**Abstract.** Aim The aim of the study was to perform a preliminary validation of the Brazilian version of the Child Perceptions Questionnaire 8-10 (CPQ 8-10). Methods The sample used to test the measurement equivalence was made up of 59 children from 8 to 10 years of age at the Federal University of Minas Gerais, Brazil. The CPQ 8-10 was administered, and clinical exams were performed by a single examiner, calibrated for the diagnosis of dental caries (Kappa= 0.98) and malocclusion (weighted Kappa and intraclass correlation coefficient = 0.66-1.00). The children were divided into three groups according to their clinical condition (22 with cavitated carious lesions; 20 with malocclusion; 17 with both oral conditions). Statistics The internal consistency of the instrument was assessed by Cronbach’s alpha Coefficient. The Intraclass correlation coefficient (ICC) was used for the test-retest reliability (40 children). Discriminant validity was determined using the Kruskal-Wallis test. Results An assessment of the psychometric properties revealed the instrument to be reliable (Cronbach’s alpha=0.92 for the total scale and 0.63-0.85 for the subscales), exhibiting excellent stability (ICC=0.96 for the total scale and 0.79-0.95 for the subscales). Construct validity was demonstrated through the significant correlations between the global indicators and subscales. There were statistically significant differences between the clinical groups regarding the total scale, thereby demonstrating discriminant validity (p=0.03). Conclusions The preliminary validation of the Brazilian version of the CPQ 8-10 showed valid and reliable for use on Brazilian children.

**Key words:** Oral health; Quality of life; Validity; Child; Questionnaires.

**Introduction**

Health-related quality of life is defined as an emotional assessment one makes regarding one’s own health status [Theunissen et al., 1998]. Dentists have traditionally been prepared to diagnose orofacial conditions such as caries and malocclusion through objective criteria, establishing the clinical need for treatment. Currently in dentistry, however, there is growing interest in assessing the impact of oral conditions on quality of life [Oliveira and Sheiham, 2004; Feitosa et al., 2005; Marques et al., 2006; Broder et al., 2007]. As a result, a need has emerged for the development of assessment instruments for measuring the influence of oral conditions on the lives of individuals [Slade, 1997].

There are as yet few instruments specifically designed for children, although recent studies have demonstrated that children’s reports regarding their health-related quality of life are valid and reliable [Jokovic et al., 2002; Varni et al., 2007a, b]. A search of the Medline databank revealed that the instruments designed and validated specifically to measure oral health-related quality of life in children are the Child-OIDP (Child-Oral Impacts on Daily Performance), COHIP (Child Oral Health Impact Profile), ECOHIS (Early Childhood Oral Health Impact Scale) and COHQoL (Child Oral Health Quality of Life Questionnaire) [Gerunpong et al., 2004; Jokovic et al., 2004; Jokovic et al., 2006; Pahel et al., 2007; Broder et al., 2007].

The following instruments have been validated for use on Brazilian children: the Child-OIDP, COHIP, and one of the COHQoL the Child Perceptions Questionnaire for the 11-to-14-year-olds (CPQ11-14) [Tesch et al., 2008; Goursand et al., 2008; Castro et al.,...
Translation and cross-cultural adaptation of the CPQ8-10. The translation of the questionnaire was performed by two independent translators. A bilingual translator, whose native language is Brazilian Portuguese, translated the original questionnaire from English into Brazilian Portuguese. Another bilingual translator, whose native language is English, performed the back-translation. The two translators worked independently and the one responsible for the back-translation had no knowledge of the original English-language version of the questionnaire [Guillemin et al., 1993].

The original and back-translated English-language versions were compared by a translation panel made up of three individuals with knowledge on the subject addressed by the instrument. In choosing the translation panel, it was determined that the members were to be Brazilian, fluent in English and specialists in paediatric dentistry due to the importance of the translation panel having experience and knowledge of the cultural context and development phase of the population to be studied [Van Widenfelt et al., 2005].

For the cross-cultural adaptation, the Brazilian version was first examined by a team of three specialists in quality of life and oral health. This evaluation obeyed the criteria of clarity of the Brazilian version through the use of simple, easily understood expressions; use of common language, avoiding the use of technical terms; and representation of the content of the original version (conceptual equivalence) [Herdman et al., 1998]. The questionnaire was then submitted to a pre-test at a school through qualitative interviews with 15 boys and 15 girls between 8 and 10 years of age (10 from each age) in order to discuss the relevance of the items with this group. Items could undergo slight changes or be substituted in order to obtain item equivalence. Fundamental items were not to be excluded due to difficulties in the translation or complexity of the items in the Brazilian culture [Corless et al., 2001].

