Parental Involvement, Psychological Distress, and Sleep: A Preliminary Examination in Sleep-Disturbed Adolescents With a History of Substance Abuse

Jennifer C. Cousins, Richard R. Bootzin, Sally J. Stevens, Bridget S. Ruiz, and Patricia L. Haynes
University of Arizona

The relationships between family environment and psychological distress and between psychological distress and sleep disturbance in adolescents are well established. However, less is known about the influence of family environment on sleep disturbance. The authors’ goal is to examine the effects of parental involvement on psychological distress and sleep disturbance in 34 adolescents with a history of substance abuse. Linear regression techniques and confidence intervals were used to test the significance of mediation analyses. Lower levels of parental involvement were associated with higher levels of psychological distress, and higher levels of psychological distress were associated with lower sleep efficiency and more time spent in bed. Follow-up analyses found that higher levels of parental involvement were associated with earlier morning arising times, when controlling for psychological distress. These data indicate that psychological distress is important to consider when examining the relationship between parental involvement and sleep in adolescents.

Keywords: adolescents, sleep, parental involvement, mental health, substance use

Adolescence is a developmental period marked by the motivation and need to regulate one’s behavior and emotions. This is also a time in which adolescents may begin to use substances, show an increased vulnerability to psychological distress, and develop sleep problems that negatively impact their lives. Previous research has demonstrated various relationships between sleep, psychological distress, and substance use; however, very little is known about the influence that perceived parental involvement has on psychological distress and sleep during adolescence. In the current analysis, we examined how perception of parental involvement affected psychological distress and sleep in a population of adolescents with a history of substance abuse.

Adolescence is also a time marked by dramatic changes in sleep. Adolescents have a tendency to be phase delayed, in that they stay up later in the evening and have difficulty awakening in the morning. Adolescents show an increase in daytime sleepiness during midpuberty regardless of the amount of nighttime sleep that is attained (Carskadon & Acebo, 2002; Dahl & Lewin, 2002). Furthermore, most adolescents do not get the required amount of sleep because of after-school work and activities and general problems with their sleep (Carskadon & Fallone, 2004). According to Mercer, Merritt, and Cowell (1998), beginning at the age of 14, adolescents report needing and wanting more sleep in order to feel better and improve daily functioning.

Adolescents may also show an increased vulnerability to emotional and behavioral problems. Recent studies suggest that the incidence of behavioral and psychological problems, such as depression, among the youth population appears to be growing (West & Sweeting, 2003). Ferdinand, Stijnen, Verhulst, and Reijden (1999) reported that emotional issues in adolescence may contribute to psychopathology and functional impairment in late adolescence and early adulthood. As will be discussed, psychological distress has been shown to lead to sleep disturbances.

Family Environment and Psychological Distress

The family environment is an important factor involved in adolescent psychological distress. Poor family and parental interactions may contribute to maladaptive behaviors in children and adolescence (Wiesner & Windle, 2004). Incompetent nuclear families—described as parents who exhibit low appreciation, insufficient monitoring, inadequate behavior control, and poor communication—appear to be related to higher psychological distress (e.g., low self-esteem) in adolescence (Spruijt, DeGoede, & Vander-
Adolescents’ perception of dysfunctional parenting, specifically in regards to negative behavior management, conflict, criticism, and feelings of rejection by both parents, has been related to internalized symptoms in boys and externalized symptoms in girls (Godkin & Schwenzfeier, 1991). In addition, Xia and Qian (2001) demonstrated that psychological distress was related to parental rejection, punishment, and overall lack of parental involvement for adolescents from mainland China. Similar findings were reported by Flouri (2005), in which greater parental involvement in youth activities was negatively related to psychological distress.

In a causal analysis it is possible that psychological distress may lead to less parental involvement (Pettit, Laird, Dodge, Bates, & Criss, 2001), rather than the reverse. Follow-up analyses will examine this alternative relationship as well as the relationship of lack of parental involvement leading to sleep disturbance.

