Initial Validation of a New Measure of Facial Expression Recognition: Survivors of Childhood Cancer Compared to Typically-Developing Children

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Background

- A significant portion of survivors of pediatric brain tumors experience cognitive, academic and social difficulties.
- Specifically, recent research has documented specific deficits in facial expression recognition.
- Interpretation of emotions portrayed through facial expressions is thought to be a key component of social interaction.
- However, assessment of facial expression recognition in survivors has been limited by a lack of valid and reliable measures.
- Specifically, existing measures often rely on photographs, which are difficult to standardize, do not include child faces, and have a limited number of non-Caucasian faces.
- The creation of a new measure may provide an opportunity to design interventions based around facial expression recognition; a step not feasible with current measures.

Objectives

The objective of the current study was to develop and provide initial validation of a new measure of facial expression recognition for children and adolescents.

Hypothesis

- The new measure will be feasible for use with survivors of childhood cancer and typically developing children.
- Survivors of pediatric cancer will perform more poorly on the measure than typically developing children.

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Methods

Participants & Procedures

- A sample of 12 survivors of pediatric cancer and 17 typically-developing children aged 10 to 16 were recruited to complete a battery of measures.
- Survivors were recruited from Duke's Divisions of Pediatric Hematology/Oncology and Pediatric Neuro-Oncology during regularly scheduled clinic visits.
- Typically-developing children were recruited from the community through an advertisement posted on a clinical trials website maintained by Duke University Medical Center.
- Following the IRB-approved consent process, participants and a parent completed a 90-minute battery of cognitive, psychosocial and social functioning measures. Participants and a parent were then paid $10 each.

Measures

- *Facial Expression Recognition Instrument (FERI)* is a new measure of facial expression recognition developed using Responsive Virtual Human Technology (RVHT). It consists of 48 faces portraying subtle and overt versions of the 6 basic emotions: Happy, Sad, Angry, Fear, Surprise and Disgust. Expressions were created using Ekman's Facial Action Coding System (FACS). Faces vary by gender – male and female – and race – Caucasian, African-American, Asian and Hispanic.
- *Diagnostic Analysis of Nonverbal Accuracy-2 (DANVA2)* is a 48-item task used to assess skill in reading emotional cues without context or communication from others. The scale consists of two subscales – Adult Facial Expressions and Child Facial Expressions.
- *Wechsler Abbreviated Scale of Intelligence (WASI)* is a well-known and accepted short-form of the popular Wechsler scales, valid for children and adults aged 6 to 89.

Results

Table 1. Demographic Information

	Cancer (n = 12)		Healthy (n = 17)	
	M ± SD	N (%)	M ± SD	N (%)
Age	11.9 ± 1.68		12.6 ± 1.90	
Gender				
Male		7 (58.3)		7 (41.2)
Female		5 (41.7)		10 (58.8)
Race				
White		11 (91.7)		8 (47.1)
Non-White		1 (8.3)		9 (52.9)
Diagnosis				
Brain Tumor		6 (50.0)		
ALL		6 (50.0)		
IQ	102.6 ± 20.75		114.5 ± 15.89	

Table 2. Initial Validity

	FERI_Total	FERI_DANVA2
DANVA2 – Child	.09	.07
DANVA2 - Adult	.44^{+}	.56*

*$p < .05$ $^{+}p = .07$

Figure 1. Number Correct for Each Expression Type

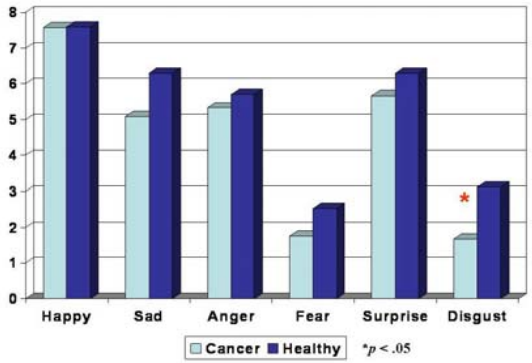
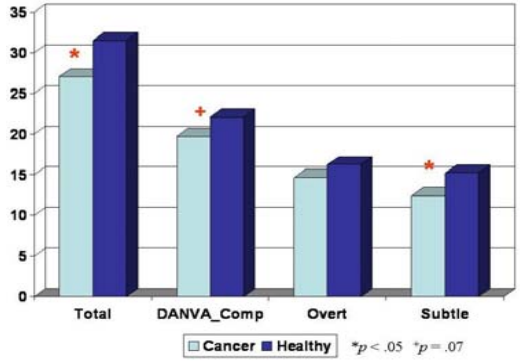


Figure 2. Number Correct for Summary Scores



Summary

- Survivors correctly identified significantly fewer expressions than typically-developing children.
- While both groups of participants had difficulty with fearful expressions; survivors had particular difficulty with faces depicting disgust.
- Survivors also had more difficulty with subtle or low-intensity expressions.
- Initial validity for the new measure was demonstrated with a significant correlation between the a four-expression version (Happy, Sad, Anger and Fear) of the new measure and the Adult Faces version of the DANVA2. There was a trend for a significant correlation between the full version of the FERI and the Adult Faces DANVA2.
- There was no correlation between the Child Faces version of the DANVA2 and the FERI.

Limitations & Future Directions

- Consistent with previous research, survivors of pediatric cancer show a deficit in facial expression recognition as compared to typically-developing children.
- Subsequent analyses will look for associations with measures of social functioning (e.g., PedsQL, Social Skills Rating System, Emory Dyssemia Index).
- These analyses are preliminary and represent only half of the target sample still being collected.
- Some faces from the FERI may need to be revised to capture an expression that is identifiable by children; particularly expressions depicting fear and disgust.