



Disturbances in Children with ASD: Assessment and Treatment

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Specific Goals and Learning Objectives

- 1) Identify the topography and prevalence of sleep problems in ASD.
- 2) Develop an understanding of the medical, developmental and behavioral factors that contribute to the emergence and maintenance of these concerns.
- 3) Identify assessment procedures and behavioral treatment strategies for common sleep disturbance in ASD.

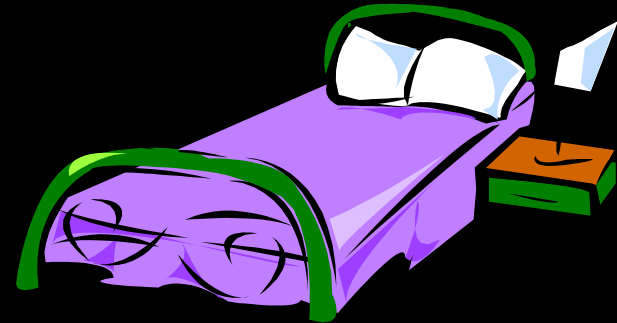
Autism Spectrum Disorders

- Neurodevelopmental disorder(s) of unknown genetic origin where symptoms unfold over the first few years of life:
 - *Impairments in socialization*
 - *Impairments in communication*
 - *Development of restricted interests, repetitive & perseverative behaviors, and need for sameness*

Beyond the Triad: Co-morbid Behavioral Concerns



Case Example



- R.E.
 - 7 year old male
 - History of difficulty falling asleep, as well as frequent waking
 - Established (Rigid) bedtime routine:
 - Soothing activities – Bath, books
 - Parent would then lie next to R.E. in bed until he fell asleep
 - Extreme tantrums: Crying, whining, disruption, and leaving the bed when parent attempted to leave the room
 - When he woke at night, he would go and wake parent and request that she return to his room or would request breakfast or play (if light – approximately 5 AM)
 - Impact on child and parent functioning throughout the day

Topography and Prevalence



- General Population: Between 20% to 40% of children have persistent sleep disturbances
- 50-80% of children with ASD display sleep problems that represent a major concern for caregivers (Richdale & Schreck, 2009 ; Souders et al., 2009).
- Behavioral insomnia in childhood (*International Classification of Sleep Disorders, 2nd edition*)
 - “Repeated difficulty with sleep initiation, duration, consolidation, or quality that occurs despite age-appropriate time and opportunity for sleep, and results in daytime functional impairment for the child or family”

Topography and Prevalence

- Trouble:
 - Falling sleep
 - Staying asleep
 - Poor quality of sleep -> Daytime sleepiness
- Results in behavioral, academic, and/or other daytime function
- Co-sleeping

Impact of Disrupted Sleep



Child:

