related to young adult internalizing and externalizing problems. Transition class related to young adult internalizing and externalizing problems, such that youth who consistently had exposure to interpersonal stress or who had transitions from low to high exposure had more internalizing and externalizing problems.

Conclusions: Findings are discussed relative to the developmental salience of these transitions and opportunities to intervene during adolescence to mitigate later mental health problems.

Short statement: The study demonstrates that early and middle adolescence is a developmentally sensitive period in which experiencing a transition in interpersonal stress – whether that transition is good (toward lower interpersonal stress) or bad (toward higher interpersonal stress) – relates to later young adult mental health. The timing of interpersonal

stress during adolescence may be more important than number of years of stress in relation to young adult mental health.

The transition to adolescence is often associated with increases in mental health problems, and some research suggests that approximately 20% of the population will be diagnosed with one or more psychological disorders by age 25 (O'Connell et al., 2009). Several developmentally relevant interpersonal stressors have been found to be reliable predictors of internalizing and externalizing problems across adolescence. Conflict or hassles within family, peer, and school systems may be especially salient during this transition (Ingoldsby et al., 2006; Parker et al., 2006). In addition to these normative stressors, youth of color and/or from immigrant families can face additional socio-culturally situated interpersonal stressors, including discrimination from peers based on one's race or ethnicity or negative experiences associated with navigating settings with different language expectations (Nair et al., 2013). Greater understanding of the cumulative role and timing of stress for U.S. Mexican-origin (hereafter "Mexican-origin") youths' mental health is vital because, in theory, alleviation of these stressors should mitigate the impact on later mental health issues.

Stressors and Mental Health among Mexican-origin youth

Mexican-origin individuals are the largest immigrant group in the U.S. (Budiman, 2020) and they are diverse on exposure to both typically-occurring and sociocultural-specific stressors (Zeiders et al., 2013). Prior work demonstrates that the interpersonal stressors predict later mental health problems for Mexican-origin adolescents. For example, during middle adolescence, exposure to conflict in the family system and hassles in peer relationships (e.g., fights with close friends, teasing, and victimization) is associated with internalizing and externalizing symptoms (Cardoso et al., 2018; Jensen et al., 2014). Language hassles in late childhood also positively predict early adolescent internalizing and externalizing problems (Nair et al., 2013). In addition, numerous studies demonstrate that youths' exposure to ethnic-racial

discrimination has consequences for later mental health issues (see Umaña-Taylor, 2016); some research highlights ethnic-racial discrimination from peers as particularly salient (Bellmore et al., 2012; Benner et al., 2018; White et al., 2014).

Although research documents implications of chronic interpersonal stressors for mental health problems experienced by Mexican-origin adolescents, this body of work often takes a variable-centered approach, which assumes that the associations of stressors and behavioral problems apply to all individuals in the group. In addition, much of it examines family, peer, or socio-cultural stressors independently, examining the degree to which each stressor affects adolescent behavioral and emotional problems. Focusing on single stressors will often underrepresent the experiences of minoritized adolescents, whose lives sometimes include multiple stressors, impeding understanding of the impact on mental health (Sameroff & Seifer, 1990; Zeiders et al. 2013). A more dynamic approach is to identify typologies or subpopulations based on their common experience of these stressors simultaneously and understand the associations of the subpopulation membership with mental health outcomes.

Cross-sectional and Longitudinal Person-centered Approaches of Youth Stressors

Some emerging work uses person-centered techniques to capture different patterns of stressors Mexican-origin youth experience. Using latent class analysis (LCA), researchers have shown that ethnic and racial minority youth demonstrate diversity in their patterns of socio-culturally salient interpersonal stressors and in how different patterns relate to mental health problems. For example, using the same data of this study, Zeiders et al. (2013) found diverse patterns in risk profiles for U.S. Mexicans at the 5th grade characterized by family and cultural stressors, including some of the interpersonal stressors examined in the current study. The most common profile was a low-stressor/low-risk profile, wherein youth were low on conflict in the

family system, peer conflict and hassles, and ethnic-racial discrimination; youth in this profile had the lowest levels of internalizing and externalizing symptoms at the 7th grade, compared to youth in riskier profiles. Kim and colleagues (2018) also used person-centered approach to investigate the effects of sociocultural stressors among Mexican-origin adolescents. They found that the groups exposed to the highest level of stressors (13%) displayed more delinquent behaviors, depression, and anxiety symptoms than those in lower-stress profiles. This work, overall, points to an accumulation of stressors as highly problematic for later mental health.

