


# Teens & Sleep

LINKING DISCOVERY, PRACTICE, AND POLICY

## Adolescent Depression and Sleep

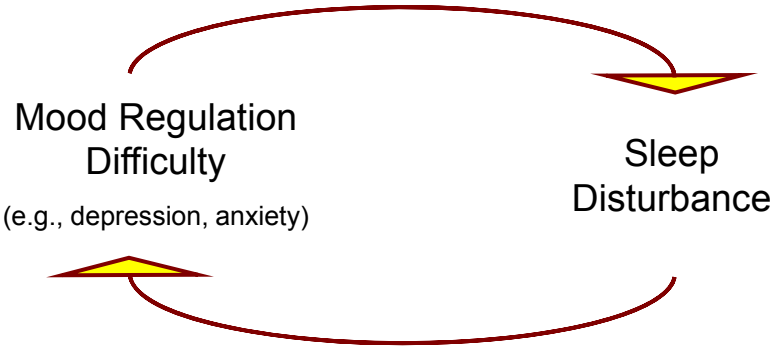
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## Bi-Directional Mutual Maintenance



Mood Regulation Difficulty  
(e.g., depression, anxiety)


Sleep Disturbance

Simple powerful strategies to improve sleep



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## Mental Illness & Sleep in Youth

- 30% of the US population over a 12-month period are diagnosed with a mental illness (Kessler et al., 1994; Regier et al., 1998).
- Half of all lifetime mental illness starts by 14 years of age (Kessler et al., 2008).
- Sleep problems in teens predict *worse* mental health (Frederikson et al. 2004; Roberts et al., 2002).
- To what extent is sleep disturbance an important, yet understudied, contributor to the cause/maintenance of mental illness/emotion dysregulation among teens?



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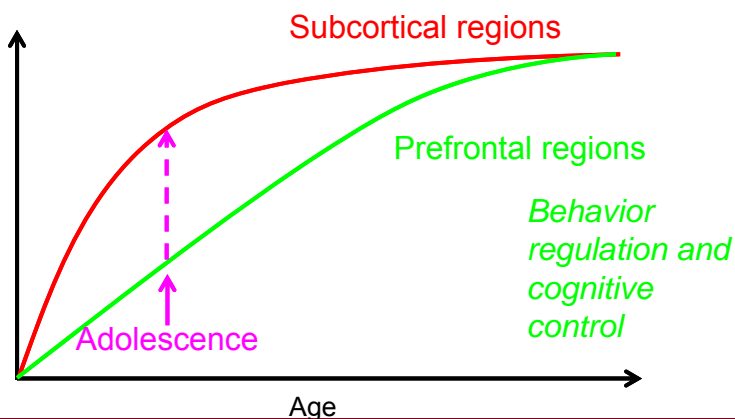
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## Temporal Gap in Brain Development

Adapted from Somerville et al., 2009  
Thanks to Zdena Op de Macks

*Emotion, reward seeking etc*



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## Depression in Teens

- 20% of adolescents will have had a depressive episode by age 18 (Lewinsohn, 1993)
- 75% relapse within 5 years (Kovacs, 1984)

## Depressing Outcomes

- Meta-analyses and reviews: modest effects for Cognitive Behavioral Therapy (CBT) and antidepressants

Weisz, JR et al. *Psychol Bull.* 2006;132:132-149.

Weersing, VR, & Brent, DA. *Child Adolesc Psychiatr Clin N Am.* 2006;15:939-57, ix.



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## Insomnia: Indirect improvement?

