

Translation and Validation of the Standardized Cosmesis and Health Nasal Outcomes Survey in Dutch

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ABSTRACT

Objective: The Standardized Cosmesis and Health Nasal Outcomes Survey is a validated instrument for patients undergoing rhinoplasty surgery. The aim of this study was to validate a Dutch-language version of the Standardized Cosmesis and Health Nasal Outcomes Survey.

Methods: The Standardized Cosmesis and Health Nasal Outcomes Survey was translated and back-translated and 10 Dutch-speaking rhinoplasty patients were interviewed to evaluate the translation. The translated version was administered to 25 rhinoplasty patients (cases) and 25 controls at 2-week intervals. The internal consistency, test–retest reliability, and factor structure of Standardized Cosmesis and Health Nasal Outcomes Survey were measured.

Results: Both the obstructive domain of the Standardized Cosmesis and Health Nasal Outcomes Survey and the cosmetic domain showed a high internal consistency, alpha 0.94 and 0.95, respectively. The Standardized Cosmesis and Health Nasal Outcomes Survey was reliable showing very strong test–retest correlations of 0.93 for Standardized Cosmesis and Health Nasal Outcomes Survey-obstructive domain and 0.94 for Standardized Cosmesis and Health Nasal Outcomes Survey-cosmetic domain, respectively. The Wilcoxon rank-sum test showed a significant difference between cases and controls for the Standardized Cosmesis and Health Nasal Outcomes Survey-cosmetic domain ($P = .0001$) but not for the Standardized Cosmesis and Health Nasal Outcomes Survey-obstructive domain ($P = .14$). Exploratory factor analysis showed unidimensionality for both the Standardized Cosmesis and Health Nasal Outcomes Survey-cosmetic domain and the Standardized Cosmesis and Health Nasal Outcomes Survey-obstructive domain.

Conclusion: The Standardized Cosmesis and Health Nasal Outcomes Survey was successfully translated, culturally adopted, and validated for its use in a Dutch-speaking population of rhinoplasty patients.

Keywords: Esthetics, nasal obstruction, patient-reported outcome measures, psychometrics, rhinoplasty

Introduction

Rhinoplasty is a frequent surgical procedure for both nasal functional and aesthetic reasons performed by otolaryngology surgeons, head and neck surgeons, or facial plastic surgeons. The evaluation of outcomes after rhinoplasty is difficult.¹ Patient-reported outcome measures (PROMs) are recommended when evaluating nasal obstruction and cosmetic problems including rhinoplasty.^{2,3} Patient-reported outcome measures used in rhinoplasty are usually able to measure either nasal obstruction or aesthetics. Additionally, some PROMs used in rhinoplasty evaluate concepts that are broader than nasal problems. For example, while the Nasal Obstruction

Symptom Evaluation Scale (NOSE) evaluates nasal function, the Rhinoplasty Outcomes Evaluation evaluates nasal aesthetics and FACE-Q assesses the entire spectrum of facial aesthetics.⁴⁻⁷ There is a well-recognized need for a tool, which is able to evaluate both functional and aesthetic aspects in rhinoplasty regardless of main complaints at initial presentation and the exact reason for surgery.⁸ In 2018, the Standardized Cosmesis and Health Nasal Outcomes Survey (SCHNOS) was introduced by Moubayed et al⁹ as a short validated tool to evaluate both functional and cosmetic domains in rhinoplasty patients. The domains of obstruction and cosmesis covered by the SCHNOS have been found to be internally consistent and unidimensional.⁹ The SCHNOS has also demonstrated good

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convergent validity with common psychiatric screening tools.¹⁰ The SCHNOS has been used to describe the natural history of the outcome of rhinoplasty.¹¹ The minimal clinically important difference for the SCHNOS has been established.¹² The SCHNOS is available in Portuguese, Turkish, Korean, Arabic, English, French, Persian, Spanish, and Russian.^{9,13-17}

Only a few questionnaires concerning nasal surgery are available in Dutch including the Utrecht Questionnaire for Outcome Assessment in Aesthetic Rhinoplasty, the NOSE, and the rhinoplasty module of the FACE-Q.¹⁸⁻²⁰ The aim of this study was to translate and validate the SCHNOS in a Dutch-speaking population in order to suggest a short and valid tool to measure functional and aesthetic outcomes of rhinoplasty.

