

## RESEARCH ARTICLE

# The trajectories of internalizing and externalizing problems from early childhood to adolescence and young adult outcome

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## ABSTRACT

**Objectives:** Trajectory studies are increasingly used to explore the developmental course of internalizing and externalizing problems. However, less is known about the adult outcome of children on different childhood trajectories. The current study explores how the trajectories of internalizing and externalizing problems from early childhood to adolescence are associated with the psychosocial wellbeing of normal population young Finnish adults (n=144).

**Methods:** The trajectories were based on mothers' reports of the Child Behavior Checklist evaluated at the ages of 4-5, 8-9 and 16-17 years. The young adult outcome was based on the Adult Self Report and the EuroHIS-8

Quality of life questionnaire at the age of 27 years.

**Results:** A high or increasing trajectory of internalizing problems from early childhood to adolescence increased the risk of internalizing problems, depressive problems and avoidant personality problems at the age of 27. High trajectory of internalizing problems decreased the risk of externalizing and antisocial problems at young adulthood. A high trajectory of externalizing problems in childhood increased the risk of a wide range of emotional and behavioral problems and poorer quality of life in young adulthood.

**Discussion:** The study suggests that especially the developmental pattern of high externalizing problems is set at an early age and increases the risk of poorer psychosocial outcome in young adulthood. Early prevention and treatment are essential.

**Key Words:** *Longitudinal study; Trajectory analyses; Internalizing problems; Externalizing problems; Childhood; Adulthood*

The level of an individual child's emotional (internalizing) and behavioural (externalizing) problems are shown to have continuity from early childhood to adolescence and young adulthood. Most children are found to have a low or moderate level of such problems through the developmental period. However, 9%-18% have a chronically high level of emotional problems, and 7%-18% a chronically high level of behavioural problems from childhood to adolescence [1-13]. In addition, some longitudinal studies have identified an adolescent onset-group of externalizing problems [3,12,14,15]. The proportion of children assigned to this group vary between 12% and 15% in different studies. Most adolescents with adolescent-onset behavioural problems are, however, suggested to return to the moderate or low level of behavioural problems when reaching early adulthood, while those with a high level of behavioural problems from childhood onwards often continue in the high-level trajectory [3].

Although internalizing and externalizing problems are shown to have stability and continuity, the phenotype may also change in adolescence and early adulthood. The internalizing problems phenotype, which is prone to withdrawn behaviour and anxiety, often continues into adulthood [16,17]. Externalizing problems are found to increase the risk of substance abuse and antisocial personality and behaviour in adulthood [15]. However, among some, childhood behavioural difficulties show up as social isolation, avoidance of close relationships, and susceptibility to anxiety and depressed mood in adulthood [15,16,18]. Thus, the same initial pathway may, when turning to adulthood, lead to multiple outcomes (multifinality), or multiple pathways may lead to the same outcome (equifinality) [19,20].

The type of childhood externalizing difficulties may also be relevant when considering the adult outcome. In a study by Reef et al. all types of aggression in childhood were associated with disruptive behaviour in adulthood, while oppositional behaviour and status violations like runaways, truancy and obscene language were associated with substance abuse, anxiety, and mood disorders [15]. Thus, childhood anxiety and depressive mood may also be underdetected and appear as oppositional behaviour among some children. Aggression problems, on the other hand, may be related to overall emotion

and behaviour regulation problems, as well as with other childhood risk factors like neuropsychiatric deficits or less optimal family environment [3].

Social competence and adaptive functioning skills refer to the individual's capacities to engage in close relationships, peers and activities. Poorer social and academic competence and internalizing and externalizing problems are found to co-occur [12,21-27]. The influence may be bidirectional for example as when a child with externalizing problems has problems in academic or peer skills due to behavioural difficulties and the problems in one area increase the problems in the other area. Co-occurrence may also develop in a cascading way, for example when a child with internalizing problems such as depression, is unable to achieve academic expectations or withdraw from peer relations and the depression thus, leads to academic or peer problems.

