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Assessing client–caregiver relationships and the applicability of the ‘student–teacher relationship scale’ for people with intellectual disabilities

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ABSTRACT

Improvements in client–caregiver relationships may lead to improvements in the quality of life of clients with intellectual disabilities (ID). For this reason, interventions aimed at influencing these relationships are important. To gain insight into the nature and intention of these relationships in the ID population, suitable measurement instruments are needed. This study examines the applicability of an existing relationship questionnaire designed for primary education, called the Student–Teacher Relationship Scale (STRS) on the basis of the following research questions: (1) What is the factor structure of the STRS? (2) Are there associations between STRS scales and other conceptually comparable instruments? (3) Is the STRS reliable? The participants in this study were 46 caregivers, who assessed 350 client–caregiver relationships. Psychometric research was conducted into the factor structure ($n = 350$), construct validity ($n = 146$), internal consistency ($n = 350$) and test–retest reliability ($n = 177$) of the STRS and the reliability of the individual scores ($n = 350$) among a study population of people with moderate and severe ID. The three-factor model of the STRS as used in primary education (1. closeness, 2. conflict, 3. dependency) was, despite minor deviations, also found in the ID population. Research into the construct validity of the STRS showed statistically significant correlations with other scales with which similarities could be expected. The internal consistency and test–retest reliability of the STRS in the population studied were very good. The 95% confidence intervals of the means were small, and these measurements can be regarded as reliable.

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1. Introduction

The academic literature over the last 20 years has increasingly pointed to the importance of positive relationships between clients with intellectual disabilities (ID) and caregivers, as a precondition for the client's good quality of life

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(Schuengel, Kef, Damen, & Worm, 2010) and/or to reduce problem behaviour (Hastings, 2005). In studies on the significance of these relationships, both 'attachment theory' and 'ecological theory' play an important role. Attachment theory emphasises the development of meaningful relationships, with insecure attachment being one of the causes of problem behaviour. Interventions grounded in attachment theory for clients with ID are applied in Došen's (2007) integrative therapy and in Sterkenburg, Janssen, and Schuengel (2008a); Sterkenburg, Janssen, and Schuengel (2008b) attachment-based behaviour therapy. In the latter, the development of an attachment relationship led to decreased problem behaviour in children with ID. In ecological theories, the cause of problem behaviour is primarily sought in the social environments of clients with ID. Interventions focus on reducing negative interactions between caregivers and clients with ID. Hastings, Daley, Burns, and Beck (2006) and Weigel, Langdon, Collins, and O'Brien (2006) suggest that, as negative criticism by caregivers is closely tied to problem behaviour in clients with ID, interventions should aim to reduce 'high emotions' by caregivers (criticism, hostility, over-involvement). Thus, research into interventions focused on improving client-caregiver relationships is important as it may help to reduce problem behaviour and improve the quality of life of clients with ID. To gain insight into the nature and intention of these relationships—and to be able to measure intervention effects—suitable measurement instruments are needed. However, for the ID population these instruments are not presently available or are still being developed (Hastings, 1997; Willems, Embregts, Stams, & Moonen, 2010).

