

Peer attitudes towards adolescents with speech disorders due to cleft lip and palate

Cassandra Alighieri ^{a,*}, Ymke Haeghebaert ^a, Kim Bettens ^a, Jolien Verbeke ^a, Imke Kissel ^a, Evelien D'haeseleer ^{a,b}, Iris Meerschman ^a, Rani Van Der Sanden ^a, Kristiane Van Lierde ^{a,b,c}

^a Department of Rehabilitation Sciences, Center for Speech and Language Sciences (CESLAS), Ghent University, Ghent, Belgium

^b Department of Otorhinolaryngology, Ghent University Hospital, Ghent, Belgium

^c Department of Speech-Language Therapy and Audiology, University of Pretoria, Pretoria, South Africa

* Corresponding author. Corneel Heymanslaan 10, 9000, Ghent, Belgium. Shared first authorship. Email: Cassandra.Alighieri@UGent.be

Abstract

Background and aims: Individuals with speech disorders are often judged more negatively than peers without speech disorders. A limited number of studies examined the attitudes of adolescents toward peers with speech disorders due to a cleft lip with or without a cleft of the palate (CL ± P). Therefore, the aim of the present study was to investigate the attitudes of peers toward the speech of adolescents with CL ± P.

Method: Seventy-eight typically developing adolescents (15–18 years, 26 boys, 52 girls) judged audio and audiovisual samples of two adolescents with CL ± P based on three attitude components, i.e., cognitive, affective, and behavioral. The degree of speech intelligibility was also scored by their peers. The study investigated whether the three attitudes were determined by speech intelligibility or appearance of an individual with CL ± P. Furthermore, the influence of knowing someone with a cleft, the age, and gender of the listeners on their attitudes were explored.

Results: A significantly positive correlation was found between the speech intelligibility percentage and the three different attitude components: more positive attitudes were observed when the speech intelligibility of the speaker was higher. A different appearance due to a cleft lip does not lead to more negative attitudes. Furthermore, boys seem to have more negative attitudes toward individuals with CL ± P compared to girls.

Conclusion: This study provided additional evidence that peers show more negative attitudes toward adolescents with less intelligible speech due to CL ± P. Intervention should focus on changing the cognitive, affective, and behavioral attitudes of peers in a more positive direction and remove the stigma of patients with a cleft. Further research is needed to verify these results.

Keywords: Cleft lip and palate; Attitudes; Adolescents; Speech intelligibility; Appearance

1. Introduction

One of the most common congenital birth defects is a cleft of the lip with or without a cleft of the palate (CL ± P) [1]. The anatomical and/or physiological defects, caused by this condition, can result in many impediments, especially speech impairments, feeding difficulties, hearing problems, and dental malformations [2,3]. Besides, individuals often experience psychosocial problems and are dissatisfied and stigmatized by their appearance. This is more common in individuals with a cleft of the lip (CL) [4]. Patients with a cleft of the palate (CP) may also present with velopharyngeal insufficiency (VPI), even after primary palatal closure [5]. VPI affects speech, swallowing, and various psychosocial aspects of life [6].

Because of these various health problems, children with a CL ± P receive interdisciplinary treatment that begins during childhood [7]. Having a visible difference may cause huge challenges in the child and adulthood [8,9]. Appearance and attractiveness play an important factor in the creation of friendship or a romantic relationship [10]. Facial symmetry has been discussed as a main feature of attractiveness [11]. It has been reported that humans are sensitive to different levels of symmetry in faces and that they generally find symmetric faces more attractive than asymmetric faces [11]. People with CL ± P, often have an asymmetric face even after primary surgery [12]. Literature has demonstrated that individuals with CL ± P were rated as less attractive [11,[13], [14], [15], [16]].

Considering the aesthetic impact of CL ± P, many children with CL ± P experience psychosocial stress as a result of their condition [3,4]. In the study by Meyer-Marcotty, Gerdes [17] participants were presented photos of the faces of individuals with a cleft lip and palate (CLP). These photos were rated as less attractive, less symmetrical, and had a lower score on the attractive scale in comparison with photos of individuals without CLP. Additionally, Quast, Batschkus [18], where also photos of CLP adolescents were rated, found similar results. Literature has reported that these aesthetic differences in children with CLP often induce a high incidence of teasing [[19], [20], [21]].

