



## The Relationship between Self-rated Psychopathic Traits and Psychopathology in a Sample of Finnish Community Youth: Exploration of Gender Differences

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### Abstract

**Background:** Associations between psychopathic traits and other forms of psychopathology among youth in the community, as well as gender differences in these associations have been scarcely studied yet. The present study aimed to explore this relationship in a sample of Finnish mid-adolescent girls and boys.

**Methods:** The sample comprised 370 secondary school ninth-graders with the mean age of 15.1 years (SD 0.28). The Youth Psychopathic traits Inventory (YPI) and the Youth Self Report (YSR) served as self-assessments.

**Results:** Boys showed significantly higher traits of psychopathy, but girls scored significantly higher on the Total Problems as well as on the majority of the syndrome scales on the YSR. In both genders, psychopathic traits correlated highly with rule-breaking and aggressive behavior, moderately with attention and thought complaints, and modestly with depression, anxiety, withdrawal and social problems. The correlations between psychopathic traits and somatic problems were moderate in boys, but modest in girls. The correlations showed only a few statistically significant gender differences: the correlation between the Affective dimension of the YPI and the rule-breaking behavior syndrome scale of the YSR, as well as the correlation between the Interpersonal dimension of the YPI and somatic problems were stronger in boys than in girls.

**Conclusions:** Even though boys show higher traits of psychopathy and girls exhibit more general psychopathology, the correlations between psychopathic traits and other forms of psychopathology closely resemble each other. In both genders, psychopathic traits correlate positively with both externalizing and internalizing problems. The callous-unemotional traits correlate more strongly with rule-breaking behavior in boys than in girls. Screening for psychopathic traits among adolescents with psychosocial adjustment problems seems relevant.

**Keywords:** Adolescence; Callous-unemotional traits; Externalizing problems; Internalizing problems; psychopathic traits; Psychopathology

### Introduction

Adolescence is a transitional stage from childhood to adulthood during which the individual undergoes many physiological, psychological, cognitive, and social changes. Adolescence is also a risk period for the emergence of many psychological and social adjustment problems. Internalizing symptoms, including somatic, depression-, anxiety- and stress-related symptoms, begin to rise, especially among girls [1]. Boys exhibit higher prevalence rates of externalizing symptoms, including hyperactive, disruptive, rule-breaking and aggressive behaviors, than do girls, but this gender gap narrows in adolescence [2]. Attention Hyperactivity Disorder (ADHD) is more prevalent in boys than in girls [3]. However, girls are more often diagnosed with a predominantly inattentive subtype, and boys with a predominantly hyperactive and impulsive subtype [4]. These core symptoms often diminish when individuals transfer from childhood to adolescence and early adulthood, but hyperactivity and impulsivity symptoms

decrease faster than do attention problems [5]. Overall, adolescence is a risk period for the emergence of mental health disorders [6], and approximately one adolescent in five will be diagnosed with a psychiatric disorder [1]. Gender differences in juvenile psychopathology likely stem directly from different genes on the X or Y chromosomes or indirectly through the effects of different hormone levels [7]. Besides, social and

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cultural expectations for boys and girls are profoundly different [7]. For instance, it is less socially acceptable for girls to display aggression, and there is some evidence that parental socialization of girls may contribute to increased likelihood of the development of internalizing rather than externalizing psychopathology [8]. The relationship between hormones, brain and behavior is, however, a complex, reciprocal and poorly understood phenomenon.

