Development of the Nighttime Parenting Scale: Differentiating nighttime versus general parenting practices and their impact on youth sleep health

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ABSTRACT

Objectives: The current study provides a novel method of assessing the impact of nighttime parenting practices on youth sleep health during the sensitive transition from childhood to adolescence (ie., peripuberty). Specifically, we aimed to advance the measurement of nighttime parenting by developing a conceptually driven questionnaire for use in research and clinical settings.

Method: A total of 625 parents (67.9% mothers) of peripubertal youth (age M = 11.6, SD = 1.31) were recruited online and completed self-report questionnaires. The sample was primarily White (67.4%), followed by 16.5% Black, 13.1% Latinx, and 9.6% Asian. Factor structure was examined through four empirically-driven stages (ie, exploratory factor analyses, confirmatory factor analyses, examining internal and test–retest reliability, and indices of validity). Furthermore, the current study sought to validate nighttime parenting as a unique construct by exploring associations with peripubertal youth sleep health.

Results: A factor structure consisting of six dimensions of nighttime parenting was established (ie, nighttime supportiveness, hostility, physical control, limit-setting, media monitoring, and co-sleeping behaviors). Furthermore, the current measure demonstrated strong psychometric properties. Finally, the established dimensions were cross-sectionally associated with youth sleep health indices.

Conclusions: This study extends previous research by examining the influence of distinct domains of parenting practices that specifically occur at nighttime and how these differentially relate to youth sleep health. Results suggest that intervention and/or prevention programs targeting sleep should place emphasis on fostering positive parenting at nighttime as a strategy for creating an evening environment that is conducive to optimizing youth sleep health.

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Introduction

Sleep problems (eg, trouble falling asleep, insufficient sleep, and daytime sleepiness) in childhood and adolescence are highly prevalent.[1,2] In fact, half of the children in the US experience deficits in sleep duration, with this number being as high as 70% when children begin the transition to adolescence.[3,4] Furthermore, sleep problems are ubiquitous to mental health disorders and have been consistently implicated in the development and maintenance of anxiety, mood, and other mental health problems.[5-7] There is growing evidence that the developmental period around the transition from childhood to adolescence (9-14 years old, "peripuberty") is uniquely sensitive to insufficient and/or poor-quality sleep.[8,9] Specifically, hormonal, neuropsychological, and social developmental shifts that characterize peripuberty have been shown to affect sleep–wake regulation and make sleep increasingly vulnerable to disturbance.[8,10] During peripuberty, sleep undergoes pronounced

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changes, and there is increasing evidence for how problems with sleep at this developmental time predict escalating rates of anxiety, depression, and suicide later in adolescence.[11-14] This is troubling, given that most teens in the United States report insufficient sleep,[4] with rates concerningly higher (85%) for peripubertal youth with internalizing pathology (eg, anxiety and depression).[15]

Youth sleep–wake behaviors are embedded within the family milieu, and as such, sleep problems have been demonstrated to be shaped by family relationships and functioning.[16] Parenting practices are one of the many family processes that relate to youth poor sleep.[17] Specifically, whereas positive and emotionally supportive parenting practices (eg, warmth, supportiveness, and limit-setting) have been linked with more optimal sleep in youth, negative and emotionally unsupportive parenting practices (eg, hostility, emotion minimization, and laxness) have been linked to higher rates of sleep problems.[17-19] Notably, recent longitudinal and cross-sectional evidence suggests that the detrimental sequelae of negative parenting practices on youth sleep health appear to be more pronounced during peripuberty.[17] This transitional developmental period may be characterized by parents' diminished involvement in scaffolding bedtime routines (eg, fostering feelings of safety by reading stories and winding down), yet parenting practices (eg, limit-setting around media use or bedtimes) can still impact children's sleep health. For example, positive parent–youth interactions characterized by warmth, closeness, and clear limit-setting may support children's ability to manage their emotions, especially negative ones (eg, anxiety), and, thus, protect youth against nighttime affective states (eg, vigilance and arousal) known to disrupt sleep.[20,21]

The emergent literature on youth sleep health suggests a unique influence of *nighttime* parenting on youth sleep. Nighttime parenting refers to practices related to children's bedtime and sleep routines, which may be distinct from daytime parenting. Prior research has primarily documented the relationship between parenting practices at night and sleep patterns and trajectories of children during the first years of life and the preschool years.[22-27] In addition, measures of nighttime and/or bedtime parent behaviors or parent–child interactions have been exclusively developed for use in infants and preschool-aged children.[28,29] As such, the nascent status of the nighttime parenting literature leaves several gaps in knowledge. Most notably, nighttime parenting practices have been studied primarily within the early childhood context (eg, infancy and toddlerhood), while it remains unknown if or how these practices change across development. The impact of nighttime parenting on youth sleep health during the sensitive period of peripuberty could reveal that parenting practices that occur in the evening hours or prior to bedtime may more powerfully impact youth sleep health given established links between evening family environments and youth sleep.[16] Indeed, parenting practices utilized in a specific context have been identified as a more powerful predictor of youth behavior in the same specific context compared to general parenting practices utilized throughout the day.[30] Advancing our understanding of nighttime parenting and how it relates to youth sleep health may reveal specific parenting practices for targeted treatment and further delineate how family context contributes to aspects of youth sleep health.