- Insomnia and depression *co-occur* (e.g., Brunello et al., 2000; Goetz et al., 1987; Lui et al., 2007)
- Insomnia is an independent *risk factor* for first and recurrent episodes of depression (e.g., Johnson et al., 1999; 2006; Gasquet & Choquet, 1994; Roberts et al., 2002)
- Insomnia is an independent predictor of *suicidal behavior* in depressed patients (Dumais et al., 2005; McCall & Blocker, 2010)
- Emerging *adult* depression & bipolar disorder RCT results

Clarke, G. & Harvey, A.G. (2012). The Complex Role of Sleep in Adolescent Depression. *Child and Adolescent Psychiatric Clinics of North America.*



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## Adults with Depression

Antidepressant + Insomnia Treatment (Cognitive Behavioral Therapy-Insomnia [CBT-I]) = 61.5%  
Antidepressant + No Insomnia Treatment = 33.3%

Rates of full remission from depression

Manber, R., & Edinger, JD, et al. *Sleep* 31(4): 489-495, 2008.



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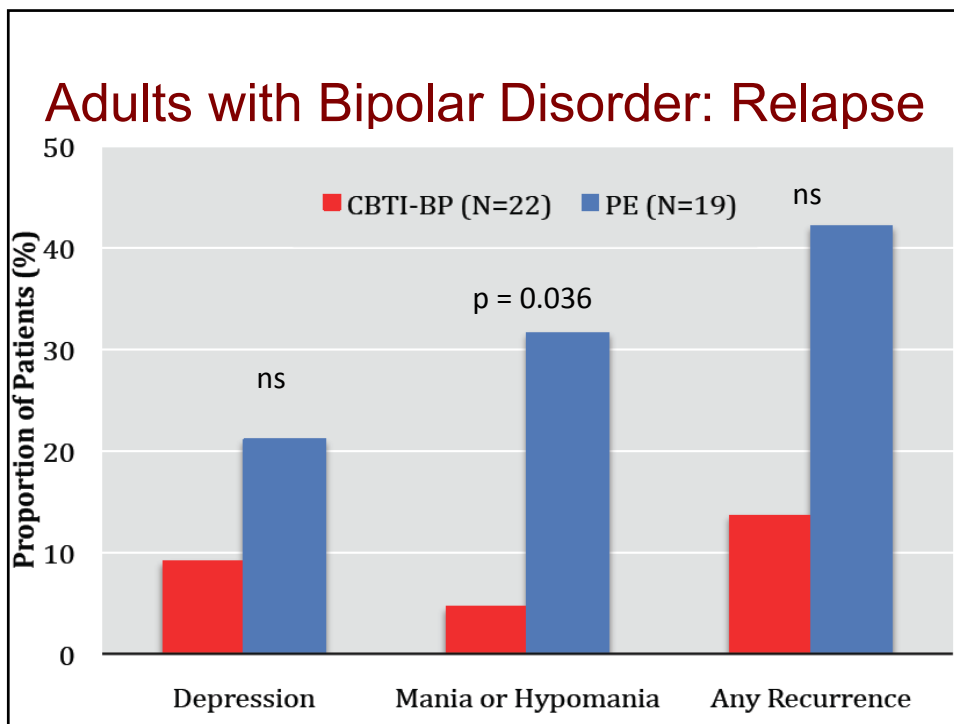
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## Youth 12-18 with Depression With Dr. Greg Clarke, Kaiser, Oregon



Cognitive Behavioral Therapy for Depression +  
Insomnia Treatment (CBT-I)

versus

Cognitive Behavioral Therapy for Depression + No  
Insomnia Treatment



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## Preliminary Sleep Outcomes

### Total Sleep Time (TST)

- Cognitive Behavioral Therapy-Insomnia (CBT-I) arm:

Baseline mean = 365.7 mins

Wk 12 mean = 465.1 mins

*Increase of 99.4 min*

- No insomnia treatment arm:

Baseline mean = 407.5 mins

Wk 12 mean = 389.6 mins

*Decline of 17.9 min*



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## Preliminary Depression Outcomes

- Clinical Global Impression, Improvement
  - Trend favoring CBT-I arm, medium-large effects
- Diagnostic Recovery (survival analysis)
  - Trend favoring CBT-I arm, large effect
  - Evident from ~Wk 16 onward




