Predictors of somatic symptoms: a five year follow up of adolescents

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Abstract

Background—Somatisation is common among adolescents.

Aims—To study factors predicting somatisation later in adulthood.

Methods—Self report questionnaires were administered at baseline examination in 1990 to students (mean age 16.8 years) in schools, and by mail five years later. Results are based on the 615 subjects with no serious disease or injury at baseline.

Results—Regression analyses showed that in men the level of somatic symptoms in 1995 was significantly predicted by the respective level in 1990 and by relief of smoking. In women, the level of somatic symptoms in 1995 was significantly predicted by the respective level in 1990, self esteem, and the number of negative life events in 1990. After exclusion of cases with a long standing disease in 1995, the multivariate results remained materially similar except that self esteem was no longer significant among women.

Conclusion—These findings may help in early identification of adolescents with somatisation persisting into early adulthood.

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Keywords: adolescence; life change events; smoking; somatoform disorders

Subjects and methods

SUBJECTS

The present cohort comprised students from five high schools in Helsinki and five in Jyväskylä, Finland. The five schools in Jyväskylä, a city of about 60 000 inhabitants in central Finland, comprised all schools in that city except the newest one. In Helsinki, the capital of Finland with approximately 500 000 inhabitants, five schools were sampled from a total of 33, stratifying for different levels of school entrance requirements.

In 1990, students were asked to fill in a self administered questionnaire, supervised by research assistants, during a regular classroom hour. Teachers were not present. The students were free to refuse to answer, to respond anonymously, or to give their written consent to take part in the follow up examination. The number of subjects with approved questionnaires was 1493, of whom 784 responded anonymously and 709 volunteered for the follow up. The follow up group did not significantly differ from the anonymous one with respect to social class, grade point average, and the factors measured in this follow up, except for the number of somatic symptoms. In both boys and girls, anonymous respondents reported less somatic symptoms than did those who identified themselves. The absolute difference in the symptom score was not very large, however. The mean scores (SE) were 22.8 (0.29) and 21.8 (0.22) for men, and 25.0 (0.23) and 24.2 (0.23) for women. Of the volunteer group, one had died and two questionnaires had to be rejected. Thus, the number of subjects in this follow up study was 706. Of these, 264 (37.4%) were men and 442 (62.6%) women. In 1995, a follow up questionnaire and up to four reminders were mailed; 649 questionnaires were returned. The response rate was 92%.

Fourteen men and 20 women were excluded from the present analysis because they had a serious illness or injury in 1990. Of the remaining cases, 33 men and 24 women were excluded because of deficient responses to questions on somatic symptoms in 1995. This left 615 subjects for analysis (fig 1).

MEASURES

Somatic symptom score was an abbreviated 14 item version of an 18 item score, used earlier in studies on both adults and adolescents.4 14 We left out a question on the lack of sexual desire because this was thought to be too sensitive for the adolescents in 1990. We also left out questions about anxiety or nervousness, nightmares, and irritability or fits of anger because of coinciding questions in the trait anxiety inven-
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Figure 1  Cohort profile and number of cases.

1493 respondents to questionnaires in schools in 1990
748 chose to answer anonymously
709 informed consent to follow up
1 dead
2 incorrect information
1493 cases analysed

706 available for follow up
8 refused
49 no response
649 respondents to follow up questionnaire in 1995
34 excluded because of serious illness or somatic symptom injury at baseline
57 excluded because of missing responses to questions at follow up
615 cases analysed

Response options and scoring for items were (1) never, (2) occasionally, (3) rather frequently, and (4) frequently. In order to examine frequent occurrence of symptoms the last two categories were combined. Subjects were asked to report symptoms that had occurred during the past six months.

Social class assessment was based either on father’s occupation or on mother’s occupation in cases where the father was not living in the family of the adolescent. The City of Helsinki social group classification has the following four groups: (I) professionals, managers, and higher administrative or clerical employees; (II) lower clerical employees; (III) skilled workers; and (IV) unskilled workers.

Academic achievement was documented by the grade point average on the final school report card. This is awarded at the end of the 9th grade when most students are 15 years old.

