



DET PSYKOLOGISKE FAKULTET



Parenting Strategies and Sleep in Adolescence

HOVEDOPPGAVE

Profesjonsstudiet i Psykologi

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Forord

Det har i mange år fascinert meg hvordan foreldre påvirker, skaper og former barna sine, og vice versa, selvsagt. Fra de små og store tingene en gjør uten å kanskje tenke over de umiddelbare eller langtidsvirkende effektene dette kan ha på barnet. Det er på mange måter det denne studien handler om, hvordan det foreldre sier og gjør eller ikke sier og gjør påvirker ungdommen, sett gjennom linsene til foreldrestrategier og ungdomssøvn i en studie jeg selv (og foreldrene mine) deltok i for akkurat litt over 10 år siden. Jeg har lært enormt mye om både foreldrestrategier og søvn, og dette er noe jeg ønsker å ta med meg i klinisk praksis, både i arbeid med voksne og i arbeid med barn og ungdom.

Arbeidet med denne oppgaven har krevd å sette seg inn i statistikk på en ny måte, og det har krevd å holde ut når en jobber alene med en stor oppgave. Jeg vil gjerne takke så meget mine flinke veiledere, Mari Hysing og Sondre Aasen Nilsen, som alltid har vært tilgjengelige, tålmodige og særdeles flinke til det de driver med.

Bergen, 16.05.2022

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Sammendrag

Formål: Til tross for at kortere søvnlengde og søvnproblemer er vanlig i ungdomstiden vet vi mindre om i hvilken grad foreldre har oversikt over hvordan ungdom sover og i hvilken grad foreldrestrategier henger sammen med hvordan ungdom sover. Formålet med studien var å undersøke sammenhengen mellom foreldrerapportert ungdomssøvn og selv-rapportert ungdomssøvn, samt sammenhengen mellom foreldrestrategier og ungdomssøvn.

Metode: studien benytter data fra ung@hordaland. Deltakerne bestod av 1324 ungdom (gjennomsnittsalder 17.27, 51.9 jenter %) og 1324 foreldre. Variablene som ble undersøkt var foreldrerapport på ungdomssøvn, selv-rapportert søvnlengde og insomni, og foreldrestilene positiv foreldrestil, inkonsekvent foreldrestil og foreldremonitorering. Det ble gjennomført både lineær og logistisk regresjonsanalyse, både ujusterte, og modeller som tok høyde for ungdoms alder og kjønn, og foreldres inntekt og utdanning.

Resultater: Resultatene av studien indikerte at ungdommer generelt sett rapporterer høyere nivå av søvnproblemer sammenliknet med foreldrene. Høy grad av inkonsekvent foreldrestil og foreldremonitorering var assosiert med henholdsvis kortere og lengre søvnlengde enn lav grad. Resultatene var signifikante også når en justerer for sosioøkonomisk status (SES). Positiv foreldrestil og foreldremonitorering var negativt assosiert med insomni etter justering for alder, kjønn og SES.

Konklusjon: Funnene fra studien tyder på at foreldre hvis foreldrestil var preget av høy grad av inkonsekvens var relatert til kortere søvntid for ungdommen. Foreldremonitorering var også relatert til lengre søvntid for ungdommen.

Abstract

Purpose: During adolescence sleep duration decreases, and sleep problems increase, however little is known about how much the parents know about their adolescents' sleep, and to which degree parenting strategies are associated with adolescent sleep. The purpose of the present study was to examine the association between parent reported adolescent sleep and self-reported adolescent sleep, and to examine the association between parenting strategies and adolescent sleep.

Method: the study used material from the youth@hordaland study. The current sample consisted of 1324 adolescent (M age 17.27, 51.9 % female) and 1324 parents. The variables examined were parent-reported adolescent sleep, self-reported sleep duration and insomnia, and positive parenting, inconsistent parenting and parental monitoring. Linear and logistic regression analyses were used, and analyses adjusting for adolescent age and sex, and household income and parental education were also conducted.

Results: The results of the study indicated that adolescents generally report higher levels of sleep problems compared to parents. Higher inconsistent parenting and parental monitoring was associated with shorter and longer sleep duration, respectively, compared to low degree of the two. These results remained significant when adjusting for age, sex and socioeconomic status (SES). Positive parenting and parental monitoring were negatively associated with insomnia when adjusting for age, sex and SES.

Conclusion: The findings from the study indicated that parents whose parenting strategies was characterized by a high degree of inconsistency was associated with relatively short adolescent sleep duration. Parental monitoring was also associated with longer adolescent sleep duration.

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Introduction

Sleep in adolescence is affected by biological- and environmentally driven changes and demands, most notably early school start times and extracurricular activities (e.g., Colrain & Baker, 2011). Adolescent sleep most commonly occurs within the family context and may therefore be affected by factors within the family. Positive family characteristics foster good sleep (Gunn et al., 2019), and positive parental factors are associated with better sleep outcomes for adolescents (Khor et al., 2021). Therefore, the association between adolescent sleep and parental behaviour is of interest. A few studies have examined the association between parenting strategies and adolescent sleep (e.g., Adam et al., 2007; Brand et al., 2009; Clinkinbeard et al., 2011; Cousins et al., 2007; Gunn et al., 2019; Khor et al., 2021; Meijer et al., 2016; Zapata Roblyer & Grzywacz, 2015). Many of the studies examining this topic are to do the association between parenting strategies and sleep duration. However, there appears to be a lack of studies which examine the association between parenting strategies and insomnia measured in line with diagnostic criteria.

Sleep in Adolescence

During adolescence, the quality and quantity of sleep changes notably. Children and young adolescents (6-13 years old) are recommended between nine and 11 hours of sleep. Older adolescents (14-17 years old) are recommended between eight and 10 hours of sleep, and young adults (18-25) seven to nine hours of sleep (Hirshkowitz et al., 2015). Adolescent sleep is characterised by a rather large discrepancy between weekdays and weekend sleep patterns, and adolescents tend toward later bedtimes and on average one to two hours longer sleep duration during weekends (Hysing et al., 2013). Furthermore, Norwegian adolescents sleep approximately 6.5 hours per night on school nights which is around two hours less than recommended (Hysing et al., 2013). The move from childhood to adulthood during

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adolescence involves changes in several biological and environmental factors and expectations which change adolescent sleep.

Bedtime is delayed during adolescence, which coupled with an increased interest in activities during evenings can lead to less sleep (Colrain & Baker, 2011). The onset of puberty leads to a shift in the sleep-wake cycle or circadian rhythm (Kirshenbaum, 2021). Delayed sleep timing is associated with the lengthening of timing in the circadian oscillator, i.e., the inner clock (Carskadon et al., 2004), which works in tangent with environmental cues. Melatonin is released later in the evening for adolescents compared to children (Onaolapo & Onaolapo, 2017), which makes for a natural inclination to go to bed at later times compared to childhood. Similarly, adolescents who have an evening chronotype have been found to have shorter weekday sleep time (Gau et al., 2007).

The two-process model for sleep regulation (Borbély et al., 2016) is a frequently used model for explaining sleep regulation. The model proposes the interaction between two processes, i.e., homeostatic rhythm (process S) and the circadian rhythm (process C). The two processes work interactively and individually (Deboer, 2018) and regulate the depth, maintenance, as well as wakefulness and sleepiness during the day (Hamre, 2020). The circadian rhythm is self-sustained internal mechanism and oscillate with a period of about 24 hours. The homeostatic process is characterized by sleep pressure which increases the longer the person is awake and dissipates as one sleeps (Crowley et al., 2006). In adolescence circadian mechanisms seem to change and includes a change toward evening phase preference. Furthermore, sleep pressure build-up seems to slow down during adolescence which permits the adolescent to stay awake longer and delay the sleep/wake cycle (Crowley et al., 2006).

The circadian rhythm also affects chronotype for activity and rest; time preference for activity and rest is further affected by sociocultural factors which govern certain activities

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during the day (Hamre, 2020). Changes in brain structures are also linked to changes in sleep (Colrain & Baker, 2011). Studies have indicated that grey matter decreases in adolescence compared to childhood and adulthood (Giedd, 2008). Continued improvement of functions performed by the prefrontal cortex is also characteristic of adolescence (Luciana, 2013). Increased myelination occurs during adolescence and into adulthood, progressing from inferior to superior brain regions, and posterior to anterior (Colrain & Baker, 2011). Slow-wave activity also appear to decrease during early adolescence, from ages 11-16.5 (Campbell & Feinberg, 2009).

A further consequence of the pubertally driven changes in sleep pressure and circadian rhythm is the fact that it can make it challenging for adolescents to get sufficiently tired to fall asleep at their previous bedtimes. Furthermore, there seems to be a pattern of less parental control over bedtime during adolescence (Carskadon, 1990), and some behavioural/environmental factors may also contribute to the delay of sleep onset and duration, e.g., electronic devices (Cain & Grandisar, 2010), and caffeine intake (Orbeta et al., 2006).

Earlier school start times, often coupled with longer morning travel, can require adolescents to rise earlier, and parents contributing to regulating bedtime is significantly associated with longer sleep duration (Bartel et al., 2016).

A previous study from youth@hordaland found that younger adolescents (15 years old) have earlier bedtimes and risetimes on both weekdays and weekends, as well as sleeping longer on weekends (Hysing et al., 2013). This age-group also spent more time in bed, had higher subjective sleep need, more sleep deficiency during weekdays, and reported less insomnia than their older peers (19 years old). Moreover, a study of adolescents aged 10 - 14 points to youth age as having had a positive linear association with more variability in sleep duration (Gunn et al., 2019).

