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Erasmus University Rotterdam
Making Minds Matter

Behavioral Problems and Psychosocial Strengths: Unique Factors Contributing to the Behavioral Profile of Youth With Down Syndrome

Lisa M. Dieleman, Sarah S.W. De Pauw, Bart Soenens, Geert Van Hove, and Peter Prinzie

Abstract

This study aimed to describe problem behaviors and psychosocial strengths, examine the problem-strength interrelations, and evaluate profiles of problems and strengths in youth with Down syndrome (DS). The community-based sample consisted of 67 parents of children with DS aged between 4 and 19 years. Parents reported about the developmental age (Vineland screener), behavioral problems (Child Behavior Checklist), and psychosocial strengths (Behavioral and Emotional Rating Scale) of their child. Results indicate that attention, social, and thought problems were most prevalent, whereas family involvement and receiving/expressing affection were identified as strengths. A confirmatory factor analysis identified problems and strengths as distinct, yet related, variables. Moreover, a cluster analysis of problems and strengths identified four different profiles. Implications for interventions are discussed.

Key Words: *Down syndrome; emotional and behavioral problems; psychosocial strengths; behavioral phenotype*

Down syndrome (DS) has aroused a longstanding interest in scholars and practitioners (e.g., Dykens & Kasari, 1997), leading to a nuanced perspective on its behavioral phenotype. Research has shown that children with DS vary largely in their behavioral presentation and possess both weaknesses and strengths (Chapman & Hesketh, 2000; Grieco, Pulsifer, Seligsohn, Skotko, & Schwartz, 2015). Nevertheless, these studies have tended to focus either on strengths or on behavioral problems. As such, important questions about their interrelation and co-occurrence have not been addressed. Do problem behaviors and strengths represent two ends of a continuum or are they separate constructs? Does an absence of behavioral problems by definition indicate the presence of strengths (and vice versa) or can different profiles of problems and strengths be distinguished? This study aims to obtain a more comprehensive view on the behavioral phenotype of children with DS by (1) describing both strengths and problems, (2) examining their interrelations, and (3) evaluating profiles of strengths and problems.

Emotional-Behavioral Problems and Psychosocial Strengths in Youth With DS

Children with DS are, although exhibiting fewer emotional and behavioral problems than children with specific syndromes or with nonspecific intellectual disability (Chapman & Hesketh, 2000; Grieco et al., 2015; Rice et al., 2015), "far from problem-free" (Dykens, 2007, p. 273). Multiple studies have documented substantially more problems in children with DS than in their typically developing peers (Dekker, Koot, van der Ende, & Verhulst, 2002; Dykens, 2007; Dykens & Kasari, 1997). Children with DS are especially at risk to display hyperactivity, impulsivity, attentional problems, noncompliance, and compulsive-like behavior (Dykens, 2007; Evans & Gray, 2000; Siegel & Smith, 2011). van Gameren-Oosterom

and colleagues (2011) found that social, thought, and attention problems were the most prevalent problems in a cohort of Dutch 8-year-olds with DS. A follow-up study indicated that these three problem domains remained most problematic during late adolescence (van Gameren-Oosterom et al., 2013).

Although research has documented systematically the problem behaviors in children with DS, only a few studies examined their psychosocial strengths. This is unfortunate because research increasingly demonstrates the importance of focusing not only on problems but also on the strengths of children with a disability (Buntinx & Schalock, 2010). The current research used a "strength-based approach" originating from positive psychology (Seligman & Csikszentmihalyi, 2000), which states that each individual manifests strengths. Psychosocial strengths are defined as behaviors that create a sense of satisfaction, foster relationships, strengthen the ability to cope with adversity, or generally promote development (Epstein & Sharma, 1998). An example is the degree to which children are able to express affection in close relationships. These psychosocial strengths reflect qualities of a person as a whole and can be differentiated from adaptive skills, which refer to conceptual (e.g., number concepts), social (e.g., social problem solving), and practical (e.g., use of money) skills that allow coping with the requirements of daily life (American Association on Intellectual and Developmental Disabilities, 2010). Until today, most research in DS has focused on adaptive skills (Dressler, Perelli, Feucht, & Bargagna, 2010; Dykens, Hodapp, & Evans, 2006), at the neglect of psychosocial strengths. However, some studies concerning the behavioral phenotype of children with DS can give an indication of their psychosocial assets. These studies identified social understanding, empathy, and social behavior as strengths of children with DS (Di Nuovo & Buono, 2011; Marchal et al., 2016). Children with DS are, for example, reported to respond adaptively to distress in others by expressing concern and offering comfort (Kasari, Freeman, & Bass, 2003).

Emotional-Behavioral Problems and Psychosocial Strengths: Two Ends of a Continuum or Separate Constructs?

According to the strength-based approach, the presence of problem behavior cannot be simply equated with the absence of psychosocial strengths (Rashid & Ostermann, 2009). Several studies in samples of children with developmental disorders, showed that emotional and behavioral problems and psychosocial strengths are related yet distinct constructs, suggesting that both indicators of adjustment need to be assessed to provide a comprehensive understanding of a population's behavioral phenotype (Lambert et al., 2015).

Although problem behavior and psychosocial strengths, as defined by Epstein and Sharma (1998), have not been simultaneously addressed yet in DS, a few studies examining the behavioral phenotype in DS can give an indication of their co-occurrence (Di Nuovo & Buono, 2011; Rosner, Hodapp, Fidler, Sagun, & Dykens, 2004). Jacola, Hickey, Howe, Esbensen, and Shear (2014) showed, for example, that problem behavior and adaptive skills are low to moderately correlated in youngsters with DS. The variance shared between both indicators of adjustment was modest (i.e., ± 20%), suggesting that both variables cannot be simply equated to each other. These results raise the question whether, in addition to behavioral profiles characterized by the presence of strengths and the absence of problems (or vice versa), some children with DS display a combination of problems and strengths or, conversely, whether some children display neither strengths nor problems.

The Present Study

The overall goal of this study was hence to obtain a more balanced and comprehensive view on the behavioral phenotype of youth with DS.

