Satisfaction with dental appearance in 8-9 years-old children.
Validation of COAS questionnaire for Italian-speaking children and evaluation of social and geographical context

R. DELI, L.A. MACRÌ, M. DE LUCA, F. TORSELLO, C. GRIPPAUDO

ABSTRACT: Aim This study was designed to adapt the original English-language COAS (Children’s Orthodontic Attitude Survey) for third-grade schoolchildren to the Italian cultural environment and to investigate its properties in typical populations, as well as to evaluate children self-perception of their dental appearance. Study design The COAS questionnaire for third-grade schoolchildren was translated and culturally adapted for Italian-speaking children. The Italian version of the questionnaire was tested on 169 (73 females, 96 males) children. Test-retest reliability was assessed on 34 children one week after the first administration. We also analysed correlations between social status and questionnaire findings. Methods All children filled in the questionnaire and then they were clinically examined by three residents. The clinical parameters were correlated with the questionnaire findings to evaluate children’s satisfaction with their dental appearance. Results Ninety-five per cent of children thought it was important to have straight teeth and 87 per cent considered that crooked teeth were ugly. Comparison with clinical parameters showed a statistically significant correlation between crowding and overjet and some answers. Urban children have a better opinion on braces: they would like to have braces and they think they need braces statistically more than rural subjects. Conclusion The Italian version of the modified-COAS questionnaire had a very good reliability. Social status and geographical context play a very important role in children’s satisfaction with dental appearance. Children with different social context demonstrate they have very different approaches towards their dental aspect and braces.

KEYWORDS: Dental appearance; Malocclusion; Self-esteem.

Introduction

The appearance of the mouth and smile plays an important role in judging facial attractiveness [Cross and Cross, 1971]. The perception of facial aesthetics influences the psychological development from early childhood to adulthood [Tung and Kiyak, 1998].

Several studies have attempted to clarify the role that malocclusion has on self-concept and the level of satisfaction with one’s dental or facial appearance, but little research on psychosocial attitudes towards malocclusion has been conducted on pre-adolescent children [Sheats et al., 1995]. However, the infant’s visual preference for human faces has been confirmed in many psychological studies [Vander Zanden, 1985]. By the age of 6 years, children have internalised cultural values of physical attractiveness and by age of 8 years their criteria for attractiveness are the same as those of adults [Carvior and Lombardi, 1973]. Children of normal dental appearance are judged to be better-looking, more desirable as friends and more intelligent [Shaw, 1981].

In order to perform a more in-depth study of the orthodontic attitudes of eighth and ninth graders,
Albino et al in 1982 developed the Children’s Orthodontic Attitude Survey (COAS). In 1995, Sheats et al developed a modification of the COAS for use on a younger population of children, namely third-grade children. Before them, no research had studied children who are candidates for early treatment in the 8-9 years old age group. Nevertheless, many orthodontic treatments start in the mixed dentition period, because they aim at creating normal craniofacial, occlusal and dental development and, if possible, at reducing the need for further more complicated treatment.

In order to use a questionnaire with different language groups and in different cultural settings, the questionnaire must not only be translated into the new language, but also be adapted to the respective cultural characteristics and then validated against the original version [Padua et al., 2003].

This paper describes the validation of the modified-COAS questionnaire for use in Italy, which includes translation, adaptation, reproducibility and the testing phase of the Italian version, as described by Guillemin (1993). Our intent was to provide Italian orthodontists with a questionnaire conceptually equivalent to the US-English version, easy to understand and to answer for Italian patients, reliable and able to permit a better comprehension of young patients’ point of view. Moreover, our objective was to assess satisfaction with dental appearance in 8-9 years old schoolchildren with different social and geographical context.

**Materials and methods**

According to the previously described methodology [Padua et al., 2002], we submitted the COAS questionnaire for third-grade schoolchildren to the validation process through translation, cultural adaptation and testing phases.

