
We recommend you cite the published version.
The publisher’s URL is: http://journals.sagepub.com/doi/full/10.1597/14-242

Refereed: Yes

©2017. Reprinted by permission of SAGE Publications

Disclaimer

UWE has obtained warranties from all depositors as to their title in the material deposited and as to their right to deposit such material.

UWE makes no representation or warranties of commercial utility, title, or fitness for a particular purpose or any other warranty, express or implied in respect of any material deposited.

UWE makes no representation that the use of the materials will not infringe any patent, copyright, trademark or other property or proprietary rights.

UWE accepts no liability for any infringement of intellectual property rights in any material deposited but will remove such material from public view pending investigation in the event of an allegation of any such infringement.

PLEASE SCROLL DOWN FOR TEXT.
Speech, language and reading in 10-year-olds with cleft: Associations with teasing, satisfaction with speech and psychological adjustment
Abstract

**Background:** Despite the utilisation of multidisciplinary services, little research has addressed issues involved in the care of those with cleft lip and/or palate across disciplines. The aim was to investigate associations between speech, language, reading and reports of teasing, subjective satisfaction with speech and psychological adjustment.

**Design:** Cross-sectional data collected during routine, multidisciplinary assessments in a centralised treatment setting, including speech and language therapists and clinical psychologists.

**Participants:** Children with cleft with palatal involvement aged 10 from three birth cohorts ($n = 170$) and their parents.

**Outcome measures:** Speech: SVANTE-N. Language: Language 6-16 (Sentence recall, Serial recall, Vocabulary, and Phonological awareness). Reading: Word Chain Test and Reading Comprehension Test. **Psychological measures:** Strengths and Difficulties Questionnaire and extracts from the Satisfaction with Appearance Scale and Child Experience Questionnaire.

**Results:** Reading skills were associated with self- and parent-reported psychological adjustment in the child. Subjective satisfaction with speech was associated with psychological adjustment, while not being consistently associated with speech therapists' assessments. Parent-reported teasing was found to be associated with lower levels of reading skills. Having a medical and/or psychological condition in addition to the cleft was found to impact significantly on speech, language and reading.

**Conclusions:** Cleft teams need to be aware of speech, language and/or reading problems as potential indicators of psychological risk in children with cleft. This study highlights the importance of multiple reports (self, parent and specialist) and a multidisciplinary approach to cleft care and research.

**Key Words:** Cleft lip and palate; speech; language; reading; psychological adjustment; teasing.
Introduction

The management of a child born with a cleft lip and/or palate (CL/P) can be complex, involving a range of disciplines and interconnected treatment pathways. Following the centralisation of cleft services in a number of European countries, recommendations have been made to support the implementation of multidisciplinary care (Sandy et al., 1998; Sandy et al., 2012). Many treatment centers worldwide now follow these recommendations, involving surgeons, orthodontists, speech and language therapists and psychologists, among others, within one team. This diversity of team members can provide a foundation for more complex and complete collaboration (Fox and Stone, 2013). Despite this, individuals working within multidisciplinary teams often keep to their own independent scopes of practice (Fox and Stone, 2013). Consequently, compared to the total number of studies, little research has addressed issues involved in the care of those with CL/P across disciplines.

One example of this pertains to associations between speech development, language skills, reading ability and psychological variables. Several studies have described potential problems related to the development of speech, language or reading in children with CL/P (e.g. Kuehn and Moller, 2000; Richman and Ryan, 2003; Scherer et al., 2008; Hardin-Jones and Chapman, 2011), as well as in relation to psychological, emotional and social adjustment (e.g. Turner et al., 1997; Hunt et al., 2005; Rumsey and Stock, 2013), yet potential associations across the two disciplines have received less attention.

A minority of studies in the field of CL/P have speculated on the possible overlap of these two disciplines. Early research indicated a possible link between speech...
difficulties and parent-reported behavioral problems in the child (McWilliams and Musgrave, 1972). Simonds and Heimburger (1978) found that children with CL/P and articulation difficulties were more likely to have psychiatric diagnoses, difficulties with learning and problems related to psychological and interpersonal adjustment. However, standardised measures have not been consistently used and findings have not always been replicated (Richman, 1976). More recently, Millard and Richman (2001) found an association between parent- and teacher-reported scores of depression and anxiety and speech difficulties in children with nonsyndromic cleft palate only (CP), although speech was not assessed by a speech and language therapist.

Although only a few studies have investigated the direct impact of speech, language and reading on psychological adjustment in children with cleft, some research has examined the impact of neurobiological aspects. These studies have indicated that abnormal brain structures in children with CL/P may influence cognitive function, including language and reading, in addition to behavioural and speech outcomes (Boes et al., 2007; Conrad et al., 2010; Nopoulos et al., 2010; Conrad et al., 2014).

Perceptions of teasing may be another important factor in the relationship between speech and psychological adjustment in children with CL/P. Some early studies suggested that difficulties with speech may invite negative reactions from others, resulting in psychological distress and low self-esteem in the child (Richman, 1983; Kapp-Simon et al., 1992). In self-reports, young people with CL/P have reported teasing perceived by them as related to aspects of their speech (Turner et al., 1997; Hunt et al., 2006; Noor and Musa, 2007; Havstam et al., 2011). More recently, Watterson and colleagues (2013) demonstrated an association between perceived speech problems and negative social acceptance, while subjective perceptions of
speech were also linked to broader psychological wellbeing (Berger and Dalton, 2011). The combination of self-reports and objective assessments of speech may thus provide additional insight into the relationship between speech and psychological adjustment.

Several potentially influential background or mediating factors may affect the development of speech and language skills, as well as psychological adjustment, including hearing problems, cognitive function, a different mother-tongue, cleft type and gender (Kuehn and Moller, 2000, Millard and Richman, 2001; Flynn et al., 2009; Ponduri et al., 2009; Roberts et al., 2012; Feragen et al., 2014). Cognitive function may further be related to the presence of other medical and/or psychological conditions additional to the cleft, such as learning difficulties, attention deficit/hyperactivity disorder (AD/HD), autism spectrum disorder, dyslexia, specific language impairment and developmental delay (Feragen et al., 2014). It is therefore necessary to identify such underlying factors, to the extent possible, in order to control their impact on the chosen outcome variables. This information should thus be registered and methodologically controlled when investigating language and reading skills in children with CL/P.

