Sounding Out Sleep: Can Audio Messages Shift Children's Bedtime Norms?

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Abstract

Despite significant progress in healthcare, racial disparities persist in access to care and health outcomes. Recent literature has highlighted the importance of sleep for health and human capital. Using time-use data from the US, we first document significant disparities in children's sleep behavior, with Black children having later bedtimes than White children. Additionally, we find a stronger intergenerational correlation in bedtime among Black families. Socioeconomic factors account for a sizeable fraction of these disparities, but they do not fully explain them, suggesting that social norms and other contextual influences may play a crucial role. Motivated by these findings, we conducted an online experiment to assess the impact of audio messages delivering a culturally tailored normative message on sleep. Participants heard messages from either a White or Black narrator, with varying delivery styles (neutral vs personal/anecdotal). While sleep increased intentions to improve sleep habits, neither the narrator's race nor the delivery style significantly influenced sleep intentions, However, we find some evidence that these factors differentially affected the likelihood of subscribing to a sleep hygiene newsletter.

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1 Introduction

Despite remarkable advancements in healthcare over the past centuries, significant racial disparities persist in both access to healthcare and health outcomes. Differences in health behaviors contribute to these disparities across a wide range of conditions. The Institute of Medicine has identified sleep as a critical yet often overlooked public health challenge (Colten et al., 2006). A growing body of research highlights the adverse effects of sleep deprivation on health, human capital, and productivity (Gibson and Shrader, 2018; Giuntella and Mazzonna, 2019; Giuntella et al., 2017, 2024b). Some scholars consider sleep to be the most prevalent risky health behavior in modern societies (Roenneberg, 2013), and researchers have emphasized its role in shaping health disparities and the complex relationship between minority status, socioeconomic factors, and health outcomes (Grandner et al., 2016). Trends in self-reported sleep patterns among adolescents are particularly concerning (Keyes et al., 2015; Giddens et al., 2022), and there is growing evidence of the importance of sleep for academic performance (Jagnani, 2021; Giuntella et al., 2024b; Creswell et al., 2023). There is increasing evidence of large disparities in sleep (Giddens et al., 2022).

One important yet understudied factor influencing health behaviors, including sleep, is the role of social norms. Social norms shape behaviors across domains such as diet, physical activity, and healthcare utilization (Cialdini et al., 1990; Reno et al., 1993; Bicchieri, 2023; Reid et al., 2010). However, their impact on health disparities, particularly in the context of sleep, remains relatively unexplored (Giuntella et al., 2024a). Misperceptions of norms may contribute to disparities, as individuals often conform to perceived but inaccurate behavioral standards within their communities. These norms intersect with structural barriers. Communities facing socioeconomic disadvantages may develop misaligned norms that inadvertently reinforce unhealthy behaviors. Furthermore, deeply rooted mistrust in medical practice may shape health-related decision-making and norms, Mistrust may shape health-related decision-making (Alsan and Eichmeyer, 2024), including beliefs about preventive behaviors like sleep.

Prior research suggests that individuals conform to perceived norms even when those perceptions are inaccurate, reinforcing unhealthy behaviors (Bicchieri 2023). Importantly, sleep is a private and largely invisible behavior, making it particularly susceptible to misperceptions about what is normative within one's community (Avery et al., 2022). If Black families systematically underestimate the prevalence or importance of early bedtimes—perhaps due to structural constraints or intergenerational patterns—then these norms may perpetuate later sleep schedules. Moreover, these patterns may interact with broader behavioral misperceptions found in preventive healthcare, where individuals undervalue the long-term benefits of health-promoting behaviors (Handel and Kolstad 2015; Bhargava, Loewenstein, and Benartzi 2017). Previous evidence suggests that social norms and individual beliefs significantly shape sleep-related intentions (Giuntella et al., 2024b). A natural question, then, is whether disparities in sleep may be explained by differences in sleep-related norms and a significant mismatch between perceptions of adequate sleep and actual reported sleep duration among racial/ethnic minorities and disadvantaged groups.

Our study contributes to this growing body of research by showing that disparities in sleep may, in part, reflect misaligned social norms. We then test the effectiveness of norm nudges.

Using data from the American Time Use Survey (ATUS), we investigate racial disparities in children's and teenagers' sleep patterns. Our analysis reveals that Black children are significantly more likely to have later bedtimes than their White peers. Nearly 48% of Black children under the age of 13 go to bed after 10 p.m., compared to 36% of White children. These differences are partly explained by socioeconomic disparities, as later bedtimes are more common among economically disadvantaged families. We find a strong negative association between income and bedtime, with children of younger mothers, single mothers, and unmarried parents significantly more likely to go to bed later. Additionally, Black parents are more likely to have lower incomes, be younger, and work night shifts—factors that contribute to their children's later bedtimes. Children of night-shift workers are particularly

prone to staying awake past 10 p.m. Lastly, our analysis of intergenerational correlations in bedtime behavior finds stronger parent-child associations among Black families, suggesting a persistent pattern across generations.

Building on these findings, we conducted an online experiment to assess whether audio-delivered sleep recommendations influence sleep-related intentions. Our descriptive analysis of data collected on the online sample corroborates findings from CPS-ATUS data, showing that children of African-American mothers are significantly more likely to go to bed later. While socioeconomic factors play a fundamental role in explaining these disparities, they do not fully account for differences in children's sleep behavior.

We then turn to the analysis of norms. In our online survey, we distinguished between descriptive norms (how people typically behave) and injunctive norms (how people believe one should behave). We find marked disparities in both. To test whether norm-nudges can help reduce disparities in sleep intentions, we conducted an information treatment. Participants were randomly assigned to hear sleep-related messages delivered by either a White or African-American narrator. The presentation style also varied: some messages were framed as personal reflections from a mother emphasizing the importance of sleep, while others were presented in a neutral, factual manner. Additionally, some messages explicitly highlighted racial disparities in sleep patterns. Our results show that providing sleep information generally increased participants' intentions to sleep longer, go to bed earlier, establish a sleep routine, and subscribe to a sleep hygiene newsletter. However, neither the narrator's race nor the message delivery style (anecdotal vs. neutral) significantly influenced these outcomes.

Our contribution to the literature is twofold. First, to our knowledge, this is the first study to analyze nationally representative data on children's and teenagers' bedtimes and sleep patterns while incorporating detailed information on parental time use alongside an extensive set of sociodemographic characteristics. This approach allows us to directly assess the relative role of socioeconomic factors in explaining racial disparities in bedtime behavior and sleep duration. Additionally, by leveraging data on both parental and child bedtimes, we

estimate the persistence of racial gaps in sleep behavior across generations. Prior research, such as Giddens et al. (2022), has documented substantial racial and income-based disparities in sleep using actigraphy data, showing that Black children sleep significantly less than their peers. However, most existing studies rely on small or localized samples, limiting generalizability. Furthermore, they typically do not include data on both parental and child sleep outcomes. Second, our study is the first to test the effectiveness of tailored norm-based nudges in shaping parental intentions regarding children's sleep behavior. By evaluating this intervention, we provide new insights into the potential for behaviorally informed strategies to mitigate sleep disparities.

Understanding racial disparities in sleep patterns is not only a public health concern but also a critical issue for shaping effective interventions and policies aimed at improving sleep behaviors among youth. Given the well-documented effects of sleep on health, human capital, and educational outcomes, addressing these disparities is essential to reducing their potential role in perpetuating racial inequalities. Social and cultural norms, along with misperceptions and biased beliefs about sleep habits, play a significant role in shaping health behaviors. These factors may contribute to racial disparities in sleep patterns in ways that cannot be fully explained by socioeconomic variables alone. Communities facing structural barriers may develop misaligned norms that reinforce unhealthy behaviors, highlighting the importance of culturally tailored interventions to realign norms and promote healthier sleep patterns among minority populations.

The paper is organized as follows. Section 2 reviews previous literature on racial disparities in health behaviors, and in particular in sleep. In section 3, we present the data and the empirical specification. Section 4 presents our main results. Concluding remarks are in Section 5.

2 Disparities in Health Behaviors and Sleep

Previous work has documented how racial disparities in health behaviors are pervasive (Williams and Mohammed, 2009). These disparities are the result of different factors, including socioeconomic status, access to health care, environmental factors, systemic racism. Studies have documented significant differences in dietary habits, driven by socioeconomic factors, cultural preferences, and access to healthy foods. Disparities in physical activity are also evident. Neighborhood safety, availability of recreational space, cultural attitudes have been shown to contribute to these differences and to the observed racial disparities in obesity and related health conditions. There is also evidence of racial disparities in tobacco and alcohol use. Utilization of preventive health services, such as vaccinations, screenings, and regular check-ups, can also vary widely among racial and ethnic groups. Barriers to accessing these services include lack of insurance, mistrust in the healthcare system, linguistic barriers, and historical abuses in medical research. Finally, there is evidence of sizeable racial disparities in mental health due to factors like stigma, discrimination, access to mental health services, and cultural competency of healthcare providers. This can lead to higher levels of stress, anxiety, and depression among these populations.

