Assessing appearance, speech, and hearing (dis)satisfaction in individuals with cleft lip and/or palate: A contribution to general population norms

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Abstract

Background: Individuals with cleft lip and/or palate (CL/P) may grow up with a visible facial difference, alongside speech and/or hearing challenges. Self-perceptions are stronger predictors of psychosocial adjustment than objective assessments, highlighting the importance of patient-reported outcome measures. Previously the Satisfaction with Appearance (SwA) questionnaire, the Cleft Hearing, Appearance and Speech Questionnaire (CHASQ) has been used in several countries to assess patient satisfaction, guide clinical decision-making, and conduct craniofacial research, but has lacked general population norms from which to draw comparisons. The aim of this study was to contribute to the development of norms by utilising existing data collected in the United Kingdom (UK) in 2004 using the original SwA.

Methods: SwA data collected from school pupils (*n*=761) aged 10-16 years were analysed across age and gender.

Results: Hair, Eyes and Ears received the highest ratings, while Teeth received the lowest ratings. Those who were younger, and those who were male, generally rated their appearance more favourably. Thresholds are proposed to identify young people in need of clinical monitoring (10%) and intervention (5%).

Discussion: This study lends weight to the potential of the CHASQ as a clinically useful outcome measure and research tool with the ability to identify appearance concerns in relation to specific facial features, as well as overall appearance satisfaction in young people with and without CL/P. Further validation of its use in the CL/P population and other patient groups, as well as countries outside the UK would add additional weight to the CHASQ's utility.

Keywords: Satisfaction with appearance; CHASQ; hearing; speech; general population norms' PROMs

Introduction

In the late 1990s, a report published in the United Kingdom (UK) by the Clinical Standards Advisory Group (CSAG) highlighted the potential psychological impacts of cleft lip and/or palate (CL/P) on both the individual affected and their family[1]. Specifically, the report recognised that being born with a visible facial difference, speech and/or hearing difficulties can have a marked impact on social interactions, self-esteem, and overall mental health. The CSAG report ultimately recommended the inclusion of a clinical psychologist on all specialist multidisciplinary CL/P teams in the UK to promote psychological health and monitor psychological outcomes.

Since the integration of specialist clinical psychologists within UK CL/P teams, a key focus has been selecting and developing outcome measures that allow the identification of patients at risk of psychological distress and can inform clinical decisions. These outcome measures are also essential for demonstrating the degree to which CL/P teams are meeting the standards of care set out by the National Health Service (NHS) Specification[2]. Explicitly, CL/P teams are charged with ensuring that all children with CL/P achieve psychological wellbeing, have any hearing issues addressed, attain intelligible speech, and achieve a "good" facial appearance[2]. With some variation, patients with CL/P living in the UK typically complete audit measures at ages 5, 10, 15, and 20 years.

Originally based on the Cleft Evaluation Profile (developed by the Royal College of Surgeons Cleft Lip and Palate Audit Group), the Satisfaction with Appearance (SwA) questionnaire was developed in 1999 by the Centre for Appearance Research (at the University of the West of England) in collaboration with the UK Cleft and Craniofacial Psychology Clinical Excellence Network (Psychology CEN). As research and clinical understanding in the area grew, the SwA underwent further adaptations. In 2014, authoritative validation analysis was carried out by the Psychology CEN utilising audit data collected from CL/P teams across the UK. The SwA was subsequently refined to include 15 items and renamed the Cleft Hearing, Appearance and Speech Questionnaire (CHASQ). A user guide was also developed in 2014[3], which describes the CHASQ's psychometric properties and posits its value as a clinical tool within the CL/P population. Today, the CHASQ is endorsed by a range of UK and international initiatives[4-6] and has been utilised successfully in a range of research studies in the UK[7-8], Europe[9-12], and globally[13-14].

Despite the growth in the popularity of the CHASQ, a significant challenge for both clinical practice and research to date has been the lack of general population norms from which to draw comparisons[15]. Appearance concerns in particular are known to be pervasive in the general population[16], and without general population norms to aid the interpretation of study results, rates of appearance dissatisfaction within the CL/P population could be under- or over-estimated[17]. Similarly, patient speech and hearing

ratings may not always correlate with assessments conducted by clinicians, indicating that subjective satisfaction scores are important to assess[18]. Measures developed for use in the general population, such as the widely used Body Esteem Scale[19] have also been criticised as being insensitive to areas of concern in individuals with visible facial difference, such as CL/P[20]. While a CL/P-specific measure therefore appears warranted, the interpretation of scores must be enacted accurately, including through the use of general population data.

The aim of the current study was to examine existing data derived from a UK population of young people using the original SwA, to contribute to the generation of general population norms and to this important discussion.

Method

Design

A quantitative, cross-sectional, self-report questionnaire design was employed. The analyses presented in this paper utilise data collected within UK schools during 2004, using the original 13-item SwA.

