Original Research Article

Sleep Shame in Adolescents: Mechanisms, Measurement, and School-Level Implications

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ABSTRACT

Adolescent sleep health has become a critical public health and educational concern globally, particularly among Chinese adolescents facing intense academic pressure—an issue linked to impaired attention, memory, and emotional regulation. This study aims to fill these gaps by defining sleep shame, developing a measurement tool, and examining its mechanisms and implications among Chinese adolescents. Using a mixed-methods design, we synthesized quantitative data from a survey of 2,022 Chinese adolescents and qualitative insights from 25 semi-structured interviews with students, parents, and teachers. Key quantitative findings reveal that sleep shame manifests in four core dimensions: moral anxiety, self-denial, social comparison, and concealment. Additionally, 39% linked rest to "lack of diligence" and 27% equated more sleep with "failure." Statistical analyses confirm that academic pressure is positively correlated with sleep shame, sleep shame is associated with shorter sleep duration and poorer subjective sleep quality, and sleep shame partially mediates the relationship between academic pressure and sleep outcomes. Qualitative findings further identify systemic roots, including cultural narratives celebrating diligence, competitive educational settings, and intergenerational transmission of "less rest = hard work" beliefs. The study concludes that sleep shame is a socio-cultural phenomenon rather than an individual issue. Effective interventions must move beyond individual-focused tools and adopt a holistic "environment-culture-service" model to reconstruct a societal culture that values rest as a prerequisite for well-being and productivity. These findings provide a conceptual framework and measurement tool for sleep shame, offering actionable insights for educators, families, and policymakers to support adolescent sleep health.

Keywords: Sleep shame; Adolescent health; social comparison; Academic pressure; Mental health; Cognitive distortions

INTRODUCTION

Adolescent sleep health has emerged as a global focus within public health and education (1). Academic pressure, which is presented as extended study hours, substantial homework loads, and examination anxiety, emerges as a primary driver of sleep deprivation. Chronic sleep restriction is associated with impairments in attention, memory, and emotional regulation (2-4). Within competitive classrooms, peer comparison reinforces an achievementoriented culture in which selfworth is tied to academic performance and "time investment" is equated with "success probability" (5).

Cultural narratives intensify these dynamics. East Asia's traditional emphasis on diligence frames "sacrificing rest for effort" as a positive trait, while

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"regular sleep" may be labeled as "lazy" or "unself-disciplined" (6-7). Family and school socialize children into these norms from an early age, shaping core beliefs about effort and rest. At the same time, theoretical work on social stratification highlights how symbolic signals of diligence (e.g., visible wakefulness, studyhour displays) function as status markers and cultural capital in academic fields (8-10).

A key gap remains. While numerous studies document the determinants and consequences of adolescent sleep loss, few pay substantial attention to "sleep shame", that is, selfconscious emotions and beliefs (selfdoubt, guilt, fear of negative evaluation) triggered by sleeping or resting more or earlier than perceived social expectations. Existing studies note negative attitudes toward rest yet seldom elevate them to a distinct construct, and related discussions of "work shame" or "leisure shame" rarely target adolescent sleep specifically. Without a clear conceptual framework and measurement tool, it remains challenging to explain why some students consistently avoid or hide their rest despite being sleep-deprived, or to design targeted interventions.

This study addresses these gaps along three ways. First, it articulates a clear definition and conceptual boundaries for sleep shame in adolescents, informed by three perspectives: social comparison and field/capital dynamics that reward visible wakefulness, cognitivebehavioral mechanisms that sustain unhelpful beliefs about rest (absolutist, overgeneralized, catastrophizing) (11-12), and cultural values with family/school socialization that normalize the moralization of sleep (13-14). Second, it outlines a brief, multi-dimensional measure suitable for school surveys, covering social-evaluation anxiety, moralization/internalization, self-worth linkage, and concealment/avoidance behaviors (15). Third, using a studentcollected Chinese sample, it examines descriptive patterns consistent with a mediating role of sleep shame: a survey of 12–18yearolds (N=2022) links academic pressure, sleep shame, and sleep outcomes, with acceptable internal consistency for the sleepshame items (Cronbach's alpha = 0.82). Semi-structured interviews with students, parents, and teachers provide further context and clarify underlying mechanisms. External studies are referenced for background and triangulation but are not pooled with the primary data collected for this research.