Racial disparities in sleep duration and quality are also well-documented (Giddens et al., 2022; Keyes et al., 2015; Guglielmo et al., 2018). African Americans are more likely to report shorter sleep duration and poorer sleep quality compared to their White counterparts. Sleep disparities have been linked to environmental factors such as neighborhood safety (Troxel et al., 2018), noise pollution (Johnson et al., 2018a), and housing conditions (Johnson et al., 2018b). Individuals living in disadvantaged neighborhoods may experience higher levels of stress and exposure to environmental disruptors of sleep (Troxel et al., 2020). Socioeconomic factors play a significant role in sleep disparities (Giddens et al., 2022; Grandner et al., 2016). Lower income levels and employment in multiple jobs or night shifts can disrupt normal sleep patterns, leading to shorter and more fragmented sleep (Jackson et al., 2013). Experiences of racism and discrimination are stressors that can negatively impact sleep (Yip et al., 2020;

Slopen et al., 2016). The chronic stress associated with facing racial discrimination can lead to difficulties falling asleep, staying asleep, and experiencing restorative sleep. Limited access to healthcare and lower levels of health literacy can affect the management of sleep disorders and knowledge about good sleep hygiene practices among racial and ethnic minorities (Williams et al., 2015). Finally, cultural beliefs and practices regarding sleep and health can also influence sleep behaviors and attitudes towards seeking treatment for sleep-related issues (Baron et al., 2019; Pantesco and Kan, 2023; Giuntella et al., 2024a).

3 Data and Empirical Specification

3.1 Data

Our main data are drawn from the American Time Use Survey. The American Time Use Survey (ATUS) was first launched in 2003 and is designed to measure how people divide their time among various activities, including work, leisure and sports, household activities, caring for others, and sleeping. The ATUS is the only federal survey providing data on the full range of non-market activities, from the amount of time spent doing household chores to time spent volunteering. The ATUS sample is drawn from households that have completed their final month of interviews for the CPS. This means that all ATUS respondents are part of households that have recently participated in the CPS. This study spans from 2003 to 2022. Participants in the ATUS are required to fill out a comprehensive diary detailing how they spent their time the previous day, including activities such as sleeping and eating. In its inaugural year, the survey saw participation from 20,720 individuals. From 2004 onwards, the survey has consistently attracted over 1,100 participants each month. While the ATUS only surveys individuals aged 15+, ATUS respondents with children aged under 13 years old are also surveyed about the time that the last household child–under the age of 13– went to bed for the night and about the first household child–under the age of 13– who woke up for the day. Our main analysis focuses on the sample to ATUS respondents with children

under the age of 13 and with non-missing information on the bedtime of their children. Furthermore, we exclude weekends from the analysis and focus on weekdays. This leaves us with approximately 39,573 observations. For this sample, we have information on both children bedtime and wake-up time as obtained from the above-mentioned questions and parental bedtime, wake-up time and sleep duration which are constructed from the time-use diaries of the ATUS respondent. In a secondary analysis, we also document racial disparities in bedtime, wake-up time and sleep behaviors of teenagers, focusing on 15-19 years old ATUS-respondents.

Employing the ATUS data for examining wake-up and bedtime comes with a few limitations. Data are based on parental reports and thus the exact times children wake up or fall asleep are uncertain. Children may engage in activities after being put to bed or before their parents are aware they're awake, potentially leading to noise in both our measures of child bedtime and wake up time. If self-reporting bias is substantially different across racial groups, this may affect the interpretation of our findings.

3.2 Empirical Analysis

We start our analysis with a description of racial gaps in bedtime behavior. We then document racial differences in factors that contribute importantly to explain differences in sleep behaviors. Exploring information on both parental and bedtime behavior, we estimate the intergenerational correlation in bedtime with the following equation separately for Black and White children.

$$Bedtime_{child_{it}} = \alpha + \beta Parental_Bedtime_{it} + \gamma X_{it} + \epsilon_{it} \tag{1}$$

where $Parental_Bedtime_{it}$ is the bedtime of the parent responding to the ATUS survey.

We then turn to analyze the factors that may contribute to the observe racial gap in bedtime and sleep behavior. More specifically, in a simple OLS regression model, we docu-

ment the sensitivity of the bedtime racial gap to the inclusion of sociodemographic controls. Formally, we estimate the following equation:

$$Bedtime_{child_{it}} = \alpha + \beta_1 Black_i + \gamma X_{it} + \epsilon_{it} \tag{2}$$

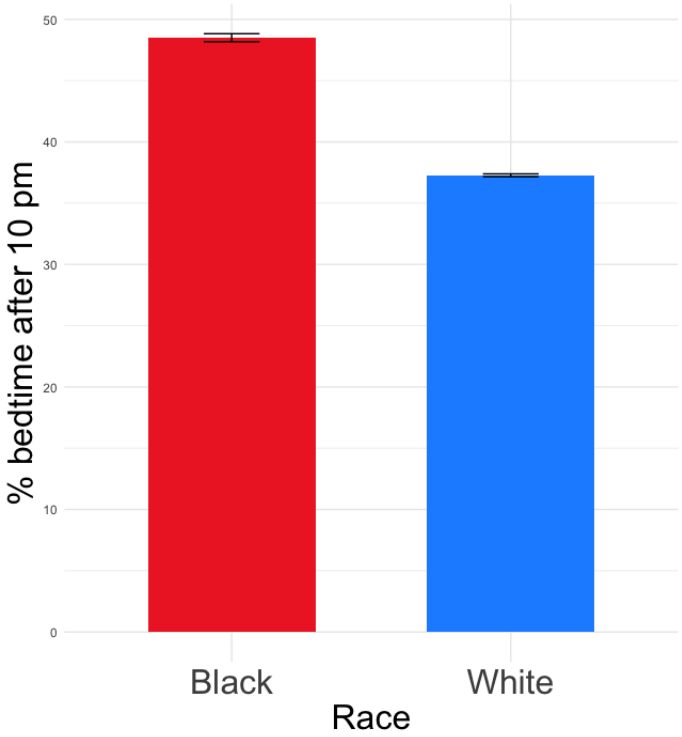
where $Bedtime_{child_{it}}$ is the bedtime of the child i at time t. $Black_i$ is an indicator equal to 1 if the ATUS respondent reported to be Black. X_{it} is a set of individual characteristics including income, education, a dummy for being under 25, an indicator for whether the respondent is a single mother, an indicator for marital status, an indicator for working nightly shifts, and parental bedtime.

4 Results

Figure 1 reports the share of children awake at 10pm among Black and Whites. Approximately 48% of Black children go to bed after 10pm. This proportion is significantly smaller among White children, approximately 37%.

These gaps may partially reflect socioeconomic disparities. Figure A.1 documents a striking monotonically negative gradient when examining the relationship between bedtime and socioeconomic status. The share of children awake at 10pm is much larger at the bottom of the income distribution (45%) than in the top quartile (30%). A similar gradient is observed when examining children bedtime by education of the adult ATUS respondent. Approximately 45% of children of high-school dropout parents are still awake at 10pm. Among college-graduates the share of children going to bed after 10pm drops to 10%. Figure A.2 documents how children of single-mothers are significantly more likely to be awake at 10pm (45%) than other children (37%). Similarly, children of unmarried mothers are more likely to go to bed later. There is also a sizeable difference between children of parents under the age of 25. Approximately 50% of young-adult parents are still awake at 10pm, while this proportion drops to 35% among children of older parents. Finally, children of parents who

Figure 1: Bedtime by Race, % children with bedtime later than 10pm



Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

work most of their hours between 5pm and 8am are significantly more likely to go to bed later than children of parents who work more than 50% of their time during standard hours (8am to 5pm).

Black children are more likely to grow up in poorer households, to have parents with lower education, and to be raised by single-mothers or unmarried mothers. Furthermore Black parents tend to go to bed later, and are more likely to work nightly shifts. Figure A.3 shows how the percentage of African-American is much higher at the bottom of the income distribution. African-American parents in our sample are also less likely to have a college degree (22% vs 37%). In our sample, the percentage of single-mothers among African-American is 40% while it is approximately 15% among Whites. Similarly, the share of married mothers among Whites (38%) is more than twice as high that of African-American mothers (18%). African-American mothers in our sample are also more likely to be under age 25, and more likely to work nightly shifts.