As a first aim, we described the degree and nature of problem behaviors and psychosocial strengths, as defined by Epstein and Sharma (1998), in youth with DS. In addition, this study also aimed to relate the problems and strengths of children with DS to children's gender, as well as both chronological age (CA) and developmental age (DA). Research on the role of gender has yielded inconclusive findings. Some studies suggested that boys with DS exhibit more externalizing problems, such as aggressive behavior, than girls (van Gameren-Oosterom et al., 2013), whereas other studies did not report this gender difference (Dykens & Kasari, 1997; Rice et al., 2015). Studies on strengths in youth with DS generally do not report systematic gender differences (Dykens et al., 2006; Jacola et al., 2014). The impact of CA on the behavioral phenotype in DS

has been repeatedly documented in the literature, as several studies suggest that externalizing problems in children with DS increase during childhood and decline throughout adolescence, whereas internalizing problems increase from middle childhood to adolescence (Dykens, Shah, Sagun, Beck, & King, 2002; Rice et al., 2015). Strengths are reported to increase during early childhood (Dykens et al., 2006; Hauser-Cram et al., 1999). However, from middle childhood onwards, these strengths appear to be no longer correlated with age, suggesting that there might be a plateau in development or, alternatively, that various developmental pathways may emerge (Dressler et al., 2010; Dykens et al., 2006). Several studies have also indicated DA as an important determinant of the behavioral phenotype in DS, suggesting that problem behavior decreases as DA increases (Di Nuovo & Buono, 2011; Evans & Gray, 2000), and some studies suggested that strengths might grow with increasing DA (Marchal et al., 2016).

As a second aim, we examined the interrelations between problem behaviors and psychosocial strengths in a DS population. In order to explore whether the problem and strength scales represent distinct constructs, we used a confirmatory factor analysis (CFA). If the problem and strength scales represent opposite constructs, the variables will be represented by a single factor or by two highly (negatively) correlated factors. However, based on the reviewed literature, we expected that the CFA would result in a model that identifies strengths and problems as distinct constructs.

Although the descriptive analysis and the CFA give an indication of how the constructs are generally related, they do not inform us about the specific profiles of children with DS. Although problems and strengths might be moderately negatively correlated, this does not indicate that all children exhibit high levels of problems and low levels of strengths or vice versa. Therefore, our third aim was to evaluate naturally occurring profiles, i.e. combinations of behavioral problems and psychosocial strengths, in DS by using a cluster analysis. If problems and strengths are almost opposite constructs, we expected to find only two profiles: (1) children with high levels of problems and low levels of strengths, and (2) children with a lot of strengths and few problems. In contrast, if the problems and strengths constructs yield unique information, we expected to find differentiated profiles containing different

combinations of problems and strengths. Furthermore, we examined whether the retained profiles differ significantly concerning their gender distribution, CA, and DA.

Method

Participants and Procedure

Parents were invited to participate in a study on the development of children with DS by distributing invitations to the most important parent associations for DS in Flanders (Belgium) and the Netherlands, and through personal contacts with training centers, schools, and guidance services. Families had to meet the following inclusion criteria: the child (1) had received a formal diagnosis of Down syndrome and (2) was at least 4 years old. Parents whose children were older than 20 years were excluded from this study ($n = 2$). Originally, 84 parents of children with DS participated, but 17 participants were excluded because of missing data. The final community-based sample consisted of 67 parents of children (37 boys and 30 girls) with DS aged between 4 and 19 years old ($M = 9.5$, $SD = 3.92$). There were no significant differences between the group that was excluded based on missing data ($n = 17$) and the included group ($n = 67$) in terms of demographic characteristics such as nationality of child (χ^2 [3] = .95, $p = .81$), type of education of the child (χ^2 [7] = 5.63, $p = .58$), CA of the child, DA of the child, and parental age (ANOVA, all $p > .05$).

Mothers' average age was 40.4 years ($SD = 11.92$) and fathers were on average 45.1 years old ($SD = 5.7$). Questionnaires were rated primarily by the mother (79.1%) and in some instances by the father (16.4%) or a foster parent (4.5%). Based on personal preference, parents could fill out either an online (86.6%) or paper version (13.4%) of the questionnaire. There were no differences between the two administration methods in terms of demographic characteristics, behavioral problems, psychosocial strengths, and frequency of missing data. Some parents didn't complete all questionnaires, resulting in varying sample sizes across questionnaires (Table 1). More demographic characteristics of the sample are summarized in Table 1.

Instruments

Developmental age. In order to examine the impact of DA, parents rated the Vineland Screener

Table 1
*Demographics (*n = 67*)*

	Years (*SD*) or %
Informant	
Mother	79.1
Father	16.4
Foster parent	4.5
Age	
Mother	40.4 (11.92)
Father	45.10 (5.70)
CA Child with DS	9.50 (3.92)
DA Child with DS	3.57 (1.06)
Marital status informant	
Married	79
Single/ Divorced/ Widowed	9
Co-habiting	12
Highest educational level parents (mother/father)	
Primary education	0/2
Secondary education	31/37
Higher education	57/45
Unknown	12/16
Nationality child	
Belgian	63
Dutch	34
Other	3
Type of education child	
Special education (Type 1[a], Type 2[b], Type 3[c])	64 (7, 54, 2)
Regular education	33
Other/Unknown	3
Comorbidities child[d]	36
Language disorder	22
Autism spectrum disorder or symptomatology	18
Motor disability	13
ADHD	6
Other	7

(Table 1 continued)

Table 1
Continued

	Years (*SD*) or %
Number of children in family	
1	16.4
2	38.8
3	26.9
4	9.0
5	6.0
>5	3.0
Participants per questionnaire	
Vineland Screener	97
Child Behavior Checklist	95
Behavioral and Emotional Rating Scale	94

Note. CA = chronological age, DA = developmental age, DS = Down syndrome.
[a]Type 1:education for children with a mild intellectual disability.
[b]Type 2: education for children with a moderate or severe intellectual disability.
[c]Type 3:education for children with severe emotional and/ or behavioral problems.
[d]Parent-report, parents could indicate more than one comorbidity.

