Additional Measures Details

Actigraphy measured sleep. Participants wore a Micro Motion Logger Watch (Ambulatory Monitoring, Inc. Ardsley, NY, USA) on their non-dominant wrist for seven consecutive days and nights. These devices measure motion in one-minute epochs using a zero-crossing mode. Researchers scored sleep data using the Sadeh algorithm[1] (Sadeh, Hauri, Kripke, & Lavie, 1995) in Action W-2 software version 2.7.1 (Ambulatory Monitoring). The Sadeh algorithm counts activity (*A*) within each epoch (*E*), calculated based on activity levels during the adjacent 2-minute period. Sleep parameters were calculated based on 1-minute epochs and significant movement after at least 10 minutes of inactivity. Actigraphy has been validated against polysomnography (Sadeh et al., 1995) and has demonstrated good reliability when measured over five nights or more (Acebo et al., 1999). All sleep data were scored by a pair of trained research assistants and reviewed by graduate student researchers to address inconsistencies. Objective measurement of sleep periods was cross-referenced with diary self-reports of sleep and wake times for indications of outliers or equipment malfunction (see Doane et al., 2015). Following recent recommendations (Gregory & Sadeh, 2012), the current study included multiple sleep parameters: (1) sleep onset latency (i.e., minutes spent in bed before falling asleep), (2) midpoint time (i.e., midpoint between sleep onset and waking), and (3) sleep duration (i.e., total sleep minutes, excluding wake periods). Prior to analysis, all daily sleep variables were examined for normality. Consistent with adolescent sleep research (see Bagley, Tu, Buckhalt, & El-Sheikh, 2016), values more or less than three *SD*s above or below the mean were considered outliers and winsorized to avoid biasing results (2.9% of sleep onset latency data, 0.5% of sleep midpoint data, 0.3% of sleep duration data). Overall there was excellent

[1] $A = E - 2(1/25) + E - 1(1/5) + E + E + 1(1/5) + E + 2(1/25)$, where *A* denotes activity counts and *E* denotes epoch.

study compliance with actigraphy procedures: 75.9% (n = 151) wore the watch for seven or more nights, 15.1% (n = 30) for six nights, 6% (n = 12) for five nights, 1.5% (n = 3) for four nights, and 2.4% (n = 3) for three or fewer nights. Sleep data were missing from one participant (0.5%) due to mechanical problems, one participant (0.5%) who lost the actiwatch, and six participants (3.0%) who decided not to wear the actiwatch but participated in other procedures.

Daily bicultural stress. In each bedtime daily diary report, participants were asked to respond "yes" or "no" to five items adapted from the 20-item Bicultural Stress Scale (Romero & Roberts, 2003) framed in a day-specific format (e.g., "Today I…". Items included: "did not feel comfortable with people whose culture is different from mine," "had to translate/interpret for parents," "my friends thought I was acting 'white' or 'anglo,'" "felt uncomfortable when others made jokes or put down people of my ethnic background," and "…felt pressure to speak English or Spanish better." This checklist of bicultural stress experiences was developed to represent the various dimensions of the original survey measure, including the domains of family, discrimination, dual language demands, and peers, which has been used reliably in numerous studies of Latino adolescents (e.g., Piña-Watson et al., 2013; Romero et al., 2007a, 2007b). This item-reduction approach and the checklist format is preferred in daily diary research to reduce participant burden and avoid introducing participant fatigue as a study confound (e.g., Chiang et al., 2016; Harari et al., 2016; Zeiders, 2017), particularly because participants were also asked to complete other procedures in this study (see Doane et al., 2018). For within-person analyses, the sum of "yes" responses for each day was used to measure the count of daily bicultural stressors. Each of the 5 items had < 0.8% missing data, and there were no missing data for the daily sum score (missing responses treated as zero). For between-person analyses, average daily bicultural stress was measured as the mean of each individual's daily scores. In support of convergent validity in this study, average daily bicultural stress was negatively associated with immigrant generation and parent education level (i.e., more acculturated participants, and participants with parents who completed more education, generally reported fewer bicultural stressors), and positively associated with depressive symptoms, anxiety symptoms, and general perceived stress (see Table S1). Similar to the original survey measure (Romero & Roberts, 2003), participants were also asked to indicate how stressful they perceived each situation that occurred that day to be on a scale from 0 (not at all stressful) to 10 (very stressful). These perceived stress severity ratings were used in follow-up sensitivity analyses as an alternative to the count measure (within-person and between-person).

Additional Descriptive Results

On average, 10.39 minutes passed between getting in bed and falling asleep (sleep onset latency; SOL; SD = 11.10), the midpoint (i.e., median) of the sleep period was approximately 4:00 AM (SD = 1.34 hours), sleep duration was 6.56 hours (SD = 1.02), which is below the 8-10 recommended hours for teenagers and 7-9 recommended hours for younger adults (National Sleep Foundation, 2015), and participants reported an average of 6.65 sleep problems (SD = 2.98), which is above the threshold (five) indicating clinically significant sleep problems (Buysse et al., 1989). Specifically, 67.3% of participants slept less than 7 hours per night, on average, and 73.5% reported five or more sleep problems. Participants endorsed at least one bicultural stressor on 28% of days. Regarding co-ethnic school composition, 23.6% of participants attended schools with lower than 28% Latino enrollment (-1 SD from mean), 57.3% attended schools with 28% to 77% Latino enrollment (within +/-1 SD from mean), and 19.1% attended schools with higher than 78% Latino enrollment (+1 SD from mean).