In summary, while deficits in speech development and reading ability have been found to be prevalent in children with CL/P, there has been less research on language development and/or how measures of language skills relate to speech and reading in this patient group (Hardin-Jones and Chapman, 2011). Further, information concerning the ways in which all three may impact upon psychological variables is scarce. In both the general population (Goodyer, 2000; Conti-Ramsden et al., 2013; Knivsberg, 2012) and in relation to children with CL/P (Berger and Dalton, 2011; Richman et al., 2012), concerns have been raised regarding the
psychological vulnerability of those with speech, reading and language difficulties. Since competency with spoken and written language is important for a child’s success both in school and beyond (Chapman, 2011), and given the value placed on educational achievement in western societies, this paucity of information is concerning. There is a need for new research, which specifically addresses the relationship between speech, reading, language and psychological adjustment, research that should take self-reported satisfaction with speech into account and involve collaborative efforts between psychologists and speech and language therapists.

The aim of the present study was to explore possible associations between psychological variables and measures of speech, language and reading, in order to explore markers of psychological risk in children with cleft. Associations were investigated between validated and objective measures of speech, language, reading and:

1) Psychological adjustment (self- and parent reports)
2) Subjective satisfaction with speech
3) Perceived teasing (self- and parent reports)

Method

Design and participants
The current study was based on multidisciplinary cross-sectional clinical data from children born with two different cleft types: cleft lip and palate (CLP) or cleft palate only (CP), aged ten at the time of routine speech, language, and psychological assessment. Norway provides centralised treatment of cleft, and most of the children
were treated according to the Oslo cleft team protocol, which involves palate repair at 12-14 months.

Three birth cohorts of children, born in 2000, 2002, and 2003, were included in the study (n = 170). Sample attrition since birth included seven children (n = 7/177): four due to death, two had moved out of the country, and one family did not want any follow-up from the team. There were 78 children with CLP and 92 with cleft palate. Further, there were 99 boys (58%) and 71 girls (42%).

Parents were 55% mothers (n = 93), 21% fathers (n = 36), or both parents together (n = 38, 22%). Three respondents (2%) were not the child’s parents, and included grandparents or foster parents.

For the first birth cohort, language and reading tests were not performed on adopted children, children that did not have Norwegian as their first language, and children with diagnosed conditions in addition to the cleft (n = 33). No measures of language and reading were administered on the 2001 birth cohort, and reading skills were not assessed for the first 23 children of the 2003 cohort, both due to changes in protocols at the time of assessments. Therefore, there is some variation in the sample size regarding some variables (see Table 1). In addition, five children were not able to undergo the routine evaluations of speech, language or reading, and/or to complete the psychological self-reported questionnaires, due to severe developmental problems.

The study conformed to guidelines provided by the local ethics committee (Region Oslo - East). Informed consent was sought from the parents of all participants (n = 170). Participation rate was 100%.
Additional conditions and difficulties

Information about the presence of an additional condition or diagnosis was collected from the child’s treatment records and/or from information provided by the parents at the time of assessment and/or by the local health services. Due to a centralised treatment setting, the child is seen by the same treatment team from birth until late adolescence, and information about the presence of other difficulties and/or diagnosed conditions are thought to be highly reliable. Additional diagnoses included a wide range of conditions, such as developmental difficulties (e.g. autism spectrum disorder, developmental delay or non-specific developmental difficulty affecting the child’s cognitive capacities and learning), AD/HD, specific language impairment (SLI), and dyslexia. Additionally, some children had a diagnosed syndrome, such as Treacher Collins, Opitz, or 22q11.2 deletion, with or without other associated difficulties, as described above. A description of the types and numbers of patients affected by other conditions are presented in Table 1.

Hearing problems

Information about previous or current hearing difficulties was drawn from the children’s case records. Children were classified according to whether they had hearing aids, and whether they still had grommets at age 10 or other hearing difficulties. Descriptives regarding hearing difficulties are found in Table 1.

Measures

Validated measures of speech, language and reading were administered by specialist speech and language therapists, while psychological measures were administered by the team’s clinical psychologists.

Speech
The Swedish Articulation and Nasality Test (SVANTE, Lohmander et. al., 2005) is a standardised test for the assessment of articulation and nasality in children with structural and/or physiological deviations such as CL/P. The measure has been developed according to international standards (Lohmander et al., 2005) and the Norwegian version (SVANTE-N) was used in the present study. The test includes assessment of words, sentences and spontaneous speech production, and is designed to systematically assess articulation and nasal resonance. In the present study, the speech therapist’s perceptual evaluation of Resonance (0-4) and Intelligibility (0-2) according to the SVANTE’s guidelines was used. All speech therapists had extensive experience evaluating children with velopharyngeal inadequacy and cleft. Both variables were dichotomized, categorizing children as having either no problems (Resonance: 0-1; Intelligibility: 0) or mild-severe problems on Resonance (2-4) and Intelligibility (1-2).

Language

Language 6-16 (Språk 6-16, Ottem and Frost, 2010) is a well-established and standardised screening test of language skills in children aged 6 to 16. Language 6-16 includes three compulsory subscales evaluating Sentence recall, Serial recall, and Vocabulary, in addition to the optional subscale Phonological Awareness. Sentence Recall measures the ability to organize and retain sentences, while Serial Recall is a measure of phonological short-term memory. Vocabulary evaluates the semantic aspects of language. The first three subscales are summarized as a Total language screening score. Phonological Awareness measures the child’s understanding of the rule-based sound system of the language. Each item is scored as correct or incorrect (0-1) and testing within a subscale is halted after three failed items. Raw scores on each subscale are converted to standard scores with a mean
of 10 and a standard deviation of 3. The Total language screening score has a mean of 100 and a standard deviation of 15. Reliability has been reported as good on all subscales ($\alpha = .71-.89$) and excellent on the Total language screening score ($\alpha = .91$). The scale has been shown to possess good content and criterion validity in addition to a coherent factor structure (Ottem and Frost, 2010). The Total Score, Sentence Recall, Serial recall, and Vocabulary of the Language 6-16 has been shown to correlate well with two of the subscales of the WISC-III (Wechsler, 1991): Verbal Comprehension and Freedom from Distractibility (Ottem, 2007).