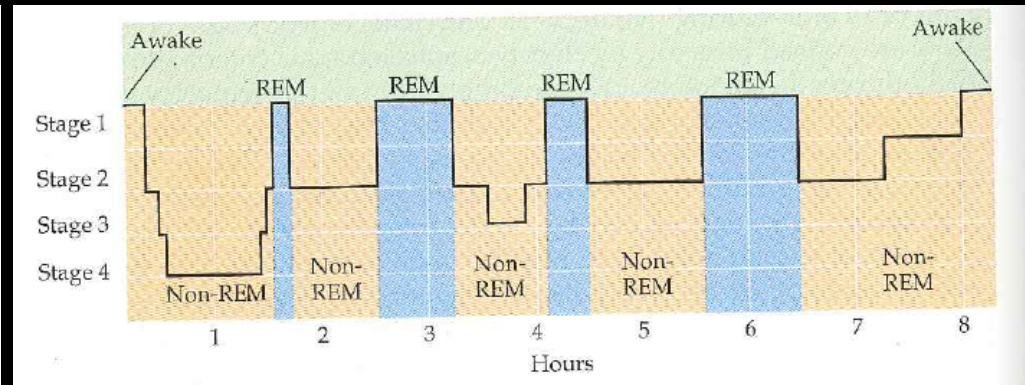
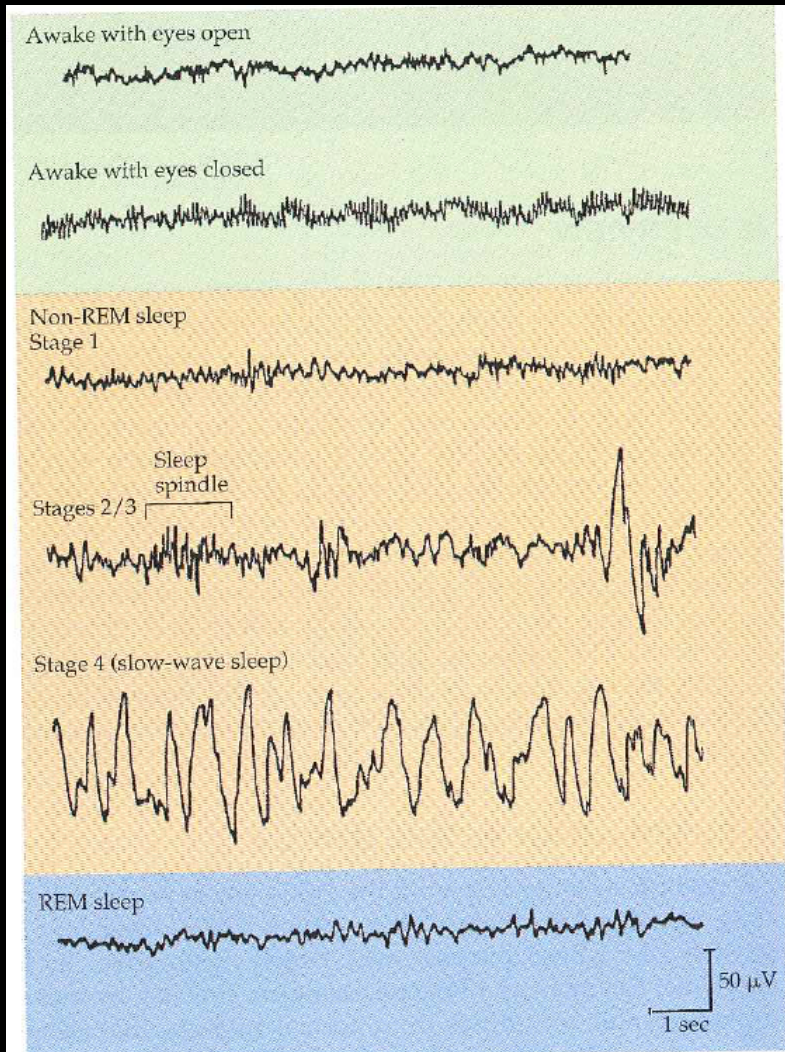
- Increase internalizing and externalizing problems
- Concentration difficulties
- Daytime sleepiness
- School performance
- Decreased response to intervention



Family:

- Parental stress
- Family tension/marital discord
- Maternal depression
- Maternal ambivalence
- Relationship between child and parent sleepiness

Sleep Cycle



Non-rapid eye movement (non-REM) sleep:
Resting brain / Active body (most reflexes intact) – Restorative.

REM sleep: Active brain / Resting body.

90 minute cycles followed by brief waking.

If sleep environment changes, this may interfere with falling back to sleep.

Typical Sleep Patterns/ Requirements

Sleep requirements and distribution of sleep stages vary by age:

- Change in ratio of REM vs. non-REM sleep:
 - Infants: REM = 50%
 - 12 months: REM approximately 20% to 25%
- Total hours needed declines:
 - Newborns: 13.2 hours (range: 10 to 18)
 - 2-year olds: 11.4 hours (range: 10 to 13)
 - Adults: 9 – 10 hours/night
- Napping:
 - Vary among individuals, cultural, and social factors
 - Most children stop napping by 5; few children require a nap past 6-7 years

Development of Sleep Patterns

- Sleeping through the night (midnight to 5 AM)
 - Occurs for most babies by 12 weeks
 - Failure to develop nighttime sleeping predictive of night waking
- Nocturnal awakenings normal part of the sleep process:
 - Infants (3 to 12 months) = 1.3 times per night
 - Toddlers (12 months to 3 year) = .73 times per night
- Infants fall into 2 general categories:
 - “self-soothers” – Return to sleep on their own
 - “signalers” – Require parental intervention to return to sleep

Types of Sleep Problems

- General categories of behavioral insomnia in childhood:
- 1.) Limit-setting type
 - Child stalls or refuses to go to bed
 - Crying, tantrums, or misbehavior at bedtime
- 2.) Sleep-onset association type
 - Inappropriate or maladaptive associations
 - Rocking, feeding, watching TV, parental presence
 - Associated with prolonged nocturnal awakenings
- 3.) Combined type
 - Significant parental difficulty with behavioral limit setting

Environmental Influence:

A - ANTECEDENT



B - BEHAVIOR



C - CONSEQUENCE

A - ANTECEDENT

Antecedent-based Interventions may involve:

- Identifying situations associated with challenging behavior
- Modify the environment to decrease probability of challenging behavior
 - Task demands, task presentation, length of engagement
 - Promotes contact with reinforcement

B - BEHAVIOR



“Gets upset when taken to the bathroom”

vs.