0–6 (Scholte, van Duijn, Dijkxhoorn, Noens, & van Berckelaer-Onnes, 2008). The Vineland screener 0–6 measures adaptive behaviors in the domains of communication, daily living skills, socialization, and motor skills and gives an estimate of the DA (see Table 1).

Emotional and behavioral problems. Parents rated emotional and behavioral problems of their child on the Child Behavior Checklist/4-18 (CBCL; Achenbach, 1991). The CBCL includes eight syndrome scales: Withdrawn/Depressed Behavior, Somatic Complaints, Anxious/Depressed Behavior, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior. The first three scales produce the Internalizing Problem factor and the last two scales create the Externalizing Problem factor. The sum of all syndrome scales forms the Total Problems scale. Although the CBCL was originally developed for typically developing children, previous studies indicated it as a suitable instrument to examine problem behaviors in children with intellectual disability (Koskentausta, Iivanainen, & Almqvist, 2004) and children with DS (Dekker et al., 2002; Dykens &

Kasari, 1997; van Gameren-Oosterom et al., 2011). In order to evaluate the level of emotional and behavioral problems, raw scores were converted into T-scores and classified as clinical versus nonclinical on the basis of Dutch population-based norms (Verhulst, Van der Ende, & Koot, 1996).

Psychosocial strengths. Parents rated their child's psychosocial strengths on the Behavioral and Emotional Rating Scale (BERS-2, Epstein, 2004). This questionnaire identifies positive emotions, behaviors, and life aspects of an individual by measuring five types of psychosocial strengths. The Interpersonal Strength scale assesses the ability of a child to adapt his or her emotions and behavior to social situations (e.g., accepts criticism). The Family Involvement scale assesses the relationship of the child with his or her family (e.g., participates in family activities). The Intrapersonal Strength scale measures the child's confidence and positive attitude (e.g., identifies personal strengths). The School Functioning scale measures the child's academic performance and skills (e.g., completes homework regularly). Finally, the Affective Strength scale measures the extent to which children can express and receive affection (e.g., accepts the closeness and intimacy of others). The questionnaire is well-validated in clinical and nonclinical groups (Buckley, Ryser, Reid, & Epstein, 2006; Epstein, 2004). The BERS-2 was developed to be broadly applicable (in children with and without disabilities) and, recently, scholars have successfully used this questionnaire in work with children with disabilities (Ren, 2010; Sointu, Savolainen, Lappalainen, & Epstein, 2012). To evaluate the level of strengths, scores were classified into groups based on the available norms of a representative school population (including mainly typically developing children and a small percentage of children with disabilities; Epstein 2004).

Plan of Analyses

First, we conducted descriptive analysis using SPSS Statistics 21. Internal consistencies of the scales were examined with Cronbach's alpha (α). The impact of gender, CA, and DA was examined with Multivariate Analysis of Covariance (MANCOVA). The internal reliability (α) of the Vineland screener in this study ranged from .77 (motor skills) to .95 (communication skills).

Second, we examine the interrelations between problem behaviors and psychosocial strengths by conducting a CFA including three latent factors for problem behaviors (Externalizing factor indicated by the subscales Aggressive and Delinquent Behavior; Internalizing factor represented by the subscales Anxious and Withdrawn Symptoms; and Cognitive and Social factor indicated by the subscales Thought, Attention, and Social Problems) and a latent factor for strengths (indicated by the Interpersonal, Intrapersonal, Affective, and Familial strengths). The CFA was conducted with Mplus7.3 (Muthén & Muthén, 1998-2012). As missing data were missing completely at random (MCAR) for the included variables (Little's MCAR test: $\chi2$ (8) = 12.39, p = .14), full information maximum likelihood was used. The model fit was evaluated with the ratio of chi-square/degrees of freedom (CMIN/DF), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). A good model fit is indicated by a CMIN/DF around 2 or lower, a CFI value of .95 or higher, a RMSEA value of .08, and a SRMR value of .08 or lower (Hu & Bentler, 1999; Kline, 2010).

Third, a cluster analysis was performed to evaluate naturally occurring profiles (i.e., combinations of behavioral problems and psychosocial strengths). Cluster analysis was conducted with SPSS Statistics 21. Prior to analysis, univariate and multivariate outliers were identified. Seven individuals were excluded because they had a score that (a) was more than 3 SD above or below the mean and/or (b) had a Mahalanobis distance higher than 10. For the cluster analysis we followed a two-step procedure as recommended by Gore (2000). First, Ward's hierarchical clustering procedure was conducted. Only cluster solutions explaining a minimum 50% of the variance in the included variables were considered for further analysis (Milligan & Cooper, 1985). In a second step, nonhierarchical k-means clustering was applied on the previously retained cluster solution, resulting in an optimized cluster solution. The iterative procedure of the nonhierarchical k-means clustering allows, in contrast to the hierarchical analysis, to reassign objects to better fitting clusters through subsequent stages by minimizing within-cluster variability and maximizing between-cluster variability. In order to test the replicability of the obtained cluster solution with n clusters, we conducted tests of omission in which one cluster was left out and the remaining participants were re-clustered into a cluster solution with n-1 clusters. Finally, ANOVA analyses

were conducted in order to examine whether profiles differ significantly concerning their CA and DA. Gender distribution across profiles was examined using a Fisher's exact test.

Results

Aim 1: Describing Emotional-Behavioral Problems and Psychosocial Strengths in DS

Table 2 shows the internal consistencies, mean scores, and the percentage of clinical scores for the CBCL scales and problem factors. The internal consistencies of the subscales ranged from .61 (social problems) to .88 (aggressive behavior). Only the subscale somatic complaints showed insufficient reliability ($\alpha = .37$), possibly due to low variance. Therefore, the somatic complaint scale was omitted in the CFA and cluster analyses, while preserved in the descriptive analyses (Table 2). Highest percentages of clinical scores were found for social problems (25%), followed by attention problems (20.3%) and thought problems (18.8%). There were no children who scored in the clinical range for anxious/depressed behavior. In order to examine the relative impact of gender and age (both CA and DA), we conducted a MANCOVA with gender as fixed factor, CA and DA as covariates, and all CBCL-subscales as dependent variables. Results showed that gender and DA did not affect the problem behaviors ($F[8,51] = .96\ p = .48$ and $F[8,51] = 2.02,\ p = .06$, respectively). CA, however, did ($F[8,51] = 2.44\ p < .05$): older children showed more anxious/depressed behavior ($F[1,58] = 9.23,\ p \leq .01$) and withdrawn / depressed behavior ($F[1,58] = 7.21,\ p \leq .01$) than younger children.