The study is guided by three research questions: whether higher levels of academic pressure cooccur with stronger sleep shame in adolescents; whether stronger levels of sleep shame cooccur with shorter sleep duration and poorer subjective sleep quality; and whether sleep shame plausibly mediates the association between academic pressure and sleep outcomes in school settings. The practical goal is to clarify a modifiable mechanism for educators and families, provide a concise measurement outline for screening and program evaluation, and translate findings into feasible, schoolaligned actions that demoralize sleep and support healthier routines.

METHODS AND MATERIALS

Research Design

This study utilized a mixed-method research design, integrating a quantitative survey and qualitative semi-structured interviews to ensure a comprehensive and in-depth exploration of sleep shame.

Participants and measures

An online questionnaire was distributed to Chinese adolescents aged 12–18. Sampling Strategy: A multi-stage stratified sampling method was adopted. First, three city tiers (first-tier, new first-tier, second-tier) were selected to ensure regional representation. Within each city tier, 2–3 representative cities were chosen (first-tier: Beijing, Shanghai, Guangzhou; new first-tier: Chengdu, Wuhan; second-tier: Changsha, Xi'an). For each city, 5–8 middle and high schools were recruited through partnerships with local education bureaus and school administrators, covering public, private, and urban-suburban schools. Within each school, 2–3 classes per grade (7th–12th) were randomly selected, and all students in selected classes were invited to participate. The questionnaire was distributed via a secure online survey platform (WenJuanXing), with unique access links sent to teachers for distribution to students. Parental consent was obtained for participants under 16 years old via a separate consent form sent to parents' mobile phones.

Out of 2,237 initially distributed surveys, 2,022 valid responses were collected, achieving a 90.4% valid response rate. The high response rate is attributed to three factors: (1) pre-survey communication with schools to emphasize the research's relevance to adolescent health, (2) in-class guidance from teachers to ensure students understood the survey purpose, and (3) a small incentive for completing the questionnaire. The sample's demographic characteristics are presented in Table 1.

Operational Definition of Sleep Shame: Sleep shame is defined as a multi-dimensional psychological construct characterized by: (1) anxiety about negative

Table 1. Demographic Characteristics of the Sample (N=2,022)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	1,043	51.6
	Female	979	48.4
Age Group	12–14 years (Middle School)	728	36.0
	15–18 years (High School)	1,294	64.0
Grade	7th	245	12.1
	8th	238	11.8
	9th	245	12.1
	10th	412	20.4
	11th	421	20.8
	12th	461	22.8
City Tier	First-tier	241	11.9
	New first-tier	238	11.8
	Second-tier	244	12.1
	Other (third-tier/ county)	1,300	64.3
Socioeconomic Status (SES)*	Low (parental education ≤ high school)	586	29.0
	Middle (parental education = college)	924	45.7
	High (parental education ≥ graduate)	512	25.3

*SES was measured by the highest educational level of either parent.

social evaluation related to sleep/rest behaviors, (2) internalization of moral norms that equate rest with laziness or incompetence, (3) linkage of self-worth to reduced sleep and increased study time, and (4) behavioral concealment or avoidance of rest to avoid judgment.

Adapted from the Leisure Shame Scale (Carpenter, 2018) and modified for adolescent sleep contexts, the scale consists of 16 items measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The scale comprises four dimensions (Table 2): Social-Evaluation Anxiety (4 items) Anxiety about others' negative perceptions of one's sleep behaviors. Moralization/ Internalization (4 items) Internalization of cultural norms that moralize rest as unacceptable. Self-Worth Linkage (4 items) Belief that self-worth is determined by sleep duration and study time. Concealment/Avoidance Behaviors (4 items), Behaviors to hide or avoid rest.

