

1 **Translation and validation of the Chinese version of the scale of oral**
2 **health outcomes for 5-year-old children (SOHO-5)**

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23 **Abstract**

24

25 **Objective:** *To adapt the oral health-related quality of life measurement tool SOHO-5*
26 *(scale of oral health outcomes for 5-year-old children) for use in Chinese populations*
27 *and to investigate the validity and reliability of the Chinese version of SOHO-5 (C-*
28 *SOHO-5).*

29

30 **Methods:** *The draft C-SOHO-5 was developed by a forward-backward process and*
31 *pilot-tested on 20 child-parent pairs. The final version was tested on a sample of 5-*
32 *year-old children and their parents. Clinical examinations were conducted to record*
33 *the children's caries experience. The reliability of C-SOHO-5 was assessed by both*
34 *internal consistency and test-retest reliability. Its discriminant validity and construct*
35 *validity were also investigated.*

36

37 **Results:** *A total of 249 child-parent pairs participated in this study. Cronbach's alpha*
38 *values for the child's version of C-SOHO-5 (C-SOHO-5c) and the parental version of*
39 *C-SOHO-5 (C-SOHO-5p) were 0.71 and 0.82, respectively. The intraclass correlation*
40 *coefficient values for C-SOHO-5c and C-SOHO-5p were 0.85 and 0.46, respectively.*
41 *Both the child's and the parental version were able to discriminate the caries and*
42 *caries-free children groups. Children with caries experience had higher mean ranks of*
43 *the total score of both C-SOHO-5c and C-SOHO-5p than those of the caries-free*
44 *children (134.9 vs 113.8, $p=0.015$; 134.7 vs 93.2, $p<0.001$). In addition, the total scores*
45 *of both child's and parental reports were significantly correlated with the global rating*
46 *questions.*

47

48 **Conclusion:** *The Chinese version of SOHO-5 demonstrated good reliability and*
49 *validity. This tool which uses both child's and parental reports can be used to assess*
50 *the oral health-related quality of life of 5-year-old children in Chinese speaking*
51 *communities.*

52 **Introduction**

53 Oral health is a complex concept including physical, psychological and social
54 consequences of oral conditions. Although traditional clinical measures are
55 undoubtedly important, they represent only the clinical dimension of oral health.¹ There
56 is a need to adopt subjective assessments to measure the impacts of oral diseases on
57 people's physical, psychological and social well-being, and hence to complement the
58 whole picture of oral health. For this purpose, different measures have been developed
59 to assess an individual's oral health-related quality of life (OHRQoL).² Although
60 various measures of OHRQoL in adults are readily available, tools developed for
61 measuring children's OHRQoL are still limited.¹ Moreover, because young children's
62 cognitive, psychosocial and linguistic abilities are still developing, it is always
63 challenging to assess their OHRQoL by self-reporting. Measurement of the OHRQoL
64 of young children is usually based on parental proxy report. Nearly all of the self-
65 reported OHRQoL measures are designed for children aged eight years or older.⁴⁻⁶

66

67 The scale of oral health outcomes for 5-year-old children (SOHO-5) was
68 developed in the United Kingdom.⁷ It is the first structured questionnaire used to
69 measure the OHRQoL of preschool children by both child's (SOHO-5c) and parental
70 reports (SOHO-5p). SOHO-5c contains seven items which are on whether the child has
71 any difficulties in eating, drinking, speaking, playing and sleeping because of his/her
72 teeth, and avoids smiling due to pain or appearance. SOHO-5p also contains seven
73 items which are on whether the parents think their child has any difficulties in eating,
74 speaking, playing and sleeping because of the child's teeth, avoids smiling due to pain
75 or appearance, and whether their child's self-confidence is affected because of his/her
76 teeth. The developers reported that the initial investigation of the validity and reliability
77 of this tool provided very promising results.⁷ This measure can discriminate children
78 with different clinical conditions, including dental caries.⁷ Later, the SOHO-5 was
79 translated and validated in other languages, including Indonesian, Persian, Portuguese
80 and Spanish.⁸⁻¹¹ Results of the latter studies show that the adapted SOHO-5 has

81 satisfactory psychometric properties and is a reliable tool to measure young children's
82 OHRQoL. Until now, no Chinese version of SOHO-5 has been published.

