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Perceived Discrimination and Mexican-Origin Young Adults' Sleep Duration and Variability: The Moderating Role of Cultural Orientations

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Abstract

Perceived ethnic discrimination is central to the experiences of Latino young adults, yet we know little about the ways in which and the conditions under which ethnic discrimination during adolescence relates to Latino young adults' sleep patterns. Using a sample of 246 Mexican-origin young adults ($M_{age} = 21.11$, $SD = 1.54$; 50% female), the current study investigated the longitudinal links between perceived ethnic discrimination and both sleep duration and night-to-night variability in duration, while also examining the moderating roles of Anglo and Mexican orientations in the associations. Results revealed that perceived discrimination predicted greater sleep variability, and this link was not moderated by cultural orientations. The relation between perceived discrimination and hours of sleep, however, was moderated by Anglo and Mexican orientations. Individuals with high Anglo and Mexican orientations (bicultural) and those with only high Mexican orientations (enculturated), showed no association between discrimination and hours of sleep. Individuals with low Anglo and Mexican orientations (marginalized) displayed a positive association, whereas those with high Anglo and low Mexican orientations (acculturated) displayed a negative association. Results suggest that discrimination has long term effects on sleep variability of all Mexican-origin young adults, regardless of cultural orientations; however, for sleep duration, bicultural and enculturated orientations are protective.

Keywords

Mexican-origin young adults; Discrimination; Sleep; Cultural orientation

Introduction

Perceived ethnic discrimination is a common experience among ethnic minority individuals within the U.S. Estimates suggest that more than half of Latino youth report discrimination experiences that include being called racially insulting names, receiving poor services at restaurants, and being excluded from school activities (Fisher, Wallace, & Fenton, 2000). A growing body of work documents the negative effects of perceived discrimination on

Latinos' physical health including internalizing and externalizing symptoms (e.g., Umaña-Taylor, Tynes, Toomey, Williams, & Mitchell, 2015; Zeiders, Umaña-Taylor, Updegraff & Jahromi, 2015b), and emerging work suggests that this stressor may also disrupt Latino youths' *sleep patterns* (Huynh & Gillen-O'Neel, 2013). Sleep is an important part of youth's health and well-being (Institute of Medicine, 2006). Fewer hours of sleep and sleep irregularity have been related to daytime sleepiness, learning difficulties, and increased stress (Carskadon, Acebo, & Jenni, 2004; Dahl, 1999; Fuligni & Hardway, 2006; Woflson & Carskadon, 1998), and long-term effects of sleep loss have been associated with heightened risks for an array of health problems (i.e., hypertension, obesity, hypertension, anxiety and depression; Institute of Medicine, 2006). Recent evidence also showed that sleep has implications for adolescent brain development (Telzer, Goldenberg, Fuligni, Lieberman, & Gálvan, 2015).

Environmental stressors are theorized to disrupt individuals' sleep patterns (Dahl & Lewin, 2002); yet, limited empirical work has examined the role of discrimination in sleep behaviors, particularly among youth. The current study focuses on Mexican-origin young adults; Latinos represent one of the largest and fastest growing ethnic minority populations in the U.S. and Mexican-origin individuals make up nearly two-thirds of the Latino population (U.S. Census Bureau, 2015). Among Mexican-origin youth, perceived discrimination emerges within a larger cultural context; a context characterized by the process of dual-cultural adaptation—adaptation to the majority culture (*acculturation*) and adaptation to (or retention of) their culture of origin (*enculturation*; Gonzales, Fabrett & Knight, 2009). Evidence suggests that cultural orientations may play a role in the ways that Latinos experience stress (Araújo Dawson, 2009; Umaña-Taylor & Updegraff, 2007). However, research rarely considers the *duality* of cultural orientations (e.g., how mainstream orientations *interact* with ethnic-specific orientations) in the stress process. Utilizing longitudinal data, the current study addressed prior limitations and examined how Mexican-origin young adults' discrimination experiences predict sleep duration and variability two years later. We also examined the moderating role of *both* Mexican and Anglo orientation in the relation between discrimination and sleep behaviors.