Among emerging person-centered approaches that incorporate both normative and socio-cultural stressors, almost all have captured only a single point in time (e.g., Kiang et al., 2018; Kim et al., 2018; Zeiders et al., 2013), without consideration of stressor transitions. In reality, some youth experiencing heightened cumulative stress earlier in life may continue to experience chronic stressors, whereas others may experience changes in their life circumstances. The single-point-in-time approach limits our understanding of dynamic experience of stressors over time and its impact given that normative and socio-cultural stressors will change across youth development because of age-dependent social demands, such as the increasing importance of autonomy and peer approval, that may lead to greater family and peer conflict (Lerner & Steinberg, 2009; Rubin et al., 2006). Moreover, shifts in developmentally related social interactions across adolescence might indicate that the timing of increases or decreases in cumulative stress matters for later mental health.

The reliance on variable-driven approaches or point-in-time person centered approaches has left important gaps in the literature of studying the effect of stress on mental health for Mexican-origin youth. It is essential to explore the impact of the timing of changes in stress moving forward. With the advancement of modern person-centered analytical methods,

specifically latent transition analyses (LTA; Lanza et al., 2013; Howard & Hoffman, 2018), we can address such gaps in prior research. LTA is a longitudinal extension of LCA that identifies latent profiles of diversity at each timepoint and traces the trend of change between these profiles across times (Lanza et al., 2013). Such method allows for person-centered measurement across several time points and testing the effects of timing in increases or decreases in the accumulation of stress as it relates to later mental health. Understanding how transitions in stress over time predict later mental health outcomes is critical to test longstanding questions about early experiences and whether later experiences offer opportunities for mitigation or intervention. In addition, research in community-based settings that examines mitigation or intensification of stressors over developmental time among Mexican-origin youth offers insight into the assumptions underpinning health, prevention, and evaluation research and further informs optimal timing of such interventions (National Research Council & Institute of Medicine, 2009; Stewart et al., 2020).

Current Study

The extant work on interpersonal stressors among Mexican-origin youth suffers from several limitations. Briefly, the work is capturing stressors at single-points-in-time, without consideration of stressor transitions. The work is mostly compartmentalized and largely constrained to the developmental stage of adolescence. It does not consider the impact of various combinations of stressors, alongside stressor transitions and the timing of these transitions, on early adult mental health, despite the theoretical salience of adolescent stressors for later adjustment (Del Guidice et al., 2011). These gaps raise questions about the importance of developmental timing of interpersonal stress which has great implication on the effectiveness of intervention efforts and policies to alleviate them.

Using the person-centered longitudinal approach with LTA, this study examined heterogeneous profiles of family, community, peer, and language conflict and hassles across multiple time points of Mexican-origin youths' development. Specifically, we employed LTA to study whether individuals stay in the same latent typology (i.e., stayers) or move to another typology of interpersonal stressors across late childhood to late adolescence (i.e., transitioners) and how transitions between the interpersonal stress subgroups across developmental time affect long term mental health. We first used LCA to identify latent interpersonal stress subpopulations based on response patterns of observed variables at each assessment point from the 5th to 12th grades. We then used LTA to characterize discrete subgroups of interpersonal stress over time. Furthermore, we investigated the relations among group characteristics based on the change in latent group status and mental health five years after grade 12.

LCA and LTA are exploratory analysis. Although we did not have specific hypothesis about the typology of stressors and transitions over time, we expected that there would be variability in exposure to family conflict, peer conflict, discrimination from peers, and language hassles, such that some adolescents may be higher or lower on all four stressors, whereas others may experience variability across stressors. We further expected that, in our diverse community-based sample of Mexican-origin youth, some would experience stability in their exposure to stressors from late childhood to late adolescence, some would experience mitigation of stressors (transitioning to a lower stress context), and some would experience intensification of stressors (transitioning to a higher stressor context). Based on theory and research on the cumulative nature of stress (Zeiders et al., 2013), we expected that youth who remained in higher interpersonal stress profiles across late childhood to late adolescence would report the highest internalizing and externalizing symptom severity, whereas youth who remained in lower