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The causes and consequences of sleep loss in adolescence are often intertwined in complex ways (Owens, 2014). In a review about consequences of sleep loss, the following four major effects of acute sleep loss were outlined: sleepiness, tiredness, emotional changes, and attention – and performance changes (Dahl, 1999). The first consequence, sleepiness, is most problematic during periods of low stimulation. For adolescents classrooms may be a place where stimulation is low. Indirect consequences of sleepiness for adolescents include conflicts with parents that can arise from difficulties getting up in the morning or the increased use of stimulants, e.g., caffeine and nicotine. Tiredness can be defined as a feeling of fatigue or decreased motivation. Tiredness can make it difficult to initiate or maintain certain behaviours. Tasks which require abstract goals or consequences, or planning are more difficult to initiate and complete when the person is tired. For adolescents this could manifest as lack of motivation for studying. Another potential consequence is emotional changes. There appears to be greater variability in emotional states and less control over emotional responses in adolescents following sleep loss, though not all adolescents experience this. Lastly, acute sleep loss can lead to changes in attention and performance.

The prevalence of sleep difficulties appears to have increased since the early 1980s. One study examined the differences between sleep-onset difficulties in younger adolescents from 1983 to 2005 (Pallesen et al., 2008). Sleep-onset difficulties were defined as answering “approximately daily or “more than once a week” on the question “how often during the last 6 months have you experienced difficulties falling asleep?”. Data was collected from a representative sample of adolescents aged 11, 13 and 15 years old, and at six occasions between 1983 and 2005. The results were that for all the ages and genders examined that the prevalence of sleep-onset difficulties had increased and the youngest adolescents had a higher prevalence than the older adolescents.

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Parental knowledge about their adolescents' sleep may be important in order to detect sleep problems in adolescence. Insufficient knowledge may lead to parents to not be able to provide the support needed if sleep problems occur. Parent report of adolescent sleep may be more closely linked to the time adolescent spend in their bedroom during nights and evenings as opposed to actual time spent asleep as they may not be aware of the length of time spent awake after the lights have been shut off (Short et al., 2013). An Australian study compared parental estimates of adolescent (13-17) sleep pattern with adolescent self-reported sleep from surveys and sleep diaries, alongside actigraphy (Short et al., 2013). The study found that there were differences between the self-report, actigraphy, and sleep diary of the adolescents and the estimates provided by the parents. On school-nights parents reported 14-18 minutes earlier bedtimes and 35-45 minutes more obtained sleep compared to adolescent-derived estimates. The wake-times for weekdays were less divergent, with 10 minutes in difference between parental report and adolescent-derived estimates. For weekend the parental estimates differed more, from 47-51 minutes later for parents compared to adolescent-derived estimates. Similarly, a recent American study used parent reported estimates on adolescent sleep, adolescent self-reported sleep estimates, alongside adolescent actigraph-reported sleep estimates (Gunn et al., 2019). The study found that while the adolescents spend on average 6.23 hours asleep, the average parent-reported sleep duration was 508 minutes (8.47 hours).

Insomnia

Insomnia is among the most prevalent sleep disorders during adolescence, with studies often reporting a prevalence ranging between 7.8 and 23.8 % for DSM-criteria (Dohnt et al., 2012; Hysing et al., 2013; Johnson et al., 2006). Insomnia is characterised by problems with falling asleep, frequent awakenings and early morning awakenings, in addition to reduced function. In line with the Diagnostic and Statistical Manual of Mental Disorders (DSM) - 5 some key criteria include difficulties initiating or maintaining sleep, that the sleep disturbance

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causes significant distress or impairment, the sleep difficulty occurs at least three nights per week and has been present for at least three months and is not explained by other mental or sleep-wake disorders. Insomnia has been shown to be a risk for future somatic dysfunction, interpersonal problems, daily activities, as well as psychological problems (Robert et al., 2002).

The risk factors for the development of insomnia can be partially due to the changes the adolescent goes through because of ageing. Processes like changes in the circadian clock and homeostatic process may interact with environmental changes and lead to reduced evening propensity for sleep which can create continued waking and delayed bedtimes (Carskadon, 2011; Jenni & LeBourgeois, 2006). Environmentally driven risk factors which may increase prevalence of insomnia can be unemployment, for adolescents it may be more evening activities, and family life stress which is significantly associated with the development of insomnia in young persons (Bernert et al., 2007).

Family Life and Sleep

Family environment is the context in which most adolescents find themselves sleeping. The family context and social bonds can be viewed as an extension of the context which allowed humans as a species to have long intervals of night-time sleep and rest; with parental and family presence particularly important for creating this safety for early periods of brain development when sleep requirements seem to be high (Dahl & El-Sheik, 2007). Put simply, the connection between family environment and sleep is that a close warm environment should foster an assessment of safety and by extension healthy sleep, while stress and conflict within family are likely to contribute to and possibly exacerbate increased vigilance and disrupted sleep (Dahl & El-Sheik, 2007).

Positive emotional and social family characteristics facilitate the fostering of the emotional security necessary for good sleep and are associated with fewer awakenings and

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longer sleep duration for children (Gunn et al., 2019). One study found that under context of family stress parental support was positively associated with sleep duration in adolescents (Tsai et al., 2018). Parents who are aware of bedtime activities, monitor waking activities, and demonstrate expectations about bedtime, may facilitate adequate sleep (Gunn et al., 2019). In terms of parenting strategies, positive parenting strategies are associated with better adolescent sleep outcomes, while poorer adolescent sleep outcomes are associated with negative parenting strategies (Brand et al., 2009; Khor et al., 2021). Lower levels of parental involvement have been associated with later adolescent morning rise time (Cousins et al., 2007). One study found that negative parenting strategies, i.e., restriction and reproach was associated with reduced sleep quality and that sleep onset latency (SOL) (Brand et al., 2009). Therefore, parents, and by extension their behaviour and parenting style influence the adolescent's sleep.

Parenting Styles

Parenting style can be defined in different ways. Darling and Steinberg (1993) define parenting style a collection of attitudes toward the child which are communicated to them and create an emotional climate in which the behaviours of the parents are expressed.

Three common parenting styles were identified by Baumrind (1966), permissive, authoritative, and authoritarian. These parenting styles differ in terms of their presence or lack of two different traits a) parental responsiveness and b) demandingness. The first trait, parental responsiveness, is defined as consisting of warmth, nurturance, and support; with the second trait, demandingness, consisting of psychological control, inconsistent and punitive discipline, and harsh discipline. The first parenting style, permissiveness, is characterised as being high in the trait of responsiveness and low in the trait demandingness, and this style is associated with child behaviour typified by low self-control and low self-reliance. The authoritarian parent can be identified by their low responsiveness and high demandingness,

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and this style is associated with children who are discontented and withdrawn. In contrast, the authoritative parent is characterised as being high in both parental responsiveness and demandingness and is subsequently associated with assertive and self-reliant behaviour in children.

Moving from childhood to adolescence results in changes in adolescent behaviour; their relationships with peers become more important than at prior states of development (Berndt, 1982; Furman & Buhrmester 1992), and the adolescent is more likely to balk at or resent parental directives without explanation. In terms of their relation to parent-child conflicts, authoritative styles are considered most beneficial while authoritarian styles are believed to exacerbate parent-child conflicts (Paikoff & Brooks-Gunn, 1991). More independence from parents leaves room for new relationships outside the parent-relation and information from peers may become more relevant than from parents and new relationships may become new sources of trust (O’Koon, 1997). The changes the adolescent goes through during this time affect their behaviour, which may in turn change the parents’ behaviour towards them as well as which parenting practices are employed (Paikoff & Brooks-Gunn, 1991). Research has shown that parental involvement, use of positive discipline techniques, and monitoring and supervision decrease as children age and are afforded more independence (Frick et al., 1999). More independence and development characterise this transition and while the adolescents may move away from their parents, this is also a time when the relationship can be transformed into one that is made up of mutual dialogue, with a mix of both independence and connectedness to the family which is important for adolescent growth and development (Dumas et al., 2009). During adolescence parents tend to grant the adolescent more autonomy (Paikoff & Brooks-Gunn, 1991). As use of parenting strategies can change during adolescence, and adolescents are awarded more independence, gaining

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further understanding of the effects parent strategies can have on adolescent sleep is useful and can inform interventions which aim to improve sleep in late adolescence

The emotional relationship the adolescents have with their parents may remain close, even in later adolescence (Brand et al., 2009), and thus it is not unreasonable to imagine that parenting style can influence both the adolescent as well as their bond to their parents as children grow older, and it is surmised that parents continue to use a particular parenting style through childhood into adolescence (Zlomke et al., 2013).

A Swiss study found a link between negative parenting styles and reduced adolescent sleep quality (Brand et al., 2009). The parenting traits were examined using the Erziehungstil Inventory. This inventory consists of the five dimensions support, commendation, reproach, restriction and inconsistency. The adolescents were asked to rate their parents' behaviour across these dimensions. Participants also completed a sleep personality questionnaire and kept a daily sleep log. Positive parenting style consisted of support and commendation, while negative parenting style of reproach, restriction and inconsistency. Positive parenting styles were related to low daytime sleepiness, longer total sleep time, and greater subjective sleep quality. The opposite was found for negative parenting styles; adolescents reported longer SOL, more focus on sleep complaints as well as poor subjective sleep quality.