Table 3 shows the internal consistencies, means, and group classifications of the psychosocial strengths. Internal consistency was good to excellent for all scales, except for School Functioning ($\alpha = .65$). Based on this lower reliability and an item-level analysis, which indicated that more than 50% of the data was missing for five items of this scale, we decided to exclude the School Functioning scale in further analyses. In comparison with the norms provided by Epstein (2004), the majority of children with DS tended to exhibit an average amount of strengths. At the same time, there was much interindividual variation in the strengths. The children showed most

strengths in the areas of family involvement and affection; interpersonal strengths were rated moderately, and intrapersonal strengths were considered as rather limited. A MANCOVA showed that gender was unrelated to the strengths ($F[4,56] = .54,\ p = .71$), while both CA and DA significantly related to the strengths ($F[4,56] = 2.80,\ p \leq .05$ and $F[4,56] = 11.02,\ p \leq .001$, respectively). Older children scored lower on intrapersonal and affective strengths ($F[1,59] = 7.65,\ p \leq .01$ and $F[1,59] = 6.13,\ p \leq .05$) than younger children. Parents reported more interpersonal ($F[1,59] = 25.18,\ p \leq .001$), intrapersonal ($F[1,59] = 41.30,\ p \leq .001$), affective ($F[1,59] = 24.24,\ p \leq .001$), and familial ($F[1,59] = 25.56,\ p \leq .001$) strengths for children with higher DAs.

Aim 2: How Are Emotional-Behavioral Problems and Psychosocial Strengths Interrelated in DS?

Correlations between problems and strengths scales (Table 4) were negative but low to moderate in terms of effect size (rs ranging from $-.12$ to $-.51$). Social problems, thought problems, and attention problems showed the strongest correlations with all the strengths (rs ranging from $-.28$ to $-.51$), whereas anxious/depressive behavior only related significantly with affective strengths ($-.27$).

In order to examine the distinction between problems and strengths more formally, a CFA with four latent factors for Externalizing Problems, Internalizing Problems, Cognitive and Social Problems, and Psychosocial Strengths was conducted. This model (Figure 1) yielded a good fit with CMIN/DF = 1.51, CFI = .96, RMSEA = .09 and SRMR = .06. All indicators had strong, significant loadings on the presupposed latent factors. Psychosocial strengths were highly negatively correlated with both the Externalizing Problem factor ($r = -.52$) and the Cognitive and Social Problem factor ($r = -.63$), whereas the correlation with the Internalizing Problem factor was moderately negative ($r = -.30$).

Aim 3: Evaluating Profiles of Emotional-Behavioral Problems and Psychosocial Strengths in DS

To conduct cluster analysis, we created four composite variables by summing the identifying scales (e.g., the variable Externalizing Problems consisted of the Delinquent and Aggressive Problem scale) after these scales had been

Table 2
Emotional and Behavioral Problems, Measured With the CBCL, in Children With DS (n = 64)

	Internal consistencies	Raw scale scores		Clinical scores[a]
	α	M	SD	%
Anxious/Depressed	.75	1.53	2.20	0.0
Withdrawn/Depressed	.76	2.67	2.72	9.4
Somatic complaints	.37	1.31	1.42	3.1
Social problems	.61	4.28	2.35	25.0
Thought problems	.84	1.67	2.60	18.8
Attention problems	.76	6.78	3.61	20.3
Delinquent behavior	.67	1.77	2.16	10.9
Aggressive behavior	.88	8.17	6.27	6.3
Internalizing problem factor	.83	5.39	5.07	10.9
Externalizing problem factor	.89	9.94	7.71	21.9
Total problem factor	.95	33.89	21.64	34.4

Note. CBCL = Child Behavior Checklist/4-18; DS = Down syndrome; M = mean scores (higher scores indicate more problems); SD = standard deviations.
[a]Clinical scores are calculated by converting raw scale scores into T-scores on the basis of Dutch population-based norms (Verhulst et al., 1996). Next, for the broad band factors, T-scores ≥63 were classified as clinical scores. For the small band subscales, T-scores ≥70 were classified as clinical scores.

standardized. By standardizing variables, differences in variability in the scales do not impact on the cluster classification. Using Ward's hierarchical clustering procedure, cluster solutions with two to six clusters were extracted and examined. The solutions with two and three clusters explained less than 50% of variance of one of the defining variables and were not further considered. The

four-cluster solution was selected for nonhierarchical *k*-means clustering, as this solution accounted for 66%, 58%, 66%, and 68% of the variance in Psychosocial Strengths, Internalizing Problems, Externalizing Problems, and Cognitive and Social Problems, respectively. The solutions with five or six clusters explained similar amounts of variances but the retained clusters solutions did not

Table 3
Strengths, Measured With BERS, in Children With DS (n = 63)

	Internal consistencies	Scaled scores		Comparison with the norms in %[a]				
	α	M	SD	Low	Below average	Average	Above average	High
Interpersonal strength	.92	8.06	2.57	17.5	15.9	60.3	6.3	0
Family involvement	.85	10.08	2.80	9.5	9.5	57.1	20.6	3.2
Intrapersonal strength	.86	7.79	2.82	19	30.2	42.9	7.9	0
Affective strength	.81	9.89	2.7	4.8	20.6	55.6	15.9	3.2
School functioning	.65	7.87	3.04	23.8	27.0	39.7	7.9	1.6

Note. BERS = Behavioral and Emotional Rating Scale; DS = Down syndrome; M: mean scaled scores (higher scores represent more strengths), SD: standard deviations
[a]Scaled scores are allocated into different groups based upon the available norms form a representative school-population (Epstein, 2004). Scaled scores below 6 are categorized as "Low." Scores from 6 to 7 are categorized as "Below average." Scaled scores from 8 to 12 are considered "Average." Scaled scores from 13 to 14 refer to the category "Above average." Scaled scores from 15 to 16 are considered "High."