Perceived Discrimination and Sleep Patterns

Theoretical models of ethnic minority individuals' health and development posit that perceived discrimination impacts individuals' general well-being (García Coll et al., 1996; Pascoe & Richman, 2009; Meyers, 2009). A burgeoning body of literature supports these theoretical ideas and has linked perceived discrimination primarily to aspects of individuals' mental health (Pascoe & Smart Richman, 2009; Schmitt, Branscombe, Postmes, & Garcia, 2014); however, perceived discrimination is also theorized to impact individuals' health behaviors, including sleep patterns (Pascoe & Richman, 2009). Like other environmental stressors (Dahl & Lewin, 2002), perceived discrimination is thought to contribute to unhealthy sleep patterns because it activates rumination processes and vigilance against threat, which in turn, impede falling and staying asleep (Beatty et al., 2011; Huynh & Gillen-O'Neel, 2013; Slopen et al., 2015).

Limited empirical work among adults supports theory; in a cross-sectional examination of African American and White adults, perceived racial discrimination related to less Stage 4 sleep and greater fatigue (Thomas, Bardell, Anocoli-Israel, & Dimsdale, 2006). Similarly, among African American, Caucasian, and Chinese women, self-reported chronic discrimination was prospectively related to more sleep complaints and night awakenings (Lewis, Troxel, Kravitz, Bromberger, Matthews, & Hall, 2013). Among youth, even fewer studies have examined the link between discrimination and sleep, and there remains no longitudinal study to date. Among Latino and Asian American youth, discrimination experiences have been linked to concurrent sleep quality and sleep duration (Huynh & Gillen-O'Neel, 2013): Self-reports of both subtle and overt discrimination related to youths' poorer sleep quality, whereas only subtle discrimination related to fewer hours of sleep. In a representative sample of youth in Brazil, discrimination in the past 30 days related to greater self-reported sleep difficulty (Bittencourt et al., 2009). The findings suggest that discrimination may be an important correlate of youths' sleep behaviors; however, the long-term implications of discrimination on youths' sleep remain unknown.

Cultural Orientations as Moderators in Stress Processes

In this study, we examined the role of young adults' cultural orientations in the links between ethnic discrimination and sleep behaviors. The duality of orientations for Mexican-origin individuals emerges from a cultural adaption process that involves navigating acculturation (adapting to the mainstream culture) and enculturation (adapting or retaining the culture or origin) *simultaneously* (Gonzales et al., 2009; Knight, Jacobson, Gonzales, Roosa, & Saenz, 2009). Individuals who display strong mainstream orientations while also displaying strong orientations to their culture of origin have been characterized as *bicultural* (Coatsworth, Maldonado-Molina, Pantin, & Szapocznik, 2005). Those with strong mainstream orientations, but weak ethnic orientations have been characterized as *acculturated*, and individuals with weak mainstream orientations but strong ethnic orientations are characterized as *enculturated*. These dual-orientation groupings are theoretically meaningful in relation to individuals' well-being, as scholars have hypothesized that bicultural Latino individuals, especially adolescents and young adults, possess skills and resources associated with both cultures, and thus may navigate the challenges of day-to-day life more readily (Buriel, 2012; Padilla, 2006).

In line with these ideas, Mexican-origin young adults' cultural orientations may influence their appraisals of stressors and their efficacy and resources for coping with stressors (Padilla, 2006; Slavin, Rainer, McCreary, & Gowda, 1991). For example, cultural orientations may provide Mexican-origin young adults a lens through which to view and understand events; when they perceive discrimination, its meaning may be interpreted through their cultural orientation configuration. If individuals are strongly and more exclusively oriented to the mainstream culture, experiences of ethnic-based discrimination may be particularly harmful because they create dissonance and a sense of alienation: Although the individual's identity is strongly connected to the dominant culture, others treat them as cultural outsiders in ethnic-based discrimination (Derlan, Umaña-Taylor, Toomey, Updegraff, Jahromi, & Flores, 2014). However, if individuals' cultural orientations encompass both the mainstream culture *and* their culture of origin, the impact of

discrimination may be lessened because their bicultural orientation provides a second cultural group to turn to for affirmation and support. Bicultural individuals also may be better able to cope with discrimination than their enculturated or acculturated counterparts because they have multiple aspects of cultural identity on which to draw (Padilla, 2006).