Participants

A total of 13 UK schools participated in the original data collection, including six primary schools and seven secondary schools. One primary school was fee-paying, while the remainder were state schools. Most schools were mixed sex (10/13). Due to three schools having a male-only intake, there was a higher percentage of males (*n*=495; 65%) in the study compared to females (*n*=266; 35%). For a distribution on an 11-point discrete scale (0 - 10) with an assumed standard deviation in the range 2.0 to 2.4, the approximate 95% confidence interval for the median was estimated within bounds smaller than +/- 0.5. A sample size of 90 or greater per group was therefore sought. The total sample included 761 students aged between 10 and 16 years of age (*M*=1.9, SD=1.86).

Procedure

Ethical approval to conduct this study was obtained from the Faculty Research Ethics Committee at (*University*). A letter outlining the aims of the study and requesting assistance in the collection of data was sent to 48 schools in (*region*). This letter was followed-up with a phone call to ascertain whether the school would be happy to take part, to answer any questions about the research, and to navigate any potential challenges. A letter was also sent to all parents ahead of data collection offering the choice to opt their children out of the study if they wished. Schools that declined to participate cited summer examinations and national curriculum pressures as key barriers.

In most cases, and wherever possible, the study was introduced to the students by the researchers, who were on hand to answer any questions during questionnaire completion. However, due to time constraints, some schools preferred to distribute and collect the questionnaires themselves using instruction sheets. It was explained to all students that participation in the study was optional, that all responses would be anonymous and confidential, and that students could withdraw their data from the study at any time prior to analysis completion using a unique participant code. Handwritten completed questionnaires were placed in sealed envelopes by participants to ensure anonymity before being handed back to the researchers.

Analysis

All original data were extracted and cleaned. The distribution of responses was calculated for the whole sample, and additionally by gender and by age (≤12; ≥13), in line with the median score and broad developmental age ranges. In each case, the data were summarised using sample frequencies and percentages. Ratings of each item were compared using the paired samples *t*-test. Differences in mean ratings between independent groups for gender and for age (≤12; ≥13) were assessed using an independent samples *t*-test, with effect size quantified using Cohen's *d*. Differences in proportions between independent groups were quantified using the odds ratio. All analyses were conducted in SPSS (version 28).

Results

Table 1 provides the mean, standard deviation, median, and lower and upper quartiles for each item across the sample according to age and gender. Broadly, male participants and younger participants reported more favourable self-perceptions. In particular, females aged ≥13 reported relatively lower scores.

Table 2 summarises the percentage distribution of responses for each item across the sample. 'Hair', 'Eyes' and 'Ears' tended to receive higher ratings, with more than 50 percent of respondents providing a rating of 8 or more on these three features. 'Teeth' comprised a greater percentage of respondents with lower ratings (3 or less) compared with other features. Participants were generally satisfied with their hearing and speech, with ~80 percent of the sample scoring a 6 or higher in all cases.

Table 3 places each item in descending rank order according to gender and age. Each feature in each ranking has assigned codes (a-i). If any two features have at least one code in common, then this indicates that the two features under consideration do not significantly differ in mean values. If any two features do not have a code in common, this indicates that the two features have significantly different mean values. For instance, for Females, the mean rating for "a. Eyes" is significantly

different from “b. Hearing” (no code in common) whereas the mean rating for “b. Hearing” is not significantly different from “b. c. Hair” (code b in common).

Gender

Table 2 summarises the percentage distribution of responses for each item by gender. A relatively high percentage of female respondents (25.6%) provided a low rating for ‘Teeth’ (3 or less). A high percentage of female respondents (9.6%) responded to the item ‘Good-Looking’ with a 0, while 50% of females gave this item a rating of 5 or lower. In contrast, ‘Lips’, ‘Hair’, ‘Eyes’ and ‘Ears’ were given a rating of 8 or higher by female respondents more than 50 percent of the time. A high percentage of male respondents gave low ratings to ‘Ears’ (13.3%) and ‘Teeth’ (18.5%) (3 or less). In contrast, ‘Lips’, ‘Chin’, ‘Hair’, ‘Eyes’ and ‘Ears’ were given a rating of 8 or higher by male respondents more than 50 percent of the time.

Each item is placed in descending rank order according to gender in Table 3. ‘Eyes’ occupied rank position 1 and received a significantly higher rating than any other feature for both female and male respondents. The same applied to the second-place ranked item ‘Hearing’, with the exception that female respondents ranked ‘Hearing’ and ‘Hair’ similarly. ‘Good-Looking’ occupied the lowest rank position for males and females. In general, the rank order of features for female respondents was similar to the rank order for males.