In addition to appearance, listeners form attitudes and make judgments about a person's age, health, social status, and educational status based solely on his or her speech characteristics [22]. A number of studies reported that individuals have negative perceptions of individuals with speech disorders, such as voice or resonance disorders [[23], [24], [25]]. Knowledge about peer attitudes is relevant because individuals with CL ± P will interact in their everyday lives with peers and form important relationships [26]. The International Classification of Functioning, Disability, and Health (ICF) emphasizes the complex interaction between a patient's health condition and environmental factors (i.e., patient's activities and participation) [27]. Peer attitudes are considered one of the most important environmental factors that could either facilitate or create a barrier to the overall social functioning and participation of an individual with speech problems [27]. The attitudes of peers are crucial in the rehabilitation process and are included in the American Speech-Language-Hearing Association (ASHA) conceptual framework for the treatment of speech and language disorders (American Speech-Language-Hearing Association, 2007).

Attitudes consist of three different dimensions: an affective component (i.e., the assessor's feelings toward the referent), a cognitive component (i.e., the focus on the attribution), and a behavioral component (i.e., the behavior of a person toward someone else) [28]. In the past, several studies have demonstrated that peers have negative attitudes toward children with CL ± P and unintelligible speech [26,29]. Reduced intelligibility is often present in the speech

of individuals with cleft palate [30]. Bettens, Alighieri [29] concluded that peers from elementary school showed a more negative attitude toward children with a cleft palate with or without a cleft lip with less intelligible speech. When a child was better understood, more positive attitudes were measured. Lee et al. (2017) investigated the attitudes of peers toward speech intelligibility in children with CLP. This study showed that children who were less intelligible were perceived as less healthy, less good-looking, and probably had no or fewer friends. Similarly, children with speech complications or hearing difficulties may be more difficult to understand, provoking a higher risk of rejection by their peers (Stock & Rumsey, 2013).

Attitudes toward CL ± P can be partially modified [31]. Chan, McPherson [31] concluded that getting in touch with someone with a cleft has a positive effect on the attitudes of adults. In addition, providing information about clefts has a positive impact on the attitudes of children and adolescents [31]. A combination of providing information and personal contact with a person with a cleft can significantly change the attitudes of children [32].

The influence of age and gender toward peer attitudes remains unclear. Werner, Peretz [33] showed that younger children report more negative attitudes. Similar results were found in the study of Bettens, Alighieri [29]. Moreover, a systematic review of Boer, Pijl [34] showed that older students held more positive attitudes toward peers with disabilities [35,36]. Students become more accepting when their knowledge and understanding of peers with disabilities increase [34]. This is in contrast with the study of Swaim and Morgan (2001) who found that younger students were more positive toward peers with disabilities. In terms of gender, the results described in the literature are inconsistent. In various studies, girls appear to have a more positive attitude toward peers with a mental and/or physical disability [34,36,38,39]. This trend also applies to articulation disorders [40,41] and stuttering [42]. In contrast, Evans, Healey, Kawai & Rowland (2008) did not find any significant difference in the perception of boys and girls (10–14 years) when they rated peers who stutter. Even though there was a disagreement in the literature, studies that have investigated the impact of age and gender on the attitudes of peers toward adolescents with CL ± P are limited.

Previous studies mainly focused on peer attitudes toward children with CL ± P. There is a lack of research investigating the peer attitudes of adolescents and young adults with CL ± P. Okkerse, Beemer [44] analyzed how students (22–27 years old) judged facial attractiveness and facial impairment in children with and without a craniofacial disorder. This study showed that attractiveness and other social variables were scored significantly more negatively in children with a craniofacial abnormality. Information regarding the attitudes of peers toward adolescents with CL ± P can be of interest to compose appropriate interventions, including educational strategies to enhance adolescents understanding and tolerating differences and difficulties in other adolescents. During adolescence, the influence of peer groups increases as peer affiliations become even more important in their lives [45,46].

Considering that there is a lack of research investigating the attitudes of adolescents, the purposes of the current study were (1) to investigate if there existed any difference between the cognitive, affective, and behavioral attitudes of peers when confronted either with only audio stimulus or with audiovisual stimulus of adolescents with CL ± P, and (2) to examine the impact of the parameters 'knowing someone with a cleft', 'age', and 'gender' on the attitudes of peers. In addition, (3) this study investigated whether speech intelligibility of adolescents with CL ± P has an effect on cognitive, affective, and behavioral attitudes of peers.

Based on the literature, it is hypothesized that attitudes are more negative when the cleft is visual (e.g., CL) compared to an invisible cleft (i.e., CP). Moreover, knowing an individual with a CL ± P has probably a positive effect on the attitude dimensions, as demonstrated by Chan, McPherson [31]. Furthermore, it is hypothesized that boys and younger peers will have more negative attitudes compared to girls and older adolescents. Additionally, reduced speech intelligibility was suspected to have a negative effect on the attitude dimensions.