Psychological Distress and Sleep Disturbances

Psychological distress has been found to lead to sleep problems in adolescents. For example, Patten, Choi, Gillin, and Pierce (2000) found that adolescents with psychological distress, such as depressive symptoms, were more likely to develop sleep problems than normal controls. Ryan and colleagues (Ryan et al., 1987) found that children and adolescents who displayed withdrawn and depressive symptoms were likely to present with hypersomnia, and those who displayed more anxious behaviors presented with complaints of insomnia.

It should be noted, however, that some studies have reported findings in the opposite direction in which poor sleep predicts psychological distress. Although our analyses do not focus on whether sleep predicts psychological distress, sleep disturbance—such as excessive sleep onset latency and frequent wake bouts after initial sleep onset—has been identified as a risk factor for anxiety disorders, depression, and lower self-esteem among adolescents (Dahl & Lewin, 2002; Dahl et al., 1996). It is likely that these two pathways, psychological distress to poor sleep and poor sleep to psychological distress, interact reciprocally creating a negative cycle such that both psychological distress and sleep disturbances are increased.

In summary, on the basis of previous literature, we hypothesized that psychological distress mediates the relationship between parental involvement and sleep.

Method

This analysis is part of a larger study to develop and evaluate a multicomponent, integrative cognitive-behavioral therapy for the treatment of sleep disturbances in adolescents who had been treated for substance abuse in outpatient treatments. See Bootzin and Stevens (2005) for more detailed information on the sleep treatment and outcomes.

Participants

The current analysis consisted of 34 participants (17 girls and 17 boys), with a mean age of 15.91 years (range 14–17). All of the participants had reports of daytime sleepiness and/or sleep disturbances at night. Forty-one percent of the sample resided with both parents living together, 5.9% of the sample reported that their parents were separated and shared custody, and 52.9% of the participants lived with a single parent who had custody. The majority of the sample considered themselves to be Caucasian (47.1%), followed by Hispanic/Mexican (23.5%). The remaining 29.4% were either from other backgrounds or did not respond. Participants were included based on the completion of the Global Appraisal of Individual Needs (baseline measure; GAIN–I) and at least 3 days of actigraphy over a 7-day period. See Bootzin and Stevens (2005) for more demographic information from the larger study.

Sleep Measures

The primary sleep measures were obtained from wrist Actiwatches (Mini Mitter Co., Inc., Model AW64) that monitors movement at night. Previous studies using the same or a similar model of Actiwatch from the Mini Mitter Co., Inc., have shown that the device is a reliable and valid measure for estimating sleep parameters (Kushida et al., 2001; Lichstein et al., 2006). Actigraphy has been used extensively in sleep research to measure sleep patterns and circadian rhythms in children, adolescents, and adults (Ancoli-Israel et al., 2003; Carskadon, Wolfson, Acebo, Tzischinsky, & Seifer, 1998; Sadeh, Sharkey, & Carskadon, 1994).

The participants were instructed to wear the Actiwatch on their nondominant wrist throughout the night during the same period in which they also completed daily sleep diaries. The participants were asked to press a button on the face of the Actiwatch to indicate when they turned off the light intending to fall asleep and when they awakened at the end of their sleep period. These markers served as measures of in-bed and out-of-bed times, providing outside boundaries for subsequent calculation of sleep onset and offset. Sleep onset was determined by the beginning of the first 5 min of contiguous stillness with less than 30 s of any recorded activity counts that occurred after in-bed time. Sleep offset was indicated as the end of the last 5 min of stillness before out-of-bed time with less than 30 s of any recorded activity counts. Actigraphy sleep measures were obtained and scored using the default scoring algorithm sensitivity settings of the Mini Mitter software package (Mini Mitter Version 3.3). This algorithm has been validated in previous studies (Kushida et al., 2001; Lichstein et al., 2006). Data were collected in a continuous mode at a 30-s sampling rate. A minimum of 3 days of data over a 7-day period was required for inclusion of actigraphy data.
in subsequent analyses. The average number of nights of actigraphy across all participants was 5.08 nights.

The daily sleep diary is a measure in which the participants record daily aspects of their sleep, including sleep onset latency, number of awakenings during the night, wake after sleep onset (WASO), and the quality and rating of their sleep. We used weekly averages of the sleep variables in the analyses. The participants completed the sleep diary every morning and telephoned the results into a voice-mail system daily. Estimates of sleep parameters from sleep diaries have been found to be reliable and valid in adults with insomnia (Bootzin & Engle-Friedman, 1981). Daily sleep diary data with at least 3 days completed over a 7-day timeframe were used as a way of editing Actiwatch data.