Social support was ascertained by asking “Do you have a significant other person with whom you may discuss your personal activities and problems?” “Yes” was scored 1, “no” 0. The question for the perceived degree of social support, “How important is this person to you?” was measured on a seven point Likert scale. An abbreviated version of the Life Event Checklist18 consisted of 20 defined life events (items 1–8, 12–13, 16, 19, 22, 30–31, 34–35, 37) considered most common among Finnish adolescents and of four open items.

The State–Trait Anxiety Inventory19 was used to measure trait anxiety, a general tendency of feeling. Trait depression was assessed by two questions following the style, scoring, and response options of the State–Trait Anxiety Inventory. The questions dealt with a general tendency to have manifest depressive mood.20 We had to confine ourselves to these two questions as some items in commonly used measures of depression were included in the State–Trait Anxiety Inventory or in the Symptoms Score. The self esteem scale by Rosenberg21 consists of 10 items measuring the self acceptance aspect of self esteem. Additive scoring was used.

The Defence Style Questionnaire (DSQ) consisted of 72 statements on a nine point scale assessing possible conscious derivatives of 20 defences.22 Based on the 88 item original, it has been revised to be congruous with the definitions of defence mechanisms in the Diagnostic and statistical manual of mental disorders (DSM-III-R) by the American Psychiatric Association.23 As in earlier research, these defences were combined into three variables: (1) mature defences (anticipation, humour, sublimation, and suppression); (2) neurotic defences (altruism, idealisation, and reaction formation and undoing); and (3) immature defences (acting out, autist fantasy, denial, devaluation, displacement, dissociation, isolation, passive aggression, projection, rationalisation, somatisation, and splitting). Earlier, a test–retest study found that the defence styles correlated closely when the DSQ was repeated six months later in a sample of 39 cases.

Relief alcohol or drug use and relief smoking, two items from DSQ, were used as independent variables to measure substance use. These were “I take drugs, medicine, or alcohol when I am tense” and “I smoke when I am nervous”. The items were removed from the immature defense style score. This did not notably weaken the immature defence style score; the correlation coefficient between the original and the abridged score was over 0.99 for both girls and boys.

STATISTICAL ANALYSIS

Between group differences in the distributions of continuous variables were assessed with the two tailed t test. Associations between categorical variables were assessed with the $\chi^2$ test. If less than two thirds of the items for a composite scale were missing, missing values were replaced by the mean value, calculated from the items answered by the respondent. The sensitivity of results to this was studied by excluding and including cases with replaced values in the analysis.

Multivariate models were fitted to evaluate the relations between dependent variables and the dependent variable. In the case of a continuous dependent variable, regression analysis was used, in the case of a categorical one logistic regression. Interactions were studied by adding product terms. The level of significance was set at $p < 0.05$.

Results

In 1995, one or more somatic symptoms were reported frequently (including the response option “rather frequently”) by 24% of the men and 44% of the women. Persistence of symptoms was studied by examining the number of cases who reported frequent occurrence of one or more symptoms both in 1990 and in 1995. Of all men reporting somatisation...
189 men and 322 women with no long standing disease in 1995

Table 5 Regression analysis of somatic symptom score in 1995 on predictors in 1990 in men and women

Table 4 Regression analysis of somatic symptom score in 1995 on predictors in 1990 in baseline variables in 1990

Table 3 Correlation coefficients (r) between the somatic symptom score in 1995 and baseline variables in 1990

Table 2 Frequency of somatic symptoms in 1995 in men and women

Table 1 Frequency of occurrence of one or more somatic symptoms in 1990 and 1995 in 218 men and 397 women

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OR, odds ratio.

Number of cases in parentheses.

*p<0.05; **p<0.01; ***p<0.001; n = number of cases.

at this level in 1995, 67% reported symptoms already in 1990. The respective figure for women was 78%. In bivariate analysis, frequent symptoms in 1990 predicted significantly the presence of frequent symptoms in 1995 in both sexes (table 1). The most common symptoms occurring frequently included fatigue or weakness, lethargy, sleeping difficulties, headache, abdominal pain, and diarrhoea or irregular bowel function (table 2).