Empirical work examining cultural orientations as moderators of stress processes among Latinos is limited and, when examined, the focus tends to be on the moderating role of either mainstream *or* culture-specific orientations rather than the *interplay* between them. Findings from this literature have revealed, for instance, that among Dominican immigrant women, enculturative behavioral orientations (i.e., Spanish media and music use) interacted with everyday discrimination to predict feelings of stress (Araújo Dawson, 2009); here, enculturative orientations proved protective, mitigating the link between discrimination and feelings of stress. In another study of primarily Mexican-origin adults, Anglo orientations moderated the association between perceived discrimination and acculturative stress, with Anglo orientations operating as a protective factor to minimize the relation between discrimination and feelings of stress (Torres, Driscoll & Voell, 2012).

Studies of Latino youth and young adults have also found that cultural orientations relate to experiences of ethnic discrimination and interact with discrimination experiences in predicting well-being. For instance, among Latino males, but not females, acculturative and enculturative orientations, separately interacted with discrimination to predict depressive symptoms and self-esteem (Umaña-Taylor & Updegraff, 2007): Acculturative orientations exacerbated the links between discrimination experiences and maladjustment (i.e., depressive symptoms, low self-esteem), whereas enculturative orientations weakened the links between discrimination and maladjustment. In a recent longitudinal examination, discrimination experiences interacted with Mexican-origin adolescent mothers' acculturative orientations to predict ethnic-racial identity affirmation (Derlan et al., 2014). Specifically, when adolescent mothers reported higher Anglo orientations, higher discrimination predicted more negative feelings about their ethnic-racial identity one year later.

Together, these findings point to the moderating role of cultural orientations in the relation between experiences of a sociocultural stressor and well-being in adolescents and adults. Note, however, that although studies have examined both acculturative and enculturative orientations, they have investigated them in isolation or as independent influences, and we know little about how the *interplay or interaction* between them may have implications for stress processes. Examination of the interaction of acculturative and enculturative orientations, however, can illuminate the role of a *bicultural orientations* in stress processes.

The Current Study

Guided by theory on the role of perceived discrimination in minority youths' health (García Coll et al., 1996; Pascoe & Richman, 2009; Meyers, 2009) and models of Latino cultural adaption (Gonzales et al., 2012; Knight et al., 2009), the current study addressed two goals. First, we examined the longitudinal relations between perceived ethnic discrimination and Mexican-origin young adults' sleep patterns (i.e., average hours of sleep; night-to-night variability in sleep duration). We hypothesized that perceived discrimination would be

related fewer hours of sleep on average and greater variability in sleep duration two years later. Given that sleep patterns differ by age (Ohayon, Carskadon, Guilleminault, & Vitiello, 2004), gender (Reyner, Horne, & Reyner, 1995), and family socio-economic status (Mezick et al., 2008), each of these factors were included as covariates. We also controlled for prior levels of sleep duration/sleep variability as well as concurrent depressive symptoms, given that depression has been linked to increases and decreases in sleep (Kaneita et al., 2006). Our second goal was to examine the moderating role of cultural orientations in the links between perceived discrimination and these sleep outcomes. We focused on both aspects of Mexican-origin young adults' cultural orientations—Anglo and Mexican—to examine if a bicultural orientation configuration (high Anglo orientation-high Mexican orientation) had implications for discrimination-sleep linkages. Specifically, we tested the hypothesis that the association between discrimination and sleep would be weakened for individuals who reported both strong Anglo and strong Mexican behavioral orientations.

Method

Participants

Data came from a longitudinal study of family processes and youth development in Mexican-origin families ($N = 246$; *Author citation*). Mothers, fathers, and two siblings (younger and older siblings) were recruited from junior high schools and parochial schools in and around a large southwestern metropolitan area. Eligibility requirements included that (a) the younger adolescent and at least one older adolescent sibling were living at home with their biological mothers and biological or long-term adoptive fathers (i.e., 10 years or more), (b) mothers were of Mexican origin; and (c) fathers were working at least 20 hours/week.

