


Teens & Sleep

LINKING DISCOVERY, PRACTICE, AND POLICY

Sleep, Caffeine Use, and Social Media

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Relaxation Drinks: The Opposite of Energy Drinks *(WSJ, October 1, 2013)*

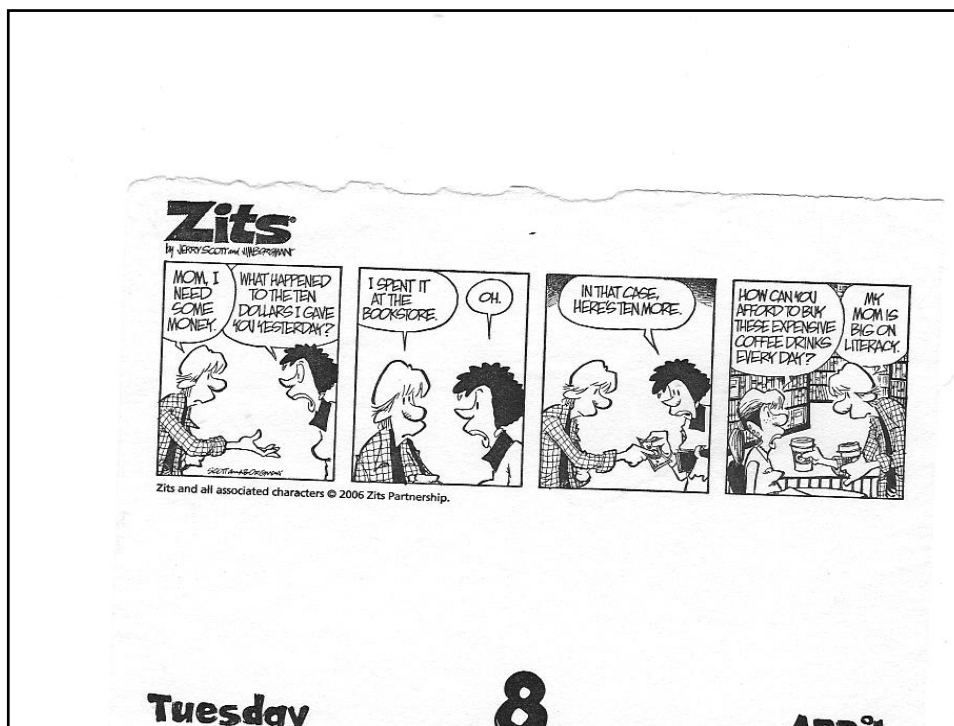


- Developed in 2012
- Not FDA approved
- Others: Neuro Bliss, Marley's Mellow Mood
- ? Healthier than soda
- Many have L-theanine, Ginkgo, etc. herbs

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Starbucks rethinks stance on young customers

Company acknowledges teens & children part of market base

www.msnbc.msn.com/id/20608492/ns/business-us_business/t/starbucks-rethinks-stance-young-customers/#.T8tejY7BBUQ



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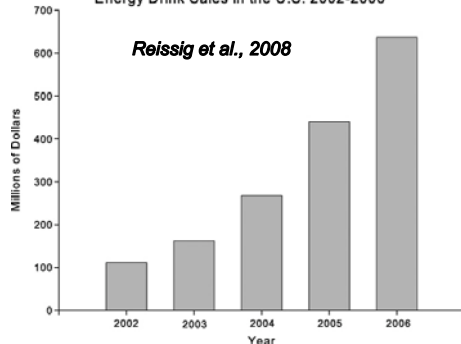
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www.msnbc.msn.com/id/20608492/ns/business-us_business/t/starbucks-rethinks-stance-young-customers/#.T8tejY7BBUQ



- Energy drinks marketed specifically to teens with Ads featuring high risk activities & **extreme sports, such as rock climbing, parasailing, & skiing**
- Catchy slogans: **“Red Bull gives you wings”** **“Excite your sense”** (Miller, 2008).

