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Journal of Behavior Therapy and Experimental Psychiatry

journal homepage: www.elsevier.com/locate/jbtep



Early maladaptive schemas in children: Development and validation of the schema inventory for children

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ARTICLE INFO

Article history:

Received 3 August 2009

Received in revised form

29 October 2009

Accepted 3 November 2009

Keywords:

Early maladaptive schemas

Children

Validation

Confirmatory factor analysis

ABSTRACT

A Schema Inventory for Children (SIC) was developed, based on Young's schema model. Its psychometric properties were investigated in a non-clinical multi-ethnic sample of children, aged 8–13 years. The latent structure of the SIC was explored using a cross-validation design. Confirmatory factor analyses yielded satisfying fits for a modified model, that included 8 of the original 15 schema factors, as well as 3 new factors, each containing a theoretically meaningful combination of 2 or 3 original schema factors. Our data suggest that, to a certain extent, children present with the same schemas as identified in adolescents and adults, although some unique, children-specific schemas occurred. SIC item loadings were moderate to good, and all factors showed adequate discriminant validity. However, factor reliability estimates were mediocre, but in most cases still acceptable. Furthermore, results suggest adequate stability for all SIC scales. Finally, strong relations between most of the SIC scales and measures of psychopathology were found, although an opposite pattern of associations emerged for two scales (i.e., Enmeshment and Self-Sacrifice), suggesting that these schemas are not maladaptive –yet– at this young age.

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1. Introduction

Young's cognitive schema model on psychopathology (Young, 1994; Young, Klosko, & Weishaar, 2003) adopts a constructivist perspective, whereby individuals throughout their lives are understood to continually and actively structure and restructure experiences, construct their personal realities, and create their own representational models of the self, others, and the world (Mahoney, 1995). Young proposed that ongoing noxious experiences with caregivers and important others during childhood and adolescence, in interaction with innate temperamental factors, could result in self-protecting but dysfunctional ways of thinking, feeling, and behaving.

Ample research has established the detrimental consequences of toxic childhood experiences such as violence, maltreatment, and inadequate care giving for the child's emotional development. For example, maltreated children have often been found to suffer from low self-esteem, impaired perception of competence, and lack of internal motivation (Kim & Cicchetti, 2004). Maltreated children have also been shown to be at high risk of developing emotion

regulation deficits (Maugham & Cicchetti, 2002), and vulnerable personality features that remained stable for years (Rogosch & Cicchetti, 2004). Furthermore, inadequate care-giving has been related to negative representational models of attachment as well as to negative self images in the child (Cicchetti, 1991), and in case of parental rejection, relationships with low esteem and drug use in adolescents have been found (Simons & Robertson, 1989).

In accordance with these findings, Young postulated that distilled knowledge from unmet or frustrated emotional and developmental needs early in life is stored in schemas, leading to a greater risk of psychopathology (McGinn & Young, 1996; Young et al., 2003). Young therefore referred to these schemas as 'early maladaptive schemas' (EMSs). EMSs serve as a guide for the interpretation of information and problem-solving; they are assumed to affect a person's experiences in a biased and self-perpetuating way, leading to an increased rigidity of the schemas (cf., Williams, Watts, MacLeod, & Mathews, 1997).

EMSs have been extensively studied in adults with the Young Schema Questionnaire (YSQ, 2nd edition; Young & Brown, 1994). Although the results concerning the structure of the YSQ vary somewhat across the different studies, at least fifteen schemas have been identified (Lee, Taylor, & Dunn, 1999; Rijkeboer & van den Bergh, 2006; Schmidt, Joiner, Young, & Telch, 1995; Stopa, Thorne, Waters, & Preston, 2001; Waller, Meyer, & Ohanian, 2001; Welburn,

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Coristine, Dagg, Pontefract, & Jordan, 2002). EMSs in adults were related to personality disorders (cf., Ball & Cecero, 2001; Petrocelli, Glaser, Calhoun, & Campbell, 2001), and to a variety of psychiatric symptoms (cf., Pinto-Gouveia, Castilho, Galhardo, & Cunha, 2006; Welburn et al., 2002). In several retrospective studies among adults EMSs correlated highly with perceived parental malpractices (Crawford & O'Dougherty Wright, 2007; Cukor & McGinn, 2006; van Hanswijck de Jonge, Waller, Fiennes, Rashid, & Lacey, 2003; Harris & Curtin, 2002; Hartt & Waller, 2002; Messman-Moore & Coates, 2007; Shah & Waller, 2000; Wright, Crawford, & Del Castillo, 2009).

EMSs have also been investigated in adolescents (Lumley & Harkness, 2007; Muris, 2006; van Vlierberghe & Braet, 2007), using the short form of the YSQ (YSQ-sf, Young, 1998). In the studies by Muris and Van Vlierberghe and Braet some of the original items were rephrased to fit the adolescent life experience (e.g., “work” was replaced by “school”). Scale reliabilities in these studies were all satisfactory, and the schema scales were found to be related to a variety of psychological symptoms in non-clinical adolescents (Muris), depressed adolescents (Lumley & Harkness), and obese adolescents (Van Vlierberghe & Braet). Furthermore, relationships were found between the schemas and experiences of parental neglect and childhood adversity, measured retrospectively in the study by Lumley and Harkness, and assessed in the present by Muris.