Table 4

Correlations Between Emotional and Behavioral Problems and Psychosocial Strengths

Variable	1	2	3	4	5	6	7	8	9	10
Problem scales										
1. Anxious/Depressed										
2. Withdrawn/Depressed	**.69*****									
3. Social problems	.38**	**.48*****								
4. Thought problems	**.63*****	**.64*****	**.51*****							
5. Attention problems	**.50*****	**.57*****	**.66*****	**.78*****						
6. Delinquent behavior	**.62*****	**.59*****	**.44*****	**.61*****	**.52*****					
7. Aggressive behavior	.39**	**.43*****	**.51*****	**.49*****	**.56*****	**.58*****				
Strength scales										
8. Interpersonal strength	−.12	−.27*	−.36**	**−.47*****	**−.46*****	−.40**	**−.48****			
9. Family involvement	−.12	−.27*	−.41**	−.41**	−.38*	−.34*	**−.43****	**.82*****		
10. Intrapersonal strength	−.12	−.30*	**−.42*****	**−.51*****	−.40**	−.31*	−.25	**.73*****	**.77*****	
11. Affective strength	−.27*	−.38**	−.28*	**−.49*****	−.38*	−.40**	−.33*	**.72*****	**.77*****	**.74*****

Note. Correlations in bold remain significant when corrected for multiple comparisons (Bonferroni correction), $p < .00091$.
*$p < .05$; **$p < .01$; ***$p < .001$.

qualitatively differ from the four-cluster solution. The optimized cluster solution is presented in Figure 2. In this figure, z-scores, indicating the relative differences between the cluster means and the total sample mean, are presented. The first cluster ($n = 8$) represented children with a very low level of Psychosocial Strengths ($z = -1.39$) and high levels of Internalizing Problems ($z = .59$), Externalizing Problems ($z = 1.06$) and Cognitive and Social Problems ($z = .97$). Because these children exhibited the most maladaptive profile, this cluster was labeled as "low strengths and high overall problems." The second cluster consisted of children ($n = 29$) exhibiting a moderate level of Psychosocial Strengths ($z = .29$) and low levels of Problem Behavior ($z = -.55$ for Internalizing Problems, $z = -.79$ for Externalizing Problems, and $z = -.62$ for Cognitive and Social Problems). This cluster was labeled as "modest strengths and low overall problems." The third cluster consisted of children ($n = 13$) with a relatively high amount of strengths ($z = .55$), relatively low levels of both Internalizing Problems ($z = -.45$) and Cognitive and Social Problems ($z = -.20$), and moderate levels of Externalizing Problems ($z = .30$). This cluster was labeled as "moderate strengths and externalizing problems." The fourth cluster represented children ($n = 3$) with high levels of both Strengths ($z = .85$) and Internalizing Problems ($z = .76$), relatively high levels of Cognitive and Social

Problems ($z = .52$), and moderate levels of Externalizing Problems ($z = -.08$). This cluster was labeled as "high strengths and internalizing, cognitive and social problems." The optimized solution accounted for 66%, 58%, 70%, and 65% of the variance in Strengths, Internalizing Problems, Externalizing Problems, and Cognitive and Social Problems.

To test the replicability of the obtained solution, four tests of omission were conducted. The overlap of the four new cluster solutions with the original solution was high (i.e., only three participants were clustered differently), indicating that the obtained cluster solution was stable.

In Table 5, mean scores for the different subscales per cluster are presented. ANOVA analyses were conducted to examine differences between the four clusters. Clusters differed most strongly on the domain of aggressive behavior ($\eta^2 = .67$), with children from Cluster 1 and Cluster 3 exhibiting the highest levels of aggression. Next, clusters differed strongly on the amount of attention problems ($\eta^2 = .60$). Again, children from Cluster 1 exhibited the most problems. Delinquent behavior and social problems, on the other hand, show the lowest differences across clusters ($\eta^2 = .30$ and $\eta^2 = .37$, respectively). When looking at the psychosocial strengths, interpersonal strengths differed most strongly across the clusters ($\eta^2 = .56$), with children from Cluster 1
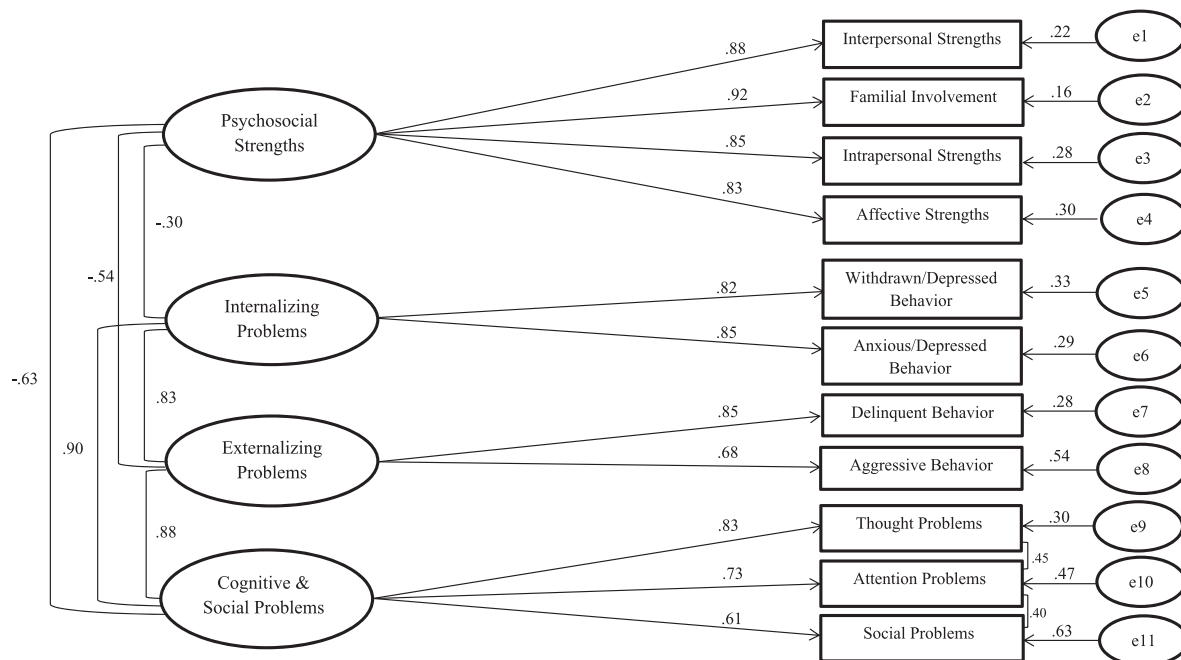
Figure 1. Confirmatory factor analyses (CFA) of the included variables. Due to item overlap correlations were allowed between thought problems and attention problems and between attention problems and social problems.