83

84 Dental caries is prevalent in preschool children worldwide.¹² In China, more
85 than 60% of the preschool children have untreated caries.¹³ A recent survey reported
86 that around half of the 5-year-old children in Hong Kong had dental caries and more
87 than 90% of their decayed teeth were untreated.¹⁴ Untreated caries can cause discomfort,
88 pain and infection. It can also affect oral functions such as chewing and speaking.
89 Moreover, severe dental caries may influence a child's nutrition absorption, growth and
90 even general health.¹⁵ Caries in anterior teeth may affect appearance and self-
91 confidence.¹⁶ Several studies conducted on Chinese populations have shown that dental
92 caries can cause negative impacts on both children and their families, leading to poor
93 OHRQoL.^{1,13,16} However, all these studies adopted the Chinese version of the Early
94 Childhood Oral Health Impact Scale (ECOHIS) which used parental report to assess
95 the OHRQoL of young children. Until now, no self-reported measurement tools in
96 Chinese language are available to directly assess young children's OHRQoL. The aim
97 of this study was to adapt the SOHO-5 for use in Chinese populations and to investigate
98 the validity and reliability of the Chinese version of SOHO-5 (C-SOHO-5).

99

100 **Materials and methods**

101 The English version SOHO-5c has seven questions asking the child whether
102 he/she has any difficulties in eating, drinking, speaking, playing and sleeping because
103 of his/her teeth, and avoids smiling due to pain or appearance. The answers are recorded
104 in a 3-point scale: 0 = 'No', 1 = 'A little', and 2 = 'A lot'. The total score of SOHO-5c
105 is the sum of the scores of the individual questions. SOHO-5p has seven questions
106 asking the parents whether their child has any difficulties in eating, speaking, playing
107 and sleeping because of the child's teeth, avoids smiling due to pain or appearance, and
108 whether their child's self-confidence is affected because of his/her teeth. The answers
109 are recorded in a 5-point scale: 0 = 'Not at all', 1 = 'A little', 2 = 'Moderate', 3 = 'A

110 lot', and 4 = 'A great deal'. The total score of SOHO-5p is the sum of the scores of
111 these seven questions. For both SOHO-5c and SOHO-5p, a higher score indicates a
112 greater negative impact on the child and therefore a poorer OHRQoL.

113

114 Cross-cultural adaptation

115 The translation and cross-cultural adaptation procedures followed the Test
116 Translation and Adaptation Guidelines of the International Test Commission.¹⁷ The
117 English SOHO-5 was translated into Chinese by a forward-backward process that
118 consisted of several stages. First, the questionnaire was translated from English to
119 Chinese by two independent bilingual English and Chinese speakers. The results were
120 discussed in a revision panel to form the first Chinese draft. Second, the first Chinese
121 draft was translated back to English by another two independent bilingual translators
122 who were blinded to the original instrument. The back-translated English version was
123 compared to the original English version by a group of experts to evaluate the semantic,
124 idiomatic, experiential and conceptual equivalence.¹⁷ Revision was then carried out and
125 the second draft was developed.

126

127 The second draft was pilot tested on 20 pairs of 5-year-old children and their
128 parents. Focus group discussions were conducted to obtain comments from the
129 participants. Feedbacks regarding the wording of the questions were collected. After
130 that, the final version was developed. The revision panel approved the final Chinese
131 version of the SOHO-5 (C-SOHO-5), including the questions for children (C-SOHO-
132 5c) and those for parents (C-SOHO-5p).

