Examining the Relationship Between Caregiver Acceptance and Children's Prosocial Behavior with Multiple Dimensions of Sleep as Moderators

by

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A thesis submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Master of Science

Auburn, Alabama
August 9, 2025

Keywords: caregiver acceptance, parental influence, prosocial behavior, child development, sleep

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Abstract

This study explored how sleep might influence the relationship between caregiver acceptance and prosocial behavior in early adolescence. Using a diverse sample and objective sleep data, the study first tested whether sleep changed the strength of this relationship. Results did not support moderation, meaning caregiver acceptance was associated with greater prosocial behavior regardless of how well adolescents slept.

However, several sleep variables did serve as partial mediators. Longer sleep duration, earlier bedtimes, and more consistent sleep schedules helped explain how caregiver acceptance was associated with higher prosocial behavior. These indirect effects remained significant or marginally significant after accounting for factors like sex, puberty, and family income. In contrast, sleep quality measures such as efficiency and latency were not related to prosocial behavior and did not serve as mediators.

Overall, the findings suggest that supportive caregiving may help adolescents develop healthier sleep patterns, which in turn promote kindness, empathy, and cooperation. Interventions that focus on both emotional support and sleep routines may be especially effective in encouraging positive social development.

Acknowledgements

This thesis was made possible by the many people who supported me and encouraged me to put forth my best efforts throughout a demanding and rewarding Master's program at Auburn University. Their presence turned this journey into one of growth, learning, and joy, allowing me to continue working within my passions.

First and foremost, I would like to express my deepest gratitude to my advisor and major professor, Dr. Brian Gillis. His insightful guidance and unwavering support at every stage of this process made the completion of my first thesis not only possible but truly fulfilling. I cannot imagine attempting this project without his mentorship. I am also sincerely grateful to my committee members, Dr. Joshua Novak and Dr. Diana Samek, for their constructive feedback and thought-provoking suggestions, which greatly enriched my work.

To my peers at Auburn University, thank you for encouraging me to pursue this thesis and for helping me recognize its value, even in difficult moments. Your support inspired me to consider further education into a PhD program.

Finally, I would like to thank my family and my best friend. My parents and brother have always stood by me, picking me up during setbacks and cheering me on as I worked toward my goals. To my best friend Tosin, your constant support, late-night pep talks, and shared celebrations have meant more than I can say. I truly could not have reached this point without your encouragement and inspiration.

Table of Contents

List of Tables

List of Abbreviations

ABCD Study = Adolescent Brain Cognitive Development Study

AFAB = assigned female at birth

AMAB = assigned male at birth

EFT = Emotionally Focused Therapy

SFT = Structural Family Therapy

Var. = variability

WASO = wake after sleep onset

Chapter 1: Introduction

Research on child development and behavior consistently highlights the critical roles of both environmental and biological factors in shaping prosocial behavior, which includes actions intended to benefit others such as helping, sharing, and cooperating (Knafo & Plomin, 2006 & Knafo-Noam, 2018). Among these influences, parenting practices, sleep quality, and social experiences are especially important in determining how children regulate emotions and respond to others (Zitzmann et al., 2024). While these factors have often been studied independently (Astill et al., 2012; Baum et al., 2014; Carlo et al., 2007), there is less research exploring how they may interact, particularly in relation to prosocial behavior during youth. Furthermore, research has traditionally focused more on antisocial behaviors than on the development of positive social traits (Guthridge, 2020). This study seeks to address this imbalance by focusing on prosocial behavior and the factors that may support it in children and adolescents.

This research also addresses broader societal concerns as adults frequently attribute poor behavior in youth to peer influence, a factor with some validity (Laible et al., 2004). However, many overlook the powerful role of parental modeling, particularly the influence caregivers have on adolescents' early decision making (Mann et al., 1989). In addition, the impact of physiological needs, especially sleep, on behavior is often underestimated (Astill et al., 2012; Liu et al., 2024). Although adults may recognize how lack of sleep affects their own mood and functioning, they may not fully appreciate its impact on children.

Sleep plays a vital role in multiple developmental processes including memory consolidation, emotional processing, problem solving, and physical repair (Diekelmann & Born, 2010; Tempesta et al., 2018). Chronic sleep deprivation or inadequate sleep can lead to irritability, poor decision making, and behavioral difficulties (Banks & Dinges, 2007; Baum et al., 2014; Maski & Kothare, 2013). Alarmingly, some research suggests that driving while sleep

deprived can be as dangerous as driving under the influence of alcohol (Sprajer et al., 2023; Williamson & Feyer, 2000). Sleep is not only essential for physical health but also foundational for social and emotional functioning. According to Maslow's hierarchy of needs, sleep is a basic human requirement that must be met before higher order needs such as emotional connection, self-reflection, and empathy can be fulfilled (Maslow, 1943).

This study explores the relationship between caregiver acceptance and sleep in predicting prosocial behavior. Specifically, it investigates whether various dimensions of sleep such as duration, consistency, and efficiency moderate the relationship between perceived parental warmth and prosocial tendencies in youth. While both parenting and sleep independently influence child development, little is known about how they may interact. This research aims to fill that gap and contribute to a more nuanced understanding of the factors that promote positive social behavior in children and adolescents.

