

# Validation of the Responsivity Training Scale (ReTS): A clinical tool to measure child directed speech in parent-child interaction



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# Why should we care about measurement of child directed speech (CDS)?

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- Accountability of our profession
- Does this parent / adult need coaching in CDS?
- Adults around the child and clinicians alike need to know if they are changing their behaviours in everyday life and maintaining these changes over time
- If not, then coaching in CDS will probably not benefit the child



# How often do clinicians report measuring CDS?

- Newbury and Sutherland (2020)
- Survey of 116 NZ and Australian SLTs
- 56/84 reported training CDS half the time or more
- Only a third reported often / always measuring CDS
- Range of measures used – usually informal observations and checklists
- Very few psychometrically validated measures used in the field
- Clinician concern over availability and suitability of measures



# Why should we care about psychometric validation?

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- Validity – are we measuring what we think we are measuring?
- Reliability – is the measure consistent?
- If it's worth measuring, it's worth measuring accurately
  
- A literature search (Newbury and Sutherland, 2020) showed a dearth of psychometrically validated tools for CDS suited for clinical purposes



## Aims of the current study

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- Can we create a CDS rating tool that is:
  - suitable for clinic? (free, quick, easy)
  - for the clinical purposes of identifying a need for intervention, settings goals and measuring change?
  - for at risk / late to talk toddlers (not those with autism)?
  - with strong psychometric properties?



# First attempt: Child Directed Speech Rating Scale (Newbury and Sutherland, 2019)

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1. Amount of talk
2. Proportion of talk (adult:child)
3. Adult pitches talk to level of child's understanding
4. Adult expansions and recasts
5. Adult using repetition to reinforce a new word
6. The effectiveness of the adult's questions to extend conversation
7. The effectiveness of the adult's comments to extend conversation
8. Adult rate of speech matched to child's ability to process and respond
9. Verbal responsivity of the adult
10. Adult is physically down at the child's level
11. Adult following the child's interest / attention
12. Adult praising the child



# Responsivity Training Rating Scale (ReTS)

|  |                            |                          |
|--|----------------------------|--------------------------|
| <b>Level 1: Adult is actively following the child's lead in play</b>             |                            |                          |
| Never / rarely<br>0  | Sometimes / often<br>1     | Nearly all the time<br>2 |
| <b>Level II</b>  |                            |                          |
| <b>a. Adult talks about what the child is attending to</b>                       |                            |                          |
| Never / rarely<br>0  | Sometimes / often<br>1     | Nearly all the time<br>2 |
| <b>b. Rate the quality of the adult's talk (variety of language modelled)</b>    |                            |                          |
|  | Variety could improve<br>0 | Excellent variety<br>1   |
| <b>Level III</b>   |                            |                          |
| <b>a. Adult expands the child's talk using a variety of sentence structures*</b> |                            |                          |
| Never / rarely<br>0  | Sometimes / often<br>1     | Nearly all the time<br>2 |
| <b>b. Rate the quality of the expansions (variety of language modelled)**</b>    |                            |                          |
|  | Variety could improve<br>0 | Excellent variety<br>1   |

**Do they  
need  
coaching ?**

# Learning to talk study (revisited) (Klee et al., 2015)

## Method:

- 105 children from the “Learning to Talk study (Klee et al., 2015)
- Time 1 measures (2-2.5 years)
  - Parent child interaction sample during play (10 mins)
  - PLS-4 expressive and receptive language
  - Demographic information
- Time 3 measures (3.5 – 4 years)
  - PLS-4 expressive and receptive language





# Language scores from Times 1 and 3 (n = 105)

|                                 | N   | Mean (SD)      | Range  | N 1 SD<br>≤X |
|---------------------------------|-----|----------------|--------|--------------|
| <b>Time 1</b>                   |     |                |        |              |
| Age (months)                    | 105 | 26.61(1.78)    | 24-31  |              |
| PLS expressive communication SS | 105 | 110.14(22.29)  | 65-150 | 13           |
| PLS auditory comprehension SS   | 105 | 108.89 (16.88) | 67-150 | 11           |
| <b>Time 3</b>                   |     |                |        |              |
| Age (months)                    | 105 | 45.42 (1.98)   | 42-50  |              |
| PLS expressive communication SS | 103 | 119.68 (15.28) | 70-148 | 5            |
| PLS auditory comprehension SS   | 104 | 116.11 (12.33) | 81-142 | 1            |

