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Conveyance of sentence-types by alaryngeal speakers

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CONVEYANCE OF SENTENCE-TYPES BY ALARYNGEAL SPEAKERS

by

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B.S., University of Montana, 1982

A Professional Paper

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for the Degree of Master of Speech Pathology

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1984

Approved by:


Chairman, Board of Examiners


Dean, Graduate School

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Conveyance of Sentence-Types by Alaryngeal Speakers (28 pp.)

Director: Charles Parker, Ph.D.

The ability to convey different sentence-types by laryngectomized individuals was assessed in this project. Each laryngectomized speaker presented two modes of functional alaryngeal speech: Esophageal and Servox electrolarynx. Audio and audio-visual recordings were taken of five subjects' production of sentences spoken in statement and question form using both speech modes. These recordings were then presented to five listeners for evaluation. Differentiation of sentence-type was achieved in a more effective manner with esophageal speech than through electrolaryngeal speech. The results showed no significant difference in conveyance of sentence-type based on presentation mode. Theoretical and practical implications of these findings are addressed.

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CHAPTER I

INTRODUCTION

Laryngeal speakers are able to convey different sentence-types (i.e., declaratives and interrogatives), regardless of the lexicon, with little or no conscious effort. This ability, however, has yet to be studied in detail when considering the alaryngeal speaker.

This study was motivated by the writer's interest in exploring dimensions of alaryngeal speech which have received limited attention in the past. Some of these aspects as discussed by Scarpino and Weinberg (1981) are rate, intensity regulation, the elimination of detrimental speech behaviors (i.e., stoma noise, facial grimacing, etc.), and pitch. Within the scope of clinical literature dealing with speech rehabilitation of the laryngectomized patient, major emphasis has been directed toward the problem of voice reacquisition and the relative merits of esophageal speech and electrolaryngeal speech. A review of the literature reveals that one factor in the consideration of comparisons of alaryngeal speech, that of sentence-type, has not received particular attention. The question arises then, to what extent can the alaryngeal speaker convey different types of sentences, independent of the lexicon.

The importance of perceptually derived information cannot be underestimated in this study. Clinical judgments are made with

our ears and, as Vrtická termed it, the "global sound" is evaluated by the listener (Hartman, 1979). Control of important dimensions of speech and voice is critical in the successful conveyance of intended messages. Information concerning the ability of the laryngectomized to achieve such control is, at best, minimal.

The results of investigations dealing with the perception of statement-question intonation patterns have shown that, in general, listeners attend to certain aspects of the fundamental frequency contour. Measurement of the physiological properties of sentences has revealed that declaratives are associated with a fall in fundamental frequency contours during the terminal portion of sentences. Interrogative sentences, on the other hand, are associated with a maximal rise in fundamental frequency at the terminal portion of sentences (Gandour and Weinberg, 1983). These are considered the primary cues which listeners use to differentiate statements from questions.

Several investigative studies have demonstrated that esophageal speakers are sometimes capable of exhibiting appropriate control over fundamental frequency. Pitch variability then, is physiologically possible in the esophageal voice. Some investigators, however, claim that this pitch variability may not be perceptually meaningful to the listener. In 1969, Curry and Snidecor found that esophageal speakers had pitch variability but were judged perceptually as having a "restricted pitch range" (Hartman, 1979). Conversely, Vrtická (1964) studied 113 subjects and 78 of these speakers (69%) were judged to have "quite natural melodic

patterns" (Hartman, 1979). Edmund Lauder (1969) pointed out that perceived pitch fluctuations may actually be an emphasis being placed on key words within an utterance (Hartman, 1979). This view postulates that larynx removal does not disrupt the rule-governed linguistic programming of speech. Rather, the peripheral execution of voice and speech production may be reorganized and thus different from laryngeal speakers. Some researchers have stated that results thus far regarding actual frequency control necessary for the laryngectomized's attainment of critical linguistic contrasts (intonation and stress), are far from conclusive. Yet, researchers such as Goldstein and Rothman (1976) have demonstrated that, although they expected frequency range to be an important parameter for distinction between effective and ineffective alaryngeal speakers, they did not find this to be a significant factor (Kalb and Carpenter, 1981).

Regardless of the fact that studies have shown esophageal speaker's ability to phonate over a wide range of fundamental frequencies (Hartman, 1979), current literature continues to provide a fair consensus to the limitations of pitch in alaryngeal speech. The extent to which laryngectomized individuals are able to exercise control over this ability remains the unanswered question. Research has indicated that this control is crucial to successfully conveying intended messages in speech. Although this control does not change the meaning of the lexicon, it does change the meaning of the utterance. The degree to which alaryngeal speakers are able to achieve these important prosodic features

and, therefore, to change the meaning of an utterance, is unknown.

