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Adapting Social & Sensory Environments in the Classroom, Clinic and Community for Children with Autism:

Adapting the Sensory Environment at the Dentist

The HELP Group Summit

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- National Institute of Dental and Craniofacial Research Planning and Pilot Data Grant –Sensory Adapted Dental Environments to Enhance Oral Care in Children with Autism Spectrum Disorders (1R34DE022263-01; PI, Cermak)

- Division of Occupational Science and Occupational Therapy at the Herman Ostrow School of Dentistry at the University of Southern California

- Children's Hospital Los Angeles

Children's Hospital LOS ANGELES SM
DIVISION OF DENTISTRY

- The National Center for Advancing Translational Science (NCATS) of the U.S. National Institutes of Health (KL2TR001854)

Oral Care

- Integral to total health and function
  - Eating
  - Speech
  - Sleep
  - Work and/or school attendance
  - Self-esteem
  - Overall quality of life
  - Risk factor for: edentulism, cardiovascular disease and respiratory disease
  - Associated with pneumonia & chronic kidney disease

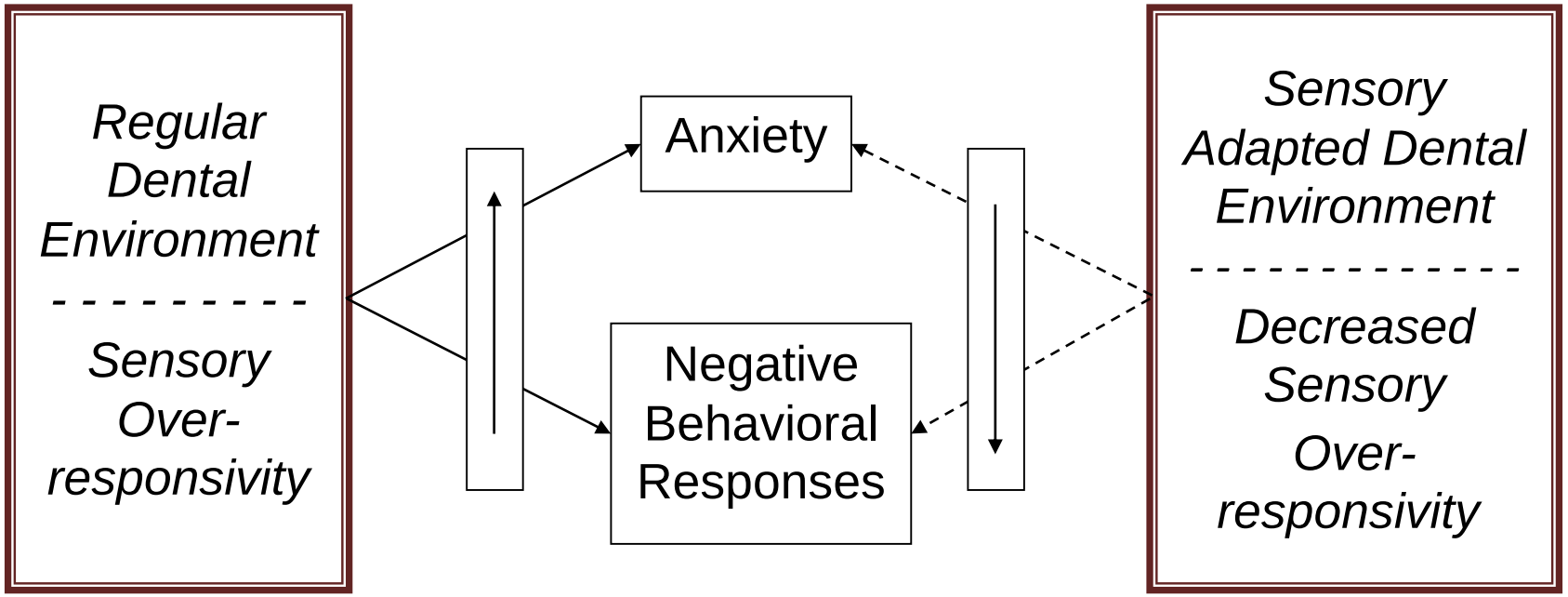
Children with special health care needs are almost twice as likely to have unmet oral health care needs than children without disabilities.