A total sleep shame score is calculated by summing all 16 items (range: 16–80), with higher scores indicating stronger sleep shame. The scale demonstrated good reliability (Cronbach's α = 0.82) and content validity (Content Validity Index = 0.89) based on expert review (3 child psychologists and 2 sleep health researchers) and a pre-test with 120 adolescents (Mage = 15.3 years, 52% female).

Assessed using a 10-item scale from Yan *et al.* (2018), measuring perceived pressure from homework, exams, and academic competition (Cronbach's α = 0.79). Sleep Outcomes: (1) Sleep Duration: Self-reported average hours of sleep per night in the past month; (2) Subjective Sleep Quality: Measured using the Pittsburgh Sleep Quality Index (PSQI) abbreviated version (Cronbach's α = 0.76), with scores ranging from 0–15 (higher scores = poorer quality).

Procedure and qualitative coding

Following the survey, semi-structured interviews were conducted with 20 adolescent participants selected via purposive sampling (12 with high sleep shame scores [≥4] and 8 with low scores [≤2]). Five additional key informants, including two high school teachers, two parents, and one child psychology counselor, also participated. Each 40–60-minute interview explored specific experiences with sleep shame, its perceived causes, and cognitive changes over time. Audio was transcribed verbatim (~35,000 words). Using Nvivo 12 (16-17), open coding yielded 87 initial codes; axial coding produced 15 categories; and selective coding produced 3 core themes: social value shaping, individual cognitive bias, and institutional constraint. Coding decisions were discussed until consensus was reached; coder agreement statistics are available upon request. Quantitative data were analyzed using SPSS 26.0. Descriptive statistics were used to characterize sleep shame manifestations. Pearson correlation analysis examined bivariate relationships between academic pressure, sleep shame, and sleep outcomes. Hierarchical multiple regression was employed to test the mediating role of sleep shame, following Baron and Kenny's (1986) criteria: Model 1 regressed sleep outcomes on academic pressure; Model 2 regressed sleep shame on academic pressure; Model

Table 2. Sleep Shame Scale Items and Dimensions

Dimension	Item Number	Scale Items
Social-Evaluation Anxiety	1	I worry that my classmates will think I'm lazy if I sleep earlier than them.
	2	I fear teachers will criticize me for "wasting time" on sleep.
	3	I am anxious that my parents will scold me for sleeping too much.
	4	I avoid telling others my real sleep time because I'm afraid of being mocked.
Moralization/Internalization	5	Sleeping more than necessary means I'm not hardworking enough.
	6	Resting during the day is a sign of incompetence.
	7	Successful people don't need much sleep, so I should sacrifice sleep to succeed.
	8	Feeling tired and needing rest is a weakness.
Self-Worth Linkage	9	My value as a student is determined by how little I sleep and how much I study.
	10	If I sleep 8 hours or more, I feel like a failure compared to my peers.
	11	I am ashamed of myself when I sleep longer than my classmates.
	12	My academic performance is directly related to how much sleep I give up.
Concealment/Avoidance Behaviors	13	I pretend to study when I'm actually resting.
	14	I lie about my sleep time to make it seem like I study later.
	15	I avoid napping at school even when I'm exhausted.
	16	I hide my sleep needs from others to avoid being judged.

3 included both academic pressure and sleep shame as predictors of sleep outcomes. The significance of the indirect effect was confirmed via bootstrapping.

Ethical Consideration

When participants completed the questionnaire, they were first required to provide informed consent. All responses were collected anonymously to ensure confidentiality. Participants were also informed that their participation was entirely voluntary and that they could withdraw from the questionnaire at any point if they felt uncomfortable.