The aforementioned findings lend support to some key premises of Young's schema approach, that is, all hypothesized EMSs are present in adolescence and adulthood, and are related to psychopathology as well as to recollections of inadequate parenting. Another core assumption of Young's schema model is that EMSs originate early in life. It is, therefore, theoretically and clinically relevant to determine whether these EMSs can also be identified in children, and if so, whether these schemas are indeed maladaptive at this early age. For example, some of these EMSs focus on restricted autonomy, i.e., feeling enmeshed with one's parents. Clearly, these schemas can be dysfunctional in late adolescence and adulthood, when at least some degree of autonomy is necessary to adapt to the demands of life. In young children, however, the maladaptive nature of these schemas is questionable.

To our knowledge, research into schemas in children is limited. So far, only in two related studies have EMSs been examined in young children. Stallard and Rayner (2005) developed a child version of the YSQ. A single item was formulated for each of the fifteen EMSs, so that all EMSs were reflected in a child-related context. Sixteen clinicians rated the face validity of the items, to check whether each item depicted the essence of a specific schema. Hereafter, 46 children (age: $M = 12.91$; $SD = 1.56$) completed the 15 item child version as well as the adult YSQ-sf, which was minimally adapted for children (e.g., “work” was replaced by “school”). Ten out of the 15 items were significantly correlated with the intended schemas, as measured by the YSQ-sf, while nearly significant coefficients were found for two items. Subsequently, Stallard (2007) tested the 12 item child version on its discriminative power and stability. The composite score of the questionnaire discriminated well between a small community sample ($n = 46$; age range: 11–16), and a clinical group ($n = 53$; age range: 9–18). To determine the stability, schemas were assessed twice in a group of 77 school children (aged 9/10), at a 6 months' interval. Correlation coefficients were modest (range r : 0.27–0.54), indicating that the endorsement of the specific schema items is moderately stable over time in these young children.

The work of Stallard and Rayner provided a first indication that Young's schemas might present with youngsters. Nevertheless, there are some limitations to these studies. Most importantly, their questionnaire contained only one item per schema. Single items,

however, do not grasp the multiple facets of each EMS, as the authors also do acknowledge. Moreover, the use of a single item representation did not enable a structural analysis of EMSs, leaving the identification of each separate EMS in childhood unfeasible. Finally, only small samples were included in these two studies, of which at least half of the participants were in their late childhood or adolescence (>11 yrs), hence no univocal information was obtained on schemas in young children.

Therefore, the aim of the present study was to construct a schema questionnaire for children containing multiple items per scale, and representing all 15 EMSs. Its psychometric properties, that is, dimensionality, reliability, and concurrent validity, were investigated in a large sample of children aged 8–13 years. First, it was explored whether all schemas, as found in adolescents and adults, can also be identified in these children. Secondly, the test-retest reliability of the identified factors was assessed, in order to investigate whether these schema factors represent stable constructs. Thirdly, the concurrent validity of established schemas was examined by relating them to temperament, and to depressive and aggressive mood. Theoretically, temperament as well as schemas are taken to be precursors of personality, both interacting with environmental factors (Shiner & Caspi, 2003). According to Young's theory (Young et al., 2003) early maladaptive schemas and the temperament dimension negative affectivity should be highly related, their interplay leading to an increased vulnerability for internalizing as well as externalizing problems. So, according to this model, positive relationships are to be expected between the schema scales and scales that measure negative affectivity, and depressive and aggressive mood. On the other hand, maladaptive schemas in children should not coincide with resilience factors such as positive affectivity and effortful control. However, as was mentioned before, doubts can be raised as to whether these premises hold true for at least some of Young's schemas. Hence, the ultimate question in the current investigation was: are all ‘early maladaptive schemas’ indeed dysfunctional in this pre-adolescent phase?

2. Methods

2.1. Participants

2.1.1. Identification of the underlying structure

The participating children represented a multi-ethnic sample ($N = 578$). For methodological reasons the total group was randomly split in two, by grouping odd and even case numbers. The odd cases formed the so-called *explorative sub-sample A*, that consisted of 289 children with a mean age of 10.8 ($SD = 1.1$, range: 8–13 yrs). In this sub-sample 44% were boys; there were 154 (53%) Dutch Caucasian children, 57 (20%) Dutch children with a Turkish background, 47 (16%) children with a European background other than Dutch, and 31 (11%) children with other mixed ethnic/national backgrounds. The even cases represented the *validation sub-sample B*, that also consisted of 289 children with a mean age of 10.8 ($SD = 1.1$, range: 8–13 yrs), of which 44% were boys. There were 169 (58%) Dutch Caucasian children, 54 (19%) Dutch children with a Turkish background, 37 (13%) children with a European background other than Dutch, and 29 (10%) children with other mixed ethnic/national backgrounds. There were no significant differences between the sub-samples A and B for the variables age, gender, and cultural background.

2.1.2. Estimation of the stability

A sub-sample of 245 children, drawn from both sub-sample A and B, performed a retest. These children had a mean age of 10.8 ($SD = 1.1$; range: 8–13 yrs), and 108 (44%) were boys. In this

sub-sample 166 (68%) children had a Dutch cultural background, 15 (6%) a Turkish background, 14 (6%) a European other than Dutch background, and 50 (20%) other mixed ethnic/national backgrounds. No significant differences were found between this sub-group and the rest of the total sample on the variables age and gender. However, there was a difference in cultural background ($\gamma = 0.244$; $p < .001$). In the retest sample relatively more children had a Dutch background.

2.1.3. Investigation of the concurrent validity

The relationship between the found schema factors and the temperament and mood scales was assessed in the total sample ($N = 578$).

