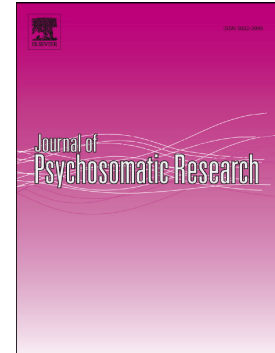# Journal Pre-proof

Psychometric properties of the Somatic Symptom Scale 8 (SSS-8) in a representative sample of German adolescents

Sören Kliem, Yvonne Krieg, Johannes Beller, Elmar Brähler, Dirk Baier

Please cite this article as: S. Kliem, Y. Krieg, J. Beller, et al., Psychometric properties of the Somatic Symptom Scale 8 (SSS-8) in a representative sample of German adolescents, *Journal of Psychosomatic Research* (2018), https://doi.org/10.1016/j.jpsychores.2021.110593

Psychometric properties of the Somatic Symptom Scale 8 (SSS-8) in a representative sample of German adolescents.

Short Report

TO BE SUBMITTED TO JOURNAL OF PSYCHOSOMATIC RESEARCH

Prof. Dr. Sören Kliem[1], Yvonne Krieg[2], M.Sc., Dr. Johannes Beller[3], Prof. Dr. Elmar Brähler[4,5] & Prof. Dr. Dirk Baier[6]

[1] Ernst-Abbe-Hochschule Jena – University of Applied Sciences, Jena, Germany

[2] Criminological Research Institute of Lower Saxony, Hannover, Germany

[3] Medical Sociology, Hannover Medical School, Hannover, Germany

[4] Department of Medical Psychology and Medical Sociology, University of Leipzig, Leipzig, Germany

[5] Department of Psychosomatic Medicine and Psychotherapy, University Medical Center Mainz, Mainz, Germany

[6] Zürcher Hochschule für Angewandte Wissenschaften, Zürich, Switzerland

Word-Count: 1498/1500
Abstract: 220/250

Corresponding author:
Prof. Dr. Sören Kliem
Ernst-Abbe-Hochschule Jena – University of Applied Sciences
Carl-Zeiss-Promenade 2
07745 Jena, Germany

Abstract

Objective The psychometric properties of the Somatic Symptom Scale 8 (SSS-8) have been investigated in different studies. However, there is no study examining its psychometric properties on representative data of adolescents. The study at hand will present results from a large representative sample of German adolescents (13 to 18 years).

Methods The following analyses draw on cross-sectional data from German ninth-grade students collected in 2015. Altogether, 10,638 individuals were surveyed with a return rate of 68.5% as part of a periodic representative survey in the German federal state of Lower Saxony.

Results For the SSS-8, coefficient omega for the full sample was $\omega = .90$, and $\omega = .77$ and .79 for males and females, respectively. In addition, convergent validity was determined with the Patient Health Questionnaire 2 (PHQ-2), Generalized Anxiety Disorder 2 (GAD-2), and the brief form of Perceived Social Support Questionnaire (FSozU-K6). Based on a confirmatory factor analysis and measurement invariance analysis (for gender and migration background), the initially determined factor structure by Gierk et al. of the SSS-8 could be confirmed.

Conclusion The results support the reliability and validity of the SSS-8 for use with adolescents. The use of the SSS-8 seems to be meaningful within different frameworks, especially when, due to a lack of time or for reasons of cost, no face-to-face interviews can be conducted.

1. Introduction

The Somatic Symptom Scale 8 (SSS-8) [1] is a time-efficient tool for the assessment of somatic symptom burden. The SSS-8 is a short form of the Patient Health Questionnaire (PHQ-15) [2] which is among the most commonly used and best validated instruments for this purpose [3]. Somatic symptoms are a characteristic of various medical problems such as cancer or coronary heart disease [4,5], and they also occur in the context of mental illnesses such as depressive disorders, anxiety disorders, or somatoform disorders [1,6,7] in the general population. Studies with adolescents confirm these associations, both cross-sectionally and longitudinally [8-10]. The assessment of somatic symptom burden is highly relevant in the context of epidemiological research, as it is associated with reduced health-related quality of life and higher utilization of health care services [4-5,11]. The psychometric properties of the SSS-8 have been investigated in different studies [1,12] and the measurement instruments have been found to be reliable and valid. However, there is no study that examines the psychometric properties of the SSS-8 in a large and representative sample of adolescents. Since the presence of somatic symptoms in childhood and adolescence is longitudinally associated with anxiety and depressive symptoms and disorders later in life [10], an early and reliable assessment seems to be of high relevance. In this short communication, we would hence like to present results from a large representative sample of German adolescents (*N*=10,638), that is useful to adequately interpret SSS-8 scores within this age group.

