

Sleep Health and Youth Suicide Prevention: Methods, Findings & Future Directions

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University of Pittsburgh		X	

Agenda

- Why Sleep?
- Methodological Considerations
- Recent Studies / Findings
- Future Directions

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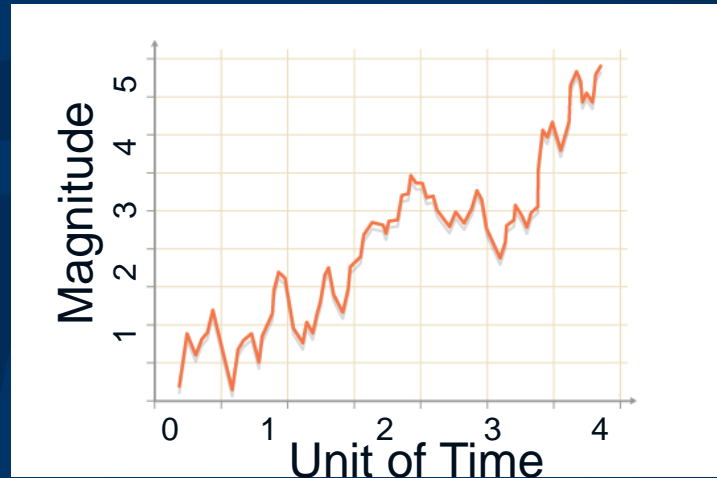
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Optimal Targets for Suicide Prevention are:

1) Proximal



2) Dynamic



3) Modifiable



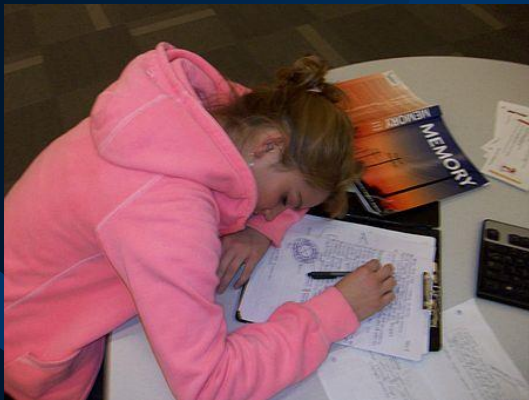
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1) Proximal