For the current study, we aimed to develop a multidimensional measure of nighttime parenting practices of high utility in both clinical and research settings, with strong psychometric properties, and that is grounded on emerging conceptual developments of youth sleep within the family context. The current study consisted of four stages, which included the exploration of the underlying factor structure of the scale, confirmatory analyses, the examination of the subscale score internal and test–retest reliability, and the validation of nighttime parenting as a unique parenting construct compared to general parenting practices.

Method

Participants

Data from 625 parents of youth between the ages of 9-14 were included in the current study based on meeting all quality control metrics discussed below in the Procedures section. Overall, 92.5% of parents completing the forms were biological parents, with 67.9% of responders being female. The sample was primarily White (67.4%), and most parents reported having obtained a college degree (60.9%). All participants were residents of the United States. In addition, most parents reported having a family income of above $50,000 (67.4%). Finally, approximately half of the youth were males (50.3%), and the average age of youth was 11.6 years old (see Table 1 for full sample demographics).

Procedure

With approval from the University's Institutional Review Board, parents of 9- to 14-year-old youth were recruited via Amazon's Mechanical Turk (MTurk). Eligible participants were parents (ie, of 9- to 14-year-old) with an MTurk account. We used CloudResearch[31] tools to facilitate listing our study to parents who previously reported having at least one child between the ages of 9 and 14 and who lived in the USA, as well as having a prior approval rate of 80% or greater. We also used their quality control features to block low-quality participants (eg, those who previously reported in-consistent demographics), duplicate and suspicious IP addresses, and to only list the study to participants with verified USA locations. Participants who met these criteria and quality thresholds had access to viewing the title and a brief description of the study and decide whether they would like to voluntarily participate. After agreeing to participate, they completed an electronic consent form and then completed a demographic questionnaire, the initial Nighttime Parenting Scale (NPS) item pool, and, finally, measures of general parenting and youth outcomes. Two weeks later, participants were sent a follow-up

Table 1
Descriptive statistics of the participants

Demographic characteristic	M (SD) or % $N = 625$
Child age	11.6 (1.31)
Child sex (% Female)	49.7
Parent gender (% Mothers)	67.9
Parent race/ethnicity	
White	67.4
Black	16.5
Latinx	13.1
Asian	9.6
American Indian/Native Alaskan	3.2
Pacific Islander	0.6
Other	0.6
Family structure	
Single	9.3
Married	78.1
Separated/Divorced	12
Widowed	0.3
Family income	
Under $20,000	6.6
$20,000-$34,999	13.4
$35,000-$49,999	12.2
$50,000-$74,999	25.6
$75,000-$99,999	17.0
Over $100,000	24.8
Parent education	
Did not complete HS	0.6
HS or GED	8.3
Some College	22.9
College Degree	60.9
More than College Degree	6.4

GED, general educational development test; HS, high school.

survey through their MTurk-generated ID. The follow-up survey included a brief demographics questionnaire and the Nighttime Parenting item pool. Participants who failed to complete and correctly match their children's demographic information on the follow-up survey were excluded from the study. Completion of the follow-up survey marked the end of participation in the current study. Parents were compensated $2.00 for the completion of the initial survey and $2.00 for the follow-up assessment 2 weeks later. Data were collected from March 2020 to February 2021 during three independent waves (March 2020, April 2020, and February 2021). Analyses included wave as a covariate to account for potential distinct functioning related to the COVID-19 pandemic timeline. Previous research has demonstrated MTurk to be reliable and valid in child and family research.[25,26] The retention rate for parents was 80% for the 2-week follow-up assessment (N = 500).

Measures

General parenting practices

The Multidimensional Assessment of Parenting Scale (MAPS)[32] was used to assess different domains of general parenting practices, and consequently, to establish convergent and incremental validity of the NPS. The MAPS is a 34-item self-report measure that includes two broadband factors (ie, positive and negative parenting) that encompass seven narrowband subscales. The 16-item positive parenting broadband factor includes the following subscales: proactive parenting, positive reinforcement, warmth, and supportiveness. The 18-item negative parenting broadband factor includes these additional subscales: hostility, lax control, and physical control. Parents respond to each item using a 5-point Likert rating scale from 1 (*never*) to 5 (*always*). Subscale scores represent the average values of items in each parenting domain. Higher scores represent a higher frequency of practices in each parenting domain. McDonald's omega was 0.90 and 0.91 for the positive and negative domains, respectively.