**Reading**

The Word Chain Test (Ordkjedetesten, Høien and Tønnesen, 2007) is a well-established standardised screening test which measures phonological decoding skills in children from the age of 8. Raw scores are converted to Stanine scores (1-9), therefore with a mean of five and a standard deviation of two. Validity was deemed satisfactory, and test re-test reliability was reported to be .84 in 10-year-old children, while split-half reliability was $r = .99, p < .001$ (Høien and Tønnesen, 2007).

The Reading Comprehension Test, S-40 (Setningsleseprøven, Høien et al., 2008) is a standardised and well-established screening test of reading comprehension in children aged 9 to 16. As the Word Chain Test, raw scores are converted to Stanine scores. Internal reliability was shown to be $\alpha = .90$ in a sample of 11-12 year old children (Høien et al., 2008).

**Psychological adjustment**

**Psychological and emotional adjustment:** The Strengths and Difficulties Questionnaire (SDQ; www.sdqinfo.com; Goodman, 1997) is a screening tool for strengths and behavioural difficulties in children and adolescents. The SDQ was
completed by one or both parents and the child in the current study. The SDQ includes five subscales measuring emotional distress, conduct problems, hyperactivity/attention difficulties, peer relationship problems, and pro-social behaviour. Each subscale consists of five items that are positively or negatively worded. Each item is scored “not true”, “somewhat true” or “certainly true” (0-2). The first four subscales are summarized as a Total Difficulties Score (including in total 20 items, with scores ranging from 0-40). Internal reliability (Cronbach’s alpha) was satisfactory for the Total Difficulties Score for both the child and the parent version of the questionnaire ($\alpha = .77$ and .84) but was modest for some of the subscales: emotional distress ($\alpha = .66$ and .65), conduct problems ($\alpha = .48$ and .58), hyperactivity/attention difficulties ($\alpha = .58$ and .80), peer relationship problems ($\alpha = .51$ and .64) and prosocial behavior ($\alpha = .65$ and .62). Similar measures of reliability have been reported in previous studies (Goodman, 2001; Van Roy et al., 2008).

Subjective satisfaction with speech: The Satisfaction with Appearance Scales (SWA, developed by the Psychology Special Interest Group of the Craniofacial Society of Great Britain and Ireland) evaluates satisfaction with cleft-related and non-cleft-related parts of the face, speech, overall appearance and visibility of the cleft (Cronbach’s $\alpha = .88$ for the scale’s 15 items). Each rating is made on an interval scale of 0 to 10 where a score of 10 indicates very high levels of satisfaction. One item measures the child’s satisfaction with speech (“How satisfied are you with your speech (=the sounds you make when you speak)?”), and was used in the current study.

Self-reported teasing: Subjective experiences of teasing were measured through the Child Experience Questionnaire (CEQ, Pertschuk and Whitaker, 1982). The CEQ utilizes a five-point Likert scale to reflect the child’s self-report of positive and
negative social experiences, with high scores reflecting positive social experiences. One item measures perceived teasing and was used in the present study ("I am teased"). The child’s reports of teasing (five-point Likert scale) were further categorised into three groups: never/very seldom, sometimes, and often/very often.

Parent-reported teasing: Parents completed the Parent Questionnaire (developed by the Psychology Special Interest Group of the Craniofacial Society of Great Britain and Ireland). The questionnaire includes a question about whether the parents believe the child is currently being teased or not (dichotomy, “Has teasing or bullying been a problem for your child?”).

Statistical analysis
Analyses were performed using SPSS 22 and AMOS 22 (IBM Corp, Armonk, NY). Preliminary analyses were undertaken to investigate the role of the potentially influential background variables gender, cleft type, hearing problems, a different mother-tongue, and the presence of an additional condition on language and reading scores. In order to control for an accumulation of Type I errors, as would be the case with successive t-tests, one-way ANOVA was chosen for this purpose. Since each outcome variable was tested with regards to five background variables, F-statistics from the ANOVA are reported in range mode to enhance readability. When exploring the impact of an additional condition on objective measures of speech, chi-square tests were performed.

Following the analyses on background factors, a path analysis was used to test for the impact of language, reading, and speech on psychological adjustment and on the child’s subjective satisfaction with speech. Only the background variable having been shown to significantly impact on language and reading was included in the path
In order to keep statistical strength to a maximum, only the total scores (Total Language Screening scale and the Total SDQ score) were used, in addition to the other main variables. Following recommendations in the AMOS users' guide (Arbuckle, 2007) model fit was determined using several indices. Model fit criteria were $\chi^2$ (should not be significant), the Normed Fit Index, NFI, and the Comparative Fit Index, CFI (both should be higher than 0.95, acceptable above 0.90), the Root Mean Square Error of Approximation, RMSEA (should be lower than 0.06, acceptable if lower than 0.08), and its lower (Lo90) and upper (Hi90) ends of a 90% confidence interval.

In order to investigate the associations between speech, language, reading, and psychological measures in more detail, correlations (Pearson's $r$) were calculated for the subscales of the SDQ and language, reading, and speech. Since the subscale Phonological Awareness is not included in the Total Language Screening score, this subscale was included in these more explorative analyses.

Last, and in order to check whether experiences of teasing were related to language, reading, and speech difficulties, analysis of variance with Tukey multiple-comparison tests (self-reports), and independent sample t tests (parent reports) were performed.

**Results**

Sample characteristics and descriptives are provided in Table 1, including information about therapist-rated assessment of problems with resonance and intelligibility, and language and reading scores for the total sample.