2.2. Measures

2.2.1. Schema Inventory for Children

The 75 items of the Schema Inventory for Children (SIC) were specifically constructed in order to represent the 15 schema constructs of the YSQ: 'Emotional Deprivation', 'Abandonment', 'Mistrust/Abuse', 'Social Isolation', 'Defectiveness', 'Failure to Achieve', 'Functional Dependency', 'Vulnerability', 'Enmeshment', 'Subjugation', 'Self-Sacrifice', 'Emotional Inhibition', 'Unrelenting Standards', 'Entitlement', and 'Insufficient Self-Control'. The items had to be meaningful for children aged 8–13 years, and refer to common issues and experiences in a child's life. Middle childhood is characterized by a rapid development of self-concepts in different domains: academic, social, emotional, and physical. This means that school, education, family, and -increasingly so- peer relationships are important aspects of the child's life. These aspects guided the construction of the items. The items of the SIC had to refer to the "here and now", because they deal with noxious experiences that are still ongoing. They were therefore phrased in the present tense as opposed to the past tense used in the adult and adolescent versions. Each scale was represented by five items to which the child could react with "not true" – "yes definitely" on a four-point Likert-scale. Item construction was a joint effort between a child psychologist (GdB) and a YSQ specialist (MR). Pilot versions of the SIC were discussed with individual children and in small groups, to check whether the meaning of the items was perceived in the way that was intended. Items were reformulated if they proved controversial or unclear. The resulting final version of 75 items was tested in this study.

2.2.2. Early Adolescent Temperament Questionnaire-Revised

An adapted version of the Early Adolescent Temperament Questionnaire-Revised (EATQ-R; Ellis & Rothbart, 2001; Dutch translation: Hartman, 2000) was used, containing three temperament dimensions and two mood scales. Psychometric characteristics, including the underlying structure of this version of the EATQ-R, have been investigated and established in a Dutch multi-ethnic sample age 8–13 years (cf., de Boo & Kolk, 2007). Two broad levels of affectivity were distinguished: 'Positive Affectivity' (i.e., smiling, laughter, pleasure, and sensitivity to positive environmental cues; Cronbach's α : 0.70), and 'Negative Affectivity' (i.e., fear, frustration, and sensitivity to negative environmental cues; Cronbach's α : 0.71). A third dimension, labeled 'Effortful Control' (Cronbach's α : 0.70) included processes that modulate reactivity, facilitating or inhibiting the affective response, including attention, impulsivity, and inhibition (Goldsmith & Rothbart, 1991). Next to the temperament scales, this version of the EATQ-R included two mood scales, i.e. – 'Depressive Mood' (Cronbach's α : 0.72), and 'Aggressive Mood' (Cronbach's α : 0.70), that were operationalized as traits. The items were formulated as statements like "It really

annoys me to wait in long lines", to which the child could react with "not true" – "always true" on a five-point Likert-scale.

2.3. Procedure

Children were recruited from 10 elementary schools in the Netherlands. All children had mastered the Dutch language. Parents gave passive consent for their children to participate, in line with the school's policies. The parents were fully informed about the purpose of the study and the fact that they could withdraw their consent at any time during the research project. The ethical committee of our department agreed with this consent procedure. Eight parents objected to their child's participation. The children were free to refuse cooperation, but none of them refused. Children endorsed the items of the questionnaires during classes, whilst their teacher and two research assistants were present to answer their questions. Sixteen children with reading difficulties got extra help, by having the items read aloud. All children received a standardized set of instructions, advising them to read each item carefully and to select the answer that seemed most appropriate. Also, they were reminded that their responses would be kept confidential.

2.4. Statistical analyses

2.4.1. Model generation and validation

In order to analyze and optimize the dimensionality of the SIC confirmatory factor analyses were conducted, using LISREL 8.51 (Jöreskog & Sörbom, 2001). Since mild deviations from multivariate normality were found in the observed variables, a square root transformation on the data points was performed. As a first step, a model-generating procedure was followed (Jöreskog & Sörbom, 1996), using the explorative sub-sample A. In this procedure the initial model is modified and repeatedly tested until an acceptable fit is obtained. Thus, the hypothesized latent structure of the SIC containing 15 factors was explored. An optimal composition of indicators was created, by taking several modification measures (see Bollen, 1989). First, CFA's were conducted at the factor level. Items with low factor loadings and high-standardized residuals were deleted. Secondly, an exploration of the total factor structure was performed, using the remaining item pool. Items with multiple loadings were deleted and non-independent factors were combined when this was theoretically meaningful. While post hoc model modification involves a considerable risk of capitalization on chance, replication of the re-specified model in another sample is warranted (MacCallum & Austin, 2000). Hence, as a next step, a strictly confirmative procedure was followed, by testing the absolute fit of this modified model in sub-sample B, the validation sample.

To evaluate the fit of each model, several subjective indices of goodness-of-fit were used. First the χ^2 statistic was inspected, which Jöreskog and Sörbom (1989) advise to evaluate in comparison with the degrees of freedom. Mueller (1996) suggests as a 'rule of thumb' criterion for good fit: $\chi^2/df < 2$. In addition to this ratio, several other fit indices were used. Following recommendations by Hu and Bentler (1998) the RMSEA, SRMR, NNFI, and CFI were included.

2.4.2. Analyzing the stability of the SIC

The scales of the SIC were measured twice, with a 4 weeks' time interval in between. The stability of each scale was estimated, using Pearson's correlation coefficient. The Statistical Package of the Social Sciences (SPSS) version 16.0 was utilized.