The construct of psychopathy is formed by a constellation of specific interpersonal, affective and behavioral character traits. With regard to interpersonal style, a prototypical psychopath is glib and superficially charming, prone to grandiose self-presentation, deceit, and manipulation. His/her deficient affective experience relates to low remorse and guilt, callousness, lack of empathy and conscience. The lifestyle reflects need for stimulation, lack of long-term goals, irresponsibility, parasitic living, impulsivity, and a tendency to ignore or violate social conventions and mores [9,10]. In the past two decades, both clinicians and researchers have begun to expand the psychopathy construct to youth; research has demonstrated strong stability of this phenomenon, from childhood through adolescence to adulthood [11], and elevated traits of psychopathy have been observed in a district group of juveniles, who engage in particularly severe, aggressive, and persistent forms of antisocial behavior [12]. Callous-unemotional (C-U) traits have increasingly been emphasized as the “core” of the psychopathy syndrome providing greater information about current and future impairment. In DSM 5 [13], Conduct Disorder (CD) was expanded with the new specifier “with limited prosocial emotions”. The specifier is used when an individual, suffering from CD, exhibits two or more of the following characteristics in multiple relationships or settings over a 12-month period: 1. lack of remorse or guilt, 2. callousness/ lack of empathy, 3. shallow or deficient affect, and 4. unconcern about his/her performance. Psychopathic traits can, however, be seen on a dimensional continuum, where psychopathy is a malicious version of the extremes of normal personality traits [14]. So, these traits do not exist only in adolescents identified due to their conduct-disordered or antisocial behavior. In community samples, adolescents with callousness and unemotionality have exhibited elevated levels of psychosocial impairment, and this affective deficit has even been suggested as an indicator of psychiatric vulnerability and psychosocial maladjustment [15]. There is growing evidence that gender differences exist in psychopathic traits: higher prevalence in males [16], and somewhat different etiological factors [17,18]. Evidence supports a higher heritability of psychopathic traits in boys [19-21], as well as a greater role of family-related risk factors in girls [22]. Besides, the manifestation of psychopathic traits seems to differ between girls and boys [23].

Because gender differences exist in both psychopathic traits and general psychopathology, one can expect substantial gender differences in associations between psychopathic traits and other forms of psychopathology. Till now, most association studies have focused on clinical or delinquent samples, and mainly on boys. The samples have often comprised both children and adolescents, even though both developmental phases have their unique characteristics in psychological and social adjustment. These studies have shown strong correlations between psychopathic traits and externalizing problems [24], but the relationship between psychopathic traits and internalizing psychopathology has remained substantially more obscure, as studies have reported no [25,26], inverse [27,28], or positive correlations [29,30]. With regard to community samples, self-rated psychopathic traits have correlated positively with delinquent and externalizing behaviors, somatic complaints and attention problems in boys aged 8

to 18 years [31]. In a large community study comprising both genders [32], callous-unemotional traits correlated positively with externalizing, social, thought, and attention problems; however, correlations with internalizing problems were found only in girls.

The aim of the present community study was to address the gaps in the literature regarding the relationship between psychopathic traits and other forms of psychopathology in community youth. Our special interest was in gender differences in this relationship. Our hypothesis presumed psychopathic traits to correlate with externalizing behavior problems, but significantly more strongly in boys than in girls. We further hypothesized that psychopathic traits would correlate positively with internalizing problems in girls, but not in boys, as Essau et al. have found in their large community study [32].

## Subjects and Methods

### Participants

The sample comprised all Finnish-speaking adolescents attending the ninth grade at secondary schools in the city of Kokkola, on the western coast of Finland, in January 2014. Kokkola is the 23rd largest town in Finland with approximately 47, 000 citizens. Of 446 students, 60 (13.4%) did not participate in the study due to either absence at school on the study day, or refusal to participate. Of the remaining 386 students, 10 individuals did not complete the self-assessments, and six did not indicate their gender on the completed questionnaire and were therefore excluded. So, the final sample comprised 370 (83.0%) ninth graders, of which 199 (53.8%) were girls. With regard to age, three pupils were 14 years old, 24 persons 16 years old, and the rest of the pupils 15 years old. Boys were significantly older than girls ( $U=15533.0$ ,  $p=0.026$ ) [33].

### Self-Assessments

#### The youth psychopathic traits inventory (YPI)

We assessed psychopathic traits using the Youth Psychopathic traits Inventory (YPI) [34], which is a 50-item self-report instrument for adolescents to measure the three personality dimensions of psychopathy: an arrogant and deceitful interpersonal style (the Interpersonal dimension), a deficient affective experience (the Affective dimension), and an impulsive and irresponsible behavioral style (the Behavioral dimension). The Interpersonal dimension consists of four subscales: Dishonest Charm, Grandiosity, Lying, and Manipulation; the Affective dimension, of three subscales: Callousness, Unemotionality, and Remorselessness; and the Behavioral dimension, of three subscales: Impulsiveness, Irresponsibility, and Thrill seeking. Items are scored on a four-point Likert-type scale (1=does not apply at all, 4=applies very well); thus, the total score of the scale can range from 50 to 200, with a higher score representing a higher level of the trait. The measurement has no official cut-off score. The original YPI showed internal consistencies ranging from marginal (Callousness: Cronbach's  $\alpha=0.66$ ; Unemotionality: 0.67) to acceptable and good (0.71-0.82) [34]. Later, and across various language versions, the YPI has shown moderate to good psychometric properties [35]. In this study, we used the authorized Finnish version of the YPI [33]. The English version of the YPI served as a basis for translation, which was performed according to the recommendations of the developers, including an iterative process of translation and independent back translation, followed by a discussion to resolve any minor differences. Table 1 presents the internal consistency values (Cronbach's  $\alpha$  coefficients), separately for boys and girls.