2. Material and methods

This study was approved by the Ethics Committee of (blinded for review) University Hospital (project EC UZG 2019/0846) and a written consent was obtained from all participants prior to participation.

2.1. Speakers, audiovisual, and audio samples

Audiovisual samples, with spontaneous speech, were collected retrospectively from two speakers, one boy with a unilateral cleft lip (15 years – sample one) and one girl with a unilateral cleft lip and palate (18 years – sample two). The audiovisual samples were collected from the information page of the University Hospital of (Blinded for Review) [47]. This online information page contained a video where adolescents provided information about the treatment process for patients with a cleft. The two samples contained different contents and duration. Sample one contained an introduction of the speaker, an explanation why a psychologist can help people with clefts, and an autobiographical story about bullying (duration: 1 min 3 s). In sample two the speaker explained what cleft is, gave more information about the different examinations and caregivers, and told also an autobiographical story about bullying (duration: 54 s). The two audiovisual samples contained background music, noise and have subtitles. The speech from the audiovisual samples were used as the audio sample for this study.

2.2. Listeners

A total of 82 adolescents, aged between 15 and 18 years old, agreed to participate in the study. They were recruited by convenience sampling on social media. The individuals were asked to complete a questionnaire to verify in- and exclusion criteria and to give written informed consent. Participants were excluded when the participant had a hearing loss ($n = 2$) and when the participant had a native language other than (blinded for review) ($n = 2$). As a result, 78 adolescents (52 men and 26 women) were included in the study (mean age 16.9, $SD = 1.05$; range 15–18). They were divided into two age categories: 15–16 years and 17–18 years. Table 1 provides demographic information about the listeners.

Table 1. Listener's demographic information: age and gender.

Age group	Total			Boys			Girls		
	n	Mean age (in years)	SD	n	Mean age (in years)	SD	n	Mean age (in years)	SD
15–16 years	26	15.6	.50	11	15.6	.52	15	15.6	.50
17–18 years	52	17.5	.51	15	17.5	.52	37	17.5	.51
Total	78	16.9	1.05	26	16.7	1.10	52	17.0	1.02

The level of prior contact was measured by using a single question on the demographic questionnaire: “Have you ever had contact with someone with a cleft lip and/or palate?” Each participant who answered this question with ‘Yes’, had to explain how they know the person with a cleft (e.g. family member, friend, classmate, an acquaintance, or other). When the adolescent knew someone with a cleft then he/shewas excluded from the first and third research questions. Sixty-four people (82%, 64/78) indicated that they knew the condition of a cleft. Twenty-one participants (27%, 21/78) indicated that they knew someone with a cleft. Consequently, these participants were excluded from the first and third question.

2.3. Attitudes

To determine the attitudes of typically developing peers toward the speech of individuals with a cleft, a questionnaire was developed based on the study of Langevin [48]. The survey included the three attitude dimensions, i.e., a cognitive, affective, and behavioral component. An equal-appearing interval (EAI) scale was used for each dimension (see Appendix A). The EAI scale used a 10 cm long scale with 11 equi-distance points. The cognitive dimension was investigated by six parameters, i.e., self-confidence, intelligence, emotional stability, satisfaction, kindness, and the number of friendships. On the left of the EAI-scale a score of “0” was represented, i.e., low self-confidence, low intelligence, emotionally unstable, unhappy, unfriendly, and the person has few friends. On the right end, the opposite was displayed. Each participant was asked to indicate which traits he/she related to the individual of the audio and audiovisual sample. The affective attitude dimension was investigated by five questions, “How do you feel about this person?”, “How would you feel if this person asked for help?”, “How would you feel if this person asks you to do something together after school hours?”, “How would you feel if this person asked you to make a group work together?”, and “How would you feel if this person fell in love with you?”. Each adolescent had to score the EAI scale ranging from “0” very unpleasant to “10” very pleasant. Finally, the behavioral dimension was explored with seven questions, e.g. “I would start a conversation with this person”, “I could build a friendship with this person”, “I would enter into a romantic relationship with this person”, “I would invite him/her to do something together outside school hours”, “I would introduce this person to my friends”, “I would stand up for this person when he/she is being bullied”, and “I would spontaneously sit next to this person in class”. Similar to the other dimensions, the EAI scale ranging from “0” never to “10” always was used to assess the questions while listening to the audio samples. A score for the three dimensions was calculated by summing the scores on the different EAI scales.

To verify the peers’ perceptions of speech intelligibility, all participants were additionally asked to judge the speech intelligibility of each speaker on an EAI scale ranging from “0” poor speech intelligibility to “10” good speech intelligibility (see Appendix B). Based on this information, a correlation could be determined between speech intelligibility and the attitude toward the adolescent with a cleft.