interpersonal stress profiles would have the lowest symptoms severity as young adults. For youth who transitioned into or out of high interpersonal stress profiles, we explored if the number of years of interpersonal stress exposure would relate to young adult psychopathology symptoms in a dose-response relationship, such that more years exposed to higher interpersonal stress would link to greater symptom severity. Alternatively, we questioned if timing of the transition into and out of interpersonal stress was more impactful to later young adult mental health than cumulative exposure to interpersonal stress, wherein the same transition during an earlier or later stage of adolescence would differentially impact internalizing and externalizing symptoms. Studies have identified youth sex, nativity, and economic hardship as risk factors that related to interpersonal stress (Bascio et al., 2013; Bolger et al., 2008; Dinh et al., 2020; Lempers et al., 1989) or behavioral problems (Gonzales et al., 2012; Zahn-Waxler et al., 2008; Zeiders et al. 2013). Thus, we included these as control variables to rule out their confounding effects.

METHOD

Participants

Data for this study came from a larger longitudinal study investigating the role of family, culture, and context in the lives of Mexican-origin youth and their families. Using a stratified random sampling strategy, the youth were recruited from rosters of 47 schools that served ethnically and linguistically diverse communities (Roosa et al., 2008). Youth were eligible if they were in the 5th grade and had no severe learning disability; both biological mother and father identified as Mexican or Mexican-origin; and the child lived with the biological mother. This study consisted of 749 youth and their biological mothers. Most mothers (74.4%) were born in Mexico and most youth (70.2%) were born in the U.S. At baseline, the mean age of the youth

was 10.4 years (*SD* = 0.55) and 49% was female; the mean age of mothers was 35.9 years (*SD* = 5.81); annual family incomes ranged from <$5,000 to >$95,000 (median $25,001 – $30,000).

Procedure

The larger study included six waves of data collection between 2004 and 2018, but the 5th wave was designed primarily as a retention and engagement effort with limited data evaluation. The current study included five waves of data: when youth were in the 5th grade (W1; *N* = 749), 7th grade (W2; *n* = 710), 10th grade (W3; *n* = 641), 12th grade (W4; *n* = 636), and five years post high school (W6; *n* = 394). The retention rates were 95%, 85%, 85%, and 53%, respectively.

Assent (for youth younger than 18-year-old) and consent forms were collected from the youth and their parents, with all materials available in both English and Spanish. Each participating member received $45, $50, $55, and $60 for participating in Waves 1–4, respectively. At Wave 6, youth received $75 for participating. Roosa et al. (2008) provided details regarding recruitment and other study procedures. All procedures were reviewed and approved by the university's institutional review board and conformed to American Psychological Association ethical standards.

Measures

Interpersonal stressors (W1 – W4). The Multicultural Events Scale for Adolescents (MESA; Gonzales et al., 2001) was used to assess culturally and developmentally salient domains of interpersonal stress: family, peers, and language. Youth indicated whether each stressful event *happened* or *did not happen* in the past three months. Each subscale was the sum of events endorsed for the domain: five events for family conflict (e.g., "members of your family hit or hurt each other"), thirteen for peer conflict (e.g., "you were pressured against your will to

join a gang"), and seven for language hassles (e.g., "a teacher put you down for not speaking English or not speaking it well").

Peer ethnic-racial discrimination was assessed based on five items adapted from Hughes and Dodge's (1997) Racism in the Workplace Scale and Klonoff and Landrine's (1995) Schedule of Sexist Events. Using a 5-point Likert scale, youth rated how true each statement was (e.g., "Kids at school called you names because you are Mexican or Mexican American"). Cronbach's alphas (α) ranged .76 to .78.

Internalizing and Externalizing Symptoms (W6). The Young Adult Self-Report (Achenbach & Rescorla, 2003) was administered to assess internalizing problems (39 items; e.g., "I feel lonely"; α = .92) and externalizing problems (35 items; "I get into many fights"; α = .88), using a 3-point Likert scale. Sum scores across the items were created.

Demographic Covariates (W1). Mothers reported on youth's biological sex and youth's country of birth (i.e., Mexico or U.S.). Mother's report of the 20-item economic hardship scale was used as an indicator of socioeconomic status (Barrera et al., 2001), pertaining to inability to make ends meet, not enough money for necessities, economic adjustments and cutbacks, and financial strain. Participants were asked to rate each item on a 5-point Likert scale. Cronbach's alpha was .83.

Internalizing and Externalizing Symptoms Covariates (W1). Mothers and children completed the Diagnostic Interview Schedule for Children (Bravo et al., 2001; Shaffer et al., 2000), which is based on the Diagnostic Statistical Manual, 4th Edition. Internalizing symptoms score was the sum of the anxiety, mood, trauma, and eating disorder symptom counts and externalizing symptoms score was the sum of conduct and attention deficit disorder symptom counts on the past 12 months based on child and mother combined reports.

