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## Functional somatic symptoms in adolescence and young adulthood

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# Chapter 2 | functional somatic symptoms are associated with perfectionism in adolescents

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## Abstract

**Background:** To investigate the influence of perfectionism on functional somatic symptoms (FSS) in adolescents. It was hypothesized that perfectionism predicts higher levels of FSS cross-sectionally and longitudinally, and that anxiety and depression mediate this relationship.

**Methods:** This prospective population-based study was part of the Dutch Tracking Adolescents' Individual Lives Survey (N=2230; 50.8% girls). Data from 1878 participants attending the third (T3) or fourth (T4) assessment wave were used (mean age T3: 16.2 (SD:0.7); mean age T4: 19.0 (SD:0.6)). Multiple regression and mediation analyses were performed in Mplus. FSS, perfectionism (i.e. the feeling one has to be perfect), anxiety and depression were assessed with the Youth Self-Report at the third and fourth wave.

**Results:** Perfectionism was associated with a higher level of FSS in adolescents, both cross-sectionally ( $B=0.11$ , 95%-CI: 0.08-0.14) and longitudinally ( $B=0.05$ , 95%-CI: 0.02-0.08). There was a small indirect effect of perfectionism on FSS through anxiety and depression ( $B=0.02$ , 95%-CI: 0.003-0.03,  $k^2=0.02$ ).

**Conclusion:** The results suggest that perfectionism predicts the course of FSS with a small indirect effect of perfectionism on FSS through anxiety and depression. Further research is needed to clarify which aspects of perfectionism are particularly responsible for this effect.

## Introduction

Functional somatic symptoms (FSS) are common in adolescents (1) and can become disabling (2). Personality traits, and in particular neuroticism, have been suggested to influence FSS in adolescents (3-5), and adults (6). Children with FSS are, besides neurotic, also regularly described as perfectionistic in clinical settings (3-5), and thus the question arises if perfectionism also influences FSS. Maladaptive perfectionism, often described as self-criticism or perceived failure to live up to expectations, has been linked with a wide range of problems in adolescents such as anxiety and depression (7). In addition, maladaptive perfectionism has been found to predict the severity of FSS, for example the levels of fatigue and pain in adults with chronic fatigue syndrome (8-10). Yet, the effect of perfectionism on FSS has not been investigated in adolescents so far.

How perfectionism is related to FSS is not well known but one could imagine that perfectionism results in symptoms of anxiety and depression due to for example worries that expectations cannot be met or feelings of hopelessness to control situations (11). In addition, symptoms of anxiety and depression have been shown to heighten the focus on bodily signals (12,13), and this may lead to an altered interpretation of these signals (14). Attentional and attributional biases towards bodily signals are thought to play an important role in the development of FSS (15).

In summary, perfectionism may play a role in the development and persistence of FSS in adolescents, but this has not been studied yet. This study investigated the cross-sectional and longitudinal effects of perfectionism on FSS in a large cohort of Dutch adolescents. We hypothesized that (1) perfectionism is associated with FSS and predicts higher levels of FSS at follow up; and that (2) symptoms of anxiety and depression mediate this longitudinal relationship.

## Methods

This study was part of the TRacking Adolescents' Individual Lives Survey (TRAILS). Participants were recruited from 135 primary schools in five municipalities in the North of the Netherlands, based on their date of birth (16). For inclusion, the school, parents or guardians and the child all had to agree to participate. At baseline in the year 2001, 2230 of the 3483 potential participants were included (mean age: 11.1, SD 0.6; 50.8% girls). Data from the third (T3, data collection from September 2005 to August 2008, mean duration to follow-up since baseline: 5.2 years [SD: 0.6]) and fourth (T4, data collection from October 2008 to September 2010, mean duration to follow-up since T3: 2.8 years [SD: 0.5]) assessment waves were used for this study (see Table 1). The study was approved by the Dutch Central Committee on Research Involving Human Subjects. Written informed consent was given by adolescents and

their parents. A more detailed description of the inclusion and exclusion criteria, recruitment, and population characteristics can be found elsewhere (16).

FSS were assessed with seven items of the Somatic Complaints subscale of the Youth Self-Report (YSR) at T3 and the Adolescents Self-Report (ASR) at T4: pain, headache, stomachache, nausea, vomiting, dizziness, and fatigue (17,18). These items refer to complaints without a known medical cause or without an obvious reason in the past six months (18). Participants indicated whether they experienced these complaints ‘never’ (0), ‘sometimes or a bit’ (1), or ‘often or a lot’ (2). The scale score represents the mean of these items (range 0-2). At T4, the online ASR contained an additional screening question, while in the paper-and-pencil version there was no screening question included (19). To correct for this method variance, we included ‘type of questionnaire’ as a covariate in the analyses.

Perfectionism was assessed with one item of the YSR at T3; ‘I have the feeling I have to be perfect’(range 0-2). To know which aspect of perfectionism was tapped by this YSR item, the item was correlated with two subscales of the Almost Perfect Scale Revised (APS-R) (20,21), in a sample of general university students in the United States (N=178, mean age: 15.7 (SD=1.3) (22). The two subscales of the APS-R represent maladaptive and adaptive perfectionism. The YSR item was significantly associated with the discrepancy subscale (reflecting maladaptive perfectionism) of the APS-R ( $r=0.3$ ,  $p<0.001$ ) but not significantly with the standards subscale (reflecting adaptive perfectionism) ( $r=0.1$ ,  $p=0.24$ ) (personal correspondence with Suldo, S. M. & Shaunessy-Dedrick, E., 25 November 2014). Information about the recruitment of this American sample can be found elsewhere (23).