**Measures of Parental Involvement, Psychological Distress, and Substance Use**

The primary measure for psychological distress, parental involvement and substance use were taken from the Global Appraisal of Individual Needs (GAIN) (Dennis, 1999). The GAIN is a structured clinical interview that assesses substance use and dependence, risk behaviors, mental and physical health, as well as environmental and social support. The GAIN–I (baseline measure) covers general history information and clinical symptoms within the past 90 days or 1 year. We used subscales of the GAIN to determine parental involvement, psychological distress, and substance use.

The GAIN’s Parental Activity Index (PAI) assesses the frequency with which the participant reports being involved in various activities with the parent(s) during the past year. There are five items in this scale, which are scored dichotomously (1 = yes, 0 = no; \( \alpha = .59 \)). The items assess if the adolescents (a) spent 30 min or more playing with their parent(s); (b) attended an organized event with their parent(s); (c) had their parent(s) read to them or talked with them about a book, magazine, or newspaper; (d) received help with their homework from their parent(s); or (e) had their parent(s) meet with a teacher, social worker, or parole officer. Higher scores suggest greater involvement with the parent(s).

The GAIN’s General Mental Distress Index (GMDI) measures mental and emotional health. This 21-item scale assesses psychological distress, such as depression, anxiety, self-esteem, somatic and behavioral problems, and suicidal symptoms within the past year (\( \alpha = .95 \)). Each item is scored dichotomously (1 = yes, 0 = no). Higher scores represent increased levels of internal mental distress. Scores above 4 indicate a possible self-medication problem; for scores above 7, there is potential for the reoccurrence of medical and mental health problems.

The GAIN’s Substance Frequency Index (SFI) is a 7-item measure that assesses the frequency of substances used over the past 90 days. Scores are calculated as the average percentage of days reported in which substances were used. Higher scores represent an increase in frequency of substance use in terms of the number of days used, the number of days in which the participant stayed high most of the day, and the number of days in which substance use caused problems (\( \alpha = .87 \)).

The GAIN’s Substance Problem Index (SPI) is a 16-item measure that assesses various symptoms associated with substance use and abuse, such as substance-induced disorders relating to psychopathology, health, and social criteria (\( \alpha = .88 \)). The scores are as follows: 0 (never), 1 (1+ years), 2 (2-12 months), and 3 (past month). Scores of 0 represent no substance-related problems. Scores of 4 or more represent substance abuse; scores of 7 or more represent substance dependence.

**Procedure**

This study was approved by the Institutional Review Board at the University of Arizona. A confidentiality certificate was provided by the National Institute of Drug Abuse.

The participants were recruited from four outpatient substance abuse treatment programs in Tucson, Arizona. They were eligible for the study if they had complaints about daytime sleepiness and/or sleep disturbances and had completed a substance abuse treatment program within the past 12 months. During the initial interview, study staff described the study procedures, obtained written consent from the parent(s)/guardian(s) and the adolescent, and administered the GAIN-I. The participants were given an Actiwatch to be worn nightly and daily sleep diaries to be completed over the next week.

**Data Analysis**

This study consists of analyses of the baseline data from a subset of the participants enrolled in the larger treatment study. Before we conducted the analyses, we examined the data for outliers. Any outlying cases were excluded from the main analyses if the outlier had significant influence on the results (as assessed via Cook’s Distance scores). Next, we conducted preliminary descriptive and correlational analyses to examine the direct effects of the PAI and GMDI scores on each sleep variable. Then, we conducted a series of linear regression analyses to assess for the potential impact of demographic and substance use variables on each sleep variable. Age, sex, ethnicity, SFI scores, and SPI scores were simultaneously entered as independent variables predicting each sleep variable as assessed via actigraphy. Any statistically significant variable was then included as a covariate in each step of the main analyses.