Each item is placed in cumulative order according to gender in Table 4. A total of 18 percent of females and 11.9 percent of males gave a rating of 0 on at least one item. This difference is statistically significant, with females being 1.6 times more likely to provide at least one 0 compared with males (p=0.02). Similarly, females were 1.5 times more likely to give a score of 0 or 1 on at least one feature (p=0.037), 1.6 times more likely to give a rating of 2 or lower on at least one feature (p=0.002), and 1.5 times more likely to give at least one rating of 3 or lower on at least one feature compared with males (p=0.011). Further, 62.8 percent of females gave themselves a score of 4 or lower on an item, compared with 53.5 percent of males (p=0.014). A total of 54.1 percent of both males and females gave a rating of 10 on at least one feature. Males and females were also equally likely to give a rating of at least one 9 or 10 on one or more features. The same pattern is observed for at least one rating of 8 or more. Male respondents provided a significantly higher mean rating than females on several items, including ‘Chin’ (p=0.024, d=0.18), ‘Overall Appearance’ (p=0.001, d=0.26), ‘Nose’ (p<0.001, d=0.26), ‘Profile’ (p<0.001, d=0.33), and ‘Good-Looking’ (p<0.001, d=0.052), as detailed in Supplementary Table 1.

Age

The percentage distribution of responses for each item by age is summarised in Table 2. Only 8 percent of participants aged ≤12 years gave a rating of 9 or 10 on 'Good-Looking', which contrasts with more than 50 percent giving a rating of 9 or 10 for 'Hair'. 'Lips', 'Hair', 'Eyes' and 'Ears' received ratings of 8 or higher more than 50 percent of the time. For those aged ≥13 years, a relatively high percentage of respondents gave low ratings (3 or less) for 'Good-Looking' (17.0%) and 'Teeth' (19.3%). 'Hair' and 'Eyes' were given ratings of 8 or higher more than 50 percent of the time.

Table 3 places each item in descending rank order according to age. 'Eyes' occupied rank position 1 and received a significantly higher rating than any other feature across both age groups. The same applied to the second-place ranked item 'Hearing', with the exception that younger respondents ranked 'Hearing' and 'Hair' similarly. 'Good-Looking' occupied the lowest rank position for younger and older respondents. In general, the rank order of features for younger respondents was similar to the rank order for older respondents.

Each item is placed in cumulative order by gender in Table 4. A total of 63 percent of those aged ≤12 and 47 percent of those aged ≥13 provided a rating of 10 on at least one item. This difference is statistically significant, with the ≤12 age group being 1.9 times more likely to give at least one rating of 10 compared with the older group (p<0.001). Similarly, those aged ≤12 are twice as likely to give a score of 9 or 10 on at least one feature (p<0.001) and 2.8 times more likely to give a rating of 8 or higher on at least one feature (p<0.001) compared with those aged ≥13. As detailed in Supplementary Table 2, the younger age group provided significantly higher ratings than the older group on 'Nose' (p=0.018, d=0.17), 'Hair' (p<0.001, d=0.33), 'Eyes' (p=0.047, d=0.16) and 'Hearing'. The older age group did not give significantly higher mean ratings on any item.

Total Score

Across the sample, the mean Total Score was 90.6 [95% CI 89.0 to 92.2] with a standard deviation of 22.3. When considering a total score for each young person, 5 percent of the sample gave a total score of 47 or less. A total of 5 percent of participants gave themselves a score of 3 or less on at least 6 features. Eighty-three percent of those with this response pattern had a total score of 50 or less. Similarly, 98.3 percent of those without this response pattern gave a score of 51 or above. Nominally, a threshold score of 50 or less could therefore indicate a subgroup of young people with appearance concerns. Goodman-Kruskal Gamma correlations between this rule and a threshold of 50 or less is 0.993 (p<0.001), but with a moderate value for Cohen's kappa measuring agreement (kappa=0.766, p<0.001).

For age- and gender-specific norms, 5 percent of females ≤12 gave a score of 50 or less, with a mean score of 91.2 [95% CI 87.7 to 94.7] and a standard deviation of 22.7. Five percent of males aged ≤12

gave a score of 49 or less with a mean total score of 93.6 [95% CI 89.8 to 97.3]. For the older age group, 5 percent of females ≥13 gave a score of 41 or less, with a mean score of 83.0 [95% CI 78.3, 87.7] and a standard deviation of 22.4. Five percent of males ≥13 gave a score of 58 or less, with a mean of 90.9 [95% CI 88.5 to 93.2] and a standard deviation of 19.8.

Thresholds were calculated to enable assessment relative to scores of peers of the same age and gender. The lower 5% point of the distribution of scores is taken as the clinical intervention score, and between the lower 5% point and the lower 10% point is the region for monitoring. The reported lower percentiles (5% and 10%) are therefore indicative thresholds to identify subgroups of young people with appearance concerns (Table 5). The standard deviations form a baseline for judging effect size and can be used to generate power calculations in intervention studies.