2.4.3. Analyzing the concurrent validity of the SIC

The patterns of associations between the scales of the SIC with the temperament and the mood dimensions of the EATQ-R were

studied in separate analyses by means of structural equation modelling, using LISREL 8.51. In each analysis, two a priori specified nested structural models were fit to the data. In these models the scales of the SIC were defined as endogenous variables, and each the temperament and the mood scales as exogenous variables. In the first model, or independence model, the endogenous and exogenous variables were specified to be unrelated. In the second model, or saturated model, all paths between the endogenous and exogenous variables were estimated freely. By specifying two nested models, comparisons between these models can be performed directly with the $\chi^2_{\text{difference}}$ test. A significant difference between the models is indicative of a better fit to the data. In both models the latent variables were indicated by one observed variable, representing the mean score of the scale under study, so no measurement model was estimated. To solve the problem of identification in this particular case (see Kelloway, 1998), on the endogenous side the common factor loading of each variable was fixed to be equal to the square root of the reliability coefficient involved, $\sqrt{(\alpha)}$, and the unique variance of this variable was fixed at a value $1-\alpha$. Hence, the reliability of each SIC scale was taken into account. On the exogenous side, the common factor loadings were fixed to equal 1 and the unique variances to equal 0, assuming perfect reliability in the indicators of the EATQ-R. Thus, parameter estimates can be taken as moderately conservative, while they are not corrected for unreliability due to measurement error in the exogenous indicators.

3. Results

3.1. Model generation and validation

After the analyses of the hypothesized latent structure of each schema scale and the multidimensionality of the complete SIC in sub-sample A, 35 items with non salient factor loadings ($\lambda < 0.30$), extreme standardized residuals ($\text{SRS} > |5.0|$), and multiple cross loadings were removed. The removal of items was done stepwise, deleting the item with the most problematic content at each step. Furthermore, theoretically linked non-independent factors were combined.

Eight of the original 15 factors could be identified, that is, 'Mistrust/Abuse', 'Defectiveness', 'Failure to Achieve', 'Unrelenting Standards', 'Self-Sacrifice', 'Enmeshment', 'Entitlement', and 'Insufficient Self-Control/Discipline'. The remaining original factors were combined to form three new factors. The first new factor was called 'Loneliness' ('Emotional Deprivation' and 'Social Isolation'), encompassing core beliefs about not being listened to or taken care of, and being alone or an outsider. Another new factor was 'Vulnerability' ('Abandonment' and 'Vulnerability to Harm and Illness'), representing basic ideas on being vulnerable to emotional and physical loss, such as the death of a loved one, or the serious loss of one's health. A third factor was called 'Submission' ('Functional Dependence', 'Subjugation', and 'Emotional Inhibition'), corresponding to core beliefs that are prevalent in Cluster C personality disorders (American Psychiatric Association, 2000). This modified model contained 40 items, spread over 11 factors

(see Appendix). The absolute fit of the model was tested in the explorative sub-sample A. All fit indices showed a good fit to the data (see Table 1): $\chi^2/df < 2$, RMSEA and SRMR < 0.06 , NNFI and CFI ≥ 0.95 . Cross-validation of this re-specified model in sub-sample B revealed a slightly reduced, but still satisfactory fit on all indices (see Table 1): $\chi^2/df < 2$, RMSEA and SRMR < 0.06 , NNFI = 0.94 and CFI = 0.94.

3.2. Parameters estimated within the modified model

Table 2 provides the factor loadings with its standard errors of each item in both the sub-samples A and B. The range of λ was 0.46–0.86 ($M = 0.66$) in sub-sample A, and 0.39–0.70 ($M = 0.58$) in sub-sample B, hence, the convergent validity of the indicators of each factor was moderate to good. All loadings were significant ($\lambda > 2 \text{ SE}$; see Anderson & Gerbing, 1988). The amount of variance explained by each factor (reliability) was generally acceptable, although in some cases rather modest, with R^2 ranging from 0.50 to 0.79. Lowest reliability coefficients were found for 'Insufficient Self-control/Discipline', $R^2 = 0.56$ in sample A and $R^2 = 0.50$ in sample B.

The correlations between the factors within the modified model of the SIC were for the most part moderate in both sub-samples A and B (see Table 3), indicating that good discriminant validity was established for most latent variables. However, some factors revealed a strong common variance, although none of the confidence intervals ($\pm 2 \text{ SE}$; see Anderson & Gerbing, 1988) included 1.0, suggesting that all factors represented distinct constructs. For 'Self-Sacrifice' and 'Entitlement' the correlations with most other factors tended to be low, and for 'Enmeshment' even negative –although low- coefficients were found.

3.3. Test-retest reliability

Pearson's correlations between the observed scores on the scales of the SIC ranged from $r = 0.53$ to $r = 0.79$ (see Table 2) with an average of $r = 0.67$. Except for 'Defectiveness' ($r = 0.53$), all scales showed test-retest coefficients above 0.60. Subsequently, the stability of the factor scores was inspected, by applying a correction for attenuation, based on the reliability estimates of each factor as found in the structural analyses. All attenuated correlation coefficients were very high, range $r' = 0.85$ to $r' = 1.00$ (see Table 2), indicating that the SIC represented fairly stable constructs, especially so given the young age of these participants.

3.4. Concurrent validity of the SIC

The relationships between the SIC and the temperament and the mood scales were measured by means of two independence and saturated models. Both saturated models yielded a significant improvement of fit compared to their specific independence model, SIC vs. temperament scales: $\chi^2_{\text{diff}} = 528.90$, $\Delta df = 43$, $p < .001$, and SIC vs. mood scales: $\chi^2_{\text{diff}} = 431.67$, $\Delta df = 31$, $p < .001$. This means that significant associations between the endogenous and both sets of exogenous variables were found (see Table 4).