2.4. Procedure

All adolescents listened to the different samples at home. A fixed sequence of listening to the samples was used, namely audio sample 1, audio sample 2, audiovisual sample 1, and audiovisual sample 2. After each audio and audiovisual sample, the adolescent has to judge the attitudes on the different EAI-scales. Following each audio sample, the listeners also rated speech intelligibility.

2.5. Statistical analysis

IBM SPSS Statistics software version 27.0 (IBM Corp., Armonk, NY) was used for the statistical analysis of the data. A probability level of 0.05 or less was considered to be significant for these analyses. A repeated analysis of covariance (ANCOVA) was used to investigate whether appearance or speech intelligibility had an effect on attitudes toward peers with a cleft. Separate analyses were performed for each attitude dimension. The medium (i.e., audio and audiovisual sample) was the independent variable, while the different dimensions (i.e., cognitive, affective, and behavioral) were the dependent variables. Speech intelligibility was added as a covariate. The Mauchly's Test of Sphericity can be ignored, considering the assumption of sphericity is always fulfilled when only two measurements are used [49]. The two-way ANCOVA was also used to verify if knowing someone with a cleft, age or gender have an effect on the three different attitude dimensions. This was examined by each dimension and medium. Age and gender were covariates. Finally, Spearman correlation coefficients were used to investigate the correlation between speech intelligibility and the three attitude dimensions on the speech samples.

3. Results

3.1. Difference between the cognitive, affective, and behavioral attitudes of peers when confronted either with only audio stimulus or with audiovisual stimulus of adolescents with $CL \pm P$

Knowing someone with a cleft may have influence on the results [31]. Therefore, these participants ($n = 21$) were excluded from this part of the study. Fifty-seven participants were included in this analysis.

3.1.1. Cognitive dimension

The mean scores for the cognitive dimension were 8.0 (SD 0.82) for the speech samples without visual stimulus (audio sample) and 8.5 (SD 0.75) for the speech samples with visual stimulus (audiovisual sample). Based on a repeated measure ANCOVA, a significant difference was found between the scores for the cognitive dimensions on the audio and audiovisual sample (F (1.55) = 13.86, $p < .001$, $\eta^2 = 0.201$). When speech intelligibility was taken into account, a significant difference was also found (F (1.55) = 8.8, $p = .004$, $\eta^2 = 0.138$).

3.1.2. Affective dimension

Mean scores of 8.1 (SD 0.95) for the audio samples and 8.2 (SD 0.87) for the audiovisual samples were found. Analysis of covariance showed that there was no significant difference between the affective dimensions of peers when they rated speech samples with or without visual stimulus (F (1.55) = 3.32, $p = .074$, $\eta^2 = 0.057$). Moreover, no significant difference was found when speech intelligibility was a control variable (F (1.55) = 2.17, $p = .147$, $\eta^2 = 0.038$).

3.1.3. Behavioral dimension

For the behavioral dimension, an overall mean of 8.3 (SD 1.04) was found for the audio samples and an overall mean of 8.4 (SD 0.97) for the audiovisual samples. A significant difference was found between the audio and audiovisual samples (F (1.55) = 8.48, $p = .005$, $\eta^2 = 0.134$), also when speech intelligibility was taken into account (F (1.55) = 7.36; $p = .009$, $\eta^2 = 0.118$).

3.2. Influence of knowing someone with a cleft, gender, and age on the attitudes

3.2.1. Speech samples without visual stimulus (audio sample)

Based on a two-way ANCOVA, no interaction effects between the parameters ‘knowing someone with a cleft’ and ‘gender’ and ‘age’ were found for the three dimensions ($p > .05$, see Table 2, Table 3). Moreover, no interaction effects between knowing someone with a cleft and the cognitive ($F(1) = 0.002, p = .962, \eta^2 = 0.000$), affective ($F(1) = 0.976, p = .326, \eta^2 = 0.013$), and behavioral ($F(1) = 0.986, p = .324, \eta^2 = \text{N.A.}$) dimension were found when controlling for age and gender. In addition, no significant difference was found between gender and the three different attitude dimensions, i.e., cognitive ($F(1) = 1.011, p = .318, \eta^2 = 0.013$), affective ($F(1) = 3.789, p = .055, \eta^2 = 0.048$), and behavioral ($F(1) = 2.470; p = .120, \eta^2 = \text{N.A.}$) dimension by controlling age. Concerning age, no significant interaction effect between the two age groups (15–16 years and 17–18 years) and the cognitive ($F(1) = 0.210, p = .648, \eta^2 = 0.004$), affective ($F(1) = 0.144, p = .706, \eta^2 = 0.002$), and behavioral ($F(1) = 0.581, p = .448, \eta^2 = \text{N.A.}$) dimensions were found for the audio samples by controlling gender.