Discussion

Synthesis of Findings

The aim of the current study was to analyse existing data collected from a non-clinical UK population of young people using the original SwA, to contribute to the generation of general population norms. The findings offer a greater understanding of how young people in the general population rate various facial and functional features. Across all ages and genders, 'Hair', 'Eyes' and 'Ears' received the highest ratings, while 'Teeth' received the lowest ratings. This finding indicates the features which are most and least favoured by young people without a craniofacial condition.

In comparison to females, males gave higher mean ratings for the appearance of several features, including overall appearance, profile, and how good-looking they perceived themselves to be. This suggests that in general, males may be more satisfied than females with their overall appearance and individual facial features. This finding aligns with broader research in the body image field, which indicates that while appearance concerns affect both genders during adolescence, females are more likely to be dissatisfied with their appearance than males[21].

Although item ratings were relatively stable across age groups, the results demonstrated that appearance satisfaction tends to become poorer with age, consistent with the idea that body dissatisfaction fluctuates over time, and with a notable decline between the ages of 10 and 16 years[22]. Similarly, and using the CHASQ with a UK clinical sample of young people with CL/P[8], Kelly and Shearer found greater appearance dissatisfaction at 15-years old than at 10-years old.

Using the Proposed Norms and Thresholds in Practice

The data collected for this study has allowed for the calculation of indicative thresholds. These thresholds can be used to make an assessment for clinical, audit, and/or research purposes about the

scores of young people with CL/P relative to peers of the same age and gender, and whether any monitoring (10%) or intervention (5%) may be indicated in practice. The paper has also presented general population data for individual items and the total score across age and gender.

While this is an important contribution, the current CHASQ was not used in this study and additional consideration is therefore required when interpreting the scores. Although the original SwA (and not the CHASQ) was used in this study, only two items are notably different. Specifically, the items 'cheeks' and 'perceived noticeability' are included in the CHASQ but were not part of the original SwA. Since 'perceived noticeability' could be seen as less relevant to the general population, it is proposed that this item is excluded from the total score when the measure is used with young people with CL/P. Instead, 'noticeability' could be interpreted as a standalone item, as has been the case in large studies of individuals with visible facial differences[23-24]. Since the item 'cheeks' was added to the measure much later, the 2004 study did not collect general population data for this item. The thresholds presented in this paper therefore only apply if 'cheeks' is excluded from the total score. We therefore suggest that clinicians and researchers wanting to use the presented thresholds with individuals with CL/P exclude the items 'cheeks' and 'noticeability' prior to scoring.

Methodological Considerations

While the contribution of general population data has helpful implications for research and clinical practice, limitations of this study require reflection. First, data were collected in 2004, and arguably normative appearance dissatisfaction could have changed during this time. For example, a UK-wide survey of 4,505 individuals in 2019 found higher levels of appearance dissatisfaction than reported in a similar survey conducted in 2013[25]. The rapid rise in social networking sites has been denounced for its detrimental impact on appearance satisfaction[26] and the Covid-19 pandemic may have also exacerbated normative discontent[27]. Second, data were collected using the original SwA that was in circulation across UK CL/P teams in 2004. While this version of the SwA and the CHASQ are not markedly distinct, additional consideration is required in the interpretation of scores. Third, and while a relatively large number of UK schools participated, generalisability to broader contexts and groups cannot be assumed. While gender differences were explored, other possible differences among sexual and/or gender minority adolescents, who may present with greater body image dissatisfaction[28] were not investigated. Similarly, information on participant ethnicity was not collected. Given the current sample consisted of UK adolescents, it is likely that the majority were White British. Recent research suggests that non-White adolescents may be at increased risk of additional appearance concerns[29], and the role of ethnicity should therefore be considered in future work. Finally, and while the current CHASQ measure has been used outside the UK, both in Europe[9-12], and globally[13-14], the analyses presented in this paper offers a contribution to UK norms only. In recognition of important

sociocultural and healthcare variations, country-specific norms should be developed where possible to ensure enhanced clinical utility. This work is already underway in a number of countries and Swedish norms for the CHASQ have already been published[13].

Conclusions

The current study has contributed general population data using the original SwA and has proposed thresholds to aid in the accurate interpretation of scores in research and practice. The CHASQ appears to be a clinically useful outcome measure and research tool with the ability to identify appearance concerns in relation to specific facial features, as well as overall appearance satisfaction in children and young people with CL/P. Further validation of its use in the CL/P population and other patient groups, as well as countries outside the UK would add additional weight to the CHASQ's utility.