A Dutch longitudinal study examined the association between general parenting behaviour and adolescent sleep (Meijer et al., 2016). The parenting behaviour was measured by adolescent report on the facets of monitoring, autonomy granting and the quality of the parent-adolescent relationship. Adolescent sleep was measured by adolescent report on questions regarding bedtimes, time in bed (TIB) and sleepiness. Higher levels of monitoring were linked to earlier bedtimes, and over time higher levels of sleep quality. Lower levels of monitoring over time contributed to bedtimes which were 1 hour later at the last point of measure compared to the first. Higher quality of the parent-adolescent relationship was linked

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to better sleep quality. High quality of the parent-adolescent relationship also seemed to interact with monitoring and exacerbate the positive effect of higher monitoring on TIB as well as be mutually compensating for each other.

Parent knowledge about sleep is associated with longer adolescent sleep duration. One study examined the effects of parental monitoring of bedtime and waking behaviours and sleep on high-risk youth aged 10-14 (Gunn et al., 2019). The measures of monitoring and sleep behaviour were completed by both parents and youths, and the youths were instructed to wear an actigraph to measure sleep. The study also found that greater youth-assessed parental monitoring was further found to be associated with longer sleep duration during the both the weekdays and the weekend.

Interactions between family stress, sleep duration and cognitive functioning may be important. One study examined the interactions between family stress, i.e., harsh parenting, parental psychological control, and marital conflict, sleep duration and cognitive functioning, on a group of 252 adolescents with a mean age of 15.8 (El-Sheik et al., 2014). The study found that high-quality sleep is advantageous in the context of low-risk parenting, i.e., low harsh parenting and low psychological control. Therefore low-risk parenting was considered beneficial in positive contexts, and high-quality sleep may be protective against negative contexts. Increased parental stress may reduce parenting quality, e.g., may lead to more inconsistency in parenting or decreased ability to monitor adolescent behaviour. Family environments and parenting strategies which are characterised by unpredictability can reduce the feeling of safety needed to initiate and maintain sleep.

The studies which examine the association between parenting strategies and adolescent sleep vary on the operationalisation of the different parenting strategies, how sleep is measured (e.g., actigraphy, sleep diary, questionnaire) and commonly use adolescents as informants regarding parenting strategies (e.g., Brand et al., 2009; Meijer et al., 2016; Tsai et

al., 2018; Zapata Roblyer & Grzywacz, 2015). The age of participants also varies from ages 6-25. This study focuses on adolescents between the ages of 15 to 19. Therefore, providing a parent-assessed measure of parenting strategies and examining an association with adolescent sleep is of interest.

Measuring Parenting

The Alabama Parenting Questionnaire (APQ) was designed to assess the parenting practices that have been shown in the literature to be most related to child behaviour problems across multiple formats, i.e., global report and telephone interview, and sources, i.e., child and parent (Frick et al., 1999). The APQ consists of five subscales measuring positive and negative styles. The two positive styles are positive parenting and parental involvement. These strategies refer to the parents' use of praise and rewards in order to reinforce desirable behaviours and the extent to which parents take part in the adolescents' activities. Poor monitoring/supervision refers to parents' knowledge of how the adolescent spend their time and inconsistent parenting consists of the incoherent use of disciplinary strategies. The final negative style is corporal punishment (Florea et al., 2022; Zlomke et al., 2013). The current study examined three measures of parenting strategies: positive parenting, inconsistent parenting, and parental monitoring.

The first dimension, positive parenting, measures behaviours like praising good behaviour or taking part in the adolescents activities. Positive parenting has also been linked to adolescent emotional health and well-being (Dumas et al., 2009), also equipping them with the encouragement, support and security they need to resolve difficult life events in an adaptive and coherent manner. Positive parenting has also been linked to identity maturity at age 26 (Dumas et al., 2009). The relationship between the parent and the emerging adult may be particularly important during this time as they face changes and increasing demands. Long-

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term effects of healthy family interactions in adolescence have also been found (Bell & Bell, 2005).

The second dimension, inconsistent parenting, is characterised by inconsistent use of rules and discipline between parents or by the changing of disciplinary strategies from one parenting situation to the next (Krishnakumar & Buehler, 2000). A possible result of family environment or marital strife (Krishnakumar & Buehler, 2000), parental consistency points to external factors as influential regarding adolescent outcomes. Consistency along with support in parenting discipline relates positively to academic competence, self-confidence, and positive peer relations for children (e.g., Conger et al., 1992). Moreover, coupled with supportive parenting, these strategies are especially important for children whose families face adverse circumstances or stresses, e.g., financial hardship, parental illness, or parental divorce. On the opposite, inconsistent parenting has been associated with negative outcomes for children and subsequently adolescents (Barry et al., 2009)

The third dimension is parental monitoring. Parental monitoring is a set of correlated parenting behaviours which involves attention to and tracking of the whereabouts, adaptations and activities of the child (Dishion & McMahon, 1998). While the practice persists from infancy to adolescence, the focus and method may change (Dishion & McMahon, 1998). Furthermore, parental monitoring may be a protective factor for children who live in high-risk settings and poor parental monitoring, or supervision has been linked to adolescent delinquency (Dishion & McMahon, 1998). As mentioned, moving from childhood to adolescence involves changes in the relationship between the parent and the adolescent, and the adolescent spend more time with their peers (Lam et al., 2014), which may result in parental monitoring decreasing. Decreased parental monitoring may lead to less effective parenting efforts (Crouter et al., 1990; Weintraub & Gold, 1991). Decreased parental monitoring may be the result of less information about their adolescents, and one paper points

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out that the potential sources of information can come from different places. The first is the willing disclosure of information from the child or adolescent (Kerr & Stattin, 2000). The other sources of information are when parents are actively seeking out and tracking adolescents' activities and whereabouts, through for instance asking the child themselves or talking with the child's friends or the parents of their friends. However, obtaining information in order to predict child behaviour was found to be by far most effective when the child itself disclosed it (Stattin & Kerr, 2000). It would therefore seem that in some ways, parents getting information about their child's activities and whereabouts is an activity more effectively performed by the child and would further suggest that the family environment is an important avenue in which parents may encourage or discourage children to share their daily experiences (Kerr & Stattin, 2000).

Sleep by Age and Sex

Studies have found that sleep problems are more prevalent among young adolescents and among females. However, while studies tend to show that sleep duration decreases across adolescence (Hitze et al., 2009) the results are mixed when it pertains to sex differences. One study pointed to male sex being more likely to have a shorter sleep duration (e.g., Gunn et al., 2019), however, other studies still report no difference between girls and boys in adolescence (e.g., Lee et al., 1999; Street et al., 2018; Wolfson & Carskadon, 1998; Yang et al., 2005).

Studies on the prevalence of insomnia has also shown age and sex differences in adolescence; moving from premenstrual to postmenstrual was for girls associated with 2.5 times more likely than boys to have insomnia in accordance with the DSM-IV criteria (Johnson et al., 2006).

Furthermore, in a population-based study of older adolescents (15-19) using the DSM-5 criteria, a 2013 study found that girls in this age group had a significantly higher prevalence of insomnia compared to boys (Hysing et al., 2013). Similarly, a review on changes in sleep difficulties found that girls had a higher prevalence of sleep onset difficulties compared to

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their male peers (Pallesen et al., 2008). Furthermore, compared to boys, girls were found to report earlier bedtimes and worse sleep quality (Meijer et al., 2016). The association between parenting strategies can vary based on the adolescents age and sex, such as enforcing fewer sleep-related rules when the child is older (Buxton et al., 2015).

Socioeconomic Status

Studies have shown that socioeconomic status can affect adolescent sleep. For instance, lower socioeconomic status is a risk factor for child sleep problems (Newton et al., 2020); and compared to their higher SES peers, youth who live in low SES contexts have an increased risk of poor sleep quality and short sleep (Jarrin et al., 2014; Marco et al., 2012).

A common way to measure SES is to examine income-based indices. Lower income families have a higher prevalence of adolescent sleep difficulties (Marco et al., 2012). Family SES is also negatively associated with adolescent TIB (Peltz et al., 2019). Higher income may allow a family the ability to create environmental conditions which are beneficial to sleep, for instance larger homes with sufficient or more comfortable sleeping spaces (Philbrook et al., 2020). Furthermore, some neighbourhood contexts may contribute to family chaos in low-income families who disproportionately live in such areas (Evans et al., 2005); lower quality housing and crowding, combined with lack of control within the family unit may contribute to family chaos, which may in turn lend itself to foster an environment which does not support adequate sleep. Furthermore, certain aspects of family chaos may in turn contribute to high levels of sensory stimulation as well as lack of daily routine and structure (Bronfenbrenner & Evans, 2000; Fiese & Winter, 2010).

Another aspect of SES is parental education. This aspect may have a different influence on family process and child adjustment compared to purely economic measures (Duncan & Magnuson, 2012). For instance, higher levels of maternal education are linked to increased knowledge about child development and childrearing, as well as supportive mothering

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(Morawska et al., 2009). Increased maternal knowledge about parenting is further linked to fewer behavioural problems in early childhood (Benasich & Brooks-Gunn, 1996; Huang et al., 2005). However, a 2015 study found that adolescents of higher educated persons slept worse than their peers whose parents had not finished high school (Zapata Roblyer & Grzywacz, 2015). SES is related to adolescent sleep and lower SES may influence parenting strategies by way of increased stress and indirectly making child-rearing behaviour less effective (Conger et al., 1992). The dual effect SES can have on both parenting strategies and adolescent sleep indicates that it is an important variable to adjust for when examining the association between parenting strategies and adolescent sleep.