2. Methods

2.1 Procedure

The following analyses draw on data from German ninth-grade students collected in 2015 as part of a periodic representative survey [13,14]. The federal school board of Lower Saxony as well as the Ministry of Education of Lower Saxony approved the survey and provided ethics auditing. The survey was strictly anonymized – neither names, nor private

2

or school addresses were obtained. The students' parents received an information leaflet

beforehand, which included a request for written consent for the participation of their child

and provided them with information about aims, methods and funding of the study.

Students were informed that participation in the survey was entirely voluntary and

anonymous and that they could withdraw from participating at any time during the

interview without any negative consequences. Furthermore, they were informed of their

right to skip individual questions within the survey and were encouraged to speak to a

counsellor or school psychologist if they felt negatively impacted in any way by

participating in the survey . Overall N=10,638 adolescents from 545 classes (response rate

68.5%; 50.2% male, 24.3% migration background) were assessed (see Table 1).

2.2 Instruments

The SSS-8 [1] was used to assess somatic symptom strain. The question was introduced as

follows: *How much have you suffered from the following complaints in the last 7 days?*

(see Table 2 for the items). The students could answer on a five-point scale ("0-*not at all*",

"1-*rather little*", "2-*partly*", "3-*rather strongly*", "4-*very strongly*"). Additionally, the PHQ-

2 (Patient Health Questionnaire 2, study at hand: ω=.68) and GAD-2 (Generalized Anxiety

Disorder 2; study at hand: ω=.70) were used to assess depression/anxiety symptoms [15].

The FSozU K-6 (brief form of the Perceived Social Support Questionnaire) [16] was used

to assess perceived social support (study at hand: ω=.82). Furthermore, health care use was

measured by the self-reported numbers of contacts with health care providers in the past 12

months (days in the hospital [accidents were not considered] and general practitioner

visits) as well as the number of school absentee days due to illness.

2.3 Statistical Analysis

2.3.1 Missing Data

To account for missing data, we applied chained equation modeling to estimate missing

data (proportion of missing values of the items of the SSS-8: 3.5%–3.6%). To avoid

implausible item values, the estimated values (y) were corrected by predictive mean matching (i.e., the observable values closest to the predicted value were chosen). We used the R package *mice* [17] for imputation.

2.3.2 Construct Validity

Regarding construct validity, the following hypotheses were formulated: depression levels and anxiety levels should be higher in individuals with high subjective symptom strain [1,11]. Furthermore, subjective symptom strain should be higher in individuals with lower perceived social support scores [16]. Additionally, negative binomial regression was performed on the count of health care visits [1], and school absentee days (due to illness), with the SSS-8 score as predictor and anxiety and depression scores as covariates, to test the hypothesis of a positive correlation between these variables [1].

2.3.3 Reliability

Internal consistencies of the SSS-8 are reported as McDonald's omega [18]. In addition, coefficient alpha is reported.

2.3.4 Factorial validity

To test the dimensional structure of the SSS-8 [1], confirmatory factor analyses (CFA) were conducted. CFA was performed using the *lavaan* package [19] for R statistics. As suggested for the use with ordered categorical measures, weighted least square means and variance adjusted estimation (WLSMV) was used. Model-fit was assessed using the following fit measures: Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA). According to Hu and Bentler [20] RMSEA values <.050 represent a "close fit"; CFI and TLI values >.950 represent a good model fit.

2.3.5 Measurement invariance

Measurement invariance (MI) was tested using multiple group factor analysis for gender (female; male), migration background (yes; no), and age (median-split: <15 years; ≥15

years). Following the procedure suggested by Wu and Estabrook [21] for ordered

categorical variables, we used theta parameterization and set item intercepts to 0 and

residual variances to 1. The following models were subsequently tested: configural

invariance (no constraints apart from those necessary for model identification), threshold

invariance (constraining all thresholds to be equal), weak invariance (constraint of

loadings), strong invariance (constraining of intercepts), and full invariance (constraining

residual invariance). Chen [22] suggest the following cut-off criteria: a change of $<-.01$ in

CFI in addition to a change of $\geq.015$ in RMSEA indicates non-invariance. We conducted a

MI for the SSS-8 across gender, and migration background. MI was performed using the

semTools package [23] for R statistics. In cases where full invariance was not given, we

tested for partial invariance by successively releasing constraints for individual indicators

[see 24,25].