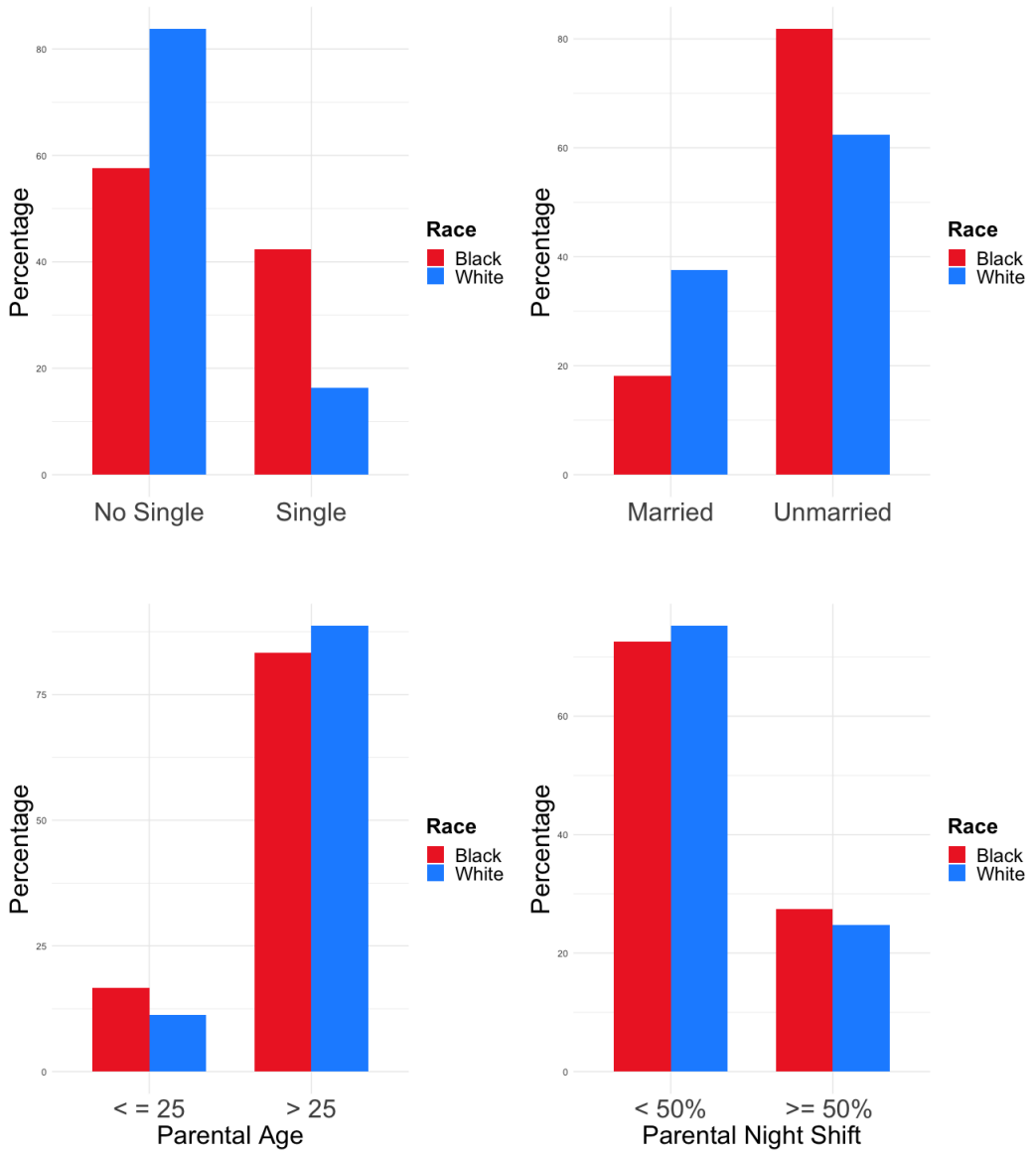
Table 1: Racial gap in % of children going to bed after 10pm

	(1)	(2)	(3)	(4)	(5)
Black	0.112***	0.092***	0.088***	0.073***	0.072***
	-0.007	-0.007	-0.008	-0.007	-0.007
Sociodemographic chars.		x	x	x	x
Mother chars.			x	x	x
Parental late bedtime				x	x
Parental night shift					x
Mean Dep.Var.	0.389	0.389	0.389	0.389	0.389
Std. Dev.	0.487	0.487	0.487	0.487	0.487
Observations	35,973	35,973	35,973	35,973	35,973

Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13. Robust standard errors are reported in parenthesis.

Given the racial gaps in sociodemographic characteristics that we have shown to importantly affect bedtime behavior, we turn to analyze to what extent racial disparities in bedtime can be explained by differences in observable determinants of bedtime and sleep habits. Table 1 shows how the racial difference in the share of children going to bed after 10pm is sensitive to the inclusion of sociodemographic characteristics, maternal characteris-

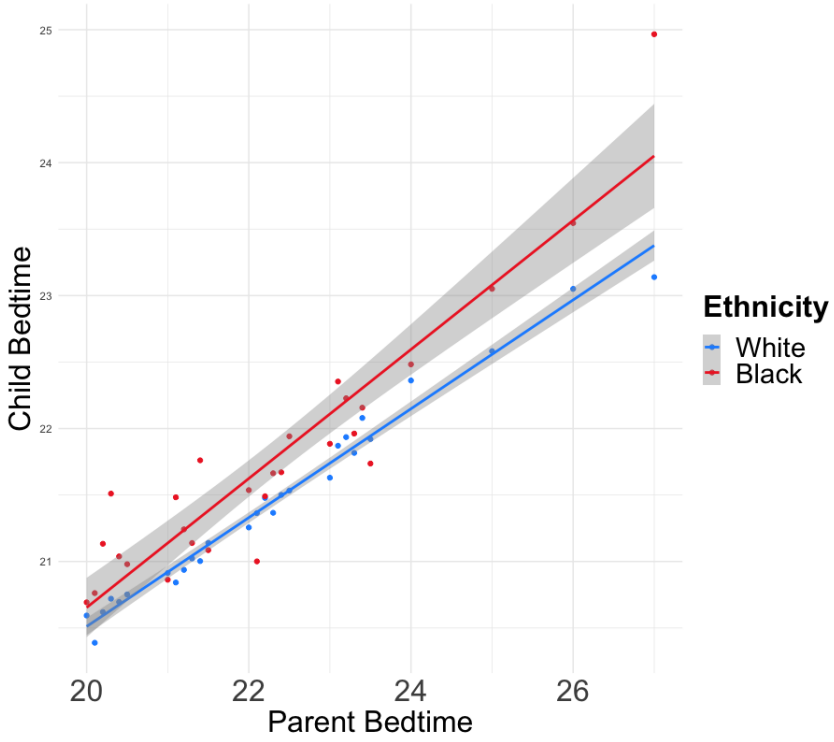
Figure 2: Racial Differences in Socio-Demographic Determinants of Bedtime by Race



Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

tics, parental late bedtime, parental night shift. The raw difference in column 1 documents a 11 percentage point gap in the likelihood of Black children to be awake at 10pm. This coefficient declines to 9 percentage points when including parental sociodemographic characteristics (see column 2). It remains fairly stable when including maternal characteristics (i.e. age, see column 3). The coefficient drops to 7.3 percentage points when including an indicator for whether the time-use respondent parent went to bed late (above the median bedtime). Further controlling for whether the responding parent works a nightly shift, the coefficient declines to 7.2 percentage point.

Figure 3: Intergenerational Correlations in Bedtime: Parental and Children Bedtime



Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

Figure 3 illustrates the extent of intergenerational correlation between parental and child bedtimes. Notably, regardless of parental bedtime, children of African-American mothers tend to go to bed later. However, the disparity increases as parental bedtime becomes later.

5 Online Intervention

Motivated by these findings, we conducted an online intervention to further explore the role of beliefs in explaining children's racial disparities in sleep behavior. Previous studies suggested differences in beliefs and social norms may contribute to explain disparities in sleep behavior. We have shown in the previous sections that while socioeconomic factors are clearly important in explaining differences in bedtime and sleep behavior, a sizeable portion of the racial gap in children's bedtime remains unexplained after accounting for observable socioeconomic differences between Black and White children.