**Preliminary analyses**
As expected, the impact of an additional condition (such as a syndrome, developmental difficulties or delay, AD/HD, SLI, and dyslexia) was highly significant on all outcome measures (Reading Comprehension: $F(7,102) = 25.47, p < .001$; Word Chain: $F(7,102) = 22.38, p < .001$; Total Language Screening: $F(7,118) = 26.50, p < .001$; Sentence Recall: $F(7,118) = 19.45, p < .001$; Serial recall: $F(7,119) = 20.82, p < .001$; Vocabulary: $F(7,118) = 15.06, p < .001$; Phonological Awareness: $F(7,111) = 28.96, p < .001$).

Analyses also indicated an association between the presence of other conditions additional to the cleft and intelligibility. While 82.3% ($n = 51$) of the children with no additional condition had normal intelligibility scores, this was only the case in approximately half of the children with an additional condition (52.8%, $n = 19$; $\chi^2 = 9.70, p < .01$). Resonance, however, was not related to the presence of conditions additional to the cleft. A total of 63.5% of the children with cleft and no additional condition had resonance scores within the normal range, compared to 52.9% of the children with an additional condition ($\chi^2 = 1.02, p > .05$).

The other background factors did not impact significantly on language and reading scores (Reading Comprehension: $F(7,102) = 0.04 - 1.70, p > .05$; Word Chain: $F(7,102) = 0.06 - 2.25, p > .05$; Total Language Screening: $F(7,118) = 0.02 - 3.75, p > .05$; Sentence Recall: $F(7,118) = 0.00 - 2.47, p > .05$; Serial recall: $F(7,119) = 0.44 - 1.26, p > .05$; Vocabulary: $F(7,118) = 0.02 - 1.17, p > .05$; Phonological Awareness: $F(7,111) = 0.09 - 2.67, p > .05$).

Since none of the background factors impacted significantly on the variables, except for the presence of an additional condition, only this last variable was taken into account in the subsequent analyses. Associations were not expected to differ...
according to whether the child had or did not have a condition additional to the cleft. In order to check for this assumption, all analyses were run separately for children with and without an additional condition in preliminary analyses. Results indicated that the associations between the variables were not consequently affected by differences in means. Subsequent analyses were therefore presented for the total sample, in order to increase statistical strength.

Associations between speech, language, reading and psychological variables

Self-reported psychological adjustment

The hypothesized model (Model 1) of potential associations between language, reading, speech and psychological variables was tested in AMOS. Goodness-of-fit statistics indicated a moderate fit ($\chi^2 (15, n = 170) = 27.84, p = .023; \text{CFI} = 0.92; \text{NFI} = 0.86; \text{RMSEA} = 0.071, \text{Lo90} = 0.026, \text{Hi90} = 0.112$). The path analysis revealed that some regression weights were not statistically significant (Intelligibility and subjective satisfaction with speech; Total language screening score and the SDQ Total score). Therefore, in the corrected model (Model 2), these two associations were deleted. Goodness-of-fit statistics indicated a better fit ($\chi^2 (17, n = 170) = 28.94, p = .035; \text{CFI} = 0.93; \text{NFI} = 0.86; \text{RMSEA} = 0.064, \text{Lo90} = 0.017, \text{Hi90} = 0.104$). The path estimates and explained variances are provided in Figure 1. As also demonstrated through the preliminary analyses, all path estimates between the presence of an additional condition and measures of speech, language and reading were highly significant ($p < .001$). In addition, and as expected, there were clear associations between language scores and assessments of reading ($p < .001$). However, while language scores did not directly predict self-reports of psychological adjustment, reading skills did ($p < .05$). Further, problems with resonance were positively correlated with intelligibility ($p < .001$), and negatively with the child’s self-
reported satisfaction with speech ($p < .05$). However, only 7% of the variance in subjective satisfaction with speech was explained by objective measures of speech ($R^2 = .07$). Lastly, subjective satisfaction with speech was associated with psychological adjustment ($p < .01$). In summary, 20% of the variance in psychological adjustment was directly explained by reading skills and the child’s subjective satisfaction with speech, and indirectly by language development and objective measures of speech ($R^2 = .20$).

**Parent-reported psychological adjustment**

The same hypothesized model as for self-reports was tested in AMOS, indicating less satisfactory goodness-of-fit statistics than for self-reports ($\chi^2 (13, n = 170) = 34.35, p = .001; \text{CFI} = 0.88; \text{NFI} = 0.84; \text{RMSEA} = 0.099, \text{Lo90} = 0.059, \text{Hi90} = 0.139$). The path analysis revealed several non-significant regression weights in the original model. No significant associations were found between Resonance, Language Screening, Intelligibility, Subjective satisfaction with speech, and the SDQ. In addition, the link between Intelligibility and Subjective satisfaction with speech was also non-significant. Therefore, in the corrected model (Model 2), these associations were deleted. Goodness-of-fit statistics were recalculated, and indicated a slightly better fit, however still moderate ($\chi^2 (18, n = 170) = 34.44, p = .003; \text{CFI} = 0.88; \text{NFI} = 0.82; \text{RMSEA} = 0.082, \text{Lo90} = 0.046, \text{Hi90} = 0.118$). Since language, reading and objective speech assessments were the same as in the model that tested self-reported adjustment, path estimates and explained variances for these variables are the same as those in Figure 1. The main difference between the model based on self-reports compared to parent reports was that the child’s subjective satisfaction with speech did not predict parent-reported psychological adjustment ($p > .05$). A minor difference was also found in the strength of associations between reading and
parent reported psychological adjustment (Reading Comprehension = -.22; Word Chain test = -.26; p < .05). In summary, 15% of the variance in parent-reported psychological adjustment was directly explained by reading skills, and indirectly by language development. There were no significant associations between objective measures of speech and psychological adjustment according to parent reports (p > .05).