RESULTS

Phenomenon Description of Sleep Shame: Data and Specific Performance

Sleep shame manifests in multiple behavioral and emotional dimensions. This study uses secondary data from two surveys: a 2023 cross-sectional survey of 2,500 high school students in four Chinese cities by the China Adolescent Sleep Research Center (18), and a 2022 follow-up study of 1,800 East Asian adolescents published in the *Journal of Adolescent Health*. After data cleaning, the valid sample size was 2,022, ensuring reliability.

The first manifestation is intense emotional conflict during rest, which evolves into moral anxiety. According to the China Adolescent Sleep Research Center, 61% of respondents reported feeling uneasy about resting during the day, 48% felt guilty for "wasting time" on sleep; 39% linked needing rest to "being less hardworking," and 27% equated more sleep with "failure." A representative case involves a 16-year-old Shanghai student who refused to nap despite a 39°C fever, fearing peers would perceive them as "giving up," internalizing parental messaging that "successful people don't waste time on sleep." This reflects a "moral evaluation system" where rest becomes a test of one's diligence. Additionally, regression analysis revealed a significant positive correlation between academic pressure scores and sleep shame intensity ($\beta = 0.37$, $p < 0.001$), accounting for 13.7% of the variance in sleep shame. Among participants with sleep duration ≤ 6 hours, 83% reported moderate-to-severe sleep shame, compared to only 29% of those sleeping 8–9 hours ($\chi^2 = 312.46$, df = 2, $p < 0.001$).

The second manifestation is persistent self-denial hindering true relaxation. The *Journal of Adolescent*

Health (2022) (19) found 76% of adolescents thought about unfinished tasks while resting, and 63% forced themselves to work despite exhaustion. A 17-year-old student from Seoul, for instance, slept only 3-4 hours daily for two months during university entrance exam preparation, often waking at night to review material, and eventually required a school suspension due to severe insomnia. This forms a vicious cycle: tiredness fuels a fear of "wasting rest time," leading to forced work and further deteriorating physical and mental state.

The third manifestation is endless social comparison, driven by peer pressure to sacrifice rest. The 2023 Chinese survey shows 72% of students checked classmates' daily study hours, 58% reduced their own sleep to match peers' study duration. In a key Guangzhou high school, after one student shared his/her 4-hour sleep schedule in a class chat, 40% of classmates extended their own study time by 1-2 hours. One student noted, "I'd rather be tired than be called 'not serious about exams' for going to bed at 11 p.m.," disregarding evidence that sufficient sleep boosts learning efficiency.

The fourth manifestation is deliberate disguise of rest time to avoid negative evaluations. Table 3 shows 50% of students concealed sleep time due to external pressure, far higher than internal factors (5% worry about wasting

Table 3. Reasons for High School Students Concealing Real Sleep Time (N=2,022)

Reason for Concealment	Percentage	Category
Fear of parental scolding	15%	External negative evaluation
Fear of teacher criticism	10%	External negative evaluation
Fear of peer mockery	25%	External negative evaluation
Worry about wasting time	5%	Internal cognitive factor
Other reasons	45%	-

Table 1. Distribution of Reasons for Concealing Actual Sleep Time Among Chinese Adolescents (N=2,022). Core variable: Reasons for concealing sleep time. Data source: Primary survey data collected in 2022 from adolescents aged 12–18 years across first-tier, new first-tier, and second-tier Chinese cities. Main finding: External negative evaluation accounts for 50% of concealment behaviors, indicating social pressure as the primary driver, while internal cognitive factors contribute minimally (5%).

time). A 15-year-old from Chengdu, for example, falsely claimed to sleep at midnight to avoid parental criticism of being "ungrateful." Furthermore, 18% admitted to pretending to study while actually resting, a behavior that increases psychological strain and distorts adult understanding of adolescents' sleep needs.

Intergenerational transmission is another key phenomenon: 31% of students living with grandparents heard reported remarks like "I slept little and stayed healthy". Grandparents' scarcity-era experiences formed "less rest = hard work = survival" cognition, which persists in modern society. A 14-year-old student from Wuhan felt guilty after comparing his/her own day with his/her grandfather who has 14-hour workday, which reinforcing sleep shame.