Table 2. ANCOVA results on the audio samples regarding the influence by gender and knowing someone with a cleft on their cognitive, affective, and behavioral attitudes toward children with speech disorders related to CL ± P.

ANCOVA results (controlling by age)				
		F	p	η^2
Cognitive	Gender	.433	.513	.006
	Knowing someone with a cleft	.009	.923	.000
	Gender x knowing someone with a cleft	.092	.762	.001
Affective	Gender	3.578	.063	.047
	Knowing someone with a cleft	1.089	.300	.015
	Gender x knowing someone with a cleft	.138	.711	.002
Behavioral	Gender	2.689	.105	.036
	Knowing someone with a cleft	1.197	.277	.016
	Gender x knowing someone with a cleft	.223	.638	.003

Table 3. ANCOVA results on the audio samples regarding influence by knowing someone with a cleft and age of the listeners on their cognitive, affective, and behavioral attitudes toward children with speech disorders related to CL ± P.

ANCOVA results (controlling by gender)				
		F	p	η^2
Cognitive	Age	.433	.513	.006
	Knowing someone with a cleft	.026	.873	.000
	Age x knowing someone with a cleft	.973	.450	.078
Affective	Age	2.258	.089	.089
	Knowing someone with a cleft	.085	.771	.001
	Age x knowing someone with a cleft	1.086	.361	.045
Behavioral	Age	.585	.447	.008
	Knowing someone with cleft	.232	.632	.003
	Age x knowing someone with a cleft	.230	.633	.003

3.2.2. Speech samples with visual stimulus (audiovisual sample)

There were no interaction effects between the parameters ‘knowing someone with a cleft’ and ‘gender’ and ‘age’ for the dimensions of the audiovisual samples ($p > .05$, see Table 4, Table 5). However, significant interaction effects between gender and the affective ($F(1) = 10.771$, $p = .002$, $\eta^2 = 0.126$) and behavioral ($F(1) = 4.792$, $p = .032$, $\eta^2 = \text{N.A.}$) dimensions were found. Regarding the affective dimension, an overall mean score of 8.5 ($SD 0.13$) for the girls was found and an overall mean 7.8 ($SD 0.18$) for the boys. An overall mean of 8.5 ($SD 0.14$) for the girls and an overall mean of 8.0 ($SD 0.21$) for the boys was found for the behavioral dimension. Females attributed significantly higher scores to the affective and behavioral dimensions. No significant interaction was found between the gender and the cognitive dimension ($F(1) = 2.349$, $p = .130$, $\eta^2 = 0.030$). No interaction effects between knowing someone with a cleft and the cognitive ($F(1) = 0.260$, $p = .619$, $\eta^2 = 0.003$), affective ($F(1) = 0.413$, $p = .523$, $\eta^2 = 0.006$), and behavioral ($F(1) = 0.487$, $p = .487$, $\eta^2 = \text{N.A.}$) dimension were found when controlling for age and gender. Furthermore, no significant interaction effects between age and the cognitive ($F(1) = 0.300$, $p = .568$, $\eta^2 = 0.003$), affective ($F(1) = 1.002$, $p = .320$, $\eta^2 = 0.013$), and behavioral ($F(1) = 1.433$, $p = .235$, $\eta^2 = \text{N.A.}$) dimension were found by controlling gender.

Table 4. ANCOVA results on the audiovisual samples regarding influence by gender and knowing someone with a cleft on their cognitive, affective, and behavioral attitudes toward children with speech disorders related to CL \pm P.

ANCOVA results (controlling by age)				
		F	p	η^2
Cognitive	Gender	2.160	.146	.029
	Know someone with a cleft	.053	.818	.001
	Gender x knowing someone with a cleft	.213	.646	.003
Affective	Gender	10.723	.002^a	.128
	Knowing someone with a cleft	.993	.322	.013
	Gender x knowing someone with a cleft	.864	.356	.012
Behavioral	Gender	4.453	.038^a	.057
	Knowing someone with a cleft	.684	.411	.009
	Gender x knowing someone with a cleft	.210	.648	.003

^aTwo-way analysis of variance, $p \leq .05$.

Table 5. ANCOVA results on the audiovisual samples regarding influence by knowing someone with a cleft and age of the listeners on their cognitive, affective, and behavioral attitudes toward children with speech disorders related to CL \pm P.