“Hits, cries, and flops on the floor when I try to take him to the bathroom”



“Does not sleep well at night”

vs.

“Wakes up 2 to 3 times per night and cries out for me”



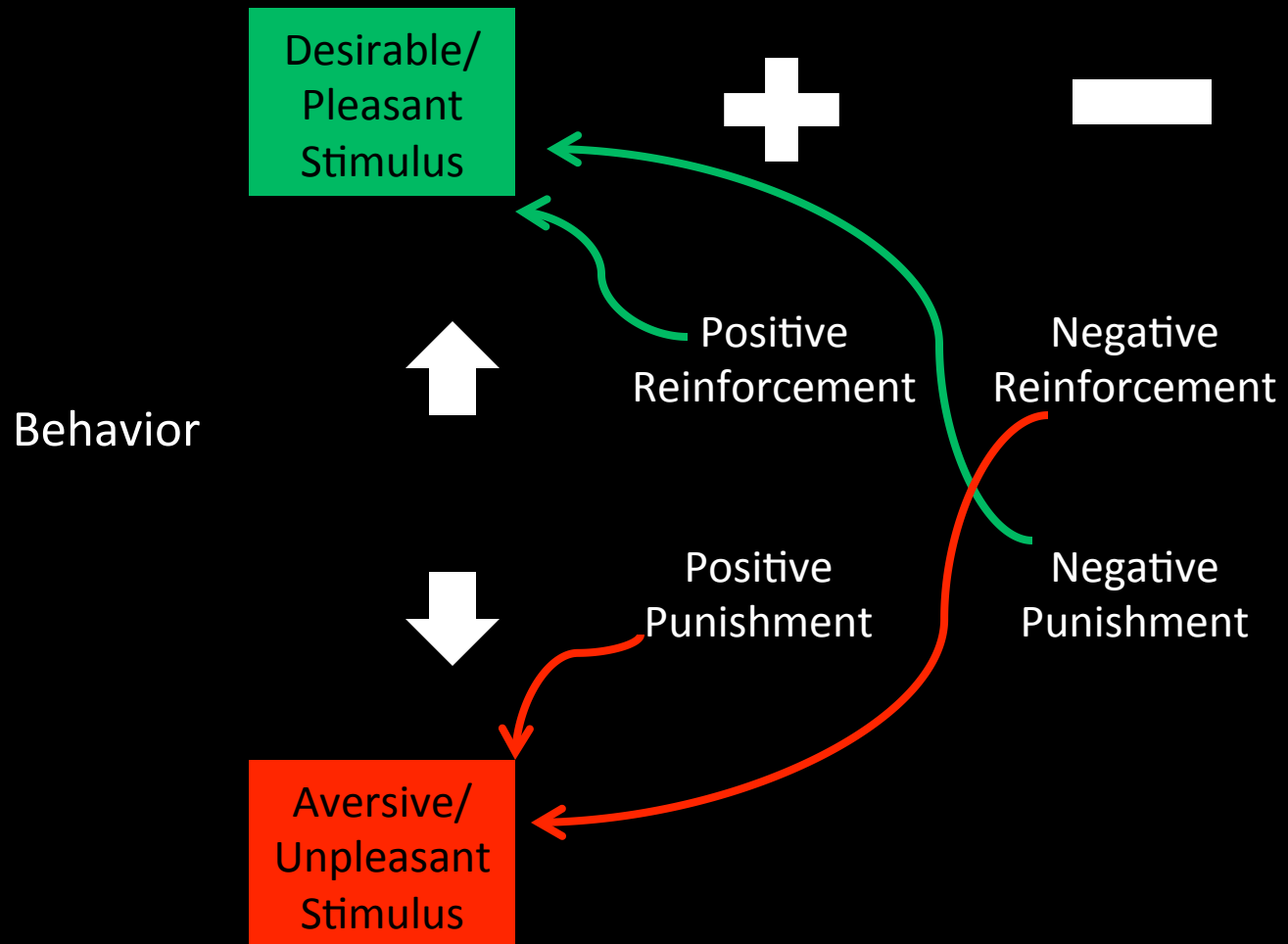
“Does not like new food”

vs.