Energy Drink Sales in the U.S. 2002-2006



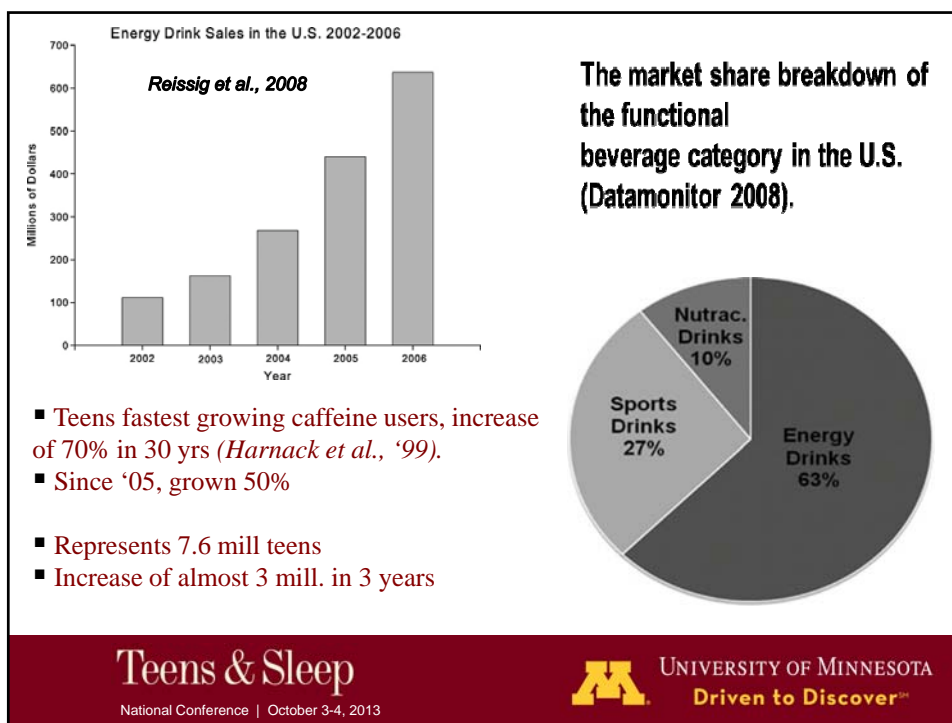
- Teens fastest growing caffeine users, increase of 70% in 30 yrs (Harnack et al., '99).
- Since '05, grown 50%
- Represents 7.6 mill teens
- Increase of almost 3 mill. in 3 years

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What Is An Energy Drink?

- Beverages that contain caffeine in combo with other ingredients - taurine, guarana, B vitamins.
- Purported to provide “teens” with extra energy.**
- Term created by companies in the beverage industry; **not recognized by FDA**
- Started in Japan, Taisho Pharmaceuticals: Lipovitan-D in 1962
- Contained mix of B1, B2, B6 vitamins, along with niacin& taurine, metabolic agents intended to boost energy & concentration.
- “Tonic drinks” grew in popularity in Asia
- 1987: Austrian, Dietrich Mateschitz added **caffeine & sugar** to create...
- Red Bull**, quickly became popular in Europe...US.....



Reasons and Expectancies for Caffeine Use

Method

197 9th – 12th graders
 51% females
 71% caucasian
 Suburban high school
 SST: 7:25am
*Health and Sleep Habits
 Survey*



Ludden & Wolfson, *Health Education & Behavior*, 2010

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Results

- 95% used caffeine during last 2 weeks
- 86% used caffeine yesterday
 - 61% soda
 - 19% coffee
 - 6% energy drinks
 - 4% tea
 - 8% other caffeine products
- Typically used 5 – 9 pm
- Males drank soda & energy drinks more often than females

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Caffeine Expectancies & Reasons for Use

- Cluster analysis revealed 3 patterns of use:
 - *mixed use* (n= 51)
 - *high soda use* (n=72)
 - *low caffeine use* (n=65)

Ludden & Wolfson, 2010

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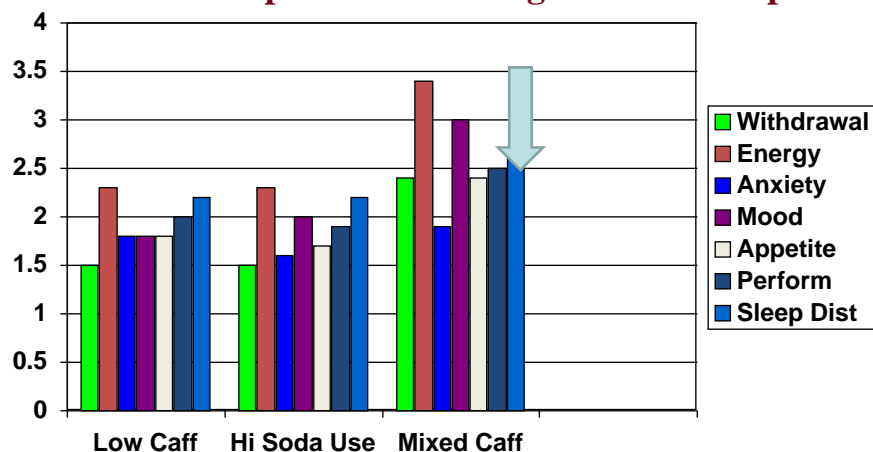
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Caffeine Expectancies & Reasons for Use