Aim

Sleep in adolescence is affected by several factors and difficulties sleeping during adolescence appears to be common and can have negative consequences for the adolescent. Sleep during this period occurs commonly in a family setting and can be affected by parental behaviour and knowledge. More parental knowledge about adolescent sleep has been associated with longer sleep duration. The current study compares parent report about adolescent sleep and adolescent self-reported sleep. Based on the above considerations the following results in the current study are expected 1) there will be some degree of overlap between parent report and adolescent self-report, and 2) that the parent report will estimate more favourable adolescent sleep compared to the self-reported sleep.

The study further aims to examine whether positive parenting, inconsistent parenting and parental monitoring, are associated with adolescent self-reported sleep duration and insomnia. Age, sex, and SES are related to both sleep and parenting strategies; the present study will therefore control for these. It was expected that parenting strategies would be

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associated with adolescent sleep. Parental monitoring is expected to have the strongest association to both adolescent sleep variables.

Materials and Method

Data Material and Procedure

The present population-based study uses data from the youth@hordaland survey of adolescents in the former county of Hordaland (now, Vestland) in Western Norway. The youth@hordaland survey is the fourth wave of the Bergen Child Study. The youth@hordaland was a population-based study of all students attending secondary education and all adolescents born between 1993 and 1995.

The data was collected in the spring of 2012, with one school hour being allocated to fill in the web-based questionnaire. Students not at school received information via postal mail to their home addresses. The questionnaire covered a broad range of issues, demographic background variables and a request for permission to obtain school data, as well as to link the information with national health registries and parental questionnaires. The study was approved by the Regional Committee for Medical Research Ethics in Western Norway and by the National Data Inspectorate.

Participants

All adolescents born between 1993 and 1995 ($n=19\,430$) were invited to participate in the study. 10 257 of the invitees agreed to participation, which yielded a participation rate of 53%. For the purposes of this study only adolescents whose parents also completed the survey were included. The study sample size consists of 1324 parents and 1324 adolescents (51.9% female).

Instruments

Parenting Strategies

Parenting strategies were measured using parent report. The questions regarding parenting strategies were about positive parenting, inconsistent parenting, and parental monitoring. The questions regarding positive parenting and inconsistent parenting were taken from the Alabama parenting questionnaire (APQ). The questions regarding parental monitoring were taken from the Tracking Opportunities and problems in childhood and adolescence (TOPP) -study (website <https://www.fhi.no/prosjekter/topp-studien-prosjektbeskrivelse/>)

The APQ was originally developed for the use on school age children, age 6-13 years, and is comprised of 42-items which are rated on a Likert-scale according to frequency (Shelton et al., 1996). According to Zlomke et al. (2013) the APQ has good psychometric properties for the five subscales for both early and middle school aged children, and Zlomke et al. (2015) found that the questionnaire is a useful tool also for the age group 11-18. The APQ has good psychometric properties including criterion validity in differentiating clinical and nonclinical groups (Dadds et al., 2003; Frick et al., 1999; Shelton et al., 1996). However, there is some debate regarding the five-factor structure and their relation. Studies using a PCA analysis of the five factors revealed better fit for a three-factor structure consisting of positive parenting/positive involvement, inconsistent/negative discipline, and poor monitoring and supervision (Molinuevo et al., 2011; Wells et al., 2000).

Positive parenting and inconsistent parenting in the current study were measured using four questions each on a five-point scale with the alternatives: (1) almost never; (2) rarely; (3) sometimes; (4) often; and (5) almost always. For both dimensions the questions were introduced by the phrase: "Think of your adolescent: How often do you do the following? It is important that you are as honest as possible when you answer the questions". Positive parenting was then measured with the following questions: (1) "You say something nice to

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your adolescent or praise her/him when they have done a good job”; (2) “You reward or give something extra when your adolescent has done something you wanted”; (3) “You show your approval when your adolescent has contributed to the housework”; (4) “You cuddle with or hug your adolescent when she/he has accomplished something”. Inconsistent parenting was measured using the following four questions: (1) “You threaten to punish your adolescent, but do not follow through”; (2) “In your experience, getting your adolescent to obey leads to trouble to such an extent that you don’t deem it worthwhile” (3) “You decide to punish your adolescent, but they persuade you not to”; (4) “You vary the punishment for your adolescent depending on your current mood”. The possible scores range from 4-20.

Parental monitoring was measured using six questions on a four-point scale with the alternatives: (1) know very little; (2) know some; (3) know a lot; and (4) know everything. The questions were introduced with the phrase: “It can be difficult to keep track of the activities of adolescents. These questions ask about what you as a parent know about the things that your adolescent does”. Following this were the six questions: (1) “With whom does your adolescent spent their time?”; (2) “Where is your adolescent during their spare time?”; (3) “How your adolescent spend their money?”; (4) “Where your adolescent goes straight after school?”; (5) “Where your adolescent goes during the day and evening during weekends?”; (6) “About problems/difficulties your adolescent has at school?”. The possible scores range from 0-18.

Sleep

Adolescent sleep was measured using self-report. Bedtime and rise-time were reported separately for weekdays and weekends. For the purposes of examining adolescent sleep duration and insomnia several other measures were first calculated. Time in bed (TIB) was calculated by deducting bedtime from risetime. Sleep onset latency (SOL) and wake after

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sleep onset (WASO) were reported in hours and minutes, and sleep duration was defined as SOL and WASO subtracted from time in bed.

Difficulties initiating and maintaining sleep (DIMS) were rated on a three-point Likert scale with response options of 'not true', 'somewhat true' and 'certainly true'. A positive response prompted participants to indicate number of days per week they experienced problems initiating or maintaining sleep. Information of the duration of DIMS was also requested from participants.

A similar three-point Likert-scale with response option of 'not true', 'somewhat true', and 'certainly true' was used to rate tiredness/sleepiness, with confirmation, i.e., either 'somewhat true' or 'certainly true' prompting follow-up question asking participants to indicate number of days per week they experienced sleepiness and tiredness, respectively. Parent report on adolescent sleep was measured using similar questions as for the adolescents.

A parent response on adolescent sleep of 'certainly true' or 'somewhat true' was combined to 'yes' and a response of 'not true' was termed as 'no'. Five questions were sufficiently similar to report both adolescent and parent response. Due to the different response options available for parents and adolescent, the following adolescent sleep variables were converted: daytime sleepiness, daytime sleepiness, and oversleeps for school. Daytime sleepiness/daytime tiredness was asked in the form of days per week, and subsequently coded as 'yes' if the adolescent replied more than three days per week of daytime sleepiness/tiredness. Adolescent self-report on oversleeping for school had the possible response options of 'never', 'rarely (a few times per year)', 'sometimes (sometimes per month)', 'mostly (several times per week)', and 'always (every day)'. A reply of 'never' and 'rarely' was coded as 'no', while 'sometimes', 'mostly' and 'always' was coded as 'yes'.

Insomnia was defined using adolescent self-report. A positive response, i.e., 'somewhat true or certainly true' to both difficulties initiating and maintaining sleep and

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sleepiness and/or tiredness more than 30 min. Additionally, a difficulty initiating and maintaining sleep frequency of at least 3 days per week and duration of insomnia of at least 3 months was a criterion.

Adjustment Variables

Age and Sex

Information about adolescent age and sex were identified through identity number in the Norwegian National Population Register. The interval between the date of birth and date of participation was used to calculate exact age.

Household Income

Household income and parental education was assessed by parent self-report. The parents were asked to indicate their household income for the past year (total annual income before tax-deduction including transfers and financial support). The response options were 'less than 200 000', '200 - 349 000', '350 – 549 000', '550 - 749 000', '750 – 999 999', and '1 000 000 or more'. For the purpose of this study the lowest two categories were collapsed.

Parental Education

Parental education was measured by asking participants to indicate the highest completed maternal and paternal education. The response options were 'compulsory education' (<11 years), 'vocational high school (2-3 additional years)', 'academic qualification high school' (2-3 additional years), 'up to four years of college or university', and 'more than four years of college or university'. For the purpose of this study the two high school options and the two college/university options were conflated into 'high school' and 'college/university'.

Statistical Procedure

All analyses were carried out using IBM SPSS statistics 27 for windows. Statistical significance was evaluated at an alpha of 0.05. To explore the consistency of the questions in

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each parenting dimension a Principal components Analysis (PCA) was used. Each dimension for parenting strategies was then subsequently summed into their own variable. The summed variables were labelled “positive parenting” (sum of 4 items, Cronbach’s $\alpha=0.571$), “inconsistent parenting” (sum of 4 items, Cronbach’s $\alpha=0.726$) and “parental monitoring” (sum of 6 items, Cronbach’s $\alpha=0.832$). To examine the association between parenting strategies and adolescent sleep duration a linear regression analysis was used. A logistic regression analysis was used to examine the association between parenting strategies and adolescent insomnia.

To control for possible effects of other variables on the association between parenting behaviour and adolescent sleep, two additional models were calculated. The first model (model 2) was adjusted for age and sex. The next model (model 3) was additionally adjusted for household income and parental education. The predicted values for sleep duration are visually presented for each of the parenting strategies in model 1 in table 3. Semi-standardised estimates are presented in table 3 and were made by z-transforming (mean = 0, standard deviation = 1) the parenting strategies before entering them into the regression analyses. This was done to facilitate comparison of estimates across the parenting strategies.