Table 1
Fit indices for the modified model of the SIC.

	χ^2	df	χ^2/df	RMSEA (90% CI)	NNFI	CFI	SRMR
Sample A	1150.57	685	1.68	0.045 (0.040–0.050)	0.95	0.96	0.055
Sample B	1240.19	685	1.81	0.051 (0.046–0.056)	0.94	0.94	0.058

Note. χ^2 = chi-square statistic; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; NNFI = Non-Normed Fit Index.
CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual.

Table 2

Factor Loadings (λ) with Standard Errors (SE) for the Items of the SIC (see Appendix), and Reliabilities of each Schema Scale.

Schema	Item	Sample A	Sample B
		λ (SE)	λ (SE)
<i>Loneliness^a</i>			
	10	0.62 (0.06)	0.65 (0.06)
	15	0.64 (0.06)	0.66 (0.06)
$R^2 = 0.76/0.76$	19	0.64 (0.06)	0.58 (0.06)
$r = 0.68; r' = 0.89$	30	0.57 (0.06)	0.52 (0.06)
	40	0.66 (0.06)	0.67 (0.06)
<i>Vulnerability^b</i>			
	4	0.62 (0.06)	0.57 (0.06)
	9	0.64 (0.06)	0.68 (0.06)
$R^2 = 0.77/0.74$	16	0.56 (0.06)	0.50 (0.06)
$r = 0.79; r' = 1.00$	17	0.64 (0.06)	0.54 (0.06)
	23	0.69 (0.05)	0.60 (0.06)
	27	0.56 (0.06)	0.48 (0.06)
<i>Mistrust/Abuse</i>			
	20	0.66 (0.06)	0.52 (0.06)
$R^2 = 0.68/0.54$	31	0.61 (0.06)	0.47 (0.06)
$r = 0.67; r' = 1.00$	35	0.66 (0.06)	0.59 (0.06)
<i>Defectiveness</i>			
	2	0.52 (0.06)	0.49 (0.06)
$R^2 = 0.58/0.62$	3	0.58 (0.06)	0.58 (0.06)
$r = 0.53; r' = 0.88$	11	0.59 (0.06)	0.69 (0.06)
<i>Failure</i>			
	18	0.75 (0.05)	0.69 (0.06)
$R^2 = 0.82/0.72$	36	0.86 (0.05)	0.64 (0.06)
$r = 0.65; r' = 0.85$	38	0.70 (0.05)	0.70 (0.06)
<i>Submission^c</i>			
	7	0.51 (0.06)	0.51 (0.06)
$R^2 = 0.68/0.70$	21	0.48 (0.06)	0.47 (0.06)
$r = 0.75; r' = 1.00$	22	0.52 (0.06)	0.60 (0.06)
	25	0.71 (0.06)	0.67 (0.06)
	39	0.48 (0.06)	0.57 (0.06)
<i>Unrelent. Standards</i>			
	5	0.54 (0.06)	0.42 (0.06)
$R^2 = 0.62/0.58$	26	0.58 (0.06)	0.53 (0.06)
$r = 0.74; r' = 1.00$	29	0.66 (0.06)	0.70 (0.06)
<i>Self-Sacrifice</i>			
	13	0.56 (0.06)	0.65 (0.06)
$R^2 = 0.66/0.61$	28	0.70 (0.06)	0.49 (0.07)
$r = 0.61; r' = 0.96$	33	0.60 (0.06)	0.60 (0.06)
<i>Enmeshment</i>			
	1	0.59 (0.07)	0.54 (0.07)
$R^2 = 0.67/0.63$	8	0.75 (0.07)	0.66 (0.07)
$r = 0.62; r' = 0.95$	12	0.54 (0.07)	0.60 (0.07)
<i>Entitlement</i>			
	24	0.72 (0.06)	0.65 (0.07)
$R^2 = 0.69/0.62$	32	0.57 (0.06)	0.56 (0.07)
$r = 0.68; r' = 1.00$	34	0.65 (0.06)	0.57 (0.07)
<i>Insuff. self-control</i>			
	6	0.54 (0.07)	0.46 (0.07)
$R^2 = 0.56/0.50$	14	0.46 (0.07)	0.39 (0.07)
$r = 0.63; r' = 1.00$	37	0.63 (0.07)	0.63 (0.07)

R^2 = squared multiple correlation: reliability (sample A/sample B); r = Spearman's correlation; stability; r' = attenuated stability coefficient.

^a Loneliness = Emotional Deprivation + Social Isolation.

^b Vulnerability = Abandonment + Vulnerability to Harm and Illness.

^c Submission = Dependency + Subjugation + Emotional Inhibition.