scoring significantly lower than the children from the other clusters.

Next, we evaluated the role of gender and CA and DA. No significant differences were found between the clusters in terms of gender distribution (Fisher's exact test = 3.38, $p = .34$). ANOVA analyses (Table 5) also indicated no significant differences in CA between clusters. The clusters

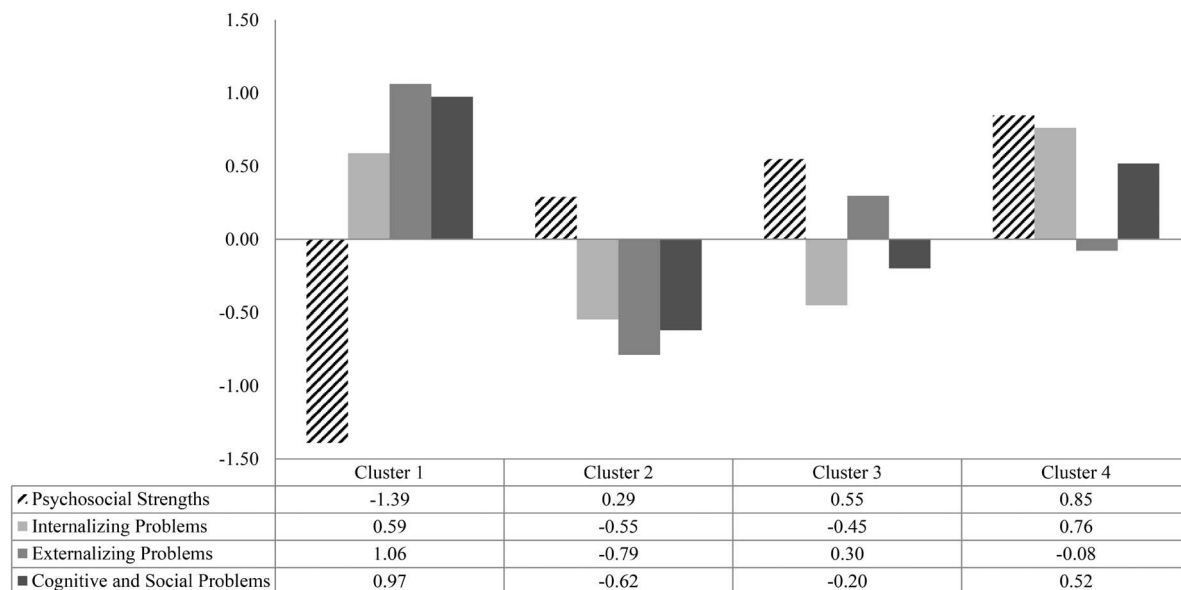|	Cluster 1	Cluster 2	Cluster 3	Cluster 4
⊿ Psychosocial Strengths	-1.39	0.29	0.55	0.85
▪ Internalizing Problems	0.59	-0.55	-0.45	0.76
▪ Externalizing Problems	1.06	-0.79	0.30	-0.08
▪ Cognitive and Social Problems	0.97	-0.62	-0.20	0.52

Figure 2. Four-cluster solution based on z-scores for Psychosocial Strengths, Internalizing Problems, Externalizing Problems, and Cognitive and Social Problems.

Table 5
ANOVAs Indicating Differences Between Clusters

| | Clusters | | | | | | | | | |
| | 1 | | 2 | | 3 | | 4 | | | |
	M	SD	M	SD	M	SD	M	SD	F (3,49)	η^2
Chronological age (years)	8.76	3.26	9.65	3.92	7.84	3.14	13.51	4.34	2.15	.12
Developmental age (months)	32.38[a]	10.28	44.66[b]	11.61	49.46[b]	8.55	54.33[b]	6.66	5.33[**]	.25
Anxious/Depressed	2.13[a]	1.35	.48[b]	.87	.85[ab]	1.07	4.33[ab]	3.06	12.64[***]	.44
Withdrawn/Depressed	4.75[a]	1.49	1.24[b]	1.50	1.31[b]	.95	3.33[a]	1.16	15.63[***]	.49
Social problems	6.38[a]	2.13	3.10[b]	1.61	3.54[b]	1.61	6.00[a]	1.00	9.75[***]	.37
Thought problems	3.13[a]	2.03	.41[b]	.68	1.23[b]	1.17	1.67[ab]	.58	13.22[***]	.45
Attention problems	10.63[a]	2.67	4.52[b]	1.33	6.46[b]	2.33	9.00[ab]	2.65	24.10[***]	.60
Delinquent behavior	2.50[a]	1.78	.52[b]	.99	1.39[c]	.96	2.00[ac]	1.73	7.14[***]	.30
Aggressive behavior	15.63[a]	6.70	3.45[b]	2.76	10.85[a]	2.08	7.33[c]	.58	33.06[***]	.67
Interpersonal strength	4.13[a]	.99	8.86[b]	1.66	9.08[b]	1.66	10.00[b]	2.65	20.54[***]	.56
Family involvement	6.25[a]	1.39	10.73[b]	2.12	11.62[b]	1.81	12.00[b]	2.65	14.22[***]	.46
Intrapersonal strength	5.25[a]	1.39	8.03[b]	2.21	9.69[c]	2.14	10.00[bc]	3.00	7.96[***]	.33
Affective strength	6.88[a]	1.46	10.38[b]	2.24	11.54[b]	2.11	11.33[b]	2.31	8.67[***]	.35

Note. Due to unequal variances, the Games Howell post hoc test is reported for the subscales anxious, thought, attention and aggressive behavior. All other tests report the LSD post hoc test. Different superscripts (a, b, c) refer to significant differences between clusters.
[**]$p < .01$, [***]$p < .001$.

did differ significantly for DA, with children from Cluster 1 having a significant lower DA than children from the other clusters.