Sensitivity Analyses

All findings remained consistent when adjusting for additional covariates, including BMI, immigrant generation, parent education, depressive symptoms, anxiety symptoms, and general perceived stress at the between-person level, and dummy codes for weekend and daily caffeine use at the day level. Immigrant generation was also tested as a moderator of associations between bicultural stress and sleep. None of these interactions were significant, including for the between-person associations of average daily bicultural stress with sleep duration, sleep midpoint, sleep onset latency, or subjective sleep problems, *p*s > .68, and within-person associations of daily bicultural stress with sleep duration, sleep midpoint, or sleep onset latency that night, *p*s > .06. Finally, using perceived stress severity as an alternative measure (i.e., 0 to 10 stress rating scale, rather than number of stressors) in the same analytic models, average bicultural stress *severity* was significantly associated with more subjective sleep problems for males, $b_3 = 0.53$, $p < .05$, and daily bicultural stress severity was significantly associated with longer sleep onset latency for males, $\gamma_{11} = 0.04$, $p < .01$ (although the magnitude of these associations was relatively smaller than for the count variable); the other significant interactions reported in Tables 1-3 were not significant using the stress severity measure, *p*s > .07.

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Table S1

Summary of Demographic Information

	n	%
[a]Family national origin		
Mexican	177	85.1%
South or Central American	21	10.1%
Cuban	11	5.3%
Other	9	4.3%
Immigrant generation		
1st generation	22	10.6%
2nd generation	129	62.0%
3rd generation or above	57	27.4%
Parent education level		
Some or less than high school	70	33.7%
High school graduate/GED	45	21.6%
Some college	52	22.8%
Bachelor's	33	15.9%
Graduate education	8	3.8%
Subjective family income		
Upper/Upper-middle class	22	10.5%
Middle class	100	47.8%
Lower-middle/Working class	83	29.8%
Other	3	1.4%

Note. From Doane et al. (2018). $N = 208$. One participant did not provide demographic information. 1st generation, born outside the United States. 2nd generation, born in United States, at least one parent born outside United States. 3rd generation, both parents born in United States.

[a] Could select more than one.

Table S2

Bivariate correlations and descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Sleep onset latency (min)	--														
2. Sleep midpoint (24-hour clock)	-.05	--													
3. Sleep duration (hours)	-.22*	.14†	--												
4. Subjective sleep problems	-.07	-.001	-.16*	--											
5. Average daily bicultural stress	.01	-.14*	-.05	.22*	--										
6. Male	.27*	.11	-.29*	-.23*	-.26*	--									
7. Co-ethnic school composition	.02	-.02	-.03	.06	.02	-.01	--								
8. Summer participation	-.17*	.46*	.27*	-.05	-.18*	.05	.02	--							
9. Body mass index	.07	.07	-.21*	.12†	-.05	-.01	.07	-.07	--						
10. Immigrant generation	.03	-.02	-.03	.09	-.23*	.05	-.34*	-.09	.09	--					
11. Parent education	-.002	.06	-.01	-.06	-.14*	.09	-.50*	-.07	-.05	.44*	--				
12. Depressive symptoms	-.10	.05	.04	.50*	.17*	-.21*	.08	.03	.01	-.03	-.09	--			
13. Anxiety symptoms	-.04	-.06	.01	.42*	.23*	-.13†	.06	-.14*	.01	-.07	-.03	.60*	--		
14. General perceived stress	-.10	-.10	-.02	.49*	.24*	-.19*	-.01	-.16*	.04	.03	.02	.68*	.72*	--	
15. Caffeine use	-.07	-.04	-.06	.13†	.07	.05	.07	-.02	-.02	-.07	-.05	.03	.05	.02	--
M [a]	10.39	3.99	6.56	6.65	0.43	0.35	0.53	0.36	25.07	2.63	3.73	16.40	7.93	9.91	0.05
SD	11.10	1.34	1.02	2.98	0.58	--	0.26	--	5.60	2.33	2.36	10.26	7.30	8.91	0.12
Minimum	0.00	0.31	3.43	0.00	0.00	--	0.06	--	14.46	0.00	1.00	0.00	0.00	0.00	0.00
Maximum	72.66	8.47	9.16	14.00	2.80	--	0.96	--	45.27	7.00	10.00	50.00	39.00	40.00	1.00

Note. N = 207. Sleep onset latency log transformed for analyses, original values presented for descriptive purposes; Sleep midpoint: 0.00 = midnight, 1.50 = 1:30 AM, etc. Average daily bicultural stress = person-level average of daily diaries; Male: 1 = male, 0 = female; Co-ethnic school composition: 1.00 = 100% Latino, 0.00 = 0% Latino; Summer participation: 1 = study completed in summer months, 0 = study completed during school year; Immigrant generation: 0 = participant, parents, and both sets of grandparents born outside U.S., 7 = all born in U.S. Parent education: 1 = completed less than high school, 10 = professional degree. Depressive symptoms: CES-D scale (Radloff, 1977). Anxiety symptoms and general perceived stress: DASS (Lovibond & Lovibond, 1995). Caffeine use: 1 = drank caffeine in hour before bed on 100% of days, 0 = never drank caffeine in hour before bed.

†$p < .10$. *$p < .05$. [a]Mean for continuous variables and percentage of study sample for dichotomous variables.