Literature Review

Relations Between Caregiver Acceptance and Prosocial Behavior

Caregiver acceptance and warmth play a crucial role in the development of prosocial behaviors in children and adolescents. Research consistently shows that positive parenting, which is characterized by warmth, responsiveness, and emotional support, fosters prosocial behaviors such as helping, sharing, and cooperating (Barber et al., 2005; Baumrind, 1991; Laible et al., 2004; Richaud, 2013). Children who experience nurturing and supportive parenting are more likely to engage in positive social behaviors and develop healthier emotional patterns. Studies by Carlo et al. (2007) and Eisenberg (1986) further suggest that emotionally available parents who demonstrate love and care help their children internalize these prosocial behaviors, which continue into adolescence.

In contrast, the absence of parental warmth or emotionally distant parenting often leads to aggression and antisocial behaviors, as noted by Llorca et al. (2017). For example, harsh or inconsistent parenting is linked to increased aggression and difficulty in emotional regulation, especially in early childhood. Additionally, both maternal and paternal behaviors significantly influence how children express and manage emotions (Samper et al., 2021; Wang et al., 2024). Furthermore, a more nurturing environment influenced by parental figures helps children navigate their emotions and respond to others with empathy, fostering prosocial tendencies.

The impact of caregiver acceptance and warmth extends into adolescence. A longitudinal study by Malonda et al. (2019) found that while peers gain influential importance during adolescence, parental influence remains significant in shaping prosocial outcomes. Adolescents who perceive their parents as warm and supportive are more likely to engage in helping behaviors and show compassion. Furthermore, adolescents from families with authoritative parenting, marked by both warmth and structure, are more likely to exhibit prosocial behaviors, feeling secure in the emotional support they receive (Baumrind, 1991; Rothrauff et al., 2009).

Overall, caregiver acceptance and warmth are central to the development of prosocial behaviors in both children and adolescents. A supportive, emotionally warm environment is associated with better social skills, enhanced emotional regulation, and healthier interpersonal relationships, and ultimately, better psychosocial adjustment.

Relations Between Sleep and Prosocial Behavior

Research consistently shows that sleep plays a critical role in children's social and emotional development, which may directly influence their prosocial behaviors (Vaughn et al., 2015). Studies have examined the effects of sleep on social competence and emotional regulation with findings suggesting that poor sleep can impair social interactions, and the inverse of this relationship has been supported as well (Banks & Dinges, 2007; Baum et al., 2014; Maski &

Kothare, 2013). Foley and Weinraub (2017) found that adequate sleep including little disruptions, typical timing, and duration during preschool years predicted better emotional adjustment and peer relationships, while poor sleep led to increased social withdrawal and less prosocial behavior. It is also important to note that there are not many articles that investigate this relationship within adolescents, but we expect similar results due to people's need for sleep regardless of age.

Sleep problems, such as night wakings, sleeping more or less than typically developing children, or trouble falling asleep, are linked to behavioral and emotional difficulties, which can disrupt social interactions. Driouch et al. (2013) and Zhang et al. (2018) found that sleep issues were associated with irritability, aggression, and social withdrawal, all of which hinder prosocial behavior. Additionally, research has highlighted a bidirectional relationship between sleep and emotional difficulties (Kortesoja et al., 2020; Li et al., 2022). These studies explored how emotional struggles like anxiety and depression exacerbate sleep problems, and poor sleep further intensifies emotional challenges, leading to diminished prosocial behavior. Inconsistent sleep patterns also correlate with behavioral difficulties in school-aged children, as shown by Biggs et al. (2011), who found that irregular sleep schedules led to increased irritability and difficulties with social interaction.

In general, poor or irregular sleep can hinder emotional regulation and social competence, while sufficient, high-quality sleep supports better behavior, stronger peer relationships, and increased prosocial behavior.

Sleep as a Moderator Between Caregiver Acceptance and Prosocial Behavior

After reviewing the available literature, no studies have specifically investigated the role of sleep as a moderator between caregiver acceptance and prosocial behavior. While a substantial body of research exists on the broader impacts of caregiver acceptance on child behavior (Barber

et al., 2005; Baumrind, 1991; Laible et al., 2004; Richaud, 2013) as well as the influence of sleep on various behavioral outcomes for children and adults (Driouch et al.,2013 & Zhang et al., 2018), there appears to be a gap in the literature when it comes to the interaction between these variables, particularly in the context of prosocial behavior. Notably, Chang et al. (2016) conducted the closest study to this topic by exploring the effects of sleep problems on the trajectory of antisocial behavior, including fear, aggression, and bias (Guthridge et al., 2020), from adolescence through early adulthood, with family functioning acting as a moderator. Although this study provides valuable insights into how sleep issues may influence behavioral outcomes and the role of family functioning on prosocial behavior, it does not specifically address how sleep might moderate the relationship between caregiver acceptance and prosocial behavior.