Given our interest in understanding patterns in young adulthood, the current study utilizes data from the older sibling during Phase 3 (P3) and Phase 4 (P4) of data collection, when the participants averaged 21.11 ($SD = 1.54$, Range = 18.25 to 26.25) and 23.01 years old ($SD = 1.54$; Range = 20.17 to 28.33 years old), respectively. At P3, young adults (50 % female) came from a range of socioeconomic levels, with a median annual household income of \$52,640 ($SD = \$51,411$; range = \$0 to over \$250,000). Most were born in the U.S. (53.7%) and preferred to be interviewed in English (87.6%). Young adults' average level of education was 12.28 years ($SD = 1.17$; some post high school training, but no degree), 40% reported currently being in school, and most were employed (78.3%).

The sample at P3 included 75% of the original 246 families ($N = 185$) from Phase 1 (P1) and 70% ($N = 173$) participated at P4. Those who did not participate: could not be located ($n = 44$ at P3; $n = 45$ at P4), had moved to Mexico ($n = 2$ at P3; $n = 4$ at P4), could not presently participate or were difficult to contact ($n = 5$ at P3; $n = 12$ at P4), or refused to participate ($n = 10$ at P3; $n = 12$ at P4). We examined differences between participating and non-participating young adults on P1 family demographics (parental education, household income), P1 indices of sleep, P1 Anglo orientation, and P1 Mexican orientation. At P3, participating adolescents differed from non-participating adolescent on P1 maternal education ($M = 10.91$, $SD = 3.74$ versus $M = 9.40$, $SD = 3.55$), P1 paternal education ($M = 10.91$, $SD = 3.74$ versus $M = 9.40$, $SD = 3.55$), P1 family income ($M = \$62,776$, $SD = \$51,720$ versus $M = \$39,402$, $SD = \$25,793$, respectively), P1 Anglo orientation ($M = 4.03$,

$SD = 57$ versus $M = 3.74$, $SD = .88$), and P1 average hours of sleep ($M = 8.46$, $SD = .89$ versus $M = 8.72$, $SD = 1.03$). At P4, similar differences were observed; participating families differed from non-participating families on P1 maternal education ($M = 11.14$, $SD = 3.58$ versus $M = 9.13$, $SD = 3.66$), P1 paternal education ($M = 10.81$, $SD = 4.2$ versus $M = 8.46$, $SD = 4.25$), P1 family income ($M = \$61,377$, $SD = \$48,857$ versus $M = \$42,761$, $SD = \$36,456$), P1 Anglo orientation ($M = 3.74$, $SD = .86$ versus $M = 4.04$, $SD = .57$) and P1 hours of sleep ($M = 8.39$, $SD = .90$ versus $M = 8.81$, $SD = .96$). Because participating families reported higher maternal education and family income at P1 as compared to non-participating families at P3 and P4, we controlled for P1 family socio-economic status in all analyses.

Procedures

Data were collected using two procedures at each phase. First, family members participated in separate in-home interviews conducted by bilingual interviewers who used laptop computers to record responses. Informed consent was obtained from each family member prior to their interview. All items were read aloud in participants' preferred language (English or Spanish). To collect data on young adults' sleep patterns, a seven-day phone diary protocol was used. In the 2-3 weeks following the home interview, young adults were telephoned on seven evenings (five weekday nights excluding Friday, and two weekend evenings) over a three to four week period and asked to report on their activities during the prior 24-hour period (5pm to 5pm). Family members each received \$75 for their participation in the in-home interview and \$75 for their participation in the phone protocol. The Institutional Review Board approved all procedures.

Measures

Perceived discrimination (P3)—The Perceived Discrimination Scale (Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001), which was adapted to be relevant to Latinos (e.g., Umaña-Taylor & Updegraff, 2007), was used to assess young adults' perceptions of discrimination at P3. On a scale ranging from 1 (*almost never*) to 4 (*very often*), young adults responded to 8 items that assessed discrimination in the past 12 months (e.g., "How often has someone said something bad or insulting to you because you are Hispanic/Latino?"). Items were averaged such that higher scores indicated greater discrimination. The scale demonstrated adequate reliability in the current sample ($\alpha = .84$).