Multivariate regression analysis was used to examine in more detail potential predictors of the symptom level in 1995. The former included social group, perceived degree of social support, trait anxiety, trait depression, number of worries, number of negative life events, self esteem, grade point average, relief smoking, relief drinking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, relief smoking, reli...
Predictors of somatic symptoms

Early cross sectional studies, including our own, have found several factors that correlate with the level of somatic symptoms. In prospective design, however, only a few of these predict the level of somatic symptoms at follow up, suggesting that the remaining factors are not causally independent and thus not relevant to changes in the symptom score. In our earlier cross sectional analysis in adolescence, somatic symptom scores associated positively with trait anxiety, trait depression, immature defence style, and alcohol or drug use in both sexes. In boys, smoking was associated with more symptoms, and in girls, high self esteem with fewer symptoms. In the present prospective analysis, the level of somatic symptoms in 1995 was significantly predicted by the respective level in 1990 and by relief smoking in men. In women, the level of somatic symptoms in 1995 was significantly predicted by the respective level in 1990 and the number of negative life events in 1990.

It is interesting that the level of somatic symptoms was predicted by relief smoking in men. Compared with women, men are less good at verbally expressing psychiatric problems, and more likely to express the latter as somatic symptoms. Relief smoking may be an effort to self medicate anxiety. However, while the effect of relief smoking was statistically significant, it was not very large in absolute terms. Moreover, the level of somatic symptoms in boys correlated least one month’s duration. Moreover, the level of somatic symptoms in boys correlated positively with those of their mothers. These findings might reflect genetic influences or learning from parental example. The importance of the genetic component is supported by a follow up study on 335 twins from birth to the age of 12–20 years. Zygosity was unfortunately not measured but the concordance of somatic symptoms was 93% in boy–boy pairs, 91% in girl–girl pairs, and 71% in boy–girl pairs, suggesting genetic inheritance. Further studies should assess the familial background of somatisation more closely. Our study was based on self reports. These may be subject to errors caused by forgetting and conscious or unconscious faking. We used self reports of frequent somatic symptoms in the absence of self reported serious disease as an approximation of somatisation. Somatisation is defined as the presence of medically unexplained symptoms. Ideally, the assessment should be based on medical examination and exclusion of disease. Unfortunately, this was not possible in our study. However, we could exclude all cases who reported a long standing disease in 1995.

The number of negative life events in adolescence predicted the level of somatic symptoms in adulthood in women. As no single life event reached significance, it seems that it is the cumulative exposure to negative events that is important in the causation of somatic symptoms. However, a larger study might find small significant effects of single negative events.

The previously mentioned one year follow up study also found that a high level of somatic symptoms was predicted by having higher levels of negative life events in cases with low social competence. We did not have a measure of social competence. A related concept is, however, self esteem. We found that both self esteem and the number of negative life events predicted somatic symptom levels in women. There was no interaction between negative life events and self esteem in our data. However, smoking was no longer a significant predictor among women after exclusion cases who reported a long standing disease.

The number of subjects with somatisation is likely to be overestimated in our study. Approximately one half of the students gave their consent for follow up at baseline, and those who preferred to respond anonymously reported on average a lower level of somatic symptoms than the rest. The mean difference in symptom score was not large, however. The mean score for men remaining anonymous was 4% lower than that for participants. The respective figure for women was 3%. Therefore, we believe that the degree of overestimation is unimportant.

Our sample comprised urban Finnish speaking adolescents, sharing a similar ethnic, educational, and social background. In Finland, almost two thirds of the annual birth cohort at this age enter high school and schooling is free. These schools correspond approximately to British higher secondary schools. Our sample thus represents the more educated majority of Finnish adolescents. Because of the lack of the less educated third of the population and cultural variation, these results should be seen as suggestive rather than directly generalisable to other population groups.

To sum up, high levels of somatic symptoms in early adulthood were predicted by high somatic symptom levels in adolescence, and moreover, by a high degree of relief smoking in men and by a high number of negative life events and low self esteem in women. These findings might be useful in early identification of subjects in whom somatic symptoms persist into early adulthood. Further studies should assess more closely the predictive value of the above measures and the familial background in the continuity of somatic symptoms and exam-
ine possibilities for early interventions to reduce somatisation.

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