Introducing a Novel Community-Based Assessment Tool: The Computerized Social Affective Language Task (C-SALT)

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BACKGROUND

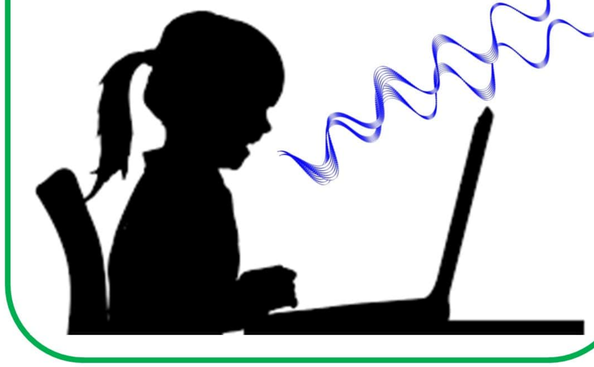
- Social communication is a significant area of weakness for individuals with developmental differences like autism spectrum disorder (ASD), but is notoriously expensive and time-consuming to measure.
- A recent movement toward fine-grained behavioral imaging using cutting-edge technologies could drastically improve our ability to automatically capture subtle and complex social communication impairments, thus laying the groundwork to generate personalized interventions.

OBJECTIVES

Assess the feasibility of using C-SALT, a low-cost computer program that children can operate independently, to gather vocalization data as part of a community-based social communication and motor battery.

PROGRAMMING

- Programmed in Unity 3D
- Versions: literate and pre-literate versions allow for collection of canonical speech, extended phonation, and response to social videos across ability levels.
- Adaptable for lab, community, and (soon) web deployment
- Video and audio can be recorded via device webcam or external recording
- Functional on tablets and computers, allowing for mass deployment to increase accessibility for a diverse range of participants



PRELIMINARY DATA

PARTICIPANTS

- 208 participants (106 ASD, 20 non-ASD, 82 TD) between the ages of 3 and 66 completed C-SALT as part of a 20 minute battery of social-motor and language tasks.
- All participants speak English as their primary language.

COMMUNITY

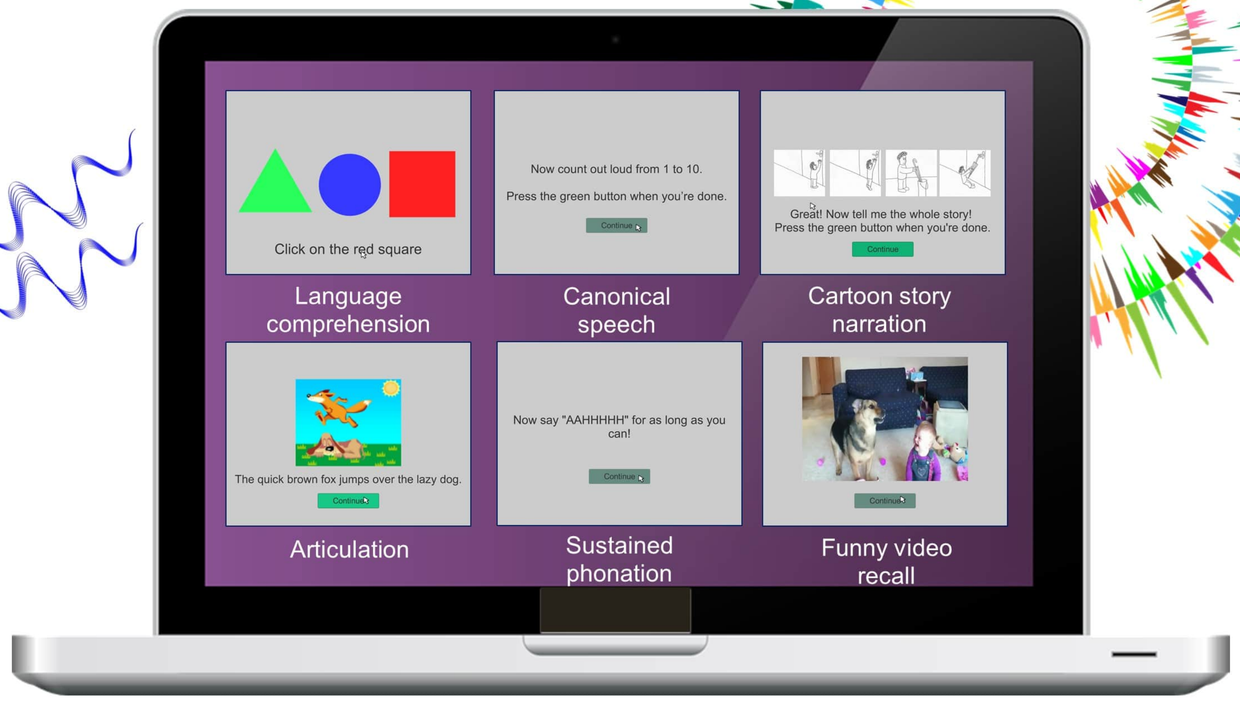
- 77 participants received the 20-minute battery in summer-camp settings, and parents of participants completed a questionnaire including reporting on developmental diagnoses.
- 13 participants were not administered C-SALT based on the Research Assistant's concern about low verbal abilities.
- Of the participants who were administered C-SALT, 100% were able to complete at least parts of the task (parts are useable in isolation).

LAB

- Based on our experiences collecting data in the community, we developed C-SALT- PL (pre-literate), to allow participants with lower verbal ability to complete the task.
- In the Lab, using both versions, 143 participants were administered C-SALT or C-SALT-PL.
- 100% were able to complete the full task, across a range of ability levels.
- Some participants with developing speech ability were able to complete C-SALT with sentence reading assistance from a Research Assistant.

OVERALL EXPERIENCE

- Most participants are able to complete C-SALT or C-SALT-PL with minimal/no help from Research Assistants or aides.
- Child participants are comfortable completing the computer-based task, including using a mouse, trackpad, or touchscreen to interact with the task.



FUTURE DIRCECTIONS

CURRENT ANALYSES

- Face processing analyses using computer vision across individual subtasks and the entire task.
- Humor response and social referencing analysis of participants while watching funny YouTube videos (see IMFAR Abstract #25280).
- Transcription for word-level analyses of cartoon narrative.
- Diagnostic classification based on facial expressions, word choice, and acoustic properties of speech.

FUTURE ANALYSIS PLAN

Linguistic features affecting social communication will be derived from audio recordings:

- Acoustic properties of voice: pitch variation, volume control, shimmer, and jitter.
- Word choice: word frequency/rareness, lexical diversity, social/nonsocial focus.
- Grammatical complexity.
- Pronunciation, rate of speech, etc.

TECHNICAL DEVELOPMENTS

- Additional versions of C-SALT can be programmed to more closely fit differing ability levels of individual participants.
- Future versions could be adaptable, assessing ability based on response to questions to determine additional items displayed.

LONG-TERM OBJECTIVES

- Use C-SALT to improve screening and diagnosis in remote areas.
- Inform treatment planning (clarify areas of strength and weakness).
- Revolutionize how we measure intervention efficacy.

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