Cultural orientations (P3)—The Acculturation Rating Scale for Mexican Americans-II (Cuéllar, Arnold, & Maldonado, 1995) was used to assess young adults' cultural orientations at P3. On a scale ranging from 1 (*not at all*) to 5 (*extremely often or almost always*), young adults reported on their *Mexican cultural orientation* (17 items, "I enjoy speaking Spanish;" "My family cooks Mexican food") and their *Anglo cultural orientation* (13 items, "I enjoy speaking English" "My friends are of Anglo origin"). Items within each subscale were averaged with higher scores reflecting stronger orientations. Both subscales demonstrated good reliability ($\alpha_{\text{Anglo}} = .88$, $\alpha_{\text{Mexican}} = .89$).

Sleep duration and variability (P4)—Young adults' sleep was assessed during the 7-day phone protocol. In line with research using self-report (Knutson & Lauderdale, 2007;

Lauderdale, Knutson, Yan, Liu, & Rathouz, 2008), participants were asked on each of the nightly phone calls, “What time did you go to sleep last night?” and “What time did you get up this morning?” Sleep duration was calculated based on the amount of time in between reported bedtime and wake time for each day, and in the analyses, we used the mean duration (in hours) across the seven calls. To assess sleep variability, we calculated a linear trajectory of each young adult's nightly sleep duration across the 7 days using a standard regression (*Author citation*). This yielded a residual estimate of each individual's linear slope, which reflected how much each individual varied from his/her own overall average duration of sleep across the 7 days. We used these residualized estimates in the analyses, with higher values indicating greater night-to-night variability in sleep duration.

Covariates—Young adults' gender and age, family socio-economic status, P1 sleep duration and variability and P4 depressive symptoms were included as controls in all analyses. Family socio-economic status (SES) at P1 was computed using mothers' and fathers' highest educational level and annual family income. Specifically, we standardized maternal and paternal education levels and family income (after transforming to correct for skewness) and computed an average across all three scores ($\alpha = .78$). The Center for Epidemiological Studies Depression Scale (Radloff, 1977) was used to assess young adults' depressive symptoms. Respondents rated the frequency that each of 20 items (e.g., “I felt lonely”) occurred on a 4-point scale in the past month (0= *Rarely or none of the time*, 3 = *Most of the time*), with high scores indicating more depressive symptoms. The scale demonstrated adequate reliability in this study ($\alpha = .91$). P1 sleep duration and sleep variability were assessed with the same procedures as P4 (described above).

Results

Table 1 presents descriptive information for the study variables. The overall mean of perceived discrimination was relatively low ($M = 1.46$), but approximately 72.8% of young adults reported at least one experience of discrimination in the past 12 months; that is, they endorsed “sometimes”, “often” or “very often” on at least one discrimination item. On average, youth reported relatively high orientations to both Anglo and Mexican cultures, and these orientations were strongly negatively correlated. Finally, this sample of young adults exhibited an average of about 8 ½ and 8 hours per night at P1 and P4, respectively, and substantial night-to-night variability in sleep, particularly at P4. Correlations revealed that P3 perceived discrimination was positively related to young adults' P4 sleep variability, but not to sleep duration.

To address our research questions, we conducted a path model in *MPLUS 7.2*. Specifically, sleep variability and sleep duration at P4 were regressed on P3 ethnic discrimination, P3 Mexican orientation, P3 Anglo orientation. To examine how Mexican and Anglo orientations interacted to moderate the relation between discrimination and sleep behaviors, we included a three-way interaction (discrimination X Mexican orientation X Anglo orientation) and all possible two-way interactions (i.e., discrimination X Anglo orientation, discrimination X Mexican orientation, Anglo orientation X Mexican orientation). We controlled for young adults' age, gender, family SES, P1 sleep behaviors, and P4 depressive symptoms. All independent variables were centered, and significant interactions were

probed using simple regression slopes (Aiken & West, 1991). Missing data were handled using full information maximum likelihood (Enders, 2010). To examine the fit of the model, multiple fit indices (chi-square test, CFI, RMSEA, and SRMR) were used; good (acceptable) model fit is reflected by a non-significant chi-square test, CFI greater than .95 (.90), RMSEA less than .05 (.08), and SRMR less than .05 (.08; Hu & Bentler, 1999; Kline, 2005).