“Pushes away the plate and leaves the table when new food presented”

C - CONSEQUENCE

Consequence



Key Points

- Once medically cleared.....
 - Assessment and intervention should focus on both the antecedents and consequences associated with a behavior
 - Antecedent interventions: Match demand with child's presentation
 - Promote contact with reinforcement
 - Stimulus fading beginning with a reasonable demand
 - Consequence Based Intervention
 - Consider the function of the behavior – **escape, avoidance, attention, access**
 - Reinforcement of alternative (more desirable) behavior

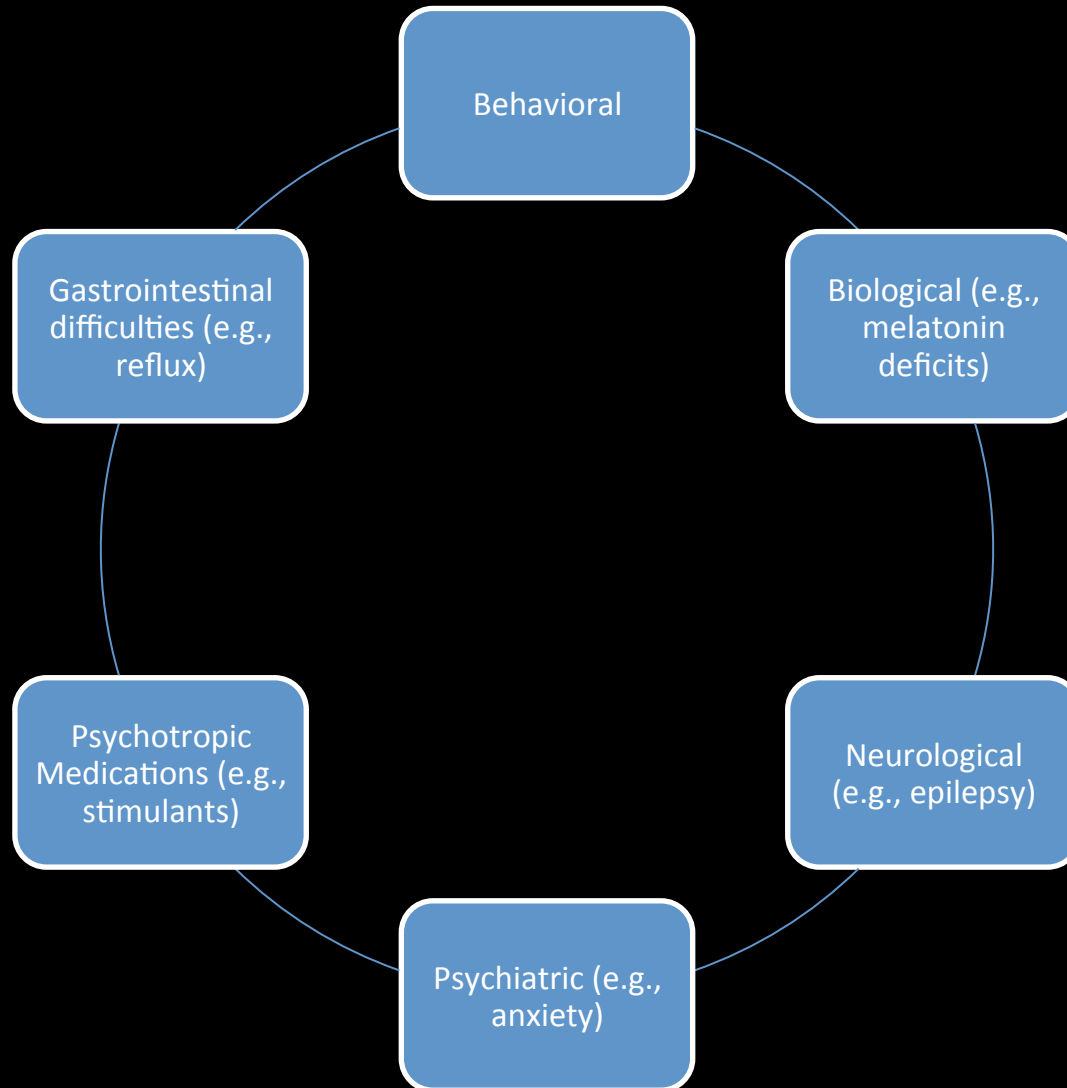
Behavioral Intervention for Sleep Difficulties in ASD



What would you do if you awoke and your..

- .. pillow was missing?
- .. hot?
- .. cold and sheet is missing?
- .. spouse/partner is not in bed?
- .. bed is gone?