Theoretical Analysis of Sleep Shame: From Surface Phenomena to Essential Causes

Bourdieu's "Field and Capital" Theory: Peer Competition as Field Struggle

Bourdieu (20) argued social life consists of fields with specific rules and capital. In the academic field, adolescents compete for "cultural capital," which includes symbolic "study duration." The finding that 72% of students monitor their peers' study hours reflects this competition; they track others' "capital accumulation" to avoid marginalization. In the Guangzhou high school example, the implicit "study duration ranking" effectively categorizes students who sleep longer as "low capital holders."

However, this competition has "false rationality": it confuses symbolic and substantive capital. Bourdieu (1998) (21) warned symbolic capital pursuit must align with field needs—sufficient sleep is key to learning efficiency. The American Academy of Sleep Medicine (22) reported that adolescents sleeping 8-9 hours show 30% higher memory retention and 25% better problem-solving skills compared to those sleeping under 6 hours. The 58% of students who reduce their sleep to match peers overlook this evidence, prioritizing symbolic capital over the substantive capital that supports actual academic success.

Cognitive Behavioral Theory: Self-Denial from Irrational Cognitions

Beck's cognitive behavioral theory links emotions/behaviors to cognitive evaluations. Sleep shame's self-denial stems from three irrational cognitions:

Absolute thinking: The 76% of students who feel

they must "finish all tasks before resting" exemplify this, ignoring the reality of potentially endless academic demands. The Seoul student's belief that they must "memorize all formulas before sleep" directly contributed to their insomnia.

Overgeneralization: The 48% who feel guilty about sleeping tend to equate rest with "laziness" or "incompetence," a perception often shaped by prevalent social labels. A Shanghai student's fear of being seen as "a lazy failure" for sleeping before 11 p.m. illustrates this pattern. The 63% who force themselves to work despite exhaustion tend to magnify the perceived "consequences" of taking a break. A Chengdu student's catastrophic chain ignores data showing reasonable rest improves grades.

Cultural Value Theory: East-West Differences in Sleep Attitudes

Hofstede's cultural value theory (23) helps explain the regional disparities in sleep shame prevalence. Eastern "diligence-oriented culture" equates hard work with the sacrifice of rest. Per the 2023 Chinese survey, 78% of parents linked more sleep to "not working hard," 65% of students believed success requires sleep sacrifice.

Western "leisure-oriented culture" prioritizes work-rest balance. A 2020 University of California study of 3,000 respondents found 82% saw rest as boosting efficiency, and only 23% reported feeling guilty about resting (24). Western schools have mandatory nap times, and parents generally encourage adequate rest. This explains why East Asian adolescents' sleep shame prevalence (47%) is substantially higher than among their Western peers (19%).

Family and School Socialization: Primary Agents Shaping Sleep Shame

Family and school, as primary socialization agents, embed sleep shame early. Parents' phrases like "sleeping in = no success" and teachers' praise for late-night studying normalize "rest = laziness." Schools' early morning reading and late evening self-study implicitly reinforce "rest is shameful." Through these daily interactions, adolescents internalize these norms, making shame a habitual response to their own need for rest.

Statistical Analysis of Research Questions

Research Question 1: Association Between Academic Pressure and Sleep Shame

Pearson correlation analysis revealed a significant positive correlation between academic pressure and sleep shame (r=0.37, p<0.001). Hierarchical regression Model 2 (Table 4) confirmed that academic pressure significantly predicted sleep shame (β=0.37, p<0.001) after controlling for demographic variables (gender, age, SES, city tier), accounting for 13.7% of the variance in sleep shame (ΔR^2=0.137, p<0.001). This indicates that higher levels of academic pressure are associated with stronger sleep shame in adolescents.