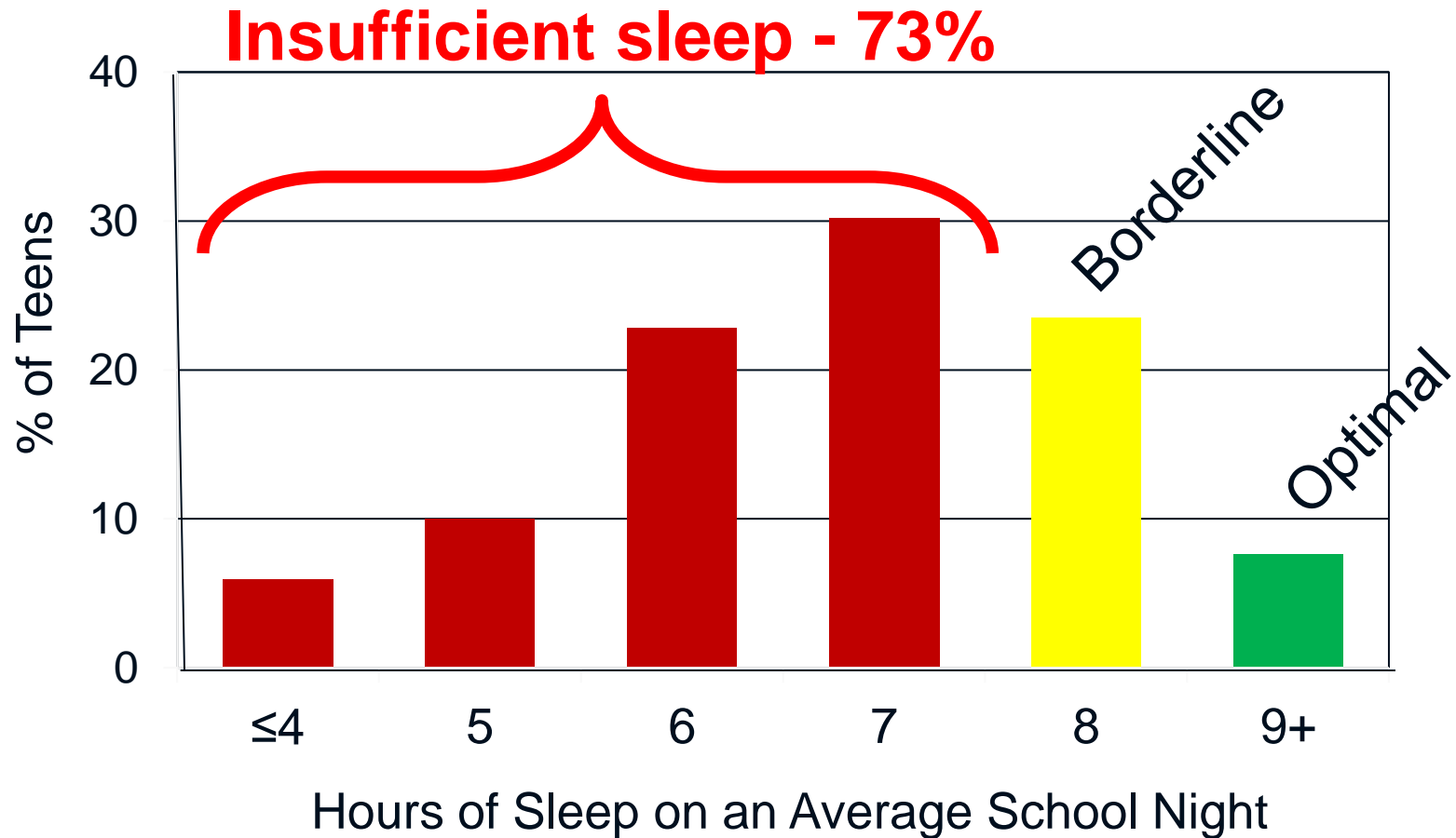
2) Dynamic

3) Modifiable

...LIKE SLEEP?!



Epidemic of Sleep Deprivation in US Teens (age 14-18)



The Sleep-Suicide Association: What Do We Know?

	Death by suicide	Suicide attempt	Suicidal ideation	Non suicidal self-injury
Insomnia	X	X	X	X
Nightmares	X	X	X	X
Poor sleep quality	X	X	X	X