Studies on professional care giving relationships in education have reported beneficial effects of positive student-teacher relationships and adverse effects of negative relationships for adjustment outcomes such as fun at school, problem behaviour and school performance (Baker, 2006; Birch & Ladd, 1997; Hamre & Pianta, 2001; Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008; Hughes, 2011). The Student-Teacher Relationship Scale (STRS, Pianta, 2001) is a commonly used questionnaire to measure the affective quality of professional care giving relationships in primary education. Koomen, Verschueren, and Pianta (2007) and Koomen, Verschueren, van Schooten, Jak, and Pianta (in press) adjusted the STRS for use in the Netherlands and for use with children from 3 to 12 years of age (in the US it has been used with children from 4 years and 1 month to 8 years and 8 months). The STRS is used to determine teachers' perceptions of their relationships with individual students. Since the studies by Birch and Ladd (1997) and Pianta, Steinberg, and Rollins (1995), the literature on student-teacher relationships has been dominated by a model consisting of three relationship dimensions: 'closeness', 'conflict' and 'dependency'. These dimensions are based on concepts from attachment theory, and are also measured by the STRS. The closeness subscale measures the teacher's perceived degree of affection, warmth, open communication, engagement, confidence and security. This subscale is seen as a positive relationship dimension. In contrast, the conflict subscale measures negativity, conflicts, unpredictability, anger and forceful behaviour, and is considered a negative relationship dimension. Likewise, the dependency subscale measures excessive demand for help and attention and strong responses to separation, and is also regarded as a negative relationship dimension. The questionnaire as a whole measures the general quality of the relationship as perceived by the teacher. Dekker (2008) validated the STRS among teachers and students in secondary special education for children with emotional and behavioural disturbances ($n = 123$, ages 13–18, including 24 students with mild ID). The factor structure of the special education population was virtually identical to that of the general primary education population.

This study examines the applicability of the STRS for the relationships between clients with ID and caregivers, on the basis of the following research questions: (1) What is the factor structure of the STRS, and to what extent are the same dimensions (closeness, conflict, dependency) found in the ID population as in primary school students? (2) Is the construct validity of the STRS in the ID population supported by relationships with conceptually comparable scales? (3) What is the internal consistency and the test-retest reliability of the STRS, and the reliability of the individual scores on the STRS subscale items?

2. Materials and methods

2.1. Participants and procedures

The participants in this study were 46 caregivers (42 women, 4 men) working in 19 activity groups spread across 4 activity centres of a large organisation for service provision to approximately 900 clients with ID. All caregivers had worked in this organisation for more than 6 months, and for at least 2.5 days per week. In the 19 activity groups studied, the STRS was filled in for 76 (48%) people with severe ID and 82 (52%) people with moderate ID. Each activity group had between 1 and 3 caregivers, who assessed the client-caregiver relationships. In total, data was obtained for 350 client-caregiver relationships, and was used to calculate the factor structure, the internal consistency of the STRS and the 95% confidence intervals for the means of the STRS subscales.

To avoid over-burdening staff with too many questionnaires, in 2 of the 4 activity centres (10 groups) the research focus was on construct validity, and in the remaining 2 activity centres (9 groups) on test-retest reliability. For the construct validity research, both the STRS and directly thereafter the Temperament Scale (TVZ, Blok, van den Berg, & Feij, 1990: see below) were filled in for 146 client-caregiver relationships, as both scales have conceptual similarities (non-response: 17 incomplete TVZ questionnaires). For the test-retest reliability of the questionnaire, the same caregivers filled in the STRS for 177 client-caregiver relationships twice, with a two-week interval (non-response: 10 questionnaires not completed during the retest).

Permission for the study was granted by the Client Council (comprised of service users with ID) and by the Representative Council (comprised of family members or representatives of service users with ID) of the service provider. The council

confirmed that the study complied with the local organisational guidelines for internal evaluation. All participants in the study agreed to anonymous publication of the research data.

2.2. Instruments

In this study, the STRS (adapted version, Koomen et al., 2007) is used to measure the relationships between clients with ID and caregivers. The term 'student' has been changed to 'client'. Staff rated the extent to which they agreed with each statement in the STRS using a 5-point Likert scale (1 = *Definitely does not apply*, 2 = *Does not really apply*, 3 = *Neutral, not sure*, 4 = *Applies somewhat* and 5 = *Definitely applies*). Psychometric research in Dutch school settings (Koomen et al., 2007) showed that the original STRS dimensions of closeness, conflict and dependency were supported by a confirmatory factor analysis. It also showed that internal consistency was 'respectable' to 'very good' according to DeVellis's (2003) criteria: Cronbach's alphas ranged from 0.77 to 0.90.