Why ASD: Additional Risk Factors

- Co-occurring disorders
  - E.g., seizure disorder, chronic GI problems, medications
- Damaging oral habits
  - E.g., bruxism, pica, self-stimulating and self-injurious behaviors
- Dietary habits
  - E.g., bottle use, limited diets, food as rewards, feeding difficulties
- Inadequate oral care
  - Difficulty with completing oral care independently, difficulty with cooperation in the home and dental office, often cannot communicate tooth pain or discomfort verbally
- Characteristics of the ASD population
  - E.g., difficulty with changes in routine, behavior difficulties, sensory sensitivities

Sensory Sensitivities

HYPOTHESIS:



Study Hypotheses

1. Child with ASD and, to a lesser extent, TD children will exhibit less behavioral distress, physiological distress, pain, and sensory discomfort during cleanings in the sensory adapted dental environment (SADE) as compared to the regular dental environment (RDE).

2. The SADE will be more cost-effective as evidenced by a shorter duration for dental cleaning, fewer staff for restraint, and reduced need for anesthesia in the SADE condition compared to the RDE.

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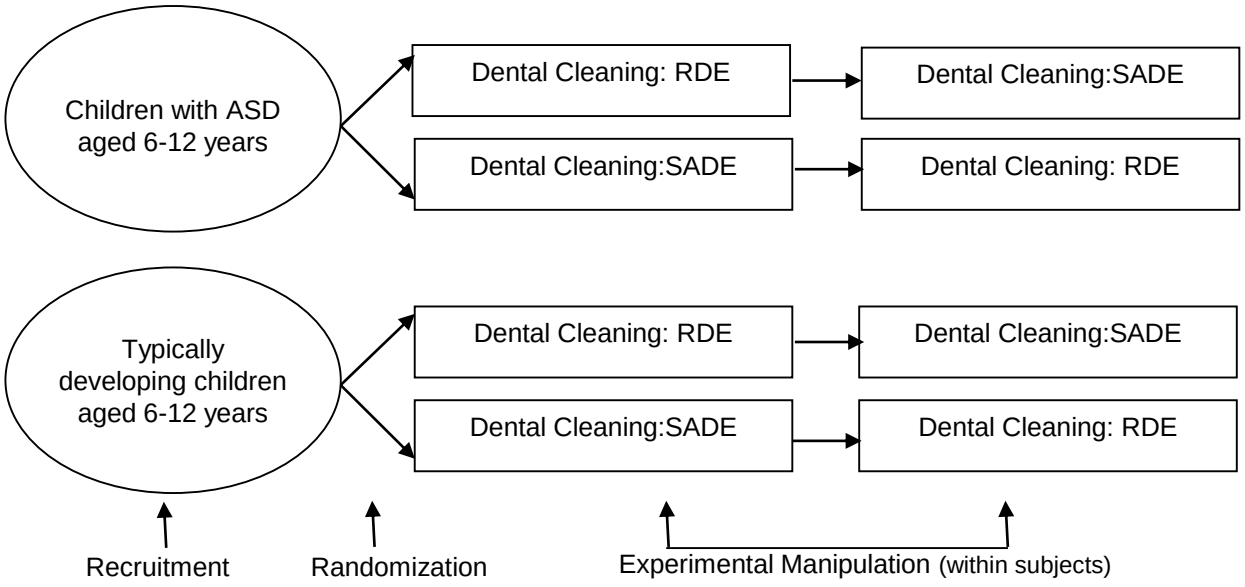
Sensory Adapted Dental Environments (The SADE Study)