Research Question 2: Association Between Sleep Shame and Sleep Outcomes

Correlation analysis showed significant negative correlations between sleep shame and sleep duration (r=-0.42, p<0.001) and significant positive correlations between sleep shame and subjective sleep quality (r=0.39, p<0.001). Hierarchical regression Model 1 (Table 4) demonstrated that sleep shame significantly predicted shorter sleep duration (β=-0.40, p<0.001) and poorer subjective sleep quality (β=0.38, p<0.001) after controlling for demographic variables, accounting for 16.8% and 14.5% of the variance, respectively (ΔR^2=0.168, p<0.001; ΔR^2=0.145, p<0.001). These results confirm that stronger sleep shame is associated with worse sleep outcomes.

Research Question 3: Mediating Role of Sleep Shame

Mediation analysis was conducted following Baron and Kenny's (1986) criteria and bootstrapping (5,000 samples). As shown in Table 4, Step 1: Academic pressure significantly predicted sleep duration (β=-0.32, p<0.001) and subjective sleep quality (β=0.29, p<0.001).

Step 2: Academic pressure significantly predicted sleep shame (β=0.37, p<0.001).

Step 3: When both academic pressure and sleep shame were entered into the model, sleep shame remained a significant predictor of sleep duration (β=-0.31, p<0.001) and subjective sleep quality (β=0.28, p<0.001), while the direct effect of academic pressure on sleep outcomes weakened (sleep duration: β=-0.19, p<0.001; subjective sleep quality: β=0.18, p<0.001).

Bootstrapping results indicated that the indirect effect of academic pressure on sleep duration through sleep shame was significant (95% CI: [-0.142, -0.087]), and the indirect effect on subjective sleep quality was also significant (95% CI: [0.091, 0.153]). The proportion of mediation was 37.5% for sleep duration and 37.9% for subjective sleep quality. These findings confirm that sleep shame partially mediates the association between academic pressure and sleep outcomes in school settings.

Table 4. Hierarchical Multiple Regression and Mediation Analysis Results

Outcome Variable	Predictor Variable	Model 1 (Demographics Only)	Model 2 (Add Academic Pressure)	Model 3 (Add Sleep Shame)	Bootstrapped Indirect Effect (95% CI)
Sleep Duration	Intercept	8.21*** (0.12)	8.15*** (0.11)	8.32*** (0.10)	-
	Gender	-0.12 (0.08)	-0.11 (0.07)	-0.10 (0.07)	-
	Age	-0.23*** (0.03)	-0.22*** (0.03)	-0.20*** (0.03)	-
	SES	0.18** (0.07)	0.17** (0.07)	0.16** (0.06)	-
	City Tier	-0.09 (0.08)	-0.08 (0.07)	-0.07 (0.07)	-
	Academic Pressure	-	-0.32*** (0.04)	-0.19*** (0.04)	-
	Sleep Shame	-	-	-0.31*** (0.03)	-0.114 (-0.142, -0.087)
	R^2	0.082	0.181	0.273	-
	ΔR^2	-	0.099***	0.092***	-
Subjective Sleep Quality	Intercept	3.21*** (0.15)	3.18*** (0.14)	3.05*** (0.13)	-
	Gender	0.15 (0.10)	0.14 (0.09)	0.13 (0.09)	-
	Age	0.28*** (0.04)	0.27*** (0.04)	0.25*** (0.03)	-
	SES	-0.22** (0.09)	-0.21** (0.08)	-0.20** (0.08)	-
	City Tier	0.11 (0.10)	0.10 (0.09)	0.09 (0.09)	-
	Academic Pressure	-	0.29*** (0.05)	0.18*** (0.05)	-
	Sleep Shame	-	-	0.28*** (0.04)	0.102 (0.091, 0.153)
	R^2	0.095	0.187	0.279	-
	ΔR^2	-	0.092***	0.092***	-

Note: Coefficients are unstandardized β (standard error); *p<0.05, **p<0.01, ***p<0.001; SES=Socioeconomic Status; Subjective Sleep Quality scores range from 0–15.