3. Results

3.1 Item characteristics

Table 2 displays means and standard deviations for the eight items of the SSS-8 in the total

sample and separately for male and female participants (eTable 1 provides an overview of

the severity categories for the SSS-8). At the item level, there were statistically significant

differences on all item scores, with higher scores for the female participants.

3.2 Construct validity

In line with our hypotheses, there were low but substantial correlations between the SSS-8

and the FSozU-K6 ($r=-.18$, $p<.001$). Furthermore, we detected high correlations between

the SSS-8 and PHQ-2 ($r=.49$, $p<.001$) / GAD-2 ($r=.52$, $p<.001$) in the expected direction.

After controlling for depression and anxiety, SSS-8 scores significantly predicted health

care visits in the past 12 months (i.e., days in the hospital [Incidence-Rate Ratio (IRR)

=1.06, SE=0.007, z=7.79, $p<.001$], general practitioner visits [IRR=1.06, SE=0.032,

z=22.08, $p<.001$]), and number of days absent from school [IRR=1.04, SE=0.002, z=17.96,

p<.001]: each 1-point increase in the SSS-8 score was accordingly associated with 6% increase in health care visits (days in the hospital and general practitioner visits) and 4% increase in school absentee days due to illness.

3.3 Internal consistency

McDonald's omega for the full sample was ω=.80 (α=.79), and ω=.77 for males (α=.75) and ω=.79 for females (α=.78).

3.4 Factorial validity

All assessed indices showed an adequate to excellent model fit for the total sample (RMSEA=.068 [95%-CI: .064-.0.72], TLI=.957, CFI=.974). First- and second-order-factor loadings are shown in eFigure 1.

3.5 Measurement invariance

The fit measures obtained in the measurement invariance analyses are presented in eTable 2. Adequate CFI and RMSEA differences are reported for all invariance steps and groups.

4. Discussion

The present study was the first to investigate the psychometric properties of the SSS-8 using a large and representative sample of adolescents. Based on the coefficient omega (and coefficient alpha), the SSS-8 can be assessed as reliable. The dimensionality of the SSS-8 [1] was confirmed on the basis of CFAs. Furthermore, the analyses showed comparable factor structures using MI in the subgroups that were studied. Lastly, the reported correlations between the SSS-8 and PHQ-2, GAD-2 and FSozU-K6 lie within the range of previous studies [1,16].

4.1 Strengths and Limitations

There are many strengths associated with this study, among them the drawing of a random sample, the large sample size, and the satisfactory response rate. It does, however, suffer from several limitations: The present study design only allowed for the survey of German students in the ninth grade. Conclusions regarding other age and ethnic groups should not

6

be drawn. Furthermore, it cannot be ruled out that particularly stressed students often did not participate in the survey due to health problems or expulsion from school.

4.2 Conclusion

The use of the SSS-8 seems to be meaningful within different frameworks, especially when, due to a lack of time or for reasons of cost, no face-to-face interviews can be held.

References

[1] B. Gierk, S. Kohlmann, K. Kroenke, L. Spangenberg, M. Zenger, E. Brähler, B. Löwe, The somatic symptom scale–8 (SSS-8): a brief measure of somatic symptom burden, JAMA Intern. Med. 174(3) (2014) 399-407. https://doi.org/10.1001/jamainternmed.2013.12179.

[2] K. Kroenke, R.L. Spitzer, J.B. Williams, The PHQ-15: validity of a new measure for evaluating the severity of somatic symptoms, Psychosom. Med. 64(2) (2002) 258-266. https://doi.org/10.1097/00006842-200203000-00008.

[3] W.L. Zijlema, R.P. Stolk, B. Löwe, W. Rief, P.D. White, J.G. Rosmalen, How to assess common somatic symptoms in large-scale studies: A systematic review of questionnaires, J. Psychosom. Res. 74(6) (2013) 459-468. https://doi.org/10.1016/j.jpsychores.2013.07.093.

[4] K. Kroenke, X. Zhong, D. Theobald, J. Wu, W. Tu, J.S. Carpenter, Somatic symptoms in patients with cancer experiencing pain or depression: prevalence, disability, and health care use, Arch. Intern. Med. 170(18) (2010) 1686-1694. https://doi.org/10.1001/archinternmed.2010.337.