In order to determine whether the Brazilian version achieved a similar effect as the original English-language version (semantic equivalence), the questionnaire was once again evaluated by three other experts in quality of life and oral health who were fluent in English as well as by a group of three specialists in the Brazilian Portuguese language [Herdman et al., 1998].

Validity and reliability of the Brazilian version of the CPQ8-10

A second pre-test was carried out at a school with 30 children who did not take part of the final sample (10 children at each age) so that the examiner could observe the possibility of employing the format of the questionnaire, instructions and measurement methods in a similar manner to the original instrument.
The option was made to administer the instrument as an interview, as the authors of the original version concluded that eight-year-old children have difficulty in responding to the questionnaire as a self-completed instrument. The interview also prevents parents from interfering in their child’s answers [Brown and Al-Khayal, 2006].

The psychometric properties were assessed in the same method as the original version of the CPQ8-10, including the adoption of an approximate sample size in order to assess measurement equivalence (59 children) (Fig. 1) [Jokovic et al., 2004].

The administration of the Brazilian version of the CPQ8-10 and the clinical oral exams of the 59 children were held at the dental clinics of the Faculty of Dentistry of the Federal University of Minas Gerais (Brazil) by a single, previously calibrated examiner (Kappa = 0.98 for dental caries; weighted Kappa and intraclass correlation coefficient = 0.74-1.00 for malocclusion). The 59 children were divided into three groups mutually exclusive according to their oral condition: children with cavitated carious lesions (22), children with malocclusions (20) and children with both conditions simultaneously (17). The children were selected due to the fact that they had their central incisors in occlusion, thereby allowing an adequate assessment of the occlusion. Another inclusion criterion was that they were not yet in treatment, which was essential to discerning the impact on quality of life due to the oral condition rather than due to the treatment to which the child was submitted.

The procedures and diagnostic criteria for dental caries were those recommended by the World Health Organization (WHO) (1997). The Dental Aesthetic Index (DAI) was used for the diagnosis of malocclusion [WHO, 1997].

The SPSS software program (version 12.0., SPSS Inc., Chicago, IL, USA) was used for the data analysis. Descriptive analysis was carried out, obtaining mean values, standard deviation, total score and subscale scores. Internal consistency of the Brazilian Portuguese-language version of the CPQ8-10 was tested using Cronbach’s alpha coefficient for the subscales and total score. Test-retest reliability was determined using the intraclass correlation coefficient for the subscales and total score; for such, 40 children of the 59 participants of the final sample were interviewed a second time within a period of seven to 14 days; these children were chosen for not having undergone dental treatment since the initial interview and maintaining the same clinical condition in both interviews. Construct validity was tested by calculating correlations between the global indicators and total score as well as between the global indicators and each subscale, using Spearman’s correlation coefficient. Discriminant validity was tested through a comparison of the clinical groups regarding the total CPQ score and score on each subscale, using the Kruskal-Wallis test at a significance level ≤5.

The study was approved by the Human Research Ethics Committee of the Federal University of Minas Gerais. Parents/guardians and children read and signed an informed consent form prior to participation in the study.

**Results**

The results of the comparison between the original CPQ8-10 and the back-translated version assessed by the translation panel demonstrate that the two versions are equivalent. The experts in quality of life found the subscales of the questionnaire to be important to Brazilian culture. The item and operational equivalence steps demonstrated that the instrument is understood by Brazilian children between 8 and 10 years of age and that the questionnaire may be administered to these children in the same format as the original. Semantic equivalence was achieved after a few changes in the grammatical structure of the questionnaire.

For the assessment of measurement equivalence, 59 children were examined and interviewed, 59.3% of whom were boys. Age distribution was homogeneous: 39.0% were eight years of age; 32.2% were nine years of age; and 28.8% were 10 years of age. Regarding oral conditions, 37.3% had cavitated carious lesions,

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**Diagram:**

The diagram illustrates the process of translation and evaluation:

1. **Original English Version**
2. **Translation/Back-Translation**
3. **Evaluation by Translation Panel**
4. **First Brazilian Version (CPQ8-10)**
   - **Conceptual Equivalence**
   - **Form Equivalence (κ≥0.60)**
   - **Semantic Equivalence**
   - **Operational Equivalence (κ≥0.70)**
   - **Brazilian Version (CPQ8-10)**
   - **Intra-Agreement**
   - **Evaluation of Psychometric Properties (κ≥0.9)**
   - **Functional Equivalence**

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The study was approved by the Human Research Ethics Committee of the Federal University of Minas Gerais. Parents/guardians and children read and signed an informed consent form prior to participation in the study.
33.9% exhibited malocclusions and 28.8% had both conditions simultaneously.