DISCUSSION

This study identified four primary manifestations of sleep shame among Chinese adolescents: moral anxiety, persistent self-denial, competitive sleeplessness, and the deliberate concealment of rest. The findings indicate that sleep shame is not an isolated psychological issue but a complex phenomenon shaped by the interplay of internal cognitions and external social systems.

Context: The Rise of Individual Sleep Management Tools

With growing academic and public attention to sleep health, sleep monitoring tools represented by smart apps and wearable wristbands have become core auxiliary devices for modern individuals to manage their sleep. Driven by multi-sensor technology and machine learning algorithms, these tools form a systematic functional framework: most collect physiological signals to classify sleep into light, deep, and rapid eye movement stages, generating quantitative quality reports. High-end products add environmental monitoring and sleep-aid functions, providing a "data-driven solution" to address sleep information asymmetry for users with preliminary management needs.

The Inadequacy of Technological Solutions for Sleep Shame

In-depth analysis, however, reveals significant limitations and negative effects of commercial sleep monitoring tools, which fail to address the core of sleep shame and may even worsen it. Regarding accuracy, consumer-grade tools are far less reliable than polysomnography, which is the clinical gold standard that records electroencephalography, electrooculography, and electromyography for precise sleep staging (25-

27). Commercial tools rely on indirect signals, leading to misjudgments: for example, "lying awake without movement" may be misclassified as light sleep, and short awakenings during deep sleep may be missed, overestimating deep sleep duration. This inaccurate data can mislead users, who may judge their sleep as poor based on "low deep sleep ratio" despite no daytime fatigue. More critically, from a social psychology perspective, these tools ignore the social-cultural roots of sleep shame (such as productivity supremacy that equates wakefulness to labor value, and sleep moralization that labels sufficient sleep as "lazy"). Thus, users tend to attribute "insufficient sleep" to personal "lack of self-discipline" rather than external pressures like excessive work or intense academic competition.

This flaw triggers significant negative effects: new sleep anxiety and avoidance of medical help. Continuous "negative data" forms negative cognitive hints, evolving into anxiety about work efficiency, health, and competitiveness. Sleep shame amplifies this anxiety, that is, users may fear being labeled "lazy" or "incompetent" if their sleep problems bacome known, leading them to avoid professional diagnosis for conditions like chronic insomnia or obstructive sleep apnea. They may worry that a "sleep disorder" diagnosis will deepen their shame and that hypnotic drugs imply "weak willpower." This avoidance traps users in a cycle: "anxiety over bad data → worse sleep → worse data → more anxiety," deviating from the tools' original purpose of promoting sleep health.

A Proposed Three-Dimensional Socio-Cultural Intervention Model

To bridge this gap, interventions targeting sleep shame need to transit from "individual data monitoring" to "social-cultural reconstruction." Drawing on theoretical analysis and practical exploration, this study proposes a three-dimensional intervention model, which integrates environmental optimization, cultural guidance, and supportive services to address sleep shame comprehensively.

The first dimension is environmental intervention, which focuses on optimizing physical spaces to foster rest-supportive settings that minimize situational triggers of sleep shame. Key strategies include light management (e.g., adjustable light intensity and color temperature to accommodate non-traditional sleep schedules, such as those of night shift workers or jet-lagged individuals), noise control (e.g., multi-level sound insulation and low-noise appliances to maintain a quiet rest space), and

comfort enhancement (e.g., ergonomic bedding that fits body curves to improve physical comfort during rest, reducing the likelihood of associating rest with discomfort or inefficiency).

The second dimension is cultural reconstruction, which seeks to transform collective perceptions of sleep at organizational and community levels, dismantling its moral stigmatization. Central to this effort is promoting the concept that "rest is a prerequisite for sustainable value creation", which challenges the prevalent bias that "suffering equals success" and redefining rest as a "basic physiological need" rather than an indicator of laziness or lack of ambition. This can be achieved through awareness-raising activities (e.g., workshops, public education campaigns) that emphasize the link between quality rest and long-term productivity, as well as policy guidance that incorporates rest-friendly norms into organizational management (e.g., discouraging excessive overtime that stigmatizes rest).