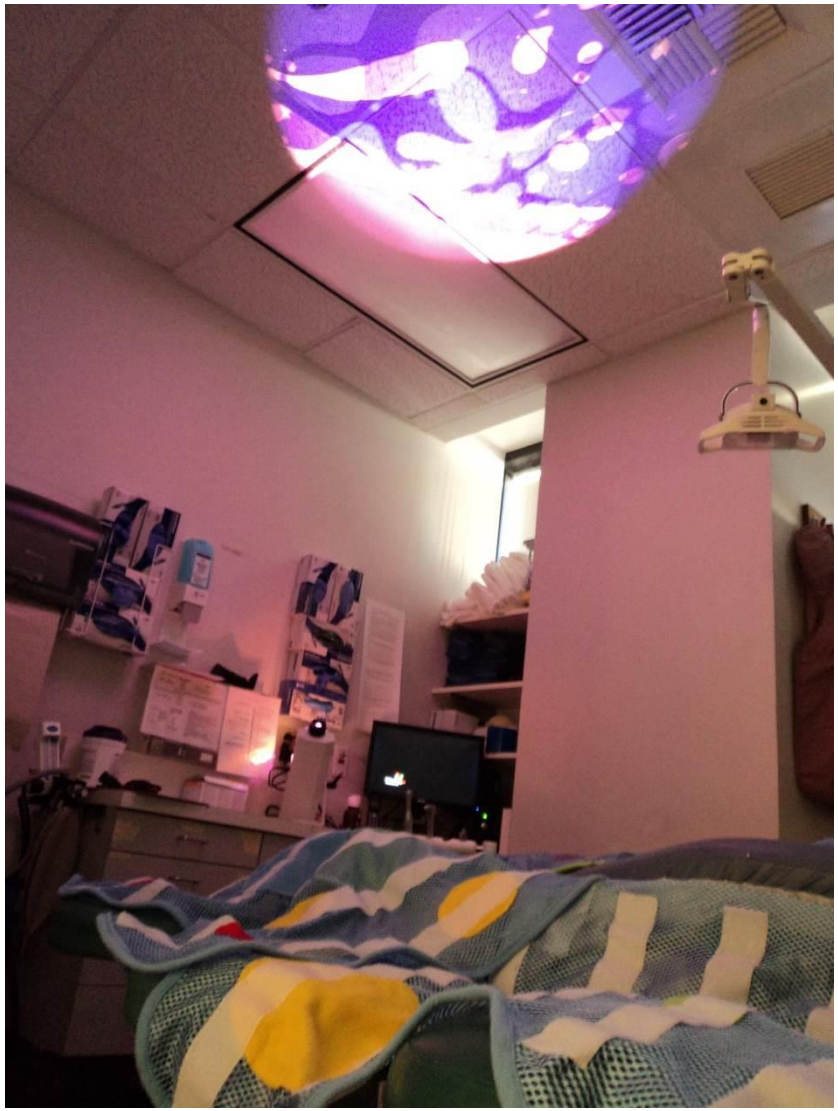


- Cooperation and anxiety (parent, child & dentist report)
- Pain intensity
- Distress behaviors
- Electrodermal activity
- Cost-savings
  - Time to complete cleaning
  - Need for sedation

Key Outcome Variables

SADE Intervention

- Visual
  - No fluorescent lights
  - Use of headlamp directed into child's mouth
  - Moving projection on ceiling (Snoezelen)
- Auditory
  - Soothing nature & piano music
- Tactile
  - Weighted vest (X-ray vest)
  - Deep pressure (butterfly)



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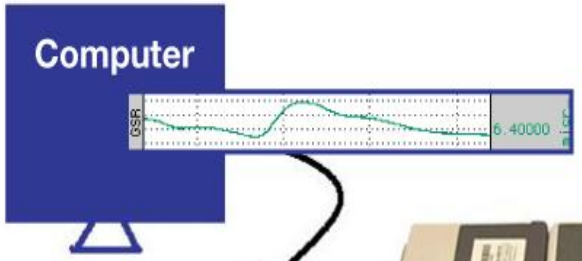
Outcome Measures