Results

Sample characteristics are presented in table 1 (page 47). The sample comprised of 1324 adolescents (51.6 % female) with an average age of 17.27 (SD = 0.82). Mothers and fathers had completed at least one year of university (60.6 % of mothers, 54.1% of fathers, with a small number having completed any compulsory education (4.4 % of mothers, 7.5 % of fathers). Most parents reported an income greater than 750 000 NOK (62.6 %), with a relatively small percentage reporting an income less than 350 000 (5.4 %).

Table 2 (page 48) show the parent reported adolescent sleep characteristics and sleep problems. The table also presents adolescent self-reported sleep where comparisons with

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parent answer is available. 22.4 % of parents reported that the adolescent has problems with falling asleep and/or frequent awakenings compared to 34.3 % of adolescents. 50 % of parents reported daytime sleepiness/tiredness, while 85.6 % of adolescents did the same. Adolescent oversleeping for school was reported by 11.9 % of parent respondents and 17.6 % of adolescents. The other two comparable questions, daytime sleepiness and daytime tiredness, had parental response rate of 36.7 % and 89.1 % respectively and 25.1 % and 49.0 % of adolescent response respectively.

Table 3 (page 49) shows the associations between the parenting strategies and adolescent sleep. The results showed that each of the parenting variables was associated with at least one of the adolescent sleep variables. The first model assessed the crude association between the three parenting strategies and sleep duration. The model showed no significant association between positive parenting and sleep duration ($b = -0.33$, $p = 7.87$). However, inconsistent parenting ($b = -3.54$, $p = .003$) and parental monitoring ($b = 4.48$, $p < .001$) was significantly associated with sleep duration. For inconsistent parenting, the analysis indicated that one unit increase on inconsistent parenting was associated with a reduction of 3.54 minutes of adolescent. For parental monitoring the analysis indicated that a one unit increase on this trait was associated with an increase of 4.48 minutes of adolescent sleep in the unadjusted model, and higher scores or parental monitoring was associated with longer sleep duration.

Accounting for age and sex (model 2), positive parenting decreased the b to -0.15 , though remaining not significant ($p = 0.90$). For inconsistent parenting adjusting for age and sex the association was increased ($b = -3.72$, $p = .002$). A one unit increase in inconsistent parenting was associated with 3.72 minutes shorter sleep for the adolescents. This model indicates that adolescents whose parents score high on this trait sleep just shy of an hour shorter than their peers whose parents have a lower score on this trait (see figure 1 page 50).

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For parental monitoring ($b = 4.77$, $p < .001$) the adjustment likewise increased the association with sleep duration. A one unit increase of parental monitoring was associated with an increase of adolescent sleep duration of 4.77 minutes.

Further accounting for parental education and household income, model 3, yielded no significant association between positive parenting and sleep duration ($b = -0.15$, $p = 0.90$). For inconsistent parenting ($b = -3.39$, $p = .004$) the model showed that adjusting for parental education and household income weakened the association between inconsistent parenting and adolescent sleep duration; a one unit increase of inconsistent parenting was associated with 3.39 minutes shorter sleep duration for adolescents. For parental monitoring this model showed an increase in the association between parental monitoring and adolescent sleep duration ($b = 4.95$, $p < .001$). A one unit increase on parental monitoring in this model was associated with 4.95 minutes longer adolescent sleep duration.

The differences in sleep duration relative to the respective parenting strategies is illustrated in Figure 1. The model shows the differences in adolescent sleep duration as seen in the second model, i.e., adjusted for age and sex. The figure shows that parents who scored three SD below standard on inconsistent parenting had adolescents who slept more than a half hour longer than adolescents of parents scoring three SD over standard. For parental the difference between three SD below and three SD above standard over amounting to over an hour longer sleep duration.

The logistic regression analysis showed no significant association between any of the parenting styles and insomnia in the unadjusted model. Positive parenting was found to be significantly, but weakly, associated with adolescent insomnia in both adjusted models. Accounting for age and sex (model 2) yielded significant associations between positive parenting and insomnia (OR = 0.93, CI 0.87, 0.99). Inconsistent parenting (OR = 0.98, CI 0.92, 1.05) was not significant for this model. Parental monitoring was significantly, but

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weakly, associated with adolescent insomnia when adjusting for age and gender (OR = 0.94, CI 0.88, 0.99). Further accounting for household income and parental education (model 3) the association between positive parenting and insomnia persisted (OR = 0.93, CI 0.86, 0.99).

The further adjustment yielded no significant association between inconsistent parenting and insomnia (OR = 0.98, CI 0.92, =.99). For parental monitoring the effects of further adjusting for parental education and household income mirror that of the adjustment for positive parenting (OR = 0.93, CI 0.86, 0.99).

Discussion

Summary of Results

This study sought out to investigate the overlap between parent-reported adolescent sleep and self-reported adolescent sleep, and whether parenting strategies were associated with sleep duration and insomnia in adolescence. The comparison of parent-reported and self-reported sleep showed that adolescents more frequently reported poor sleep quality overall relative to parent report. Positive parenting was not associated with sleep duration, while inconsistent parenting and parental monitoring were associated with sleep duration. The association between inconsistent parenting and sleep duration, and parental monitoring and adolescent sleep duration was significant in all the assessed models. The adjusted models (model 2 and model 3) showed a significant association between positive parenting and insomnia and parental monitoring and insomnia. The association between inconsistent parenting and insomnia remained non-significant in all assessed models.

Examining the Results

Parent Reported Sleep and Adolescent Self-Reported Sleep

Parent estimates of adolescent sleep and adolescent self-estimated sleep were reported with somewhat different frequency. Daytime sleepiness/tiredness was reported by 86 % of

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adolescents and 50 % of parents. While, subjective daytime sleepiness/tiredness may present itself visually in some individuals, others can experience sleepiness/tiredness without a particularly visual signifier, i.e., be sleepy/tired without showing it. Oversleeping for school was reported by 12 % of parents and 18 % of adolescents. Oversleeping for school may be an area on which the parent may have inaccurate knowledge. The adolescent may have school start times which are different from parent work time start, leading to different rise-times. Different rise-times may lead the parent to be unaware of when the adolescent get out of bed in the morning and thus, they may not know whether the adolescent has overslept for school. These results are in line with previous studies which have pointed out that parents may have inaccurate knowledge of adolescent sleep (e.g., Short et al., 2013).

Positive Parenting

Positive Parenting and Sleep Duration. Positive parenting and sleep duration were not significantly associated in neither the crude model nor the adjusted analysis. This finding appears to be in line with previous studies finding no association (e.g., Adam et al., 2007; Brand et al., 2009; Doane et al., 2018; Tsai et al., 2018; Zapata Roblyer & Grzywacz, 2015). However, one study found a positive association (Brand et al., 2009). A possible explanation for the discrepancy in results across studies is the different ways in which the studies measure sleep duration. Previous studies use different measures, including objective measures like actigraphy (e.g., Doane et al., 2018; Tsai et al., 2018), and some using subjective measures like sleep-diary (e.g., Adam et al., 2007; Brand et al., 2009) or survey (Zapata Roblyer & Grzywacz, 2015).

Definitions of sleep duration also seem to vary from adolescent self-assessment of hours of actual sleep they get each night (e.g., Zapata Roblyer & Grzywacz, 2015) to actigraphy-measured time spent asleep (e.g., Tsai et al., 2018). In the studies which found no association between positive parenting and adolescent sleep and where the adolescents were

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closer in age to the current study, i.e., average age over 16, used parental support (and on one case communication and support) as a measure of positive parenting. One study which found a significant association between positive parenting strategies and adolescent sleep duration in the same age range used commendation as a measure of positive parenting. However, as far as the author of the current study is aware, no clear pattern emerged linking the studies which found an association and studies which found no association. The current study uses adolescent self-report on several measures and defines sleep duration as self-reported TIB minus SOL and WASO. Different definitions of adolescent sleep duration may contribute to conflicting findings on the association between sleep duration and positive parenting strategies. Studies which use TIB as a sleep measure mostly finding a positive association between the two (e.g., Street et al., 2018; Vazsonyi et al., 2014). The studies which found an association between positive parenting strategies and TIB all used adolescents as informants regarding parenting strategies.

Moreover, another possible explanation for the discrepancy in findings lies in the measurement of positive parental factors. While the current study uses parent report on questions from the APQ to measure positive parenting, studies often use adolescent report on positive parenting strategies, which may yield somewhat different results. To the authors knowledge only one study used only parent report on positive parenting (Adam et al., 2007). This study did not find a significant association between positive parenting and sleep duration. It also used a sample which consisted of a wider range of child/adolescent age (5.5 – 11.9 and 12 – 19). The study found that parental warmth was significantly associated with longer sleep duration in the first age group, but not with adolescents.