Discussion

In recent years, calls have been made by international organizations, such as the American Association on Intellectual and Developmental Disabilities, to devote more attention to the strengths of children with disabilities, in order to arrive at a more balanced view on their adjustment and to support more tailor-made interventions. Although the behavioral phenotype of children with DS has been studied intensively, research on strengths in children with DS primarily attended to their adaptive skills (Dressler et al., 2010). The focus on these conceptual, practical, and social skills does give an indication of the ability of children with DS to cope with requirements of daily life, but does not offer a holistic view of the children's sources of well-being. Psychosocial strengths, as defined by Epstein and Sharma (1998), reflect broader emotional and behavioral skills, competencies, and characteristics that promote well-being and development (Tedeschi & Kilmer, 2005). These psychosocial strengths re-

main, until today, rather unexamined in children with DS (with the exception of social competence skills, Kasari et al., 2003). As a result, it also remains unclear how strengths and behavioral problems relate and co-occur in this population. This study aimed to obtain a more balanced view of children with DS by (1) describing both their problems and strengths, (2) by examining their interrelations, and (3) by evaluating profiles of problems and strengths.

Emotional-Behavioral Problems and Psychosocial Strengths in Youngsters With DS

First, in line with previous research (van Gameren-Oosterom et al., 2011; 2013), parents of children with DS reported most clinically elevated problems in the social and attention domain. These behavioral problems may be important to take into account, for example, within the school context. Teachers may try to avoid overstimulating children with DS, for instance by having frequent breaks to optimize their attention throughout the day. Consistent with previous studies (e.g., Evans & Gray, 2000), parents also reported high levels of thought problems, indicating that children with DS are at risk for developing obsessive or

repetitive thoughts or behaviors. Also in line with prior studies (Dykens & Kasari, 1997; van Gameren-Oosterom et al., 2011), parents reported low levels of anxious/depressive behavior. Notably, we found internalizing problems to be related with CA, indicating that older children with DS exhibit more anxious and withdrawn behavior than younger children. In the literature, this phenomenon has been linked to the higher proneness for depression, repeatedly reported in adults with DS (Dykens, 2007). This phenomenon might also reflect that the capacity to show internal distress increases as children with DS grow older or, alternatively, that parents become gradually more skilled at detecting signals of internal distress.

In addition, this study supplements the dominant focus on problems by also shedding light on the psychosocial strengths of children with DS. Interestingly, parents identified the most strengths for family involvement and expressing/ receiving affect. This suggests that parents generally experience their interactions with the child as positive, perceiving their child as having a real sense of belonging to the family. Most parents also indicate that their child effectively communicates emotions and is very receptive for affection from others. These findings are in line with previous studies identifying social understanding/behavior and empathy as the best developed skills of children with DS (Di Nuovo & Buono, 2011; Dykens et al., 2006; Kasari et al., 2003). One intriguing question is how the moderate level of interpersonal strengths (i.e., the ability to adapt to social situations) can be aligned with the documented high prevalence of social problems. In this regard, it is important to note that the CBCL-social problems scale assesses personal preference of the child and social acceptance by others, whereas the BERS-interpersonal strengths subscale focuses on actual behaviors during social interactions. Thus, it appears that, despite experiencing quite a number of social difficulties, children with DS are well able to adjust their emotions and behavior in more specific social situations (e.g., considering consequences of own behavior). Least reported by parents were intrapersonal strengths, indicating that children with DS experience less behaviors such as being self-confident, expressing a sense humor, and identifying own feelings. Results further suggest that strengths of children with DS improve as DA increases, indicating that the acquisition of conceptual, practical, and social skills fosters psychosocial strengths (or vice versa).

There was also a negative relation between CA and intrapersonal and affective strengths. As the cross-sectional design of this study precludes a thorough examination of age effects, inquiring about the developmental course of psychosocial strengths in longitudinal research is highly warranted.

The Interrelation Between Emotional-Behavioral Problems and Psychosocial Strengths in Youngsters With DS

In line with previous studies in different (e.g., Lambert et al., 2015) and similar populations (Jacola et al., 2014), the correlation analysis and the CFA pointed towards the distinctiveness of the concepts of behavioral problems and psychosocial strengths in children with DS. The strong negative relation between Cognitive and Social Problems and Psychosocial Strengths suggests that their co-occurrence is least likely. This is in line with Jacola and colleagues (2014), who reported a strong negative association between attention problems and adaptive skills. The negative relation between internalizing problems and strengths was, on the other hand, rather moderate, suggesting that they are more likely to co-occur.

Despite the moderate to strong correlations between strengths and problems, the CFA did support a four-factor model, identifying all four indicators as separable constructs. This implies that problems and strengths are not mutually exclusive and that both encompass distinct and valuable information about the behavioral presentation of a child with DS. Therefore, the next step was to examine naturally occurring profiles in this group.

Profiles of Emotional-Behavioral Problems and Psychosocial Strengths in Youngsters With DS

The cluster analysis identified four different profiles of problems and strengths. Interestingly, most children exhibited moderate to high levels of strengths (in combination with different levels and types of problems), whereas only a small number of children (Cluster 1, $n = 8$) showed an absence of strengths. This cluster (low strengths and high overall problems) represents the most maladaptive group of children with DS and is in strong contrast with Cluster 2 (modest strengths and low overall problems), the largest group of children exhibiting strengths but no behavioral problems. If psychosocial problems and strengths

would represent perfectly opposite constructs, one would expect only these two profiles to emerge. However, two other clusters (i.e., clusters 3 and 4) reveal children with more nuanced combinations of problems and strengths. Cluster 4 is particularly interesting, because this cluster represents children with DS who, in spite of several problems (such as internalizing problems), exhibit a high number of strengths.