[5] S. Kohlmann, B. Gierk, elgen, S. Blankenberg, B. Löwe, Somatic symptoms in patients with coronary heart disease: prevalence, risk factors, and quality of life, JAMA Intern. Med. 173(15) (2013) 1469-1471. https://doi.org/10.1001/jamainternmed.2013.6835.

[6] G.E. Simon, M. Von Korff, M. Piccinelli, C. Fullerton, J. Ormel, An international study of the relation between somatic symptoms and depression, N. Engl. J. Med. 341(18) (1999) 1329-1335. https://doi.org/10.1056/NEJM199910283411801.

[7] W. Rief, A. Martin, A. Klaiberg, E. Brähler, Specific effects of depression, panic, and somatic symptoms on illness behavior, Psychosom. Med. 67(4) (2005) 596-601. https://doi.org/10.1097/01.psy.0000171158.59706.e7.

[8] J.V. Campo, Annual Research Review: Functional somatic symptoms and associated anxiety and depression - developmental psychopathology in pediatric practice, J. of Child Psychol. and Psychiatry 53(5) (2012) 575-592. https://doi.org/10.1111/j.1469-7610.2012.02535.x.

[9] H. Bohman, U. Jonsson, A.-L. Von Knorring, L. Von Knorring, A. Päären, G. Olsson, Somatic symptoms as a marker for severity in adolescent depression, Acta Pædiatrica 99(11) (2010) 1724-1730. https://doi.org/10.1111/j.1651-2227.2010.01906.x

[10] T. Lallukka, G.B. Mekuria, T. Nummi, P. Virtanen, M. Virtanen, A. Hammarström, Co-occurrence of depressive, anxiety, and somatic symptoms: trajectories from adolescence to midlife using group-based joint trajectory analysis, BMC Psychiatry 19(236) (2019). https://doi.org/10.1186/s12888-019-2203-7.

[11] S. Kliem, A. Lohmann, T. Klatt, T. Mößle, F. Rehbein, A. Hinz, M. Beutel, E. Brähler, Brief assessment of subjective health complaints: Development, validation and population norms of a brief form of the Giessen Subjective Complaints List (GBB-8), J. of Psychosom. Res. 95 (2017) 33-43. https://doi.org/10.1016/j.jpsychores.2017.02.003.

[12] B. Gierk, S. Kohlmann, A. Toussaint, I. Wahl, C.A. Brünahl, A.M. Murray, B. Löwe, Assessing somatic symptom burden: A psychometric comparison of the Patient Health Questionnaire—15 (PHQ-15) and the Somatic Symptom Scale—8 (SSS-8), J. of Psychosom. Res. 78(4) (2015) 352-355. https://doi.org/10.1016/j.jpsychores.2014.11.006.

[13] S. Kliem, A. Lohmann, M. Neumann, C. Glaubitz, S. Haselbach, M.C. Bergmann, D. Baier, Factor structure of the inventory of callous-unemotional traits in a representative sample of German 9th grade students, J. of Abnorm. Child Psychol. 48(1) (2020) 43-55. https://doi.org/10.1007/s10802-019-00590-x.

[14] F. Rehbein, S. Kliem, D. Baier, T. Mößle, N. M. Petry, Prevalence of internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a

state-wide representative sample, Addiction 110(5) (2015) 842-851.

https://doi.org/10.1111/add.12849.

[15] K. Kroenke, R. L. Spitzer, J. B. W. Williams, B. Löwe, An ultra-brief screening scale

for anxiety and depression: The PHQ–4, Psychosomatics 50(6) (2009) 613–621.

https://doi.org/10.1176/appi.psy.50.6.613.

[16] S. Kliem, T. Mößle, F. Rehbein, D. F. Hellmann, M. Zenger, E. Brähler, A brief form

of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and

standardized, J. of Clin. Epidemiol. 68(5) (2015) 551-562.

https://doi.org/10.1016/j.jclinepi.2014.11.003.

[17] Z. Zhang, Multiple imputation with multivariate imputation by chained equation

(MICE) package, Ann. of Transl. Med. 4(2) (2016) 30. https://doi.org/10.3978/j.issn.2305-

5839.2015.12.63.

[18] D. McNeish, Thanks coefficient alpha, we'll take it from here. Psychol.