Short sleep	X	X	X	
Long sleep	X		X	
Sleep variability/Weekend “catch up” sleep		X	X	X
Hypersomnia		X	X	
Eveningness		X	X	
Sleep apnea			X	
Daytime sleepiness			X	
Circadian reversal		X		
Regular sleeping pill use	X			

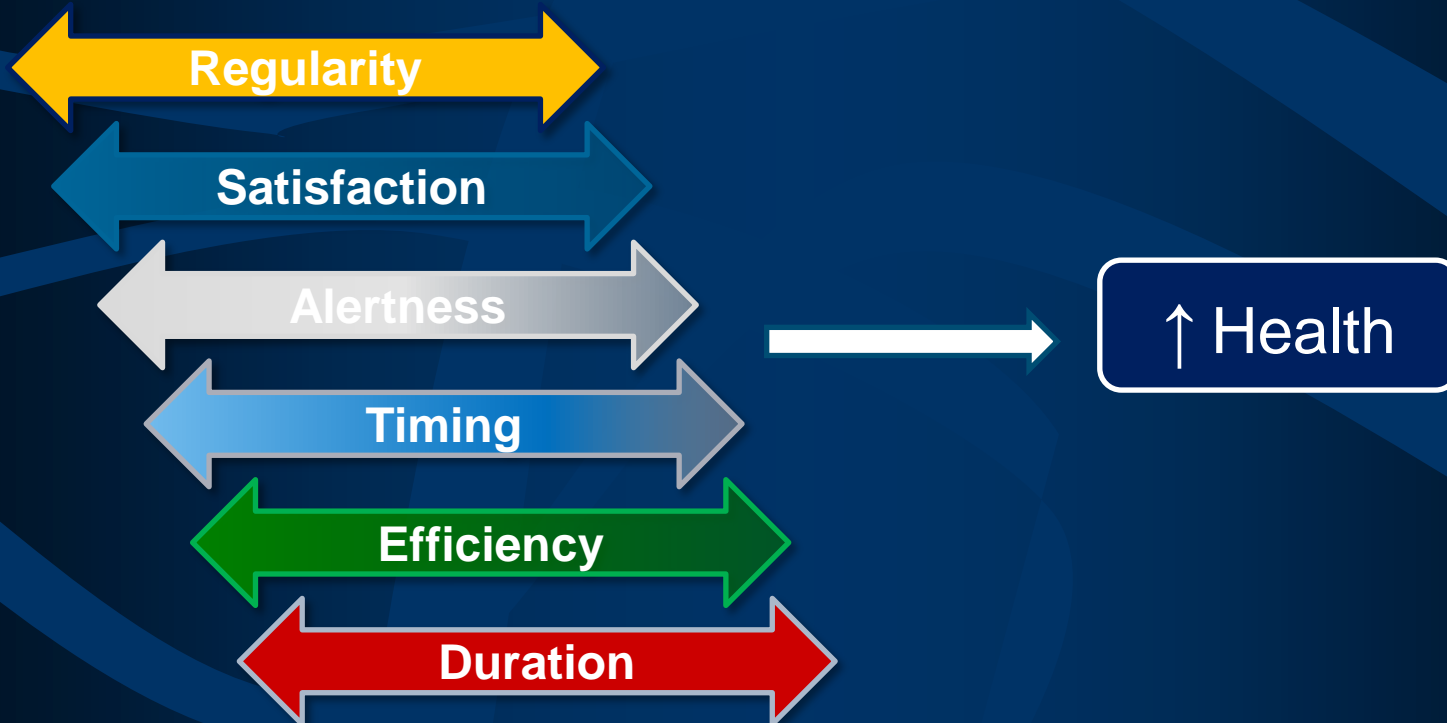
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- Next Steps