- "Physiological Distress"
  - Electrodermal Activity (EDA): sympathetic nervous system activation
    - Skin conductance level; Frequency of non-specific skin conductance responses
- "Behavioral Stress"
  - Dentist-report measures of uncooperative behavior and anxiety
    - Anxiety & Cooperation Scale; Frankl Scale
  - Researcher-coded measure of distress behaviors
    - Children's Dental Behavior Rating Scale (CDBRS)
    - Number of hands required to restrain child
- Perception of Pain
  - Child report measure of pain intensity (Faces Pain Scale-Revised)
- Dental Sensory Sensitivity Scale
  - Child report measure of "bother" of sensory features in office
- Cost Effectiveness
  - Duration of dental cleaning; Number of hands required to restrain child; Need for pharmacological methods



The receiver is connected directly to the MP150 system which contains the software and hardware required for EDA data acquisition and analysis (including the analysis software AcqKnowledge).

4

5

One cable is used to connect the MP150 system to the computer.

MP150 UIM100C

3

One cable is used to connect the amplifier/transmitter unit to the receiver.

EDA sensors (wires) connect to an amplifier/transmitter unit placed next to the subject.

2

1

The EDA sensors (wires) attach to the two disposable electrodes located on the subject's fingers (thenar and hypothenar eminences of the palm for a child-sized hand).

Participants

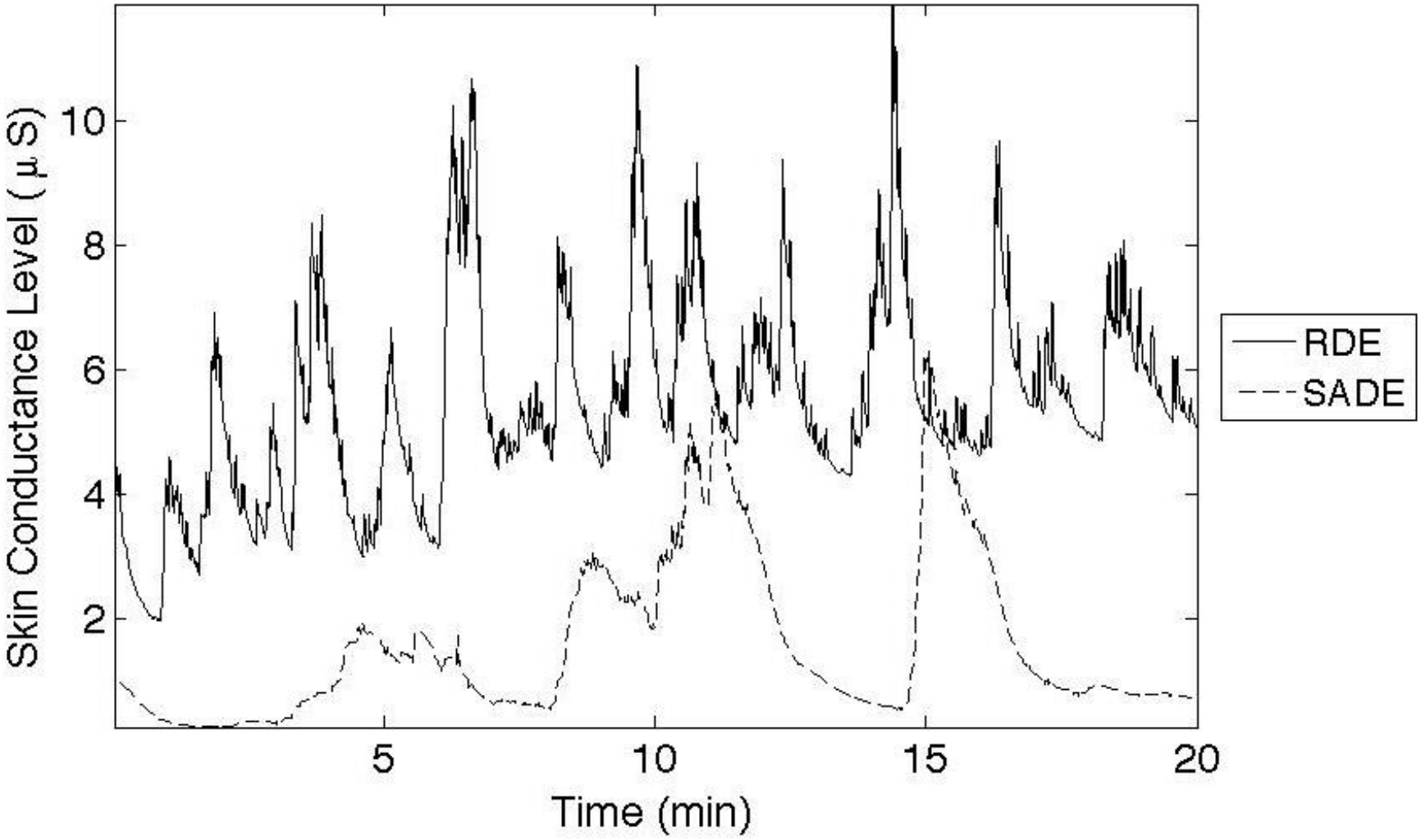
- N=44 (n=22 ASD, n=22 TD)
  - No significant difference: age, ethnicity, race, maternal/paternal education status.
  - Significantly different: gender, communication ability, sensory processing, general anxiety, dental anxiety (all p's ≤.01).
  - ASD group diagnoses confirmed by ADOS.