**Translation and cultural adaptation.** The questionnaire was translated into Italian by a mother tongue translator and by a physician. The two Italian versions were analysed for the cultural characteristics of Italian people. We compared the two versions and, as no meaningful differences were noted, we proceeded with the validation of one of the two translations. No special Italian items have been performed. The Italian version was then back-translated into English, compared with the original text, and checked for inconsistencies. This process of validity checking ensures that the translated version reflects the same content as the original version.

**Validity.** The construct validity of the new instrument was tested on 169 (73 females, 96 males) third-grade schoolchildren (mean age 8.41 years, SD 0.49, range 8-9 years). In order to avoid sample bias we enrolled children from schools sited in rural and urban districts. Fifty-eight (21 females, 37 males) of them were from a big urban area; 111 of them (52 females and 59 males) were from a little rural town in the south of Italy.

No systematic effort was made to stratify subjects based on race or gender.

Each child filled in the questionnaire. Questionnaire was administered by the same interviewer to each child.

In accordance with literature, we predicted that subjects with no malocclusion would have lower scores than children with malocclusion and that urban children would be more favourably disposed towards braces and more satisfied with their dental appearance with braces.

**Reliability.** In order to assess the reproducibility (test-retest reliability), 34 children were asked to fill in again the questionnaire approximately one week after the first administration. This time interval was selected for the test-retest because the respondents should have remained stable and, in addition, they were unlikely to remember how they answered the first time.

**Clinical examination methods.** Children were examined by three orthodontic residents during the Fall 2006 screenings. The clinical findings were available from dental screening forms that were completed by one of the three physicians.

The following clinical parameters were included for analysis:
1. assessment of antero-posterior molar relation;
2. overjet (measured to nearest mm);
3. overbite (measured to nearest mm);
4. anterior crossbite (present or absent);
5. posterior crossbite (present or absent);
6. crowding (in mm);
7. diastemas.

Then, we correlated clinical parameters with questionnaire findings to evaluate the children’s perceived need/desire for braces. Moreover we analysed the correlations between social status and questionnaire findings. Social status was assessed using a graded scale from 1 (low) to 3 (high).

**Statistical Analyses.** Statistical analysis was performed by using the STAT-SOFT (OK-USA) package. Kolmogorov-Smirnov and Liliefors
probability tests were used to assess distribution.
Because ordinal or nominal scales were used for measurement, non-parametric analysis of the correlation was assessed by Spearman’s R test and the comparison of the groups was assessed by the U-Mann Withney test.
The standard Pearson Chi-square test (2x2 table) was performed to evaluate the relationship between two dichotomous variables and the difference between two groups in the frequency of one dichotomous variable.
Reproducibility was assessed by Spearman-Brown test-retest reliability test.

Results
Clinical status. Class I molars were seen in 139 (82%) of the subjects on the right side and in 136 (80%) on the left side. Class II molars were observed in 23 (14%) children on the right side and in 26 (16%) on the left side. Class III molars were seen in 7 (4%) children on both sides.
Overjet ranged from -2 to 12 mm (mean 3.2 SD 2.26). Overbite ranged from -5 to 8 mm (mean 3.1 SD 2.14). One child was not evaluable for overjet and overbite because of loss of primary anterior teeth (Fig. 1, 2).
Anterior crossbite was seen in 10 children (6%), 4 males and 6 females; posterior crossbite was present in 31 subjects (18%), 11 females and 20 males.
Crowding was noted in 72 children (43%), including children classified in the 0-3 mm crowding category, and of 97 remaining subjects, 22 had one or more diastemas.
Comparison of clinical parameters between the two different subgroups (urban/rural) showed no statistical differences. Socio-cultural comparison between the two different subgroups (urban/rural) highlighted a big statistical variation (p= 0.00) (Fig. 3).

