



The Childhood Autism Rating Scale: Concurrent and Predictive Validity



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BACKGROUND

Autism spectrum disorder is characterized by differences in social interaction, communication, and repetitive behavior. The Childhood Autism Rating Scale (CARS) was the first objective measurement for the diagnosis of ASD, but yields one overall score. The creation of CARS subscales would help align the CARS with current thinking that there are different domains.

OBJECTIVES

1. Create CARS subscales using 3 different strategies, including one using WHD EI chart data.
2. Test concurrent validity of CARS subscale scores.
3. Test predictive validity of CARS subscale scores.

METHODS

Sample: Children identified with ASD before age three through review of Early Intervention charts. Mean age at Time 1=25 mos; at Time 2- 10 ys 5 mos; Male: Female ratio 4.5:1; N for Obj 1-49, Obj 2-75, Obj 3-22-24

Instruments: Vineland Adaptive Behavior Scales & Childhood Autism Rating Scale items and scores from charts; Gilliam Autism Rating Scale (GARS) from follow-up parent questionnaires. Time 2 Vinelands from follow-up interview
Community Partners: Westchester County Department of Health

OBJECTIVE 1: CREATE SUBSCALES

Magyar, 2007*
N=164
20 – 82 mos

LEND, 2014*
N= 49
15 – 36 mos

DSM-5* subscales

Social Interaction: 2, 11, 12, 14, 15

Socl Comm:1,2,12,14,15

Social Comm : 1,2,3,11,12

Social Comm: 1,7

Stereotyped: 4,7,11

Stereotyped: 3,4,5,6,7,8,9

Stereotyped: 4,8,9

Negative React: 6,10

Emotional Reg: 3,6,10,13

Activity & Fear; 9,13

* Derived subscales from factor analysis

* Derived subscales from current data correlation matrix

* We assigned CARS items to DSM symptom domains

RESULTS

OBJECTIVE 2: CONCURRENT VALIDITY Early CARS X Early Vineland Scales

| N=75 | Early Vine Comm | Early Vine DLS | Early Vine Soc | Early Vine Mot | Early Vine ABC |
|-------------------|-----------------|----------------|----------------|----------------|----------------|
| CARS Total | -.34** | -.42** | -.33** | -.27* | -.26* |
| Magyar Soc Inter | | -.32* | | | -.33* |
| Magyar Soc Comm | -.33* | -.44* | -.37* | | -.38* |
| Magyar Stereotype | | | | -.33* | |
| Magyar Emot Reg | | | | | |
| LEND Soc Comm | | -.39* | -.38* | | |
| LEND Stereotype | | -.40* | -.34* | | -.44** |
| LEND Neg Emot | | | | -.33* | |
| LEND Act & Fear | | | | | |
| DSM SC | | | | | |
| DSM Ster | | | | | |

Objective 2: Conclusions

- CARS Total is still the best predictor of concurrent adaptive behavior
- The more autism symptoms a child has, the lower his/her developmental skill level
- Magyar subscales of Social Communication and LEND subscale of Stereotypic Behavior are the best subscale predictors

OBJECTIVE 3: PREDICTIVE VALIDITY Early CARS X Later Vineland Scales & Gilliam Autism Rating Scale

| N=22 | Later Vine Comm | Later Vine DLS | Later Vine Soc | Later Vine ABC | N=24 | Later GARS Stere | Later GARS Comm | Later GARS Soc | Later GARS DevD | Later GARS TOTL |
|-------------------|-----------------|----------------|----------------|----------------|-------------------|------------------|-----------------|----------------|-----------------|-----------------|
| CARS Total | | | | | CARS Total | .41* | | | | |
| Magyar Soc Inter | -.42* | -.59** | | -.49* | Magyar Soc Inter | .61** | | .45* | | .47* |
| Magyar Soc Comm | | | | | Magyar Soc Comm | | | | | |
| Magyar Stereotype | | -.63** | | -.49* | Magyar Stereotype | .48* | | | | |
| Magyar Emot Reg | -.56* | -.63** | | -.57* | Magyar Emot Reg | | | | | |
| LEND Soc Comm | | | | | LEND Soc Comm | .41* | | | | |
| LEND Stereotype | | | | | LEND Stereotype | .56** | | .43* | | |
| LEND Neg Emot | -.36* | -.50* | | | LEND Neg Emot | | | | | |
| LEND Act & Fear | -.69** | -.76** | -.68** | -.73** | LEND Act & Fear | | | | | |
| DSM SC | | | | | DSM SC | | | | | |
| DSM Ster | | | | | DSM Ster | | | | | |

Objective 3: Conclusions

- CARS Total is a poor predictor of future adaptive behavior and symptom severity
- LEND subscale Activity & Fear is a strong predictor of future adaptive behavior
- CARS scores selectively predict GARS stereotype behaviors compared to other GARS subscales

Implications

- The DSM-5 CARS subscales are not correlated with concurrent or predictive adaptive behaviors or symptom severity
- Children who are reported as the most active and fearful before age 3 have the lowest developmental outcomes