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Research article

# Sexual abuse predicts functional somatic symptoms: An adolescent population study

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ABSTRACT

The main aim of this study was to investigate the effect of childhood sexual abuse on medically not well explained or functional somatic symptoms (FSSs) in adolescents. We hypothesized that sexual abuse predicts higher levels of FSSs and that anxiety and depression contribute to this relationship. In addition, we hypothesized that more severe abuse is associated with higher levels of FSSs and that sexual abuse is related to gastrointestinal FSSs in particular. This study was part of the Tracking Adolescents' Individual Lives Survey (TRAILS): a general population cohort which started in 2001 ($N$ = 2,230; 50.8% girls, mean age 11.1 years). The current study uses data of 1,680 participants over four assessment waves (75% of baseline, mean duration of follow-up: 8 years). FSSs were measured by the Somatic Complaints subscale of the Youth Self-Report at all waves. Sexual abuse before the age of sixteen was assessed retrospectively with a questionnaire at T4. To test the hypotheses linear mixed models were used adjusted for age, sex, socioeconomic status, anxiety and depression. Sexual abuse predicted higher levels of FSSs after adjustment for age sex and socioeconomic status ($B$ = .06) and after additional adjustment for anxiety and depression ($B$ = .03). While sexual abuse involving physical contact significantly predicted the level of FSSs (assault; $B$ = .08, rape; $B$ = .05), non-contact sexual abuse was not significantly associated with FSSs ($B$ = .04). Sexual abuse was not a stronger predictor of gastrointestinal FSSs ($B$ = .06) than of all FSSs. Further research is needed to clarify possible mechanisms underlying relationship between sexual abuse and FSSs.



## Introduction

Functional somatic symptoms (FSSs), or symptoms that are not well explained by an underlying pathology, are common in adolescence and can be very persistent and impairing (Hunfeld et al., 2001; Perquin et al., 2003). In children and adolescents gastrointestinal complaints, pain, and fatigue are the most common symptoms (Perquin et al., 2003; Saps et al., 2009; ter Wolbeek et al., 2006). The aetiology of FSSs is not well understood, but several social, psychological and biological risk factors have already been identified (Beck, 2008; Janssens et al., 2010, 2014). One of these potential risk factors for FSSs is sexual abuse (Afari et al., 2014; Davis, Luecken, & Zautra, 2005; Kugler et al., 2012; Paras et al., 2009; van Tilburg et al., 2010). Yet,

*Abbreviations:* FSSs, functional somatic symptoms; LMMs, linear mixed models; SES, socioeconomic status; TRAILS, Tracking Adolescents' Individual Lives Survey.

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previous studies that investigated the effect of sexual abuse on FSSs mostly relied on cross-sectional analyses of recalled sexual abuse and current FSSs (Afari et al., 2014; Paras et al., 2009). This may have introduced biases. For example; people who suffer from anxiety, depression, or FSSs may more easily recall negative events that triggered the same mood or resulted in the same symptoms (Blaney, 1986). In addition, often the effect of sexual abuse on one specific type of FSSs in female clinical populations was studied (Afari et al., 2014; Paras et al., 2009). Thus, it remains unclear if the recall of sexual abuse predicts a spectrum of prospectively assessed FSSs in the general adolescent population.

Further, most studies did not adjust for concurrent symptoms of anxiety and depression or chronic stressors. Yet, symptoms of anxiety and depression may (partly) explain the association between sexual abuse and FSSs (Chen et al., 2010; Janssens et al., 2010). Indeed, in the two studies in adolescents that adjusted for symptoms of anxiety and/or depression, the association between sexual abuse and FSSs was reduced or no longer significant (Kugler et al., 2012; van Tilburg et al., 2010). Furthermore, the effect of sexual abuse on FSSs might depend on the type of abuse that was experienced, such as abuse involving contact versus abuse without bodily contact, but not much has been written on this topic (Bendixen, Muus, & Schei, 1994; Leserman et al., 1996; Paras et al., 2009). Finally, a meta-analysis found that sexual abuse and gastrointestinal complaints, but not headache or fibromyalgia, were related in adults (Paras et al., 2009). This raises the question whether sexual abuse might be a risk factor for gastrointestinal FSSs in particular.