Questionnaire findings. Test-retest reliability of children’s responses showed no statistical differences between the two administrations on every item.
Seventy-one percent of children wanted braces while 62% believed they needed braces (q 5). Ninety-five percent of children thought it is important to have straight teeth (q 17); the same percentage wished their teeth were straight (q 25) and 87% thought that crooked teeth are ugly (q 24).
Comparing clinical status with perceived need of braces, we noted a statistical significant correlation between crowding and questions number 22 (p=0.04), 29 (p=0.02) and 34 (p=0.01). It means that children...
with more severe crowding think that “people need straight teeth to look good”, that they “would be willing to wear a night brace or headgear” and that they “would be willing to give up their allowance for one year in order to have their teeth straightened”.

Moreover, we observed a statistical significant correlation between overjet value and item 8. It means that children with a higher overjet would not mind wearing braces.

Comparison between rural and urban children is statistically significant for questions number 1, 2, 5, 8, 13 and 30. It means that urban children would like to have braces statistically more than rural subjects (p=0.0005); urban sample also thought braces would look silly on their teeth less than rural sample (p=0.0002). Furthermore, urban subjects thought they need braces more than rural ones (p=0.001), and they would mind wearing braces less than rural (p=0.009). Urban children answered questions “Would braces bother you?” (p=0.001) and “Do you think braces hurt?” (p=0.0003) significantly more frequently “No” than rural children (Table 1).

Moreover, lower social level children answered “No, not at all” more statistically frequently to the questions from 31 to 33. It means they won’t give up their Nike or Reebok (p=0.006), or their TV (p=0.02) or their Nintendo (p=0.03) in order to get teeth straightened.

We also noted that children with the largest number of brothers/sisters believed “braces look cool on other people’s teeth” (p=0.03).

**Discussion**

The infant’s visual preference for human faces has been confirmed in many psychological studies [Vander Zanden, 1985]. By the age of 6 years, children have internalised cultural values of physical attractiveness and by age of 8 years their criteria for

<table>
<thead>
<tr>
<th>Questions</th>
<th>Urban children (111)</th>
<th>Rural children (58)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to have braces?</td>
<td>Yes very much 38%</td>
<td>Yes very much 23%</td>
<td>0.0005</td>
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<td></td>
<td>Yes a little 36%</td>
<td>Yes a little 17%</td>
<td></td>
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<tr>
<td></td>
<td>No, not at all 26%</td>
<td>No, not at all 60%</td>
<td></td>
</tr>
<tr>
<td>Do you think braces would look silly on your teeth?</td>
<td>Yes very much 9%</td>
<td>Yes very much 29%</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>Yes a little 17%</td>
<td>Yes a little 29%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No, not at all 74%</td>
<td>No, not at all 41%</td>
<td></td>
</tr>
<tr>
<td>Do you think you need braces?</td>
<td>Yes very much 50%</td>
<td>Yes very much 38%</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Yes a little 33%</td>
<td>Yes a little 27%</td>
<td></td>
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<tr>
<td></td>
<td>No, not at all 15%</td>
<td>No, not at all 31%</td>
<td></td>
</tr>
<tr>
<td>Do you think you would mind wearing braces?</td>
<td>Yes very much 10%</td>
<td>Yes very much 28%</td>
<td>0.009</td>
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<td></td>
<td>Yes a little 24%</td>
<td>Yes a little 22%</td>
<td></td>
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<tr>
<td></td>
<td>No, not at all 62%</td>
<td>No, not at all 46%</td>
<td></td>
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<tr>
<td></td>
<td>Missing value 4%</td>
<td>Missing value 4%</td>
<td></td>
</tr>
<tr>
<td>Would braces on your teeth bother you?</td>
<td>Yes very much 14%</td>
<td>Yes very much 42%</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Yes a little 36%</td>
<td>Yes a little 26%</td>
<td></td>
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<tr>
<td></td>
<td>No, not at all 50%</td>
<td>No, not at all 32%</td>
<td></td>
</tr>
<tr>
<td>Do you think braces hurt?</td>
<td>Yes very much 5%</td>
<td>Yes very much 28%</td>
<td>0.0003</td>
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<td></td>
<td>Yes a little 28%</td>
<td>Yes a little 30%</td>
<td></td>
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<tr>
<td></td>
<td>No, not at all 67%</td>
<td>No, not at all 39%</td>
<td></td>
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<td></td>
<td>Missing value 3%</td>
<td>Missing value 3%</td>
<td></td>
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<tr>
<td>Would you be willing to give up your Nike or Reebok in order to have your teeth straightened?</td>
<td>Yes very much 10%</td>
<td>Yes very much 10%</td>
<td></td>
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<td></td>
<td>Yes a little 24%</td>
<td>Yes a little 24%</td>
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<tr>
<td></td>
<td>No, not at all 62%</td>
<td>No, not at all 62%</td>
<td></td>
</tr>
<tr>
<td>Would you be willing to give up your Nintendo in order to have your teeth straightened?</td>
<td>Yes very much 10%</td>
<td>Yes very much 10%</td>
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<td></td>
<td>Yes a little 24%</td>
<td>Yes a little 24%</td>
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<tr>
<td></td>
<td>No, not at all 62%</td>
<td>No, not at all 62%</td>
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**Table 1 - COAS scores by socioeconomic factors.**
attractiveness are the same as those of adults and they are able to say their opinion on it [Carvior and Lombardi, 1973].