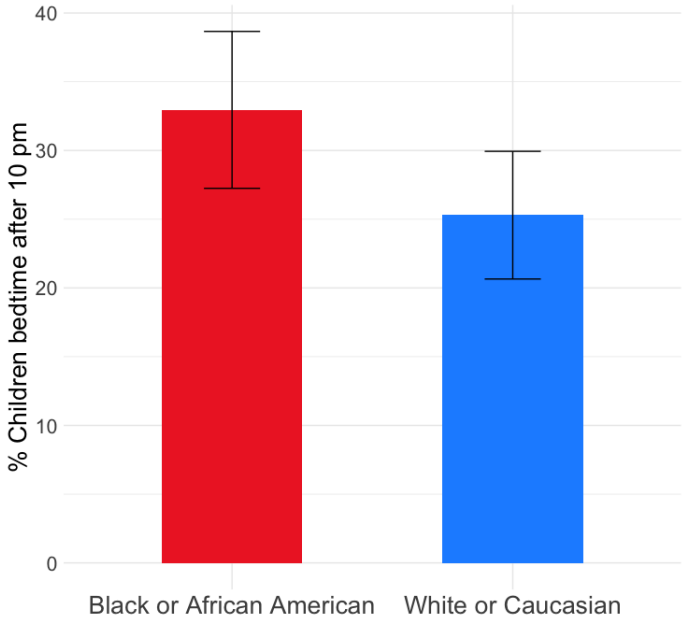
We conducted our intervention on Prolific, a platform widely used to conduct surveys and experiments online (Palan and Schitter, 2018), in May-June 2024 using Qualtrics. The sample was restricted to mothers of children aged 6-13, residing in North America (the United States or Canada) who identified as either Black or White. We oversampled African-American immigrants. Participants were surveyed on their demographics, sleep patterns, beliefs about others' sleep, health conditions, children's sleep habits, beliefs about other children's sleep, knowledge of children's sleep risks, children's bedtime routines, and, if applicable, they received treatment (randomly assigned).

Participants were offered a guaranteed $6.5 completion fee for 25-minutes survey and could earn as high as $15 with bonus payments. The experiment was launched on May 30, 2024. We collected data from a sample of 755 mothers, 381 African-American and 348 White mothers.

5.1 Descriptives

We first show that the sample surveyed on Prolific largely confirms the results obtained from the analysis of the American Time Use Survey. African-american children (34%) are significantly more likely to go to bed after 10pm (see Figure 4) than children of white mothers (25%). As shown using ATUS data socioeconomic factors are importantly correlated with

Figure 4: Online Survey - Bedtime by Ethnicity, % children with bedtime later than 10pm



Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

children's bedtime behavior (see Figures A.4-A.7 in the Appendix). Similarly to what was observed in the ATUS data, there is a larger correlation between parental bedtime and child's bedtime among Black children than among White children (see Figure A.8).

Furthermore, our survey allowed us to explore disparities in norms about sleep. As shown in Figures A.9 and **??**, when examining descriptive norms (which involve perceptions of actual behavior), African-American mothers believe that children of other parents sleep, on average, less than what White mothers believe about children of other parents. For instance, only 35% of African-American mothers believed other people's children sleep more than 9 hours (descriptive norms), compared to 44% of White mothers. Furthermore, 53% of African-American mothers believed children should sleep more than 9 hours, compared to 75% of White mothers (injunctive norm).

5.2 Information intervention

We then proceed to analyze our online intervention. Participants were randomized to hear messages from either a White Caucasian or an African American narrator (Table 2). We also varied the presentation style: some messages were delivered as personal reflections from a mother emphasizing the importance of sleep, while others were straightforward and neutral. Additionally, we included messages that highlighted racial disparities in sleep patterns.

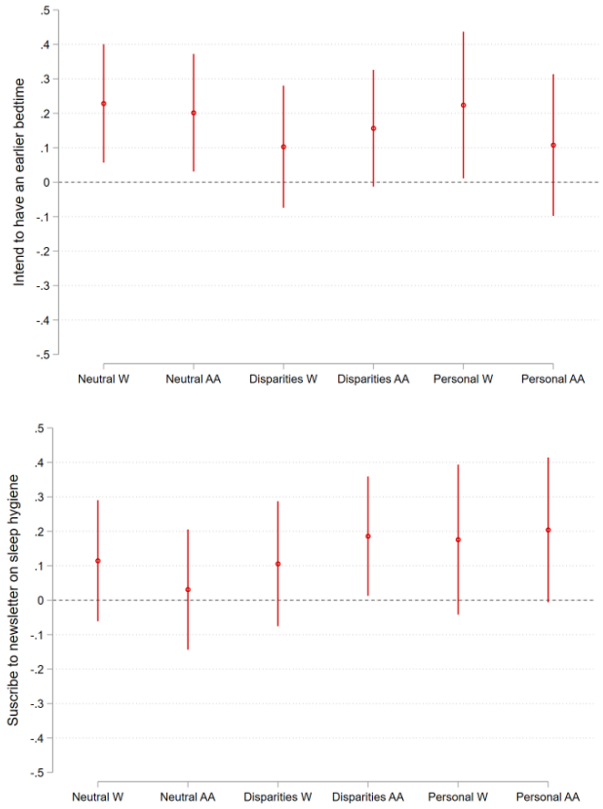
Table 2: Treatment arms

Treatment Group
T1: Information (White Narrator, Neutral Tone)
T2: Information (African-American Narrator, Neutral Tone)
T3: Information Highlighting Racial Disparities (White Narrator, Neutral Tone)
T4: Information Highlighting Racial Disparities (African-American Narrator, Neutral Tone)
T5: Personal Reflection (White Narrator)
T6: Personal Reflection (African-American Narrator)

The first set of messages (T1 and T2) provided general sleep recommendations, emphasizing the risks of insufficient sleep and the benefits of proper sleep routines, based on CDC guidelines. A second set of messages (T3 and T4) highlighted racial disparities in bedtime behaviors, presenting data showing that Black children were more likely to go to bed later than White children. Finally, a third set of messages (T5 and T6) used a personal reflection style, where a narrator described their own experience of enforcing bedtime routines and the positive outcomes associated with sufficient sleep. This variation allowed us to examine the relative influence of neutral versus personal storytelling, as well as the impact of explicitly addressing racial disparities in sleep patterns. The text of the messages is included in Appendix B.

Our results showed that providing sleep information generally increased participants' intentions to have their children sleep longer and go to bed earlier. Individuals in the treatment arm were 30 to 40 percentage points more likely to report wanting their children to sleep longer hours. Similar effects were found for children's bedtimes.We found no evidence

Figure 5: Effects of Information Treatments on Bedtime and Newsletter Subscription



Notes: Data are drawn from our Online Survey conducted in May 2024. The sample is restricted to African-American mothers. We plot the coefficients of each information treatment with respect to sleep intentions and the intention to subscribe to a newsletter in the control group."

that varying the accent or delivery style of the audio influenced the effects The effect on the likelihood of subscribing to a newsletter on sleep hygiene was less precisely estimated overall. Interestingly, if anything, the effect was larger when disparities were highlighted by an African-American-sounding voice or when the message was delivered as a personal reflection.

6 Conclusions

Our findings reveal considerable racial disparities in children's and teenagers' sleep behaviors. Black children tend to go to sleep later than White children, with socioeconomic factors explaining a substantial portion of these differences. However, even after accounting for income, education, parental age, and work schedules, a notable gap remains, suggesting that social and cultural norms may also play a critical role in shaping bedtime habits. To investigate whether differences in norms and beliefs may explain

To further explore the role of beliefs and norms, we conducted an online experiment testing whether different types of sleep-related messaging could influence parental intentions to improve sleep routines. Our results show that providing general sleep information significantly increased sleep-related intentions across all groups. However, messages that highlighted racial disparities were no more effective than those that simply emphasized the importance of sleep hygiene and academic benefits. Furthermore, we found no evidence that varying the narrator's race or the presentation style (personal reflection vs. neutral) influenced the effects, suggesting that factual information may be more influential than identity-based framing.

These findings have important implications for public health and education policy. Given the well-documented effects of sleep on cognitive performance, mental health, and long-term well-being, addressing disparities in sleep is essential for promoting health equity. While structural factors such as economic disadvantage and work schedules contribute to these

gaps, interventions should also consider the influence of social norms and perceptions about sleep. Future efforts should explore community-based and culturally tailored interventions that promote sleep education while accounting for family routines and work constraints.

As sleep is a modifiable health behavior, targeted interventions—whether through schools, healthcare providers, or digital campaigns—could help narrow racial gaps in sleep habits, ultimately improving both short- and long-term health outcomes. Future research should continue to investigate how cultural beliefs, parental stress, and neighborhood environments shape children's sleep, as well as the most effective strategies for shifting norms toward healthier sleep practices.