Nighttime parenting scale

The NPS assesses parenting practices in the nighttime hours (ie, 2 hours prior to child bedtime) and around youth bedtime. Parents responded to each item using a 5-point Likert rating scale from 1 (*never*) to 5 (*always*). Prior to recruiting, the initial 86 nighttime parenting items (see Online Supplementary appendix) were developed, some of which were created based on the authors' clinical experiences with youth with sleep problems, while others (34%) were modified from an existing and established parenting scale (ie, MAPS) to reflect the nature of parent–youth interactions that occur specifically during the *nighttime* (eg, "*I lose my temper when my child doesn't do something I ask him/her to do*" on the MAPS versus "*I lose my temper at bedtime when my child doesn't do something I ask her/him to do (such as going to her/his bed to sleep*" on the NPS)).

Parental emotion socialization strategies

The Coping with Children's Negative Emotions Scale—Adolescent Version (CCNES-A)[33,34] was used to assess parents' reactions to their children's negative emotions and establish convergent and incremental validity of the NPS. The CCNES presents hypothetical scenarios in which an adolescent gets upset or angry and asks caregivers to measure their reactions to their adolescent's display of negative emotions in such scenarios, using a Likert scale (1 = "very unlikely" to 7 = "very likely"). There are six-item subscales created to assess parental emotion socialization practices (ie, problem-focused, emotion-focused, expressive encouragement, minimization, punitive, and distress). In line with previous research, we created two composite variables of nonsupportive (ie, distress, minimization, and punitive reactions) and supportive (ie, problem-focused, emotion-focused, and expressive encouragement) parenting responses to adolescents' negative emotional expressions using two composite variables.[35] Omega was 0.95 and 0.93 for the supportive and unsupportive scales, respectively.

Youth sleep health

Parents reported on their children's sleep via a parent proxy version of the Children's Report of Sleep Patterns (CRSP)[36] and the Patient-Reported Outcomes Measurement Information System (PROMIS) Pediatric Sleep-Related-Impairment.[37] These measures were included to establish the predictive validity of the NPS. The CRSP is a 60-item questionnaire that assesses three domains of sleep health: sleep patterns (eg, bedtimes, waketimes, sleep onset latency, and naps), sleep hygiene (eg, caffeine use, sleep location, and electronic use at sleep onset), and sleep disturbance (eg, bedtime fears, insomnia, and parasomnia).

The CRSP also assesses daytime sleepiness. Specifically, the sleep patterns scale includes data that are meant to be used descriptively. Estimated nighttime sleep duration and sleep efficiency were calculated based on this data. Specifically, nighttime sleep duration was calculated by subtracting estimated sleep onset latency and night waking duration from sleep opportunity (ie, bedtime to waketime), and sleep efficiency was calculated by dividing estimated nighttime sleep duration by sleep opportunity. For each of the three domains, higher scores indicate worse sleep hygiene or greater sleep disturbances. The CRSP has been demonstrated to be reliable and valid as a measurement of sleep health in youth.[36] McDonald's omega was 0.77, 0.82, and 0.83 for the sleep hygiene, sleep disturbances, and daytime sleepiness scales, respectively. In addition, the PROMIS Parent Proxy Sleep-Related Impairment (SRI) is an 8-item questionnaire that inquires about a full range of SRIs. Omega for the PROMIS SRI was 0.95.

Youth mental health

The PROMIS Parent Proxy Anxiety and Depressive Symptoms short forms are parent-report measures that independently assess anxiety and depressive symptoms in youth ages 5-17.[38] Strong psychometric properties have been demonstrated for both scales.[38,39] McDonald's omega was 0.94 and 0.90 for the Anxiety and Depressive Symptoms scales, respectively. In addition, parents reported on their children's externalizing and internalizing pathology through the Brief Problem Monitor (BPM).[40,41] This 19-item scale, derived from the Child Behavior Checklist and Youth Self-Report, has been demonstrated to have excellent reliability, validity, and internal consistency.[40,41] McDonald's omega was 0.91 and 0.77 for the externalizing and internalizing subscales, respectively.