Our main hypothesis was that psychological distress would mediate the relationship between parental involvement and sleep (see Figure 1). We conducted the following analyses to test for mediation in accordance with the product of coefficient methods: First, we used linear regression to estimate whether lower scores on the PAI (the independent variable, or IV) were associated with higher scores on the GMDI (the mediator, or M; see path a in Figure 1). Then, we used a series of linear regression equations to estimate whether lower GMDI scores (M) were associated with worse sleep (the dependent variable, or DV) when
controlling for the PAI index (IV; see path b in Figure 1).

We tested each sleep variable in separate regression equations.

To test for the significance of the mediation effect, we computed confidence limits on the basis of the distribution of the product of two normal random variables (MacKinnon, Lockwood, & Williams, 2004):

\[
|a \times b| \pm (\text{empirical M distribution critical value})
\times \sqrt{b^2 \times s_a^2 + a^2 \times s_b^2},
\]

where \(b\) = the unstandardized regression path coefficient from GMDI to sleep when controlling for PAI; \(a\) = the unstandardized regression path coefficient from the independent variable, PAI, to the mediator, GMDI; and \(s\) = the standard error. A recent statistical simulation performed by MacKinnon and colleagues (MacKinnon et al., 2004) revealed that these confidence limits are more accurate than confidence limits that are based on the normal distribution assumption. The normal distribution has low power and imbalanced confidence limits for the indirect effect (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon et al., 2004).

In the primary analysis, we evaluated whether psychological distress was a mediator for the relationship between parental involvement and sleep. However, because it is plausible that the relationship between parental involvement and adolescent mental health is bidirectional, we conducted follow-up analyses switching the placement of GMDI scores and PAI scores so that GMDI was the IV and PAI was the M.

Results

Preliminary Analyses

No demographic or substance use variables emerged as statistically significant in predicting each sleep variable. Computation of Cook’s Distance scores identified one participant who had excessive amounts of WASO (\(M = 190 \text{ min}\)). Significant differences emerged from the main analyses on this variable depending on the inclusion of this case. Therefore, we excluded this case from all analyses using WASO as the DV.

Descriptive statistics for each GAIN index and sleep variable are reported in Table 1. The mean score on the SPI, which assesses negative symptoms related to substance use, revealed a level of substance abuse problems consistent with a sample that has been in treatment for substance abuse (\(M = 12.56, SD = 3.85\)). Further examination of the participants’ responses indicated that all of the endorsed substance abuse problems had taken place more than a year before the baseline interview for the study; none were current problems for any of the participants. The mean score for the SFI, which measures the average percentage of days reported in which substances were used during the past 90 days, was .07 (SD = .12), indicating that the average substance frequency of the entire sample was less than 1 day of use during the past 3 months. On the GMDI, the average score of 11.15 (SD = 4.08) was well above the criterion score (7 or more) for an acute clinical problem. For the PAI,

Figure 1. Hypothesized mediational model. \(a\) = the unstandardized regression path coefficient from the independent variable, PAI, to the mediator, GMDI; \(b\) = the unstandardized regression path coefficient from GMDI to sleep when controlling for PAI; \(c’\) = the unstandardized coefficient predicting sleep from the independent variable, PAI, when controlling for the mediating variable, GMDI.

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>(M)</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAIN indices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance Problem Index</td>
<td>12.56</td>
<td>3.85</td>
</tr>
<tr>
<td>Substance Frequency Index</td>
<td>0.07</td>
<td>0.12</td>
</tr>
<tr>
<td>General Mental Health Distress Index</td>
<td>11.15</td>
<td>4.08</td>
</tr>
<tr>
<td>Parental Activity Index</td>
<td>4.03</td>
<td>1.06</td>
</tr>
<tr>
<td><strong>Sleep indices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-bed time in evening</td>
<td>23:39</td>
<td>55 min</td>
</tr>
<tr>
<td>Time of sleep onset</td>
<td>00:25</td>
<td>1 hr, 5 min</td>
</tr>
<tr>
<td>Sleep onset latency (min)</td>
<td>46</td>
<td>28</td>
</tr>
<tr>
<td>Number of awakenings</td>
<td>40</td>
<td>11</td>
</tr>
<tr>
<td>Wake time after sleep onset (min)</td>
<td>50</td>
<td>16</td>
</tr>
<tr>
<td>Total sleep time (min)</td>
<td>427</td>
<td>62</td>
</tr>
<tr>
<td>Total time in bed (min)</td>
<td>544</td>
<td>78</td>
</tr>
<tr>
<td>Sleep efficiency (%)</td>
<td>79</td>
<td>7</td>
</tr>
<tr>
<td>Final awakening time in morning</td>
<td>8:26</td>
<td>1 hr, 41 min</td>
</tr>
<tr>
<td>Arising time</td>
<td>8:43</td>
<td>1 hr, 43 min</td>
</tr>
</tbody>
</table>