Subscales of the SDQ: Associations with language, reading and speech

In order to further investigate the impact of language, reading, and speech difficulties on psychological adjustment, correlations including the SDQ’s subscales (emotional, cognitive, behavioural and social adjustment) were calculated. Results for self-reports are given in Table 2, while the results for the parent reports are found in Table 3. The Total Score of the SDQ was significantly associated with language and reading subscales for self-reports \((r = -.20\) to \(-.27)\) and parent reports \((r = -.19\) to \(-.33)\). A similar pattern was evident for self-reported Emotional Distress \((r = -.23\) to \(-.25)\), and parent-reported Social Difficulties \((r = -.23\) to \(-.27)\). Interestingly, measures of language and reading correlated with neither parent-reported Emotional Distress nor self-reported Social Difficulties. The Language Screening Total score was also associated with problems of attention and/or hyperactivity based on both self-reports \((r = -.22\) to \(-.24)\) and parent reports \((r = -.22\) to \(-.36)\).

As can be seen from Tables 2 and 3, the associations between the objective speech variables and the SDQ were non-significant for all subscales, except for the associations between Intelligibility and parent-reported Total Problem Scores \((r = .22, p < .05)\) and Social Difficulties \((r = .31, p < .01)\). Subjective satisfaction with speech on the other hand, correlated significantly in self-reports for all subscales on
the SDQ except Social Difficulties. There were no significant associations between the parent-reported SDQ and the child’s subjective evaluations of speech.

**Teasing: self- and parent reports**

Most children reported no or very few experiences of teasing (79.1%, n = 76), while 17.7% (n = 17) described it to happen sometimes. Only 3.1% (n = 3) of the children said they were teased often or very often. According to parent reports, 65.8% (n = 73) were not teased, while 34.2% had experienced teasing (n = 38). Self- and parent reports of teasing correlated relatively well ($r = .51$, $p < .01$, $n = 109$).

As can be seen in Table 4, the more reported teasing, the lower language and reading skills, except for Reading Comprehension. Children reporting frequent and repeated teasing had language and reading scores (Word Chain Test) within the lower the normal range or below, while children who said they were never or seldom teased had language and reading scores within the normal range. However, Tukey Post Hoc analyses revealed that none of these differences were statistically significant.

Associations between parent-reported teasing and language and reading skills are provided in Table 5 and reveal that children who were teased had lower scores on both reading tests. However, differences were only statistically significant for the Word Chain test ($t (92) = 2.05$, $p < .05$). There were no differences in language scores between the two groups.

There seemed to be fewer problems with intelligibility in children who reported little or no teasing (Table 4). However, this difference was not statistically significant, and the mean score for those few children reporting repeated teasing indicated only mild problems with intelligibility in this group. There were no associations between parent
reports of teasing and intelligibility. Calculations of means regarding resonance was
neither associated with self-reported (Table 4) nor parent-reported teasing (Table 5).

Subjective satisfaction with speech was significantly associated with parent-reported
teasing (t(86) = 2.53, p < .05), while the differences between the groups in self-reported teasing were not statistically significant. However, children reporting teasing
‘sometimes’ were less satisfied with their speech than children who did not
experience any or almost any teasing. Unexpectedly, the few children (n = 3) reporting repeated teasing were very satisfied with their speech.

Discussion
This study explored associations between speech, language, reading and
psychological adjustment, including measures of teasing and subjective satisfaction
with speech. Self-reports, parent-reports and assessments carried out by specialist
speech and language therapists and clinical psychologists were included. Analyses
indicated associations between reading skills and psychological adjustment, as well
as associations between subjective satisfaction with speech and psychological
adjustment. Further, results indicated a possible association between experiences
of teasing and some measures of language, reading and speech. Differences
between ‘objective’ assessments and subjective reports were observed.

Language, reading, and psychological adjustment
While problems with language were not directly related to psychological adjustment
in the path analysis, difficulties with reading (both self- and parent report) were. This
finding may point to the importance placed on reading skills in western societies.
According to the correlational analysis, language and reading were associated with emotional difficulties (self-report), social problems (parent-report) and difficulties with attention/hyperactivity (self- and parent reports).

In a society where literacy is a highly valued skill, children’s feelings of competence and emotional well-being may be shaped by the comparisons they make between themselves and others (Burden, 2008). As the present findings suggest, difficulties in language and reading may subsequently contribute to emotional distress. Self-reported emotional difficulties have also been linked to language and reading skills in the general population (Arnold et al., 2005; Terras et al., 2009) and although little is known about the underlying factors, several hypotheses have been offered (Maughan and Carroll, 2006). For example, co-morbidity may be explained by common risk factors, such as neurobiological factors, but also by a causal link, whereby reading difficulties may increase the likelihood of emotional problems. Another hypothesis proposes attentional deficits as a potential underlying factor (Carroll et al., 2005). Although the cross-sectional design of the present study prevents us from drawing conclusions about causality, the findings confirm that psychological variables, such as emotional adjustment and attention, are associated with language and reading skills, which could be related to underlying neurobiological components (Richman and Ryan, 2003; Nopoulos et al., 2010; Conrad et al., 2014).

**Speech problems and psychological adjustment**

The path analysis indicated that participants’ subjective satisfaction with speech was not associated with the speech therapists’ assessments of intelligibility, or with objective measures of language and reading. This is in line with Conrad et al. (2014) who did not find associations between reading and measures of speech, and with
Havstam et al. (2008), who only found weak associations between subjective and ‘objective’ measures of speech in adults with a cleft. However, a significant association was found between the speech therapist’s assessment of resonance and the child’s satisfaction with speech, suggesting that children with CL/P may be aware of potential hypernasality in their speech at age 10.

The only ‘objective’ speech variable that correlated with psychological measures according to correlational analyses was intelligibility, which was associated with parent-reported general psychological difficulties and social problems. This association could suggest a psychological vulnerability in cases of certain cleft-related speech problems. However, this association was not confirmed in the path analysis, which may be due to other variables not accounted for in the correlational analyses. This finding could, for example, be related to and/or partly explained by the relationship between intelligibility and the presence of an additional condition, where a higher frequency of children with an additional condition had problems related to intelligibility. This relationship was supported by the path analysis and has also been reported in a previous study (Persson et al., 2002). It could be that the presence of an additional condition moderates the associations between intelligibility and social risk. Future research is needed in order to further examine the associations between an additional condition, intelligibility, and psychological risk.