Figure 1 presents path analysis findings. Model fit indicated good fit. Results indicated that P3 ethnic discrimination significantly predicted P4 sleep variability, controlling for age, gender, SES, current depressive symptoms and prior sleep variability. Mexican and Anglo orientations did not interact with discrimination to predict sleep variability. For sleep duration, there was no significant main effect for discrimination; however, discrimination interacted with Mexican and Anglo orientation to predict duration, controlling for age, gender, SES, current depressive symptoms, and prior sleep duration. To probe the interaction, we examined simple regression slopes. These are typically examined at 1 standard deviation (*SD*) above and below the mean of the moderator (Aiken & West, 1991). However, because Anglo and Mexican orientation were positively skewed, scores at 1*SD* below the mean of each orientation were actually moderate rather than low levels of Anglo and Mexican orientations. Given that we were trying to capture theoretically meaningful groups (i.e., enculturated, acculturated), we plotted the regression slopes at 1*SD* above the mean, and 2 *SD* below the mean. As seen in Figure 2, probing revealed that the relation between P3 discrimination and P4 sleep duration varied based on both Anglo and Mexican orientations. Specifically, among young adults who reported both weak Mexican and Anglo orientations, P3 discrimination predicted P4 sleep duration, $b = 2.51$ ($SE = 1.00$), $p = .01$. For young adults who reported strong Anglo but weak Mexican orientations, a marginally significant negative relation emerged between P3 discrimination and P4 sleep duration, $b = -.86$ ($SE = .47$), $p = .06$. Finally, for those who reported strong Mexican but weak Anglo orientations and those who reported strong Mexican and Anglo orientations, there were no associations between discrimination and sleep duration, $b = -.24$ ($SE = .33$), $p = .46$, and $b = .31$ ($SE = .29$), $p = .28$, respectively.

Alternative Models

We also examined alternative models in which P3 sleep behaviors (duration and variability) predicted P4 discrimination (not presented in figures). Neither sleep duration ($b = -.04$, $SE = .04$, $p = .29$) nor sleep variability ($b = .03$, $SE = .05$, $p = .59$) were significant predictors of discrimination, suggesting that sleep behaviors did not have a longitudinal effects on young adults' perceptions of discrimination. Further, no interactions between cultural orientations and discrimination were significant in these models.

Discussion

Discrimination experiences have been conceptualized as socio-cultural stressors that are linked to internalizing and externalizing symptoms (Umaña-Taylor & Updegraff, 2007; Zeiders et al., 2015), and growing evidence suggests that they also may disrupt healthful sleep patterns (Slopen et al., 2015). The current study extends prior work focused on discrimination and well-being by examining the *longitudinal* relations over a two-year

period between experiences of discrimination and two indices of sleep, sleep variability and sleep duration, in Mexican-origin young adults. Individuals' cultural orientations may shape the ways they perceive and cope with discrimination, and for Latino young adults, these include orientations related to the majority culture *and* their culture of origin. Thus, we examined whether Mexican and Anglo orientations operated in combination to moderate the associations between discrimination and young adults' patterns of sleep. Our findings revealed that discrimination predicted young adults' sleep variability over time, but for sleep duration, the relation was dependent upon young adults' cultural orientations. Individuals with a bicultural (high Anglo-high Mexican) and enculturated orientation (low Anglo-high Mexican) reported no association between discrimination and hours of sleep two years later; those with an acculturated orientation (high Anglo-low Mexican) reported a marginally significant negative association, and those with a marginalized orientation (low Anglo-low Mexican) reported a positive association. Our findings highlight the role of young adults' cultural orientations in the connections between a sociocultural stressor, ethnic discrimination, and sleep, an index of health and well-being in young adulthood, and they have significant practical implications for promoting coping mechanisms during this developmental period.