Which Aspect(s) of Sleep Matter? Applying the Sleep Health Framework

Sleep health is a multidimensional pattern of sleep-wakefulness, adapted to individual, social, and environmental demands, that promotes physical and mental well-being.



How to Measure Sleep?

“Objective” vs Subjective Measures



Wearables



Sensitive for sleep
Poorly specific for wake
Various scoring algorithms
Best combined with sleep diary

Retrospective self-report

Recall bias
Specificity of sleep constructs?



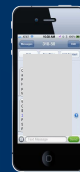
Mobile Sensing

Ubiquitous
Unobtrusive
Validity?
Acceptability?



Daily self-report/EMA

Poor sleepers overestimate sleep problems/ good sleepers underestimate
Adherence
Prompts per day

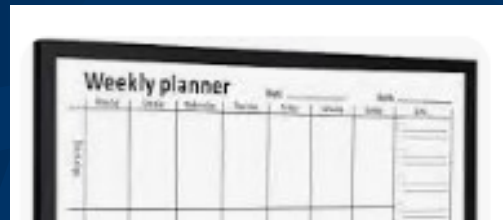


...Over What Timeframe Does Sleep Affect Suicide Risk?

Days?



Weeks?



Months?



Sleep difficulties are:

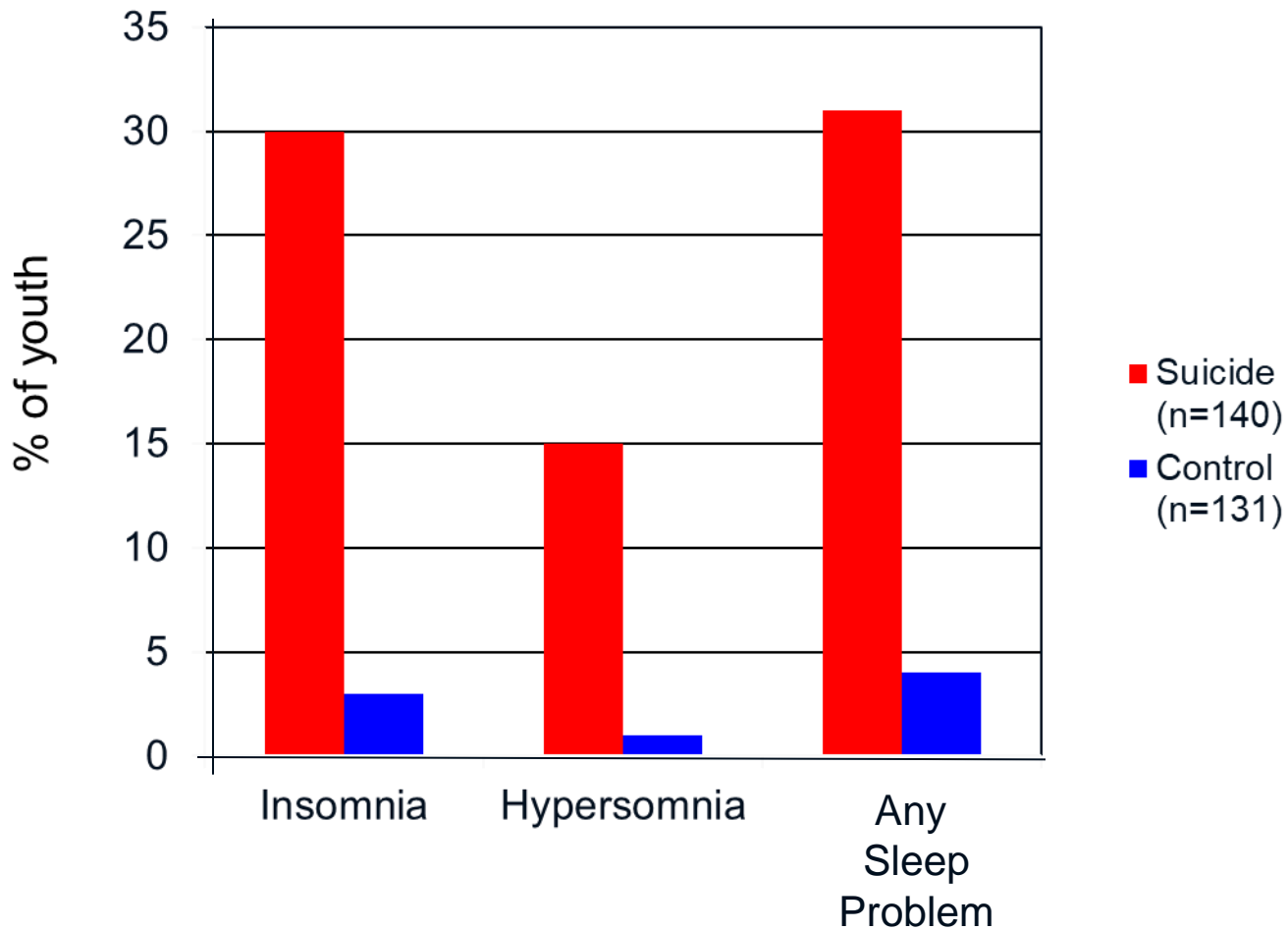
- ✓ Acute
- ✓ Chronic
- ✓ Cumulative

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Greater Rates of Sleep Disturbance in the Preceding Week Among Youth who Died by Suicide vs. Controls



Examining the prospective association
between sleep health and suicidality in
adolescents and college students
at ultra-high risk for suicide



Funded by: The American Foundation for Suicide Prevention
The University of Pittsburgh Clinical and Translational Science Institute

STAR IOP

Adolescents
age 13-18
(n=50)

Co-STAR IOP

College Students
age 18-24
(n=20)

Baseline

1-month

2-month

3-month

Clinical Assessment
Suicidality
Related risk factors



Daily Actigraphy

Objective sleep health

91%



**Daily Cellphone
Ratings**

Suicidal ideation / behavior
Subjective sleep health

84%



**Weekly Clinical
Ratings**

Related risk factors
eg, substance use

Does Last Night's Sleep Predict Suicidal Ideation Today?