133

134 Assessment of validity and reliability

135 *Sample size calculation and recruitment of participants*

136 This study was approved by the Institutional Review Board of the University of
137 Hong Kong/Hospital Authority Hong Kong West Cluster (UW 18-182). Sample size
138 calculation was performed according to the internal consistency test (Cronbach's alpha
139 statistics). For a questionnaire with seven items, by setting the value of Cronbach's

140 alpha as 0.9 and type I error as 0.05, at least 221 children-parents pairs would be needed.
141 The sample size calculation was performed using the computer software Microsoft
142 Excel and a formula recommended by a previous study.¹⁸

143

144 This study was conducted in Hong Kong, a city on the southern coast of China.
145 All 5-year-old children and their parents from three kindergartens were invited to join
146 this study. Invitation letters that explained the purpose and procedures of this study
147 were sent to the parents. Written parental consents were obtained before the study took
148 place. Children who were aged 5 years, generally healthy and Chinese-speaking, and
149 whose parents were able to read Chinese were recruited in this study. Children who
150 were uncooperative at the dental examination or had severe systemic diseases were
151 excluded.

152

153 *Questionnaire survey*

154 The C-SOHO-5c was completed before dental examination by conducting
155 individual face-to-face interview with each child in a classroom in the kindergarten.
156 Three research assistants were trained to conduct the interviews. Each child was asked
157 to answer the seven questions of the C-SOHO-5c and two additional global rating
158 questions for assessing construct validity ('How happy are you with your teeth?' and
159 'Do you have any holes in your teeth?'). Duplicate interviews were performed on one
160 class of children in one kindergarten. The duplicate interviews were conducted two
161 weeks after the first-round interviews by the same research assistants using the same
162 questionnaire.

163

164 The C-SOHO-5p questionnaires were distributed to the parents of the
165 participant children and collected before the examination of the children. The parents
166 were asked to answer the seven questions of the C-SOHO-5p and four additional global
167 rating questions for assessing the construct validity ('Overall, how would you rate your
168 child's dental health?', 'Overall, how happy are you with your child's dental health?',
169 'Do you think your child needs any dental treatment because of the state [holes in teeth,

170 pain] of his/her teeth?', and 'Do you think the well-being of your child is affected by
171 the conditions of their teeth, lips, jaws or mouth?'). Duplicate questionnaires were
172 completed by the parents of one class of children. The same C-SOHO-5p questionnaire
173 was distributed to the parents two weeks after the collection of the first-round
174 questionnaires.

175

176 *Clinical examination*

177 Dental examinations of the participant children were performed in a classroom
178 in the kindergarten by a single dentist experienced in conducting dental caries surveys.
179 Plaque and food debris obscuring inspection of teeth were removed by a cotton bud. A
180 0.5 mm ball-ended Community Periodontal Index probe and a disposable dental mirror
181 attached to a handle with an intra-oral light-emitting diode were used in the examination.
182 Dental caries experience was recorded by the number of decayed, missing (due to caries)
183 and filled primary teeth (dmft) following the World Health Organization
184 recommendation.¹⁹ Duplicate examinations were performed on 5% of the children to
185 study intra-examiner reliability.

186

187 *Statistical analysis*

188 Collected data were entered into a computer. Data cleaning was performed
189 before data analysis. The software SPSS version 24.0 (IBM Corporation, Armonk, USA)
190 was used to conduct data analysis. Kappa statistic was adopted to assess intra-examiner
191 reliability. The reliability of C-SOHO-5 was assessed by both internal consistency and
192 test-retest reliability. The internal consistency was assessed by Cronbach's alpha
193 coefficient, item-total correlation coefficients and, for each item, the Cronbach's alpha
194 if item deleted. The test-retest reliability was measured by the level of agreement of the
195 answers of the first and repeated questionnaires revealed by the intraclass correlation
196 coefficients (ICC). The validity of C-SOHO-5 was assessed by both discriminant
197 validity and construct validity. The discriminant validity was assessed by Mann-
198 Whitney U test through comparing the C-SOHO-5 scores of the children with and
199 without dental caries experience. The construct validity was measured by the

200 associations between the C-SOHO-5 scores and the answers of the global rating
201 questions using Spearman's correlation coefficients. Statistical significance was set at
202 $p=0.05$ for all tests.