The gap in research surrounding sleep as a moderator in these dynamics suggests an area primed for further exploration. Understanding whether and how sleep might influence the connection between caregiver acceptance and prosocial behavior could have significant implications for interventions aimed at improving child development, particularly in fostering positive social outcomes. Given the growing recognition of sleep's importance to emotional and behavioral regulation, exploring this moderator effect could contribute to a more comprehensive understanding of the factors that shape prosocial behavior in children and adolescents.

Theory/Conceptualization

This study is grounded in two theoretical frameworks: family systems theory and positive youth development. Family systems theory, particularly Bowen Family Systems Theory (Erdem & Safi, 2018), is central to understanding the dynamics within family relationships, emphasizing emotional systems and how family interactions shape individual development. Bowen's approach, which focuses on enmeshment and differentiation, allows for a deeper understanding

of the varying roles of family across different levels of involvement. These patterns allow for youth to either struggle or succeed with identifying their emotions, maintaining a sense of independence and autonomy, and understanding others' perspectives (Kerr, 1981). Positive youth development also informs this study, as Siu et al. (2012) highlight the importance of prosocial norms within this framework. They define prosocial norms as societal expectations that encourage behaviors such as helping, sharing, and cooperating, which benefit others. Additionally, they propose that promoting prosocial norms can be an effective strategy for preventing antisocial behaviors and fostering positive outcomes in youth. Thus, this study integrates these theoretical perspectives to explore the interactions between family dynamics and prosocial behavior in the positive development of adolescents.

Present Study

This study aims to address a significant gap in the literature by exploring how sleep might moderate the relationship between caregiver acceptance and prosocial behavior in adolescents. While previous research has independently examined the effects of parenting and sleep on social and emotional development, little is known about how these factors interact. Specifically, it is unclear how sleep may influence the impact of parental warmth and support on prosocial behaviors. This gap in knowledge is particularly relevant given the importance of both family dynamics and sleep in shaping adolescents' social well-being.

The present study will examine (1) associations between parent acceptance and prosocial behavior, (2) associations between sleep and prosocial behavior, and (3) sleep as a moderator of associations between caregiver acceptance and prosocial behavior. Regarding direct effects, based on the literature, we anticipate that greater caregiver acceptance will be associated with greater prosocial behavior and more-optimal sleep will be associated with more prosocial behavior. We further expect that sleep could moderate this association, such that under conditions

of more-optimal sleep, associations between caregiver acceptance and prosocial behavior could be amplified, while under conditions of suboptimal sleep, associations could be weakened. We also expect these associations due to the protective enhancing patterns consistent with current research (Luthar et al, 2000). Meaning that in situations with low caregiver acceptance, we can expect children to exhibit lower prosocial behavior, but in the presence of higher caregiver acceptance, we can expect youth to show higher rates of prosocial behavior. Therefore, we specifically expect a "protective-enhancing" pattern among the variables (Luthar et al, 2000). We also considered sleep mediating the relationship between caregiver acceptance and youth prosocial behavior

The findings from this study could offer valuable insights for families aiming to encourage positive behaviors in their children. Additionally, therapists can gain a better understanding of how sleep and parenting interact to influence prosocial development, which can inform therapeutic interventions that enhance emotional regulation and social competence. Furthermore, the study underscores the increasing necessity to promote prosocial behaviors in youth, especially in light of escalating societal pressures due to political and economic strain and strife, highlighting the importance of this research. By exploring these interactions, the study has the potential to contribute to interventions that support positive youth development, improve social outcomes, and reduce perceived behavioral issues in adolescence.

Chapter 2: Method

Participants

The participants in the Adolescent Brain Cognitive Development (ABCD) Study were recruited from 21 sites across the United States, beginning when they were either 9 or 10 years old, along with their caregivers. The study follows these children and adolescents through

multiple time points, tracking both biological and behavioral developments from early adolescence into young adulthood, aiming to continue until the participants reach approximately 20 years old by 2025. Initially, the study included approximately 11,875 youth who participated in extensive data collection every two years. In between these waves, families engaged in shorter data-collection sessions during the alternate years.

During the two-year follow-up in 2017, approximately 4,300 participants were provided with Fitbit Charge HR devices to wear at home for three weeks following their annual laboratory visit. Of these, around 3,000 youth (N = 2,979) wore their devices for at least five nights per week. These participants were included in the analytic sample, consistent with established guidelines for sleep assessment in childhood (Meltzer et al., 2020). At this time point, participants were, on average, 12 years old (M age = 11.96 years, SD = 7.80 months), with roughly equal numbers assigned male and female at birth (51.19% AMAB; 48.81% AFAB). According to parent reports, youth represented a range of pubertal development: 14.36% were in pre-puberty, 27.67% in early puberty, 40.39% in mid-puberty, 17.27% in late puberty, and 0.31% in post-puberty. Most families were considered middle class or higher (64.96%) based on their income-to-needs ratio. The sample was also racially and ethnically diverse, supporting the generalizability of findings to a broader population of children and adolescents across the United States. Participants identified as Hispanic (12.2%), White non-Hispanic (61.3%), Black non-Hispanic (7.1%), American Indian or Alaska Native non-Hispanic (0.2%), Asian non-Hispanic (2.7%), some other race non-Hispanic (0.5%), and multiracial (16.1%).