ANCOVA results (controlling by gender)				
		F	p	η^2
Cognitive	Age	2.259	.089	.089
	Knowing someone with a cleft	.011	.917	.000
	Age x knowing someone with a cleft	.965	.415	.040
Affective	Age	2.477	.069	.097
	Knowing someone with a cleft	.084	.773	.001
	Age x knowing someone with a cleft	2.001	.122	.080
Behavioral	Age	1.128	.344	.047
	Knowing someone with a cleft	.082	.775	.001
	Age x knowing someone with a cleft	.646	.588	.027

3.3. Correlations between speech intelligibility and mean attitude scores

The participants ($n = 21$) who indicated that they knew someone with a cleft, were excluded from this part of the study. These adolescents might have been more familiar with speech disorders associated with a cleft palate [31].

The participants ($n = 57$) gave a mean score of 8.3 (SD 1.12) for speech intelligibility on the first audio sample. For the second audio sample, a mean score of 7.6 (SD : 1.29) was given. Moderate and statistically significant positive correlations were found between speech intelligibility and the cognitive ($r = 0.376$, $p = .004$), affective ($r = 0.371$, $p = .004$), and behavioral ($r = 0.401$, $p = .002$) dimension.

4. Discussion

This study examined the attitudes of 15-to-18 years typically developing peers toward adolescents with speech disorders related to $CL \pm P$. More specifically, the relationships were investigated between the cognitive, affective, and behavioral attitude dimensions of peers and the speech intelligibility of adolescents with $CL \pm P$. Moreover, this study investigated whether the three attitudes were determined by appearance. Possible differences in attitudes related to different parameters of the peers (i.e., knowing someone with a cleft, age, and gender) were also explored.

Moderate and statistically significant correlations were found between the three attitude dimensions (i.e., cognitive, affective, and behavioral) and speech intelligibility judged by their peers. The more intelligible a speaker was judged, the more positive attitudes the peers had toward the speaker. As the primary aim of speech therapy in individuals with $CL \pm P$ is to improve speech intelligibility, this finding highlights the importance and relevance of speech therapy in terms of improving social integration and acceptance of these patients. This finding is comparable with the results reported by Bettens, Alighieri [29], who found a strong and significant positive correlation between speech intelligibility of children with a cleft palate with or without a cleft lip determined by a transcription of a continuous speech sample by naïve adult listeners, on a five-point Likert scale by the peers themselves or by an experienced speech-language pathologist. Lee et al. (2017) also reported similar results in children with a cleft palate with or without a cleft lip who included a similar method of presentation (i.e., EAI-scales) of the attitudes with a focus on the cognitive dimension. Although similar dimensions were involved, different age groups were investigated. This study included adolescents between 15 and 18 years old, while Lee et al. (2017) included children between 6 and 14 years and Bettens et al. (2020) children between 6 and 12 years. Despite this difference, similar results were found.

Knowing someone with a cleft has no significant effect on the attitude dimensions of adolescents between 15 and 18 years old toward peers with a cleft. The present results can be compared with earlier studies. Blancher and Goodwyn [32] found that personal contact did not significantly affect the attitudes of young adults aged 19 and 46 years old toward individuals with CLP. Similar results were found in the study of Allard and Williams [22], who indicated no significant differences between the ratings of participants who do not know someone with a communication disorder and know someone with a communication disorder on nine different trait pairs (e.g. low intelligence/high intelligence, low self-esteem/high self-esteem). The authors argued that, regardless of personal contact, a strong negative stereotype against people with CLP exists. This finding was also observed by Doody, Kalinowski [50] who investigated

stereotypes of stutterers and nonstutterers by adults. The authors found that a negative stereotype still exists even though 85% of the respondents reported that they knew someone who stutters. Close contact with someone with a disability is not always reflected in more positive attitudes [51]. This could be explained by the notion that personal experiences might lead to more realistic expectations and attitudes [52]. Moreover, it is important to break all these stereotypes of persons with a cleft. Stereotypes can result in a self-fulfilling prophecy, so that lower expectations conveyed to the affected patient may be internalized into their self-concepts, likely to affect their behavior and psychosocial development [53]. It is therefore important for teachers and parents to be aware of social prejudices and how these can be addressed, especially considering the resistance to change by some adolescents [32]. In contrast, some studies found that contact does lead to more positive attitudes toward peers with CL ± P [31], peers who stutter [54], or peers with disabilities [55,56]. Further research is necessary to find out whether adolescents can change their attitude when they come into contact with someone who was born with a CL ± P.