	Boys	Girls	Boys	Girls	Statistics		
	$\alpha$	$\alpha$	Mean(SD)	Mean(SD)	t(df)	p*	Cohen's d
<i>YPI Dimension</i>							
Interpersonal	0.89	0.87	1.78(0.58)	1.64(0.53)	2.50(368)	0.013	0.261
Affective	0.55	0.73	2.02(0.43)	1.64(0.42)	9.39(368)	<0.001	0.981
Behavioral	0.86	0.8	2.17(0.61)	2.10(0.54)	0.96(368)	NS	0.098
<i>YPI Total</i>	0.91	0.89	1.97(0.49)	1.78(0.42)	4.16(368)	<0.001	0.436
<i>YSR Dimension</i>							
Anxious/Depressed	0.87	0.84	3.71(4.22)	7.29(0.53)	-8.66(368)	<0.001	-0.894
Withdrawn/Depressed	0.76	0.72	3.35(2.91)	4.32(2.87)	-3.59(368)	<0.001	-0.375
Somatic complaints	0.86	0.74	3.90(3.45)	5.94(3.45)	-7.36(368)	<0.001	-0.762
Social problems	0.79	0.67	3.29(3.33)	3.89(2.83)	-3.24(368)	0.001	-0.329
Thought problems	0.82	0.7	4.61(4.09)	5.89(4.29)	-3.68(368)	<0.001	-0.39
Attention problems	0.7	0.67	5.19(2.98)	6.10(2.84)	-3.55(368)	<0.001	-0.373
Rule-breaking behavior	0.87	0.84	6.30(5.38)	5.18(4.48)	2.10(368)	0.036	0.216
Aggressive behavior	0.88	0.83	6.71(5.58)	7.80(4.73)	-3.35(368)	0.001	-0.345
<i>YSR Internalizing scale</i>	0.86	0.79	10.76(9.88)	17.55(9.37)	-7.89(368)	<0.001	-0.817
<i>YSR Externalizing scale</i>	0.88	0.83	13.02(10.34)	12.98(8.50)	-1.12(368)	NS	0.116
<i>YSR Total</i>	0.9	0.83	41.95(29.43)	52.40(23.80)	-5.22(368)	<0.001	-0.535

The YPI scores are presented as average scores and the YSR scores as raw scores.

Group comparisons were conducted using the Independent samples t-test post-hoc the Benjamini-Hochberg Procedure.

\*Findings are considered significant if  $p < 0.04333$  (=the Benjamini-Hochberg critical value)

Cohen's d served as a measure of effect size.

NS=not statistically significant

**Table 1:** Internal consistencies (Cronbach's alpha coefficients,  $\alpha$ ), descriptives, and group differences in the Youth Psychopathic traits Inventory (YPI) scores and in the Youth Self Report (YSR) scores between boys (n=171) and girls (n=199) attending the 9<sup>th</sup> grade at secondary school.

## The youth self-report (YSR)

The adolescents' psychopathology was assessed with the Youth Self Report (YSR), which is a self-questionnaire for 11- to 18-year-olds [36]. The YSR contains 112 problem items, which are short sentences/statements worded in the first person to be answered on a three-point scale: 0=untrue, 1=somewhat or sometimes true, 2=very true or often true. Eight syndrome scales can be delivered: Anxious/Depressed, Withdrawn/Depressed, Somatic complaints, Social problems, Thought problems, Attention problems, Rule-breaking behavior, and Aggressive behavior. They compose two broadband scales called the Internalizing (comprising Anxious/Depressed, Withdrawn/Depressed, and Somatic complaints syndromes) and the Externalizing scale (containing Rule-breaking behavior and Aggressive behavior scales). Further, a Total Problems Score can be delivered as a sum of scores on all the problem items of the questionnaire. Because of its satisfactory psychometric properties as well as the extensive data behind its standardized scores and clinical cut-offs, the YSR has been widely used to assess adolescents' emotional and behavioral problems [36-38]. In this study, continuous scores were, however, used. Table 1 presents Cronbach's alpha coefficients, separately for boys and girls.