Methods

This was a single-center prospective observational cohort study. In 2021, 25 rhinoplasty patients and 25 non-rhinoplasty patients were recruited at an otorhinolaryngology department of a private hospital. The respondents were adults >17 years and were able to speak Dutch fluently. Those eligible and willing to take part signed an informed consent form. The protocol has been approved by the ethical board of the GZA hospital (approval number: 190301ACADEM, Date: 01/12/2020).

The SCHNOS is a 10-item questionnaire that uses a Likert-like 0-5 scale ("no problem" to "extreme problem"). The SCHNOS does not produce a combined total score but 2 scores—one for each domain, an obstruction score (SCHNOS-O) and a cosmesis score (SCHNOS-C). The SCHNOS-O is calculated as a sum of the items' scores (items #1-#4) divided by 20 and multiplied by 100 to base the score out of a possible maximum score of 100. Similarly, a SCHNOS-C score is calculated as a sum of the items' scores (items #5-#10) divided by 30 and multiplied by 100 to base the score out of a possible maximum score of 100.

Translation Process

The original SCHNOS questionnaire was translated from English to Dutch according to the guidelines by the International Society for Pharmacoeconomics and Outcomes Research and the World Health Organization. The process was conducted in 3 steps: (1) translation; (2) back translation; and (3) pilot comprehension testing.^{7,21} Two researchers independently translated the English version of the SCHNOS. Conceptual and cultural rather than grammatical translation was emphasized.

Main Points

- The use of international translation guidelines, with a strict translation-back-translation process and cognitive debriefing interviews led to a Dutch version of the Standardized Cosmesis and Health Nasal Outcomes Survey (SCHNOS) conceptually corresponding to the original.
- The translated SCHNOS demonstrated unidimensional factor structure for both domains (the SCHNOS-obstruction and the SCHNOS-cosmesis).
- The SCHNOS was successfully translated, culturally adopted, and validated for use in a Dutch-speaking population of rhinoplasty patients.

Differences and disagreements were resolved by discussing and consulting an expert panel of 5 specialists in otorhinolaryngology. Without an access to the original English version of SCHNOS, the backward translation was performed by a native English speaker, who also speaks Dutch fluently. The results of back translation were reviewed by the expert panel. The final version was introduced to 10 rhinoplasty patients, who were asked to identify ambiguities and to comment on the comprehensibility by explaining the meaning of each item. In case of a different interpretation, alternatives of translation were explored.

Finally, the questionnaire was administered to 25 rhinoplasty patients and 25 non-rhinoplasty patients. The sample size was adapted from previous similar studies.⁵ Patients were contacted by phone 2 weeks later to complete the questionnaire once more.

Statistical Analysis

The estimates were reported as means, standard deviations (SDs), medians, interquartile ranges (IRQs), and percentages when appropriate.

Internal Consistency

To measure the internal consistency of the SCHNOS-O and the SCHNOS-C, the Cronbach's alpha was calculated along with a 1-sided (lower) 95% confidence limit (95% CL). Cronbach's alpha ≥ 0.9 was considered excellent, $0.9 > \alpha \geq 0.8$ good, $0.8 > \alpha \geq 0.7$ acceptable, $0.7 > \alpha \geq 0.6$ questionable, $0.6 > \alpha \geq 0.5$ poor, and < 0.5 unacceptable. Several additional alpha-related estimates were reported: item-test correlations, item-rest correlations, average interitem covariances, and alphas with 1 item removed at a time.

Test-Retest Reliability

To investigate the correlations between repeated measures, the Spearman correlation coefficient was calculated along with 95% CI. The correlation coefficient of < 0.19 was considered very weak, 0.20-0.39 weak, 0.40-0.59 moderate, 0.60-0.79 strong, and 0.80-1.0 very strong.

