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Development and validation of the Dutch Student-Teacher Relationship Scale:

Factor models and factorial invariance

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Assessing teacher-child relationship quality using multiple methods and perspectives



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Student-Teacher Relationship Scale (STRS; Pianta 2001):

- Widely used measure in international research and practice
- Exploratory factor analysis: Conflict, Closeness, and Dependency
- To date no confirmatory factor analysis (CFA)



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Goals present study:

1. Demonstrate multidimensionality of Dutch adapted STRS with CFA
(Koomen, Verschueren, & Pianta, 2007)
2. Improve Dependency scale in Dutch STRS
3. Extend age range of the STRS: 3-12 years
4. Explore factorial invariance across gender and age



Original STRS:

- Dependency occasionally left out or combined with Conflict
- Reason: mediocre reliability
- 5-item Dependency scale: Cronbach's alpha's .61-.69





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STRS for older students?

- Original STRS: 4 years (+1m) – 8 years (+8m)
- Relationships still important predictors for older students (Davis, 2003)
- Older students: student perceptions of relationship?
- Teacher perceptions could make a different contribution





Teacher-Student Relationship Inventory (TSRI; Ang, 2005)

- Teacher perspective on relationship with older student
- Clear three-factor structure (CFA): Satisfaction, Instrumental Help, and Conflict.
- TSRI Satisfaction & TSRI Conflict more simple constructs than STRS Closeness & STRS Conflict
- Instrumental Help less negative than Dependency



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Dependency relevant for older children?

- Ang (2005): dependency items (e.g. clingy behaviors) not relevant for older students
- Our opinion: dependency could still be relevant for special groups, e.g. behavioral disorders, learning disabilities.



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Extend age range of Dutch STRS

- Demonstrate three-factor structure for age range 3-12
- Reliabilities of Closeness, Conflict, and Dependency for each age/year group
- *Are similar constructs measured in the same way at different ages?*





Invariance of Dutch STRS across gender:

- Is a close relationship with girls conceptually similar to a close relationship with boys?
- If so: does a particular closeness score mean the same for boys and girls?
- Measurement invariance is generally assumed (and a precondition for group comparisons), but not sorted out



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Method

Participants:

- normative sample of 2335 children (49% boys; M age 8.10 years) from various parts of the Netherlands
- 1047 teachers (81% female) from 98 elementary schools and 29 preschool/day care centers



Distribution normative sample according to age and gender

Age groups	Boys	Girls	Total
3	102	107	209
4	106	101	207
5	123	128	251
6	112	114	226
7	124	118	242
8	108	130	238
9	119	126	245
10	121	133	254
11	123	123	246
12	102	115	217
Total	1140	1195	2335





Method

Dutch STRS scale construction

- Authorized Dutch translation of original 28-item STRS (Pianta, 2001)
- +
- 6 new items: 3 for Dependency scale and 3 for Closeness scale
- =
- 34 Dutch STRS items to start with



Definitely does not apply	Does not really apply	Neutraal, not sure	Applies somewhat	Definitely applies
1	2	3	4	5

29. This child keeps a close eye on me all day long (Dependency)	1	2	3	4	5
30. This child looks to me for help, appreciation and support (Dependency)	1	2	3	4	5
31. This child seems to be on his/her guard for me (Closeness, reversed)	1	2	3	4	5
32. This child allows himself/herself to be encouraged by me (Closeness).	1	2	3	4	5
33. This child needs to be continually confirmed by me (Dependency).	1	2	3	4	5
34. This child seems to feel secure with me (Closeness).	1	2	3	4	5





Confirmatory Factor Analyses (CFA)

- A-priori three-factor structure tested in several steps (Mplus program)
- Total sample (N=2335) randomly divided in sample 1 (n=1139) and sample 2 (n=1196)
- Fit indices: χ^2 (sensitive to sample size), CFI, SRMR, RMSEA
 - Good fit: CFI \geq .95, SRMR \leq .08, RMSEA \leq .06
 - Acceptable fit: CFI \geq .90, RMSEA \leq .08



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Results step 1

CFA initial three-factor model (34 items): sample 1

- Fit of full model (34 items) was *unsatisfactory*

($\chi^2(524)=3048.41, p=.00; CFI=.83; RMSEA=.07; SRMR=.09$)

- Inspection of Modification Indices and standardized residuals → removal of 6 items:

- 3 x Closeness (2 old, 1 new)
- 1 x Conflict (old)
- 2 x Dependency (1 old, 1 new)



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Results step 2

CFA's with modified models: sample 1

- Closeness (11 items; 2 new) model fit: overall **good**
($\chi^2 (44)=217.36$, $p=.00$; $CFI=.96$; $RMSEA=.07$; $SRMR=.03$)
- Dependency (6 items; 2 new) model fit: overall **good**
($\chi^2 (9)=51.08$, $p=.00$; $CFI=.98$; $RMSEA=.08$; $SRMR=.03$)
- Conflict (11 items) model fit: overall **acceptable**
($\chi^2 (44)=523.86$, $p=.00$; $CFI=.90$; $RMSEA=.11$; $SRMR=.05$)
- Three-factor model (28 items) model fit: overall **acceptable**
($\chi^2 (347)=1701.72$, $p=.00$; $CFI=.89$; $RMSEA=.06$; $SRMR=.06$)



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