Analytic Plan

The youth participants were recruited from 47 schools. Due to high mobility of the sample (White et al., 2014, 2022) and long timespan of the study, the youth did not stay in the same elementary, middle, or high schools across waves. Consistent with unshared mobility and school transitions, the intraclass correlations (ICC) of the variables by school across assessments were low (M_{icc} = .02). Additionally, it is not feasible to handle cross-classification clustering. We applied LTA to explore the patterns of transitions in interpersonal stressors from late childhood to late adolescence. As a longitudinal modeling technique, LTA is an extension of LCA, studying movement among latent classes over time. To perform LTA, researchers generally conduct LCA for each time point first and then examine the probability of transitioning from each class at one time point to all other classes at the next time point.

Missing Data. We used Mplus 8 (Muthén & Muthén, 1998-2017) to conduct LCA/LTA and examine the association of transition patterns and early adult internalizing and externalizing problems. We applied two modern approaches to handle missing data. We first handled missing data for the interpersonal stressor variables used in the LCA/LTA with multiple imputations (MI) using SAS due to the limitation of LCA/LTA not being able to handle missing data with full information maximum likelihood (FIML). We included demographic and family variables that might be related to the missingness as auxiliary variables in the imputation model to increase the accuracy of the procedure (Collins et al., 2001). The auxiliary variables included child nativity, family income, parent education, household structure (one vs. two parents), economic hardship, family stress, parent depression, and neighborhood quality. A total of 100 datasets were imputed, and a combined dataset with averages of each variable was produced for conducting LCA/LTA; categorical and count variables were rounded to the nearest integer and continuous

variables were standardized. In general, for the MI analysis, the hypothesized model is conducted with each imputed dataset and the estimates (coefficients and standard errors) are combined across all imputed datasets. However, it is not feasible to combine the results of MI analysis in a post-hoc fashion for LCA/LTA such that slightly different latent class models might be selected for each imputed data, leaving no logical way to combine results across imputations. We recognized that we only partially accounted for the uncertainty of parameter estimates. Missing data for the rest analyses beyond LCA/LTA were handled with FIML.

Latent Class Analysis (LCA). We first conducted LCA, which explored unobserved latent classes of youth with similar patterns of the scores on interpersonal stressors, separately for Waves 1–4. The resulting class solutions were then used to guide the number of classes to be used in the LTA. The interpersonal stress variables included three count variables (family conflict, peer conflict, language hassles) and one continuous variable (peer ethnic-racial discrimination). LCAs with 1- to 4-class model were performed, successively, at each grade. Sample adjusted Bayesian information criteria (saBIC; Sclove, 1987), Lo-Mendell-Rubin (LMR; Lo et al., 2001), and interpretability of classes were used to determine the optimal number of classes (Tein et al., 2013). In addition, entropy was used to gauge whether the latent classes were highly discriminating (Nylund et al., 2007; Ram & Grimm, 2009).

Latent Transition Analysis (LTA). Based on the class solutions of separate LCAs from Waves 1–4, LTAs were conducted to investigate patterns of transitions between interpersonal stress subtypes over time. Number of classes at each grade were specified based on LCAs. To avoid problems with model identification, variable means were constrained to be equal across grades to reduce the number of parameter estimates and obtain model stability (Nylund et al., 2007).

Predicting Distal Outcomes. Last, we investigated whether transitions in and out of interpersonal adversity identified in the LTA model mattered for young adult internalizing and externalizing symptoms, separately. This step consisted of multiple regression with LTA class membership being a categorical (nominal) predictive variable (using dummy code with the stable high interpersonal stress group designated as the reference group), controlling for demographic and W1 internalizing or externalizing covariates to rule out confounding effects. Beforehand, we also examine the association of LTA class membership and the covariates. All predictors were allowed to correlate.

RESULTS

Latent Class Analyses

Fit statistics for LCAs with models of 1- to 4-class solutions and their proportions at each wave are shown in Table 1. At W2 and W4, the 2-class models were the optimal choice based on the combination of goodness-of-fit indices. At W3, although the LMR was significant for the 3-class model, entropy decreased below .70; therefore the 2-class model was also chosen. At W1, both the 2- and 3-class models fit the data with similar LMR and entropy, so we examined the class characteristics for both. In the 2-class model, a low and high interpersonal stress group emerged. In the 3-class model, the low stress group remained whereas the high adversity group split. Both high stress groups remained higher on all variables compared to the low stress group; the main difference between the two groups was the level of peer conflict. The 2-class model was then selected at W1 for it being a more parsimonious model and consistent with other three time points. Table 2 presents the means of the four stressor variables for the low and high interpersonal stress classes for each wave and the percentage of participants in each class.