Difference Between Cases and Controls

A 2-sample Wilcoxon rank-sum (Mann-Whitney) test was applied to investigate if the first responses given by cases were significantly different from the first responses given by controls. The significance level of all the 2-tailed *P*-values was set at ≤ 0.05 .

Exploratory Factor Analysis

An exploratory factor analysis (EFA) was conducted on the estimates obtained from all 50 cases and included both quantitative (unrotated principal factors and parallel analysis) and graphical (scree plot along with a parallel analysis line) analyses. The cut-off for retaining was set at eigenvalues > 1.0 (Kaiser rule).

All the analyses were carried out using Stata/IC Statistical Software: Release 16 (StataCorp LP, College Station, Tex, USA) and JASP (JASP Team (2020); JASP (Version 0.14.1) [Computer software]).

Table 1. SCHNOS Repeated Scores

Variable	First Measurement			Second Measurement		
	Median	IQR		Median	IQR	
		25%	75%		25%	75%
Cases (n=25)						
SCHNOS-O	20.0	5.0	75.0	20.0	5.0	70.0
SCHNOS-C	30.0	10.0	66.7	50.0	10.0	76.7
Controls (n=25)						
SCHNOS-O	10.0	0.0	30.0	10.0	0.0	35.0
SCHNOS-C	0.0	0.0	10.0	0.0	0.0	6.7
All (n=50)						
SCHNOS-O	15.0	0.0	45.0	15.0	0.0	50.0
SCHNOS-C	10.0	0.0	50.0	10.0	0.0	56.7

IQR, interquartile range; SCHNOS, Standardized Cosmesis and Health Nasal Outcomes Survey; SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; SCHNOS-C, Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain.

Results

Translation and Cultural Adaptation

Two forward translations were similar showing mostly grammatical rather than conceptual discrepancies (Supplemental file 1). The main differences were noticed in the word order and syntax. The translations were merged after consulting an expert panel. Back translation showed only minimal discrepancies requiring no further modification. The resulting questionnaire was fairly easy to read with Flesch Kincaid Reading Ease score of 71.4 points and Flesch Kincaid Grade Level of 5.3. Ten native Dutch-speaking rhinoplasty patients (6 women, median age 28 [IQR: 9] years) reviewed the questionnaire. For all 10 patients, the cognitive debriefing interviews confirmed that

the questionnaire was understandable and easy to use and that the changes suggested by the experts were appropriate.

The final set was introduced to 25 rhinoplasty patients and 25 non-rhinoplasty controls (Supplemental file 2). The median age of the 25 rhinoplasty patients (76% women) was 30 (IQR: 13) years. Of the 25 cases, 11 were planned for rhinoplasty and 14 were already operated. Among the cases, the median SCHNOS-O was 20 (IQR: 70) points and the median SCHNOS-C was 30 (IQR: 57) points (Table 1).

Reliability

The Cronbach's alpha was excellent for both the SCHNOS-O (0.94, 95% CL: 0.91) and the SCHNOS-C (0.95, 95% CL:

Table 3. Spearman's Rank Correlation Between 2 Repeated Measures (All Respondents n=50)

Variables	Correlation	95% CI	
SCHNOS-O score	0.93	0.88	0.96
Item 1	0.86	0.77	0.92
Item 2	0.93	0.88	0.96
Item 3	0.90	0.83	0.94
Item 4	0.80	0.67	0.88
SCHNOS-C score	0.94	0.90	0.97
Item 5	0.83	0.72	0.90
Item 6	0.86	0.77	0.92
Item 7	0.90	0.83	0.94
Item 8	0.88	0.80	0.93
Item 9	0.94	0.90	0.97
Item 10	0.88	0.80	0.93

SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; SCHNOS-C, Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain.