The positive parenting measured in the current study covers what the parent says or does but does not measure the extent to which the parent is involved in adolescent activities and actively participates in their life. Two studies of a broader adolescent age group measured

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the association between shared activities and adolescent sleep duration (Adam et al., 2007; Zapata Roblyer & Grzywacz, 2015). One of the studies found that time spent eating together lead to longer sleep duration (Adam et al., 2007). The other study found no significant association between time spent together and sleep duration. The two studies differed in several ways, from number of participants (2454; 91), use of informant (parent; parent-adolescent dyads) and measurement of sleep duration (time diary; self-report). These findings could indicate that an important part of parenting strategies' positive effects on sleep duration is parental involvement and could potentially point to the exclusion of parental involvement as a facet of positive parenting strategies contributing to the results of the current study. Parental involvement decreases with child age as they are afforded more independence (Frick et al., 1999). This could explain the lack of association in the two studies and why the first study found an association between positive parenting and sleep duration with children, and not with adolescents. The author could find no studies which examine the effects of shared activities as a measure of positive parenting and adolescent sleep duration on older adolescents.

It is also possible that shared activities function more as a measure of a form of parental monitoring rather than positive parenting. This could mean that higher levels of shared activities allow the parent to gain more knowledge about the adolescents' activities and whereabouts and is therefore able to more closely monitor them. In older adolescents the ways through which parents gain knowledge about their adolescents' activities and behaviour is more successful when the adolescent voluntarily discloses that information. Higher levels of parental knowledge are associated with longer sleep duration (Gunn et al., 2019). This could point to shared activities is in itself an insufficient route to higher levels of knowledge and thus unrelated to sleep duration in older adolescents.

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This study adds to the existing body of studies which found no significant association between adolescent-reported positive parenting factors and adolescent sleep duration by further finding no significant association between parent-reported positive parenting and adolescent sleep duration. The variation in results between studies on positive parenting and sleep duration indicates a need to further examine this topic.

Positive Parenting and Insomnia. Positive parenting and insomnia were found to be significantly associated when adjusting for age and sex, and further for household income and parental education, but not for the crude association. The association becoming significant when adjusting for age and sex indicates need to examine further the association between parenting strategies and insomnia. The current study did not test for interaction effects between parenting style, age and sex, making it difficult to conclude the direction of effect the adjusted variables had; it does, however, indicate the importance of adjusting for these factors when examining the association.

Insomnia is more prevalent in girls compared to boys in adolescence (Johnson et al., 2006), and some studies reporting a positive association between age and insomnia symptoms in adolescence (e.g., Liu & Zhou, 2002). Furthermore, the current study indicates an association between positive parenting strategies and insomnia. The association changing when adjusting for age and sex could indicate that there are complex associations between age/sex/parenting strategies and sleep which could be of interest for future studies.

To the authors knowledge, no previous studies have examined the association between positive parenting and insomnia. There are, however, several studies which examine the association between positive parenting strategies and adolescent sleep quality. The results of the current study are somewhat inconsistent with a Swiss study which found that adolescents who reported higher positive parenting, operationalised as support, had shorter SOL, and was associated with better sleep quality (Brand et al., 2009). The same study found no significant

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association between parental commendation and SOL, but the association was significant with sleep quality. Another study found that higher levels of positive parenting strategies was associated significantly with reduced difficulties maintaining sleep but was not associated with difficulties initiating sleep (Zapata Roblyer & Grzywacz, 2015). The same study found that parental support and commendation was significantly associated with adolescent sleep quality. Another study found no association between adolescent reported parental support and any of the self-reported sleep measures, unless the adolescent was from a high-stress family (Tsai et al., 2018). However, a systematic review and meta-study point to parental warmth, which could be an indicator of positive parenting, as being associated with shorter SOL, less sleep initiation problems and better overall sleep quality (Khor et al., 2021).

Inconsistent Parenting and Adolescent Sleep:

Inconsistent Parenting and Sleep Duration. The analysis showed a negative association between inconsistent parenting and sleep duration. This association remained significant in both adjusted models. Higher scores of inconsistent parenting was associated with shorter sleep. This may suggest that inconsistent parenting can have an adverse effect on adolescent sleep and a more inconsistent parent leads to shorter sleep for the adolescent. The results of the study indicate the difference between the parents with the highest degree of inconsistent parenting strategies and the lowest degree inconsistent parenting strategies yielded a little shy of an hour shorter sleep. This finding is especially important when considering that adolescents as a group often get shorter than recommended sleep (Hysing et al., 2013). Insufficient sleep is associated with consequences like changes in mood, and reduced motivation and attention (Dahl, 1999). The results of the study could point to the significant differences in outcome the parent can have on adolescent sleep.

To the authors knowledge, very little work has considered between inconsistent parenting and sleep duration. One study, which defined inconsistency as the degree to which

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the child perceives the behaviour of the parents as inconsistent, and therefore over time and in respect to their own behaviour not predictable, found no association between parental inconsistency and adolescent sleep duration (Brand et al., 2009).

The current study uses an inconsistent parenting definition as a parenting strategy characterised by differences between the parents in use of disciplinary strategies and rule enforcement, or by the changing by one or both parents of disciplinary strategies from one parenting situation to the next (Krishnakumar & Buehler, 2000). A systematic review and meta-study found no significant association between total sleep time and parental inconsistency, but did identify rule setting, which may more be specific to sleep, and parent-set bedtimes as associated longer total sleep time (Khor et al., 2021). Parents who score high in rule-setting may be less likely to have a more inconsistent parenting strategy. A study on children aged 6-17 found that parent - enforced rules about bedtime was associated with longer sleep duration on school days (Buxton et al., 2015). Parent-set rules has been found to be s associated with greater sleep for adolescents aged 12 to 19 (Adam et al., 2007).

Two of the questions regarding inconsistent parenting used in the current study measure the degree to which the parents report not following through on threats of punishments and being talked out of giving punishment by the adolescent. Therefore, one could argue that parents who are more consistent regarding rule-setting and to communicate clear expectations for their adolescent are less likely to score high on inconsistent parenting. Furthermore, parents who are over-accommodating by permitting avoidance behaviours, modifying family routines, protection behaviours, may contribute to the development and maintenance of insomnia (Blake et al., 2018). They may be less likely to consistently set rules and expectation and may permit late and variable bedtimes. They may also be more likely to permit poor sleep hygiene behaviours like permitting electronic devices in the bedroom.

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Parental permissiveness has been shown to be associated with a shorter than recommended sleep duration for adolescents aged 13 – 19 (Clinkinbeard et al., 2011)

More family conflict has been found to be associated with shorter subjective total sleep time (Khor et al., 2021). Therefore, family stress may be a factor which affects inconsistent parenting and subsequently sleep.

Taken together, other studies have not found a significant association between inconsistent parenting and adolescent sleep duration. However, there are several studies which examine traits which can signal or lead to higher degree of inconsistent parenting like permissiveness, lack of rules, and family conflict.

Inconsistent Parenting and Insomnia. The current study found no significant association between inconsistent parenting and insomnia. The association between inconsistent parenting and insomnia remained insignificant in both adjusted models.

To the authors knowledge, previous studies have not examined the association between inconsistent parenting and insomnia. However, there are studies which examine the association between inconsistent parenting and general sleep quality. Results for these studies appear to be mixed; one study found a significant negative association between inconsistent parenting and reduced adolescent sleep quality (Brand et al., 2009). One study used the parent-reported APQ-measure of inconsistent discipline in a sample of 193 adolescents (M age = 15.7) and found no significant association between the two (Peltz et al., 2019). The same study found that parent-reported family disorder was positively related to use of inconsistent discipline. One study found an association between family conflict measured in ages 7-15 with insomnia at age 18 (Gregory et al., 2006). Furthermore, findings from a 2015 study indicate that parental behavioural control and a parent-child relationship with low degree of conflict may promote positive sleep functioning among adolescents (Zapata Roblyer & Grzywacz, 2015). Taken together, although negative parenting strategies like inconsistent

parenting could signify the presence of family conflict which does increase the risk of insomnia, there is insufficient evidence to suggest that inconsistent parenting itself is not associated with insomnia.

Parental Monitoring

Parental Monitoring and Sleep Duration. The associations between parental monitoring and sleep duration showed a significant positive association in all models examined. This result seems to be partially in line with overall previous research. Greater youth-assessed parental monitoring of waking activities was further found to be associated with longer actigraphy-measured sleep duration during both the weekdays and the weekend (Gunn et al., 2019). The same study also found that greater parent reported monitoring was associated with longer weekday sleep duration, but the association was not significant for weekend sleep duration. Furthermore, the association between parental monitoring and adolescent subjectively assessed sleep duration was not significantly associated. A large study of 14382 American adolescents aged 13 – 19 using parent assessed parental supervision found that parental supervision was negatively associated with shorter than recommended sleep (Clinkinbeard et al., 2011). A Dutch study found an association between TIB and parental monitoring; higher levels of monitoring were linked to earlier bedtimes, and lower levels of monitoring over time contributed to later bedtimes (Meijer et al., 2016). The same study also found that high quality of the parent-adolescent relationship seemed to interact with monitoring and exacerbate the positive effect of higher monitoring on TIB. However, another study found no correlation between parental control, i.e., monitoring, and adolescent sleep duration (Zapata Roblyer & Grzywacz, 2015).

The reason for the discrepancies in studies could be linked to the measurement of sleep duration. One of the studies found a significant association between parental monitoring and adolescent sleep duration when the sleep duration was actigraphy-assessed, but not when

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the adolescents assessed their own sleep (Gunn et al., 2019). Other studies used adolescent assessment of sleep duration (Clinkinbeard et al., 2011; Meijer et al., 2016; Zapata Roblyer & Grzywacz, 2015). Furthermore, there were differences in the operationalisation of parental monitoring, with some studies asking parents to assess how much they monitored/knew their adolescents' activities (Gunn et al., 2019). Some asking adolescents to assess how much the parents monitored/knew about their activities (Gunn et al., 2019; Meijer et al., 2016; Zapata Roblyer & Grzywacz, 2015). One of the studies measured parental monitoring as the extent to which the parent was present when the adolescent left for school, returned from school and went to bed (Clinkinbeard et al., 2011).