Latent Transition Analyses

Based on findings from the LCAs, the LTA model specified two classes at Waves 1-4, respectively. The resulting model had an entropy of .80, an adequate level of certainty about class membership (Celeux & Soromenho, 1996). Consistent with our expectations, some youth transitioned into and out of high levels of family, peer, and community stressors. The percentage of participants in the low and high interpersonal stress classes at each wave determined by the LTA model was similar to the percentage of participants in these classes as determined by the separate LCAs, with discrepancies less than 6%. Note that we examined LTA with alternative combinations of classes (i.e., 3 classes at W1); the model with two classes at all waves remained the most optimal solution.

Of the sixteen possible latent transition combinations (i.e., 2 x 2 x 2 x 2), six had class sizes at least 5% of the overall sample and together comprised 85% of the sample (N = 634). Of the six classes, two consisted of stayers, participants who either stayed in low interpersonal stress across waves (n = 274) or in high interpersonal stress across waves (n = 110). These two groups accounted for 60% of the six classes. The remaining 40% of participants were transitioners. Three groups transitioned to low interpersonal stress: 86 participants transitioned to low stress at grade 7, 42 transitioned to low stress at grade 10, and 76 transitioned to low stress at grade 12. One group of 46 participants transitioned to high stress at grade 10. The 634 youth under these 6 classes were retained for the analyses of predicting youth behavioral outcomes. The sample sizes for the rest of the classes were too small for reliable predictions. Giving the entropy ≥ .80, we assigned the youth to the most likely class based on the highest estimated posterior probabilities using the 'SAVE=CPROBABILITIES' command (Asparouhov & Muthén, 2013; Clark & Muthén 2009). We then examined the association of LTA class membership with covariates and distal outcomes as shown in the next section. We noted that a better method of conducting the

association is to account for the uncertainty of membership (i.e., BCH method; see Asparouhov & Muthén, 2021). However, due to the extremely low numbers of individuals in some of the 16 transition patterns, such model could not be estimated.

Relation of LTA class membership with covariates and young adult mental health

We examined how the LTA class membership related to baseline covariates and whether transitions between interpersonal stress impacted later mental health. The associations of LTA transition patterns and covariates are provided in Supplemental Material. Briefly, child gender and nativity differed minimally across transition patterns, whereas family economic hardship and child internalizing and externalizing problems varied greatly across the transition patterns. Not surprisingly, youth who started with lower interpersonal stress had lower baseline internalizing and externalizing problems. However, differences in economic hardship at 5th grade between transition groups was unpredictable, with no clear link to interpersonal stress levels at any grade.

Regression coefficients and test statistics of the covariates and transition patterns in predicting young adult internalizing or externalizing problems are presented in Table 3. When compared to the high stable stress group, there were significantly lower levels of young adult internalizing and externalizing symptoms among the following three groups: low stable stress, high to low stress at grade 7, and high to low stress at grade 10. There was no significant difference between the high stable stress group and high to low stress at grade 12 as well as low to high stress at grade 10. For the covariates, only youth gender, nativity, and internalizing problems were marginally related to internalizing problems at W6.

DISCUSSION

This study sought to uncover the latent transition typologies in developmentally and culturally salient interpersonal stressors from late childhood to late adolescence and explore

whether transitions in interpersonal stress typology predicted young adult internalizing and externalizing symptoms.

Latent Transition Patterns of Interpersonal Stressors

Findings from this study suggest there is substantial diversity in Mexican-origin youths' exposures to interpersonal stressors from late childhood to late adolescence. The largest group (43%) consisted of youth who remained in the low stress profiles across grades 5 to 12. While 17% of the Mexican-origin youth were in relatively high stable stress profiles, 33% transitioned from high stress contexts to low ones, transitioning in either early, middle, or late adolescence. Moreover, a small proportion of the youth (7%) started out in relatively low stress contexts but transitioned to relatively high stress contexts in middle adolescence. Altogether, approximately three quarters of the sample was categorized in the relatively low interpersonal stress class at grade 12, indicating the majority of the youth were reporting low levels of peer hassles, family conflict, language hassles, and ethnic-racial discrimination by late adolescence.