Quality of life (QOL) refers to individuals' as well as societies' general wellbeing and life satisfaction including aspects like physical health, family, education, employment and economical satisfaction and wealth. Mental disorders may decrease life satisfaction and poor life satisfaction is found to increase the risk of mental disorders [28].

Despite a few studies from large longitudinal normal population samples, we still lack knowledge of the outcome of the different patterns of childhood problems in adulthood, especially in terms of internalizing problems.

## AIMS & OBJECTIVES

The current study aims to explore how the trajectories of internalizing and externalizing problems from early childhood to adolescence, based on earlier study stage (see Methods), are associated with emotional and behavioural problems in young adulthood.

The first hypothesis concerning internalizing problems was that those young adults with high or increasing level of problems from childhood to adolescence would have poorer adaptive functioning and quality of life in young adulthood compared to those with a low level of problems. The second hypothesis was that the level of both high and low internalizing problems

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would show continuity into young adulthood. The third hypothesis was that those young adults who had a chronically high or increasing level of internalizing problems from early childhood to adolescence would have more depressive and anxiety symptoms as well as avoidant personality problems concurrently compared to those with low levels of internalizing problems in childhood.

The first hypothesis concerning externalizing problems was that those young adults with high or increasing level of problems from childhood to adolescence would have poorer adaptive functioning and quality of life in young adulthood compared to those with a low level of problems. The second hypothesis considering the continuity of externalizing problems was that those with a high level of externalizing problems in childhood would have a higher level of externalizing and internalizing problems in young adulthood compared to those having a low level of externalizing problems in childhood. The third hypothesis was that those having a high level of externalizing problems in children were expected to have more antisocial problems, substance use, and anxiety symptoms in young adulthood.

**MATERIALS AND METHODS**

**Sample**

The original sample of this normal population longitudinal study was collected from maternity clinics in Tampere, Finland in 1989-1990, and it consisted of 349 mothers expecting their first child. Data were collected four times from the third trimester of pregnancy up to the child's age of 6 months (T1-T4), and again when the child was aged 4-5 years (T5), 8-9 years (T6), 16-17 years (T7), and 26-27 years (T8; 2016). The full description of the sample and its characteristics at previous study points is described in more detail elsewhere [12,29,30]. In the current study, at T8, questionnaires were sent to 239 of the 350 children (including one pair of twins) of the original first-time mothers. A total of 111 children were excluded because no reports of internalizing and externalizing problems existed for them, they or their mother had died by T8 (n=10/111), they were excluded at some previous point because of serious illness or refusal, or their address was not known at T8. A total of 144 young adults (60%) returned the questionnaires (62% females). The mean age was 27.0 years (SD=0.25). In the current study, data from study points T5-T8 were used.

The characteristics of the sample are shown in Table 1.

**TABLE 1**

**Characteristics of the young adult sample (aged 26–27 years)**

	n = 144
	%
<b>Gender</b>	
Female	62
Male	38
<b>Living arrangements</b>	
Alone	26
Spouse	47
Spouse and/or children	21
Other**	6
<b>Employment status</b>	
Employed	67
Unemployed	5
Student	19
Maternity/paternity/ parental leave	9
<b>Children</b>	
No	79
Yes	21

\*None of the differences between the socioeconomic factors and trajectory groups were statistically significant.

\*\*e.g. with parents or roommate

**Measures**

The questionnaire used at data collection points T5-T7 to evaluate the child's psychosocial functioning was the Child Behavior Checklist (CBCL; different but parallel questionnaires for 1.5-5 year-old and 6-18 year old children),