The 'Temperament Scale for people with ID' (TVZ, Blok et al., 1990) measures a number of personal characteristics, including temperament. The TVZ is filled in by caregivers across 7 subscales: 'adaptation', 'intensity', 'sensitivity', 'mood', 'persistence', 'soothability' and 'approachability' as well as a composite scale 'difficult temperament'. The TVZ scales of approachability, intensity and difficult temperament were selected for the research into the STRS's construct validity due to their conceptual similarities with the STRS scales of closeness and conflict. Approachability measures accessibility/positive orientation to the environment, while intensity measures acting-out behaviour. Difficult temperament measures intense responses, poor distractibility, negative response to changes and depressive mood. Staff rated the extent to which they agreed with each item in the TVZ using a 5-point Likert scale (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often* and 5 = *Always*). In psychometric research, the TVZ subscales were supported by a factor analysis (Blok et al., 1990). The internal consistency was shown to be 'respectable' to 'very good' according to DeVellis's (2003) criteria (Cronbach's alphas ranged from 0.75 to 0.86).

2.3. Statistical analyses

2.3.1. Factor structure

Principal factor analysis was used to calculate the factor structure of the STRS. This has advantages compared to principal component analysis when the aim of the research, as in this study, is a first exploration of a data structure (Field, 2009). The suitability of the dataset for factor analysis was determined using the Kaiser–Meyer–Olkin (KMO) index and the Bartlett test of sphericity. The higher the KMO (range: 0–1), the more suitable the dataset (Hutcheson & Sofroniou, 1999). The Bartlett test needs to be statistically significant ($p < 0.05$). Oblimin rotation was the chosen rotation method, because based on earlier STRS research (Koomen et al., 2007) the underlying factors could be assumed to be interrelated (e.g. positive correlations between the STRS scales of conflict and dependency and negative correlations between the scales closeness and conflict). The value 0.40 was used as a cut-off point for significant factor loadings (Field, 2009). The number of STRS factors was chosen on the basis of the Cattell screen plot (Cattell, 1966). The eigenvalues for successive factors can be shown in a line plot. The optimal number of factors corresponds with the place where the smooth decrease of eigenvalues appears to level off to the right of the plot.

It should be mentioned that caregivers rated their relationships with more than one client. In addition, several clients worked in the same department of the vocational centre. Consequently, hierarchical data structures (caregivers rating more than one client and several clients working in the same department of a vocational centre) could be possible. Such hierarchical structures can be identified via multilevel analyses. However, these additional analyses did not reveal statistically significant influences of the variables 'caregiver' and 'department' on the STRS scores. Therefore, neither variable was included in the factor analysis.

2.3.2. Construct validity

The similarities between the STRS scales and the TVZ scales were calculated using Pearson correlation coefficients. These correlations were also calculated for the individual STRS scales. Due to the conceptual similarities, statistically significant positive correlations were expected between the subscales of closeness (STRS) and approachability (TVZ), between conflict (STRS) and intensity (TVZ) and between conflict (STRS) and difficult temperament (TVZ). Due to conceptual contrasts, statistically significant negative correlations were expected between the subscales of closeness (STRS) and intensity (TVZ), between closeness (STRS) and difficult temperament (TVZ), and between conflict (STRS) and approachability (TVZ).

Based on research by Koomen et al. (2007), statistically significant correlations between the individual STRS scales were also expected. They found (1) a statistically significant positive correlation between the scales of conflict and dependency ($r = 0.42$; $p < 0.01$) and (2) a statistically significant negative correlation between the scales of closeness and conflict ($r = -0.40$; $p < 0.001$) and (3) a statistically significant positive but low correlation between the scales of closeness and dependency ($r = 0.05$; $p < 0.05$).