## Procedure and ethical aspects

The ninth-graders completed the self-assessments during their ordinary school lessons. They also received information about the study both verbally and in a cover letter, were assured of the confidentiality and anonymity of the data and informed that their participation was voluntary. By returning the completed questionnaires, the participants confirmed their consent. The participants' age and gender served as background variables. After completing the self-assessments, each participant placed them into an envelope, sealed the envelope, and returned the sealed envelope to the teacher. The adolescents were informed that they could contact the researchers (who provided their e-mail addresses and telephone numbers) if the content of the self-assessment raised questions or ideas, that they wanted to share

with the researchers. According to research ethics policy in Finland, the guardians of the adolescents received a letter informing them of the study, and inviting them to familiarize themselves with the self-assessment. The guardians were also able to discuss the study with the researchers. The Ethics Committee of the Helsinki and Uusimaa Hospital District evaluated the study plan, and the administration of the Helsinki and Uusimaa Hospital District as well as the administration of the schools granted permission to conduct the study. The study was performed in accordance with the Declaration of Helsinki.

## Statistical analyses

In line with previous research [31,33,34,39,40], and for greater interpretability across dimensions (which differ in number of items), we used the averaged dimension and total scores of the YPI. The scores were calculated by summing up the item scores on the respective scale and then dividing the sum score by the number of items on that scale. Traditionally, the YSR scale scores appear as sums [36-38]. First, we performed the logarithm transformation of the scores, since the original data was skewed to the right. Next, for gender comparisons, the Independent samples t-test was performed. Further, Cohen's d (d) was used to estimate the effect sizes of the gender differences, interpreting an effect size <0.3 as small, 0.3 to 0.5 as moderate, and over 0.5, as large effect [41]. Pearson correlations between the YPI and YSR scores were calculated, separately for boys and girls. As recommended [41], we considered a Pearson's coefficient (Pearson's r) of 0.1-0.3 as weak, 0.3-0.5 as moderate, and > 0.5 as high. For both the group comparisons and correlation analyses, the Benjamini-Hochberg Procedure was applied to control the false discovery rate. Because boys were significantly older than girls, control for age was included into the analyses. Finally, we used Fisher's z transformation to evaluate the magnitudes of gender differences between the correlations. Findings were considered statistically significant with a two-tailed  $p < 0.05$ . The statistical analyses were performed with IBM SPSS Statistics version 22.

YSR	Anxious/Depressed		Withdrawn/Depressed		Somatic complains		Social problems		Thought problems		Attention problems		Rule-breaking behavior		Aggressive behavior		Internalizing scale		Externalizing scale		Total		
	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	
YPI																							
Interpersonal	0.286**	0.170*	0.255**	0.194**	0.392**	0.200**	0.318**	0.157*	0.410**	0.332**	0.363**	0.197**	<b>0.517**</b>	0.378**	<b>0.554**</b>	0.400**	0.376**	0.202**	<b>0.572**</b>	0.442**	<b>0.519**</b>	0.366**	
Affective	0.124	0.014	0.190*	0.268**	0.242**	0.1	0.193*	0.14	0.267**	0.204**	0.271**	0.177**	<b>0.518**</b>	0.311**	0.392**	0.299**	0.193*	0.170*	0.496**	0.345**	0.357**	0.264**	
Behavioral	0.177*	0.237**	0.102	0.173*	0.323**	0.337**	0.204**	0.12	0.442**	0.389**	0.484**	<b>0.523**</b>	<b>0.661**</b>	<b>0.625**</b>	<b>0.544**</b>	<b>0.579**</b>	0.260**	0.297**	<b>0.674**</b>	<b>0.678**</b>	<b>0.546**</b>	<b>0.517**</b>	
Total	0.243**	0.188*	0.224**	0.244**	0.380**	0.269**	0.282**	0.170*	0.443**	0.390**	0.443**	0.369**	<b>0.648**</b>	<b>0.540**</b>	<b>0.577**</b>	<b>0.525**</b>	0.334**	0.256**	<b>0.670**</b>	<b>0.602**</b>	<b>0.558**</b>	0.475**	

The analyses were performed on logarithm transformed score values; age was controlled for in the analyses.  
 \*\*Correlation is significant at the 0.00750 level; \*correlation is significant at the 0.04432 level (=the Benjamini Hochberg critical values). Strong correlations are in bold.