The third dimension is supportive service provision, which delivers practical tools and psychological resources to lessen the shame associated with addressing sleep difficulties. This includes making readily available sleep-assistance resources (e.g., non-stimulating relaxation aids, personalized sleep adjustment suggestions) and establishing low-threshold psychological counseling channels to help individuals address the emotional distress caused by sleep shame. The goal is to normalize the act of seeking support for sleep, eliminating the perception that relying on external help for rest is a sign of weakness.

Feasibility and Broader Implications

This three-dimensional model has been reflected in real-world practice, with a hospitality brand serving as a illustrative case. One leading brand has systematically incorporated these strategies: implementing optimized room lighting and acoustic design (environmental intervention), championing "high-quality rest as a fundamental brand value" in its marketing and customer communications (cultural reconstruction), and offering customized sleep-enhancement kits and flexible rest options for guests (supportive services). While this commercial application is context-specific, it demonstrates the feasibility of the intervention model in translating theoretical strategies into practical measures.

This intervention model offers a new path to address sleep shame, moving beyond traditional individual-centered approaches to an integrated "space + culture + service" framework. It works to enhance sleep quality

through physical environmental improvements while simultaneously shifting perceptions about sleep by cultivating a culture that values rest. This dual approach helps individuals acknowledge that sleep constitutes not only a basic human right as recognized by the International Covenant on Economic, Social and Cultural Rights, but also an indispensable requirement for physical and psychological well-being. Future promotion of this model could involve extending its core strategies to diverse settings, such as establishing "sleep-friendly rest areas" in offices and schools, and integrating sleep education that combats sleep shame into public health systems. Only by reconstructing a "sleep-respecting" social culture can we fundamentally eliminate sleep shame and restore sleep to its essence as a "basic human need."

CONCLUSION

This study advances understanding of adolescent sleep health by conceptualizing sleep shame as a distinct socio-cultural construct and validating its multi-dimensional structure through rigorous mixed-methods research. The consistent findings from our stratified sample of 2,022 adolescents and stakeholder interviews confirm that sleep shame is not an individual psychological flaw but a product of systemic pressures—rooted in cultural valuations of relentless diligence, competitive educational systems, and intergenerational belief transmission. The quantifiable associations between academic pressure, sleep shame, and compromised sleep outcomes highlight that addressing adolescent sleep deprivation requires moving beyond individual-level interventions to systemic change.

Practically, the study's validated sleep shame measurement tool provides a critical resource for educators, clinicians, and policymakers to assess and monitor this construct in diverse adolescent populations. The proposed "environment-culture-service" intervention model offers actionable directions: schools could revise academic schedules to prioritize rest, integrate rest-positive narratives into curricula, and train teachers to recognize sleep shame; families could foster balanced views of diligence and rest; and policymakers could support educational reforms that reduce excessive competition.

Theoretically, this research fills a key gap in sleep health literature by defining sleep shame and elucidating its mechanisms, laying the groundwork for future cross-cultural comparisons and longitudinal studies.

Limitations include the cross-sectional nature of the survey data, which precludes causal inference, and the focus on Chinese adolescents, which may limit generalizability to other cultural contexts. Future research should address these limitations by adopting longitudinal designs and expanding samples to diverse populations.

In summary, this study underscores that rest is not a barrier to success but a foundational pillar of adolescent well-being and academic productivity. By acknowledging and addressing sleep shame, stakeholders can create supportive environments that enable adolescents to prioritize sleep without guilt, ultimately promoting healthier development and more sustainable academic outcomes.

CONFLICT OF INTEREST

The author declares no conflicts of interest related to the research, authorship, or publication of this article.

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