Etiological Factors

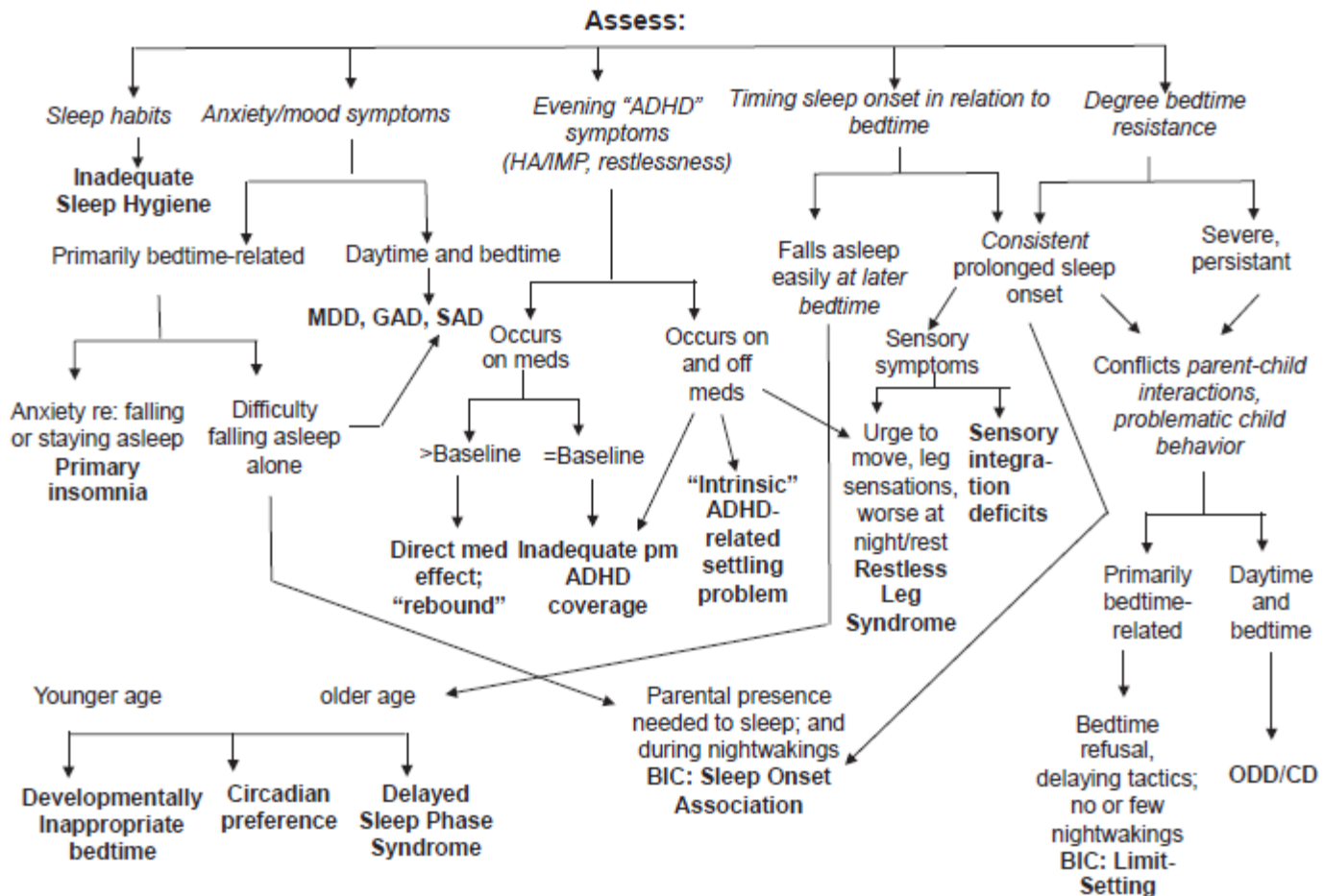


ORIGINAL ARTICLES

A Clinical Overview of Sleep and Attention-Deficit/Hyperactivity Disorder in Children and Adolescents

Judith A. Owens MD, MPH¹

Figure 1: Sleep and ADHD: Bedtime Resistance/Prolonged Sleep Onset



Sleep - Assessment

- Clinical interview:
 - Psychosocial history
 - Daytime functioning
 - Naps
 - Morning wakefulness
 - Activity level
 - Behavioral issues
 - Feeding Schedule

Sleep - Assessment

- Clinical interview:
 - Bedtime routine
 - Timing and consistency of bedtime activities
 - Child's behavior
 - Bedroom environment – Temp, cleanliness, co-sleeping, light and noise
 - Nocturnal behavior
 - Frequency, duration, and parent response to awakenings
 - Enuresis, nightmares, or night terrors

BEARS (Owens J, Dalzell, 2005)

- The questions vary for age and accordingly are directed at the parent, child, or both.
- Examples of items :
 - 1.) Bedtime problems: Does your child have any problems at bedtime?
 - 2.) Excessive daytime sleepiness: Does your child have difficulty waking in the morning, seem sleepy during the day or take naps?
 - 3.) Awakenings during the night: Does your child wake up a lot at night? Any sleepwalking or nightmares?
 - 4.) Regularity and duration of sleep: What time does your child go to bed and get up on school days? Weekends? Do you think he/she is getting enough sleep?
 - 5.) Sleep-disordered breathing: Does your child have loud or nightly snoring or any breathing difficulties at night?