filled in by the mother. At T8, the young adults completed the Adult Self Report (ASR) questionnaire. The CBC and ASR are questionnaires included in the Achenbach System of Empirically Based Assessment (ASEBA), which assesses behavioural, emotional, social, and thought problems as well as adaptive functioning [31-36]. The Internalizing Problems score is a sum score including withdrawal, somatic complaints, and anxiety/depression items. The Externalizing Problems score is a sum score of items concerning social problems, rule-breaking behaviour, and aggressive behaviour. ASR Adaptive functioning score includes scores from activities, social skills and relationships, and education and job performance subscales. Questions concerning a job and/or education are included only if relevant to the respondent's life at the time of the questionnaire's completion. Each of the adaptive functioning scales is scored by summing the scores of its items, taking into account the negative weighting of some items [36]. The ASR also includes a substance abuse section that has subgroups for tobacco, alcohol, and drug abuse (the number of times per day having used tobacco, been drunk, and used drugs for nonmedical purposes in the past six months).

The CBCL Internalizing and Externalizing raw problem scores used in defining the trajectory groups as well as ASR Internalizing and Externalizing raw problem scores and Adaptive Functioning raw score was converted into normalized T-scores and used as continuous variables. In clinical use, problem scores 60-63 are considered subclinical and  $\geq 64$  clinical. In the adaptive functioning scale, scoring 31-35 is considered borderline and  $\leq 30$  clinical. In the substance use scales, the borderline range is 65-69, and the clinical range is  $\geq 70$ .

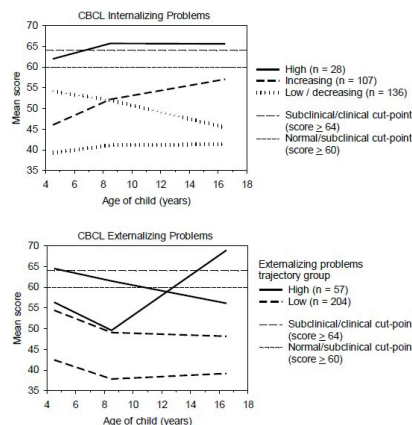
The ASEBA forms also include DSM IV oriented outcome scales. The outcome scales for ASR are depressive problems, anxiety problems, somatic problems, avoidant personality problems, attention deficiency/hyperactivity (AD/H) problems, and antisocial personality problems. The DSM scales were also converted into normalized T-scores and used as continuous variables. The borderline clinical range is between 65-69 and clinical range  $\geq 70$  [36].

At T8, to measure the quality of life, the 8-item short version of the WHO's Quality of Life questionnaire (EUROHIS-QOL) was used. In EUROHIS-QOL, psychological, physical, social, and environmental domains are each represented by two items. All answer scales have a 5-point Likert-type response format. The outcome index is the mean of all scores, and it has shown good cross-cultural consistency and a satisfactory convergence and discriminant validity [37,38].

Sociodemographic data were collected by questionnaires designed for this study phase.

**Statistical analysis**

The trajectory analyses of the children's internalizing and externalizing problems, performed in a previous study of the sample [12], were based on mother's CBCL reports at T5-T7 (4-5, 8-9, and 16-17 years). The trajectory groups identified for internalizing problems were low-stable (28%), moderate decreasing (20%), moderate-increasing (41%), and high-stable (11%). The trajectory groups for externalizing problems were low-stable (20%), moderate-decreasing (58%), moderate to high (adolescent-onset; 5%), and high-decreasing (17%; Figure 1). Based on preliminary analyses (Figure supplement 1a and 1b), the four original internalizing problems trajectory groups were reorganized into three groups (low/decreasing, n=75; increasing (n=56) and high (n=13) and those of externalizing problems trajectory groups were dichotomized into low (including the low-stable and moderate-decreasing group; n=114) and high (including the High-decreasing and moderate-to-high groups; n=30) trajectory groups.



**Figure 1** Adult self report assessments of young adults assigned to high and low internalizing and externalizing symptom trajectories extending from 4–5 to 16–17 years of age

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Continuous variables are described as means and standard deviations (SD). Pearson correlation was used to examine their correlations. The differences between groups were examined by the independent samples t-test. Categorized variables are described as percentages, and the differences between groups were examined by the chi-squared test or Fisher's exact test, as appropriate. P-values below 0.05 are considered significant and those between 0.05 and 0.10 indicative; values up to 0.10 are reported. All analyses were conducted with SPSS 16.0.