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Table 1: Descriptive statistics for each item by gender and age group

Feature	Group	Mean	SD	LQ	Med	UQ	N
Whole Appearance	All	6.79	2.32	5.0	7.0	8.0	742
	M, ≤ 12	7.05	2.37	5.0	8.0	9.0	171
	F, ≤ 12	6.63	2.46	5.0	7.0	8.0	166
	M, ≥ 13	6.97	2.12	6.0	7.0	8.0	315
	F, ≥ 13	5.97	2.49	5.0	6.0	8.0	88
Face	All	6.55	2.39	5.0	7.0	8.0	743
	M, ≤ 12	6.69	2.64	5.0	7.0	9.0	171
	F, ≤ 12	6.63	2.50	5.0	7.0	9.0	166
	M, ≥ 13	6.61	2.08	5.0	7.0	8.0	316
	F, ≥ 13	5.92	2.66	4.0	6.0	8.0	89
Sideview Profile	All	6.37	2.43	5.0	7.0	8.0	738
	M, ≤12	6.71	2.53	5.0	7.0	9.0	168
	F, ≤12	5.96	2.71	4.0	6.0	8.0	164
	M, ≥ 13	6.60	2.15	5.0	7.0	8.0	316
	F, ≥ 13	5.65	2.42	4.0	6.0	7.0	89
Good-Looking	All	5.73	2.48	4.0	6.0	8.0	743
	M, ≤12	5.86	2.58	4.0	6.0	8.0	171
	F, ≤ 12	5.24	2.44	4.0	5.0	7.0	164
	M, ≥ 13	6.15	2.34	5.0	6.0	8.0	316
	F, ≥13	4.97	2.56	3.0	5.0	7.0	89
Nose	All	6.56	2.61	5.0	7.0	9.0	743
	M, ≤ 12	7.10	2.64	6.0	8.0	9.0	171
	F, ≤ 12	6.48	2.72	4.0	7.0	9.0	166
	M, ≥ 13	6.61	2.39	5.0	7.0	8.0	316
	F, ≥ 13	5.40	2.73	4.0	5.0	8.0	89
Lips	All	7.27	2.33	6.0	8.0	9.0	701
	M, ≤ 12	7.25	2.49	6.0	8.0	9.0	171
	F, ≤ 12	7.57	2.33	6.0	8.0	9.0	167
	M, ≥ 13	7.19	2.24	6.0	8.0	9.0	273
	F, ≥ 13	7.00	2.28	5.0	7.0	9.0	89
Chin	All	6.92	2.39	5.0	7.0	9.0	698
	M, ≤ 12	7.16	2.37	5.0	8.0	9.0	171
	F, ≤ 12	6.89	2.52	5.0	7.0	9.0	167
	M, ≥ 13	7.02	2.25	5.0	7.0	9.0	270
	F, ≥13	6.18	2.46	5.0	7.0	8.0	89
Teeth	All	6.12	2.93	4.0	7.0	9.0	694
	M, ≤ 12	6.13	2.95	4.0	7.0	9.0	168
	F, ≤12	5.65	3.14	3.0	6.0	8.0	166
	M, ≥ 13	6.34	2.72	5.0	7.0	9.0	270
	F, ≥13	6.24	3.03	4.0	7.0	9.0	89
Hair	All	7.52	2.55	6.0	8.0	9.0	683
	M, ≤ 12	7.93	2.52	7.0	9.0	10.0	166
	F, ≤12	7.95	2.44	7.0	9.0	10.0	166
	M, ≥ 13	7.21	2.51	6.0	8.0	9.0	263
	F, ≥13	6.79	2.63	5.0	8.0	9.0	87
Eyes	All	8.30	2.00	8.0	9.0	10.0	683
	M, ≤ 12	8.40	2.26	8.0	9.0	10.0	166
	F, ≤12	8.51	1.90	8.0	9.0	10.0	166
	M, ≥ 13	8.13	1.96	7.0	9.0	10.0	263
	F, ≥13	8.24	1.80	7.0	9.0	10.0	87
Ears	All	6.98	2.70	5.0	8.0	9.0	683

	M, ≤ 12	6.92	2.91	5.0	8.0	9.0	165
	F, ≤12	7.26	2.71	6.0	8.0	9.0	166
	M, ≥ 13	6.82	2.65	5.0	8.0	9.0	263
	F, ≥13	6.98	2.38	6.0	7.0	9.0	87
Speech	All	7.42	2.47	6.0	8.0	10.0	695
	M, ≤ 12	7.50	2.51	6.0	8.0	10.0	169
	F, ≤12	7.44	2.51	6.0	8.0	10.0	167
	M, ≥ 13	7.48	2.41	6.0	8.0	10.0	269
	F, ≥13	7.02	2.48	5.0	8.0	9.0	89
Hearing	All	7.82	2.44	7.0	9.0	10.0	695
	M, ≤ 12	8.00	2.57	7.0	9.0	10.0	169
	F, ≤12	8.04	2.29	7.0	9.0	10.0	167
	M, ≥ 13	7.77	2.30	7.0	8.0	10.0	269
	F, ≥13	7.19	2.54	5.0	8.0	9.0	89