Sleep Chart/Diary

- Provides a detailed, often visual, tracking of a 24 hour sleep-wake cycle
- Directions:
 - 1.) Put an X to mark the time you put your child to bed or to nap
 - 2.) Shade the time your child was asleep
 - 3.) Leave blank the times when he/she was awake
 - 4.) Put a U to mark the time your child got up in the morning or after a nap.

Caregiver worksheet - Routine

Bedtime Problems: Tracking the Bedtime Routine



We start getting ready for bed at __: __ PM

Then we.....

1.) _____

2.) _____

3.) _____

4.) _____

5.) _____

6.) _____

7.) _____

8.) _____

_____ falls asleep by __: __ PM

Actigraph



Device resembling a wristwatch that records activity patterns and can estimate sleep parameters

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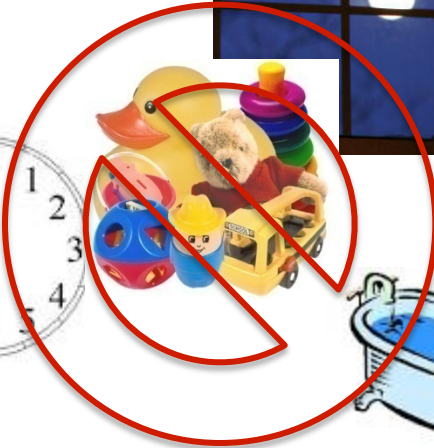
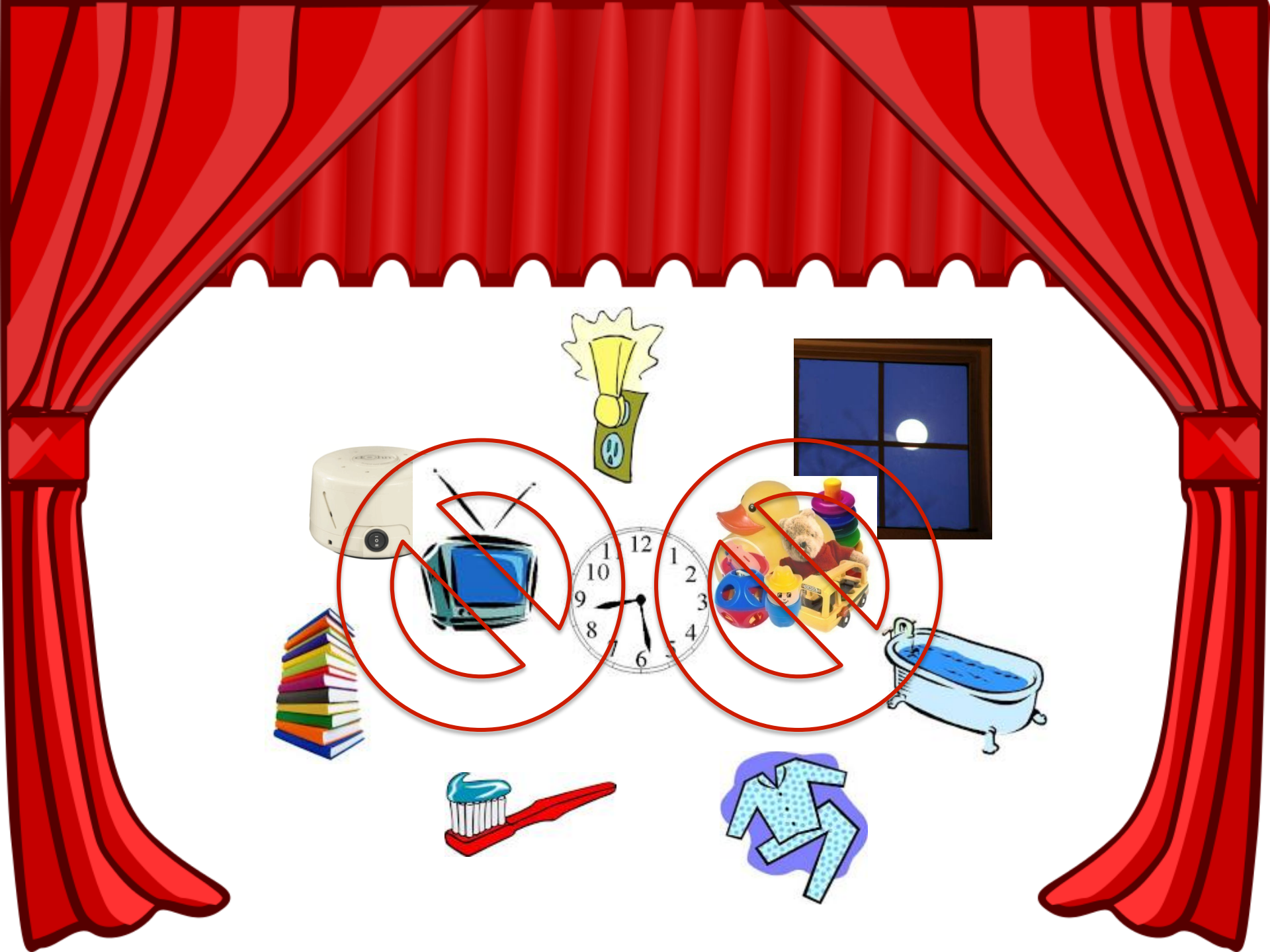
Judith A. Owens MD, MPH¹