As was expected, most schema scales yielded significant and, in most cases, strong positive associations with 'Negative Affectivity', standardized regression weights ranging from $\gamma = 0.17, p < .001$ to $\gamma = 0.60, p < .001$, and with 'Depressive Mood', range: $\gamma = 0.26, p < .001$ to $\gamma = 0.56, p < .001$. Also mild positive relationships were found between most schema scales and 'Aggressive Mood', range: $\gamma = 0.14, p < .001$ to $\gamma = 0.39, p < .001$. Strongest positive

associations with 'Aggressive Mood' were yielded for 'Entitlement', $\gamma = 0.39, p < .001$, 'Mistrust/Abuse', 'Insufficient Self-Control', and 'Defectiveness' ($\gamma = 0.38, p < .001$ for all). All of these aforementioned findings are in line with Young's theory, stating that early schemas are maladaptive in nature. However, two schema scales turned out to have a different direction in their relationships. 'Self-Sacrifice' and, even more so, 'Enmeshment' showed negative associations and no or mildly positive associations with scales representing psychopathology; respective standardized regression weights: 'Negative Affectivity', $\gamma = 0.17, p < .001$ and $\gamma = -0.06$, ns, 'Depressive Mood', $\gamma = 0.26, p < .001$ and $\gamma = -0.06$, ns, and 'Aggressive Mood', $\gamma = -0.13, p < .05$ and $\gamma = -0.29, p < .001$. Both 'Self-Sacrifice' and 'Enmeshment' were also positively associated with temperament dimensions that are related to resilience: 'Positive Affectivity', $\gamma = 0.42, p < .001$ and $\gamma = 0.25, p < .001$, and 'Effortful Control', $\gamma = 0.31, p < .001$ and $\gamma = 0.41, p < .001$.

4. Discussion

The dimensionality, stability, and concurrent validity of the Schema Inventory for Children (SIC) were investigated in a non-clinical multi-ethnic sample of children, aged 8–13 years. The latent structure of the SIC was explored, using a cross-validation design. Confirmatory factor analyses yielded a good fit in the explorative sub-sample and a satisfying replication of fit in the validation sub-sample for a modified model, that included 40 items and 11 factors. Eight of the original 15 schema factors could be identified, as well as 3 new factors, each containing a theoretically-meaningful combination of 2 or 3 original schema factors. 'Emotional Deprivation' and 'Social Isolation' were clustered into a factor called 'Loneliness', 'Abandonment' and 'Vulnerability' were aggregated into a new factor 'Vulnerability', and finally 'Functional Dependence', 'Subjugation', and 'Emotional Inhibition' were merged into a factor called 'Submission'.

Interestingly, these new factors bear resemblance with content profiles found in research on schema modes in adults (Lobbestael, 2008; Lobbestael, van Vreeswijk, & Arntz, 2008). Schema modes are, next to schemas and coping styles, one of the central concepts of the schema therapy model developed by Young. Schema modes are broadly defined as the moment-to-moment emotional states and coping responses that are guided by certain combinations of schemas (Young et al., 2003). The content of some of these modes coincide with the aggregated schema factors found in the SIC. For example, the vulnerable child modes 'Lonely child' and 'Abandoned Child' are theoretically closely tied to the SIC factors 'Loneliness' and 'Vulnerability' (Lobbestael, van Vreeswijk, Arntz, Spinhoven, & 't Hoen, 2005). Apparently, these specific clusters of schemas can be found also in adults.

Within the re-specified 11 factor model all loadings were moderate to good in both sub-samples. Although some factors were strongly related, again all 11 factors appeared to represent significantly distinct constructs in both sub-samples, and most factors showed a satisfactory discriminant validity. Factor reliability estimates, however, were mediocre, but in most cases still acceptable.

Since the modified model could be replicated in another sub-sample, thereby reducing the risk of misspecification due to specific sample statistics (Smith & McCarthy, 1995), and since parameter estimates were all adequate, the found factor solution can be considered as fairly robust. This means that these young children, to a certain extent, present with the same schemas as identified in adolescents and adults. Hence, no evidence was found against a key premise of Young's schema model (Young et al., 2003), that is, that –at least some– schemas are developed early in life.

Table 3

Intercorrelations and Standard Errors (in parentheses) between the 11 factors of the SIC in Sample A and B.

	1	2	3	4	5	6	7	8	9	10	11
1. <i>Loneliness</i>	A 1.00 B 1.00										
2. <i>Vulnerability</i>	A 0.87 (0.03) B 0.72 (0.05)	1.00 1.00									
3. <i>Mistrust/Abuse</i>	A 0.69 (0.06) B 0.84 (0.06)	0.77 (0.05) 0.79 (0.07)	1.00 1.00								
4. <i>Defectiveness</i>	A 0.74 (0.06) B 0.79 (0.05)	0.76 (0.06) 0.67 (0.06)	0.77 (0.07) 0.79 (0.08)	1.00 1.00							
5. <i>Failure</i>	A 0.75 (0.04) B 0.81 (0.05)	0.60 (0.05) 0.60 (0.06)	0.40 (0.07) 0.54 (0.08)	0.53 (0.07) 0.86 (0.05)	1.00 1.00						
6. <i>Submission</i>	A 0.84 (0.04) B 0.83 (0.04)	0.81 (0.05) 0.63 (0.06)	0.66 (0.06) 0.67 (0.08)	0.67 (0.07) 0.81 (0.06)	0.62 (0.06) 0.89 (0.04)	1.00 1.00					
7. <i>Unrel. Stand.</i>	A 0.60 (0.07) B 0.63 (0.07)	0.84 (0.05) 0.83 (0.06)	0.70 (0.07) 0.66 (0.09)	0.50 (0.09) 0.59 (0.08)	0.48 (0.07) 0.69 (0.07)	0.61 (0.07) 0.65 (0.07)	1.00 1.00				
8. <i>Self-Sacrifice</i>	A 0.13 (0.08) B 0.20 (0.08)	0.40 (0.07) 0.60 (0.07)	0.26 (0.08) 0.34 (0.10)	0.03 (0.09) 0.17 (0.09)	0.05 (0.08) 0.27 (0.08)	0.25 (0.08) 0.30 (0.07)	0.46 (0.08) 0.50 (0.09)	1.00 1.00			
9. <i>Enmeshment</i>	A −0.15 (0.08) B −0.02 (0.08)	−0.07 (0.08) 0.23 (0.08)	−0.12 (0.09) 0.15 (0.10)	−0.16 (0.09) 0.03 (0.09)	−0.15 (0.08) 0.03 (0.09)	−0.24 (0.08) 0.06 (0.09)	−0.11 (0.09) 0.12 (0.09)	0.47 (0.08) 0.61 (0.08)	1.00 1.00		
10. <i>Entitlement</i>	A 0.13 (0.08) B 0.34 (0.08)	0.26 (0.08) 0.36 (0.08)	0.42 (0.08) 0.64 (0.08)	0.41 (0.08) 0.43 (0.09)	−0.13 (0.08) 0.17 (0.09)	0.24 (0.08) 0.34 (0.08)	0.18 (0.09) 0.26 (0.09)	−0.01 (0.09) 0.05 (0.10)	0.03 (0.09) 0.02 (0.09)	1.00 1.00	
11. <i>Insuff. Contr.</i>	A 0.63 (0.07) B 0.64 (0.08)	0.71 (0.06) 0.53 (0.08)	0.61 (0.08) 0.70 (0.09)	0.60 (0.09) 0.41 (0.10)	0.48 (0.07) 0.56 (0.08)	0.74 (0.07) 0.50 (0.09)	0.70 (0.08) 0.62 (0.09)	0.17 (0.09) 0.05 (0.10)	−0.33 (0.09) −0.09 (0.10)	0.18 (0.09) 0.22 (0.10)	1.00 1.00

