INTELLIGIBILITY AND ACCEPTABILITY OF WORDS PRODUCED WITH OBLIGATORY NASAL TURBULENCE

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INTRODUCTION

Background

Children with repaired cleft palate often exhibit nasal turbulence (also known as nasal rustle or velar flutter) as an obligatory symptom of velopharyngeal dysfunction. Nasal turbulence is characterized by a distinctive snorting-type sound that accompanies the production of oral pressure consonants. Although nasal turbulence is considered perceptually distracting to a listener (Peterson-Falzone et al., 2010), objective information regarding its effect on either speech intelligibility or acceptability is lacking. Nevertheless, some children are referred for secondary speech surgery when nasal turbulence is the only primary symptom.

Purpose

The purpose of this study was to determine intelligibility and acceptability of words produced with nasal turbulence by children with repaired cleft palate.

METHOD

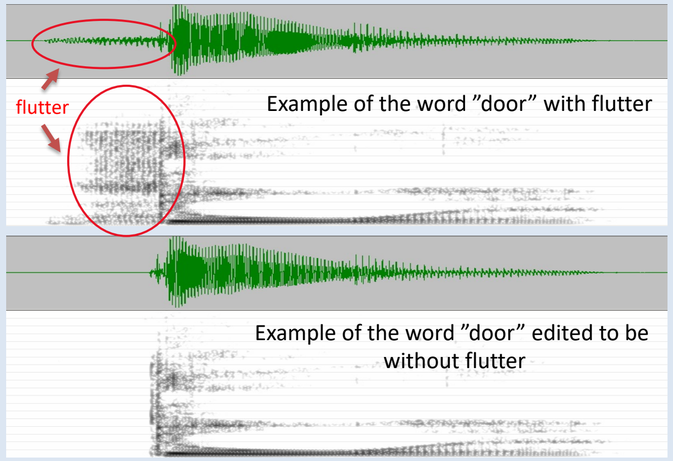
Participants

- Ten undergraduate female students 19 to 20 years of age served as listeners. They were native English speakers and passed pure-tone hearing screenings.
- None of the listeners had training in speech pathology or linguistics

Procedures

Orthographic Intelligibility Task

- The listeners wore headphones and heard 50 words – 25 with nasal turbulence and 25 edited without nasal turbulence. They were told that they would hear some common words and they were to simply type in the word they heard.



Acceptability Task

- Following the intelligibility task, the listeners were told that they would hear 55 words and were to judge how acceptable the words were. They were instructed to use a visual analog scale (VAS) to indicate if the word drew attention to itself or was distracting in some way, even if the word was understood.
- The VAS had 100 units and was labeled “Not distracting” at 0 and “Highly distracting” at 100.
- The 55 words consisted of the same words as in the intelligibility task with 5 words randomly selected and repeated for reliability.

RESULTS

Listener	Flutter Intelligibility Accuracy	Non-Flutter Intelligibility Accuracy	Average Acceptability Rating with Flutter	Average Acceptability Rating without Flutter
1	84%	80%	36.84	31.84
2	88%	88%	14.16	7.72
3	80%	80%	43.48	23.88
4	88%	88%	10.20	10.64
5	88%	84%	43.92	24.36
6	84%	80%	22.4	24.44
7	76%	80%	31.6	25.80
8	80%	72%	20.76	20.08
9	88%	84%	21.68	14.36
10	72%	80%	34.96	16.72

Intelligibility

The 10 listeners correctly transcribed 82% (SD=4.7) of words without nasal turbulence and 83% (SD=5.7) of words with nasal turbulence. A paired t-test indicated no significant difference (p=.434).

Acceptability

The 10 listeners assigned a mean distractibility rating of 20 VAS points (SD=8) to words without nasal turbulence and 28 VAS points (SD=12) to words with nasal turbulence. Higher values indicate higher distractibility. A paired t-test indicated that the mean difference was significant (p=.013).

Reliability

The intra-listener reliability of the acceptability ratings was assessed by determining the absolute difference between the ratings of the 5 repeated words. Four listeners had mean differences less than 10%, 4 listeners had mean differences less than 20%, and 2 listeners had mean differences less than 25%. Eliminating ratings from the 2 listeners with the lowest reliability did not change the overall statistical results.

CONCLUSIONS

- The present findings confirm clinical impressions that audible nasal turbulence is distracting to listeners. Intelligibility, however, was not affected.
- Although statistically significant, the mean difference between acceptability of words with and without nasal turbulence was relatively small. In addition, the mean overall distractibility rating for words with nasal turbulence was relatively low at 28% of the possible total VAS.
- Children with repaired cleft palate are referred for secondary surgical management when obligatory symptoms of velopharyngeal dysfunction are severe enough to negatively impact speech intelligibility and/or acceptability.
- However, the present findings suggest that these criteria may not be met for nasal turbulence as judged by naïve listeners

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DISCLOSURES

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