Methods 23(3) (2018) 412-433. https://doi.org/10.1037/met0000144.

[19] Y. Rosseel, T. D. Jorgensen, D. Oberski, J. Byrnes, L. Vanbrabant, V. Savalei, V., ...

& Scharf, F. (2020). lavaan: Latent Variable Analysis (0.6-6) [Computer software].

[20] L.T. Hu, P. M. Bentler, Cutoff criteria for fit indexes in covariance structure analysis:

Conventional criteria versus new alternatives, Struct. Equ. Modeling: A Multidiscip. J. 6(1)

(1999) 1-55. https://doi.org/10.1080/10705519909540118.

[21] H. Wu, R. Estabrook, Identification of Confirmatory Factor Analysis Models of

Different Levels of Invariance for Ordered Categorical Outcomes, Psychometrika 81(4)

(2016) 1014–1045. https://doi.org/10.1007/s11336-016-9506-0.

[22] F.F. Chen, Sensitivity of goodness of fit indexes to lack of measurement

invariance, Struct. Equ. Modeling: A Multidiscip. J. 14(3) (2007) 464-504.

https://doi.org/10.1080/10705510701301834.

[23] T. D. Jorgensen, S. Pornprasertmanit, A. M. Schoemann, Y. Rosseel, P. Miller, C. Quick, ... & C. Enders (2020). Package 'semTools'.

[24] B. Schmalbach, M. Zenger, A. N. Tibubos, S. Kliem, K. Petrowski, E. Brähler, Psychometric Properties of Two Brief Versions of the Hopkins Symptom Checklist: HSCL-5 and HSCL-10, Assessment 28(2) (2021) 617-631. https://doi.org/10.1177/1073191119860910.

[26] C. Kröger, J. Schulz, J. Kosfelder, U. Schweiger, S. McMain, S. Kliem, Factorial invariance of the Emotion-Dysregulation-Scale for Canadian and German treatment-seeking adults with borderline personality disorder, major depression or substance dependence, Personality and Individual Differences 71 (2014) 124-129. https://doi.org/10.1016/j.paid.2014.07.031.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

All procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from each individual participating in the study.

Table 1.

Demographic characteristics of the study sample

| Sample characteristics	Male (N = 5 340)	Female (N = 5 298)	Total (N = 10 638)
Age[1]			
13	12 (0.2%)	8 (0.2%)	20 (0.2%)
14	1262 (23.6%)	1716 (32.4%)	2978 (28.0%)
15	2961 (55.5%)	2863 (54.0%)	5824 (54.8%)
16	945 (17.7%)	612 (11.6%)	1557 (14.6%)
17	150 (2.8%)	89 (1.7%)	239 (2.3%)
18	10 (0.2%)	10 (0.2%)	20 (0.1%)
Migration background[2]			
no	4079 (76.4%)	3972 (75.0%)	8051 (75.7%)
yes	1261 (23.6%)	1326 (25.1%)	2587 (24.3%)
School type[3]			
low	498 (9.3%)	361 (6.8%)	859 (8.1%)
medium	3334 (62.4%)	3094 (58.4%)	6428 (60.4%)
high	1508 (28.2%)	1843 (34.8%)	3351 (31.5%)

Note: [1]The age range is quite wide for two reasons. Firstly, the school entry age in Germany already varies between five and seven years. Secondly, in Germany there is the possibility of repeating a grade level in case of poor grades or of skipping a grade level in case of very good grades; [2] A migration background exists if the students, or at least one of their parents, were not born in Germany or do not have German citizenship; [3] The types of school can be classified according to the ISCED (International Standard Classification of Education). According to this categorisation, students of the low and medium school types reach Lower Secondary Education (Level 2). Whereas students of the low school type usually complete nine years of schooling, students of the medium school type usually complete ten years of schooling. Students of the high school type reach Upper Secondary Education (Level 3) after 13 years of school.