The positive association between parental monitoring and sleep duration in the current study of older adolescents 16 – 19 years may suggest that higher levels of parental monitoring is conducive longer sleep duration for this age group. Parents who score higher on parental monitoring are more likely to provide structure around bedtime and sleep and contribute to the feeling of security which promotes sleep. An environment which feels safe may also be more likely to foster adolescent disclosure. Adolescent disclosure is the most efficient way in which parents gain information about the adolescent (Stattin & Kerr, 2000).

Parental Monitoring and Insomnia. Parental monitoring and insomnia were not significantly associated in the unadjusted model. However, adjusting for age and sex yielded a significant association between parental monitoring and insomnia. Further adjusting for household income and parental education yielded little change in the significance of the association. As previously mentioned, there is a need to further examine the association between parenting strategies and insomnia, and the potential effects age and sex can have on this association.

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Previous studies have indicated that higher degrees of parental monitoring are conducive to better sleep quality (Khor et al., 2021; Meijer et al., 2016). The author found no studies which examine the association between parental monitoring and adolescent insomnia.

Methodological Strengths and Limitations

Methodological Strengths

The current study supports some previous demonstrated associations between parenting strategies and adolescent sleep and underline the continued potential effect parenting may have on sleep even in later adolescence. By using parent-reported measures on parenting strategies this study also demonstrates that parent perception of their own behaviour can influence adolescent and adds to the body of literature which demonstrates the association between adolescent-reported parenting strategies and sleep.

This study uses a definition of insomnia which is in line with the diagnostic criteria of the DMS-5. The use of self-reported questionnaires as a measurement of the prevalence of insomnia have, however, potential weaknesses associated with it. It may be necessary for future studies to use a different measure of insomnia more in line with diagnostic standards, i.e., clinical interview in order to more accurately determine whether there is an association between parenting strategies and adolescent insomnia. Nevertheless, the data collection and definition allow for a large sample size to be examined for behaviours which could signal the presence of insomnia.

A further strength of the current study is the large sample size and the use of a comprehensive sleep assessment with multiple informants, though with some notable limitations.

Methodological Limitations

Limitations Regarding the Respondents. Answering questionnaires requires willing participation. Regarding most of the adolescents, the survey was completed during school

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hours, a time which already signal participation. The youth@hordaland may have been less successful at recruiting adolescents who were not at school, which might include adolescents who have more sleep problems. However, an effort was made to recruit attempted to these adolescents by allowing them to answer the questionnaire outside of school. Regarding the parents, however, the questionnaire was completed at home, and required the adolescents to agree to their parents' participation. Parents who are more likely to complete the survey could also be more likely to be interested in both the topic and their adolescents' activities, which could yield a higher likelihood of parents who score higher in the traits of positive parenting and parental monitoring to respond. As parent participation required adolescent consent the parent-adolescent relationship may have also skewed the sample. Participants who have a better relationship with their parents may be more likely to allow parents to participate.

The participants of the current study were all adolescents and parents living in the former Hordaland region of Norway. Norway is considered a rich country with a relatively homogenous population, 18.5 % having an immigrant background, of which 41 % were from a western country (Thorsnæs, 2022). This may affect the wider representativeness of the study. The parent participants were also only the ones who were allowed by their adolescents to participate. Thus, the representativeness of the sample may be somewhat unsure.

Limitations Regarding the Questionnaire: the APQ, of which two of the three parenting factors is based is comprised of use six questions to examine each parenting strategy, the current study is based on a questionnaire which used four out of the six questions for each parenting strategy. The PCA analysis revealed the lowest internal consistency between the questions regarding positive parenting (sum of 4 items, Cronbach's $\alpha = 0.571$) which is lower than what is usually considered acceptable (Cronbach's $\alpha < 0.7$). This indicates that this variable had more measurement-error and could have contributed to imprecise result between this parenting strategy and sleep duration. The questions regarding

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positive parenting measured parent behaviour and to some extent the relationship to the adolescent. The questions concern mainly things the parent does or says to the adolescent but does not measure the extent to which the parent and adolescent spend time together or engage in shared activities. Some studies suggest that shared activities are associated with longer sleep duration. Therefore, the current measure of positive parenting may have limitations regarding comparisons with other studies, and it is possible that including shared activities could have yielded different results in the current study.

Limitations Regarding Self-Report: due to the nature of self-report it is important to keep in mind potential biases which may occur when asking the parents to assess their own parenting behaviour. Biases which may colour the results are consistency motif, transient mood state and social desirability (Podsakoff et al., 2003). The responses may be affected by the current mood of the respondent, and negative moods are more likely to yield less favourable responses. Moreover, parents may be for instance biased to answer the questions in a way which reflects more positively on them regarding their behaviour toward the adolescent. In the case of this questionnaire the questions regarding positive parenting and inconsistent parenting were prompted by asking the parents to be as honest as possible, which could reduce the likelihood of answering more favourably. Similarly, the questions regarding parental monitoring were prompted with “It can be difficult to pay attention to the adolescents’ activities”, which may make it easier for parents to be honest if they have less information about the adolescent. A way to counteract the potential biases which may stem from parent report, the inclusion of adolescent report could be a solution. The current study nevertheless provides information about self-perceived parenting strategies as it pertains to the associations with adolescent sleep.

Limitations Regarding the Method: The current study firstly assessed the crude associations between parenting strategies and sleep duration and insomnia. The study then

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adjusted for age and sex, and then further for household income and parental education. While household income and parental education could be argued are both facets of SES and examining the traits simultaneously was appropriate, the same argument may not be true for age and sex. The current study also examined the direct associations between single parenting strategies and adolescent sleep. The relationship between the different parenting strategies and their association to adolescent sleep can be complicated and interactive. Regarding the side-by-side comparisons of parent report on adolescent sleep and adolescent self-reported sleep there were only five questions regarding adolescent sleep which were sufficiently similar as to allow side-by-side comparisons.

Implications

Implications for Future Research. the current study shows an association between inconsistent parenting and sleep duration and parental monitoring and sleep duration, with associations persisting when adjusting for age, sex, household income and parental education. The results suggest that these variables have may an effect on adolescent sleep. There is, however, the need for further studies which examine the association between inconsistent parenting and parental monitoring and the potential effects on sleep duration, and more research is needed in order to more conclusively point to an association. Longitudinal studies which examine the role of parenting strategies and its effect on adolescent sleep may provide additional insight into the long - term effects of parenting strategies on adolescent sleep.

Regarding positive parenting the studies vary in terms of the age groups examined, the operationalisation of positive parenting strategies, the informants regarding parenting strategies, as well as measurements of adolescent sleep. Future could focus on examining specific age-groups separately, which is especially important as changes in adolescence indicate that the experiences of someone who is 11 years old is different from someone who is 19 years old. Furthermore, examining positive parenting strategies both in terms of what the

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parent says or does, but also how they participate in the adolescent lives, from both parent and adolescent perspective. It would also be useful to examine the perceived relationship between the two, from both parent and adolescent perspective. As parents and adolescents may perceive their use of strategies and relationship differently and both measures are useful in informing the relationship. Finally, it may be useful to use measures of sleep which are both subjective (e.g., questionnaires and sleep diary), and objective, (e.g., actigraphy).

Lastly, as time spent with peers increase during adolescence, studies examining the associations between peer factors and adolescent sleep, particularly when the adolescent experiences an unstable family situation, e.g., high levels of inconsistent parenting, could be of interest.

Implications for Future Interventions. Most adolescents sleep in the same home as one or both of their parents and are affected by their behaviour and parenting strategies. Some programs which are aimed at promoting adolescent sleep have been successful in changing adolescent sleep behaviour (Levenson et al., 2021). Many programs consist of multiple face-to-face sessions in specialty care settings which may limit their accessibility and feasibility (Levenson et al., 2021). Furthermore, school-based sleep programs have delivered mixed results (Khor et al., 2021). One qualitative study on how to improve adolescent sleep which provided information from young adults, parents of adolescents, and mental healthcare professionals working with adolescents (Levenson et al., 2021). The study points to modelling behaviour and the need for strategies which balance increasing adolescent autonomy with the still important parental role when promoting healthy sleep.

Future interventions on adolescent sleep could focus on educating parents on the potential influence their behaviour and strategies can have on the adolescents' sleep. Due to their proximity in parents may be well-suited to support healthier sleeping habits. Previous studies have pointed to associations between adolescent assessed parent strategies and

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adolescent sleep. The current study used parent report on parenting strategies and showed a subsequent association to adolescent report of sleep. This could indicate that the knowledge or assessment the parents have or make about their own use of these parenting strategies has real effects. It could further indicate that parents could be able to monitor their own use of parenting strategies and changes occurring. Interventions which focus on parent introspection and assessment of their own behaviour and its relation to adolescent sleep, with a goal of modifying said strategies may yield favourable results. More knowledge on a subject often lead to higher interest. Interventions which focus on increasing parent knowledge about adolescent sleep could also aid in increasing the quality and quantity of adolescent sleep.