Prior work has documented cross-sectional and longitudinal relations between discrimination and indices of sleep among adults (Beatty et al., 2011; Slopen et al., 2015). However, only a few cross-sectional studies have examined the association in youth (e.g., Huynh & Gillen-O'Neel, 2013), and none have included sleep variability. Using longitudinal data, our findings indicated that discrimination positively predicted young adults' greater sleep variability two years later, and this association was not moderated by cultural orientations. Our findings are noteworthy given recent evidence that sleep variability, but not sleep duration, has long-term negative consequences on brain development during adolescence (Telzer, Goldenberg, Fuligni, Lieberman, & Gálvan, 2015). The relation between discrimination and sleep variability may reflect one process by which discrimination has impacts on health: Discrimination experiences may activate feelings of threat or arousal, which impedes individuals' sleep on some nights and results in the need to catch up on other nights. This association also may reflect young adults' involvement in contexts beyond the family where discrimination is more likely. That is, young adults show fluctuations in sleep duration due to spending time with friends, working, or other contexts where they are more likely to experience discrimination. We also examined an alternative model testing whether sleep predicted ethnic discrimination, and no associations were found. Thus, we can rule out the explanation that variability in sleep predicts discriminatory experiences in young adults in this sample.

Turning to sleep duration, the effects of discrimination were moderated by young adults' cultural orientations. For bicultural and enculturated young adults, there was no association between discrimination and sleep duration. However, for more acculturated youth, there was a marginally significant negative relation between discrimination and sleep duration. This relation is consistent with prior work linking experiences of discrimination to more sleep disruptions, lower sleep quality, and fewer hours of sleep (Slopen et al., 2015), and suggests that, when youth are oriented only to Anglo culture, they are at a disadvantage as compared to their bicultural and enculturated counterparts. Being more exclusively oriented to the

mainstream culture (acculturated) may make experiences of discrimination—which are likely coming from members of the mainstream culture—particularly harmful because they create dissonance and a sense of alienation (Derlan, et al., 2014). However, if individuals' cultural orientations encompass both the mainstream culture *and* their culture of origin, the impact of discrimination may be lessened because their bicultural orientation provides a second cultural group to turn to for affirmation and support. And, the benefits of Mexican American individuals' own culture or origin apply even when they are not strongly oriented to the mainstream culture given that enculturation orientation also emerged as a protective factor. Thus, it may be that high orientation to their culture of origin allows individuals to navigate and cope more readily with experiences of ethnic discrimination.

Marginalized young adults (those with low Mexican and Anglo orientation) reported an unexpected positive association linking discrimination to sleep duration. When marginalized young adults experience discrimination, they may internalize these experiences and withdraw—including through spending more time sleeping—because they lack resources and support to draw from given they are oriented to neither the mainstream nor their ethnic culture. Although our analytic models controlled for depressive symptoms, future research should test whether the links between discrimination and sleep are mediated through depression or other mental health processes in marginalized young adults.

Limitations and Future Directions

The present study provides an initial step toward understanding the effect of discrimination on young adults' sleep and the ways in which orientations to both the mainstream and ethnic cultures moderate stress processes. We provided what we believe to be the first evidence of longitudinal associations between discrimination and sleep behaviors in Mexican American young adults, and identified configurations of cultural orientations that moderate young adults' experiences of this stressor. At the most general level, our findings imply that young adults with bicultural and enculturated orientations may respond less strongly on one measure of health—sleep duration—as compared to acculturated or marginalized young adults; however, all Mexican-origin young adults, regardless of orientations, still experienced greater night-to-night variability in sleep two years later in response to discrimination.

In the face of its contributions, our study has several limitations. First, given the sample size and model complexity, we were unable to examine young adults' gender as a potential moderator. Previous research suggest that male youth report greater experiences of discrimination (Lee & Turney, 2012), may be more reactive to discrimination (Updegraff, Roosa, & Umaña-Taylor, 2011), and may be more influenced by cultural orientations in the stress process as compared to female youth (Umaña-Taylor & Updegraff, 2007). Future research examining the role of gender in the associations is greatly needed. Related, the current study did not examine the ways in which sleep behaviors may influence Mexican-origin youths' subsequent health; further research is needed to examine sleep as a possible mediator in the relation between discrimination and long term health. In regards to generalizability, the current study included young adults who came from two-parent

households. Expanding our knowledge of stressors, cultural orientation, and sleep behaviors should include young adults from diverse family structures to strengthen external validity.