Procedure

The University of California, San Diego Study institutional review board provided approval for ABCD study procedures. The secondary data analysis conducted for this study was determined to be exempt from human-subjects protocol by the Auburn University Institutional

Review Board. To access the data from the National Institute of Mental Health Data Archive, Auburn University provided a Data Use Certification. In this current study, parents consented to participation while youth assented to participation. Participants were recruited from families residing across the United States and were enrolled in the study at one of 21 participating research laboratories. These families provided questionnaire data through iPads and the youth wore a Fitbit Charge HR for a continuous 21 days at home to collect objective sleep data. At the first-year follow-up visit, youth answered questions about caregiver acceptance. At the second-year follow-up visit, youth answered questions about their prosocial behavior while parents provided demographic information for their child. Additionally, a trained research assistant tracked the waist circumference for the youth.

Measures

Caregiver Acceptance

Caregiver acceptance was measured using the five-item caregiver support subscale of the widely used and well-established Children's Report of Parent Behavior Inventory (Schaefer, 1965). Youth responded on a scale from 1 (*Not like him/her*) to 3 (*A lot like him/her*) to items such as, "Is able to make me feel better when I am upset" and "Believes in showing his/her love for me," for up to two caregivers. Items for each caregiver were summed for a total possible range of 5 (low caregiver acceptance) to 15 (high caregiver acceptance); if items were completed for two caregivers, scores were averaged across caregivers. The scale had acceptable reliability in the analytic sample ($\alpha = 0.72–0.74$ across caregiver 1 and caregiver 2). The vast majority of youth (n = 2738, 92%) reported acceptance for two caregivers. For caregiver 1, 92.72% of youth identified their mother. Most reported a father as their second caregiver (72%); 12% were mothers, 9% were grandparents, 5% other, and 2% aunt or uncle.

Sleep

Sleep was measured by data collection through FitBit Charge HR devices, and the data was scored and extracted by Fitabase. Sleep duration was measured by sleep minutes as measured by the average number of minutes one was assumed to be asleep from sleep start to waking. Sleep quality was measured by sleep efficiency, wake after sleep onset (WASO), and sleep latency. Sleep efficiency is the percentage of minutes a person's sleep minutes divided by their minutes from sleep onset to wake. WASO is the number of wake minutes between sleep onset and wake. Sleep latency is the average minutes from the first minute of getting into bed and sleep onset. Sleep timing was measured by the average midpoint between sleep onset and wake as indicated by the middle minute in clock time. Sleep regularity was measured by the variability in previously mentioned measures of sleep minutes and sleep midpoint throughout the data collection period.

Sleep minutes, WASO, time in bed, sleep onset, and wake data were tracked using Fitabase, aligning with a study that validated the FitBit Charge HR device against polysomnography (de Zambotti et al., 2015). Sleep efficiency, latency, midpoint, and their variability were calculated using established best practices (Fekedulegn et al., 2020) and commonly used formulas (Becker et al., 2017; Randler et al., 2019), ensuring consistency with the validation study. Participants who wore their FitBit for at least five nights, in accordance with best practices, had their sleep data included; on average, participants wore the devices for 12.46 nights (*SD* = 5.78 nights).

Youth Prosocial Behavior

Youth prosocial behavior was measured using the three-item Prosocial Behavior scale of the widely used and well-established Strengths and Difficulties Questionnaire (Goodman, 2001). Youth responded on a scale from 0 (*Not True*) to 2 (*Certainly True*) to the items "I try to be nice to other people. I care about their feelings," "I am helpful if someone is hurt, upset, or feeling

sick," and "I often offer to help others (parents, teachers, children)" for how they felt about themselves. The items were summed for a total possible range of 0 (low prosocial behavior) to 6 (high prosocial behavior). The scale had fair reliability in the analytic sample ($\alpha = 0.66$).

Covariates

Caregivers provided demographic information for the youth participants, which included sex assigned at birth, ethnicity, race, age, waist circumference, and details about the household, including size and income. The household size and income data were specifically used to calculate the income-to-needs ratio, a measure that helps assess the economic context of the family relative to the poverty threshold (Diemer et al., 2013; U.S Department of Commerce, 2018). The inclusion of these covariates is warranted because prior research has shown that sleep parameters and prosocial behavior vary by sex assigned at birth, ethnicity, race, age, and household characteristics such as income and size (Giddens et al., 2022 & Wang et al., 2024).