Table 2: Percentage distributions of responses for each item

Feature	Group	0	1	2	3	4	5	6	7	8	9	10	N
Whole Appearance	All	2.0	1.8	1.6	3.8	4.3	14.7	11.0	15.6	20.5	14.4	10.2	742
	Male	1.9	1.0	1.4	2.9	3.7	13.2	10.9	15.4	23.7	15.6	10.3	486
	Female	2.4	3.1	2.0	5.5	5.5	17.6	11.0	16.1	14.5	12.2	10.2	255
	≤12	1.5	1.8	2.4	4.4	5.6	14.5	8.6	14.8	17.2	16.3	13.0	338
	≥13	2.5	1.7	1.0	3.2	3.2	14.9	13.1	16.3	23.3	12.9	7.9	404
Face	All	2.2	2.0	2.2	5.0	5.5	14.9	12.1	17.4	15.7	12.9	10.1	743
	Male	1.8	1.8	1.4	4.3	5.5	15.0	12.1	18.3	16.6	14.4	8.6	487
	Female	2.7	2.4	3.5	6.3	5.5	14.9	12.2	15.7	13.7	10.2	12.9	255
	≤12	3.0	2.4	2.7	4.1	5.0	13.3	10.9	16.9	13.6	13.9	14.2	338
	≥13	1.5	1.7	1.7	5.7	5.9	16.3	13.1	17.8	17.5	12.1	6.7	405
Sideview Profile	All	3.0	2.3	2.8	3.7	6.2	15.6	13.7	16.8	16.4	10.7	8.8	738
	Male	1.9	2.3	1.9	3.1	5.0	15.5	12.2	17.6	19.4	12.8	8.5	484
	Female	5.1	2.4	4.7	4.7	8.7	15.8	16.6	15.4	10.3	6.7	9.5	253
	≤12	4.2	3.0	3.0	3.3	6.9	15.3	10.5	16.2	14.7	11.4	11.4	333
	≥13	2.0	1.7	2.7	4.0	5.7	15.8	16.3	17.3	17.8	10.1	6.7	405
Good-Looking	All	4.0	2.4	5.3	5.7	8.1	17.4	13.7	14.7	16.4	7.7	4.6	505
	Male	2.3	2.6	4.1	5.4	7.2	17.5	13.4	14.4	18.8	9.0	5.4	389
	Female	9.6	1.7	9.6	7.0	11.3	17.4	14.8	14.8	8.7	3.5	1.7	115
	≤12	7.0	1.0	5.0	6.0	13.0	14.0	13.0	15.0	18.0	6.0	2.0	100
	≥13	3.2	2.7	5.4	5.7	6.9	18.3	13.8	14.6	16.0	8.1	5.2	405
Nose	All	2.8	2.7	3.0	4.8	6.9	13.5	9.8	12.4	17.5	14.4	12.2	743
	Male	2.5	2.5	1.8	2.9	6.2	14.4	9.4	14.2	17.7	15.4	13.1	487
	Female	3.5	3.1	5.1	8.6	8.2	11.8	10.6	9.0	17.3	12.5	10.2	255
	≤12	2.7	3.0	3.0	5.9	5.3	8.9	10.4	10.7	16.6	18.3	15.4	338
	≥13	3.0	2.5	3.0	4.0	8.1	17.3	9.4	13.8	18.3	11.1	9.6	405
Lips	All	1.3	1.7	1.4	3.0	4.3	10.7	9.3	12.6	20.0	18.1	17.7	701
	Male	1.6	1.8	0.9	3.6	3.4	11.9	9.7	12.2	20.5	18.5	16.0	444
	Female	0.8	1.6	2.3	2.0	5.9	8.6	8.6	13.3	19.1	17.6	20.3	256
	≤12	1.2	2.1	1.8	3.5	4.4	7.1	9.1	10.6	19.5	19.8	20.9	339
	≥13	3.0	2.5	3.0	4.0	8.1	17.3	9.4	13.8	18.3	11.1	9.6	405
Chin	All	1.4	2.0	2.3	2.6	5.6	14.3	10.5	14.6	16.3	15.8	14.6	698
	Male	0.9	2.3	1.6	1.8	5.2	14.5	9.3	13.6	19.3	17.2	14.3	441
	Female	2.3	1.6	3.5	3.9	6.3	14.1	12.5	16.4	11.3	13.3	14.8	256