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## Chronotype



**'Night Owls' ...**


- More active later in the day
- Going to sleep later and getting up later (Horne & Ostberg, 1976)
- Children's Morningness-Eveningness Scale (Carskadon et al., 1993)





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## 'Night-Owls'

- More depression and anxiety symptoms (Chelminski et al., 1999; Gaspar-Barba et al., 2009; Gau et al., 2007)
- Greater emotional instability (Di Milia & Bohle, 2009; Kerkhof, 1985; Tankova et al., 1994; Tonetti et al., 2009)
- Suicidality (Gau et al., 2007)
- Aggressive and antisocial behavior, and rule-breaking (Goldstein et al., 2007; Susman et al., 2007)
- Poor self-regulation (Negriff et al., 2001)
- Greater use of alcohol and nicotine (Adan, 1994; Giannotti et al., 2002)
- Greater tendency for impulsivity (Adan, 1994)
- Some non-replications (Giampietro et al., 2007; Roberts et al., 1999)



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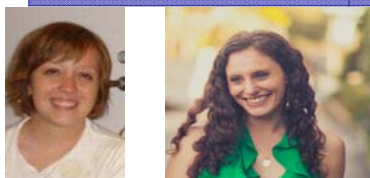
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Schoener & Harvey, in prep



## 'Night-Owl' at 11-18 yrs ...

	Predicts negative outcomes		Predates negative outcomes*	
	OR	95%CI	OR	95%CI
Emotional distress/depression	1.37	1.14-1.65	1.23	1.02-1.49
Suicidal thoughts/attempts	1.24	0.95-1.16	1.24	0.95-1.62
Criminal activity	1.40	1.15-1.17	1.33	1.09-1.63
Alcohol use	1.80	1.53-2.11	1.31	1.01-1.68
Drug use	1.92	1.64-2.25	1.61	1.36-1.91
Unsafe sexual activity	1.06	0.90-1.26	1.05	0.88-1.25



... at 18-24 yrs

McGlinchey, Asarnow, Harvey, submitted



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$p < .001$

## Current Research

- 'Night-Owls' who are 10-18 years old
  - Hypothesis: A 6-session intervention to reduce eveningness will improve *sleep* and reduce risk across *five health-relevant domains*
    - emotional (e.g., Mental illness)
    - physical
    - social
    - behavioral
    - cognitive



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## Session 6

### Top 5 Sleep Tips for Teens (P18\_11 yr F)

1. Light stops melatonin from being released, melatonin makes you sleepy. I need to be in dim light to get sleepy
2. Circadian rhythm is important because it is the body's natural rhythm for sleep. Respect the rhythm
3. Wake up at the same time everyday
4. Naps after school make sleep pressure go down, because your sleep pressure has to start all over again after a nap
5. Conditioning: don't do anything in bed, but sleep. Don't worry in bed
6. Worry and excitement keep you awake
7. If you can't get to sleep, get out of bed and read with a flashlight
8. Staying up later and waking up later on weekends gives you jet lag every single week



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## Zolpidem (Ambien) and Sleep-Dependent Cortical Plasticity

- Kittens (28-41 days postnatal)
- Medication to “increase/improve” sleep vs. placebo
- Zolpidem:
  - *Increased* NREM sleep 27%
  - *Increased* total sleep over the 8 hour period
  - *Reduced* cortical plasticity by 50%
- *Hypnotics that produce more “physiological” sleep based on EEG may actually impair critical sleep-dependent brain-processes during development*

Seibt J, et al. *Sleep* 31(10):1381-1391, 2008.