Reliability
Cronbach’s alpha coefficient was 0.92 for the total scale and ranged from 0.63 (oral symptoms) to 0.85 (emotional and social wellbeing) for the subscales. Test-retest reliability was assessed using the intraclass correlation coefficient (ICC). The ICC was 0.96 for the total scale, 0.79 for oral symptoms, 0.88 for functional limitations, 0.95 for emotional wellbeing and 0.92 for social wellbeing (Table 1).

Construct validity
Spearman’s correlation was significant for the global indicators and total scale (r = 0.27 and 0.26), functional limitations (r = 0.23 and 0.26) and emotional wellbeing (r = 0.28 and 0.22). The oral symptoms subscale was only significantly associated with the global indicator related to the wellbeing of the child (r = 0.30). The social wellbeing subscale was not associated to either of the global indicators (Table 2).

Discriminant validity
There was a statistically significant different between the clinical groups (children with cavitated carious lesion; children with malocclusion; children with both conditions) regarding the total score (p = 0.03), oral symptoms (p = 0.01) and emotional wellbeing (p = 0.02) (Table 3).

Discussion
The psychometric properties of the questionnaire were evaluated in a similar way to that of the original instrument so as to facilitate the comparison of the results. As the objective of the present study was to assess the reliability and validity of the Brazilian version of the CPQ8-10 through the establishment of measurement equivalence, the comparison of the values of the psychometric properties with those of the original questionnaire is more important than the obtained values [Reichenheim and Moraes, 2007]. To date, the CPQ8-10 has not been completely validated for use in other cultures or countries.

Internal consistency of a questionnaire shows whether all the items that make up the instrument are related to one another. The internal consistency of the Brazilian version of the CPQ8-10 proved satisfactory for the social and emotional wellbeing subscales and acceptable for the oral symptoms and functional limitation subscales, given that Cronbach’s alpha

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. items</th>
<th>Cronbach’s α</th>
<th>Intraclass correlation coefficient</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total scale</td>
<td>25</td>
<td>0.92</td>
<td>0.96</td>
<td>0.90-0.98</td>
</tr>
<tr>
<td>Subscales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral symptoms</td>
<td>5</td>
<td>0.63</td>
<td>0.79</td>
<td>0.60-0.89</td>
</tr>
<tr>
<td>Functional limitations</td>
<td>5</td>
<td>0.67</td>
<td>0.88</td>
<td>0.78-0.94</td>
</tr>
<tr>
<td>Emotional wellbeing</td>
<td>5</td>
<td>0.85</td>
<td>0.95</td>
<td>0.91-0.98</td>
</tr>
<tr>
<td>Social wellbeing</td>
<td>10</td>
<td>0.85</td>
<td>0.92</td>
<td>0.84-0.96</td>
</tr>
</tbody>
</table>

Table 1 - Reliability statistics for total scale and subscales (n=59).

<table>
<thead>
<tr>
<th>Global Rating</th>
<th>Oral Health</th>
<th>Overall Wellbeing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r*</td>
<td>p-value</td>
</tr>
<tr>
<td><strong>Total scale</strong></td>
<td>0.27</td>
<td>0.02</td>
</tr>
<tr>
<td>Subscales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral symptoms</td>
<td>0.21</td>
<td>0.06</td>
</tr>
<tr>
<td>Functional limitations</td>
<td>0.23</td>
<td>0.04</td>
</tr>
<tr>
<td>Emotional wellbeing</td>
<td>0.28</td>
<td>0.01</td>
</tr>
<tr>
<td>Social wellbeing</td>
<td>0.16</td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Spearman’s Correlation Coefficient

Table 2 - Construct validity: rank correlations between total scale and subscale scores; global rating of oral health and overall wellbeing (n=59).
Coefficient should be at least 0.7 to 0.8 in order to be considered satisfactory when comparing groups [Bland and Altman, 1997]. Compared to the original questionnaire, the Brazilian version achieved higher values for the total scale and the emotional and social wellbeing subscales. On the oral symptoms and functional limitation subscales, the results were similar to those found for the original questionnaire. Cronbach’s alpha coefficient for the Brazilian version of the CPQ11-14 (0.86) [Goursand et al., 2008] was similar to that found in the present study (0.92).