Drop-out analyses conducted at the earlier study stages have indicated no statistically significant differences between the drop-outs and the participants regarding mother's age, marital status, education level, or family SES (data available at T6 and T7 only). Drop-outs from T5 to T6 and from T6 to T7 have shown no differences in internalizing or externalizing problem scoring. However, there were more mother-son dyads in the drop-out group at the data collection points T5, T6, and T7 [30]. At T8, the drop-out analyses indicated that there were more drop-outs among those with lower family SES ( $p=0.017$ ) and lower maternal education level ( $p=0.088$ ) at T7. In addition, there were more males in the drop out group ( $p<0.001$ ). There were no differences between the participants and dropouts regarding the trajectory group of internalizing or externalizing problems, neither with the original four-group variable nor with the three and two-group variable. There were, however, more drop-outs among those who had a higher level of externalizing problems in self-reports ( $p=0.063$ ) and poorer social competence both in mother's report and self-report ( $p<0.001$  and  $p=0.069$ , respectively) at T7.

## RESULTS

### Internalizing problems trajectories from early childhood to adolescence and young adult outcome

No statistically significant associations were found between the trajectory of internalizing problems and the quality of life or the adaptive functioning of the young adults.

The internalizing problems trajectory was statistically indicatively associated with the level of the young adult's internalizing problems ( $p=0.087$ ; Figure 2). In addition, there was a statistically indicative association between the trajectory of internalizing problems at childhood and externalizing problems at young adulthood ( $p=0.054$ ). The mean externalizing problems score in young adulthood was lowest among those assigned to the high trajectory of internalizing problems and highest among those assigned to the increasing trajectory group (Figure 2).

Considering the DSM IV symptoms (Figure 2), the trajectory of internalizing problems from early childhood to adolescence was statistically indicatively associated with antisocial personality problems ( $p=0.064$ ), the mean being lowest among those assigned to the high trajectory of internalizing problems and highest among those assigned to the increasing trajectory of internalizing problems at childhood. In addition, there were statistically significant associations between the trajectory of internalizing problems and both depressive symptoms and avoidant personality problems, the mean being highest among those assigned to the high trajectory and lowest among those assigned to the low trajectory of internalizing problems ( $p=0.033$  and  $0.002$ , respectively).

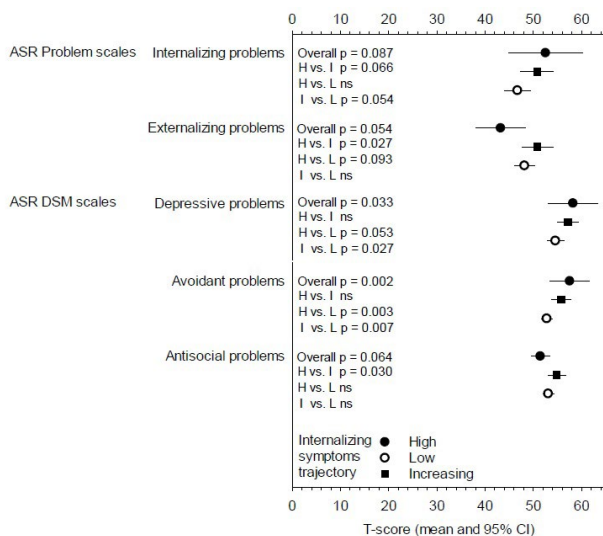


Figure 2) The associations between the trajectory of internalizing problems and young adult outcome

### The externalizing problems trajectory from early childhood to adolescence and young adult outcome

No statistically significant differences were found between the trajectory of externalizing problems and the adaptive functioning of the young adults. On the other hand, those assigned to the high trajectory of externalizing problems assessed themselves as having a poorer quality of life than those assigned to the low trajectory (EUROHIS-QOL index mean 3.9, SD 0.6 vs. 4.2, SD 0.5;  $p=0.033$ ).