Note. \(N = 34\) except for wake time after sleep onset, where \(N = 33\). GAIN = Global Appraisal of Individual Needs. Sleep efficiency = (total sleep time/total time in bed) expressed as a percentage.
the average score of 4.03 (SD = 1.06) indicated that the adolescent respondents reported substantial contact with their parents. The intercorrelations of the GAIN subscales are reported in Table 2. Bivariate correlations between the PAI, GMDI, and sleep indices are reported in Table 3.

### Mediation Analyses

Statistically significant indirect effects emerged for sleep efficiency ($a \times b = 1.02$, 95% confidence interval [CI] = 0.06, 2.53) and mean total time spent in bed ($a \times b = -9.73$, CI = 0.13, 24.89). Regression coefficients for each of these analyses are reported in Table 4.

As can be seen in Table 4, lower levels of parental involvement were associated with higher levels of psychological distress: Path $a$: Adj $R^2 = 0.13$, $F(1, 32) = 6.12$, $p = .019$. Higher levels of psychological distress were associated with lower levels of sleep efficiency, $\Delta R^2 = 0.12$, $\Delta F(1, 31) = 4.26$, $p = .047$ (see Figure 2), and with more overall time spent in bed, $\Delta R^2 = 0.09$, $\Delta F(1, 31) = 3.63$, $p = .066$, when controlling for PAI scores (see Figure 3).

An interesting finding was that no direct relationship emerged for PAI and sleep efficiency (see Table 3). The failure to find a direct effect in the presence of an indirect effect may indicate that classical suppression is operating. This interpretation is supported by examination of the direction of coefficients; the indirect relationship ($a \times b$) for sleep efficiency is opposite in sign to its partial direct relationship between PAI and sleep ($c'$). Thus, PAI accounts for (suppresses) unique variability in GMDI, thereby improving the power of GMDI to predict sleep efficiency (see Figure 4).

A direct relationship did emerge between PAI and time in bed (see Table 3). This relationship reduced to a nonsignificant level with the inclusion of GMDI in the model (see Table 3). These findings indicate that GMDI fully mediates the relationship between parental involvement and time in bed.

No other sleep variables emerged as being statistically significant. Taken together, these findings indicate that less parental involvement is directly associated with worse mental health and is indirectly associated with worse sleep.

### Follow-Up Analyses

After switching the placement of GMDI and PAI in the model, one significant indirect effect emerged for arising time in the morning: $a \times b = 204.00$, CI = 1.16, 524.50. Higher levels of psychological distress were associated with less parental involvement. Less parental involvement was associated with later adolescent arise times when controlling for GMDI scores (see Table 4): $\Delta R^2 = 0.10$, $\Delta F(1, 31) = 3.54$, $p = .009$ (see Figure 5). No direct or partial relationship emerged between GMDI and arising time (see Tables 3 & 4), thereby suggesting a suppression effect may be operating. GMDI is explaining unique variability in PAI, which improves the power of PAI to predict morning arising time.

### Discussion

Our aim with this study was to examine the likelihood that psychological distress acts as a mediator between...
parental involvement and sleep in adolescents. The analyses revealed that lower levels of parental involvement were associated with higher levels of psychological distress, which is consistent with previous research (Flouri, 2005; Godkin & Schwenzfeier, 1991). Higher levels of psychological distress were also associated with lower sleep efficiency and more time spent in bed. This finding is in agreement with other research that demonstrates that

Figure 2. Negative correlation between General Mental Health Distress Index scores and sleep efficiency when controlling for Parental Activity Index (PAI) scores. The data have been jittered to ensure that all of the data points can be seen.