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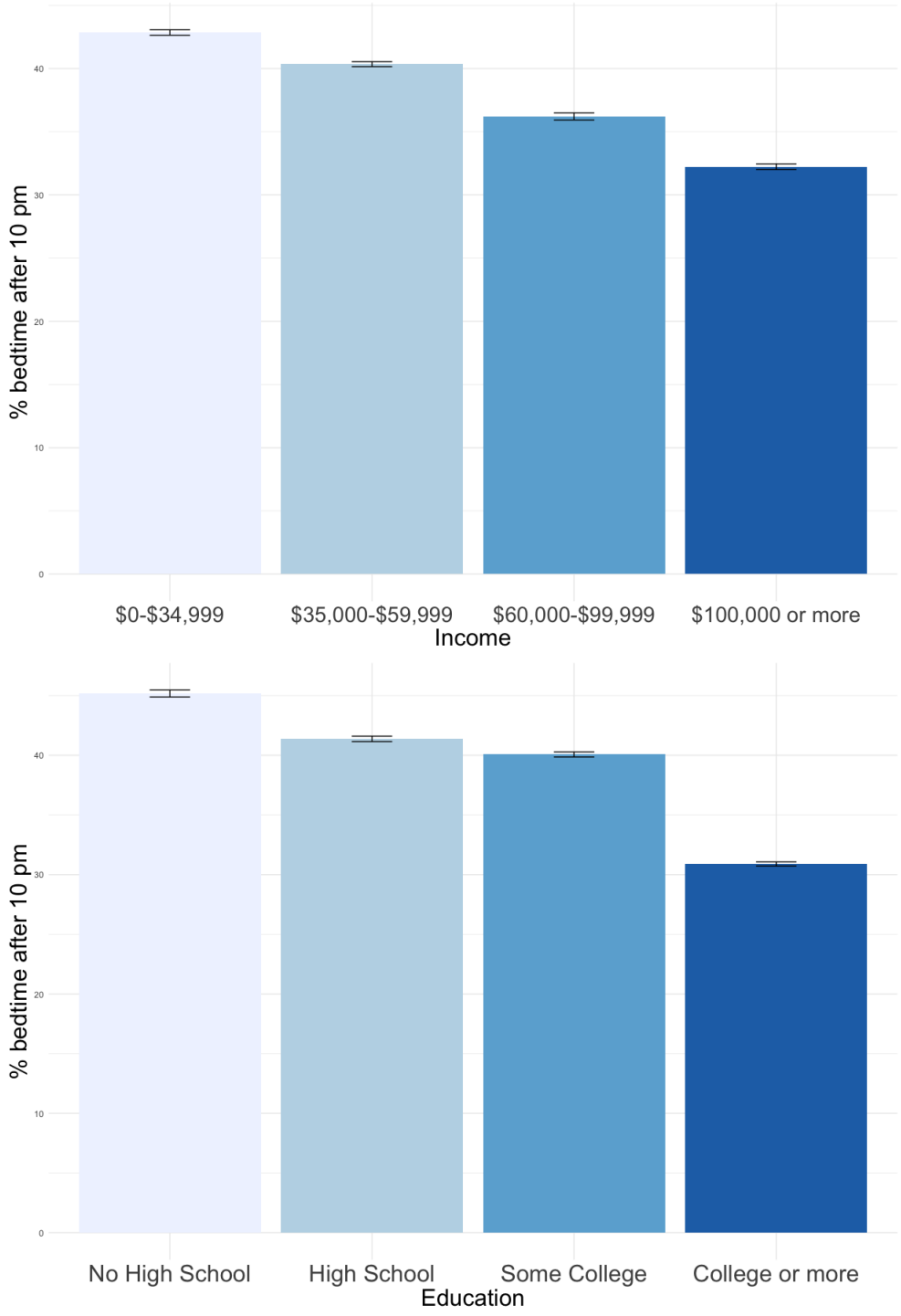
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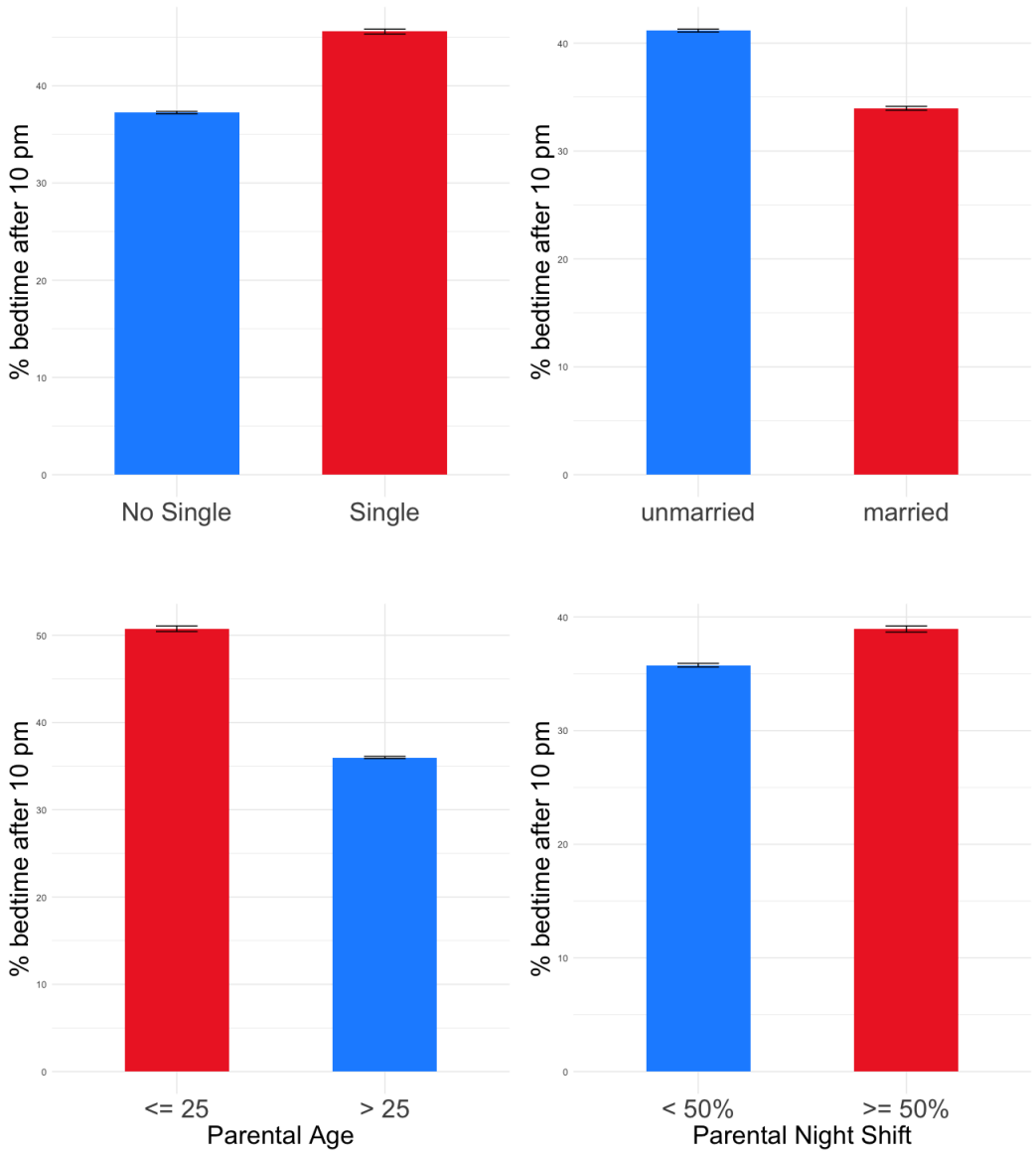
Appendix A. Figures and tables

Figure A.1: Bedtime by Income and Education, % with children bedtime later than 10pm



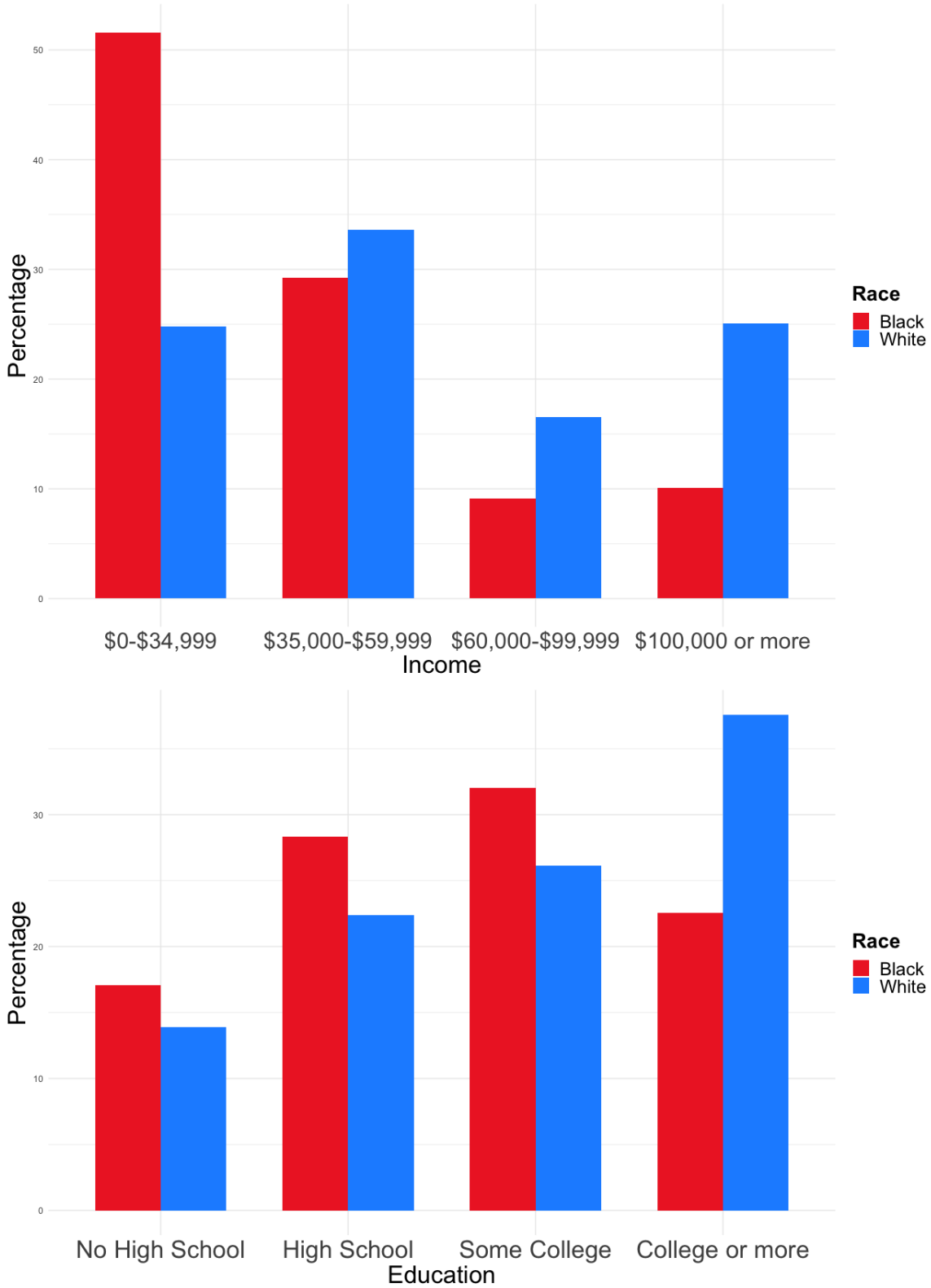
Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