Pilot Results

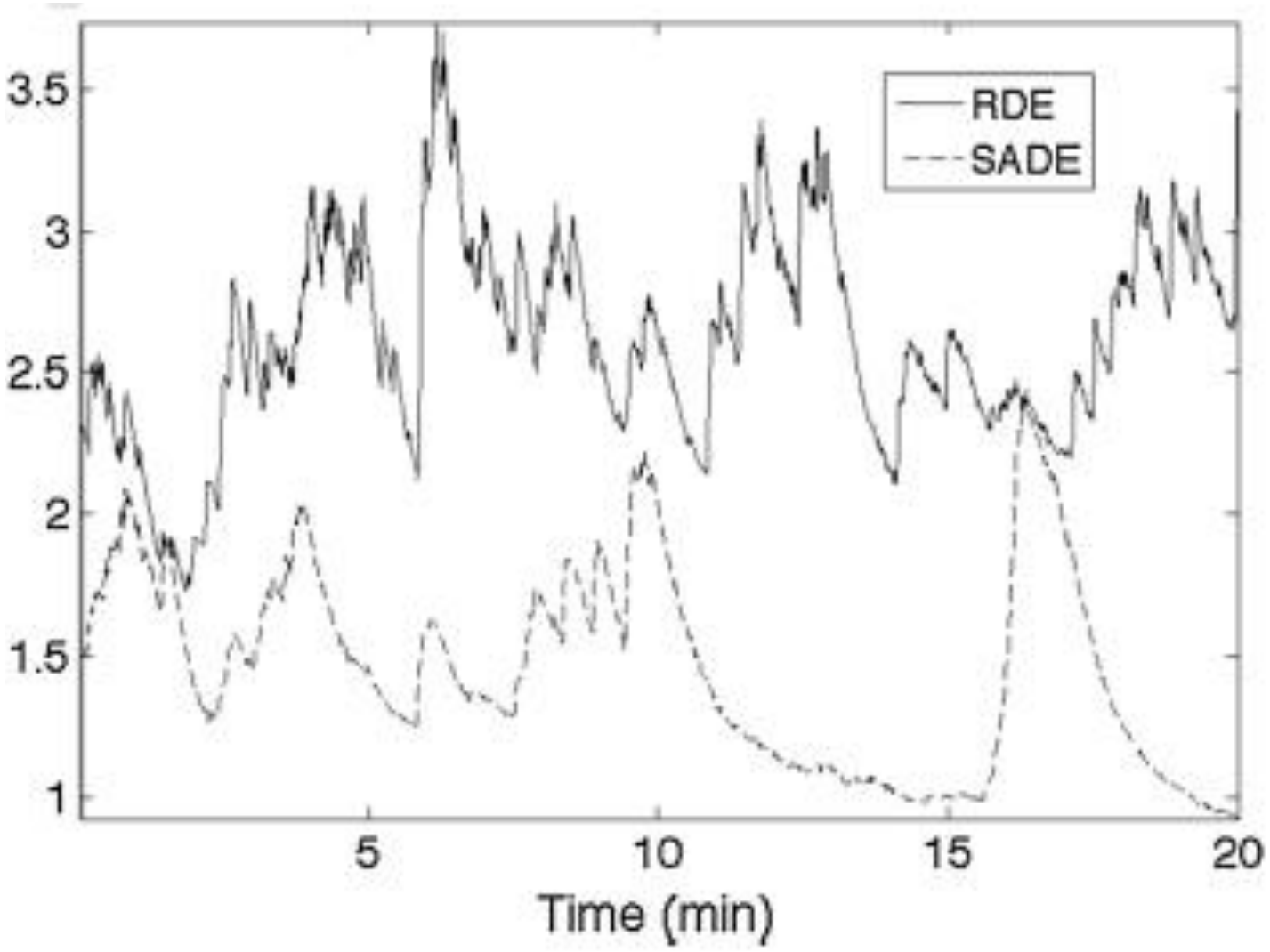
- Overt Behavioral Distress
  - Outcomes were in the expected direction
    - Less behavioral distress in the SADE vs. the RDE, as measured by the Anxiety & Cooperation Scale, Frankl Scale, and CDBRS
- Physiological Distress
  - Outcomes were in the expected direction
    - Less physiological distress in the SADE vs. the RDE, as measured by EDA
    - Both SCL & NS-SCR frequency were lower in the RDE as compared to the SADE (p's $\leq .06$)
      - (SCL) ASD group: $d = 0.6$-0.7; TD group: $d = 0.4$-0.5
      - (NS-SCR) ASD group: $d = 0.3$-0.5; TD group: $d = 0.3$-0.4