Conclusion

The current study examined the association between parent strategies adolescent sleep. The main results of the study indicate that inconsistent parenting is associated with shorter sleep duration in adolescents, and that parental monitoring is associated with longer sleep duration in adolescents. This finding suggests that higher levels of inconsistent parenting may not be conducive to adolescent sleep, and that parental monitoring may be conducive to adolescent sleep. This finding is partially in line with previous findings and adds to the literature examining the associations between different parenting practices by providing a significant association between parent-assessed parenting strategies and adolescent self-reported sleep. There seem to be a lack of studies which examine the association between parenting strategies and adolescent insomnia. The study further adds to the literature by providing a significant association between parenting strategies and by providing an association between positive parenting and parental monitoring, and insomnia when adjusted for age and sex.

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The study also indicates implications for future interventions which target adolescent sleep by pointing to the influence parent strategies can have on adolescent sleep. Parenting strategies can be a source through which parents affect the behaviour of their adolescents, and parents ordinarily have a proximity to the adolescent which can allow them to more efficiently positively influence adolescent and model positive behaviours. Regarding sleep this study point to the potential direct effects parenting strategies can have on sleep, and parents can model sleep behaviours which are more conducive to better adolescent sleep.

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Tables and Figures

Table 1 *Descriptive Characteristics of the Sample*

	<i>n (%)</i>
Participants	
Adolescents	1324
Parents	1324
Gender	
Female	687 (51.9)
Age	
16	589 (45.6)
17	415 (32.1)
18	272 (21.1)
19	15 (1.2)
mean (SD)	17.27 (0.82)
Maternal education, n=	
	1263
Compulsory	56 (4.4)
High School	442 (35.0)
College/University	765 (60.6)
Missing	61 (4.8)
Paternal education	
	1194
Compulsory	89 (7.5)
High School	459 (38.4)
College/University	646 (54.1)
Missing	130 (10.9)
Household income	
<200.000-349.999	69 (5.4)
350.000-549.000	169 (13.2)
550.000-749.000	240 (18.8)
750.000-999.999	396 (31.0)
>1.000.000	403 (31.6)
Parenting strategies	
Positive parenting [mean (sd)]	15.46 (2.32)
Inconsistent parenting [mean (sd)]	6.10 (2.41)
Parental monitoring [mean (sd)]	13.01 (2.61)

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Table 2 *Adolescent Sleep Pattern, as Reported by Parents, Self-Report also Partially Available*

	<i>Adolescent %(n)</i>	<i>Parent %(n)</i>
Total n	1324	1249
Has problems with falling asleep and/or frequent awakenings	34.3 (445)	22.4 (280)
Trouble falling asleep		93.9 (262)
Frequent awakenings		34.5 (95)
Has your adolescent had previous sleeping difficulties?		16.7 (208)
During their first years		24.0 (50)
Preschool age		22.1 (46)
Primary school		34.1 (71)
Secondary school		78.4 (163)
Do you think your adolescent gets enough sleep?		
Not enough		12.2 (152)
Somewhat not enough		41.7 (520)
The right amount		44.7 (557)
Too much		1.4 (18)
Experiences sleepiness/tiredness during daytime	85.6 (1112)	50.0 (624)
Sleepiness (nods off easily)	25.1 (264)	36.7 (223)
Tiredness (is tired/seems tired)	49.0 (542)	89.1 (555)
The adolescent does not get enough sleep during weekdays		60.2 (752)
Has difficulties sleeping which affects schoolwork		20.0 (249)
The adolescent oversleeps for school	17.6 (228)	11.9 (149)

Table 3 Associations Between Parenting, Sleep Duration and Insomnia

	Sleep duration						Insomnia					
	b (SE)						OR (95 CI)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b (95% CI)	B (95% CI)	b (95% CI)	B (95 % CI)	b (95% CI)	B (95% CI)	OR (95% CI)	OR ^s (95% CI)	OR (95% CI)	OR ^s (95% CI)	OR (95 % CI)	OR ^s (95% CI)
Positive parenting	-0.33 (-2.71, 2.05)	-0.69 (-6.29, 4.77)	-0.15 (-2.55, 2.25)	-0.34 (-5.90, 5.22)	-0.15 (-2.55, 2.24)	-0.35 (5.90, 5.19)	0.94 (0.88, 1.01)	0.88 (0.75, 1.02)	0.93 (0.87, 0.99)*	0.84 (0.72, 0.98)	0.93 (0.86, 0.99)*	0.84 (0.72, 0.98)*
Inconsistent parenting	-3.54 (-5.84, -1.23)**	-8.59 (-14.19, -2.99)	-3.72 (-6.03, -1.41)**	-9.03 (-14.64, -3.41)**	-3.39 (-5.71, -1.07)**	-8.23 (-13.86, -2.06)*	0.98 (0.92, 1.05)	0.95 (0.81, 1.12)	0.99 (0.92, 1.06)	0.97 (0.83, 1.14)	0.98 (0.92, 1.05)	0.95 (0.81, 1.121)
Parental monitoring	4.48 (2.36, 6.60)***	11.77 (6.21, 17.67)	4.77 (2.64, 6.90)***	12.53 (6.93, 18.12)	4.95 (2.83, 7.08)***	13.00 (7.42, 18.60)*	0.95 (0.90, 1.00)	0.88 (0.75, 1.02)	0.94 (0.88, 0.99)*	0.85 (0.72, 0.99)	0.93 (0.88, 0.99)*	0.84 (0.71, 0.98)*

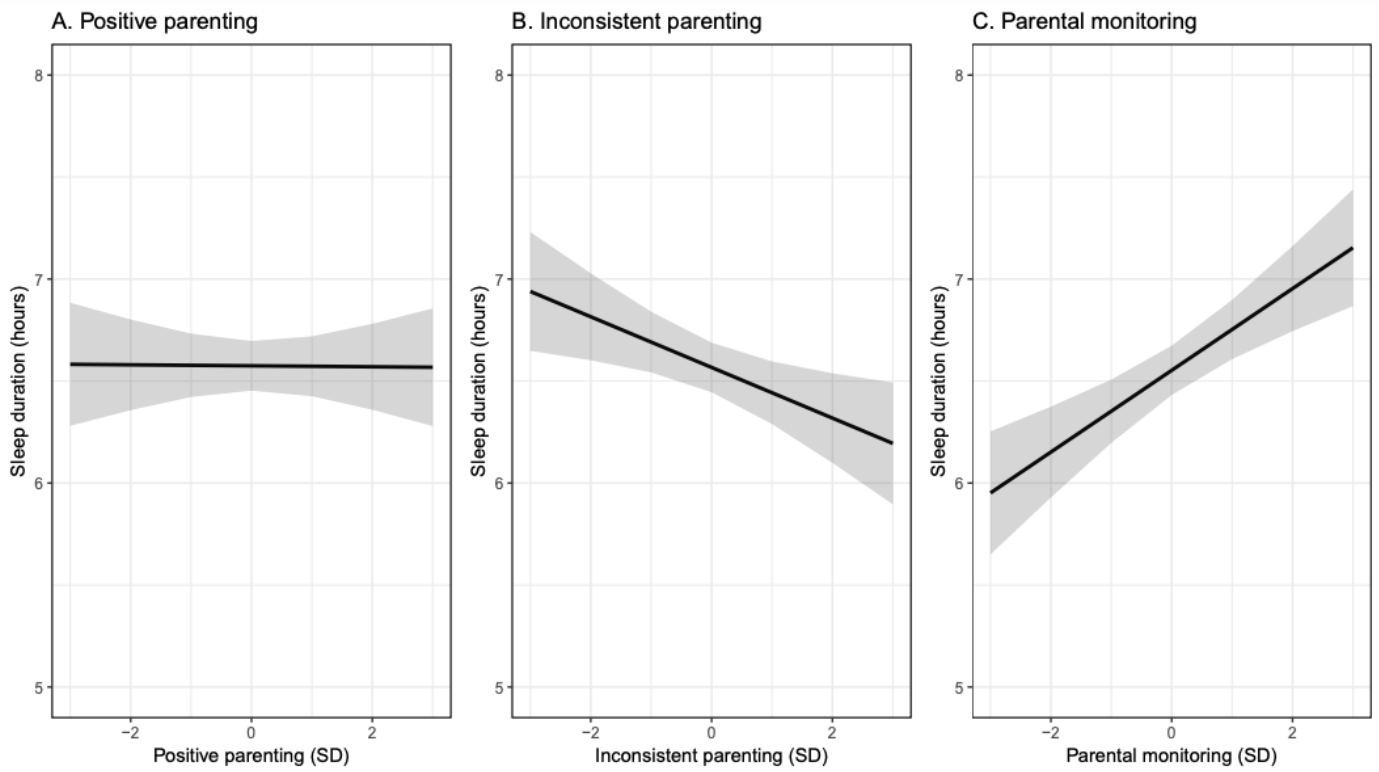
note. Model 1: Unadjusted associations, Model 2: Adjusted by age, gender, Model 3: Adjusted by age, gender, parental education and household income. b = unstandardized regression coefficient. B = regression coefficient when predictors are standardized.

*Statistically significant at $p < 0.05$, **statistically significant at $p < 0.01$, ***statistically significant at $p < 0.001$.

OR^s = odds ratio when predictors are standardised

Figure 1

Predicted Values of Adolescent Sleep Duration by Parenting Styles



Note: The figure shows the primary adjusted model (model 2) for a) positive parenting, b) inconsistent parenting, and c) parental monitoring, stated from ± 3 standard, adjusted for adolescent gender and age. The shaded grey areas represent the 95% CI of the regressionline