Additional limitations pertain to our measures. Sleep behaviors were assessed using self-reports of bed-time and wake-time for 7 days. Our diary approach to assessing sleep behaviors across a number of days is a strength, as reliance on a single day of measurement or global self-reports of usual sleep patterns can be less reliable, particularly for assessing sleep variability (Libman, Fichten, Bailes, & Amsel, 2000). Although self-reports are correlated with objective measures of sleep (Werner, Molinari, Guyer, & Jenni, 2008), future research should include objective assessments and also examine sleep duration in order to capture night awakenings, and additional dimensions of sleep (e.g., sleep latency, sleep efficiency). Turning to measures of cultural orientations, we assessed a limited number of dimensions, focusing on behaviors in reference to the ethnic and mainstream cultures. Cultural orientations, however, involve an intertwined configuration of behaviors, values, beliefs, and a sense of belonging to culture (White et al., 2015). Future work that assesses additional dimensions of cultural orientations is an important next step.

Conclusion

Despite these limitations, our study is the first to examine the longitudinal associations between ethnic discrimination and young adults' sleep behaviors while also considering nuanced effects of cultural orientations. Our findings suggest that discrimination experiences have consequences for young adults' sleep variability. For sleep duration, however, the effect of discrimination depended upon young adults' cultural orientations; enculturated and bicultural orientations offered some protection, whereas orientations that did not include high levels of enculturation conferred some risk. The findings demonstrate that cultural orientations matter for young adults' reactions to sociocultural stressors like discrimination, and that maintaining an orientation to the culture of origin may provide resources to cope more readily with stress. Future research should continue to explore the ways multiple aspects of cultural orientations intersect to impact the health and development of Latinos across adolescence and into young adulthood.

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Figure 1.

Perceived ethnic discrimination and cultural orientations at P3 linked to Mexican-origin young adults' average sleep variability and sleep duration at P4 ($N = 246$). $\chi^2(2) = .74$, $p = .69$, CFI = 1.00, RMSEA = .00, SRMR = .01. * $p < .05$, ** $p < .01$. Young adult gender, age, and family socio-economic status included as covariates on P4 sleep variability and P4 sleep duration.

Figure 2.

Interaction between perceived ethnic discrimination, cultural orientations, and Mexican-origin young adults' average sleep duration. † slope p value = .06, *slope p value < .001.

Table 1

Correlations and Descriptive Statistic for Study Variables

	1	2	3	4	5	6	7	8	9	10	11.
1. P3 Discrimination	--										
2. P3 Mexican orientation	.17 [*]	--									
3. P3 Anglo orientation	-.33 ^{***}	-.46 ^{***}	--								
4. P4 Sleep duration	.05	-.00	.05	--							
5. P4 Sleep variability	.22 [*]	.06	.01	-.10	--						
6. P4 Depressive symptoms	.13	-.00	-.14	.02	.10	--					
7. P3 Young adults' age	-.20 [*]	-.11	-.02	-.01	.14	.01	--				
8. Young adults' gender	.24 ^{**}	-.08	-.08	-.07	-.01	-.15 [†]	-.07	--			
9. P1 Family SES	-.31 ^{***}	-.47 ^{***}	.44 ^{***}	-.04	.01	-.10	.04	-.02	--		
10. P1 Sleep duration	.11	.28 ^{**}	-.06	.05	-.11	.02	-.26 ^{**}	.02	-.25 ^{***}	--	
11. P1 Sleep variability	-.08	-.16 [†]	.05	.06	.16	.22 ^{**}	.19 ^{**}	-.15 [*]	.01	-.10	--
Mean	1.46	3.55	3.97	8.01	1.49	12.58	21.11	1.50	-.01	8.55	1.22
Standard deviation	.50	.78	.64	1.07	.83	9.57	1.54	.50	.83	.95	.67
Minimum value	1.00	1.76	1.08	5.64	.27	.00	18.25	1.00	-2.12	5.89	.19
Maximum value	3.50	4.94	4.92	13.25	5.13	48.00	26.25	2.00	2.12	13.25	4.42

Note. P1 = Phase 1; P3 = Phase 3; P4 = Phase 4; SES = Socio-economic status; Young adults' gender coded 1 = female, 2 = male.

[†] $p < .10$

^{*} $p < .05$

^{**} $p < .01$

^{***} $p < .001$