The young adults assigned to the high trajectory of externalizing problems had higher levels of both externalizing and internalizing problems in young adulthood ( $p=0.003$  and  $0.051$ , respectively; Figure 3).

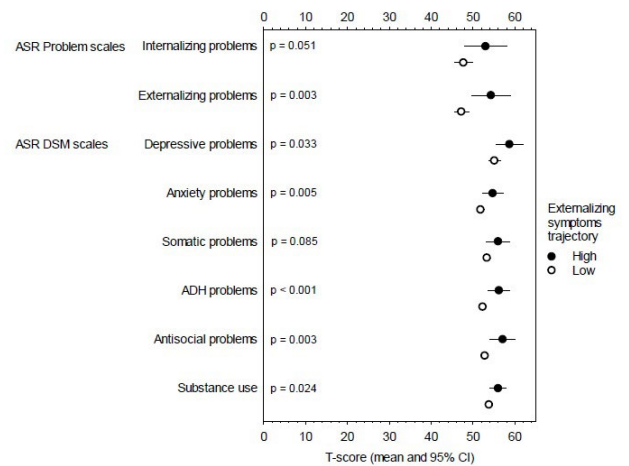


Figure 3) The associations between the trajectory of externalizing problems and young adult outcome

Considering the DSM IV symptom scales, the externalizing problems trajectory was statistically significantly or indicatively associated with depressive problems ( $p=0.033$ ), anxiety problems ( $p=0.026$ ), somatic problems ( $p=0.085$ ), AD/H problems ( $p \leq 0.001$ ), antisocial personality problems ( $p=0.003$ ), and substance use ( $p=0.024$ ) in young adulthood. In all cases, the mean score was higher among those assigned to the high trajectory group of externalizing problems (Figure 3).

## DISCUSSION & CONCLUSION

The current study explored the psychosocial outcome of 27 years old Finnish normal population young adults whose symptoms were followed up from the age of four. In general, the adaptive functioning of the young adults was good. There were no statistically significant differences in employment status, marital status, or the parenthood status between those having a high or low level of internalizing or externalizing problems in childhood.

According to the current study, the children who had a high level of internalizing problems from early childhood to adolescence did surprisingly well as young adults. The hypothesis that a high internalizing problems trajectory in childhood increases the risk of poorer adaptive functioning in young adulthood was not supported. This is somewhat surprising as the previous study of the sample indicated that children with chronically high internalizing problems had poorest mean Social competence score throughout childhood [12].

Concerning smaller, DSM-related problem clusters, a high internalizing problem trajectory was associated with higher levels of depressive and avoidant personality problems but lower levels of antisocial problems. As being a rather well-functioning normal population sample, a high level of internalizing problems in the current sample perhaps better illustrates avoidant and withdrawn personality characteristics than internalizing psychopathology. Withdrawn behaviour has shown to have rather high stability from childhood to adulthood and to increase the risk of anxiety and major depressive disorder in adulthood [8]. On the other hand, it has also been suggested that high internalizing problems may serve as a protective factor against antisocial behaviour [23,25], as the findings of the current study also indicate.

However, those children with an increasing level of internalizing problems had significantly more antisocial personality problems and externalizing problems than those with a low or high level of internalizing problems. As the trajectory of increasing internalizing problems peaked at the adolescence, the findings suggest that there is an increased risk of comorbidity of internalizing

and externalizing problems in young adulthood among those with adolescent-onset internalizing problems. In addition, those with increased internalizing problems at childhood also had more depressive symptoms than those with a low level of internalizing problems at childhood.

Considering the trajectories of externalizing problems, no association between the trajectories of externalizing problems and adaptive functioning of the young adults was detected. However, those young adults who had a high level of externalizing problems in childhood experienced a poorer quality of life in terms of e.g., health, financial situation, and ability to perform daily activities, relationships, and living environment. The mean in the low externalizing group (4.0) was the same as found in a large Finnish Health 2011 study conducted by The National Institute for Health and Welfare for males at the age group of 30-44 and close to that of women's (4.1) [39]. Poorer quality of life and socioeconomic status may also lead to e.g. sleep problems, which again may lead to mental health problems [40,41].