**Teasing: self-reports and parent reports**

While mean scores indicated an association between the child’s experience of being teased and lower scores on measures of language, reading and speech, few of these associations were found to be significant. This may be due in part to the relatively small number of children reporting repeated experiences of being teased.
One of the measures of reading skills did vary significantly with parent-reported teasing, an association that has been reported in a non-cleft sample (Terras et al., 2009). However, according to the present study’s parent reports, mean reading scores for children who were teased were still within the normal range, indicating that parent reported teasing was probably not related to poor reading skills. Self-reported teasing, on the other hand, was associated with language and reading difficulties, possibly reflecting the child’s awareness of problems with communication and their potential consequences on social interaction and experiences.

In relation to speech, ‘objective’ measures of intelligibility and resonance were not significantly associated with reports of negative social experiences, in line with a previous study on children with CL/P (Murray et al., 2010). In contrast, a recent study found an association between problems of resonance and expected negative social judgements (Watterson et al., 2013), which could further be indicative of teasing experiences. Similarly, several previous studies have reported a strong association between subjectively measured speech problems and self-reported teasing (Turner et al., 1997; Hunt et al., 2006), while other studies have investigated patient’s belief about the source of teasing, pointing to speech difficulties as a potential vulnerability factor (Semb et al., 2005; Noor and Musa, 2007; Havstam et al., 2011).

The present results illustrate the complex relationship between subjective and objective outcome measures. Perceptions of teasing may be coloured by the child’s psychological vulnerability or strength (Snyder and Pope, 2003). Questions by peers or strangers about the cleft may be experienced as teasing by a vulnerable child, while a more secure child will interpret it as positive curiosity or as a simple question
(Feragen et al., 2009; Shavel-Jessop and Shearer, 2013). In addition, children who are aware of poor language or reading skills may feel socially vulnerable, a susceptibility that could be potentially strengthened if the child feels uncomfortable about a visible and/or audible difference due to CL/P. In addition, the results highlight the importance of independent observers, since the children’s subjective experiences may differ from those reported by their parents (Turner et al., 1997), as was shown in the present study. More research is needed in order to further explore the relationships between language and reading skills, speech quality, and social vulnerability, recognised by both the parents and the child in the present study.

The influence of background variables

Several children participating in this study had one or more conditions in addition to the cleft, such as learning difficulties, attention deficit/hyperactivity disorder (AD/HD), autism spectrum disorder, dyslexia, specific language impairment and developmental delay. Preliminary and path analyses demonstrated the high prevalence and significant influence of an additional condition on measures of language, reading and intelligibility. While the present study did not primarily aim to investigate the impact of additional conditions, previous research has reported a relationship between these types of conditions and speech, psychological and academic outcomes (Persson et al., 2002; Feragen et al., 2014; Knight et al., in press).

Consequently, the role of additional conditions should be considered when examining the results from the present study. The findings point to a potential double-association between psychological vulnerability and problems of language, reading and intelligibility in this subgroup of children with CL/P, as has been documented in the non-cleft population (Bishop, 2009). Since children with
conditions in addition to the cleft have been shown to be a potentially vulnerable subgroup in other cleft samples (Persson et al., 2002; Feragen and Stock, 2014; Knight et al., in press), the possibility of this factor being of central importance also for language and reading skills in children with CL/P should be considered and discussed in future studies. In addition, the impact of an additional condition on speech variables requires further investigation. Recent neuropsychological research has investigated associations between brain structure and behavioural outcomes in young people with cleft (Conrad et al., 2010; Nopoulos et al., 2010). More specifically, Conrad et al. (2014) reported an association between cerebellum size and problems with articulation in boys. The authors ask whether underlying variables that were not measured could explain this relationship. The findings of the present study suggest that the presence of an additional condition could potentially be a confounding variable in the development of speech, language, and reading. A better understanding of this potentially critical background variable would help us distinguish which outcomes are related to the cleft and which are associated with having an additional condition(s). The findings of the current study also emphasise the need to identify additional difficulties as early as possible to facilitate the initiation of appropriate interventions.

The impact of other potentially influential background variables such as gender, cleft type, different mother-tongue, hearing difficulties and secondary surgery were not found to significantly affect results. However, these variables may require further investigation, since associations with speech and language have been identified within the cleft population (for a review, see Kuehn and Moller, 2000). In the present study, these variables represented small subsamples, and thus individual variations may explain the non-significant findings.
Clinical implications

The associations between language and reading, and their potential impact on emotional and social development, suggest that speech therapists and psychologists, in addition to other health professionals, teachers and parents, should be particularly alert to potential psychological difficulties in children with CL/P who have language and reading difficulties. This suggestion also applies in some respect to problems related to ‘objective’ ratings of intelligibility. In addition, the child’s subjective satisfaction with speech may be a useful indicator of psychological risk, at least in relation to self-reported psychological adjustment.

The differences observed between self- and parent reports, as well as between ‘objective’ and subjective measures are interesting. Discrepancies between self- and parent reports have been described previously when using the SDQ (Van Roy et al., 2010). Such findings may be due to parents having a greater capacity than children to observe and identify social problems, while emotional difficulties may not be apparent to anyone other than the affected person. In addition, ‘objective’ measures of speech were not significantly associated with psychological adjustment, while participants’ subjective ratings of speech were. These differences highlight the importance of including multiple perspectives during clinical assessments, in order to capture the complexity of perceptions of psychological adjustment.

The results of the present study illustrate the importance of a multidisciplinary approach to the treatment of children with CL/P, including the monitoring of speech, language and reading skills and the assessment of psychological adjustment. In addition, and given the variation in levels of care provided within some cleft teams across and within countries (Fox and Stone, 2013; Scott et al., in press 2014), the identification of variables other than those pertaining to psychological adjustment
that could identify children with cleft as being at risk are valuable and would allow a more targeted allocation of limited resources.