Figure 3. Positive correlation between General Mental Health Distress Index scores and time in bed when controlling for Parental Activity Index (PAI) scores. The data have been jittered to ensure that all of the data points can be seen.
poor sleep is associated with poor mental health (Dahl & Lewin, 2002).

The analysis for the main hypothesis revealed that PAI was related to sleep (sleep efficiency, time in bed) but only through its relationship with GMDI. For sleep efficiency, GMDI operated as a suppressor variable; PAI accounted for a unique portion of the variance in GMDI, enabling GMDI to become a stronger predictor for sleep efficiency. Therefore, a lack of perceived parental involvement relates to higher psychological distress, and higher psychological distress predicts lower sleep efficiency. Sleep efficiency, which is determined by total sleep time divided by time in bed, provides a single measure that encompasses several factors related to sleep. Because total sleep time is reduced by both the duration of sleep onset latency as well as the time spent awake during the night, having a high sleep efficiency indicates that the adolescents have neither trouble falling asleep at night nor trouble awakening after initial sleep onset.

The fact that the relationship between PAI and time in bed disappeared when GMDI was included into the model supports a full mediating role for GMDI in the relationship between PAI and time in bed. This suggests that the association between increases in time in bed and a lack of adolescent-perceived parental involvement may be occurring via an increase in psychological distress. However, our study lacks the temporal precedence to establish this causal direction. Furthermore, adolescents with anxious behaviors also had complaints of insomnia (Ryan et al., 1987), which may lead to more time spent in bed attempting to fall asleep and stay asleep.

In psychological research it is often difficult to demonstrate the direction between variables; for instance, a stressful family environment in adolescence may lead to poor sleep, or the effects of poor sleep may lead to stressful family environment. In order to understand this relationship better, we examined the associations when PAI was the mediator for GMDI and sleep. An indirect effect for arising time was revealed, in which psychological distress accounted for a proportion of the variance in parental involvement, which then improved the prediction of arising time. This analysis does not answer the directionality question specifically; however, it does reveal that elements of parental involvement, which are unrelated to psychological distress, are significant predictors of arise times in these adolescents.

Overall, the findings demonstrate that parental involve-
ment is both indirectly and directly related to sleep. In this study, parental involvement was characterized by adolescent reports of interactions with their parents or guardians, such as spending time reading, playing, attending an organized event, or receiving help with schoolwork. These questions may tap into the construct of nurturance, which is concerned with providing a positive atmosphere for the child or adolescent. This positive atmosphere is accomplished by offering verbal communications of acceptance and love, giving hugs, playing games together, or helping (Locke & Prinz, 2002). Parental nurturance has been associated with increased global self-worth and a more positive relationship with parents (Boll, Ferring, & Filipp, 2003; Hopkins, 1993). Therefore, a feeling of positive parental involvement may decrease the likelihood of having or developing psychological distress that is common during adolescence and, in turn, may decrease the likelihood of developing sleep problems attributable to the psychological distress that may occur during adolescence. A major component to achieving proper sleep is the environment. An environment that limits a threat perception triggered by an unstable family environment and reflects a safe, nurturing environment would be less likely to interfere with various aspects of adolescent sleep, specifically in regards to sleep efficiency and arise times (Dahl & Lewin, 2002).

It was interesting that no relationships emerged with substance use and sleep or with substance use and parental involvement. However, the SPI was positively related to GMDI (see Table 2). This finding is supported by other studies in which substance use and problems related to substance use are often associated with mental health distress (Hser et al., 2001; Hallfors, Waller, Bauer, Ford, & Halpern, 2005; Libby, Orton, Stover, & Riggs, 2005). This finding also suggests that mental health may be a mediator between substance use and sleep, which corresponds with previous findings by Johnson and Breslau (2001) suggesting that mental health accounts for the primary effects of substances on sleep in adolescents. Because the analysis did not show that substance use was related to sleep or PAI, these findings may reflect our unique population in which all of the participants had been substance users but had recently completed an outpatient substance abuse treatment; this yielded a highly restricted range in terms of substance use and reduced the chance of substance use being a predictive factor for sleep and parental involvement.