Plan of Analysis

Data were managed in SPSS 29. I evaluated normality of data (or measures of central tendency and distribution) through visual inspection of histograms and examination of descriptive statistics. For variables with skewness > 2.00 or < – 2.00, extreme observations were identified through Mahalanobis distance and trimmed to the value of the observation nearest to 3 *SDs* from the mean. Moderation analyses were performed in Mplus 8.9. All exogenous (independent) variables were mean centered, and interaction terms for each sleep parameter were created as the product of Caregiver acceptance x Sleep. Separate models were fit for each sleep parameter (six total models). Variables were entered into multiple linear regression models in a step-wise fashion: 1) youth prosocial behavior regressed onto caregiver acceptance; 2) adding youth sleep an independent variable; and 3) adding the interaction of Caregiver acceptance x Sleep an independent variable, along with covariates described above. Significance was

determined using a probability value threshold of $p < .008$ (0.05 / 6). Significant interactions were plotted, and simple slopes were examined using Mplus. Sizes of moderation effects were reported as the percentage of variance explained in each outcome (R^2).

Chapter 3: Results

Preliminary Analyses

Demographic characteristics of the sample are presented in Table 1, and descriptive statistics of main study variables are reported in Table 2. Caregiver acceptance was relatively high with a mean of 13.96 out of a maximum score of 15.00. On average, youth sleep for 7 hours and 31 minutes per night, with a bedtime of 11:01pm and a wake time of 7:07am. Caregiver acceptance was correlated with longer sleep duration, earlier sleep timing, and less variability in sleep timing and duration (Table 3). Both caregiver acceptance (girls: $M = 14.06$, boys: $M = 13.86$; $t(2{,}897.19) = -4.08$, $p < 0.001$) and prosocial behavior (girls: $M = 5.37$, boys: $M = 5.01$; $t(2{,}918.52) = -9.23$, $p < 0.001$) were higher for youth who were assigned female at birth.

Direct Association Between Caregiver Acceptance and Youth Prosocial Behavior

Caregiver acceptance was positively associated with youth prosocial behavior, with everyone one-unit increment of caregiver acceptance related to approximately 0.20 higher prosocial behavior (Table 4).

Direct Association Between Youth Sleep and Youth Prosocial Behavior

Longer sleep duration ($B = 0.002$, $p = 0.002$), later sleep onset ($B = -0.001$, $p = 0.02$), less variability in sleep onset ($B = -2.05$, $p = 0.01$), and less variability in sleep midpoint ($B = -2.28$, $p = 0.01$) were associated with high prosocial behavior among youth (Table 4). Sleep efficiency, WASO, latency, wake, midpoint, variability in wake, and variability in minutes were not related to youth prosocial behavior.

Sleep as a Moderator Between Caregiver Acceptance and Youth Prosocial Behavior

Across all dimensions of sleep, sleep did not moderate the association between caregiver acceptance and youth prosocial behavior (Table 4).

Post-hoc Mediation Analyses[1]

Sleep Duration

In models without control variables, higher caregiver acceptance was associated with longer sleep, $B = 2.16$, $p < 0.001$; longer sleep, in turn, was associated with more prosocial behavior, $B = 0.002$, $p < 0.001$ (Table 4). Sleep minutes was a significant indirect pathway through which higher caregiver acceptance was associated with more prosocial behavior (indirect: $B = 0.01$, $p = 0.003$). When accounting associations of sex assigned at birth, pubertal status, and family income with both sleep minutes and youth prosocial behavior, this indirect effect became marginally significant (indirect: $B = 0.002$, $p = 0.07$).

Sleep Quality

Higher caregiver acceptance was not associated with sleep efficiency, WASO, or latency (Table 4). These sleep parameters were not related to prosocial behavior. Sleep efficiency, WASO, and latency were not indirect pathways through which higher caregiver acceptance was associated with more prosocial behavior.

Sleep Schedule (Timing)

In a model without control variables, higher caregiver acceptance was associated with earlier sleep onset, $B = –3.75$, $p < 0.001$; sleep onset, in turn, was associated with more prosocial behavior, $B = –0.001$, $p < 0.05$ (Table 4). Sleep onset was an indirect pathway linking caregiver acceptance to prosocial behavior (indirect: $B = 0.003$, $p < 0.05$). The full model containing caregiver acceptance, sleep onset, and control variables explained 8.30% of the variance in youth prosocial behavior. This indirect effect was marginally significant (indirect: $B = 0.002$, $p = 0.07$)

[1] After finding that sleep did not moderate the association between caregiver acceptance and youth prosocial behavior, additional models tested sleep as a mediator or indirect pathway linking caregiver acceptance and youth prosocial behavior. Mediation models were tested in Mplus 8.9 using model indirect command.

when accounting for control variables (sex assigned at birth, pubertal status, family income, and waist circumference).

Caregiver acceptance was not associated with wake time; later wake time was associated with higher prosocial behavior, $B = 0.001$, $p < 0.05$. However, wake was not a significant indirect pathway.

Higher caregiver acceptance was associated an earlier sleep midpoint, $B = –2.70$, $p < 0.01$, but sleep midpoint was unrelated to youth prosocial behavior. Sleep midpoint was not a significant indirect pathway.

Sleep Variability

Higher caregiver acceptance was associated with less variability in sleep onset, $B = –0.002$, $p < 0.001$; less variability in sleep onset, in turn, was associated with more prosocial behavior, $B = –2.28$, $p < 0.001$ (Table 3). Variability in sleep onset was a significant indirect pathway through which higher caregiver acceptance was associated with more prosocial behavior (indirect: $B = 0.005$, $p < 0.01$). The full model (caregiver acceptance, variability in sleep onset, and controls) accounted for 8.50% of the variability in youth prosocial behavior. This indirect effect remained significant (indirect: $B = 0.003$, $p < 0.05$) after accounting for control variables.