- Cluster analysis revealed 3 patterns of use:
 - *mixed use* (n= 51)
 - *high soda use* (n=72)
 - *low caffeine use* (n=65)
- Mixed group:
 - Use soda or coffee 6 - 9 X in 2 weeks.
 - Use caffeine **earlier in day**, consume **more caffeine pills**, wake up earlier on school days, report **more sleepiness**.
- Mixed vs. High Soda users:
 - More likely to use caffeine **to get through the day**, have fun, experiment, and **expect more dependence symptoms and energy enhancement---**
 - More dependency-like behaviors!

Ludden & Wolfson, 2010

Caffeine Use Expectancies among Cluster Groups



Mixed Caffeine Group higher expectations for withdrawal, energy, mood, appetite, performance vs. other clusters, p 's < .001 (Ludden & Wolfson, 2010)

High School Focus Groups on Caffeine and Sleep

Revealed coffee & energy drinks as most popular!

Girls more attracted to diet coke, coffee, iced coffee, whereas boys more energy drink use.

Ludden, Hayaki, & Wolfson, unpublished

Energy drinks/coffee were consumed to escape daytime sleepiness, but also mentioned that it prevented them from being able to fall asleep at night.

"I think you need it when you have had like zero hours of sleep. Coffee I feel like just wakes you up in the morning. Five hour energy shot is like key for me."

"A couple of years ago like I use to try Monsters but I never felt anything like I never felt alert or anything. But then when I would try to go to sleep at night I couldn't sleep."

"Some people just instantly think, oh if I drink coffee I'll be wide awake all day."

Timing: If you do drink coffee do you drink in the morning or at night?

"Morning or like when I'm going to work or after school."

"Yeah it's situational depending on if I'm going to school or going to work or something that requires me actually to stay focused and awake."

Caffeine Inhaler!

- Each puff 100 mg caffeine, equivalent to tall mocha at Starbucks (6 to 8 shots)
- March '12: FDA issued warning letter to *Breathable Foods Inc*, makers of AeroShot, for false/ misleading statements in labeling; questions about safety of “caffeine inhaler.”
- FDA expressed concern about use of AeroShot by children/ adolescents and in **combination with alcohol.**
- Company’s Web site indicates AeroShot “not recommended for those under 18 years of age,” product label states “not intended for people under 12.” **But Web site targets youth!**



AEROSHOT

ARE OR WHAT ARE THE CONSEQUENCES?

R. Griffiths (Johns Hopkins School of Medicine, 2008):

“Caffeine is the most common mood altering drug in the world”

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Caffeine and Sleep...

- Reduces SWS
- Increases sleep onset latency and night awakenings
- Decreases sleep efficiency
- Decreases sleep duration
- Increases morning sleepiness
- Negative impact on sleep quality
- Moderate - High vs. Very Low HS caffeine users **1.9 times more** likely to have difficulty sleeping!
- **1.8 times more** likely to report morning sleepiness!
- Caffeine disrupts (increased WASO) sleep for larks > owls in college sample.

James, et al., 2010; Orbeta et al., 2006; Pollak & Bright, 2003; Hernandez et al., 2012

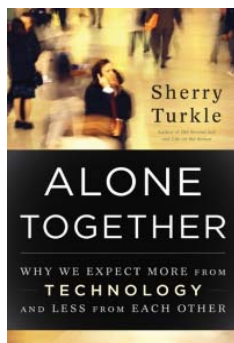
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- “But if we are always on, we may deny ourselves the rewards of solitude,” S. Turkle
- Question: and rewards of sleep?
- Have Facebook, texting, smart phones, etc. “eroded the boundaries between work and leisure?”
- **Or, in sleep terms– between wake states and sleep states?**

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An iPad for every student?**What Los Angeles school district is thinking.**

The Christian Science Monitor (8/28/13): Los Angeles Unified School District is passing out iPads to all 650,000 of its students this fall, part of a \$1 billion high-tech investment. Whether that's a smart move depends on teacher training and a host of other factors, experts say.....