Figure A.2: Bedtime by Parental Characteristics, % with bedtime later than 10pm



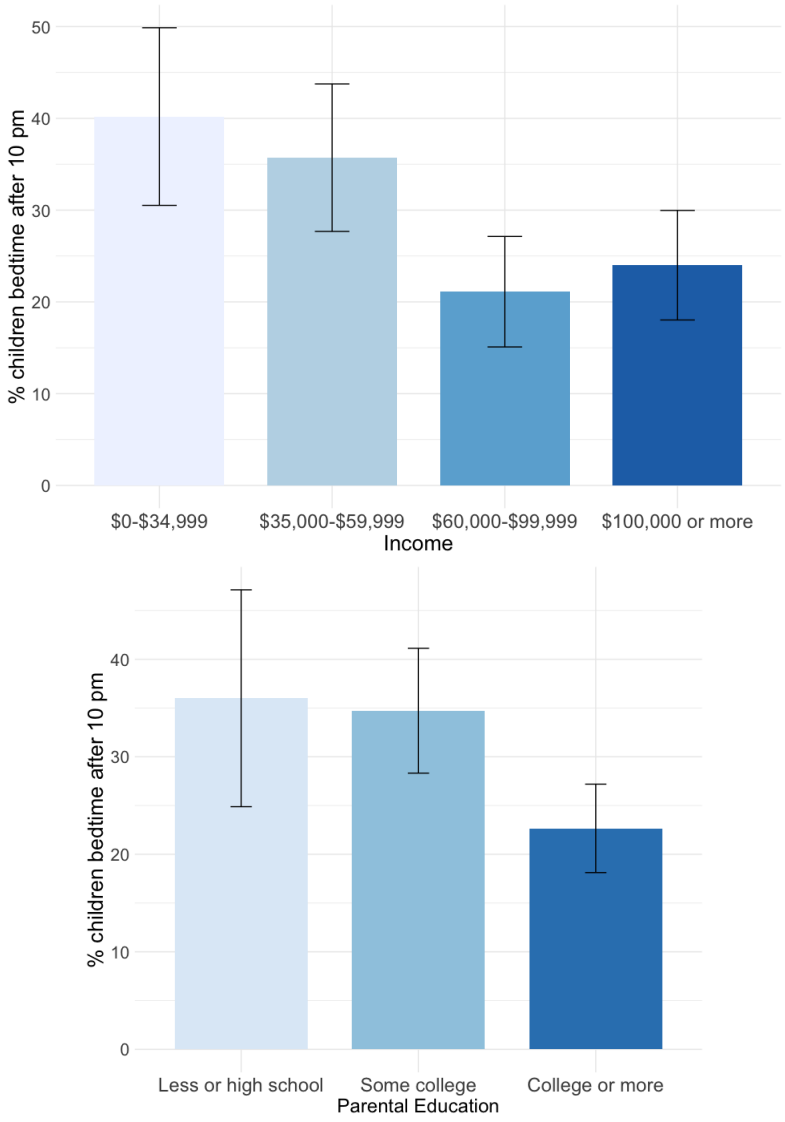
Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

Figure A.3: Income and Education by White and Black



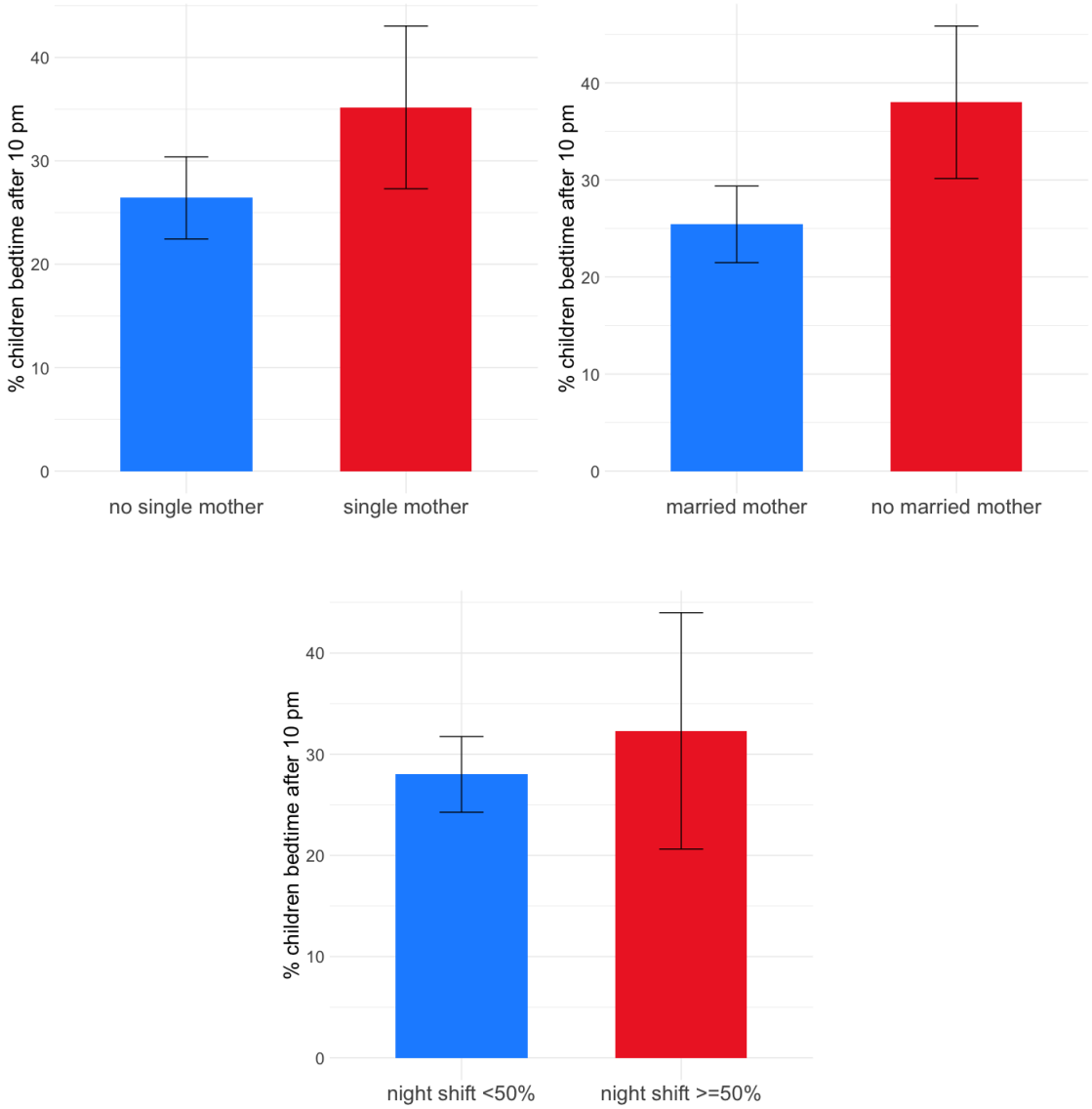
Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13.