Relation between Interpersonal Stress Transitions and Young Adult Mental Health

The relation between young adult mental health and membership in the subpopulations with various patterns of interpersonal stress replicates, to some degree, prior work on the cumulative nature of stress (Zeiders et al., 2016). As expected, those in the consistently low stress LTA profile had the lowest young adult internalizing and externalizing scores, whereas those in the consistently high stress LTA profile had the highest scores. These relations emphasize the important impact of adolescent interpersonal stress on wellbeing, not only during adolescence but many years later during young adulthood.

We moved beyond the cumulative model by examining transitions in interpersonal stress. For youth who experienced a transition in interpersonal stress, the number of years exposed to

stress did not directly link to severity of young adult mental health symptoms; that is, it was not a simple dose-response cumulative relationship. Our results suggest that early and middle adolescence may be a developmentally sensitive period in which to experience a transition in interpersonal stress – whether that transition is good (toward lower interpersonal stress) or bad (toward higher interpersonal stress) – relates to later young adult mental health. Prior work suggests that early and middle adolescence is a time when youth are exploring sexuality and romantic relationships, ethnic-racial identity, and negotiating autonomy within family contexts, reflecting the key role of interpersonal skills and potential long-term impact of interpersonal stress (Steinberg & Morris, 2001). Transitions out of high interpersonal stress at grades 7 and 10 were beneficial for young adult mental health, with significantly lower symptoms compared to the high stable stress group. Unexpectedly, a similar transition at grade 12, even though it resulted in a lower dosage of stress, had no benefit for young adult internalizing and externalizing symptoms. Thus, our findings are consistent with the salience of the timing of the transition.

Also highlighting the salience of developmental timing, the group that transitioned into high interpersonal stress at grade 10 appears to have gained little benefit from prior years in low stress. Despite the fact that these youth started in low stress contexts in late childhood and early adolescence (and experienced a similar dose of higher stress to the group that transitioned from high to low in 10th grade), their transition into high stress around middle adolescence was associated with having young adult internalizing and externalizing scores equal to their peers who remained in high stress contexts from grades 5 to 12. Specifically, the transition at grade 10 into high interpersonal stress was so costly that youth did not experience any detectable benefit from their earlier years being characterized by low interpersonal stress. One possible explanation

is that during early and middle adolescence, the importance of autonomy, peer groups, and ethnic-racial discrimination (White et al., 2014) continues to increase along with the subsequent necessity to navigate new interpersonal situations with peers, parents, and the larger community (Rubin et al., 2006), which leads to opportunities for developing cognitive schema regarding relationships. Cognitive schema are pervasive patterns of thinking about oneself and one's relationships with others that help organizing and interpreting information (Young et al., 2003; Calvete et al., 2013), and the development of negative schemas has been linked with later mental health (Hawke & Provencher, 2011). Alongside these changes, adolescence is considered a sensitive period for changes to the stress response system and for altering life history strategies that could lead to internalizing and externalizing phenotypes (Del Guidice et al., 2011). Early and middle adolescence is an important time for these foundational experiences regarding relationships (Rubin et al., 2006) that could impact cognitive schema, life history strategies, and physiological responses.

For youth who transitioned into low interpersonal stress by grade 7 or grade 10, they have ample adolescent years left for new – less stressful – interpersonal experiences and development of the stress response systems. On the other hand, for adolescents who remained in high interpersonal stress environments until late adolescence, many new, developmentally salient interpersonal experiences and further development of stress-response systems (Del Guidice et al., 2011) occurred within stressful contexts. These impacts might have carried into young adulthood and manifested as mental health symptoms. Similarly, detrimental, transitioning to a high stress category at grade 10, with remaining years for experiencing new interpersonal situations, allows for a multitude of opportunities to form conflict-related beliefs about oneself and relationships with others and further alter life history strategies (Del Guidice et al., 2011).