2.3.3. Reliability

For each STRS scale and for the total score, the internal consistency was calculated using Cronbach's alpha. Test-retest reliability was calculated using the intraclass correlation coefficient (ICC), a measure for quantifying the agreement between

two (or more) repeatedly measured values. The reliability of the individual scores was determined by calculating the standard error of measurement $SEM = SD \cdot \sqrt{(1 - ICC)}$ and the 95% confidence interval (CI) around the mean subscale scores ($95\% \text{ CI} = \bar{x} \pm 1.96 \times SEM$). A CI can be used to calculate the precision of a measurement. In repeated random spot checks from the same population, the confidence interval—in this case the 95% CI—will in 95% of cases cover the true value. The narrower the interval, the more precise the research results.

3. Results

3.1. Factor structure

The dataset was suitable for factor analysis, given the high values of the Kaiser–Meyer–Olkin index (0.88; ‘very good’ according to Hutcheson & Sofroniou (1999) and the statistical significance of the Bartlett test of sphericity ($p < 0.001$)). On the basis of the Kaiser criterion, according to which factors are only formed if the eigenvalue is larger than 1, four factors were initially found. One factor, however, was represented by only one item (‘this client is sneaky or manipulative with me’) and was thus redundant in view of the aim of factor analysis (i.e. to find underlying factors that represent multiple items). On the basis of the Cattell screen plot, three factors were selected. A three-factor model is consistent with the factor structure of the STRS as found among American primary school students (Pianta, 2001) and Dutch primary school students (Koomen et al., 2007). The principal factor analysis was therefore performed again, with three factors sought. Table 1 shows the result of this final factor analysis.

Only minor differences with the factor structure from primary education were found. In the ID population, item 17 (‘this client expresses hurt or jealousy when I spend time with other clients’) loaded on the factor of conflict rather than on dependency, as in the Dutch primary school population. In addition, item 20 (‘dealing with this client drains my energy’) loaded on the factor of dependency rather than on conflict, as in the Dutch primary school population. For this reason, for the ID population items 17 and 20 were placed in the scales of conflict and dependency respectively. Item 4 (‘this client is

Table 1
Principal factor analysis of the STRS after oblimin rotation.

Item	N = 350	Rotated factor loadings		
		Factor loadings		
		1 Conflict	2 Closeness	3 Dependency
2	This client and I always seem to be struggling with each other	0.75		
11	This client easily becomes angry with me	0.73		
13	This client feels that I treat him/her unfairly	0.70		
18	This client remains angry or is resistant after being disciplined	0.67		
26	This client is sneaky or manipulative with me	0.65		
23	This client's feelings toward me can be unpredictable or can change suddenly	0.60		
16	This client sees me as a source of punishment and criticism	0.53		
17 ^a	This client expresses hurt or jealousy when I spend time with other clients	0.52		
24	Despite my best efforts, I am uncomfortable with how this client and I get along	0.49		
25	This client whines or cries when he/she wants something from me	0.43		
22	When this client is in a bad mood, I know we're in for a long and difficult day	0.40		
9	This client seems to feel secure with me		0.73	
21	This client allows himself/herself to be encouraged by me		0.72	
28	My interactions with this client make me feel effective and confident		0.69	
7	When I praise this client, he/she beams with pride		0.67	
3	If upset, this client will seek comfort with me		0.67	
1	I share an affectionate, warm relationship with this client		0.66	
12	This client tries to please me		0.65	
5	This client values his/her relationship with me		0.64	
15	It is easy to be in tune with what this client is feeling		0.64	
27	This client openly shares his/her feelings and experiences with me		0.62	
10	This client is overly dependent on me			−0.82
6	This client fixes his/her attention on me the whole day long			−0.76
8	This client reacts strongly to separation from me			−0.62
19	This client needs to be continually confirmed by me			−0.65
20 ^b	Dealing with this client drains my energy			−0.48
14	This client asks for my help when he/she really does not need help			−0.46
	Eigenvalue	6.1	5.3	1.1
	Percentage of explained variation	24.5	21.4	5.8
	Cronbach's alpha	0.87	0.89	0.81
	Mean	20.4	39.7	14.8
	Standard deviation	7.2	6.5	5.1

Only factor loadings >0.40 are shown.