In addition to the poorer quality of life, those young adults assigned to the high trajectory of externalizing problems at childhood had more both internalizing and externalizing problems at young adulthood than those with the low trajectory of externalizing problems. When considering the DSM V clusters, they had more AD/H problems, substance use, antisocial personality problems, depressive problems, anxiety as well as somatic complaints at the age of 27 compared to those young adults who had a low level of externalizing problems in childhood.

Several aspects have been considered to explain the developmental risk of externalizing problems [42,43]. First, behavioural problems may create a highly adverse environment leading to later adversity and thus compromise the adaptive functioning in adulthood. In addition, in normal population studies, the level of externalizing problems is found to decrease while the level of internalizing problems increases [31,44]. It has been speculated that this is the result of many inner and outer changes during puberty. Alternatively, with the improvement of cognitive abilities in age, the expression of emotions also evolves. Consequently, the anxiety that has been expressed as externalizing behaviour in childhood may be expressed as anxiety, depressive symptoms, or social isolation in adolescence and adulthood [18].

There is also direct and indirect comorbidity of internalizing and externalizing problems [45,46], and comorbidity is found to worsen the prognosis [47]. A previous study of the current sample indicated that approximately 50% of the children who were assigned to the high trajectory of either internalizing or externalizing problems were also assigned to the high pattern of the other problem trajectory [12]. Emotional and behavioural problems may also be genetically or neurobiologically linked [48]. The DSM V has included a new diagnostic category called disruptive mood dysregulation disorder to describe children with severe emotional, behavioural, and cognitive dysregulation problems. In a longitudinal study by Althoff et al. (2010), the presence of childhood dysregulation problems was associated with increased rates of adult anxiety disorders, mood disorders, disruptive behaviour disorders, and drug abuse 14 years later, thus indicating a variety of outcome diagnoses [49]. In addition, there is a diagnostic overlapping of psychiatric symptoms. Irritability is a symptom of both depression and conduct problems/oppositional defiant disorder, and recent studies suggest that childhood irritability is a risk factor especially for emotional problems in adolescence and young adulthood [50-54].

The trajectories of the current study were based on symptoms evaluated for the first time at the age of 4 years. Those children with a high level of either internalizing or externalizing problems were already at the subclinical/clinical level at the age of 4 years. The findings thus remind us of the importance of early prevention, support, and treatment, since developmental patterns are perhaps set at a very early age. The mediating and moderating factors associated with the development of emotional and behavioural problems from childhood to adolescence and adulthood are still to a great extent unknown and should be studied further. In addition, identifying anxiety and depressive symptoms behind externalizing behaviour at an early age might be essential, as the treatment practices for behavioural and emotional problems are somewhat different.

There are some limitations to be considered. The major limitation of the study is the relatively small sample size. In addition, those who dropped out between the adolescence and young adulthood study phases had a higher mean externalizing problems score and lower social competence score at the adolescence study phase. This, for one, could explain why the adaptive function was not found to be associated with the patterns of internalizing and externalizing problems since those with poorer functioning did not participate. There has also been cumulative attrition of males. Partly because of the long follow-up time, the number of drop-outs is relatively high. In addition, Finland is rather a homogenous country in terms of

socioeconomic factors. This could be one of the reasons for not seeing any socioeconomic differences between the high and low trajectory groups. The sample size also limited the statistical analyses as the four trajectory groups had to be combined into three groups for internalizing and into two groups for externalizing symptoms in order to have large enough subgroups for statistical analyses. Even so, some actually existing associations might not have reached statistical significance. Thus, more studies using large population samples are needed to confirm the findings and to more precisely identify the mechanisms modifying the different developmental patterns of internalizing and externalizing problems.

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