One project attempting to determine the degree to which English-speaking alaryngeal speakers were able to produce prosodic patterns was conducted by Gandour and Weinberg in March of 1983. Using simple declarative and interrogative sentences, they found that intonational contrasts were achieved in a highly effective manner by two groups of alaryngeal speakers, namely, conventional esophageal and tracheo-esophageal (Blom-Singer) speakers. In contrast, users of electronic neck-type artificial larynges were generally unable to convey the intonational distinctions in sentences. One characteristic of this study was that the authors used different groups of subjects to contrast each different form of alaryngeal speech. Therefore, individual speaker variation may have influenced their results to some degree.

Measures using the same subject to produce the different modes of speech have shown to negate such influences as individual speaker variation. One such study by Kalb and Carpenter (1981), comparing relative intelligibility of esophageal and artificial larynx speech, made a deliberate attempt to minimize these possible effects of individual characteristics. In their study, contrasts were made between samples from subjects who could use both means of alaryngeal speech. They did not rely solely on data comparisons between groups of different speakers. Their results revealed just minimal differences in average intelligibility between esophageal and artificial larynx speech when samples were produced by the same speaker. However, substantial differences

were observed when the analysis was based on responses to utterances produced by two different speaker groups. This suggests that "individual speaker characteristics may have influenced the data reported in past studies contrasting the intelligibility of esophageal speech and artificial larynx speech." Kalb and Carpenter point out that because different speaker groups were used in these investigations, the results may be, at least in part, a "reflection of variations among individual speakers rather than a demonstration solely of differences between methods of communication." And so too, with the Gandour and Weinberg study. Although their intent was to measure only the influences of the mode of speech in intonational contrast in sentence-type, the effects of between-group variation and individual speaker characteristics may also be evidenced in their results.

Because information concerning the extent to which alaryngeal speakers are able to convey sentence-type is inconclusive, the first and primary question addressed in this study was:

1. What, if any, are the differences in the conveyance of sentence-type when comparing two modes of alaryngeal speech used by the same speaker?

Most alaryngeal speakers are visible to their listeners. Information concerning the effect of visual cues on the ability to convey sentence-type is virtually non-existent. Therefore, the second question was asked:

2. To what extent does the addition of visual cues improve the success with which the alaryngeal speaker conveys sentence-type?

CHAPTER II

METHODS

Subjects

Five adult male English-speaking subjects provided the speech data for this study. All five were laryngectomized men who were functional users of esophageal speech as well as Servox electrolaryngeal speech. Criteria for functional speech was based on a definition initiated by Johns and Schaefer (May, 1982). They quantitatively defined functional esophageal speech or, FES, as the mode of communication that can be used more than 50% of the time. Individuals are able to fulfill daily activities in a problem free fashion through this speech mode. In this study that term was carried over to include electrolaryngeal speech--also FES. All speakers were chosen on the basis that they were able to use both modes of FES.

Of the alaryngeal speakers who fit the above criterion, five were recommended by a highly experienced speech-language pathologist in the rehabilitation of laryngectomized individuals. The speech-language pathologist was asked to recommend laryngectomized patients who produced fluent discourse and produced speech with a high degree of intelligibility. All five of the subjects chosen had, for at least a portion of their training, been instructed by the forementioned speech-language pathologist.

A profile of biographic data is provided in Table 1 including each of the five subjects.

Table 1. Biographic data of all five alaryngeal speakers.

SUBJECT	AGE	DATE & TYPE SURGICAL PROCEDURE	MOS POST-OP	RADIATION THERAPY
1	70	02/78--total laryngectomy with left radical neck dissection	72	post-op
2	62	01/77--total laryngectomy with right radical neck dissection	84	none
3	45	02/84--total laryngectomy with right radical neck dissection	3	post-op
4	58	10/83--total laryngectomy	5	none
5	51	04/83--total laryngectomy	12	post-op

Speech Materials

Two simple sentences were chosen to investigate conveyance of sentence-types through each mode of FES. Bev loves Bob and Bev bombed Bob were used as stimuli. These sentences have been used by others to study prosodic or intonational aspects of American English in normal speakers and, most recently, were used by Weinberg (1983) in studying alaryngeal speech aspects.

Table 2 lists the two pairs of simple sentences. Each pair consisted of one declarative sentence and one interrogative as indicated by punctuation.

Table 2. Paired stimulus sentences.

Statement-Question	Bev loves Bob. Bev loves Bob?
Statement-Question	Bev bombed Bob. Bev bombed Bob?