Symptoms of anxiety and depression were studied as the mean scale score of twelve items of the Anxious/Depressed scale of the YSR at T3. The thirteenth item ‘I have the feeling I have to be perfect’ was excluded from this scale.

The relation of perfectionism with FSS was analyzed in multiple regression models in Mplus 5.2. First, FSS at T3 was regressed on perfectionism at T3 and sex. Second, FSS at T4 were regressed on perfectionism at T3, sex, FSS at T3 and type of questionnaire. Finally, the indirect effect of perfectionism at T3 on FSS at T4 through symptoms of anxiety and depression was estimated and a kappa-squared effect size ( $k^2$ ) was calculated. Missing data (<12%) were handled with maximum likelihood estimation. Because the FSS variables were skewed in the sample, bias corrected bootstrapping was used to determine all estimates (10.000 bootstraps per analyses). Ninety-five percent confidence intervals not containing zero were considered statistically significant.

## Results

Characteristics of the study sample are shown in Table I. Out of 1657 participants, 1054 (64%, whereof 46% girls) reported that they never felt like they had to be perfect; 497 (30%, whereof 64% girls) that they felt like they had to be perfect sometimes or a bit, and 106 (6%, whereof 82% girls) participants that they felt like they had to be perfect often or a lot.

**Table 2.1.** Characteristics of the study sample.

Characteristic	T3	T4
Subjects, <i>N</i>	1661	1694
Female subjects, <i>N</i> (%)	884 (53%)	928 (55%)
Age years, mean (SD)	16.2 (0.7)	19.0 (0.6)
Mean FSS (SD)	0.35 (0.35)	0.20 (0.30)
Mean Anx/Dep (SD)	0.28 (0.29)	

Note. T3, third assessment wave. T4, fourth assessment wave. FSS, functional somatic symptoms. Range mean FSS: 0-2. Anx/Dep, symptoms of anxiety and depression. Range mean Anx/Dep: 0-2. Analyses performed on the 1878 participants who attended T3 and/or T4.

Perfectionism at T3 was significantly associated with FSS at T3 ( $B=0.11, 95\%-CI: 0.08-0.14$ , adjusted for sex), and significantly predicted FSS at T4 ( $B=0.05, 95\%-CI: 0.02-0.08$ , adjusted for sex, FSS at T3 and type of questionnaire). The longitudinal effect of perfectionism on FSS at T4 was significantly mediated by symptoms of anxiety and depression ( $B=0.02, 95\%-CI: 0.003-0.03, k^2: 0.02$ ).

## Discussion

Perfectionism was associated with FSS, predicted the course of FSS and had a small indirect effect on FSS through symptoms of anxiety and depression. To our knowledge, this is the first study that examined the effect of perfectionism on FSS in adolescents over a two year period. The main strengths of this study are the use of a large population-based cohort and the assessment of a broad spectrum of FSS. A limitation of our study is that the measure of perfectionism was based on a single item while perfectionism is thought to be a complex trait, encompassing multiple domains (24). Yet, the YSR perfectionism item was significantly correlated with maladaptive perfectionism and not with adaptive perfectionism in another cohort study (23). In addition, we did not analyze the influence of other potentially relevant personality characteristics, such as neuroticism or obsessive-compulsive disorder.

Our results are in line with a study in children, which found that perfectionism predicted the severity of headaches in children with chronic headache over a two month period (4), and a study in young adults, in which perfectionism predicted fatigue at four months follow-up (8). In adults, perfectionism has also been reported to predict fatigue and pain in patients with chronic fatigue syndrome (9,10). While one study in adults with chronic fatigue syndrome found, in line with our findings, that the

effect of perfectionism on fatigue and pain was only to some extent explained by symptoms of depression (10), two other studies suggested that the effect of perfectionism on FSS was fully mediated by such symptoms in patients with chronic fatigue syndrome (8,9). Despite these differences in the magnitude of the mediation effects found, the effect of perfectionism on FSS seems at least to a small extent mediated by symptoms of anxiety and depression.

Our findings raise the question which other pathways may lead from perfectionism to FSS in adolescents. A possible mechanism is that perfectionists experience and perceive more daily stressors, are more vulnerable to these stressors, and may prolong generated distress through the use of maladaptive coping strategies such as rumination and catastrophizing (7,15,25). Previous research already found some of these associations in neuroticism (26), which is a trait assumed to be closely related to perfectionism (24,27). Chronic stress, potentially generated by perfectionism, can lead to alterations in the functioning of the hypothalamic-pituitary-adrenal axis, which in turn can cause altered cortisol stress-responses (28). Low cortisol levels are associated with higher levels of FSS (29). Another potential mechanism underlying the association between perfectionism and FSS might be that perfectionists more often than non-perfectionists tend to trivialize their symptoms and persist their activities despite these symptoms. This so-called endurance behavior is, although beneficial on the short term, thought to eventually result in feelings of failure, emotional distress, and increased symptom severity (30). Finally, it is conceivable that some domains of perfectionism, such as an excessive attention for details and controlling behavior, also heighten the focus on bodily signals. An increased perception of bodily signals is assumed to be another important pathway in the development of FSS (15). Eventually, more insight into which aspects of perfectionism are particularly responsible for the increase of FSS may improve management strategies for FSS in adolescents.

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