Data analytic plan

Analyses were conducted in four stages to examine the measure's underlying factor structure and psychometric properties. For stage 1, the total sample was randomly split into two, and as such, half of the study sample (*n* = 315) was included in the exploration of the underlying factor structure of the data through exploratory factor analyses (EFA). Collected waves were similarly split across EFA and confirmatory factor analyses (CFA) samples. EFA was conducted in Jamovi using maximum likelihood estimation with promax rotation. These analyses were data-driven and iterative based on four criteria: (a) item factor loadings above 0.50, (b) not having a cross-loading above 0.30, (c) theoretical relevance of items and factors, and (d) overlap or redundancy of items to ensure a brief overall scale. Retained items were included in the next stage of analyses (ie, CFA).

For stage 2, data from the other half of the sample (*n* = 310) were utilized to run CFA in R using Lavaan. Additional items were removed at this stage based on the replication of results across an independent sample and retaining the most robust items in each

subscale. Stage 2 also examined measurement invariance across youth sex and age (9-11 vs. 12-14), as well as parent race, ethnicity, and education. Next, stage 3 included the entire sample (N = 625) to establish internal consistency (ie, alpha and omega). As recent research has suggested that omega is a preferable index of internal consistency over alpha,[42,43] coefficient omega was calculated for each scale and subscale after the final factor structure was decided. For comparison purposes, alpha coefficients were also calculated. Two-week test–retest reliability was also conducted in stage 3 by conducting bivariate correlations between both collected waves of the *NPS.* Finally, stage 4 also included the entire study sample and focused on conducting initial validity tests examining cross-sectional associations between nighttime parenting practices and indices of general parenting practices, youth sleep, and youth mental health outcomes. In addition, stage 4 examined the unique predictive capability of each scale by simultaneously entering all scales into each regression model. Hierarchical regression analyses were then conducted to examine the incremental utility of NPS over and above general parenting practices.

Results

Stage 1—Exploratory factor analyses

EFA results demonstrated six factors within the NPS based on parallel analysis (30 items, 55.6% cumulative variance explained). Emergent factors described the following parenting practices: nighttime supportiveness, hostility, physical control, limit-setting, media monitoring, and co-sleeping behaviors.

Stage 2—Confirmatory factor analyses

Items retained in stage 1 were used to conduct CFA with the other half of the total sample (n = 310). At this stage, items were dropped based on low factor loadings and theoretical redundancy with other items within the same factor. In addition, items that showed potential differential item functioning across child sex, youth developmental stage (ie, 9-11 vs. 12-13), parent race, ethnicity, and education were also dropped. After removing these seven items, the NPS demonstrated configural, metric, and scalar

invariance across youth sex and developmental stage, and parent race, ethnicity, or level of education. The final six-factor structure with 23 items demonstrated good model fit, χ^2 (215) = 374.46, p < .01, RMSEA = 0.051, 90% CI 0.042-0.060, CFI = 0.944, and SRMR = 0.054 (see Table 2 for final CFA results and the Appendix for final item content).

Stage 3—Internal and test–retest reliability

Internal reliability

Reliability was good for supportiveness (omega Ω = 0.80 [0.77 to 0.83] and alpha α = 0.80), hostility (Ω = 0.79 [0.75 to .82] and α = 0.79), physical control (α = 0.81 [0.74 to .86]), co-sleeping (Ω = 0.83 [0.77 to .84] and α = 0.81), limit-setting (Ω = 0.78 [0.72 to .81] and α = 0.77), and media-related behaviors (Ω = 0.78 [0.73 to .81] and α = 0.77).

Test–retest reliability

At all three waves, the study sample was reassessed 2 weeks after baseline (80% retention) to establish test–retest reliability. Bivariate correlations among the six subscales demonstrated that 2-week test–retest reliability was strong for all factors indicated by high correlations for supportiveness, r = 0.77 and p < .01, hostility, r = 0.74 and p < .01, limit-setting, r = 0.76 and p < .01, and co-sleeping, r = 0.84 and p < .01, and moderate correlations for physical control, r = 0.68, and media-related behaviors, r = 0.53 and p < .01.

Stage 4—Initial validity

Convergent validity

See Table 3 for complete results. Nighttime supportiveness was significantly correlated with conceptually similar subscales on the MAPS (ie, supportiveness and warmth) and on the CCNES (ie, supportive emotion socialization). On the other hand, nighttime supportiveness was negatively correlated with unsupportive emotion socialization practices (CCNES). Nighttime hostility was significantly correlated with the MAPS general hostility subscale and with unsupportive emotion socialization practices. Furthermore, nighttime physical control was significantly correlated with general physical control and unsupportive emotion socialization practices. Nighttime