Figure A.4: Online Survey - Bedtime by Income and Education, % children with bedtime later than 10pm



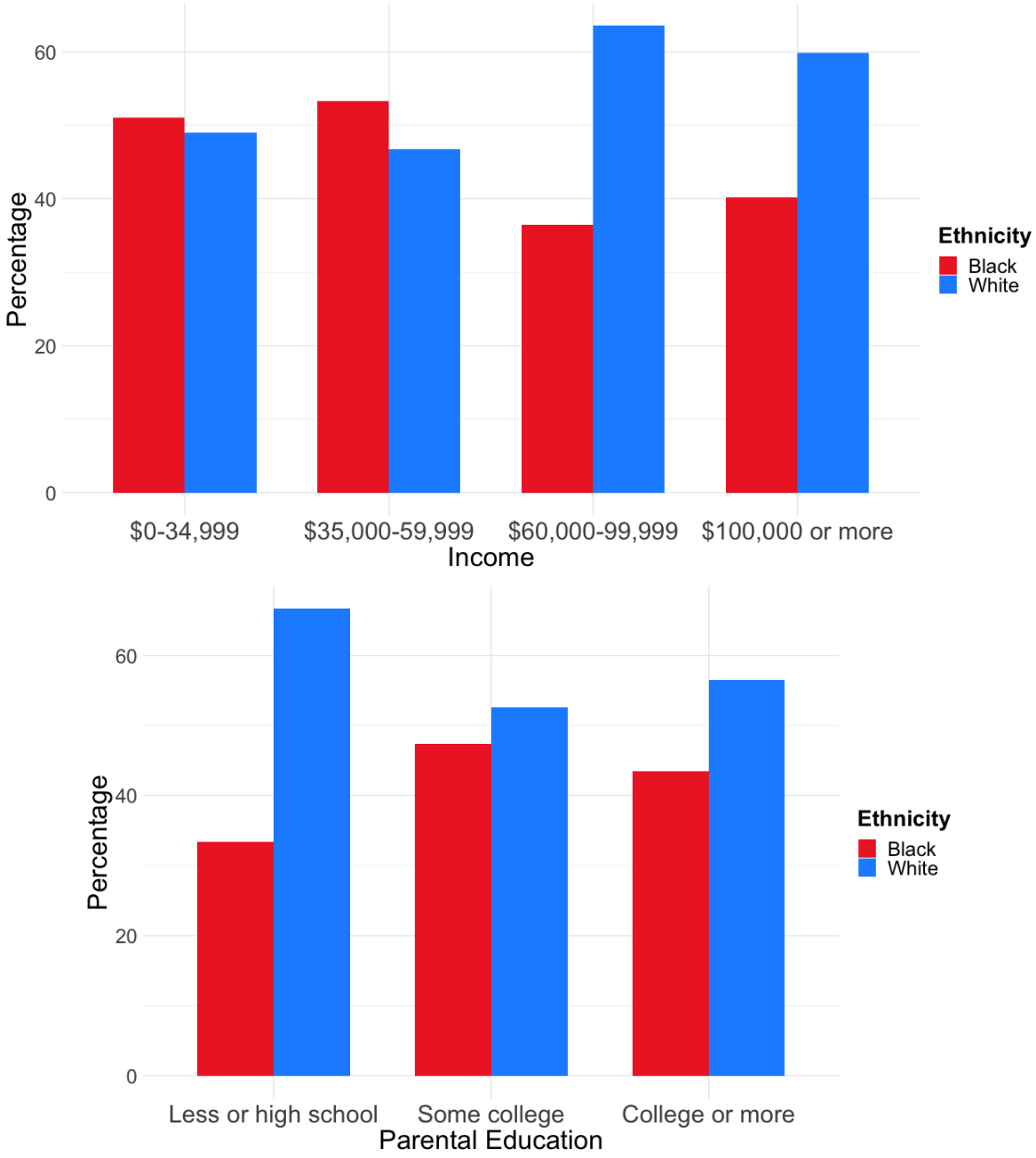
Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Figure A.5: Online Survey - Bedtime by Parental Characteristics, % with children bedtime later than 10pm



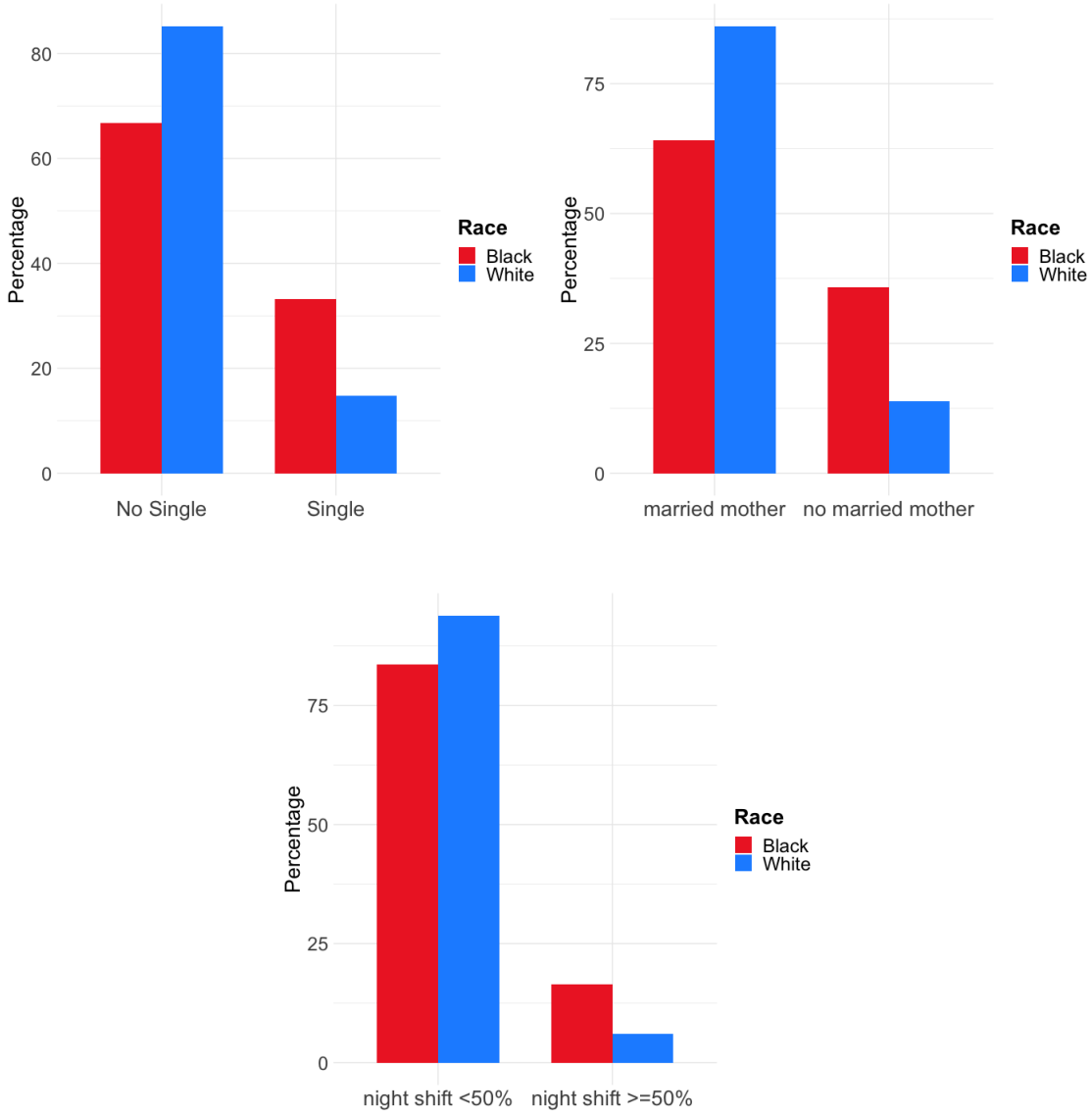
Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Figure A.6: Online Survey - Income and Parental Education by White and Black