LA Times (9/30/13): You just had to see this coming. Los Angeles is temporarily pulling the plug on plans to let students take home iPads issued by the school district. In a surprise move, tech-savvy teens cut through district security like a hot knife through butter, allowing them to check out websites, chat on Twitter or stream music, rather than stick to just school work...

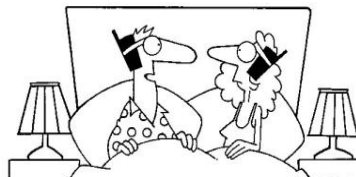
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? SLEEP



"With wireless sleep technology, the people in my dreams can send e-mail and faxes to the people in your dreams!"

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phone: (216) 371-8600 / e-mail: ft@funnytimes.com

Reflections...

- Many reasons why teens (WE) get insufficient sleep...
- Yet, precipitating factor is an often unappreciated, technological breakthrough: the electric light**more powerful than any** drug
- Without it, few teens would use caffeine to stay awake at night.
- Between 1950 and today, greater light consumption (cost fell 6-fold) paralleled rise in sleep deprivation.
- Energy efficient solid-state light-emitting diodes (LEDs) now widely used in TVs, computer/laptop screens, tablets, smart phones, further increasing light consumption.....**particularly in Teens and Emerging Adults**

Czeisler, Nature, 05/2013

Cell-Smart Phones, Computers, Tablets, Texting

- 78% of teens have cell phone
- 47% of those own smartphones – boys/girls (up from 23% in '11)
- Nearly 1 in 4 teens have tablet computer, comparable to general adult population
- 93% teens have computer/access at home
- 25% “cell-mostly” internet users — vs. 15% of adults
- 34% of girls (24% boys) ages 14-17 mostly go online using cell phone
- Nearly 50% 7th – 12th graders text - spending **at least** 1.5 hr/day text messaging
 - Over 3,000 messages/mo

Pew Internet '13; Nielsen, '10; Rideout et al., '10; Soderquist et al, '08

The sleep and technology use of Americans: Results from 2011 NSF Sleep in America Poll

Aim: to measure presence, use of technology on sleep across ages.

Method: 1,508 respondents, representative of the USA population between 13-64 yrs of age, completed the survey either via telephone interview (N=750) or the web (N=758)

Sample:

- Adolescents (13-18yrs)
- Emerging Adults (19-29yrs)
- Middle Age Adults (30-45yrs)
- Middle/Older Adults (46-64yrs)

Each age group was weighted to 2009 USA Census data.

Gradisar, Wolfson, Harvey, et al., in press

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Key Results

- **Usage:** 9/10 reported using technological device in hour before bed (e.g., TVs the most popular; 60%).
- **Under 30 vs. Over 30:**
 - ✓ were more likely to use cell phones (72% teens, 67% emerging adults) vs. over 30 yrs.
 - ✓ Adolescents & Emerging adults' sleep patterns significantly later across week.
- **Passive devices (TV, mp3 players) vs. More interactive (social) devices (computers/laptops, cell phones, video game consoles) in hour before bed,**
 - **Greater difficulties falling asleep ($p < .0001$)**
 - **More unrefreshing sleep ($p < 0.04$)**
 - ◆ Nappers (nap > 3 times past 2 weeks) more likely to use interactive devices before bed ($p = .009$), *suggesting overlap between napping & stimulating devices in predicting sleep patterns.* (Gradisar, Wolfson, Harvey et al., 2013)

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	Age 13-18	Age 19-29	Age 30-45	Age 46-64
Technologies Used in Hour Before Trying to Sleep	Cell phone (72%) Electronic music device (64%) Computer or laptop (60%) Television (54%) Video game console (23%)	Cell phone (67%) Computer or laptop (60%) Television (59%) Electronic music device (43%) Video game console (18%)	Television (61%) Printed book or magazine (52%) Cell phone (36%)	Television (62%) Printed book or magazine (46%)
Texting in Hour Before Trying to Sleep	56%	42%	15%	5%
Sleeping with Cell Phone Ringer on in the Bedroom	28%	38%	22%	12%
Awakened after go to bed few nights/week by text message or email	18% (9% every night)	20%		

Data from NSF Sleep in America Poll, 2011

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TV, Bedrooms, and Sleep

TV in Bedrooms

- **71%** of U.S. 8-18 year olds report TVs in bedrooms.
- Sleep-Smart low SES sample, 7th graders: **62% TVs in bedrooms** (40% shared bedrooms).