	≤12	1.2	2.4	2.4	2.4	4.4	15.6	10.3	12.7	13.9	16.5	18.3	339
	≥13	1.7	1.7	2.2	2.8	6.7	13.1	10.6	16.4	18.7	15.0	11.1	359
Teeth	All	4.9	4.5	5.2	6.5	5.6	14.1	8.5	11.8	12.2	13.8	12.8	694
	Male	3.9	4.1	4.1	6.4	5.5	14.4	8.9	13.7	11.9	15.1	12.1	438
	Female	6.7	5.1	7.1	6.7	5.9	13.7	7.8	8.6	12.9	11.8	13.7	255
	≤12	6.3	6.0	6.0	4.8	6.9	14.3	7.5	10.1	12.5	13.7	11.9	335
	≥13	3.6	3.1	4.5	8.1	4.5	13.9	9.5	13.4	12.0	13.9	13.6	359
Hair	All	2.9	1.8	1.2	3.1	2.9	7.8	7.8	10.0	17.1	20.8	24.7	683
	Male	2.8	1.9	1.2	3.0	2.8	7.9	9.1	9.8	16.1	21.2	24.2	429
	Female	3.2	1.6	1.2	3.2	3.2	7.5	5.5	10.3	19.0	20.2	25.3	253
	≤12	3.6	0.6	0.9	1.5	2.4	7.2	4.2	8.4	14.7	24.3	32.1	333
	≥13	2.3	2.9	1.4	4.6	3.4	8.3	11.1	11.4	19.4	17.4	17.7	350
Eyes	All	1.6	0.1	0.4	1.5	1.2	4.5	5.0	8.9	19.2	23.7	33.8	683
	Male	1.9	0.0	0.5	2.1	1.6	4.7	4.2	9.1	18.9	24.7	32.4	429
	Female	1.2	0.4	0.4	0.4	0.4	4.3	6.3	8.7	19.8	22.1	36.0	253
	≤12	2.1	0.3	0.9	1.5	0.3	2.4	4.2	8.1	17.7	22.2	40.2	333
	≥13	1.1	0.0	0.0	1.4	2.0	6.6	5.7	9.7	20.6	25.1	27.7	350
Ears	All	4.0	3.2	1.3	3.2	3.5	10.0	11.3	11.1	16.4	18.3	17.6	682
	Male	4.4	3.3	1.6	4.0	3.5	9.6	11.2	11.7	15.7	19.4	15.7	428
	Female	3.2	3.2	0.8	2.0	3.6	10.7	11.5	10.3	17.8	16.6	20.6	253
	≤12	4.5	3.6	1.2	2.7	3.6	8.7	9.6	10.5	15.1	18.4	22.0	332
	≥13	3.4	2.9	1.4	3.7	3.4	11.1	12.9	11.7	17.7	18.3	13.4	350
Speech	All	1.9	0.7	2.3	3.0	4.3	10.6	9.1	9.8	15.3	18.0	25.0	695
	Male	1.8	0.7	2.5	2.5	4.6	8.9	9.4	9.8	16.0	18.3	25.6	438
	Female	2.0	0.8	2.0	3.9	3.9	13.7	8.6	9.8	14.1	17.2	24.2	256
	≤12	1.8	0.6	3.3	3.3	3.3	9.2	9.5	11.6	11.9	18.4	27.3	337
	≥13	2.0	0.8	1.4	2.8	5.3	12.0	8.7	8.1	18.4	17.6	22.9	358
Hearing	All	1.6	1.7	1.7	2.3	2.9	7.6	5.5	8.9	15.4	21.7	30.6	695
	Male	1.6	2.1	1.8	2.1	2.7	6.2	5.7	9.6	15.8	20.1	32.4	438
	Female	1.6	1.2	1.6	2.7	3.1	10.2	5.1	7.8	14.8	24.6	27.3	256
	≤12	1.5	2.1	2.1	1.2	2.7	5.9	4.2	9.8	12.5	22.3	35.9	337
	≥13	1.7	1.4	1.4	3.4	3.1	9.2	6.7	8.1	18.2	21.2	25.7	358

Table 3: Rank order by gender and age

All		**Female**		**Male**		**≤12**		**≥13**	
Feature	Mean	Feature	Mean	Feature	Mean	Feature	Mean	Feature	Mean
a. Eyes	8.30	a. Eyes	8.42	a. Eyes	8.23	a. Eyes	8.46	a. Eyes	8.15
b. Hearing	7.82	b. Hearing	7.75	b. Hearing	7.86	b. Hearing	8.03	b. Hearing	7.63
c. Hair	7.52	b. c. Hair	7.55	c. Hair	7.49	b. Hair	7.95	b. c. Speech	7.37
c. Speech	7.42	c. d. Lips	7.38	c. Speech	7.49	c. Speech	7.47	c. Lips	7.14
d. Lips	7.27	c. d. Speech	7.30	d. Lips	7.21	c. Lips	7.42	c. Hair	7.11
e. Ears	6.98	d. Ears	7.16	d. e. Chin	7.07	d. Ears	7.10	c. d. Ears	6.86
e. Chin	6.92	e. Chin	6.64	d. e. f. Appearance	7.00	d. Chin	7.03	d. Chin	6.81
e. Appearance	6.79	e. f. Appearance	6.40	e. f. g. Ears	6.86	d. e. Appearance	6.84	d. Appearance	6.75
f. Nose	6.56	e. f. Face	6.38	e. g. Nose	6.78	d. e. Nose	6.80	e. Face	6.46
f. Face	6.55	f. Nose	6.11	g. Face	6.64	e. Face	6.67	e. Sideview	6.40