Table 1: Behavioral Interventions for Sleep Problems in Children and Adolescents

- **Extinction:** elimination of parental attention as a reinforcer for undesired behaviors (i.e., protesting at bedtime)
 - **Unmodified extinction** (“cry it out” approach): parents put the child to bed at a designated bedtime, and then ignore protest behaviors such as tantrums until a preset time the next morning
 - **Modified or “graduated” extinction** (“Ferber method”, “sleep training”): a variety of techniques in which parents are typically instructed to ignore bedtime crying and tantrums for specified periods of time and which involve gradual shaping of appropriate behaviors and fading of interventions
- **Positive routines:** parents develop a set and consistent bedtime routine – quiet and calming activities that the child enjoys; last portion is preferred activity and takes place in sleeping environment
- **Bedtime fading:** temporarily delay of bedtime to ensure rapid sleep initiation; bedtime is then moved earlier by small increments (i.e., 15 minutes) over successive nights (“fading”) until pre-established bedtime goal is achieved
- **Sleep restriction:** limits the amount of time in bed to actual sleep time
 - Define optimal sleep length as goal
 - Set initial time in bed to current average total sleep time
 - Get up at the same time every day
 - Increase time in bed by small increments (15 – 20 minutes/week) when sleep efficiency (total sleep time/time in bed) is greater than 90%
- **Stimulus control:** reinforcement of the association between bed and bedtime with sleep rather than with wakefulness
 - Use bed for sleep only
 - Go to bed only when sleepy
 - If sleep onset (or waking during the night) is greater than 20-30 minutes, get out of bed and engage in a non-stimulating activity (i.e., reading a boring book) until drowsy
 - Avoid naps

Sleep hygiene and Positive Bedtime Routines

- Recommendations to set the stage for sleep:
 - Bedtime routine
 - Length
 - Activities (to do / avoid)
 - Consistency
 - Prompts
 - Bedroom environment
 - Clean room
 - Night light
 - White noise maker
 - Sense of possession



Medical Intervention

Melatonin Treatment:

- Doyen C, Mighiu D, Kaye K, Colineaux C, Beaumanoir C, Mouraëff Y, Rieu C, Paubel C, Contejean Y (2011) Melatonin in children with autistic spectrum disorders: recent and practical data. *Eur Child Adolesc Psychiatry* 20:231–239
- Gue´nole´ F, Baleyte JM (2010) Effectiveness of melatonin for sleep problems in autism spectrum disorders: evidence grows but research is still needed. *J Autism Dev Disord* 41:974–975

Behavioral Interventions

Procedures include:

- Standard/Unmodified Extinction
- Graduated Extinction/Progressive Approach
- Extinction with Parental Presence
- Bedtime Fading
- Scheduled Nocturnal Awakenings

Considerations:

- Extinction Burst
- Parent Adherence
- Family factors/living arrangements
- Child temperament

Behavioral Interventions for Sleep Problems in Children With Autism Spectrum Disorders: Current Findings and Future Directions

Jennifer L. Vriend,¹ BSc, Penny V. Corkum,¹ PhD, Erin C. Moon,¹ BA, and Isabel M. Smith,² PhD

¹*Department of Psychology, Dalhousie University, and* ²*Psychology, IWK Health Centre*

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“Despite these advantages, behavioral interventions are not offered to families of children with ASD as frequently pharmacological treatments.”

“Unfortunately, systematic, controlled studies evaluating the efficacy of behavioral interventions for sleep problems are lacking for children with ASD.”