Caregiver acceptance was not related to variability in wake, and variability in wake was unrelated to youth prosocial behavior. Variability in wake was not a significant indirect pathway.

Higher caregiver acceptance was associated with less variability in sleep midpoint, $B = –0.002$, $p < 0.001$; less variability in sleep midpoint, in turn, was associated with more prosocial behavior, $B = –2.25$, $p < 0.01$ (Table 3). Variability in sleep midpoint was a significant indirect pathway through which higher caregiver acceptance was associated with more prosocial

behavior (indirect: $B = 0.004$, $p < 0.05$). The full model (caregiver acceptance, variability in sleep midpoint, and controls) accounted for 8.40% of the variability in youth prosocial behavior. This indirect effect was marginally significant after accounting for control variables (indirect: $B = 0.003$, $p < 0.05$).

Higher caregiver acceptance was associated with less variability in sleep minutes, $B = –0.01$, $p < 0.001$; less variability in sleep minutes, in turn, was associated with more prosocial behavior, $B = –0.84$, $p < 0.01$ (Table 3). Variability in sleep minutes was a significant indirect pathway through which higher caregiver acceptance was associated with more prosocial behavior (indirect: $B = 0.01$, $p < 0.01$). The full model (caregiver acceptance, variability in sleep minutes, and controls) accounted for 8.40% of the variability in youth prosocial behavior. This indirect effect remained significant after accounting for control variables (indirect: $B = 0.004$, $p < 0.05$).

Chapter 4: Discussion

Summary of Results

This study examined the associations among caregiver acceptance, sleep, and prosocial behavior in early adolescence. Results showed that greater caregiver acceptance was directly related to higher levels of prosocial behavior, supporting prior research on the importance of warm and supportive parenting for youth social development.

Sleep duration, earlier sleep timing, and more consistent sleep patterns were also positively associated with prosocial behavior. Although sleep did not moderate the relationship between caregiver acceptance and prosocial behavior, several sleep variables served as significant indirect pathways. Specifically, sleep duration, sleep onset, and variability in sleep timing partially explained how caregiver acceptance may influence prosocial outcomes. However, these effects were somewhat reduced when accounting for demographic factors.

Measures of sleep quality, such as sleep efficiency and latency, were not significantly related to prosocial behavior. This suggests that the regularity and timing of sleep may be more influential during this developmental period.

Overall, these findings highlight the joint contributions of caregiver support and sleep in shaping prosocial behavior. Efforts to enhance youth social functioning may benefit from promoting both emotionally supportive caregiving and healthy sleep routines.

Situating Results Within the Literature

This study aligns with research indicating that emotionally supportive parenting models are internalized by children and reflect in their prosocial behavior toward peers. Caregivers who model empathy, respect, and communication provide templates that youth replicate in their own social interactions (Eisenberg et al., 2006; Carlo et al., 2007). These findings support the proposition that caregiving quality is foundational to children's social and moral development.

Connections between healthy sleep and prosocial behavior parallel existing literature on the impact of sleep on emotional regulation and daily mood in adolescents (Foley & Weinraub, 2017; Baum et al., 2014). Sufficient and regular sleep reduces irritability and enhances emotional control, which in turn allows for more considerate and cooperative behavior toward others.

Although sleep did not moderate the connection between caregiver acceptance and prosocial behavior, mediation findings highlight how caregiver warmth can influence youth sleep, which then supports prosocial behavior. These findings are consistent with Dahl's theory that emotional safety is necessary for healthy sleep (Dahl, 1996). Youth who feel accepted and secure are less hypervigilant at night and experience deeper, more regular sleep, which contributes to improved social functioning and positive interpersonal behaviors.

However, post-hoc mediation models showed that sleep duration, earlier bedtimes, and more stable sleep patterns serve as pathways through which caregiver acceptance relates to prosocial behavior. These indirect effects persisted, though they became marginal when controlling for demographic factors. There are minimal studies that examine these variables through a mediation model, however Richardson et al. (2023) found that parental warmth in adolescence is a protective factor for sleep within early adulthood. The results suggest that emotionally secure environments may promote healthier sleep (Baumrind, 1991; Dahl, 1996; Rothrauff et al., 2009), which then supports compassionate social engagement with peers (Driouch et al., 2013).

Hypotheses Review

Hypothesis 1: Caregiver Acceptance and Youth Prosocial Behavior

The data indicate that increased caregiver acceptance is significantly associated with greater prosocial behavior in youth. This could suggest that caregivers who express warmth,

understanding, and consistent acceptance display behaviors that children often emulate in peer interactions, such as listening, showing concern, and helping, thus fostering prosocial tendencies (Barber et al., 2005; Baumrind, 1991; Laible et al., 2004; Richaud, 2013).