^a Item 17 is placed in the dimension conflict (original dimension: dependency).

^b Item 20 is placed in the dimension dependency (original dimension: conflict). Item numbers are consistent with the original STRS items.

Table 2Correlations (Pearson's correlation coefficients) between the STRS and TVZ scales ($n = 146$) and between the individual STRS scales ($n = 350$).

STRS	TVZ scales			
	Closeness	Approachability	Intensity	Difficult temperament
		0.40 ^{*,a}	-0.29 ^{*,a}	-0.11 ^a
	Conflict	-0.20 ^{*,a}	0.60 ^{**,a}	0.60 ^{**,a}
STRS	STRS subscales			
	Closeness	Closeness	Conflict	Dependency
		-	-0.08 ^a	0.20 ^{*,a}
	Conflict	-0.08 ^a	-	0.56 ^{**,a}
	Dependency	0.20 ^{*,a}	0.56 ^{**,a}	-

^a In line with expected correlation.^{*} $p < 0.05$.^{**} $p < 0.01$.

uncomfortable with physical affection or touch from me') had a factor loading below the set cut-off value of 0.40, and was thus excluded from the analyses.

3.2. Construct validity

Table 2 shows the correlations between the STRS scales and the TVZ scales, and between the individual STRS scales. In all analyses, the positive and negative correlations between the relationship dimensions of the STRS and the temperament characteristics of the TVZ were in line with expectations. However, the negative correlation expected (and indeed found) between the scales of closeness and difficult temperament was not statistically significant. The negative correlations between the scales of closeness and intensity and between conflict and approachability were statistically significant, but 'very weak' according to Floyd et al.'s (2006) criteria. The remaining correlations were statistically significant and 'moderate', in Floyd et al.'s terms.

The correlation pattern between the individual STRS scales was only partly consistent with what was expected based on the correlation pattern found in the primary school population. The statistically significant positive correlation expected between the scales of conflict and dependency was confirmed in the ID population ($r = 0.56$; $p < 0.01$ in the ID population compared to $r = 0.42$; $p < 0.001$ in primary education). The negative correlation expected between the scales of closeness and conflict was indeed found in the ID population, but was very weak and not statistically significant ($r = -0.08$; *n.s.* in the ID population in comparison with $r = -0.40$; $p < 0.001$ in primary education). A somewhat less weak statistical significant correlation was found between closeness and dependency in the ID population ($r = 0.20$; $p < 0.01$ in the ID population compared with $r = 0.05$; $p < 0.05$ in primary school).

3.3. Reliability

The Cronbach's alphas (internal consistency, $n = 350$) of the STRS scales and for the total score were 0.89 for closeness, 0.87 for conflict, 0.81 for dependency and 0.87 for the total score; that is, 'very good' according to DeVellis's (2003) criteria. The intraclass correlation coefficients (test-retest reliability, $n = 177$) of the STRS scales were 0.89 for closeness, 0.92 for conflict, 0.85 for dependency and 0.92 for the total score; that is, 'excellent' according to Cicchetti and Sparrow's (1981) criteria. The means were reliable parameters, given the narrow confidence intervals: closeness 39.7 ± 0.7 , conflict 20.4 ± 0.8 , dependency 14.7 ± 0.5 . Table 3 shows the measures indicated for each subscale and for the total score, including the 95% confidence intervals for the means.

Table 3

Internal consistency (Cronbach's alpha), test-retest reliability (ICC), 95% confidence intervals (95% CI) and ranges of the STRS scales.