Family, school, and community interventions designed to support youth mental health by reducing various forms of interpersonal stressors (see Ellis 2019 for a discussion) or improving coping skills to manage unchangeable stressors, rest, in part, on the assumption that reduction of these stressors or more adaptive responses to stressors will promote better mental health (National Research Council & Institute of Medicine, 2009; McLaughlin & Hatzenbuehler, 2009). Although extensive research has explored how changes in adaptive coping can impact mental health (Gu et al., 2015; Robinson et al., 2015), limited research has been able to test the assumption regarding changes in interpersonal stressors or to examine whether the timing of mitigation matters. Our findings are consistent with the possibility that youth would benefit from intervention programs that alleviate interpersonal stress – including family conflict, peer hassles, language hassles, and exposure to ethnic discrimination – alongside programs that prevent exposures to these interpersonal adversities. Such interventions are particularly important to consider given the central role of the family, language fluency, acceptance from peers, and exposure to cultural stressors that are pertinent to the everyday experiences of Mexican-origin youth. Importantly, youth will likely benefit most when interventions occur in early and middle adolescence, a potentially critical period for healthy relationships in terms of later emotional wellbeing. However, it is also likely important to consider the timing of such interventions for Mexican-origin youth in the context of other transitions these youth might experience, such as when they immigrated to the U.S. or if their family had recently migrated to a new community.

Limitations and Future directions

Although majority of the transitions were consistently high or low, or moving to one direction, we could not rule out that the report might indicate instability or inconsistency in self-report experiences. Also, we could not account for the data clustering effects because of the long

timespan and high mobility of the sample. We suggest replication studies to validate the transition patterns. Because some of the latent transition patterns consisted of small class sizes, we were limited to examining the effects on young adult internalizing or externalizing problems to six patterns. Future studies with larger sample sizes are necessary to replicate the findings and examine the effects of other transition patterns on long-term behavioral outcomes. Additionally, common to longitudinal studies, each individual wave represents a point-in-time assessment and additional transitions between waves would have been unobserved. Studies which allow for more frequent assessments would expand understandings of transitions in interpersonal stress and could account for greater nuances in interpersonal stressor changes. Finally, substantial attrition occurred at W6 when youth entered young adulthood (i.e., age *mean* = 22.0, *SD* = .70), mainly due to the high mobility of Mexican-origin families and the youth transitions outside of the family home, which made it difficult to reach the young adult sample. We conducted the regression analysis predicting W6 youth internalizing and externalizing behaviors with the full sample, applying FIML to deal with missing data. Simulation studies show that analyses based on listwise deletion (i.e., including only participants with no missing data) are more likely to be biased and not as efficient (i.e., a minimum variance unbiased estimator) as the maximum likelihood or multiple imputations methods (King et al., 2001; Schafer & Graham, 2002) under the missing at random mechanism (Little, 1995; Tein, 2017), even if the missing data reached 50%. The attrition analysis shows that youth who dropped out of the W6 assessment were more likely to have mothers who were born in Mexico and have families with more economic hardship. The differential attrition indicates that it was probable that the missing data in this study followed the missing at random mechanism; however, we could not fully confirm the results were unbiased without having a definitive assumption of the missing data mechanism.

Important next steps in research would include modeling the impact of evidence-based interventions that promote stress reduction on transitions in interpersonal stress. In addition to interventions focused on skill building, current findings can be disseminated to aid with societal efforts, such as programs and policies, that alleviate interpersonal stress in early to middle adolescence. To understand who might benefit the most from early intervention, research examining factors that predict who transitions and when transitions in interpersonal adversity occur (i.e., factors predicting transitions from one class to another), is vital. Future research should also examine factors that may mitigate the costs associated with experiencing high levels of interpersonal stress from late childhood to late adolescence such as religious participation, family closeness, or academic achievement. Finally, it is important to recognize that our modeling technique captured the extent to which levels of internalizing and externalizing were similar or different for those who had stable high exposures to interpersonal stressors, including discrimination from peers, and those in other groups. Such approaches are not capable of indicating if lower levels of exposure to discrimination are benign. Indeed, prior work would suggest that even lower levels of exposure to discrimination are problematic for health and well-being of racial/ethnic minorities (Benner et al., 2018).

Summary

Mexican-origin youth consistently experiencing lower interpersonal stress had the lowest young adult internalizing and externalizing scores, and those consistently experiencing higher stress had the highest internalizing and externalizing scores. For Mexican-origin youth who transitioned from lower-to-higher or higher-to-lower stress profiles, number of years of interpersonal stress was not directly linked to mental health symptoms as young adults. Transitions out of higher interpersonal stress at grades 7 and 10 benefited young adult mental health, whereas a transition

at grade 12 had no benefit. Moreover, youth who transitioned into higher interpersonal stress at grade 10 did not experience any detectable benefit from earlier years of lower interpersonal stress. Results suggest that early and middle adolescence may be a developmentally sensitive period to experience a transition in interpersonal stress; timing of the transition in interpersonal stress is as important as number of years stress is experienced.