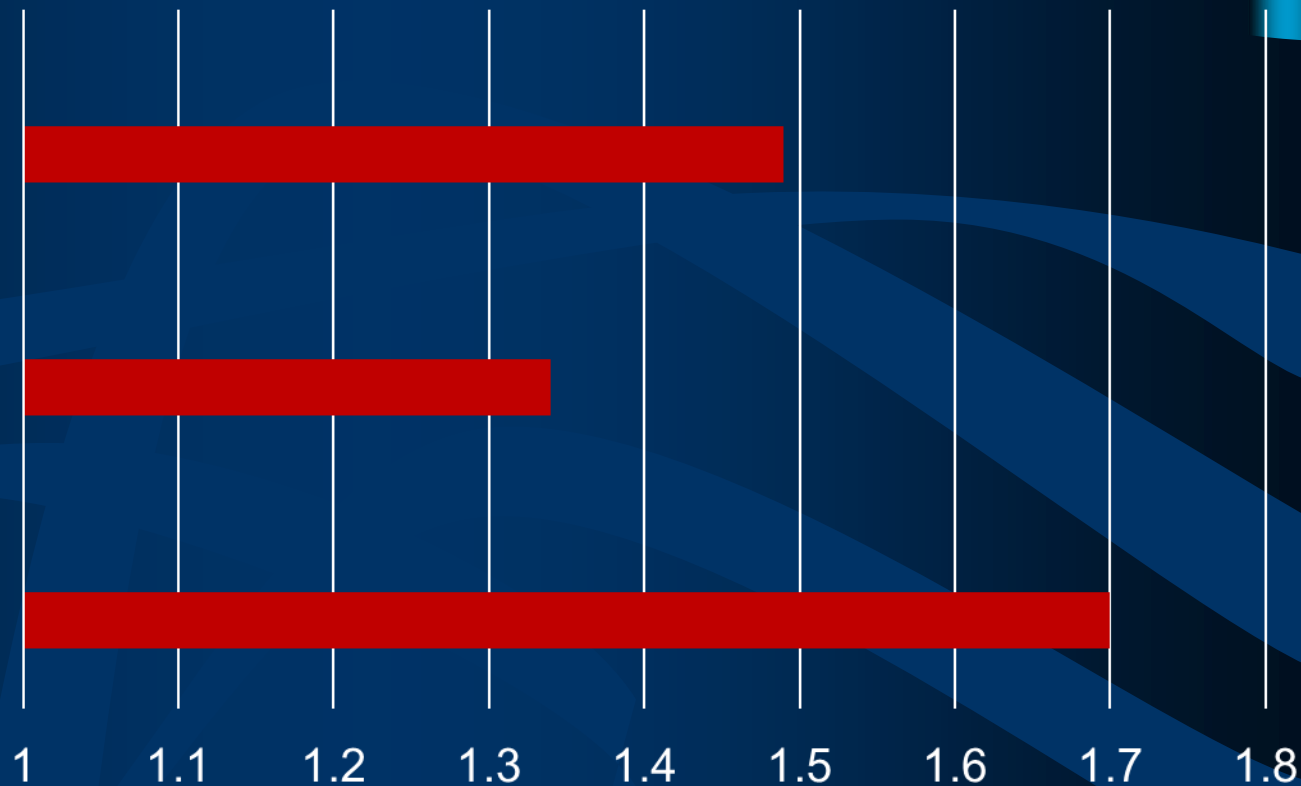
Sleep Onset Latency



Sleep Quality



Nightmares



Standardized Effect:
Odds Ratio for Next Day Suicidal Ideation

HOW Does Sleep Disturbance Contribute to Adolescent Suicide Risk? Examining Mechanisms

Positive and Negative Interpersonal Events

Messages 9:48 AM research.psychiatry.upmc.com

How enjoyable/pleasant was your most positive event (had fun/was complimented) today?

Not at all enjoyable | Extremely enjoyable

Who did this positive event involve? (Select all that apply)

- Family
- Peers
- Other adults



Messages 9:47 AM research.psychiatry.upmc.com

How stressful/upsetting was your most negative event (conflict/excluded/insulted) today?

Not at all upsetting | Extremely upsetting

Who did this negative event involve? (Select all that apply)

- Family
- Peers
- Other adults



HOW Does Sleep Disturbance Contribute to Suicide Risk in Adolescents?

Reactivity to Interpersonal Events

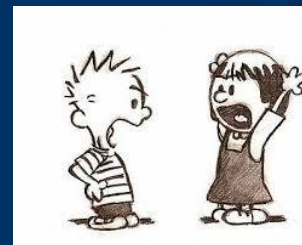
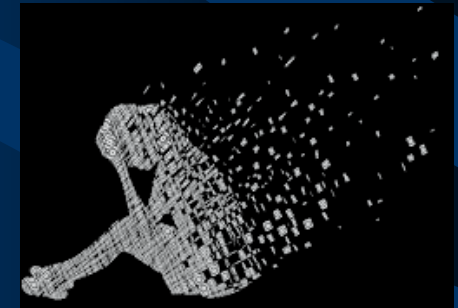
Less sleep & Poorer quality sleep