Table 2.
Means (M), standard deviation (SD), and group differences for the Somatic Symptom Scale-8

	Total		Male		Female		Group differences		
	M	*SD*	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Stomach or bowel problems	0.83	1.06	0.54	0.89	1.12	1.14	28.85	10636	<.001
Backpain	1.27	1.26	1.13	1.21	1.41	1.29	11.63	10636	<.001
Pain in your arms, legs, or joints	1.15	1.18	1.06	1.16	1.24	1.18	8.26	10636	<.001
Headaches	1.39	1.29	1.03	1.17	1.75	1.31	30.31	10636	<.001
Chest pain or shortness of breath	0.59	1.03	0.42	0.88	0.76	1.14	17.23	10636	<.001
Dizziness	0.85	1.16	0.53	0.94	1.17	1.27	29.22	10636	<.001
Feeling tired or having low energy	1.80	1.33	1.48	1.28	2.13	1.30	25.03	10636	<.001
Trouble sleeping	0.97	1.31	0.70	1.14	1.45	1.41	22.18	10636	<.001
SSS-8	8.85	6.11	6.89	5.25	10.82	6.27	35.13	10636	<.001

Note: SSS = Somatic Symptom Scale
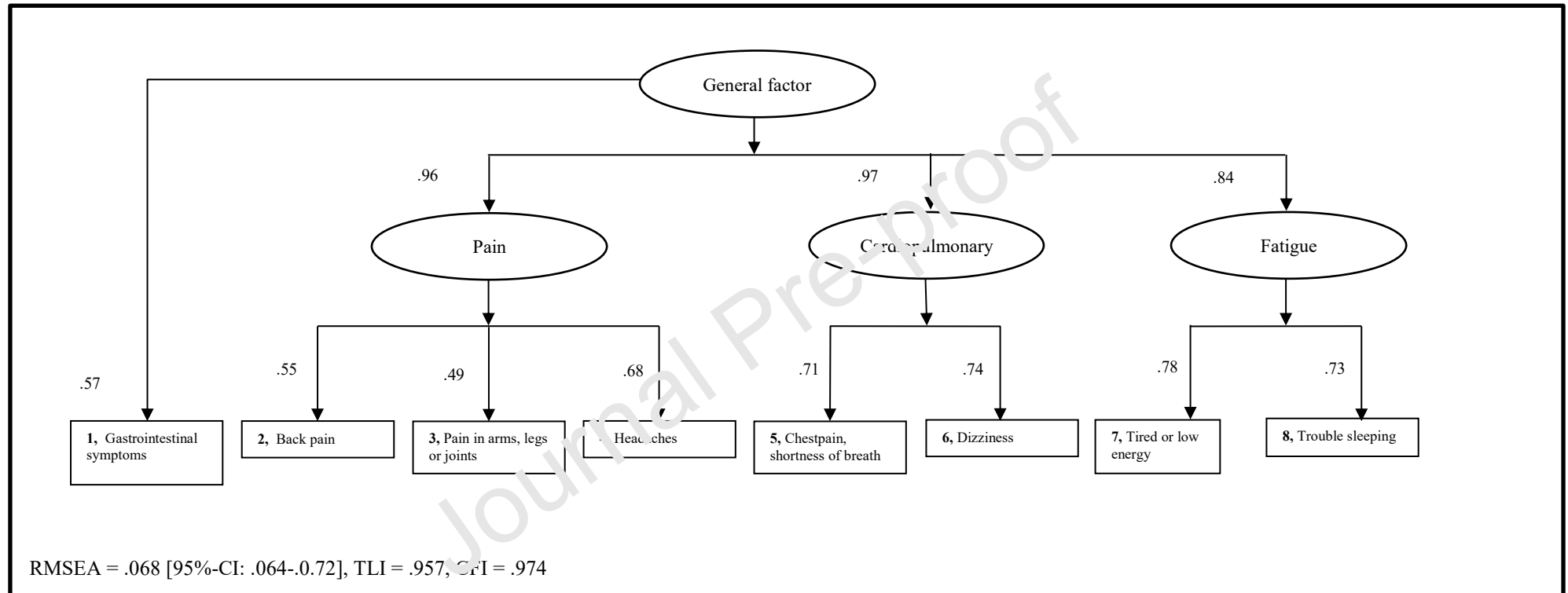
eFigure 1. Confirmatory Factor Analysis of the Higher-Order General-Factor Model

Note: The model presented consisted of an overarching somatic symptom factor and four lower-order symptom clusters (gastrointestinal, pain, cardiopulmonary, and fatigue). The model was estimated using robust weighted least-squares estimation with mean and variance adjustment based on polychoric correlations. All factor loadings are standardized.

eTable 1.
Severity categories for the Somatic Symptom Scale-8 for the total sample and for females and males respectively.