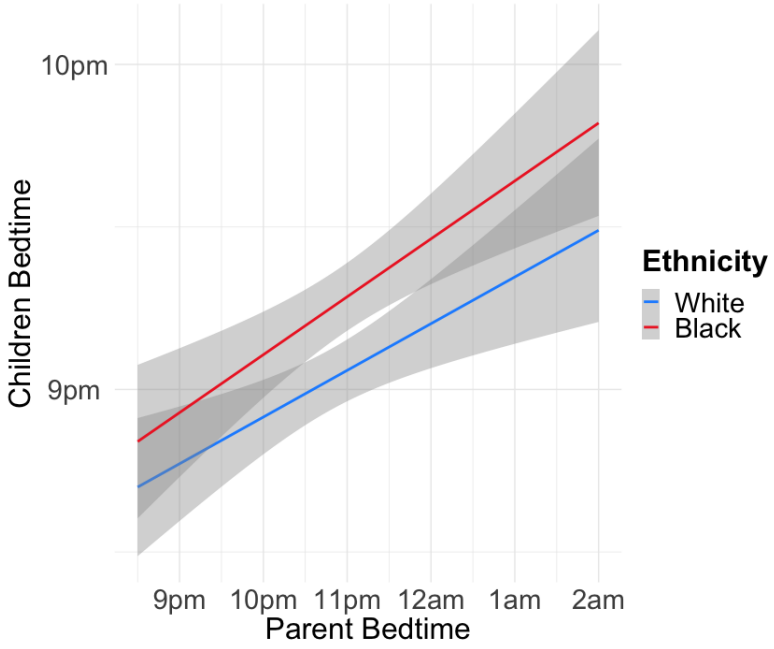
Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Figure A.7: Online Survey - Racial Differences in Socio-Demographic Determinants of Bedtime by Race



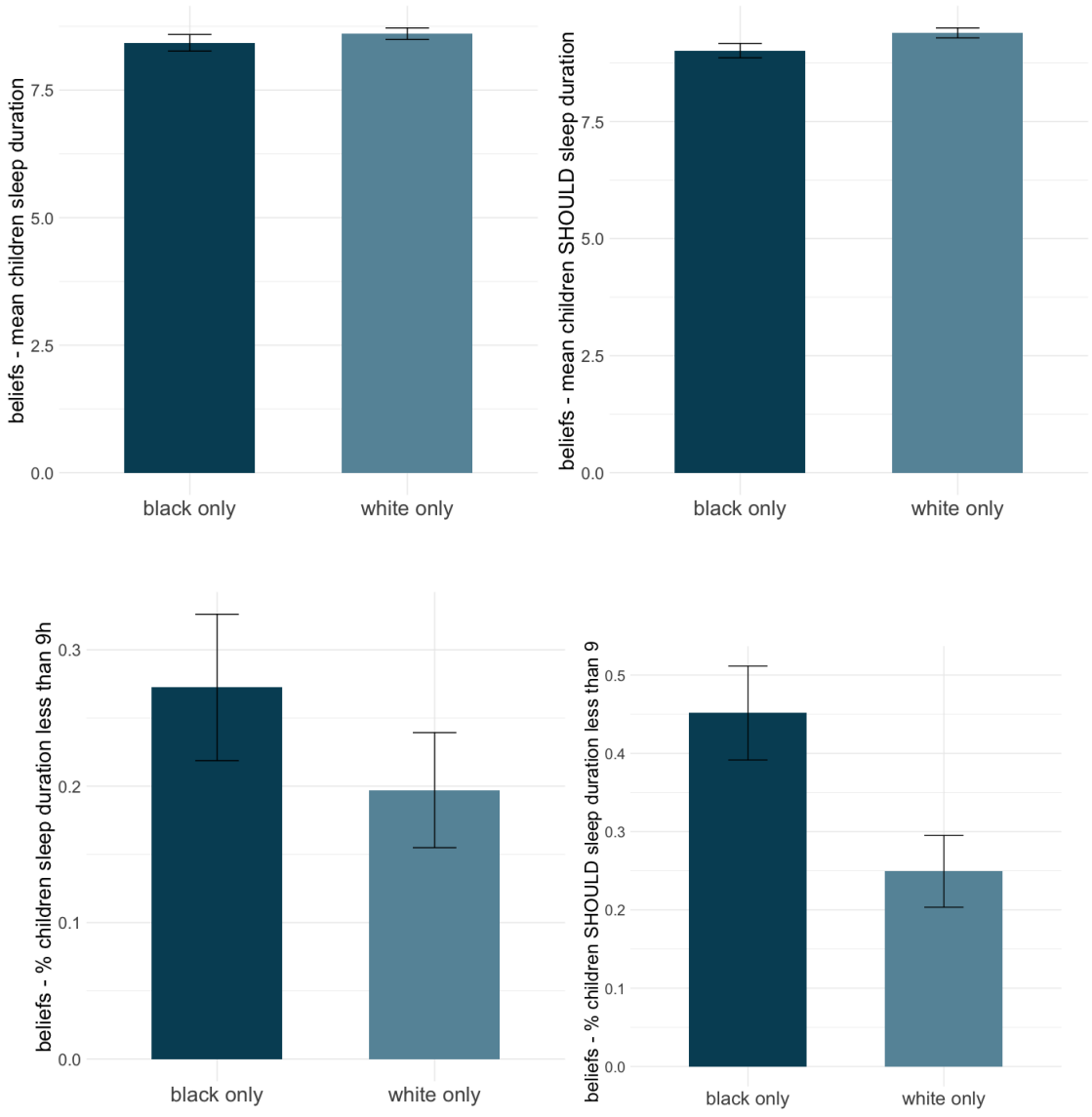
Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Figure A.8: Online Survey - Intergenerational Correlations in Bedtime: Parental and Children Bedtime



Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Figure A.9: Online Survey - Mothers beliefs on other children, descriptive norms vs. injunctive norms



Notes: Data are drawn from the Online Survey on Prolific 2024. Only parents with at least one child between the ages of 6 and 13 were interviewed.

Table A.1: Intergenerational Correlation in Bedtime

Panel A : Blacks				
	(1)	**(2)**	**(3)**	**(4)**
parental bedtime	0.446***	0.443***	0.443***	0.442***
	-0.017	-0.017	-0.017	-0.017
Sociodemographic chars.		x	x	x
Maternal chars.			x	x
Parental night shift				x
Mean dep.var.	21.936	21.936	21.936	21.936
sd dep.var.	2.092	2.092	2.092	2.092
Observations	3,914	3,914	3,914	3,914
Panel B : Whites				
	(1)	**(2)**	**(3)**	**(4)**
parental bedtime	0.408***	0.411***	0.411***	0.410***
	-0.006	-0.006	-0.006	-0.006
Sociodemographic chars.		x	x	x
Maternal chars.			x	x
Parental night shift				x
Mean Dep. Var.	21.469	21.469	21.469	21.469
Std. Dev.	1.705	1.705	1.705	1.705
Observations	31,069	31,069	31,069	31,069

Notes: Data are drawn from the ATUS survey 2003-2022. We restricted the sample to ATUS-respondents with children under the age of 13. Robust standard errors are reported in parenthesis.

Appendix B: Information intervention

The first set of messages (T1 and T2) provided general sleep recommendations, emphasizing the risks of insufficient sleep and the benefits of proper sleep routines, based on CDC guidelines. *"The percentage of children (up to 13 years old) going to bed before 10 pm among participants in the American Time Use Survey was 63%. The remaining 37% instead goes to bed after 10 pm, risking to sleep less than the recommended hours. Children who do not get enough sleep are more likely to have attention and behavior problems, which can contribute*

to poor academic performance. There is extensive literature indicating that good academic performance translates into higher future earnings. The CDC recommends the following sleep routine for children: Children should sleep for a certain number of hours per day depending on their age group. For example, children 1 to 2 years old should sleep 11 to 14 hours, and children 6 to 12 years old should sleep 9 to 12 hours. Children should follow the same steps every night before going to bed, such as brushing their teeth, reading a story, or listening to soothing music. Children should have a consistent bedtime and wake-up time every day, even on weekends and holidays."

A second set of messages (T3 and T4) highlighted racial disparities in bedtime behaviors, presenting data showing that Black children were more likely to go to bed later than White children.

Specifically: *The percentage of children (up to 13 years old) who go to bed before and after 10 pm among participants in the American Time Use Survey was different between Black and White participants. Among white children, 36% go to bed after 10 PM, while among black children 47%, risking not to get the recommended number of hours of sleep. Children who do not get enough sleep are more likely to have attention and behavior problems, which can contribute to poor academic performance. There is extensive literature indicating that good academic performance translates into higher future earnings. The CDC recommends the following sleep routine for children: Children should sleep for a certain number of hours per day depending on their age group. For example, children 1 to 2 years old should sleep 11 to 14 hours, and children 6 to 12 years old should sleep 9 to 12 hours. Children should follow the same steps every night before going to bed, such as brushing their teeth, reading a story, or listening to soothing music. Children should have a consistent bedtime and wake-up time every day, even on weekends and holidays.*

Finally, a third set of messages (T5 and T6) used a personal reflection style, where a narrator described their own experience of enforcing bedtime routines and the positive outcomes associated with sufficient sleep. This variation allowed us to examine the relative

influence of neutral versus personal storytelling, as well as the impact of explicitly addressing racial disparities in sleep patterns Specifically: *"Every night, I make sure my kids stick to their bedtime routine, which includes brushing their teeth, reading a story, and cuddling before they fall asleep. On average, they sleep about 10 hours, as recommended by our pediatrician for children aged 6-13. I've noticed that when they get enough sleep, they're in a better mood, behave well, and perform much better at school."*