Reactivity to interpersonal events



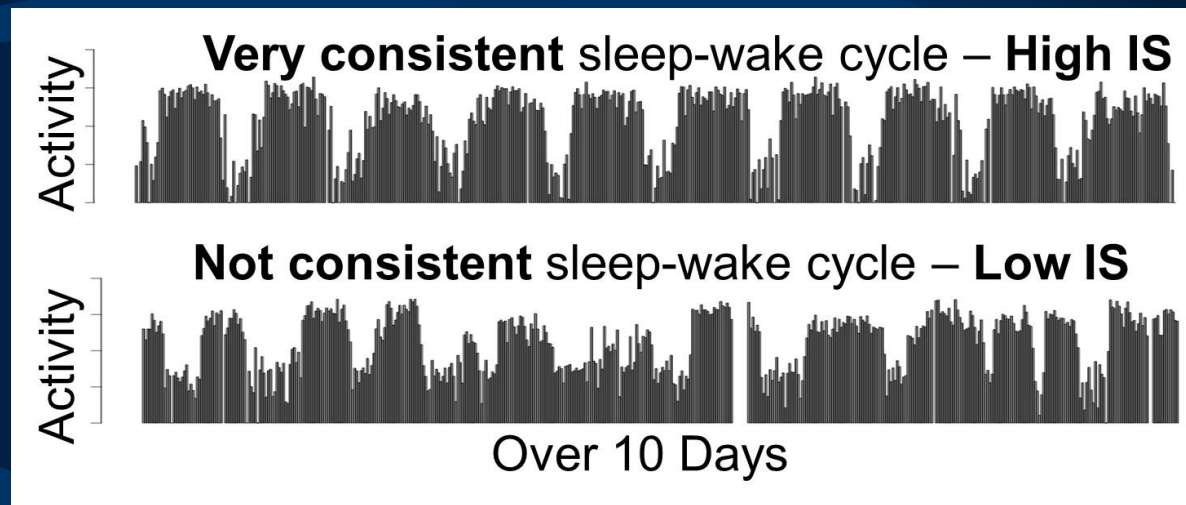
Suicidal ideation



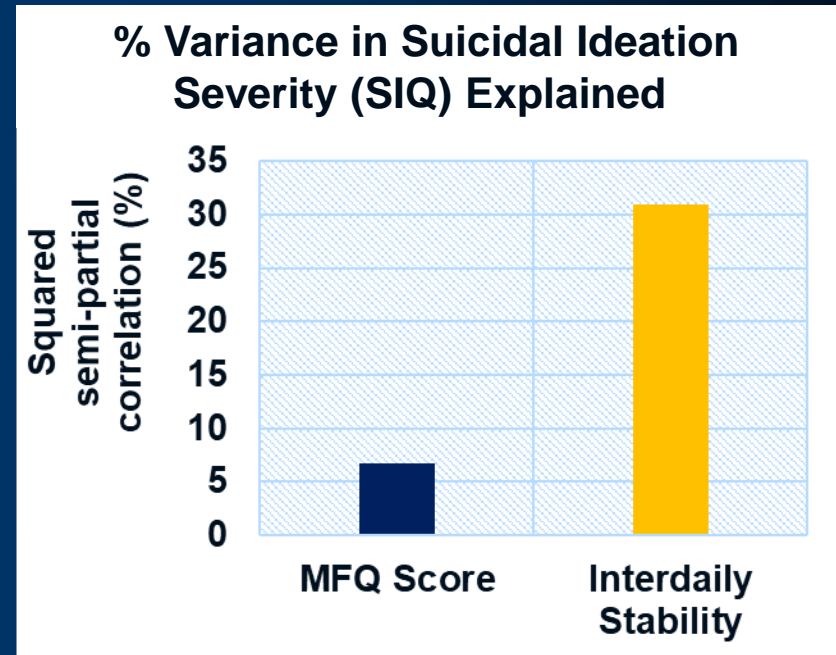
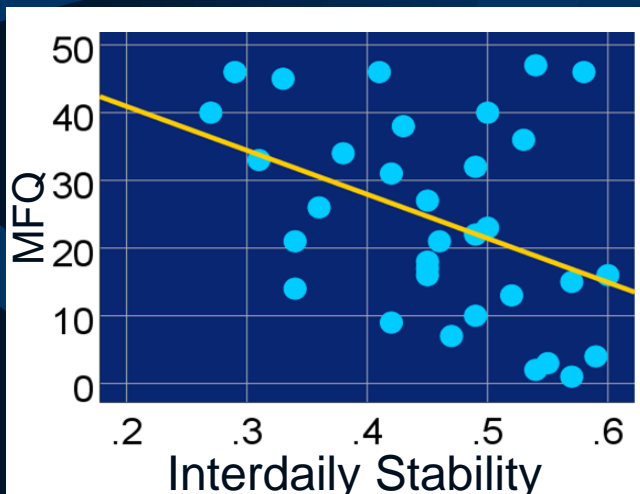
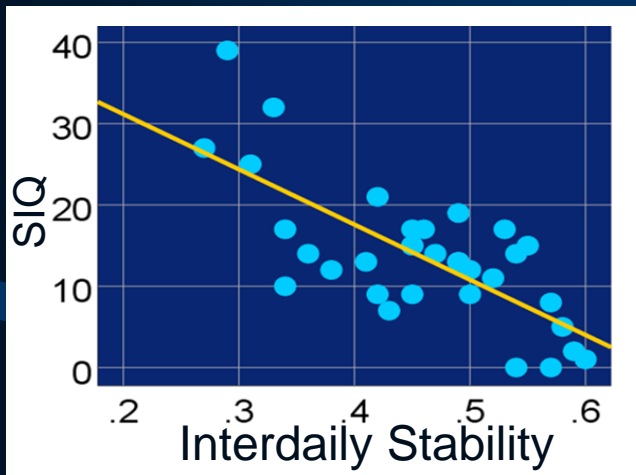
Rest-Activity Rhythms Among Youth with Bipolar Disorder