Table 2. Internal Consistency of SCHNOS-O and SCHNOS-C

Item	n	Sign	Item-Test Correlation	Item-Rest Correlation	Average Interitem Covariance	Cronbach Alpha
SCHNOS-O score					2.34	0.94
Item 1	50	+	0.95	0.91	2.27	0.91
Item 2	50	+	0.93	0.86	2.23	0.92
Item 3	50	+	0.91	0.84	2.44	0.93
Item 4	50	+	0.90	0.83	2.41	0.93
SCHNOS-C score					2.53	0.95
Item 5	50	+	0.90	0.85	2.59	0.94
Item 6	50	+	0.91	0.86	2.51	0.94
Item 7	50	+	0.90	0.85	2.52	0.94
Item 8	50	+	0.87	0.81	2.56	0.95
Item 9	50	+	0.90	0.86	2.50	0.94
Item 10	50	+	0.92	0.88	2.51	0.94

SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; SCHNOS-C, Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain.

Table 4. Parallel Analysis for SCHNOS-O and SCHNOS-C. In Both Domains, 1 Factor Could be Retained Based on Kaiser Cut-Off Point (Eigenvalue > 1)

Factors	Eigenvalues	Eigenvalues Averaged Over 10 Replications	Difference
SCHNOS-O			
#1	3.54	0.74	2.79
#2	0.08	0.26	-0.18
#3	-0.02	-0.07	0.06
#4	-0.05	-0.29	0.24
SCHNOS-C			
#5	4.44	0.99	3.45
#6	0.33	0.63	-0.30
#7	0.12	0.24	-0.13
#8	0.00	0.03	-0.03
#9	-0.06	-0.19	0.13
#10	-0.11	-0.34	0.23

SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; SCHNOS-C, Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain.

0.95) scores (Table 2). All the items demonstrated strong item-test and item-rest correlation. Also, excluding 1 item at a time did not improve alpha for either the SCHNOS-O or the SCHNOS-C.

All the correlations between repeated measures were very strong (Table 3). The Wilcoxon rank-sum (Mann-Whitney) test showed significant differences between cases and controls for the SCHNOS-C ($P < .0001$) but not for the SCHNOS-O ($P = .1436$).

Table 5. Exploratory Factor Analysis. Retained Factor Loadings (Pattern Matrix) for SCHNOS-O and SCHNOS-C and Unique Variances of Items

Items	Factor #1	Uniqueness
SCHNOS-O		
Item 1	0.97	0.06
Item 2	0.97	0.06
Item 3	0.93	0.13
Item 4	0.89	0.21
SCHNOS-C		
Item 5	0.89	0.22
Item 6	0.82	0.33
Item 7	0.83	0.31
Item 8	0.87	0.25
Item 9	0.86	0.26
Item 10	0.89	0.20

SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; SCHNOS-C, Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain.

Validity

The exploratory factor analysis demonstrated unidimensionality of both the SCHNOS-O and the SCHNOS-C scores. For the SCHNOS-O, the single factor retained with eigenvalue 3.54 (Tables 4, 5 and Figure 1). Similarly, for the SCHNOS-C, a single factor exceeded the cut-off level with eigenvalue 4.44 (Tables 4, 5 and Figure 2).

Discussion

In this prospective cohort study among a panel of 5 experts, 25 rhinoplasty patients, and their 25 non-rhinoplasty controls,