203

204 **Results**

205 A total of 279 5-year-old children and their parents were invited and 249 (89%)
206 child-parent pairs participated. More than half of the participants ($n=144$, 58%) were
207 boys. The prevalence of caries experience of the participants was 53% and their mean
208 dmft score was 2.8 ($SD = 4.0$). The Kappa value of the duplicate examinations was 0.94.
209 The majority (55%) of the children reported at least one oral health-related impact
210 caused by their teeth. The mean C-SOHO-5c score was 1.6 ($SD=2.2$), with a range of
211 0 to 12. Less than half (42%) of the parents reported any oral health-related negative
212 impacts on their children. The mean C-SOHO-5p score was 1.2 ($SD=2.3$), with a range
213 of 0 to 17. Distribution of the responses of C-SOHO-5c and C-SOHO-5p are shown in
214 Table 1.

215

216 The overall Cronbach's alpha values of C-SOHO-5c and C-SOHO-5p were 0.71
217 and 0.82, respectively. The Cronbach's alpha values were lower when any of the items
218 in C-SOHO-5c was deleted. However, the Cronbach's alpha value of C-SOHO-5p was
219 increased to 0.85 if the item 'difficulty in eating because of his/her teeth' was deleted
220 (Table 2). There were 25 children joining the retest of C-SOHO-5c. The ICC analysis
221 showed that C-SOHO-5c presented a good test-retest reliability (overall $ICC = 0.85$,
222 $p<0.001$). Twenty-eight parents returned the retest questionnaire of C-SOHO-5p. The
223 overall ICC of C-SOHO-5p was 0.46 ($p=0.006$).

224

225 Normality test found that the distribution of the responses of C-SOHO-5 in both
226 the caries and the caries-free groups did not follow normal distribution but the shapes
227 of the two distributions were similar. Children with caries experience had a higher mean
228 rank of the total score of C-SOHO-5c than the caries-free children (134.9 vs 113.8,

229 p=0.015) (Table 3). Children with caries experience had higher mean ranks of C-
230 SOHO-5p scores in most of the items than the caries-free children.

231

232 The total scores of both children's and parental reports were significantly
233 correlated with the answers of the global rating questions. C-SOHO-5c score was
234 negatively correlated with the children's satisfaction with their teeth ($r=-0.35$, $p<0.001$).
235 The total score of C-SOHO-5c was correlated with the children's awareness of the
236 presence of dental caries in their teeth ($r=0.37$, $p<0.001$) (Table 4). Increase in C-
237 SOHO-5p score was correlated with lower parental rating of their child's oral health
238 status ($r=-0.57$, $p<0.001$), lower parental satisfaction with their child's teeth ($r=-0.48$,
239 $p<0.001$), and increase in parental-reported negative impacts on their child's general
240 health ($r=0.51$, $p<0.001$) (Table 5). The C-SOHO-5p score was also correlated with the
241 parental-perceived treatment need of the child ($r=0.27$, $p<0.001$).

242

243 **Discussion**

244 This study successfully adapted and validated the SOHO-5 for use in Chinese
245 5-year-old children and their parents. All the items in both the child's and parental
246 reports of the SOHO-5 were retained in the Chinese version. Therefore, the Chinese
247 version of SOHO-5 can be used in cross-cultural comparisons with studies that adopted
248 other language versions. In addition, C-SOHO-5 is the first tool in Chinese language
249 for preschool children to self-report their OHRQoL. In this study, all of the 5-year-old
250 Chinese children interviewed had no difficulty in understanding the content of C-
251 SOHO-5c and providing answers to the questions.

252

253 Results of this study show that the child's OHRQoL reported by the children
254 and their parents can be rather different. For example, slightly more than half of the
255 study children reported at least one negative oral health-related impact caused by their
256 teeth while less than half of the parents reported so. Another finding is that around one
257 quarter of the study children mentioned that they did not smile because of the

258 appearance of their teeth. However, only 12% of the parents mentioned this behaviour.
259 Hence, studies on the OHRQoL of Chinese young children should not solely rely on
260 parental proxy report and should include children's own reporting as well.