This study investigates the relation between sexual abuse and a spectrum of prospectively assessed FSSs in a large population-based cohort of Dutch adolescents. It was hypothesized that (1) sexual abuse predicts higher levels of FSSs; (2) symptoms of anxiety and depression explain at least part of this relationship; (3) sexual abuse involving contact predicts a higher level of FSSs than sexual abuse not involving contact. In addition this study explored if sexual abuse is related to gastrointestinal symptoms in particular.

## Methods

### *Participants*

This study was part of the Tracking Adolescents' Individual Lives Survey (TRAILS), a prospective population based cohort recruited from five municipalities in the North of the Netherlands (de Winter et al., 2005). In total 3,483 potential participants from 135 primary schools were identified based on their date of birth. Schools, parents and children were informed and all had to agree to participate for inclusion. Children incapable of participating due to mental retardation, serious physical illness or handicap were excluded from the study, as were children with no Dutch, Turkish or Moroccan speaking parent or guardian. At baseline in 2001, 2,230 children were included (mean age 11.1 years [*SD* = 0.6]). Extensive recruitment efforts were made to increase the representativeness of the cohort. No differences were found between responders and non-responders in sociodemographic factors and health outcomes (de Winter et al., 2005). Data from four assessment waves were used for this study (T1–T4, T2: mean time to follow up 2.5 years, mean age 13.6 years [*SD* = 0.5]; T3: mean time to follow up 5.2 years, mean age 16.3 years [*SD* = 0.7]; T4: mean time to follow up 8.0 years, mean age 19.1 years [*SD* = 0.6]). Data on sexual abuse were collected for 1,680 participants at T4 (Table 1). Attrition over the four waves was associated with being male, a low socioeconomic status, peer problems, substance use and externalizing problems (Nederhof et al., 2012). A more detailed description of the recruitment efforts, population characteristics and non-response bias can be found elsewhere (de Winter et al., 2005; Huisman et al., 2008; Nederhof et al., 2012). Approval by the Dutch Central Committee on Research Involving Human Subjects was obtained. Written informed consent was given by parents at T1 and by adolescents at T2, T3 and T4.

### *Measures*

*Functional Somatic Symptoms.* FSSs were assessed with nine items of the Somatic Complaints subscale of the Youth Self-report (YSR) at T1-T4 (Achenbach, Dumenci, & Rescorla, 2003). The YSR has been shown to have a good cross-cultural validity (de Groot, Koot, & Verhulst, 1996). The items refer to somatic symptoms without a known medical cause or without an obvious

**Table 1**
Characteristics of the study sample.

| Characteristic | T1 | T2 | T3 | T4 |
|---|---|---|---|---|
| Subjects, *N* (% T4) | 1,658 (99%) | 1,642 (98%) | 1,466 (87%) | 1,680 (100%) |
| Female subjects, *n* (%)[a] | 912 (55.0%) | 898 (54.7%) | 812 (55.4%) | 921 (54.8%) |
| Age, mean years (*SD*) | 11.1 (0.6) | 13.5 (0.5) | 16.2 (0.7) | 19.1 (0.6) |
| FSSs, mean (*SD*) | 0.47 (0.35) | 0.40 (0.36) | 0.35 (0.34) | 0.20 (0.31) |
| Sexually abused, *N* (%)[a] | 30 (1.8%) | 58 (3.4%) | 138 (8.3%) | 154 (9.2%) |
| FSSs sexually abused, mean (*SD*) | 0.61 (.36) | 0.58 (.48) | 0.53 (.41) | 0.32 (0.41) |
| Sexually abused females, *n* (%)[b] | 23 (2.5%) | 46 (5.0%) | 108 (11.7%) | 120 (13.0%) |
| Sexually abused males, *n* (%)[b] | 7 (0.9%) | 12 (1.6%) | 30 (4.0%) | 34 (4.5%) |

*Note*: T1–T4 represent the four assessment waves. FSSs, functional somatic symptoms.
[a] Percentages based on the total number of participants who attended the corresponding wave.
[b] Percentages based on the total number of females/males who attended the corresponding wave.