Table 2
Factor loadings for the confirmatory factor analysis model

	SP	HS	PC	LS	MM	CS
Item 7: Comfort my child	0.79					
Item 4: Listen to ideas and opinions	0.78					
Item 2: Quality time	0.76					
Item 1: Express feelings	0.66					
Item 10: Talk about how day went	0.70					
Item: 8: Laugh at night	0.69					
Item 23: Calm and focus on positive things	0.61					
Item 21: Yell at bedtime		0.85				
Item 11: Argue with my child		0.82				
Item 15: Lose my temper		0.77				
Item 20: Conflict between my child and I		0.73				
Item 3: Spank my child in the evening			0.86			
Item 9: Physical punishment to discipline			0.86			
Item 5: Spank when extremely angry			0.84			
Item 12: Promote consistent bedtime				0.85		
Item 18: Even if child whines and complains, consistent bedtime				0.80		
Item 6: Clear expectations				0.53		
Item 22: Allow electronic devices school nights					0.83	
Item 17: Limit screen time before bedtime					-0.70	
Item 14: Monitor child's screen time					-0.53	
Item 13: Let child sleep with me						0.90
Item 16: Lie next to my child until asleep						0.49
Item 19: Sleep with my child if they ask						0.89

SP, supportiveness; HS, hostility; PC, physical control; LS, limit-setting; MM, media monitoring; CS, co-sleeping. See NPS appendix for full item content.

Table 3
Intercorrelations between NPS factors and relevant youth variables

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. NPS Supportiveness	3.98 (0.62)	1													
2. NPS Hostility	1.93 (0.76)	-.33*	1												
3. NPS Physical Control	1.29 (0.62)	-.11*	.38*	1											
4. NPS Limit-Setting	4.21 (0.74)	.40*	-.30*	-.17*	1										
5. NPS Media Monitoring	3.15 (0.55)	.30*	-.05	.04	.31*	1									
6. NPS Co-sleeping	2.04 (0.98)	.16*	.20*	.26*	-.17*	.08**	1								
7. CRSP Sleep Hygiene	2.17 (0.48)	-.004	.26*	.34*	-.24*	.02	.39*	1							
8. CRSP Sleep Disturbances	1.74 (0.47)	-.17*	.47*	.28*	-.19*	-.002	.21*	.39*	1						
9. CRSP Sleep Satisfaction	3.32 (0.69)	.17*	-.26*	-.05	.21*	.11*	-.09*	-.13*	-.41*	1					
10. PROMIS SRI	14.20 (5.7)	-.23*	.47*	.32*	-.37*	-.04	.20*	.39*	.46*	-.29*	1				
11. CRSP Sleep Efficiency	96.90 (2.5)	.13*	-.27*	.01	.09**	.03	.07	-.11	-.47*	.46*	-.24*	1			
12. CRSP Sleep Duration	9:07 (0:57)	.11*	-.14*	.01	.16*	.03	.00	-.14*	-.09*	.16*	-.16*	.38*	1		
13. BPM Internalizing	7.69 (1.99)	-.10*	.25*	.18*	-.08	-.03	.10*	.21*	.45*	-.25*	.32*	-.17*	-.12*	1	
14. BPM Externalizing	8.99 (2.73)	-16*	.46*	.27*	-.09*	.01	.05	.24*	.38*	-.22*	.33*	-.17*	-.09**	.44*	1

Intercorrelations are Pearson correlations, which are point-biserial correlations.
NPS, nighttime parenting scale; SRI, sleep-related impairment; CRSP, Children's Report of Sleep Patterns; BPM, brief problem monitor; PROMIS, Patient-Reported Outcomes Measurement Information System.
* $p < .01$.
** $p < .05$.

limit-setting was significantly correlated with the MAPS proactive parenting and positive reinforcement subscales while negatively correlated with the MAPS lax control subscale. It was also significantly correlated with supportive emotion socialization practices. In addition, nighttime media monitoring, was significantly and negatively correlated with the activities-before-bedtime subscale on the CRSP. Finally, co-sleeping was significantly correlated with the sleep-location subscale of the CRSP.

Predictive validity

We examined the intercorrelations between NPS factors and different youth sleep and mental health variables (see Table 4 for results). Overall, positive nighttime parenting practices, such as supportiveness and limit-setting, were globally associated with better youth sleep indices, including longer sleep duration, higher sleep efficiency, and satisfaction, as well as lower sleep disturbances. These positive practices were also negatively correlated with youth