With a few exceptions, all the measures developed are in the English language and are intended for use in English-speaking countries [Guillemin et al., 1993]. Multiple-language versions of the same psychometric instrument are increasingly needed [Perneger et al., 1999], but simply translating an English version word-to-word into another language is not adequate to account for linguistic and cultural differences [Hilton and Skrutkowski, 2002]. The adaptation between one culture and another requires the most precise attention to conceptual equivalence and the ripples of meaning associated with a word [Hunt, 1993].

We evaluated our Italian version of the questionnaire on a heterogeneous population composed by urban and rural children to assess reliability. In fact, as reported by Dworkin et al. (2002), “reliability is at the core of valid or useful diagnostic procedures, and if reliability is low, validity cannot be determined”.

Note that the validity of this instrument could not be evaluated using any other measure of self-perception or attitude assessment because no information has been reported for this age group [Sheats et al. 1995].

The findings of this study support theories of Shaw et al. (1980), Helm et al. (1985) and Kilpelainen et al. (1993). In fact we found, like them, that overjet and crowding are the most significant predictors of the desire to seek orthodontic correction. On the other hand, Angle’s Class II and III molars are not associated with desire for treatment.

In the observed samples, although no systematic effort was made to select subjects, none of them had conspicuous facial impairment, such as cleft lip or palate and the two groups of children have no statistical differences in the clinical parameters.

Social status was inferred from what children said about their parents’ job and it was graded in a scale from 1 (low) to 3 (high).

In the questionnaire findings, even if the answers at the question “Do you think your teeth are crooked?” were similar for both samples, the subjective need for treatment was higher in urban than in rural children, confirming earlier findings that subjects in rural areas, characterized by low orthodontic treatment rates, are likely to demonstrate a greater degree of tolerance toward malocclusion [Espeland et al., 1993; Bergstrom et al., 1998]. Conversely, urban subjects are statistically more favourably disposed towards braces and they would be more satisfied with their dental appearance with braces. As suggested by Burden (1995), peers group at school and treatment rate in the area of living may have a greater influence on perceived need for treatment than whether the treatment is readily available.

Comparison between different social levels showed that the subjective need for treatment was higher in the upper social level. Furthermore lower social level children were not willing to make renunciations in order to have their teeth straightened.

We have also seen that children with the largest number of brothers/sisters believed “braces look cool on other people’s teeth”. It suggests that familiarity with orthodontic appliances among a subject’s peer group has a greater influence on the attitude toward orthodontic treatment [Burden, 1995].

Conclusion

The Italian version of modified-COAS questionnaire had a very good reliability. The objective clinical status, with exception of crowding and overjet, does not influence self-perception. Instead, social status and geographic context play a very important role in children’s satisfaction with dental appearance. Children with different social context demonstrate they have a very different approach towards their dental aspects and braces.

References