Note. All are attenuated correlation coefficients.

It should be noted, however, that unidimensionality was established only for eight of the 15 hypothesized schema factors. Whereas all original schemas could be identified in adolescents (van Vlierberghe, 2008), and adults (e.g., Lee et al., 1999; Rijkeboer & van den Bergh, 2006), a less differentiated picture emerged in our study with children. Several explanations for this finding can be put forward. For example, it might be that schemas become more fine-grained by age (see Richardson, 1998), so in these young children more clusters of negative themes are to be found. On the other hand, it should be remembered that this study relied on a non-clinical sample. If a clinical sample of children had been examined, more variance in the data might have appeared (cf., Rijkeboer, van den Bergh, & van de Bout, 2005), possibly leading to the identification of additional independent factors. Therefore, a replication of this study in a clinical sample is warranted, using all the original items of the SIC. Moreover, most factors in the re-specified model were represented by three items only. This could also explain why some of the factors, which have emerged as separate in studies of the YSQ in adolescents and adults, became merged in this study. It might be that insufficient item coverage of the individual schemas did not enable them to emerge as separate factors. Hence, additional items need to be developed and tested in new samples.

Following this investigation of the dimensional structure of the SIC, the stability of the established factors was analysed. Adequate

test-retest coefficients were found, especially at the factor score level, indicating that the schema constructs were stable over a period of four weeks. This is consistent with findings of studies on the stability of schemas in adults (Blissett & Farrow, 2007; Rijkeboer et al., 2005). Yet, conclusions should be made with caution, since the time frame of our study was rather short. Nevertheless, it should be noted that Stallard (2007) used a prolonged time interval of six months and that significant, although modest, stability coefficients were still found for their schema measure in children, resembling results of recent research, indicating that personality is already moderately stable in childhood (cf., Shiner, 2005).

Finally, an investigation into the concurrent validity of the established factors was performed. Multivariate analyses revealed that, as expected, most schemas are positively related to the temperament dimension 'Negative Affectivity' and in a few cases negatively related to 'Effortful Control'. Similar results were found in adolescents (Muris, 2006), and adults (Rijkeboer, van den Bergh, & Arntz, submitted for publication). Hence, it seems to be an age-independent finding that most schemas coincide with the trait neuroticism and do not or negatively relate to conscientiousness.

As predicted, most scales of the SIC were positively related to aggressive, and especially to depressive mood. This is well in keeping with results of studies among adolescents and adults (e.g., Harris & Curtin, 2002; Shah & Waller, 2000; Waller, Shah, Ohanian, & Elliott, 2001). Largest positive relationships between schemas

Table 4

Significant Associations (Gamma with its Standard Error in Parenthesis) between the Scales of the SIC and the Temperament Scales and Mood scales (EATQ-R).

	Temperament			Mood	
	NA	PA	EC	Aggres	Depres
<i>Loneliness</i>	0.40 (0.05)		−0.20 (0.05)	0.25 (0.04)	0.56 (0.04)
<i>Vulnerability</i>	0.57 (0.05)	0.13 (0.04)		0.22 (0.04)	0.54 (0.04)
<i>Mistrust/Abuse</i>	0.55 (0.06)			0.38 (0.05)	0.37 (0.05)
<i>Defectiveness</i>	0.41 (0.06)			0.38 (0.05)	0.35 (0.05)
<i>Failure</i>	0.26 (0.05)		−0.16 (0.05)	0.15 (0.04)	0.46 (0.04)
<i>Submission</i>	0.40 (0.05)		−0.17 (0.05)	0.14 (0.05)	0.48 (0.05)
<i>Unrelenting Standards</i>	0.60 (0.05)			0.28 (0.05)	0.47 (0.05)
<i>Self-Sacrifice</i>	0.17 (0.05)	0.42 (0.05)	0.31 (0.05)	−0.13 (0.05)	0.26 (0.05)
<i>Enmeshment</i>		0.25 (0.05)	0.41 (0.05)	−0.29 (0.05)	
<i>Entitlement</i>	0.26 (0.06)			0.39 (0.05)	
<i>Insufficient Self-Control</i>	0.47 (0.06)		−0.40 (0.06)	0.38 (0.05)	0.53 (0.05)