VIDEO

Child with ASD - EDA Example



TD Child - EDA Example



Results – Hypothesis 2

Cost-effectiveness in SADE > RDE

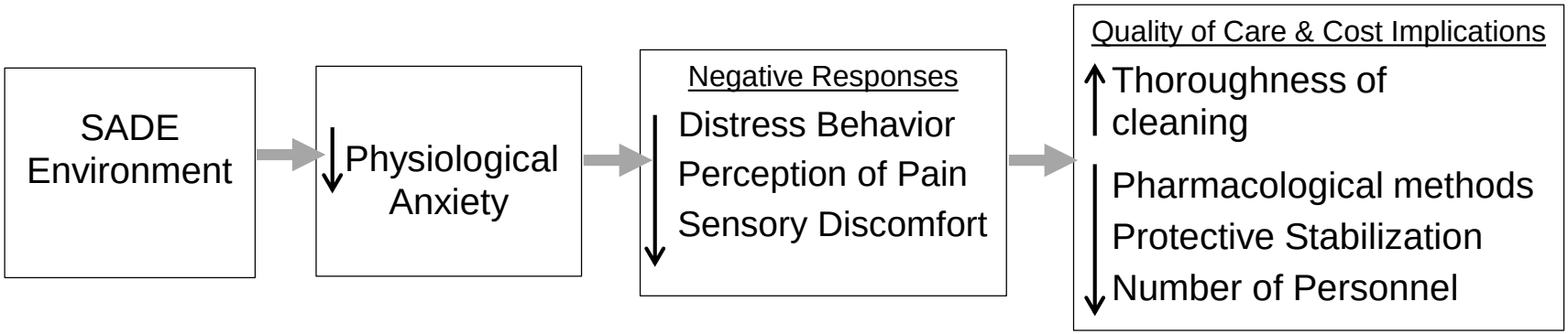
	ASD Group	TD Group
Construct	Effect Size (Cohen's d)	Effect Size (Cohen's d)
Pharmacological Methods	--	--
Number of Restraining Hands	0.42	--
Duration of Cleaning	0.80	0.78