A significant influence of gender was found on the attitudes of peers toward adolescents with CL ± P. Boys had significantly more negative attitudes compared to girls in two attitude dimensions, i.e. affective and behavioral dimensions. This is in line with our hypothesis. Girls are, in general, more empathic than boys [57,58]. Empathy for a member of a stigmatized group can improve attitudes [59,60]. A recent study by Bettens et al. (2020) found similar results. Boys had significantly more negative attitudes toward peers with a cleft palate with or without a cleft lip compared to girls on the three attitude dimensions. Previous studies showed that girls had a more positive attitude compared to boys with speech disorders [[40], [41], [42]]. Counseling peers (in terms of informing them about CL ± P) can perhaps be a solution to ameliorate their attitudes.

Attitudes can vary with age during childhood and adolescence, although a consistent positive or negative direction has not yet been established [36,52,61]. In particular, no age effect was found in the study of Vignes, Godeau [62] who investigated the effect of age on students' attitudes toward peers with (psychological or cognitive) disabilities. This current study also found no significant influence of age on the attitudes of peers toward adolescents with CL ± P. Younger adolescents (15–16 years old) did not show more negative attitudes compared to the older adolescents (17–18 years old) in all three attitude dimensions. This is in contrast with the results of other studies that showed that older children/adolescents have more positive attitudes compared to younger children [29,63]. A possible explanation is the narrow age range in the current study. The study compared the attitudes of the youngest group (15–16 years old) and the oldest group (17–18 years old), with a narrow age range of two years. Future research is necessary to confirm these results. In the future, it would be interesting to include a broader age range.

The results of this study showed that adolescents have more negative attitudes when listening to audio samples compared to audiovisual samples for all three attitude dimensions. However, only a significant difference was found between the audio and audiovisual samples for the cognitive and behavioral dimensions. This could indicate that speech intelligibility had a more negative effect on attitudes toward peers with cleft compared to appearance. Previous studies showed a more negative attitude toward children with unintelligible speech [26,29]. Other studies investigated how children with hypernasal speech were perceived by peers using audio samples [25,64]. They found that children responded more negatively to the speech samples as the hypernasality increased. Hypernasality can impact speech intelligibility [29,65]. Children and adolescents with a cleft receive often speech therapy to improve speech intelligibility

[66,67]. An improvement in speech intelligibility through speech therapy could therefore possibly contribute to more positive attitudes of individuals with a cleft.

The findings of this study suggest that there may be a compensatory influence of appearance on reduced speech intelligibility. An audiovisual sample provides multimodal information, i.e., mouth movements and speech input [68,69]. A study of Dodd [70] showed that raters judged speech intelligibility better when the speaker's face was seen. Additionally, the external features associated with a cleft were only limited visible in the video samples. The results of the present study, i.e. the appearance of adolescents with clefts does not lead to a more negative attitude among peers, is in contrast with other research [15,18]. A possible explanation for the discrepancy may be the quality of the audiovisual sample. The audiovisual sample was not specifically designed for this study so probably the face was not always clearly visible.

The current results do not provide unequivocal evidence for the existence of prejudice and stereotyping among adolescents toward their peers with a cleft. On the different dimensions, high mean scores were found, with a more positive attitude on the audiovisual samples. Probably there is a more negative stereotyping toward the speech disorder associated with cleft than toward the external features. These results are in line with the results from Allard and Williams [22], who examined the attitudes toward different communication disorders. The researchers found that individuals without a communication disorder were judged more positively than people with a communication disorder.

This was the first study to investigate peers' attitudes, i.e., the cognitive, affective, and behavioral dimensions, toward adolescents with CL ± P. However, this study also had some limitations. The inclusion of only two adolescents with CL ± P can be considered a limitation of this study. Data collection was not possible due to the COVID-19 pandemic and therefore audiovisual samples that were available on the internet were used. Because of the small sample size in this study, results cannot be generalized to the broader population and should therefore be interpreted with caution. Furthermore, the audiovisual sample in the current study contained subtitles. A recent study showed that text added to auditory-visual signals improved speech intelligibility [71]. Therefore, the subtitles probably ensured a higher score of speech intelligibility. Both text and facial cues can namely provide audiovisual benefits for speech intelligibility [71]. Moreover, external factors such as the message content and background noise may also interfere with speech intelligibility [72]. In terms of message content, the audio and audiovisual samples used in the current study were already part of existing data. Therefore, the samples, with spontaneous speech, of adolescents with CL ± P were not controlled for content. The content of the sample may have influenced the attitudes of the listeners [29]. In further research, the content of the samples should be controlled. Further research can use the cleft audit protocol for speech-augmented (CAPS-A) framework for the evaluation of speech intelligibility, hypernasality, and the presence/absence of compensatory articulation patterns [73,74]. Moreover, it is important to control the speech samples for vulnerable speech sounds for individuals with cleft palate, e.g. high-pressure consonants and high vowels. In this manner, a representative speech sample is obtained and a comparison can be made across patient groups and languages [75]. Despite the use of spontaneous speech without content control, it does reflect the speech in everyday life [76,77]. Additionally, the audio and audiovisual samples contained background music and noise, which can also reduce speech intelligibility [69,[78], [79], [80]].