Hypothesis 2: Sleep and Youth Prosocial Behavior

Youth who slept longer, went to bed earlier, and maintained more consistent sleep schedules reported higher prosocial behavior. These findings support theories that adequate sleep enhances emotional regulation, impulse control, and empathy which are all critical traits for prosocial engagement (Foley & Weinraub, 2017). This also speaks to existing evidence that sleep improves cognitive and affective functioning in adolescence (Astill et al., 2012 & Liu et al., 2024).

Hypothesis 3: Sleep Moderates the Relationship Between Caregiver Acceptance and Prosocial Behavior

Sleep did not significantly change the strength or direction of the link between caregiver acceptance and prosocial behavior. This suggests that caregiver influence tends to be consistent regardless of variations in youth sleep patterns. Whether youth sleep better or worse, the positive impact of caregiver acceptance on prosocial behavior remains robust.

Clinical Implications

The current findings offer important implications for clinical practice, particularly within the frameworks of Structural Family Therapy (SFT) and Emotionally Focused Therapy (EFT). Both models offer tools for promoting caregiver acceptance and addressing family dynamics that can influence adolescent sleep and social functioning.

Structural Family Therapy focuses on realigning family hierarchies, roles, and boundaries to promote healthier functioning (Minuchin & Fishman,1981& Muntigl & Horvath, 2020). In families where caregiver acceptance is low, SFT techniques such as joining, tracking, and

restructuring can help shift rigid or disengaged family structures into more supportive and emotionally responsive environments (Minuchin & Fishman,1981). By strengthening the parental subsystem and clarifying caregiver roles, adolescents are more likely to experience consistent emotional support, which, according to the findings, is associated with improved sleep and increased prosocial behavior (Barber et al., 2005; Baumrind, 1991; Laible et al., 2004; Richaud, 2013). Structural interventions can also help parents establish developmentally appropriate expectations and routines, including consistent sleep schedules and healthy household rhythms that promote emotional and behavioral regulation in adolescents (Minuchin & Fishman,1981).

Emotionally Focused Therapy, traditionally used in couple and family contexts, emphasizes the development of secure emotional bonds through the identification and restructuring of attachment-related interactions (Furrow et al., 2019 & Greenberg, 2004). EFT's focus on fostering emotional attunement and responsiveness between caregivers and children is directly aligned with the concept of caregiver acceptance (Greenberg, 2004). When caregivers can respond to their children's emotional needs with empathy and validation, it can reduce adolescent stress, promote feelings of safety, and improve sleep quality (Furrow et al., 2019). These secure emotional connections not only support sleep but also encourage youth to model empathetic, cooperative behaviors in their own relationships.

Together, these models suggest that clinical work aimed at improving family emotional environments and structure can lead to measurable gains in adolescent well-being. Promoting caregiver acceptance through therapeutic restructuring and emotional connection has the potential to not only improve the parent–child relationship but also support biological and social outcomes, including healthier sleep patterns and increased prosocial behavior.

Future Directions

Future research should use longitudinal and experimental designs to better establish causality among caregiver acceptance, sleep behaviors, and prosocial outcomes. Tracking these variables over time would help clarify how changes in parenting and sleep impact youth behavior during different developmental stages. Experimental studies, such as parenting or sleep interventions, could directly test whether improvements in these areas lead to increased prosocial behavior.

Future work should also incorporate multiple informants and methods. Observational data or reports from teachers and peers would offer a more complete understanding of prosocial behavior. Additional factors like school stress, peer dynamics, and family conflict should also be explored as potential moderators. Examining how these patterns vary across groups, such as by gender or socioeconomic status, may provide insight into more personalized intervention strategies.

Strengths and Limitations

This study has several strengths. It used a large and diverse sample of early adolescents and included objective sleep data collected over several nights. The inclusion of multiple sleep parameters allowed for a comprehensive view of how sleep may support social behavior. The findings are likely more generalizable than studies using smaller or more homogenous samples.

However, some limitations must be considered. The cross-sectional design does not allow for conclusions over time. Self-report measures, particularly for prosocial behavior, may be affected by bias or limited self-awareness. Finally, although the sample was diverse, most families were middle income or above, which may limit the applicability of findings to populations facing greater economic hardship.

Conclusion

This study highlights two pathways by which caregiver acceptance supports prosocial behavior in adolescents. The first is through direct caregiver modeling, and the second is through the promotion of healthy sleep. Together, these findings point to the importance of supportive family environments and good sleep habits in fostering empathy, cooperation, and kindness in youth.

By identifying sleep as a partial mediator, this research adds to the understanding of how caregiver behavior can shape both biological and social development. The results support family-based approaches that focus on both emotional connection and sleep consistency as important components of youth well-being.

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Table 1

Demographic Characteristics of Sample

	M (*SD*) or %
Age	*M* = 11.96 years, *SD* = 7.80 months
Sex assigned at birth	48.81% AFAB; 51.19% AMAB
Pubertal status	14.36% pre-puberty 27.67% early puberty 40.39% mid-puberty 17.27% late puberty 0.31% post-puberty
Family income	20.97% at or near poverty line 14.06% lower middle class 64.96% middle-class or above
Race/ethnicity	12.2% Hispanic 61.3% White non-Hispanic 7.1% Black non-Hispanic 0.2% American Indian or Alaska Native non-Hispanic 2.7% Asian non-Hispanic 0.5% Some other race non-Hispanic 16.1% Multiracial

Note. AFAB = assigned female at birth. AMAB = assigned male at birth.