261

262 In this study the extent to which all the items in C-SOHO-5 measure the same
263 concept and whether the items are closely correlated with one another as a group in the
264 questionnaire was used to assess its internal consistency.²⁰ The overall Cronbach's
265 alpha value of C-SOHO-5c was 0.71, which was similar to the result of the original
266 study (Cronbach's alpha=0.74).⁷ This Cronbach's alpha value can be regarded as rather
267 high for a measure that has only seven items because the Cronbach's alpha value tends
268 to be low in measures that contain few items.²¹ In addition, in this study the Cronbach's
269 alpha value of C-SOHO-5c became lower if any of the items was deleted, and the item-
270 total correlation coefficients of all items were above the recommended level.²⁰ All these
271 findings show that the C-SOHO-5c has a good internal consistency. For C-SOHO-5p,
272 although the Cronbach's alpha value of C-SOHO-5p was increased if the item
273 'difficulty in eating because of his/her teeth' was deleted, the increment was small (0.82
274 to 0.85). In addition, this item was correlated with the prevalence of dental caries and
275 the answers of the global rating questions. Therefore, we decided not to remove this
276 item from the questionnaire. Despite this, the Cronbach's alpha values and item-total
277 correlation coefficients of the C-SOHO-5p were high, showing that it has good internal
278 consistency.

279

280 This study adopted ICC to assess the test-retest reliability of the questionnaires,
281 which could reflect the degree of both correlation and agreement between ratings at
282 different times.²² The ICC value of the C-SOHO-5c score in this study is 0.85, which
283 indicates an excellent test-retest reliability of the children's report. However, the ICC
284 value of the C-SOHO-5p score shows a moderate test-retest reliability.²³ A low ICC
285 value may not necessarily reflect a low degree of agreement but may be due to a small
286 number of participants in the test-retest or a lack of variability among the answers.²⁴ In

287 this study, only 28 parents from the same kindergarten participated in the second test,
288 which may lead to a low ICC value.

289

290 Because dental caries is the most common and prevalent oral disease in Hong
291 Kong preschool children, the presence of dental caries was used for assessing the
292 discriminant validity of C-SOHO-5 in this study. The study children with caries
293 experience had significantly higher C-SOHO-5c and C-SOHO-5p scores. This finding
294 supports the ability of C-SOHO-5 in discriminating children with and without dental
295 caries. It is noteworthy that most of the items in the C-SOHO-5p could independently
296 discriminate the study children with and without dental caries. However, no single item
297 in the C-SOHO-5c was able to discriminate the caries and caries-free groups. This
298 finding is different from those of studies conducted in other communities.^{8,11} Further
299 studies on other Chinese populations are needed to verify this.

300

301 Spearman's rank correlation coefficient was adopted to assess the construct
302 validity of the C-SOHO-5 in this study because the scores were skewed and there were
303 extreme values.²⁵ Both child's and parental reports had significant correlations between
304 the total scores and the answers of the global rating questions showing that the C-
305 SOHO-5 has good construct validity. However, the correlation between the C-SOHO-
306 5p score and parental-perceived treatment need of their children is considered
307 negligible.²⁵ This finding implies that although the parents realized that dental problems
308 had negative impacts on their children, most of them did not think that their children
309 needed any dental treatment. This may explain why the prevalence of dental visit
310 among the Hong Kong preschool children is very low.^{14,26}

311

312 There are limitations of this study. First, the number of participants included
313 in the assessment of test-retest reliability was low. Nevertheless, C-SOHO-5 still
314 demonstrated acceptable test-retest reliability, together with other satisfactory
315 psychometric properties. Second, we used dental caries as the only oral health-related
316 condition to assess the discriminant validity of C-SOHO-5. In an earlier epidemiology

317 survey on Hong Kong children's OHRQoL using ECOHIS as the measurement tool,
318 the researchers also only assessed the negative impacts of dental caries on the children
319 and their families.¹⁴ Therefore, we considered dental caries as the most significant
320 dental disease to be studied in this child population and the best choice for validating
321 C-SOHO-5. Third, in this study, all correlations found were restricted to the bivariate
322 level. The results may not sustain if possible confounding variables are considered in a
323 regression model.