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Table 1

Fit statistics for separate-grade LCAs with 1- to 4-class solutions and posterior probability of sample in each latent class

	Classes	saBIC	saBIC diff	LMR *p*	Entropy	Class Proportion 1	2	3	4
	1	10473							
W1-	2	9664	809	0.00	0.73	0.51	0.49		
Grade 5	3	9513	151	0.00	0.74	0.43	0.38	0.19	
	4	9461	51	0.52	0.76	0.42	0.36	0.15	0.07
	1	9237							
W2-	2	8231	1006	0.00	0.75	0.62	0.38		
Grade 7	3	8074	158	0.16	0.78	0.53	0.40	0.08	
	4	7985	88	0.10	0.82	0.50	0.38	0.08	0.05
	1	9324							
W3-	2	8556	767	0.00	0.71	0.62	0.38		
Grade 10	3	8452	104	0.03	0.65	0.52	0.31	0.18	
	4	8403	49	0.05	0.72	0.48	0.33	0.15	0.05
	1	8436							
W4-	2	7553	883	0.00	0.79	0.73	0.27		
Grade 12	3	7423	130	0.06	0.68	0.45	0.44	0.12	
	4	7375	48	0.01	0.72	0.48	0.35	0.15	0.02

Note. saBIC = sample adjusted Bayesian information criteria. LMR = Lo-Mendell-Rubin test

Table 2

Model means of interpersonal stressors from separate wave LCAs for low r and high adversity classes.

	W1—5th		W2—7th		W3—10th		W4—12th	
	Low	High	Low	High	Low	High	Low	High
Family conflict	-0.1	1.6	-1.2	0.6	-0.5	0.7	-0.9	0.7
Peer conflict	0.3	0.5	0.0	1.6	0.4	1.6	0.2	1.5
Language conflict	-0.9	0.3	-2.1	-0.1	-2.6	0.0	-3.0	-0.3
Peer-discrimination	-0.4	0.5	-0.3	0.4	-0.3	0.5	-0.3	0.7
	51%	49%	62%	38%	62%	38%	73%	27%

Note. Family conflict (5 items), peer conflict (13 items), and language hassles (7 items) were count scales; peer discrimination (5 items) was a standardized continuous scale score.

Note. Model means refer to the mean of a continuous, unlimited latent response variable so means can be less than lower censoring point.

Table 3

Interpersonal stressor transition patterns and young adult internalizing and externalizing, N=634 (reference group = stable higher)

Predictors						YA Internalizing			YA Externalizing		
Covariates						B(SE)	*p*	β	B(SE)	*p*	β
Youth Gender (0=female)						-2.09(1.07)	.051	-.10	1.21(.82)	.14	.08
Youth Nativity (0=US born)						-2.38(1.23)	.052	-.11	-1.23(.94)	.19	-.07
Economic Hardship						0.71(.55)	.20	.07	0.36(.42)	.39	.05
Externalizing Symptoms						-	-	-	0.61(.44)	.29	.08
Internalizing Symptoms						1.09(.58)	.06	.11	-	-	-
		Transition Pattern									
Latent Classes	N(%)	W1-5th	W2-7th	W3-10th	W4-12th						
Lower (stable)	274 (43%)	1	1	1	1	-5.39(1.55)	.001	-.26**	-5.74(1.19)	<.001	-.37**
Higher » lower at 7th	86 (14%)	2	1	1	1	-5.54(1.97)	.005	-.19**	-5.63(1.51)	<.001	-.25**
Higher » lower at 10th	42 (7%)	2	2	1	1	-4.18(2.04)	.04	-.13*	-4.58(1.55)	.003	-.19**
Higher » lower at 12th	76 (12%)	2	2	2	1	2.15(2.09)	.30	.06	-0.42(1.60)	.79	-.01
Lower » higher at 10th	46 (7%)	1	1	2	2	-2.74(2.39)	.25	-.07	-1.96(1.83)	.29	-.06
Higher (stable) -- Reference	110 (17%)	2	2	2	2	-	-	-	-	-	-

Note. Transition Pattern:1 = lower interpersonal stressor group; 2 = higher interpersonal stressor group; YA = young adult; B(SE) for unstandardized regression coefficients and standard errors; β for standardized regression coefficients. *significant at < .05; **significant at < .01.