Table 2

Descriptive Statistics of Main Study Variables

	n	*M*	*SD*	Min.	Max.
Caregiver acceptance	2929	13.96	1.29	6.00	15.00
Sleep minutes	2979	450.85	37.50	262.40	598.80
Sleep efficiency	2979	88.67	1.68	81.28	93.89
Wake after sleep onset	2979	57.84	10.98	18.00	103.00
Sleep latency	2979	6.72	4.89	0.00	51.00
Sleep onset	2979	1380.07	68.07	1142.50	1775.00
Wake	2979	427.07	74.69	–459.07	621.27
Sleep midpoint	2979	1634.19	62.35	1394.58	2048.29
Variability in sleep onset	2979	0.05	0.03	0.01	0.28
Variability in wake	2979	0.23	1.14	–25.02	22.28
Variability in sleep midpoint	2979	0.04	0.02	0.01	0.23
Variability in sleep minutes	2979	0.14	0.07	0.01	0.44
Youth prosocial behavior	2976	5.19	1.07	0.00	6.00

Note. For sleep minutes, 450.85 minutes = 7 hours, 31 minutes. For sleep onset, 1380.07 = 11:01pm. For wake, 427.07 = 7:07am. For sleep midpoint: 1634.19 = 3:14am.

Table 3

Correlations of Main Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Caregiver acceptance	–												
2. Sleep minutes	.07***	–											
3. Sleep efficiency	.04	–.05**	–										
4. Wake after sleep onset	.002	.48***	–.90***	–									
5. Sleep latency	.01	.14***	.24***	–.15***	–								
6. Sleep onset	–.07***	–.38***	.15***	–.29***	–.001	–							
7. Wake	.03	.13***	–.05*	.10***	–.01	.06**	–						
8. Sleep midpoint	–.06**	–.11***	.07***	–.10***	.02	.95***	.10***	–					
9. Variability in sleep onset	–.10***	–.23***	.08***	–.17***	.06**	.38***	–.24***	.33***	–				
10. Variability in wake	–.01	–.07***	.004	–.03	.07***	.09***	–.08***	.08***	.14***	–			
11. Variability in sleep midpoint	–.09***	–.24***	.09***	–.18***	–.02	.42***	–.29***	.37***	.91***	.18***	–		
12. Variability in sleep minutes	–.12***	–.40***	.07***	–.23***	.20	.47***	–.22***	.38***	.62***	.12***	.64***	–	
13. Youth prosocial behavior	.29***	.10***	.03	.02	.01	–.07***	.04*	–.04*	–.09**	–.01	–.08***	–.08***	–

Note. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 4

Sleep as a Moderator of Relations Between Caregiver Acceptance and Youth Prosocial Behavior

	B	*SE*	*p*
Model for sleep minutes			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Sleep minutes	0.002	0.001	0.002
Caregiver Acceptance x Minutes	0.00	0.00	0.57
Model for sleep efficiency			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Sleep efficiency	0.00	0.01	0.97
Caregiver Acceptance x Efficiency	–0.01	0.01	0.30
Model for wake after sleep onset			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
WASO	0.002	0.002	0.17
Caregiver Acceptance x WASO	0.001	0.001	0.54
Model for sleep latency			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Sleep latency	0.002	0.004	0.69
Caregiver Acceptance x Latency	0.001	0.003	0.84
Model for sleep onset			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Sleep onset	–0.001	0.00	0.02
Caregiver Acceptance x Onset	0.00	0.00	0.33
Model for wake			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Wake	0.00	0.00	0.07
Caregiver Acceptance x Wake	0.00	0.00	0.58
Model for sleep midpoint			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Sleep midpoint	0.00	0.00	0.18
Caregiver Acceptance x Midpoint	0.00	0.00	0.24
Model for variability in sleep onset			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Variability in sleep onset	–2.05	0.73	0.01
Caregiver Acceptance x Var. Onset	–0.14	0.45	0.77
Model for variability in wake			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Variability in wake	–0.01	0.02	0.63
Caregiver Acceptance x Var. Wake	0.01	0.01	0.61
Model for variability in sleep midpoint			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Variability in sleep midpoint	–2.29	0.86	0.01
Caregiver Acceptance x Var. Midpoint	–0.42	0.56	0.45
Model for variability in sleep minutes			
Intercept	5.19	0.02	0.00
Caregiver acceptance	0.22	0.02	0.00
Variability in sleep minutes	–0.60	0.33	0.07
Caregiver Acceptance x Var. Minutes.	–0.32	0.21	0.13

Notes. WASO = wake after sleep onset. Var. = variability. Separate models were fit for each sleep parameter. All models controlled for sex assigned at birth, race/ethnicity, family income, and puberty.