Test-retest reliability was assessed using the ICC, which is considered excellent when above 0.74; good when between 0.6 and 0.74; and fair when between 0.4 and 0.59 [Wilson-Genderson et al., 2007]. The results showed excellent stability of the questionnaire for both the total scale and subscales. Unlike the original instrument, which did not achieve a good test-retest result for the social wellbeing subscale, the Brazilian version obtained an excellent result for this subscale (0.92) as well as all the other subscales of the questionnaire. When validated for use in the United Kingdom, the CPQ11-14 achieved an ICC of 0.83, which the authors considered nearly perfect agreement [Marshman et al., 2005].

Spearman’s correlation demonstrated the construct validity for the Brazilian version of the CPQ8-10, excepted for the social wellbeing subscale. The oral symptoms subscale was only significantly associated with the global indicator related to the wellbeing of the child. Both the original and the Brazilian versions revealed non-significant correlations when relating the social wellbeing and functional limitation subscales to the global rating of oral health. A study carried out in Ireland with 270 eight-year-old children compared the scores of the CPQ8-10 with those from an instrument of high validity and reliability that assesses children’s attitudes within their social context (Coopersmith Self-Esteem Inventory-School Form) [Humphris et al., 2005]. However, the Irish study assessed only the construct validity of the CPQ8-10 and did not perform the other psychometric properties.

The original CPQ8-10 did not demonstrate discriminant validity between the groups studied. The authors state that this was likely due to the fact that the children had previously received clinical and psychological treatment [Jokovic et al., 2004]. In the present validation study, none of the children had yet received treatment, which was an important criterion to demonstrate the statistically significant differences between the groups regarding the total scale, oral symptoms and emotional wellbeing subscales, especially when comparing the scores of the children with one oral condition to those with both conditions. The CPQ11-14 has been validated in different languages and has demonstrated discriminant validity between groups with different severities of oral conditions such as malocclusion and dental caries [Foster Page et al., 2005; Brown and Al-Khayal, 2006; O’Brien et al., 2006].

The Brazilian version of the CPQ8-10 exhibited similar psychometric properties to those of the original instrument, thereby demonstrating the different types of equivalence (conceptual, item, semantic and operational) and achieving the final objective of functional equivalence [Herdman et al., 1998].

### Conclusions

The preliminary validation of the Brazilian version of the CPQ8-10 showed valid and reliable for administration to Brazilian children from 8 to 10 years old. The psychometric properties were similar to the properties of the original English language version and functional equivalence was proven. Thus, the validated questionnaire may assist healthcare professionals,

**TABLE 3 - Discriminant validity: total and subscale scores for children with caries, children with malocclusion and children with both conditions (n=59).**

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Cavitated caries (22)</th>
<th>Malocclusion (20)</th>
<th>Cavitated caries + malocclusion (17)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total scale</strong></td>
<td>Mean 14.77 Median 9.00 (SD 3.28)</td>
<td>Mean 10.70 Median 6.50 (SD 12.30)</td>
<td>Mean 21.29 Median 21.00 (SD 13.18)</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Subscales</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral symptoms</td>
<td>Mean 4.86 Median 4.50 (SD 3.21)</td>
<td>Mean 3.20 Median 2.50 (SD 2.72)</td>
<td>Mean 7.29 Median 7.00 (SD 3.07)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Functional limitations</td>
<td>Mean 3.05 Median 2.00 (SD 2.95)</td>
<td>Mean 2.30 Median 1.50 (SD 2.95)</td>
<td>Mean 2.88 Median 2.00 (SD 2.61)</td>
<td>0.40</td>
</tr>
<tr>
<td>Emotional wellbeing</td>
<td>Mean 3.00 Median 1.00 (SD 3.79)</td>
<td>Mean 1.75 Median 0.50 (SD 3.02)</td>
<td>Mean 4.65 Median 3.00 (SD 4.15)</td>
<td>0.02</td>
</tr>
<tr>
<td>Social wellbeing</td>
<td>Mean 3.95 Median 2.00 (SD 5.73)</td>
<td>Mean 3.40 Median 1.00 (SD 5.09)</td>
<td>Mean 6.53 Median 6.00 (SD 5.76)</td>
<td>0.10</td>
</tr>
</tbody>
</table>

* Kruskall-Wallis Test
especially paediatric dentists, in better understanding the influence of oral health on the quality of life of children. Based on such knowledge, effective health promotion measures targeting this segment of the population can be developed and applied.

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