Table 4
Convergent validity of NPS factors with conceptually similar subscales

Variable	r
Nighttime Supportiveness	
Supportiveness (MAPS)	.62*
Warmth (MAPS)	.57*
Supportive ES (CCNES)	.57*
Unsupportive ES (CCNES)	-.29*
Nighttime Hostility	
Hostility (MAPS)	.65*
Unsupportive ES (CCNES)	.50*
Nighttime Physical Control	
Physical Control (MAPS)	.82*
Unsupportive ES (CCNES)	.50*
Nighttime Limit-Setting	
Proactive Parenting (MAPS)	.48*
Positive Reinforcement (MAPS)	.37*
Supportive ES (CCNES)	.44*
Lax Control (MAPS)	-.40*
Nighttime Media Monitoring	
Activities-Before Bedtime (CRSP)	-.18*
Electronic Use at Sleep Onset (CRSP)	-.03
Cosleeping	
Sleep Location (CRSP)	.54*

CCNES, Coping With Children's Negative Emotions Scale—Adolescent Version; CRSP, Children's Report of Sleep Patterns; ES, emotion socialization; MAPS, multidimensional assessment of parenting scale; NPS, nighttime parenting scale.
* $p < .01$.

externalizing and internalizing problems. On the other hand, negative nighttime parenting practices (ie, hostility and physical control) were globally associated with worse youth sleep hygiene, insomnia, bedtime worries, and shorter sleep duration, as well as with higher SRI. Negative nighttime parenting practices were also positively correlated with youth externalizing and internalizing problems. Furthermore, nighttime media-related behaviors were positively associated with youth sleep satisfaction. Finally, co-sleeping was associated with worse youth sleep hygiene and satisfaction, as well as with higher sleep disturbances, bedtime worries, SRI, and internalizing problems.

Unique predictive validity

We examined the unique predictive capability of each subscale by including all of them within the same regression model when predicting a relevant youth outcome. As illustrated in Table 5, trends in the factors' unique predictive validity included negative nighttime parenting practices (eg, hostility) predicting youth sleep and mental health outcomes above and beyond positive nighttime parenting practices (eg, supportiveness). Notably, parents' nighttime limit-setting was predominantly and significantly associated with better indices of youth sleep health.

Incremental validity

Utilizing hierarchical regression, we examined the incremental validity of the NPS factors over and above the impact of general daytime parenting practices measured by the MAPS. Results demonstrated that nighttime supportiveness predicted youth externalizing symptoms ($\beta = -0.17$, $p = .002$, and $\Delta R^2 = 0.07$) above and beyond the impact of general positive parenting. Nighttime supportiveness also significantly predicted youth sleep hygiene ($\beta = 0.11$, $p = .05$, and $\Delta R^2 = 0.010$) above the impact of general supportiveness and warmth. Nighttime hostility significantly predicted youth sleep hygiene ($\beta = 0.19$, $p < .001$, and $\Delta R^2 = 0.069$), sleep disturbances ($\beta = 0.34$, $p < .01$, and $\Delta R^2 = 0.24$), sleep onset latency ($\beta = 0.22$, $p < .001$, and $\Delta R^2 = 0.04$), sleep satisfaction ($\beta = -0.25$, $p < .001$, and $\Delta R^2 = 0.06$), insomnia ($\beta = 0.31$, $p < .001$, and $\Delta R^2 = 0.189$), bedtime worries ($\beta = 0.29$, $p < .001$, and $\Delta R^2 = 0.16$), daytime sleepiness ($\beta = 0.25$, $p < .001$, and $\Delta R^2 = 0.16$), and SRI ($\beta = 0.38$, $p < .01$, and $\Delta R^2 = 0.23$) above and beyond general hostility. Nighttime physical control significantly predicted youth sleep hygiene ($\beta = 0.22$, $p = .001$, and $\Delta R^2 = 0.12$), sleep disturbances ($\beta = 0.19$, $p = .007$, and $\Delta R^2 = 0.08$), insomnia ($\beta = 0.17$, $p = .01$, and $\Delta R^2 = 0.033$), daytime sleepiness ($\beta = 0.23$, $p < .001$, and $\Delta R^2 = 0.19$),