Sleep Patterns

- TV/Computer in Bedroom, Frequency of use, Duration of use tied to---
 - **More delayed** sleep patterns
 - Less time in bed, **shorter sleep duration**
 - Longer **sleep onset latency**
 - **More sleep problems** such as, night wakings...
 - Increased **daytime sleepiness**
- Teens who reduced TV viewing from > 1 to < 1 hr/day, ages 14 – 22, **reduced risk sleep probs** as emerging adults.

Rideout et al., '10; Cain & Gradisar, '10; Johnson et al., '04; Van den Bulck, '04; Richards, Wolfson, et al., '11; Alexandru et al., '06; Owens et al., '99; Adam et al., '07

INTERVENTIONS/ COUNTERMEASURES?

HEALTH EDUCATION
PREVENTIVE-INTERVENTIONS
POLICIES AND BANS



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Sleep-Smart Program Study

- 1: What is sleep? Why is it important? Basic sleep facts
- 2: Learn cool sleep habits
- 3: Where is sleep on your schedule and how much are you getting?
- 4: Consistent Sleep/Wake Schedules
- 5: Bedtime and morning routines
- 6: Monitoring sleep patterns and competence in obtaining sleep goals
- 7: **Caffeine Use**
- 8: Review and Commencement



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- 8: Review and Commencement
- ❖ *Sessions co-lead by BA-level Leaders*
- ❖ *SS teens kept sleep diaries during program*
- ❖ *Parents receive weekly newsletter reviewing and reinforcing curriculum*



Design: *Using cluster sampling, 7th graders from 2 urban, public, New England schools (SST = 8:37am) assigned to Sleep-Smart (SS) Program or Comparison group*

Table 1	Sleep Smart	Comparison
Baseline (Time 1)	2-3 weeks before Sleep-Smart program (7 th)	Baseline
Post-Intervention (Time 2)	8-10 weeks later/post-Sleep-Smart program (7 th)	8-10 weeks later (7 th)
	Boosters May/June 7 th grade	

Sleep-Smart: Results

Sleep Smart vs. Comp: Overall differences from T1 to T2, $p < .05$.

- Nearly 24 min more Sleep on school nights (weekends: nearly 10 min) vs. Comp. group who reported 12 min less TIB.
- **Improved Physiological Sleep Hygiene practices** (i.e., frequency of behaviors including activities before bedtime)
- **Marginal decrease in bedtime screen use!**
- **Less PM Caffeine Use!**
- Maintained Aver. English Grades whereas Comp. grades dropped significantly from T1 to T2.

Johnson, Harkins, Marco, Ludden, & Wolfson, 2012

Soda and Energy Drink Bans

- 2004: AAP statement re: ban sale of soda/ sweetened drinks to school-age children to stop childhood obesity epidemic.
- 2010: Majority US beverage companies ended sales of sodas in elementary schools, limited sales in high schools to diet sodas (American Beverage Association).
- May 2011:
 - AAP clinical report defined ingredients of sports & energy drinks
 - Discussed misuses and abuses
 - Encouraged
 - Screening during annual physical examinations for sports & energy drink use
 - Understanding reasons why youth consumption is widespread
 - Improving education aimed at decreasing/ eliminating inappropriate use of caffeinated beverages by children & adolescents

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Thank You!



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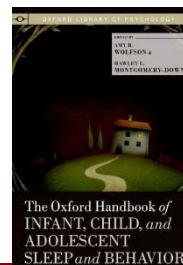
- NIH, NICHD, 5 R01 HD047928-06
- College of the Holy Cross Faculty O'Leary Award, Faculty Scholarship Award, Holy Cross Student Summer Research Fellowship Awards

Sleep-Smart Lab

- Michaela Sparling, BA, MSW
- Andrea Azuaje, BA, Brown Brothers Harriman
- Lizzie Harkins, BA, NIH
- Michaela Johnson, BA
- 2013-'14 Sleep-Smart Team: L. Chin, L. Bellerose, T. Henershott, M. Cook, T. Risakota

Collaborators/Colleagues

- Christine Marco, Ph.D., Rhode Island College
- Alison Ludden, Ph.D., College of the Holy Cross
- Jumi Hayaki, Ph.D., College of the Holy Cross
- Hawley Montgomery Downs, Ph.D., West Virginia University



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