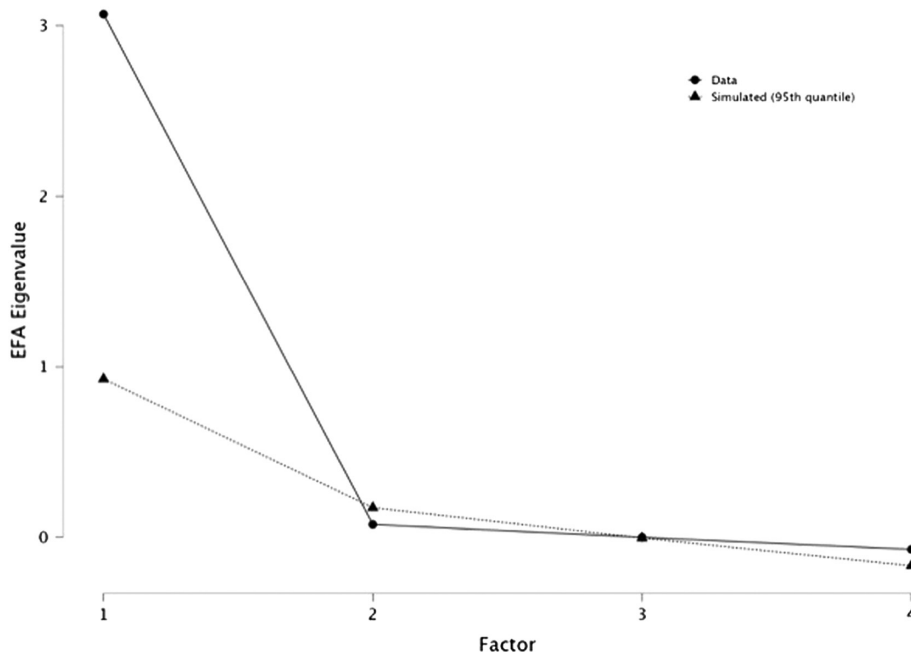


Figure 1. Scree plot of the SCHNOS-O. SCHNOS-O, Standardized Cosmesis and Health Nasal Outcomes Survey obstruction domain; EFA, exploratory factor analysis.

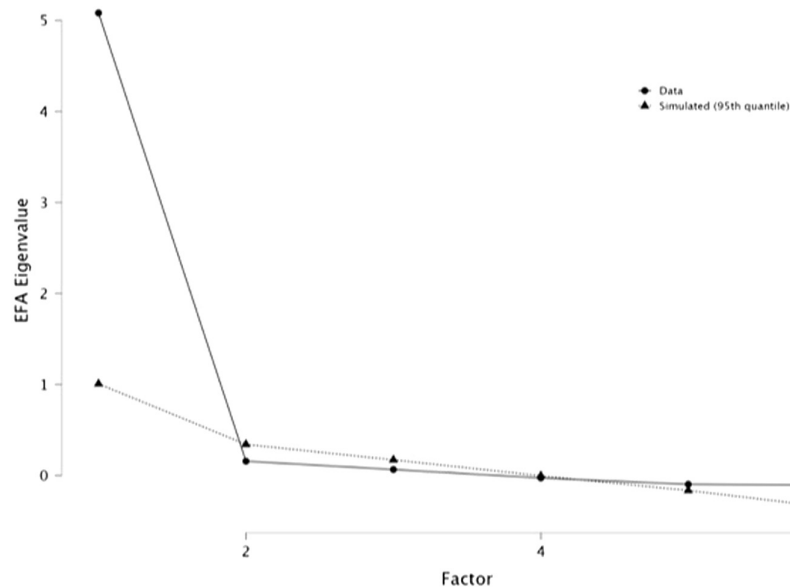


Figure 2. Scree plot of the SCHNOS-C. SCHNOS-C Standardized Cosmesis and Health Nasal Outcomes Survey cosmesis domain; EFA, exploratory factor analysis.

the SCHNOS was translated, culturally adapted, and validated for its use in a Dutch-speaking population of patients undergoing rhinoplasty. The success of forward translation was ensured by back translation. The translated SCHNOS demonstrated good internal consistency and unidimensional factor structure for both SCHNOS-O and the SCHNOS-C domains. While the non-rhinoplasty controls responded to the SCHNOS-C significantly differently than the rhinoplasty patients, no such difference was observed for the SCHNOS-O.

Similarity between SCHNOS-O scores seen in the rhinoplasty patients and the controls could probably be explained by the fact that there were pre- and postoperative patients in the rhinoplasty group and possibly also due to specific characteristics of the controls.

This was the first study of the SCHNOS in Dutch language, and therefore, no direct comparison with previous research could be made. The present results were similar to the original English version of the SCHNOS.⁸ Previously, the domains of obstruction and cosmesis covered by the SCHNOS have also been found to be internally consistent and unidimensional.⁹

The generalization of the results might be limited mainly by a small sample size, which was also predominated by women. The study was conducted in a single hospital, which might emphasize some specific characteristics of a sample that are not equally common in a broader population of rhinoplasty patients. Both the cases and the controls produced substantially heterogeneous scores for both the SCHNOS-O and the SCHNOS-C demonstrating very wide IQRs. Also, lack of comparison between responses given by rhinoplasty patients and healthy controls may leave some important issues unrevealed.