Table 5
Unique predictive validity of NPS factors on relevant youth variables

Variable	B	95% CI
Sleep duration (CRSP)		
Hostility	-572.98*	-1046.36, − 85.54
Limit-setting	679.34*	159.03, 1169.26
Sleep hygiene (CRSP)		
Hostility	.06*	.01, .12
Physical control	.16**	.09, .23
Limit-setting	−.11*	−.17, − .05
Cosleeping	.13*	.08, .18
Sleep disturbances (CRSP)		
Hostility	.25**	.19, .30
Cosleeping	.06*	.01, .09
Sleep onset latency (CRSP)		
Hostility	4.10**	2.80, 5.44
Physical control	−1.62*	−3.08, − .25
Cosleeping	−1.11*	−1.95, − .27
Sleep efficiency (CRSP)		
Hostility	−1.09**	−1.49, − .69
Cosleeping	.32*	.04, .57
Sleep satisfaction (CRSP)		
Hostility	−.19*	−.29, − .089
Limit-setting	.12*	.02, .21
Sleep-related impairment (PROMIS)		
Hostility	2.45**	1.74, 3.14
Physical control	1.26*	.41, 2.12
Limit-setting	−1.99**	−2.78, − 1.23
Media monitoring	.85*	.03, 1.59
Insomnia (CRSP)		
Hostility	1.97**	1.48, 2.44
Bedtime worries (CRSP)		
Hostility	.68**	.47, .88
Cosleeping	.17*	.04, .30
Anxiety (PROMIS)		
Hostility	2.63**	1.92, 3.33
Cosleeping	.52*	.04, 1.08
Depressive symptoms (PROMIS)		
Hostility	1.59**	1.03, 2.11
Physical control	.73*	.09, 1.35
Externalizing problems (BPM)		
Hostility	1.58**	1.27, 1.91
Physical control	.59*	.17, .96

CRSP, Children's Report of Sleep Problems; BPM, brief problem monitor; NPS, nighttime parenting scale; PROMIS, Patient-Reported Outcomes Measurement Information System.

* $p < .05$.
** $p < .01$.

and SRI ($\beta = 0.14$, $p = .03$, and $\Delta R^2 = 0.12$) above and beyond general physical control practices. Furthermore, nighttime limit-setting significantly predicted youth nighttime sleep duration ($\beta = 0.25$, $p < .001$, and $\Delta R^2 = 0.05$) sleep hygiene ($\beta = − 0.10$, $p = .02$, and $\Delta R^2 = 0.08$), sleep satisfaction ($\beta = 0.15$, $p = .001$, and $\Delta R^2 = 0.06$), and SRI ($\beta = − 0.19$, $p < .001$, and $\Delta R^2 = 0.30$) above and beyond general lax control, proactive parenting, and positive reinforcement practices.

Discussion

Across four stages of analyses, the current study developed a multidimensional measure of nighttime parenting practices for youth ages 9-14, with strong initial psychometric properties. Stages 1 and 2 of the NPS development resulted in a factor structure of six subscales: *Nighttime Supportiveness*, which includes items representing positive and/or emotionally supportive parenting practices such as spending quality time, encouraging emotional expression, openness to youth's ideas and opinions, and comforting behaviors; *Nighttime Hostility*, which includes items representing coercive parenting practices, such as yelling, arguing, and/or losing one's temper at bedtime; *Nighttime Physical Control*, which included items representing physical discipline and physically aggressive behaviors (eg, spanking) out of anger at bedtime; *Nighttime Limit-Setting*, which includes items representing permissiveness around

bedtimes and nighttime routines; *Nighttime Media Monitoring*, which includes items representing practices of monitoring youth's nighttime media use; and finally, *Nighttime Co-sleeping Behaviors*, which include items representing practices of sleeping in the same bed until youth fall asleep on their own or because youth requested it (see Supplementary appendix for the final NPS).

Stage 2 of the NPS development also included analyses of measurement invariance. At this stage, items that showed potential bias toward key youth and parent demographic variables were eliminated. These removals supported full measurement invariance of the final structure of the NPS across youth sex and developmental stage, as well as across parent race, ethnicity, and education. This important step is a clear strength of the developed scale given the scarcity of measures with established measurement invariance in parenting and clinical research, especially across diverse racial and ethnic groups.[44] Furthermore, stage 3 entailed establishing the reliability properties of the scale. Results demonstrated strong internal reliability for most factors, including supportiveness, hostility, physical control, and co-sleeping, as evidenced by omega and alpha coefficients above 0.80. The remaining factors, limit-setting and media monitoring, demonstrated acceptable internal reliability. In addition, the 2-week test–retest reliability was strong for supportiveness, hostility, limit-setting, and co-sleeping, and moderate for physical control and media monitoring.

Furthermore, stage 4 of the current study entailed examining the initial validity of the NPS. With respect to initial convergent validity, results demonstrated meaningful overlap between conceptually similar subscales on the NPS and MAPS. For example, the NPS supportiveness subscale was significantly associated with the MAPS supportiveness and warmth subscales, while the NPS hostility and physical control subscales were significantly associated with the MAPS hostility and physical control subscales, respectively. Nighttime supportive practices were also associated with supportive emotion socialization behaviors on the part of parents (eg, emotional validation and expression). Similarly, nighttime "negative" parenting behaviors (ie, hostility and physical control) were associated with unsupportive emotion socialization practices. The additional subscales (ie, limit-setting, media monitoring, and co-sleeping) were also related to conceptually similar subscales on the MAPS and CRSP. These results suggest that the NPS is tapping into theoretically similar constructs of parenting practices; however, all measures were completed by the same informant, and future research should use multiple informants and methods to provide stronger support for the convergent validity of scores.