Another possible explanation for the lack of a substance use relationship concerns the type of parenting scale used in the analyses; this particular scale assessed generally positive parent-adolescent interactions. Adolescent reports of negative parental interactions or substance use in the family environment were not assessed before the substance abuse treatment. Therefore, it is unknown whether the family environment contributed to the adolescent using substances. However, previous research shows that poor family environments contribute to substance use in adolescents (Jacob & Johnson, 1999). Although it is unknown if the family environment affected the adolescents’ sleep, reports of poor sleep have also been associated with substance use and emotional distress (Johnson & Breslau, 2001).

Considerations

Drawbacks of the present analyses are that the sample is unusual in that it consists of 34 adolescents with a history of substance abuse who had sleep disturbance or daytime sleepiness complaints and who complied with all assessment requirements of the protocol. In addition, the data for the analyses are taken from the baseline period of a sleep treatment project. Thus, the study reflects a cross-sectional design with statistical power to detect large, not small, effects. These considerations suggest that the findings of the mediation of psychological distress between perceptions of parental activity and sleep disturbances may not generalize to all adolescents. Future studies involving longitudinal designs with larger samples comparing participants with different substance use histories would provide the opportunity to replicate the current findings and provide causal analyses of the relationships between family environment, psychological distress, and sleep variables.

A related drawback is the lack of a comparison condition of adolescents with sleep disturbances or daytime sleepiness; however, this was not part of the design of the larger study from which these data were drawn. Results from our study, when compared with a published study examining sleep patterns in adolescents without a history of sleep disorders, psychopathology, or drug use (Carskadon, Wolfson, Acebo, Tzischinsky, & Seifer, 1998), found a more phase delayed sleep pattern. The adolescents in the present study fell asleep on average more than an hour later than those in Carskadon et al.’s (1998) study. These results should be interpreted with caution as they were obtained in different locations using different research protocols.

Adolescents with a history of substance abuse can be a difficult population to study. A major issue for the larger study, and therefore these analyses, was the fact that some of the participants did not complete all of the study measures, (e.g., wearing the Actiwatch for the time prescribed). Future research using a representative sample and a longitudinal design is necessary to assess the effect of parental involvement on sleep and mental health.

In addition, more measures that gauge the adolescent-parent interaction with validated parenting scales may be useful. There were only five items in the PAI; therefore, only a small portion of the parent-adolescent relationship was assessed. Furthermore, other aspects of the family structure, such as marital conflict, have an impact on sleep. El-Sheikh, Buckhalt, Mize, and Acebo (2006) reported that marital conflict, which is likely to be experienced as a social stressor, predicted reduced total sleep time, lower sleep quality, increased sleep fragmentation, and more subjective sleepiness in prepubertal children. In addition, Brassington (1994) found that authoritarian parenting was associated with more reports of insomnia in college students; however, authoritative parenting, which involved more expressions of warm discipline, was associated with less incidence of insomnia in college students. Therefore it would be informative to include additional measures of family structure in future studies.

As discussed above, we were unable to assess direction-
ality of each of these relationships. All of the measures were
gathered around the same time frame; therefore, we cannot conclude that there is a cause and effect relationship. How-
ever, the measures from the GAIN-I (PAI, GMDI, SPI, and SFI) required reports from the past 90 days or from the past
year, which preceded the sleep assessments.

Conclusions

Adolescent sleep is affected by biological changes and by
psychological, social, and environmental demands. The re-
sults of the present analyses support the hypothesis that parental involvement and reduced psychological distress are
important components to healthy sleep in adolescents. To
our knowledge, this is the first study to assess these rela-
tionships in a population of adolescents with a history of
substance abuse. In developing sleep interventions for this
population, it is likely to be beneficial to consider the role of
the family environment and the adolescents’ psychological
distress in producing and maintaining sleep disturbances.

References

Ancoli-Israel, S., Cole, R., Alessi, C., Chambers, M., Moorcroft, W., & Pollack, C. (2003). The role of actigraphy in the study of
sleep and circadian rhythms. Sleep, 26, 342–359.

differential treatment in middle adulthood: Curvilinear relations
with individuals’ experienced relationship quality to sibling and

Bootzin, R. R., & Engle-Friedman, M. (1981). The assessment of

abuse, and the treatment of insomnia and daytime sleepiness.