324

325 **Conclusion**

326 The Chinese version of SOHO-5 has good psychometric properties, including
327 internal consistency, test-retest reliability, discriminant validity and construct validity.
328 This tool which uses both child's and parental reports can be used to assess the oral
329 health-related quality of life of 5-year-old children in Chinese speaking communities.

330

331 **Competing interests**

332 The authors declare that they have no competing interests.

333

334 **Funding**

335 This study did not receive any financial support.

336

337 **Ethics**

338 This study has been conducted in full accordance with the World Medical
339 Association Declaration of Helsinki. Written consent was obtained from the parents of
340 each participating child. This study has been independently reviewed and approved by
341 the Institutional Review Board of the University of Hong Kong/Hospital Authority
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410 Table 1 Distribution of the responses of C-SOHO-5

C-SOHO-5c					
Item	Response (number, prevalence)				
	No	A little	A lot		
Difficulty in eating	185, 74%	43, 17%	21, 8%		
Difficulty in drinking	207, 83%	32, 13%	10, 4%		
Difficulty in speaking	210, 84%	25, 10%	14, 6%		
Difficulty in playing	213, 86%	25, 10%	11, 4%		
Avoid smiling due to pain	199, 80%	37, 15%	13, 5%		
Avoid smiling due to appearance	197, 79%	42, 17%	10, 4%		
Difficulty in sleeping	214, 86%	27, 11%	8, 3%		

C-SOHO-5p					
Item	Response (number, prevalence)				
	Not at all	A little	Moderate	A lot	A great deal
Difficulty in eating	162, 67%	61, 25%	12, 5%	4, 2%	3, 1%
Difficulty in speaking	215, 90%	18, 8%	4, 2%	2, 1%	0, 0%
Difficulty in playing	233, 96%	8, 3%	1, 0%	1, 0%	0, 0%
Avoid smiling due to appearance	218, 88%	26, 11%	3, 1%	1, 0%	0, 0%
Avoid smiling due to pain	208, 86%	28, 12%	3, 1%	4, 2%	0, 0%
Difficulty in sleeping	215, 88%	22, 9%	3, 1%	4, 2%	0, 0%
Influence self-confidence	212, 88%	26, 11%	2, 1%	1, 0%	0, 0%

411 C-SOHO-5c, Chinese children’s self-report of the scale of oral health outcomes for 5-year-old
 412 children; C-SOHO-5p, Chinese parental report of the scale of oral health outcomes for 5-year-
 413 old children.

414 Table 2 Reliability analysis of C-SOHO-5

Item	Internal consistency reliability		Test-retest reliability		
	Corrected item-total correlation	Cronbach's alpha if item deleted	Intraclass correlation	95% CI	p-value
C-SOHO-5c					
Total score	-	-	0.85	0.70 - 0.93	<0.001
Difficulty in eating	0.44	0.67	0.48	0.12 - 0.73	0.006
Difficulty in drinking	0.44	0.67	0.27	-0.12 - 0.60	0.086
Difficulty in speaking	0.44	0.67	0.35	-0.04 - 0.65	0.037
Difficulty in playing	0.42	0.68	0.23	-0.17 - 0.57	0.127
Avoid smiling due to pain	0.37	0.69	0.19	-0.21 - 0.54	0.174
Avoid smiling due to appearance	0.31	0.70	0.23	-0.17 - 0.57	0.127
Difficulty in sleeping	0.55	0.65	0.47	0.11 - 0.73	0.007
C-SOHO-5p					
Total score	-	-	0.46	0.12 - 0.71	0.006
Difficulty in eating	0.48	0.85	0.35	-0.17 - 0.63	0.030
Difficulty in speaking	0.67	0.78	0.10	-0.27 - 0.45	0.300
Difficulty in playing	0.57	0.81	0.37	0.01 - 0.65	0.023
Avoid smiling due to appearance	0.54	0.81	0.52	0.20 - 0.75	0.002
Avoid smiling due to pain	0.64	0.79	0.60	0.30 - 0.79	<0.001
Difficulty in sleeping	0.71	0.77	0.37	0.01 - 0.65	0.023
Influence self-confidence	0.66	0.79	0.35	-0.01 - 0.64	0.028