(P. 1017)

Vriend et al. (2011)

- 15 studies identified
- All involved establishing good sleep hygiene/parent education + other behavioral elements:
 - Standard extinction (3 studies)
 - Graduated extinction (2 studies)
 - Scheduled awakenings (1 study)
 - Fading bedtime / sleep restriction (5 studies)
 - Stimulus fading (1 study)
 - Chronotherapy (1 study)
 - Multi-component (2 studies)

Standard extinction

- A.k.a. - “letting the child cry out”
 - Promotes self-soothing
- Steps: Put the child and ignore all crying and misbehavior
- Pros-
 - Demonstrated to eliminate bedtime tantrums and/or night time waking
 - Increased likeability, security, and emotionality
- Cons-
 - Protocol drift
 - Difficult to ignore
 - Parental stress

Graduated extinction

- A.k.a. - Progressive approach, Ferber (1985) method
- Steps:
 - Place child in bed
 - If child is crying/fussy, check back for brief period after 5 minutes
 - Do not pick up the child or try to console
 - Increase the length of time between check-ins
 - Each night, gradually increase the length of time before the initial check and between checks
- Pros-
 - May increase adherence, parental satisfaction, treatment acceptability
- Cons-
 - May initially teach a child to cry longer (extinction burst)

Check-In Schedule

If your child is still crying

Day	At First Wait	Second Wait	Third Wait	Subsequent Wait
1	5	10	15	15
2	10	15	20	20
3	15	20	25	25
4	20	25	30	30
5	24	30	35	35
6	30	35	40	40
7	35	40	45	45

Source: Ferber (1985)- *Solve Your Child's Sleep Problems*

Scheduled nocturnal awakenings

- Night terrors: Involve sudden arousal from slow wave sleep, accompanied by intense signs of fear (e.g., screaming or crying)
- Steps:
 - Collect baseline data to assess waking pattern
 - Awakening child for a brief period of time before usual spontaneous awakening and provide comfort
 - Gradually fadeout the procedure by increasing the time between scheduled awakenings (e.g., 30 minutes increments) so that the child was sleeping for longer periods of time before waking occurs
- Pros: Provides alternative treatment for parent who have difficulty ignoring crying
- Cons: May disrupt sleep cycle and lead to new “fixed” awakening schedule

Fading bedtime / sleep restriction

Steps:

- Select a bedtime when your child is likely to fall asleep with little or no difficulty within about 15 minutes.
- If your child falls asleep within 15 minutes of being put to bed at this new bedtime and without resistance for two consecutive nights, then move back bedtime 15 minutes (e.g., from 1:30 AM to 1:15 AM).
 - ___:___ PM – 15 minutes = ___:___ PM New Bedtime
- Repeat step #3-- Continue to move back the bedtime by 15 minutes (e.g., from 1:15 AM to 1:00 AM) as directed under #3 until the desired bedtime is reached.
- Child also awakened at the same time each morning and not allowed to sleep outside proscribed sleep times.

- Pros- Potential for few problem behaviors
- Cons- Time consuming

Stimulus fading

- Parent remains in the room with the child
- May involve:
 - Increasing distance from child
 - Fading time in room
 - Sleeping a separate bed
- Pros- Potential for few problem behaviors
- Cons- Time consuming

Chronotherapy

- Involves systematically delaying bedtime and waketime each day while maintaining a regular wake schedule
- Bedtime advances around the clock until child is falling asleep at the desired time

Safety Concerns



Bedtime Problems: Sleep Chart

Directions: 1.) Put an X to mark the time you put your child to bed or to nap; 2.) Shade the time your child was asleep; 3.) Leave blank the times when he/she was awake; 4.) Put a U to mark the time your child got up in the morning or after a nap.

DAY	Mid night		2 AM		4 AM		6 AM		8 AM		10 AM		Noon		2 PM		4 PM		6 PM		8 PM		10 PM	
SAT																								
SUN																								
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Dates	Bedtime (Mean)	Range of Bedtime	Latency to 1 st waking (Mean)	Number of night wakings (Mean)	Duration of night wakings (Mean)	Total Sleep: 8:30pm– 7am (Mean)
10/11 – 10/17	10:15 pm	8:20-12:00	2.2 hrs	1.6	2.0 hrs	6.8 hrs
10/18 – 10/14	9:20 pm	9:00 – 9:40	5.7 hrs	1.3	1.2 hrs	8.4 hrs
11/8 – 11/14	8:40 pm	8:15 – 9:45	5.9 hrs	1.3	.9 hrs	9.4 hrs

Reference - Sleep

- Doyen C, Mighiu D, Kaye K, Colineaux C, Beaumanoir C, Mouraëff Y, Rieu C, Paubel C, Contejean Y (2011) Melatonin in children with autistic spectrum disorders: recent and practical data. *Eur Child Adolesc Psychiatry* 20:231–239
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