**Table 2:** Pearson's correlations between dimensional and total scores on the Youth Psychopathic traits Inventory (YPI) and the Youth Self Report (YSR) in boys (n=171) and girls (n=199) attending the 9<sup>th</sup> grade at secondary school.

## Results

### Descriptive statistics

Table 1 shows means and standard deviations of the total, dimensional, and scale scores of both self-assessments, separately for boys and girls, as well as gender comparisons. In the YPI, boys exhibited significantly higher traits of psychopathy, except on the Behavioral dimension. In the YSR, girls showed significantly higher total and syndrome scale scores with one exception; boys scored significantly higher in rule-breaking behavior, though the effect size of this difference remained small. Focusing on the compound scales, girls scored significantly higher on the Internalizing scale, but we observed no significant gender difference on the Externalizing scale.

### Correlations

In both genders, psychopathic traits correlated highly with rule-breaking and aggressive behavior, moderately with attention and thought complaints, and modestly with depression, anxiety, withdrawal and social problems. Correlations between psychopathic traits and somatic problems were moderate in boys, but weak in girls (Table 2).

Fisher's z transformation revealed no statistically significant gender differences in correlations between the psychopathy total score and the YSR. However, some statistically significant gender differences emerged on the dimensional level: the correlation between the Affective dimension of the YPI and rule-breaking behavior ( $z=2.38, p=0.017$ ) and the correlation between the Interpersonal dimension of the YPI and somatic complains ( $z=1.99, p=0.046$ ) were significantly stronger in boys than in girls.

## Discussion

To our knowledge, this is one of few studies [31,32] investigating the relationship between psychopathic traits and other forms of psychopathology in mid-adolescent community youth. Our special interest focused on gender differences in this relationship. Here we review our most important findings and link them to previous research.

### Gender differences in descriptive statistics

As in most previous community studies [42], boys scored significantly higher on psychopathic traits as well as on the underlying Affective (callous-unemotional) dimension than girls did. With regard to general psychopathology, several studies have revealed that adolescent girls report more symptoms of depression, anxiety, and stress than do boys [43-46]. Externalizing problems are widely considered more prevalent in boys, and, respectively, internalizing ones in girls [43,47-50]. For example, in a recent Dutch study reporting ten-year trends in adolescents' self-reported emotional and behavioral problems, boys

continually reported more conduct but fewer emotional problems than girls did [51]. Our findings are very much in line with the above-mentioned ones when it comes to internalizing psychopathology, but we were unable to observe any significant gender difference in the Externalizing scale, and, in fact, girls even reported significantly more aggressive behavior than boys did. This finding is not, however, a new one; the tendency has been reported repeatedly in Finnish community studies [52,53]. Moreover, in a recent cross-national study of more than 8000 adolescents from different Nordic countries, girls reported significantly more anger symptoms than boys did [54]. According to some researchers, this phenomenon may reflect the social, educational and economic gender equality characteristics of Nordic countries [53].

Gender differences in correlations between psychopathic traits and other forms of psychopathology

The psychopathy total score correlated significantly and positively with all dimensions and scales of the YSR in both genders. As expected, psychopathic traits and externalizing problems showed the strongest correlations between each other, the correlation between psychopathic traits and attention problems being the second strongest. In clinical samples, externalizing disorders have related to elevated traits of psychopathy, and researchers have suggested that the same biological and environmental factors play a role in the etiology of both conduct disorder and psychopathy [24]. The relation between ADHD and elevated traits of psychopathy is mediated mostly by conduct disorder [24] although ADHD has a small independent contribution as well [55]. Contrary to our hypothesis, the psychopathy total score failed to correlate with externalizing problems significantly stronger in boys than in girls. Equally, psychopathic traits correlated positively with internalizing behavior problems, but the correlations among girls were not significantly stronger than those among boys. All in all, even though boys showed higher traits of psychopathy and girls exhibited more general psychopathology, the correlations between psychopathic traits and other forms of psychopathology closely resembled each other.