**Strengths and limitations**

One of the strengths of the present study was that information was drawn from three almost-complete birth cohorts, with a participation rate of 100%. Due to centralised treatment, the sample can be expected to be representative of the population under study. Furthermore, the sample was able to shed light on the potentially vulnerable subsample of children with associated conditions, raising awareness about those potentially at risk for speech, language, and reading problems, in addition to potential psychological risk. Furthermore, the restricted age range reduced the possible confounding variable of developmental stage. Another strength was the use of validated instruments regarding language, reading and psychological adjustment. In addition, speech was assessed both subjectively and rated by trained speech and language therapists, providing a double-perspective on potential speech problems. Additionally, psychological outcome measures were completed by both the children and the parents, also strengthening the findings. The multidisciplinary approach, linking validated measures of speech and language skills with psychological adjustment, also add value to the present study.

Nevertheless, several limitations also have to be considered. First, without a control group allowing for comparisons with the general population, it is difficult to tease apart which findings may apply specifically to children with CL/P. Nonetheless, few studies have addressed the potential impact of speech, language and reading on psychological variables, and thus the present study offers an important step on the way to improved knowledge. Second, while information about hearing was provided and controlled for, the cross-sectional nature of the study meant that information was
missing in some cases. More detailed and specific information about hearing
difficulties are warranted. Further, future studies should also aim to include other
cleft-related disciplines, such as surgeons and orthodontists, in order to provide a
holistic perspective. A third limitation was related to the use of national measures of
language and reading, restricting comparisons between studies carried out in other
countries. The psychological outcome measure, however, is broadly used
internationally. Fourth, only two measures of objective speech evaluations were
included, and speech was assessed by the child’s speech therapist only, impeding
calculations of internal reliability. Another measurement issue was that information
about teasing was provided by one item only in both self-reports and parent reports.
However, issues related to teasing and negative social experiences are discussed in
depth with the child during the psychological routine assessment when needed, and
are therefore believed to reflect the child’s perception of his or her social
experiences. Finally, language assessments did not include tests of reading ability in
the first birth cohort, due to different team routines at the time. Nonetheless, all
measures were available for two complete birth cohorts. A final limitation was the
lack of demographic information such as socio-economic status. However, the
potential impact of such demographic information on the results was considered to
be low, given that SES and educational level are expected to have a reduced impact
in Norwegian samples than in many other Western societies (Heiervang et al., 2008).
Nevertheless, future research should aim to include such information.

Conclusions

Associations were identified between language, reading, speech and psychological
adjustment. The findings confirm the need to include both self- and parent reported
measures, in order to capture multiple perspectives in research and clinical
assessments. Cleft teams, in addition to teachers and local health services, should be aware of co-variations between problems with speech, language, reading and psychological difficulties, in order to identify potentially vulnerable children and maximise the likelihood of appropriate treatment and interventions. Future and longitudinal studies should examine cross-discipline associations further, in order to gain a better understanding of which interventions may be the most suitable.

References


Berger ZE, Dalton LJ. Coping with a cleft II: Factors associated with psychosocial adjustment of adolescents with a cleft lip and palate and their parents. Cleft Palate Craniofac J. 2011;48:82–90.


Feragen KJB, Stock NM. When there is more than a cleft: psychological adjustment when a cleft is associated with an additional condition. *Cleft Palate Craniofac J*. 2014;51:5-14.


Heiervang E, Goodman A, Goodman R. The Nordic advantage in child mental health: Separating health differences from reporting style in a crosscultural


Sandy J, Rumsey N, Persson M, Waylen A, Kilpatrick N, Ireland T, Ness A. Using service rationalisation to build a research network: Lessons from the


Figure 1. Standardised path estimates for Model 2 exploring associations between validated measures of language, reading, speech and two psychological outcome variables: self-reported satisfaction with speech and self-reported psychological adjustment on the Strength and Difficulties Questionnaire (SDQ, Total score).

Note to the figure: Additional condition (No=0; Yes=1); Language and reading: Lower scores indicate more problems; Resonance and Intelligibility: Higher scores indicate more problems; SDQ: Higher scores indicate more problems; Subjective satisfaction with speech: Lower scores indicate less subjective satisfaction.
Table 1. Study sample \((n = 170)\) with demographic and background variables, in addition to means for measures of speech, language and reading.

<table>
<thead>
<tr>
<th>Cleft type</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleft lip and palate</td>
<td>78/170</td>
<td>45.9</td>
</tr>
<tr>
<td>Cleft palate</td>
<td>92/170</td>
<td>54.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>99/170</td>
<td>58.2</td>
</tr>
<tr>
<td>Girls</td>
<td>71/170</td>
<td>41.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional conditions(^1)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syndrome</td>
<td>24/170</td>
<td>14.1</td>
</tr>
<tr>
<td>Developmental difficulties</td>
<td>24/166</td>
<td>14.5</td>
</tr>
<tr>
<td>AD/HD</td>
<td>19/170</td>
<td>11.7</td>
</tr>
<tr>
<td>SLI and/or dyslexia</td>
<td>15/170</td>
<td>9.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adopted children</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopted children</td>
<td>13/170</td>
<td>7.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Different first mother-tongue</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different first mother-tongue</td>
<td>21/170</td>
<td>12.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hearing problems(^2)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing aids</td>
<td>7/157</td>
<td>4.5</td>
</tr>
<tr>
<td>Grommets &lt; age 10</td>
<td>98/129</td>
<td>76.0</td>
</tr>
<tr>
<td>Grommets at age 10</td>
<td>5/116</td>
<td>4.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary surgery</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery before age 10</td>
<td>47/139</td>
<td>33.8</td>
</tr>
<tr>
<td>Waiting list for surgery</td>
<td>4/170</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resonance</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No difficulties</td>
<td>58/97</td>
<td>59.8</td>
</tr>
<tr>
<td>Mild problems</td>
<td>31/97</td>
<td>32</td>
</tr>
<tr>
<td>Moderate/severe</td>
<td>8/97</td>
<td>8.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intelligibility</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No difficulties</td>
<td>70/98</td>
<td>71.4</td>
</tr>
<tr>
<td>Mild problems</td>
<td>24/98</td>
<td>24.5</td>
</tr>
<tr>
<td>Moderate/severe</td>
<td>4/98</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Comprehension</td>
<td>109/114</td>
</tr>
<tr>
<td>Word Chain Test</td>
<td>109/114</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>129/137</td>
<td>93.4 (15.91)</td>
</tr>
<tr>
<td>Phonological awareness</td>
<td>122/137</td>
<td>9.0 (3.12)</td>
</tr>
</tbody>
</table>

Note: Due to some missing data, information about sample size is specified for each variable.