Brassington, G. S. (1994). Insomnia and styles of parental authority
in college students. Psychological Reports, 74, 712–714.

614.

Theory and Application, 23(6), 8.

Carskadon, M. A., Wolfson, A. R., Acebo, C., Tzischinsky, O., &
Seifer, R. (1998). Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. Sleep, 21,
871–881.

Chambers, J., Power, K., Loucks, N., & Swanson, V. (2001). The interaction of perceived maternal and paternal parenting styles

175–184.

Dahl, R. E., Ryan, N. D., Matty, M. K., Birmaher, B., Al-

Dennis, M. L. (1999). Global appraisal of individual needs—


Ferdinand, R. F., Stijnen, T., Verhulst, F. C., & Reijden, M. V. D.
(1999). Associations between behavioural and emotional prob-

Flouri, E. (2005). Women’s psychological distress in midadult-
hood: The role of childhood parenting experiences. European Psychologist, 10(2), 116–123.

dysfunctional parenting and adolescent symptoms. Family Medicine, 23, 436–442.

Hallfors, D. D., Waller, M. W., Bauer, D., Ford, C. A., & Halpern,
163–170.


Hser, Y., Grella, C. E., Hubbard, R. L., Hsieh, S., Fletcher, B. W.,
689–695.


Johnson, E. O., & Breslau, N. (2001). Sleep problems and sub-
stance use in adolescence. Drug and Alcohol Dependence, 64, 1–7.

Kushida, C. A., Chang, A., Gadkary, C., Guilleminault, C., Car-
rillo, O., & Dement, W. C. (2001). Comparison of actigraphic,
polysomnographic, and subjective assessment of sleep param-
eters in sleep-disordered patients. Sleep Medicine, 2, 389–396.

What came first, major depression or substance use disorder?
Clinical characteristics and substance use comparing teens in a

Lichstein, K. L., Stone, K. C., Donaldson, J., Nau, S. D., Soeffing,

929.

83–104.

Confidence limits for the indirect effect: Distribution of the product and resampling methods. Multivariate Behavioral Re-
search, 39(1), 99–128.

23, 259–263.

Depressive symptoms and cigarette smoking predict develop-

Petit, G. S., Laird, R. D., Dodge, K. A., Bates, J. E., & Criss,
M. M. (2001). Antecedents and behavior-problem outcomes of
parental monitoring and psychological control in early adoles-
cence. Child Development, 72, 583–598.

Ryan, N. D., Puig-Antich, J., Ambrosini, P., Rabinovich, H.,


Received March 2, 2006
Revision received October 5, 2006
Accepted October 26, 2006

---

**Members of Underrepresented Groups: Reviewers for Journal Manuscripts Wanted**

If you are interested in reviewing manuscripts for APA journals, the APA Publications and Communications Board would like to invite your participation. Manuscript reviewers are vital to the publications process. As a reviewer, you would gain valuable experience in publishing. The P&C Board is particularly interested in encouraging members of underrepresented groups to participate more in this process.

If you are interested in reviewing manuscripts, please write to the address below. Please note the following important points:

- To be selected as a reviewer, you must have published articles in peer-reviewed journals. The experience of publishing provides a reviewer with the basis for preparing a thorough, objective review.

- To be selected, it is critical to be a regular reader of the five to six empirical journals that are most central to the area or journal for which you would like to review. Current knowledge of recently published research provides a reviewer with the knowledge base to evaluate a new submission within the context of existing research.

- To select the appropriate reviewers for each manuscript, the editor needs detailed information. Please include with your letter your vita. In the letter, please identify which APA journal(s) you are interested in, and describe your area of expertise. Be as specific as possible. For example, “social psychology” is not sufficient—you would need to specify “social cognition” or “attitude change” as well.

- Reviewing a manuscript takes time (1–4 hours per manuscript reviewed). If you are selected to review a manuscript, be prepared to invest the necessary time to evaluate the manuscript thoroughly.

Write to Journals Office, American Psychological Association, 750 First Street, NE, Washington, DC 20002-4242.