In addition, examinations of predictive validity were consistent with previous research demonstrating associations between parenting practices and youth sleep health,[17,19,45] as well as between parenting practices and child externalizing and internalizing pathology.[46-48] More specifically, factors of the NPS reflecting "positive" parenting practices (eg, supportive communication, quality time, and limit-setting around bedtime routines) were positively associated with indices of sleep health in youth, such as longer sleep duration, higher sleep efficiency, and sleep satisfaction. These positive practices were also negatively associated with sleep disturbances and SRI. Although directionality cannot be assumed from the current study's data, these results highlight parenting contexts within which youth sleep health may be optimized. Indeed, supportive parent–youth interactions in the evening may protect youth against vigilant states (eg, attention to threat) known to disturb sleep onset and maintenance during the sensitive period of early adolescence.[49] In addition, in line with previous research,[25,50] our results further emphasize the benefit of parental limit-setting around youth bedtime routine on youth sleep health, even as children grow older and transition to a more autonomous sleep context.

Alternatively, associations between "negative" nighttime parenting practices and indices of poorer sleep health in youth

demonstrated in the current study further lend support for how youth sleep may be hampered by conflicted and coercive parent–youth nighttime interactions. Notably, when all factors of the NPS were entered as predictors of youth sleep health, hostility and physical control were almost ubiquitously related to youth sleep health over and above "positive" or supportive nighttime parenting practices. These relations are likely reciprocal as difficulties related to sleep may precipitate a higher rate of "negative" nighttime parenting practices through higher levels of parenting stress and fatigue.[18] Importantly, this reciprocal relation may be further exacerbated by the increase in emotional and behavioral difficulties observed in youth with sleep problems.[51] Nevertheless, "negative" and unsupportive parenting practices have a detrimental influence on youth sleep, particularly during peripuberty,[17] highlighting the role of specific family processes on children's sleep health, perhaps through disruptions in emotion regulation or increases in vigilant attention.[49]

The current study is not without limitations. First and foremost, data were exclusively obtained through parent reports, which introduces the possibility of shared method variance and limiting information on a single perspective on nighttime parenting practices. Although research has shown modest correlations between parent-reported general parenting practices and youth-reported or observational assessments,[52-55] little is known about if this generalizes to nighttime parent–youth interactions, and future investigations should aim to validate youth self-report and observational versions of the NPS scale. Additional informants and methods for the assessment of youth sleep will also be important next steps for providing support for the validity and clinical utility of NPS scores.

Second, due to the cross-sectional nature of the study, we cannot assume that parenting behaviors are causally associated with youth's sleep health indices. Moreover, the majority of participants in the current study identified as White, non-Hispanic, married, and educated, with all participants residing in the United States. More research with diverse populations is needed to ascertain whether nighttime parenting practices vary according to race, ethnicity, culture, socioeconomic status, and so on and how these differences may relate to indices of youth sleep health. Nevertheless, a significant strength of the current study included the validation of measurement invariance across parental race, ethnicity, and education, suggesting that item responses and the underlying structure of the proposed measure appear consistent across these key demographic characteristics. Furthermore, approximately one-third of our participants were fathers, a group that has been traditionally underrepresented in family research.[56,57] Finally, data were entirely collected during the Covid-19 pandemic; thus, results may not be generalizable given drastic changes in families' sleep and broader functioning due to highly stressful circumstances.[58] For these reasons, we controlled for the pandemic phase in analyses. Nevertheless, future replicatory studies are warranted.

In conclusion, the current study extended previous research by broadening the conceptualization of ecological models of children's sleep through examinations of the influence of distinct domains of nighttime parenting practices on youth sleep health. Our results corroborate previous research linking parenting to children's sleep–wake behaviors and emphasize an untapped intervention target for enhancing youth sleep health: addressing conflicting parent–youth interactions at nighttime. Indeed, our results have clinical implications and suggest that fostering positive nighttime parenting may be helpful in creating environments that are conducive to youth getting more and better-quality sleep. Doing so may be particularly relevant when addressing the health risks (eg, anxiety and depression) posed by poor sleep health among youth. Importantly, promoting positive nighttime interactions between youth and their caregivers may represent a fruitful opportunity to transdiagnostically reduce sleep problems and co-occurring symptoms (eg, heightened anxiety)

through general improvements in family functioning. Overall, the support for nighttime parenting as a unique construct highlights a largely unexplored area of the literature with promising implications for clinical practice.

Declaration of conflicts of interest

The authors declare no conflicts of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.sleh.2023.05.007.

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