The Affective (callous-unemotional) dimension of psychopathy and general psychopathology

Because C-U traits have been given increasing emphasis as the "core" of the psychopathy construct providing greater information about current and future impairment, we wanted to focus special attention on the relationship between the Affective dimension score and general psychopathology. In line with a large community study by Essau et al. [32], C-U traits correlated positively with a wide range of psychosocial problems. However, contrary to their study, we observed a positive though modest correlation between the Affective dimension score and the Internalizing scale in both genders, not only in girls. In a child sample by Charles et al. [56], boys scored higher on C-U traits than girls did, but the traits correlated more strongly and with a wider

array of adjustment problems among girls. Our sample did not show this kind of gender difference. On the contrary, C-U traits correlated with rule-breaking behavior more strongly in boys than in girls. According to recent research, adolescents with C-U traits can benefit from treatment interventions if these interventions take into account their unique emotional, cognitive, and motivational styles [15]. From this perspective, screening for C-U traits among adolescents seeking help for psychosocial adjustment problems seems important.

## Strengths and limitations

An obvious strength of the present study is its high participation rate and sample distribution with almost equal numbers of girls and boys. The sample came from one middle-size Finnish town, but as Finland is a relatively small and both economically and culturally homogenous country, the chosen ninth-graders most likely represent average Finnish youth. For example, the School Health Promotion Study, a nationwide population study, which is carried out every second year in order to monitor the health and wellbeing of Finnish 14–20-year-old students with self-report questionnaires, has not reported substantial differences between different areas of Finland. Of the eligible pupils, 17% dropped out for various reasons. Unfortunately, we were unable to carry out a drop-out analysis. Various learning and communication disorders as well as attention problems are more prevalent in boys than in girls [13], and this probably explains, at least partly, why Finnish boys fall to pass their grade in school more often than girls [57]. Moreover, boys more often show problems in achieving school maturity; thus, they tend to start their school careers older than their female counterparts do [57]. Among our ninth-graders, boys were slightly older than girls, and age was controlled for in the statistical analyses. One must also remember that we measured both psychopathic traits and other psychopathology with self-questionnaires. The Psychopathy Checklist Youth Version (PCL-YV) by Forth et al. [58], a gold standard for assessing adolescent psychopathic traits, is obviously a more objective instrument than a self-questionnaire. Moreover, self-questionnaires are known to be more or less transparent [59,60]. However, the PCL-YV is a time-consuming method demanding rigorous training, and, thus, difficult to use in large population studies. In Finland, two self-assessments to measure juvenile psychopathic traits are currently available: the YPI and the Antisocial Process Screening Device-Self Report (APSD-SR) [61]. Recently, we studied psychometric properties of these two questionnaires, and found that the YPI showed slightly better psychometric properties than did the APSD-SR [33]. However, the YPI has repeatedly shown fairly low internal consistencies for the affective dimension of psychopathy [62-64], which was also observed in our male sample. In the future, new and more sophisticated instruments to measure C-U traits, like the Inventory of Callous-Unemotional Traits (ICU) [65], should be introduced in Finland. Moreover, in line with previous studies [38,66], marginal internal consistencies were observed on two YSR scales (social and attention problems) among girls. Finally, the cross-sectional nature of the study does not allow us to make conclusions about causal linkage between variables or about stability of these traits within individuals.

## Conclusion

Even though mid-adolescent community boys show higher traits of psychopathy, and girls, in contrast, more general psychopathology, correlations between psychopathic traits and other forms of psychopathology closely resemble each other. In both genders, psychopathic traits show positive correlations with both externalizing and internalizing problems. Based on this study, screening for psychopathic traits among adolescents with psychosocial adjustment problems seems relevant.

## Ethics Approval

The study protocol was approved by the Ethics Committee of the Helsinki and Uusimaa Hospital District, the administration of the Helsinki and Uusimaa Hospital District as well as the administration of the schools in Kokkola city. The study was performed in accordance with the Declaration of Helsinki.

## Competing Interests

The authors declare no conflict of interest.

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