- Mean difference 5-7 minutes for both groups, opposite of the hypothesized direction

Current Research

Sensory Adapted Dental Environments to Enhance Oral Care in Children (the SADE-2 Study)

- Funded by the National Institute of Dental and Craniofacial Research (NIDCR)
- Five-year study
- n=184 children with ASD



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Discussion / Conclusions

- Enhancing oral care is critical for children with special needs.
- The SADE intervention shows promising results.
- Findings highlight the potential for OTs to be part of an interdisciplinary team in oral health.

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For More Information…

- Contact us:
  - sade2@usc.edu
  - 323-442-2206 (English & Spanish)
  - 323-442-1864 (English only)
- Research Articles:
  - Cermak, Stein Duker, Williams, Dawson, Lane, & Polido (2015). Sensory adapted dental environments to enhance oral care for children with autism spectrum disorders: A randomized controlled pilot study. *Journal of Autism and Developmental Disorders, 45,* 2876-2888.
  - Stein, Lane, Williams, Dawson, Polido, & Cermak (2014). Physiological and behavioral stress and anxiety in children with autism spectrum disorders during routine oral care. *BioMed Research International, Article ID 694876,* 1-10.
  - Stein, Polido, & Cermak (2013). Oral care and sensory over-responsivity in children with autism spectrum disorders. *Pediatric Dentistry, 35,* 230-235.
  - Stein, Polido, Lopez Najera, & Cermak (2012). Oral care experiences and challenges in children with autism spectrum disorders. *Pediatric Dentistry, 34,* 387-391.

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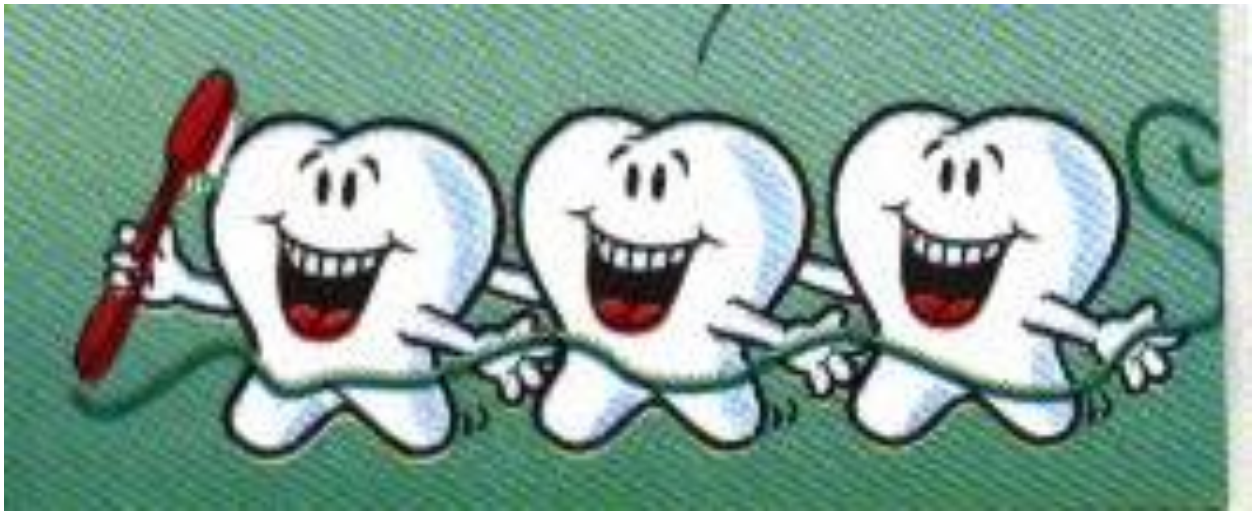
Thank you!



Questions?