g. Sideview	6.37	f. Teeth	5.85	g. Sideview	6.64	f. Sideview	6.34	e. Nose	6.35
h. Teeth	6.12	f. Sideview	5.85	h. Teeth	6.26	g. Teeth	5.90	e. Teeth	6.32
i. Good Looking	5.81	g. Good Looking	4.84	h. Good Looking	6.09	h. Good Looking	5.52	f. Good Looking	5.88
Any two features without a letter (a, b, c, d, e, f, g h, i) in common are significantly different									

Table 4: Cumulative ratings by gender and age

Rating	Gender				Age			
At least one	**Female**	**Male**	***p***	**Odds**	**≤12**	**≥13**	***p***	**Odds**
0	48 (18.0%)	59 (11.9%)	.020	1.626	55 (16.1%)	52 (12.4%)	.136	1.364
0 or 1	69 (25.9%)	96 (19.4%)	.037	1.456	83 (24.3%)	82 (19.5%)	.105	1.330
0 or 1 or 2	101 (38.0%)	135 (27.3%)	.002	1.631	112 (32.8%)	124 (29.5%)	.314	1.171
0 or 1 or 2 or 3	138 (51.9%)	209 (42.2%)	.011	1.475	150 (44.0%)	197 (46.8%)	.439	0.893
0 or 1 or 2 or 3 or 4	167 (62.8%)	265 (53.5%)	.014	1.464	192 (56.3%)	240 (57.0%)	.846	0.972
10	144 (54.1%)	268 (54.1%)	.999	1.000	215 (63.0%)	198 (47.0%)	<.001	1.923
10 or 9	212 (79.7%)	381 (77.0%)	.387	1.175	288 (84.5%)	306 (72.7%)	<.001	2.041
10 or 9 or 8	245 (92.1%)	445 (89.9%)	.318	1.311	324 (95.0%)	367 (87.2%)	<.001	2.801

Table 5: Thresholds for monitoring and intervention

Group		5% - threshold for intervention	10% – threshold for monitoring
All		<= 50	51 – 63
Female	**≤12**	<= 50	51 – 59
	≥13	<= 41	42 – 53
Male	**≤12**	<= 49	50 - 61
	≥13	<= 58	58 – 64

NB: The total score of the CHASQ must be recalculated to exclude items ‘cheeks’ and ‘noticeability’ before comparison to the thresholds presented above

Supplementary Table 1: Comparison between genders (all ages) across each item

Feature	Male		Female			
	Mean	SD	Mean	SD	T	p
Appearance	7.00	2.206	6.40	2.484	-3.243	.001
Face	6.64	2.289	6.38	2.578	-1.336	.182

Sideview	6.64	2.287	5.85	2.613	-4.068	<.001
Good Looking	6.09	2.378	4.84	2.543	-4.695	<.001
Nose	6.78	2.486	6.11	2.767	-3.283	.001
Lips	7.21	2.335	7.38	2.325	0.906	.365
Chin	7.07	2.295	6.64	2.518	-2.266	.024
Teeth	6.26	2.806	5.85	3.107	-1.725	.085
Hair	7.49	2.538	7.55	2.561	0.285	.776
Eyes	8.23	2.079	8.42	1.868	1.177	.240
Ears	6.86	2.747	7.16	2.599	1.447	.149
Speech	7.49	2.449	7.30	2.506	-0.981	.327
Hearing	7.86	2.452	7.75	2.411	-0.601	.548

Supplementary Table 2: Comparison between age groups (all genders) across each item

Feature	**<=12**		**>= 13**			
	Mean	SD	Mean	SD	t	p
Appearance	6.84	2.413	6.75	2.241	0.521	.602
Face	6.67	2.570	6.46	2.233	1.143	.254
Sideview	6.34	2.642	6.40	2.244	-0.288	.773
Good Looking	5.52	2.517	5.88	2.455	-1.293	.198
Nose	6.80	2.695	6.35	2.513	2.371	.018
Lips	7.42	2.412	7.14	2.249	1.559	.119
Chin	7.03	2.446	6.81	2.329	1.210	.227
Teeth	5.90	3.053	6.32	2.793	-1.856	.064
Hair	7.95	2.476	7.11	2.546	4.358	<.001
Eyes	8.46	2.083	8.15	1.916	1.990	.047
Ears	7.10	2.811	6.86	2.581	1.142	.254
Speech	7.47	2.507	7.37	2.435	0.565	.572
Hearing	8.03	2.432	7.63	2.426	2.160	.031