	Closeness	Conflict	Dependency	Total score
Cronbach's α $n = 350$	0.89	0.87	0.81	0.87
ICC ^a $n = 177$	0.89	0.92	0.85	0.92
Mean $n = 350$	39.7	20.4	14.7	106.9
95% CI ^b $n = 350$	39.0–40.4	19.6–21.2	14.2–15.2	105.8–108.0
Range ^c	10–50	11–55	6–24	27–135

^a Intraclass correlation coefficient.^b 95% CI covering the average score per subscale.^c Minimum and maximum scores per subscale.

4. Conclusions

This study examined the applicability of the STRS among clients with ID. The factor structure in the ID population appeared to be closely comparable with that of primary school students. Item 4, 'this client is uncomfortable with physical affection or touch from me', was excluded as its factor loading was too low. This item also had the lowest loading in the studies by Koomen et al. (2007) and Dekker (2008). In people with ID, and particularly in those with an autism spectrum disorder, physical contact is often experienced as unpleasant. This casts doubt over item 4, as it is intended to be a positive relationship characteristic within the closeness dimension but is not experienced as such by clients with ID and caregivers. Thus, in addition to statistical issues, there are also substantive reasons for not including this question in the STRS for clients with ID. Due to the factor structure, item 20 ('dealing with this client drains my energy') was included in the dependency dimension. In clients with ID, and particularly with severe ID (48% in the population studied), dependency is also caused by severe physical disabilities and caregivers can find that dealing with these clients calls for extra energy. Thus, it seems reasonable to include it in the dependency dimension. Item 17 ('this client expresses hurt or jealousy when I spend time with other clients') was placed in the conflict dimension due to its factor loading. Teachers perhaps more readily accept jealous behaviour in children, because this behaviour is not unusual at a young age. It may be seen as inappropriate in adulthood, however, making caregivers less likely to accept jealous behaviour in adults with ID, which could give rise to conflict.

Construct validity was examined by comparing the STRS with the TVZ and analysing the associations between the individual STRS scales. The consistency between the STRS and TVZ was in line with expectations, although some correlation coefficients appeared to be quite low. These relatively low correlations (3 × 'very weak' and 3 × 'moderate' according to Floyd et al.'s (2006) criteria) may be attributed to the fact that, in addition to their conceptual similarities, there are considerable differences between these instruments. The STRS is underpinned by relational constructs, which take into account the share of the clients, the share of the caregivers and the interactions between the two groups. The TVZ, in contrast, only measures the caregivers' perceptions of the clients' temperaments.

In the study on the relationships between the individual STRS scales a negative correlation was found between conflict and closeness, but this correlation was very weak and not statistically significant. This contrasts with the primary education research, in which a statistically significant moderate negative correlation was found. This difference could relate to the different professional attitudes of caregivers versus teachers; caregivers may choose consciously to work with clients who display problem behaviour (including conflict). Thus, dealing with conflict is perhaps more inherent in the profession than in education, and causes no or little harm to the positive relationship (closeness). This notion is reinforced by the lack of a statistically significant negative correlation between closeness (STRS) and difficult temperament (TVZ).

The reliability of the STRS scales was very good: the internal consistency was 'very good' according to DeVellis's (2003) criteria, and the test-retest reliability of all STRS scales was 'excellent' according to Cicchetti and Sparrow's (1981) criteria. The 95% confidence intervals for the means were small and thus reliable. Overall, the STRS appears to be a sound tool for measuring the relationship between caregivers and clients with ID.

One limitation should be noted, however: the STRS was only studied in vocational centres and filled in for clients with moderate and severe ID. The results can thus not be generalised to the ID population as a whole, because no data were included for people with mild and with profound ID.

Measurement instruments need good psychometric qualities if they are to be applied responsibly in practice. In view of these results, the STRS can be used to screen or evaluate relationship patterns between clients with moderate and severe ID and caregivers. Differences between caregivers in scores for the same clients could then give rise to discussions on how caregivers can approach these clients. The STRS can also be used to evaluate the effects of interventions aiming to influence client-caregiver relationships. In research, it can help to bring about greater insight into the influence of the client-caregiver relationships on problem behaviour and how to reduce it.

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