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PSYCHOMETRIC PROPERTIES OF SEGMENTAL ASSESSMENT OF TRUNK CONTROL IN INFANTS AND TODDLERS WITH DOWN SYNDROME

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PURPOSE

The purpose of this study was to investigate infants and toddlers with Down Syndrome (DS) to determine:

1. interrater, intrarater, and live versus video reliability of the Segmental Assessment of Trunk Control (SATCo)
2. concurrent validity of the SATCo with the Gross Motor Function Measure (GMFM), and
3. whether a model of staggered entry with age and SATCo score predicts GMFM score.

PARTICIPANTS

- 18 children with DS between 6 to 23 months participated
- Mean age = 13.67 months, SD = 5.31

METHODS

- SATCo assesses 7 discrete levels of trunk control in children with neuromotor disabilities.
- At each level, the child is tested on static, active, and reactive trunk control for a possible total score of 20.
- The GMFM measures gross motor function in children with cerebral palsy and DS (under 6 years old).
- Child is scored across 5 dimensions of functional movement.
- Each participant was tested (and video-recorded) on the SATCo by 2 physical therapist (PT) raters at least 30 minutes apart.
- One PT rater also administered GMFM to all participants.
- After 2 weeks, the PT raters re-scored their video-recorded SATCo testing sessions.
- A third PT rater, who did not perform live testing sessions, also scored the SATCo videos.



RESULTS - RELIABILITY

Table 1. Reliability of the SATCo Using ICC (2,1)

	Static ICC (2,1) [95%CI]	Active ICC (2,1) [95%CI]	Reactive ICC (2,1) [95%CI]	Total Score ICC (2,1) [95%CI]	SATCo Level ICC (2,1) [95%CI]
Interrater Reliability (Rater 1 vs Rater 2)	0.647 [0.272,0.852] <i>p</i> = 0.001	0.544 [0.118,0.801] <i>p</i> = 0.008	0.686 [0.336,0.870] <i>p</i> = 0.001	0.661 [0.294,0.858] <i>p</i> = 0.001	0.615 [0.221,0.836] <i>p</i> = 0.003
Interrater Reliability (Rater 2 live vs Rater 3 video)	0.852 [0.647,0.942] <i>p</i> < 0.001	0.679 [0.324,0.867] <i>p</i> = 0.001	0.549 [0.124,0.803] <i>p</i> = 0.008	0.784 [0.511,0.913] <i>p</i> < 0.001	0.568 [0.152,0.813] <i>p</i> = 0.006
Interrater Reliability (Rater 2 video vs Rater 3 video)	0.859 [0.662,0.945] <i>p</i> < 0.001	0.678 [0.332,0.866] <i>p</i> = 0.001	0.508 [0.068,0.782] <i>p</i> = 0.013	0.747 [0.441,0.897] <i>p</i> < 0.001	0.524 [0.090,0.791] <i>p</i> = 0.011
Intrarater Reliability (Rater 1 live vs Rater 1 video)	0.852 [0.648,0.942] <i>p</i> < 0.001	0.830 [0.602,0.933] <i>p</i> < 0.001	0.806 [0.554,0.923] <i>p</i> < 0.001	0.859 [0.662,0.945] <i>p</i> < 0.001	0.806 [0.554,0.923] <i>p</i> < 0.001
Intrarater Reliability (Rater 2 live vs Rater 2 video)	0.922 [0.803,0.970] <i>p</i> < 0.001	0.772 [0.488,0.908] <i>p</i> < 0.001	0.846 [0.635,0.939] <i>p</i> < 0.001	0.941 [0.850,0.978] <i>p</i> < 0.001	0.867 [0.679,0.948] <i>p</i> < 0.001

ICC = Intraclass Correlation Coefficient

RESULTS – CONCURRENT VALIDITY

Table 2. Spearman's Rho Correlations (*r_s*)

	SATCo Static Score	SATCo Active Score	SATCo Reactive Score	SATCo Total Score	SATCo Level
GMFM Dimension B (sitting) Score	0.781	0.803	0.834	0.821	0.834
GMFM Total Score	0.788	0.832	0.821	0.829	0.821

*all values significant at *p* < 0.001

GMFM = Gross Motor Function Measure (Russell et al 2000)

SATCo = Segmental Assessment of Trunk Control (Butler et al 2010)

RESULTS – CONSTRUCT VALIDITY

- Age accounted for 63% of the variation in GMFM total score and SATCo total score accounted for an additional 17%.
- There was a significant regression equation ($F(2,15) = 30.45, p < 0.001$).
- Block entry of the single predictors of age ($R = 0.82, R^2 = 0.67, F(1,16) = 31.89, p < 0.001$) and SATCo total score ($R = 0.86, R^2 = 0.74, F(1,16) = 46.599, p < 0.001$) had a significant predictive effect on dimension B (sitting) of the GMFM.

CONCLUSIONS

- Three PT raters who had no prior experience with the SATCo were able to administer and score this outcome measure in infants and toddlers with DS.
- Trunk control appears to play a central role in the gross motor function of infants and toddlers with DS. The SATCo was found to have good psychometric properties in infants and toddlers with DS.

CLINICAL RELEVANCE

- This study contributes to the literature on the psychometric properties of the SATCo and supports its use to measure trunk control in infants and toddlers with DS.

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