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## A Little about the Approach

- ‘Sleep coaches’ not ‘therapists’
- Intrinsic motivation
  - Youth identifies value of behavior change.
  - Motivation emanates from one’s self because of importance for his/her goals
  - Feels motivated
- Extrinsic motivation
  - Behavior change motivated by compliance to gain approval and security.
  - Feels anxiety and pressure

Self-Determination Theory  
(Deci & Ryan, 1985; 1991)



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## A Little about the Approach

- Youth as budding sleep scientist
  - *‘The only way I can get my homework done is to nap when I get home’*
  - Prediction: *‘After a nap I am better able to do my homework and the nap has nothing to do with my nighttime sleep’*
  - Experiment
    - 2 days do as you usually do (nap)
    - 2 days do the opposite (brainstorm what: exercise, sunlight, visit with a friend etc)
  - Text: feelings after nap, homework and sleep



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## Role of Parent/Carer

12-year-old boy

Leaves for school at 7.15am

Mom 3 x attempts to wake up over 1.5 hours  
(starts earlier because it takes so long)

Result:

Tornado dressing

Donuts and Vitamin water in the car

Stressed, anxious, angry



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## Parent

- Parents are our clients too: 'gate keepers' to youth accessing treatment
- Invite parents at the end of the session – depending on the age and dynamics of the family
- Or 2-3 phone calls across the treatment
  - ✦ Hand their son/daughter full responsibility for his/her sleep
  - ✦ Teen may request practical and/or emotional support for their home practice exercises



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## Individualized Practice Exercises

(rather than 'homework')

- Go to bed earlier by 20-30 minutes each week
- Reduce the gap between weekday and weekend bed and wake times
  
- Why might doing XX be helpful?
  - ❖ Make sure the rationale is collaboratively crafted and understood
- Are there any downsides to doing XX?
 

Obstacles?

  - ❖ Trouble shoot



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## Balance & Emphasis Flexible!

Valuing sleep  
But NOT getting anxious about sleep



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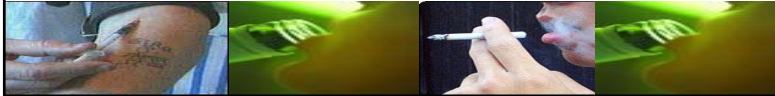
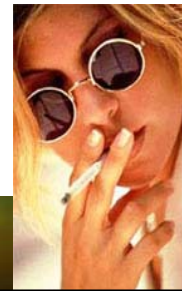
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## Next Steps? Go into School!

With Dr. Emily Ozer (Co-PIs; R34; NIDA)

- Adolescent substance use is prevalent
- Insufficient sleep in youth predates and predicts substance use
- Caffeine, tobacco and other stimulants used to manage daytime sleepiness
- Alcohol and marijuana used to induce sleep
- Goal: Develop & evaluate a school based prevention program to improve sleep and thereby prevent onset of teen substance related problems ... & Youth as Co-Is



## Conclusions

- Sleep disturbance is an important contributor to emotional dysfunction and mental illness



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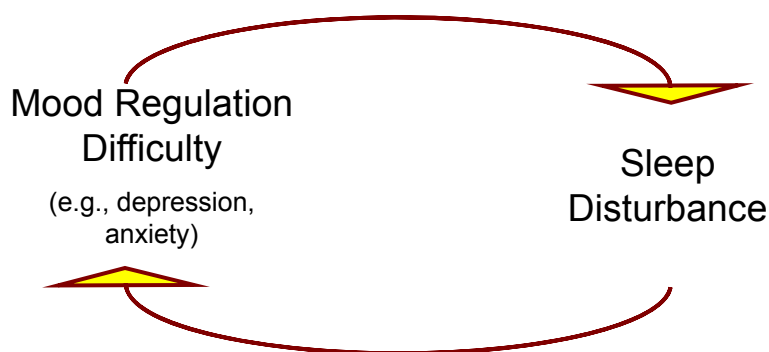
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## Bi-Directional Mutual Maintenance



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## Conclusions

- Sleep disturbance is an important contributor to emotional dysfunction and mental illness
- Treating sleep disturbance, given high prevalence, may have wide reaching public health implications:
  - Improving sleep improve the **functioning** and **quality of life**
  - A sleep treatment may also **reduce symptoms** and processes of **comorbid psychiatric disorders**
- Likely applications to other mental illness (ADHD, etc.)
- Simple powerful approaches
- Need more research and more researchers to help!



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