Moreover, information about the degree of speech disorder or a speech intelligibility percentage was not available for the used speech samples. Additionally, the audiovisual sample

used in this study was an advertising video for people with a cleft. These participants were perhaps not representative of the general population of people with a cleft. People who are shown in advertising are often role models [81,82]. Probably the included individuals with CL ± P in this study have fewer difficulties than other adolescents with CL ± P. Unfortunately, no control group consisting of individuals without speech disorders was involved. However, one participant had only a cleft lip. This individual had probably no speech disorder [83]. In this way, a control group was still taken into account. A higher mean score was found for the control group in comparison to the patient with a speech disorder due to cleft.

Neely [69] indicated that there were different speech intelligibility scores when the angle changed at which the observers sat to view the speaker. In the current study, a dynamic audiovisual sample (i.e., the participant walked while talking) was used. In most studies, video recordings were made with the subject facing natural light and the face and upper neck framed in the picture [74]. This difference can lead to different results and therefore it is difficult to make a comparison with other studies.

Additionally, this study used an equal-appearing interval scale to measure speech intelligibility. The study of Whitehill [30] noted that an EAI is not a valid method for measuring speech intelligibility and consequently, this is a limitation of the study. Moreover, it has been claimed that it is difficult for listeners to focus on intelligibility only when involved in a rating task. Other speech variables, such as hypernasality, nasal emission, or articulation disorders, may interfere with the task [84]. It will be easier for listeners to focus only on intelligibility when using a transcription task. Transcriptions are considered to be the gold standard for measuring intelligibility [85]. Using a transcription method might have led to different results.

Furthermore, speech intelligibility was only measured on the audio samples. Moreover, many measuring points are wishful. In this way, the Intraclass Correlation Coefficient (ICC) can be calculated.

Moreover, a high prevalence of malocclusions is presented by adolescents with oral clefts [86,87]. Malocclusion has a major impact on adolescents' attitudes [88,89]. Olsen and Inglehart [90] concluded that malocclusions affect ratings of attractiveness, intelligence, and personality, as well as behavioral intentions to interact with others. Whether and to what extent the included participants with a cleft had a malocclusion was unclear. In future research, it is important to investigate the degree of malocclusion and whether this has an effect on peers' attitudes.

The type of cleft can also have an impact on speech intelligibility. Karling, Larson [91] reported significant differences in the parameter 'speech intelligibility' between patients with unilateral cleft lip and palate (UCLP) and bilateral cleft lip and palate (BCLP). Patients with a BCLP had poorer speech intelligibility in comparison to patients with a UCLP. Similar results were found by Lehiste and Peterson [92]. Remarkably enough, both groups (i.e., UCLP and BCLP) performed better than patients with a cleft palate only. The present study included only patients with a unilateral CL ± P. Future research must include various types of cleft as this variable has an impact on speech intelligibility.

Additional research into the attitudes of people toward peers with a cleft is necessary to emphasize the importance of a positive attitude and the general well-being of individuals born with CL ± P. In addition, a comparison between the attitudes toward children, adolescents, and adults would be an added value to the literature. In this way, a specific intervention program for either target group can be developed. It is namely important to reduce the stigmatization,

and to include educational strategies to enhance adolescents understanding and tolerating differences and difficulties in other adolescents with disabilities [9,34,93,94]. Educational staff should be aware of this when implementing inclusive education [34,93].

In further research, it would also be interesting to investigate which aspects of speech intelligibility lead to the rather negative attitudes of adolescents toward peers with a speech disorder due to cleft. The study of Bettens, Alighieri [29] investigated this aspect by children. Perceived hypernasality, audible nasal airflow, and articulation errors were related to more negative attitudes. Whether or not this finding is also applicable to adolescents is a topic for further research.

5. Conclusion

This study provided additional evidence that peers show more negative attitudes toward adolescents with less intelligible speech due to a cleft lip with or without a cleft of the palate. Moderate significant correlations were found between the three attitudes (i.e., cognitive, affective, and behavioral) of peers and the speech intelligibility in adolescents with CL ± P. Appearance has a lower impact on attitudes compared to speech intelligibility. Further research is necessary to explore the impact of age and knowing someone with a cleft on the attitudes of peers, due to the contradictory results in the literature.

Data availability statement

Data is available on request from the authors due to privacy reasons.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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