A more in-depth examination of the problem subscales indicated that the differences between clusters concerning externalizing problems were mostly driven by differences in aggressive behaviors. Clusters differed, in contrast, only little on delinquent behavior. This might be related to the lower levels of variance in delinquent behaviors. This in-depth examination also indicated that, even though children from different clusters hardly differed on social problems (such as not being liked by other children), children with DS did differ strongly in their ability to adapt to social situations (i.e., interpersonal strengths).The finding that children with DS vary strongly in their interpersonal strengths is in contrast with the stereotypical idea that a child with DS is charming and sociable (Gilmore, 2006; Gilmore, Campbell, & Cuskelly, 2003). Although this stereotypical idea has been shown to be inaccurate, it still might impact the perception and expectations of laymen and parents (Gilmore, 2006; Gilmore et al., 2003). Therefore, these results stress the importance of an in-depth assessment of both problems and strengths.

Cluster 1 is characterized by a lower DA, compared to the other clusters, suggesting that the DA of children with DS substantially determines the behavioral phenotype. Stimulating conceptual, practical, and social skills might thus promote the development of psychosocial strengths or decrease behavioral problems in children with DS. However, it is also possible that the high amount of problem behaviors and the absence of strengths hinder this group from developing adaptive skills, leading to a lower DA. To further elucidate reciprocal relations between DA and the behavioral profile of children with DS, future research should use longitudinal designs.

In sum, the differentiated combinations of problems and strengths in this study indicate that the presence of emotional or behavioral problems does not necessarily exclude the presence of psychosocial strengths in children with DS (and vice versa), appealing clinicians, researchers, and caregivers to attend to both behavioral domains in their practices.

Clinical Relevance

By focusing on the deficits of children with DS, research and practice risk overlooking crucial keys to support these children and their families. This study stresses the importance of a more holistic approach by including both problems and psychosocial strengths in assessments of children with DS. By assessing a child's strengths, as well as his or her problems, we do not only attain a more comprehensive view on the child. The child and his or her parents might also feel more empowered, and a positive relationship between the child, the parents, and the practitioner can be facilitated (Tedeschi & Kilmer, 2005).

The current findings can also be integrated into interventions for children with DS because they might help (a) examining which children are most at risk for a maladaptive development, (b) uncovering sources of strengths upon which can be built in interventions, and (c) identifying which specific interventions are needed. In this regard, the children with low levels of strengths in addition to high levels of problems (Cluster 1) appear to be most at-risk and, hence, might need more intensive or longer support than other children with DS. Interventions for these children should target the diverse problem behaviors, while simultaneously addressing the strengths. Practitioners can, for example, try to foster family involvement by searching for activities that are fun and feasible for both the child with DS and the other family members. These activities might, at the same time, offer opportunities to deal with problem behaviors, such as aggression. Tailor-made interventions for children from Cluster 4 could, on the other hand, focus more on applying strengths in order to overcome the internalizing problems. Because these children exhibit higher levels of interpersonal and affective strengths, it might be interesting to work on communicating and interpreting signals of internal distress. Similarly, interventions for children from clusters 2 and 3 can be tailored towards their specific profiles by focusing on fostering specific domains of strengths. Yet, as these profiles are based on group patterns, it remains crucial to also address one individual's specific profile in order to tailor a person-based support and intervention plan.

Limitations and Future Directions

To the best of our knowledge, this study is among the first to derive profiles of problems and strengths in children with DS. Therefore, future research is needed to replicate these profiles and to gain insight in their developmental antecedents. For instance, research could examine whether and how profiles are related to different parenting behavior and to temperamental characteristics of the child. Research is also needed to examine the developmental pathways of these profiles.

Some limitations must be acknowledged. First, the generalizability of the present findings is limited by the small sample size, the convenience sampling method, and the use of parents as single informants. Another important issue relates to the selected instruments. Both the CBCL (Achenbach, 1991) and BERS-2 (Epstein, 2004) were originally developed for the general population and might not be specific or sensitive enough to capture all the problems and strengths of children with DS. Some scholars noted that the CBCL (Achenbach, 1991) may underestimate behavioral problems in children with intellectual disability (ID) because (1) problems that are typical for these children might not be assessed, and (2) children with ID might express these problems differently (Koskentausta et al., 2004). Yet, multiple studies have now shown that the CBCL is a suitable instrument to use in children with DS (e.g., Dekker et al., 2002) and more heterogeneous ID (e.g., Borthwick-Duffy, Lane, & Widaman, 1997). Previous research also found the BERS-2 (Epstein, 2004) adequate to assess psychosocial strengths in children with heterogeneous disabilities (e.g., Ren, 2010). Choosing these instruments in this study enabled the comparison to comparable studies with the CBCL (e.g., van Gameren-Oosterom et al., 2011; 2013) and BERS-2 (e.g., Jacola et al., 2014). Moreover, our study suggests that the BERS-2 (Epstein, 2004) is a promising instrument to identify strengths in youth with DS. Only the School Functioning scale proved less useful in this sample, as five items were less than 50% endorsed by parents, presumably because the items entailed school-specific goals not validated by children with DS. Thus, more research addressing the validity of all the BERS-2 scales in a DS population is needed. A final limitation is the cross-sectional design of the current study, which impedes the inference of causal relations. Future research using longitudinal designs is highly recommended to reveal the developmental pathways of behavioral problems and strengths in DS and understand their long-term interrelations.

Conclusion

This study contributes to research about the behavioral phenotype of children with DS by (1) describing their most prevalent problems and strengths, (2) examining the interrelations between behavioral problems and psychosocial strengths, and (3) by describing four different profiles of problems and strengths. These findings emphasize the importance of assessing psychosocial strengths in addition to behavioral problems and provide suggestions to integrate both concepts in interventions.

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