## ReTS scores for the sample (n = 105)

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| ReTS items                                       | N   | Mean (SD)     | Range (possible range) |
|--|-----|---------------|------------------------|
| Level I Follows the child's lead                 | 105 | 1.7 (.48)     | 0-2 (0-2)              |
| Level IIa Talks about what child is attending to | 105 | 1.75 (.48)    | 0-2 (0-2)              |
| Level IIb Uses variety of language               | 105 | .75 (.43)     | 0-1 (0-1)              |
| Level IIIa Expansions                            | 93  | .84 (.37)     | 0-1 (0-2)              |
| Level IIIb Variety of expansions                 | 90  | .53 (.50)     | 0-1 (0-1)              |
| ReTS total percentage score                      | 105 | 70.36 (21.01) | 0-100 (0-100)          |

# Psychometric properties of the ReTS (Terwee et al., 2007)

| Psychometric property                   | Result  | Comments   |
|---|---|--|
| Criterion validity                      | $r = .32-.52$   | Moderate to strong given the ReTS uses 2-3 point scales      |
| Construct validity                      | The ReTS total score predicted 5.4% variance in expressive language outcomes at time 3 even when controlling for known predictors | Positive start – further hypotheses could be tested          |
| Internal consistency – Cronbach's alpha | .75 (n = 91)  | Strong, but the scale/sample was slightly smaller than ideal |
| Factor analysis                         | Loadings = .65-.79  | Loads on a single factor of responsivity as designed         |
| Interrater reliability                  | 72-92% point to point agreement   | Moderate to strong   |

## General conclusions

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- The ReTs has moderate to strong psychometric properties.
- Note we reduced the scales down from 5 points to 2-3 to improve interrater reliability (Martin & Bateson, 2007)
- This is fine for the purpose of *setting goals*
- Likely negative impact on its *ability to detect change*
- Needs replication with a more representative sample



## Future research

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- Next steps - trial it for clinical use with the target population
- How much verbal responsivity is enough for individual children?

### Take home messages:

1. If you are working on CDS, consider teaming to measure it pre and post intervention
2. Measuring verbal responsivity accurately requires a well designed measure



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## Disclosure statements

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# References

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- Camarata, S., & Yoder, P. (2002). Language transactions during development and intervention: Theoretical implications for developmental neuroscience. *International Journal of Developmental Neuroscience*, 20(3-5), 459-465. [https://doi.org/10.1016/S0736-5748\(02\)00044-8](https://doi.org/10.1016/S0736-5748(02)00044-8)
- Klee, T., Stokes, S. & Moran, C. (2015). *Early Factors in Childhood Communication Disorders: Final project report*. Marsden Fund of the Royal Society of New Zealand.
- Martin, P. & Bateson, P. (2007). *Measuring Behaviour an Introductory Guide* (3<sup>rd</sup> ed). Cambridge University Press.
- Newbury, J. & Sutherland, D. (2019). A faster way to measure child-directed speech: Development and validation of a new clinical tool [poster presentation]. Speech Pathology Australia Conference, Brisbane, June.
- Newbury, J. & Sutherland, D. (2020). Measurement of child-directed speech: A survey of clinical practice. *International Journal of Speech-Language Pathology*, 22(4), 399-413. DOI: [10.1080/17549507.2019.1650111](https://doi.org/10.1080/17549507.2019.1650111)
- Suskind, D., Leffel, K., Graf, E., Hernandez, M., Gunderson, E., Sapolich, S., . . . Levine, S. (2016). A parent-directed language intervention for children of low socioeconomic status: A randomized controlled pilot study. *Journal of Child Language*, 43(2), 366-406. doi:10.1017/S0305000915000033
- Tamis-LeMonda, C. S., Bornstein, M. H., & Baumwell, L. (2001). Maternal responsiveness and children's achievement of language milestones. *Child Development*, 72(3), 748-767. <https://doi.org/10.1111/1467-8624.00313>
- Terwee, C.B., Bot, S.D., de Boer, M.R., van der Windt, D.A., Knol, D.L., Dekker, J., Bouter, L.M., de Vet, H.C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, 60(1), 34-42.
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