- Youth ages 12-18 (n=33) diagnosed with Bipolar spectrum disorder
- Actigraphy collected for ~ 2 weeks
- Calculated 'non-parametric' rest-activity rhythms
(Van Someren et al 1999; Mitchell et al 2018)

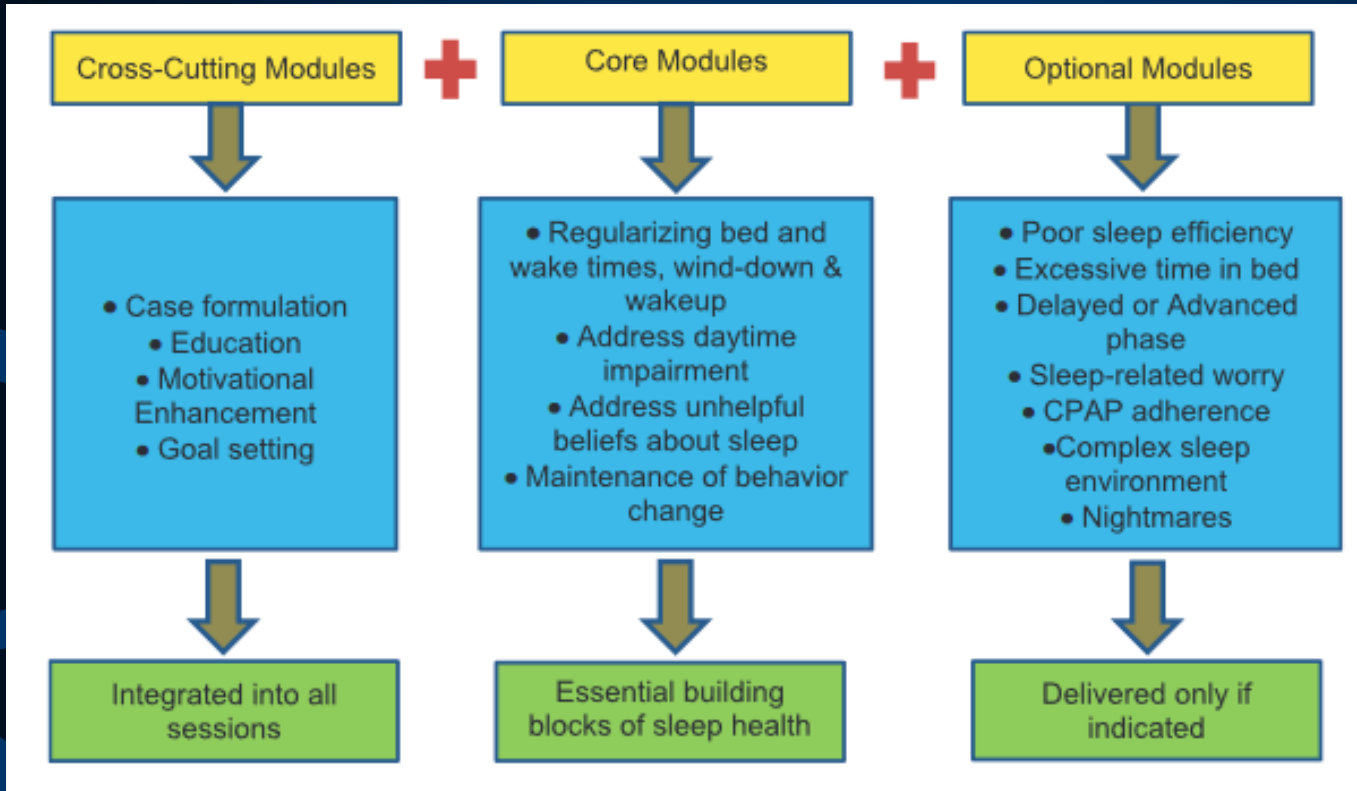
IS: Interdaily stability



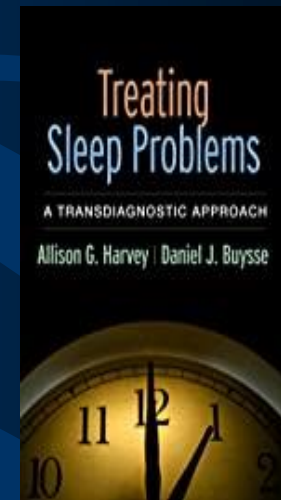
Lower Interdaily Stability (IS) Associated with More Severe Suicidal Ideation and Depressive Symptoms in Youth with Bipolar Disorder



