Sensor-Enabled Reduction of Stereotypy

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Stereotypy

• A broad term covering many different physical and vocal behaviors.
  • Hand flapping, eye poking, vocal echolalia, etc.

• Likely maintained by automatic reinforcement
  • Therefore especially challenging to reduce

• Can cause disruptions in learning and social stigmatization
Kinect and Software

• WMU Computer science students developed software to identify instances of hand flapping
• Kinect sensor tracked movement of participant
• Software programmed to deliver consequences
Original Project

• Dependent Variable: Hand Flapping (Stereotypic behavior displayed by participant)

• Independent Variable: Stereotypy contingent termination of video/audio from a highly preferred TV program.
Setting

• Kalamazoo Autism Center (KAC)
• The participant and tutor in play area
• Minimized distractions to other students
Participant

• 5-year-old child diagnosed with Autism
• Selected based on high rate of target behavior
• Recruited through his treatment center
Changes to Original Project

• Started with a time-out procedure
  • Removal of preferred TV program following stereotypy
• Differential Reinforcement of Other Behavior (DRO) Procedure
  • A reinforcer is presented after a fixed interval of time if the response of interest has NOT occurred during that interval
Results

Baseline: No intervention

Automated DRO 30": Reinforcer after 30 seconds of no stereotypy

Baseline

Manual DRO 10" 15"
Limitations

• High amount of false positives
  • Poor skeleton tracking
• Laptop and Kinect sometimes malfunctioned
  • Lower treatment integrity
• Busy classroom may have affected sessions
• Sessions were sometimes intrusive
• Complexity of implementation
  • Long setup and take-down time
  • Expensive and numerous components
Discussion

• Experimenters noted many potential confounding variables
  • Locations
  • Stimuli present (toys, tutors, etc.)
  • Work/play condition
  • Temporal proximity to reinforcement

• Future research involving technological applications of applied behavior analysis are necessary
Questions?

Thanks!