	Total (*N* = 10 638)					Male (*N* = 5 340)					Female (*N* = 5 298)				
	not at all	*rather little*	*partly*	*rather strongly*	*very strongly*	*not at all*	*rather little*	*partly*	*rather strongly*	*very strongly*	*not at all*	*rather little*	*partly*	*rather strongly*	*very strongly*
Stomach or bowel problems (%)	40.1	24.4	22.8	9.1	2.6	53.5	21.1	16.9	6.3	2.3	66.7	17.9	11.0	3.4	1.0
Backpain (%)	34.6	18.5	25.4	14.0	7.5	39.0	19.0	23.8	12.3	5.9	43.5	19.4	22.1	10.7	4.3
Pain in your arms, legs, or joints (%)	35.8	23.9	24.9	10.9	4.5	40.5	22.1	23.3	10.0	4.1	45.1	20.5	21.8	9.1	3.6
Headaches (%)	23.3	19.7	26.7	19.0	11.4	34.7	20.9	22.8	14.0	7.6	46.0	22.2	18.9	9.1	3.9
Chest pain or shortness of breath (%)	61.5	15.8	11.8	7.1	3.9	69.1	13.4	9.7	5.2	2.6	76.5	11.1	7.5	3.4	1.4
Dizziness (%)	43.6	20.3	18.3	11.9	6.4	56.3	18.1	13.7	8.1	3.8	69.1	16.0	9.0	4.4	1.5
Feeling tired or having low energy (%)	13.5	19.9	25.6	22.4	18.7	21.6	21.8	24.6	18.6	13.4	29.7	23.7	23.6	14.7	8.2
Trouble sleeping (%)	45.3	18.0	14.6	10.8	11.3	55.0	16.8	11.9	8.4	7.9	64.7	15.7	9.2	6.1	4.4

15

eTable 2.
Results of measurement invariance analyses

	χ^2	*df*	CFI	ΔCFI	RMSEA	ΔRMSEA	Measurement invariance
Gender (female; male)							
Configural invariance	445.32	28	.984		.053		
Threshold invariance (equivalency of thresholds)	794.47	44	.971	-.013	.057	.004	√
Metric invariance (equivalency of thresholds + factor loadings)	746.54	49	.973	.002	.052	-.005	√
Scalar invariance (equivalency of thresholds + factor loadings + equivalency of constants)	1508.46	57	.945	-.0.8	.069	.017	x
Partial Scalar invariance (the intercepts of Items 2 and 3 were freed to vary between groups)	840.56	55	.970	-.003	.052	.000	√
Full invariance (equivalency of thresholds + factor loadings + equivalency of constants + unique-factor variances)	1671.94	65	.967	-003	.051	-.001	√
Migration Background (yes; no)							
Configural invariance	509.38	28	.984		.057		
Threshold invariance (equivalency of thresholds)	937.79	44	.971	-0.13	.062	.005	√
Metric invariance (equivalency of thresholds + factor loadings)	832.36	49	.975	.004	.055	-.007	√
Scalar invariance (equivalency of thresholds + factor loadings + equivalency of constants)	836.84	57	.975	.000	.051	-.004	√
Full invariance (equivalency of thresholds + factor loadings + equivalency of constants + unique-factor variances)	921.76	63	.972	-.003	.051	.000	√
Age (Median-Split: <15 years; ≥15 years)							
Configural invariance	512.90	28	.969		.057		
Threshold invariance (equivalency of thresholds)	931.55	44	.972	.003	.062	.005	√
Metric invariance (equivalency of thresholds + factor loadings)	832.34	49	.975	.003	.055	-.007	√
Scalar invariance (equivalency of thresholds + factor loadings + equivalency of constants)	830.66	57	.976	.001	.051	-.004	√
Full invariance (equivalency of thresholds + factor loadings + equivalency of constants + unique-factor variances)	838.14	63	.976	.000	.047	-.004	√

Note: All fit statistics are robust; CFI = Comparative Fit Index; ΔCFI = CFI-differences for the different measurement invariance levels; RMSEA = Root Mean Square Error of Approximation; ΔRMSEA = RMSEA-differences for the different measurement invariance levels; [a] = $\Delta CFI \leq -.010$ complemented by $\Delta RMSEA \geq .015$ indicates a violation of measurement invariance; √ marks measurement invariance for the respective level.

16

Highlights

- Psychometric quality of the SSS-8 using a representative sample of adolescents

- The dimensionality and measurement invariance of the SSS-8 was confirmed

- The SSS-8 seems to be suitable as a screening instrument for adolescents