Note. NA = Negative Affectivity; PA = Positive Affectivity; EC = Effortful Control; Aggres = Aggressive Mood; Depres = Depressive Mood.

and aggressive mood were found for 'Defectiveness', 'Mistrust/Abuse', 'Entitlement' and 'Insufficient Self-Control'. Interestingly, clear relationships have also been established between the latter three schemas and the trait aggressiveness in late adolescents and adults (Tremblay & Dozois, 2009). In a study by Calvete (2008) amongst adolescents, the sum score of the items of the scale 'Entitlement' appeared to be a strong predictor of aggressive behaviour half a year later. Furthermore, Donnellan, Trzesniewski, Robins, Moffitt, and Caspi (2005) found a robust relation between low self-esteem -or the view of oneself as being defective- and externalizing problems, whereby the effect on specifically aggression was independent of narcissism. So, being able to identify these aforementioned four schemas in young children might be of great clinical relevance, for example, in order to set up aggression prevention programs in which these beliefs can be addressed.

An important finding in our study is that, although most schemas in children were related to indicators of psychopathology, two schemas revealed a different, opposite pattern. 'Self-Sacrifice' and even more so 'Enmeshment' did not, or hardly, relate to 'Negative Affectivity', and 'Depressive Mood'. They had strong positive relationships with 'Positive Affectivity' and 'Effortful Control', and negative associations with 'Aggressive Mood'. Thus, our data suggest that, in contrast to Young's theory, these schemas cannot be considered maladaptive in childhood. The adaptive nature of 'Enmeshment' was already predicted, whilst the developmental task of autonomy will take place mainly in adolescence, so the striving for strong bonds and sharing with parents is age appropriate for young children. Also, cognitions that are centred around the need to please others, and giving up one's own needs in order to help others, might just as well be indicators of pro-social behaviour. In the egocentric phase of childhood, self-sacrifice may turn out to be adaptive, whereas later in life, when one needs to take care of oneself more and more, strong beliefs of self-sacrifice may become increasingly pathologic.

Evaluating our study, important strengths were the cross-validation design, whereby the explorative model could be tested directly in the validation sample. Furthermore, the concurrent validity was examined by means of multivariate analyses, taking the shared variance of measures under study into account. However, this study is not exempt of limitations. As noted before, non-clinical samples of school children were examined, even though assessment of schemas originally focussed on identifying persons at risk of pathology. Hence, a replication in a clinical sample of children is warranted. Furthermore, while model fits were satisfying, mediocre factor reliability estimates were yielded. The SIC in its present form may therefore be valuable for research purposes, but must be used with caution in clinical settings. New items are needed to improve the homogeneity of the scales. The most serious weakness is the method of data assembly in order to evaluate the concurrent validity of the SIC. Cross-sectional analyses of self-reports can spuriously increase the strength of associations. Nevertheless, we hope that the outcomes of this study will inspire other researchers to include cognitive schemas in their work, as we believe this will provide valuable new insights into how personality development might derail.

Acknowledgements

The authors thank Arnoud Arntz and two anonymous reviewers for their valuable comments on an earlier version of this paper.

Appendix

Schema Inventory for Children (SIC) (de Boo & Rijkeboer, 2009)

1. My parents always know where I am and what I'm doing.

2. I'm not worth loving.
3. If others whom I really like would find out about my nasty sides, they won't want to be with me anymore.
4. I'm often afraid of being let down.
5. I get angry with myself if I make mistakes.
6. I can't stick to my intentions.
7. I can't solve problems on my own.
8. I always tell my parents what I've been doing at school.
9. I don't feel I belong.
10. I always feel really bad if a friend doesn't want to play with me, because I fear that he/she doesn't want to be my friend anymore.
11. If other children really got to know me, they wouldn't want to be my friend.
12. I never hold secrets for my parents, nor do they for me.
13. I always listen carefully to what my teacher tells me, because I want him/her to like me.
14. I often forget to do things, even when I truly promised to do them.
15. In a group of children I feel like an outsider.
16. I'm often worried that we'll lose all our money and become poor.
17. I'm often afraid that I'll get very ill.
18. I feel ashamed, because I'm not good at anything.
19. Nobody ever pays me any attention.
20. Other children and grown-ups are often dishonest.
21. I'm too shy to show someone that I like him/her.
22. I find it hard to stick up for myself.
23. I always have the feeling that something awful is going to happen.
24. I'm more important than other children.
25. I have to do what other people want, otherwise they won't like me.
26. My work is never that good; I think I can always do better.
27. I'm often afraid that someone I love is going to die.
28. I'm always trying to please others.
29. I feel awful if I don't think I've done my utmost best.
30. There's nobody who really listens to me.
31. You can never trust someone else.
32. I think I should always get my own way.
33. I always try very hard to be sweet to others.
34. I don't want to be treated like other children; I'm special.
35. I often have to protect myself against other children or grown-ups.
36. Other children are much better at everything than I am.
37. I often do things without thinking and feel sorry about them later.
38. I'm more stupid than most children.
39. I need a lot more help than other children do.
40. I don't feel comfortable with other people.

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