415 C-SOHO-5c, Chinese children's self-report of the scale of oral health outcomes for 5-year-old
 416 children; CI, confidence interval; C-SOHO-5p, Chinese parental report of the scale of oral
 417 health outcomes for 5-year-old children.

418 Table 3 Discriminant validity of C-SOHO-5

Item	Mean rank		p-value
	Caries free	Caries	
C-SOHO-5c			
Total score	113.8	134.9	0.015
Difficulty in eating	118.9	130.5	0.097
Difficulty in drinking	124.3	125.6	0.825
Difficulty in speaking	121.6	128.1	0.262
Difficulty in playing	124.2	125.7	0.786
Avoid smiling due to pain	120.2	129.2	0.158
Avoid smiling due to appearance	119.5	129.9	0.110
Difficulty in sleeping	121.2	128.4	0.192
C-SOHO-5p			
Total score	93.2	134.7	<0.001
Difficulty in eating	102.3	138.6	<0.001
Difficulty in speaking	114.3	125.2	0.019
Difficulty in playing	119.1	124.6	0.076
Avoid smiling due to appearance	117.8	130.5	0.015
Avoid smiling due to pain	109.9	132.8	<0.001
Difficulty in sleeping	112.2	131.8	<0.001
Influence self-confidence	113.9	127.6	0.007

419 C-SOHO-5c, Chinese children’s self-report of the scale of oral health outcomes for 5-year-old
 420 children; C-SOHO-5p, Chinese parental report of the scale of oral health outcomes for 5-year-
 421 old children.

422 Table 4 Construct validity of C-SOHO-5c

Item	Satisfaction		Self-reported caries	
	r	p-value	r	p-value
Total score	-0.35	<0.001	0.37	<0.001
Difficulty in eating	-0.24	<0.001	0.33	<0.001
Difficulty in drinking	-0.17	0.008	0.21	0.002
Difficulty in speaking	-0.25	<0.001	0.15	0.027
Difficulty in playing	-0.24	<0.001	0.09	0.179
Avoid smile because of toothache	-0.17	0.007	0.25	<0.001
Avoid smile because of appearance	-0.20	0.001	0.19	0.006
Difficulty in sleeping	-0.19	0.002	0.31	<0.001

423 C-SOHO-5c, Chinese children's self-report of the scale of oral health outcomes for 5-year-old
 424 children.

425 Table 5 Construct validity of C-SOHO-5p

Item	Parents-rated oral health		Satisfaction		Treatment need		Impact on general health	
	r	p-value	r	p-value	r	p-value	r	p-value
Total score	-0.57	<0.001	-0.48	<0.001	0.27	<0.001	0.51	<0.001
Difficulty in eating	-0.51	<0.001	-0.41	<0.001	0.28	<0.001	0.43	<0.001
Difficulty in speaking	-0.23	<0.001	-0.18	0.005	0.08	0.266	0.38	<0.001
Difficulty in playing	-0.27	<0.001	-0.13	0.044	0.10	0.175	0.28	<0.001
Avoid smile because of appearance	-0.30	<0.001	-0.19	0.003	0.06	0.427	0.31	<0.001
Avoid smile because of toothache	-0.38	<0.001	-0.32	<0.001	0.22	0.003	0.34	<0.001
Difficulty in sleeping	-0.30	<0.001	-0.25	<0.001	0.18	0.017	0.38	<0.001
Influence self-confidence	-0.19	0.002	-0.31	<0.001	0.23	0.002	0.32	<0.001

426 C-SOHO-5p, Chinese parental report of the scale of oral health outcomes for 5-year-old
 427 children.