\(^1\) The number of children with a specific condition does not add up to the total number of children with an additional condition since a) some children had more than one additional condition, and b) some children with a diagnosed syndrome did not have any other associated difficulties.

\(^2\) Children with hearing aids and grommets at age 10 were included in the group called Hearing problems.
Table 2. Subscales of the Strengths and Difficulties Questionnaire (self-reports): Correlations with measures of reading, language and speech.

<table>
<thead>
<tr>
<th></th>
<th>Total score</th>
<th>Emotional</th>
<th>Conduct</th>
<th>Attention</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>-.28**</td>
<td>-.23*</td>
<td>-.18</td>
<td>-.22*</td>
<td>-.10</td>
</tr>
<tr>
<td>Word Chain</td>
<td>-.27**</td>
<td>-.19</td>
<td>-.16</td>
<td>-.24*</td>
<td>-.13</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Language Screening</td>
<td>-.20*</td>
<td>-.25**</td>
<td>-.09</td>
<td>-.02</td>
<td>.17</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>-.27**</td>
<td>-.13</td>
<td>-.26**</td>
<td>-.24*</td>
<td>-.13</td>
</tr>
<tr>
<td><strong>Speech</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resonance</td>
<td>.05</td>
<td>.00</td>
<td>.02</td>
<td>.01</td>
<td>.13</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>.14</td>
<td>.09</td>
<td>.01</td>
<td>.08</td>
<td>.21</td>
</tr>
<tr>
<td>Subjective speech (self-report)</td>
<td>-.29**</td>
<td>-.20*</td>
<td>-.23*</td>
<td>-.21*</td>
<td>-.15</td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < .01.
Table 3. Subscales of the Strengths and Difficulties Questionnaire (parent reports): Correlations with measures of reading, language and speech.

<table>
<thead>
<tr>
<th></th>
<th>Total score</th>
<th>Emotional</th>
<th>Conduct</th>
<th>Attention</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>-.32**</td>
<td>-.16</td>
<td>-.21*</td>
<td>-.36***</td>
<td>-.16</td>
</tr>
<tr>
<td>Word Chain</td>
<td>-.33**</td>
<td>-.13</td>
<td>-.21*</td>
<td>-.33**</td>
<td>-.23**</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Language Screening</td>
<td>-.23**</td>
<td>-.11</td>
<td>-.21*</td>
<td>-.17</td>
<td>-.27**</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>-.19*</td>
<td>-.03</td>
<td>-.10</td>
<td>-.22*</td>
<td>-.19</td>
</tr>
<tr>
<td><strong>Speech</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resonance</td>
<td>.17</td>
<td>.05</td>
<td>.14</td>
<td>.19</td>
<td>.12</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>.22*</td>
<td>.12</td>
<td>.02</td>
<td>.17</td>
<td>.31**</td>
</tr>
<tr>
<td>Subjective speech (self-reports)</td>
<td>-.10</td>
<td>-.07</td>
<td>-.10</td>
<td>-.09</td>
<td>-.04</td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < .01, ***p < .001.
Table 4. Self-reported experiences of teasing, with corresponding means (M) and standard deviations (SD), on validated measures of language, reading, and speech, in addition to subjective satisfaction with speech.

<table>
<thead>
<tr>
<th></th>
<th>Never/seldom</th>
<th>Sometimes</th>
<th>Often/very often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>Reported teasing (self-reports)</td>
<td>79.1 (76)</td>
<td>17.7 (17)</td>
<td>3.1 (3)</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Language score</td>
<td>95.1 (14.21)</td>
<td>87.1 (21.08)</td>
<td>78.0 (25.71)</td>
</tr>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>5.0 (1.75)</td>
<td>4.5 (2.24)</td>
<td>6.0 (0.00)</td>
</tr>
<tr>
<td>Word Chain Test</td>
<td>6.1 (1.79)</td>
<td>5.7 (1.80)</td>
<td>4.0 (1.41)</td>
</tr>
<tr>
<td><strong>Speech</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resonance</td>
<td>.47 (.65)</td>
<td>.43 (.51)</td>
<td>1.0 (0.00)</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>.24 (.47)</td>
<td>.46 (.52)</td>
<td>1.0 (0.00)</td>
</tr>
<tr>
<td>Subjective speech (self-reports)</td>
<td>8.3 (2.13)</td>
<td>7.9 (2.92)</td>
<td>10.0 (0.00)</td>
</tr>
</tbody>
</table>

Note: Tukey Post hoc analyses between groups were all non-significant.
Table 5. Parent reported experiences of teasing, with corresponding means (M) and standard deviations (SD), on validated measures of language, reading, and speech, in addition to subjective satisfaction with speech.

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>Reported teasing (parent reports)</td>
<td>65.8 (73)</td>
<td>34.2 (38)</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Language score</td>
<td>93.4 (16.61)</td>
<td>91.8 (16.38)</td>
</tr>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>5.1 (1.79)</td>
<td>4.5 (2.11)</td>
</tr>
<tr>
<td>Word Chain Test</td>
<td>6.0 (1.90)</td>
<td>5.1 (1.88)</td>
</tr>
<tr>
<td><strong>Speech</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resonance</td>
<td>.46 (.65)</td>
<td>.54 (.58)</td>
</tr>
<tr>
<td>Intelligibility</td>
<td>.34 (.52)</td>
<td>.35 (.56)</td>
</tr>
<tr>
<td>Subjective speech (self-reports)</td>
<td>8.6 (1.85)</td>
<td>7.4 (2.53)</td>
</tr>
</tbody>
</table>

Note: * p < .05.