Further research on larger samples should be conducted to ensure the usability of the SCHNOS in a Dutch-speaking population. Also, the psychometric properties of a translated version should be investigated in more detail using confirmatory factor analysis and item response theory.

In conclusion, the SCHNOS was successfully translated, culturally adapted, and validated for its use in a Dutch-speaking population of rhinoplasty patients. Additional research is required to support the use of the Dutch SCHNOS in clinical practice.

Ethics Committee Approval: The study was approved by Ethics committee from GZA Hospitals, (Approval No: 190301ACADEM, Date: 01/12/2020).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – D.F., M.S.; Design – P.L., V.V.; Supervision – D.F.; Materials – D.F.; Data Collection and/or Processing – P.L., V.V.; Analysis and/or Interpretation – S.M., D.F.; Literature Review – P.L., V.V.; Writing – P.L., V.V., D.F.; Critical Review – M.S., S.M.

Declaration of Interests: The authors have no conflict of interest to declare.

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Supplemental Materials

Supplemental file 1. Forward Translation

Item	English Version	Forward Translation 1	Forward Translation 2	Final Version
1	Having a blocked or obstructed nose	Een geblokkeerde of geobstrueerde neus hebben	Een geblokkeerde of verstopte neus	Neusblokkade of neusobstructie
2	Getting air through my nose during exercise	Lucht krijgen doorheen mijn neus tijdens inspanning	Lucht doorheen mijn neus krijgen tijdens inspanningen	Neusademhaling tijdens inspanning
3	Having a congested nose	Een verstopte neus hebben	Een verstopte neus	Een verstopte neus
4	Breathing through my nose during sleep	Ademen door mijn neus tijdens de slaap	Ademen door mijn neus tijdens de slaap	Ademen door mijn neus tijdens de slaap
5	Decreased mood and self-esteem due to my nose	Verminderde stemming en gevoel van eigenwaarde door mijn neus	Verminderd humeur en zelfbeeld als gevolg van mijn neus	Verminderde stemming en zelfbeeld als gevolg van mijn neus
6	The shape of my nasal tip	De vorm van mijn neustip	De vorm van mijn neustip	De vorm van mijn neustip
7	The straightness of my nose	De rechtheid van mijn neus	De rechtheid van mijn neus	Hoe recht mijn neus is
8	The shape of my nose from the side	De vorm van mijn neus vanaf de zijkant/ in zijaanzicht	De vorm van mijn neus in zijaanzicht	De vorm van mijn neus in zijaanzicht
9	How well my nose suits my face	Hoe goed mijn neus bij mijn gezicht past	Hoe goed mijn neus bij mijn gezicht past	Hoe goed mijn neus bij mijn gezicht past
10	The overall symmetry of my nose	De algehele symmetrie van mijn neus	De algehele symmetrie van mijn neus	De symmetrie van mijn neus

Supplemental file 2. Final version of the Dutch SCHNOS

SCHNOS vragenlijst Nederlands

In welke mate waren onderstaande stellingen een **probleem** de afgelopen **maand**:

	Geen probleem			Ernstig probleem			
1. Neusblokkade of neusobstructie	0	1	2	3	4	5	
2. Neusademhaling tijdens inspanning	0	1	2	3	4	5	
3. Een verstopte neus	0	1	2	3	4	5	
4. Ademen door mijn neus tijdens de slaap	0	1	2	3	4	5	
5. Verminderde stemming en zelfbeeld als gevolg van mijn neus	0	1	2	3	4	5	
6. De vorm van mijn neustip	0	1	2	3	4	5	
7. Hoe recht mijn neus is	0	1	2	3	4	5	
8. De vorm van mijn neus in zijaanzicht	0	1	2	3	4	5	
9. Hoe goed mijn neus bij mijn gezicht past	0	1	2	3	4	5	
10. De symmetrie van mijn neus	0	1	2	3	4	5	