Transdiagnostic Intervention for Sleep and Circadian Dysfunction (TSC / TranS-C)



Harvey 2022



Harvey & Buysse 2017

- Youth with evening chronotype, age 10-18 (n=176; Dolson et al 2021)
- ADHD (n=14, ages 13–17; Becker et al 2022)
- Adults with serious mental illness in community care settings (n=92; Harvey et al 2016, 2021)

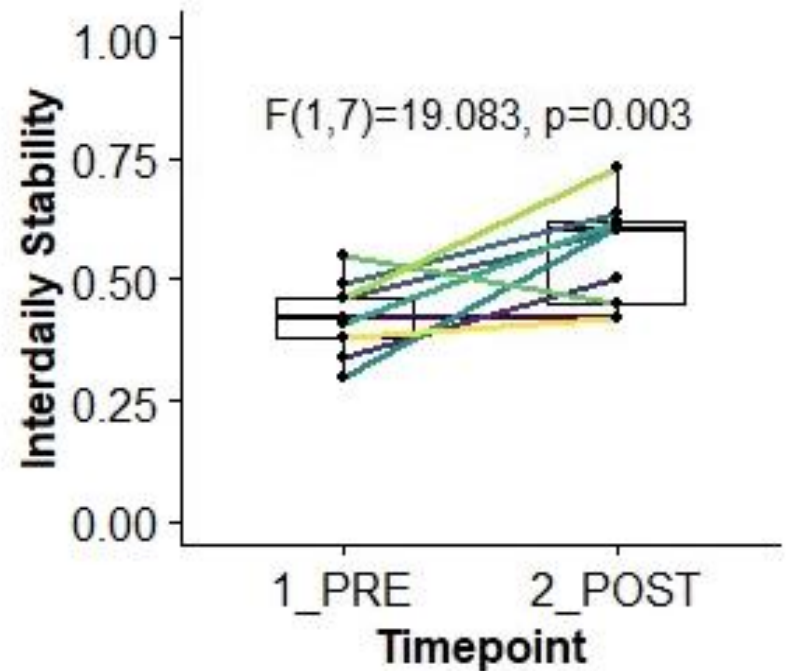
Open Pilot Study: Transdiagnostic Intervention for Sleep and Circadian Dysfunction (TSC) for Suicidal Adolescents

- Depressed and suicidal adolescents (n=20; age 13-18)
- TSC adjunct to IOP (M=5.1TSC sessions)
- Daily diary + Actigraphy
- Increase am light (Re-Timer) & decrease pm light (Blue Blockers)



- Next steps: RCT (ETUDES P50)

Actigraphy-derived interdaily stability improves from pre- to post-TSC



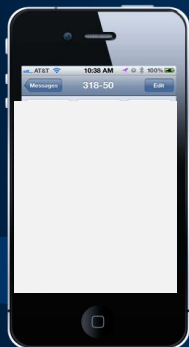
Williamson et al 2022
P50 MH115838

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Promising Strategy for Suicide Prevention...?



Real-time monitoring of sleep health



Low risk

Ongoing individualized evidence-based sleep promotion strategies

High risk



Alert providers, parents



Prompt teen to use skills and safety plan

HOW Does Sleep Disturbance Contribute to Adolescent Suicide Risk?

Distal Factors

- Psychopathology
- Substance Use
- Family History
- Hopelessness
- Non-Suicidal Self-Injury
- Sexual/Gender Minority
- Emotion Dysregulation
- Family conflict
- Trauma
- Suicide attempt history
- Physical illness

Proximal Factors

Poor Sleep Health

- Short / Long Duration
- Late Timing
- Timing / Duration Variability
- Low Efficiency
- Poor Satisfaction / Quality
- Low Daytime Alertness

Neural Changes

- Cortico-limbic
- Cortico-striatal circuits

Affective / Behavioral Dysregulation

- Emotion Dysregulation
- Increased stress reactivity
- Impulsivity
- Blunted reward sensitivity
- Poor problem solving
- Interpersonal conflict
- Social withdrawal
- Substance use

Suicidal Outcomes

Developmental Changes (Biological & Psychosocial)

Conclusions

- Why Sleep?
Proximal, Dynamic, Modifiable risk factor for suicide
- Methodological Considerations
Defining and measuring sleep health constructs
Considering timeframes
Defining suicidal outcomes
- Recent Studies / Findings
Prospective, longitudinal multi-method with high-risk samples
Behavioral intervention targeting sleep among suicidal youth
- Future Directions
Just in time interventions
Underlying mechanisms

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