Recording Procedure

Each speaker was instructed verbally prior to recordings. These instructions included a description of the semantic context in which the test sentences would occur. To reinforce the semantic context, each speaker was given a verbal demonstration of the sentence-types by a laryngeal speaker. The speaker was asked to read the sentences to himself and, if opting to do so, was allowed to practice.

Three-by-five flash cards were used for cueing each speaker during actual recordings. Each card presented a pair of sentences: one statement and one question form of the same lexicon. Each speaker was instructed to say each sentence as he would if speaking to someone in everyday conversation. A random order of presentation was used for each speaker. A total of forty utterances were collected for the recordings.

All recordings were made in a quiet room using a high-quality microphone and Videocorder (Sony Matic AV-3650). Each speaker was seated and the microphone was hand-held approximately four inches from the lips by a clinician. The camera was focused such that each speaker was viewed from the shoulders and above.

Listening Procedure

A two-interval-forced-choice procedure was used in the listening task. With this procedure, a trial consisted of the presentation of a given statement-question stimulus pair. The order of this presentation was determined randomly.

One test tape was used which contained all five speakers using both forms of FES. This test tape contained 40 trials (4 sentences x 2 FES x 5 speakers) with an interstimulus response interval of approximately four seconds.

Five listeners interpreted and responded to the test tape. Each listener was provided with a response sheet showing the types of stimulus sentences which appeared in each trial. Spaces were provided for recording the one which they interpreted as statements vs. questions in each trial. Listeners were instructed to indicate statement vs. question with a check to represent the observation interval in which they occurred. Listeners were not allowed to hear or view a sentence more than once but were allowed additional time to respond to a particular sentence if they so requested. See Appendix A for a sample of the response sheet. One-half of the sentences produced through each type of FES was presented auditorily while the remaining one-half was presented audio-visually. Random selection of audio only vs. audio-visual presentation was made for each listener.

The five listeners were adults who were unfamiliar with alaryngeal speech. This judgment was made based on self-report. Additionally, each listener was screened for hearing acuity using

American National Standards (ANSI) of 1969. All thresholds were better than 20 decibels at 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz and 4000 Hz.

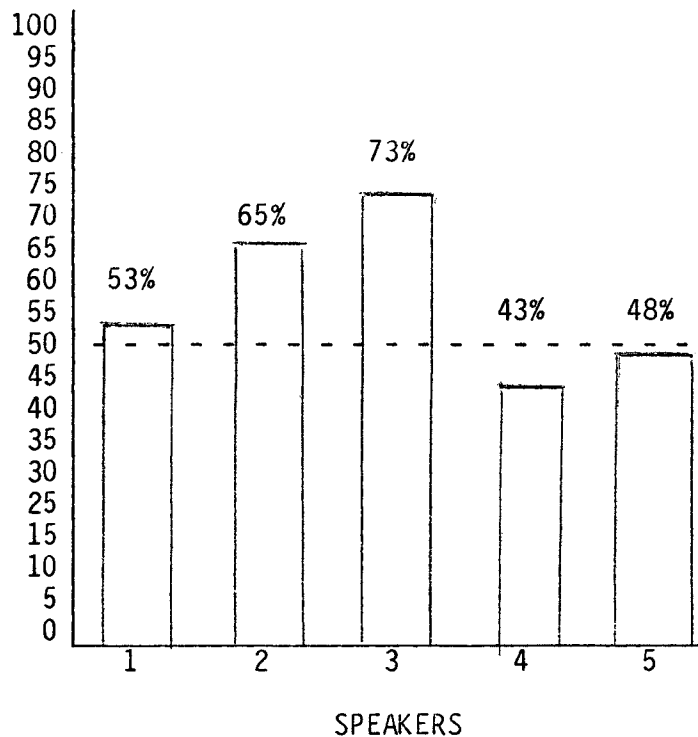
CHAPTER III

RESULTS

The data were analyzed by means of a two-way analysis of variance. This method of analysis allowed for the assessment of differences in successful conveyances of sentence-types as a function of three main effects: a) speaker, b) mode of speech (FES), and c) mode of presentation.

The ability of alaryngeal speakers to convey sentence-types was assessed by determining the accuracy with which listeners identified the statement-question versions of simple sentences ("Bev loves Bob" and "Bev bombed Bob"). The percentages of correct conveyances (n = 200; 5 listeners x 40 trials per speaker) made by each speaker using both functional esophageal and functional electrolaryngeal speech (FESs) are summarized. The combined data (successful conveyances) is shown in Table 3.

Table 3. Overall sc of sentence-types.

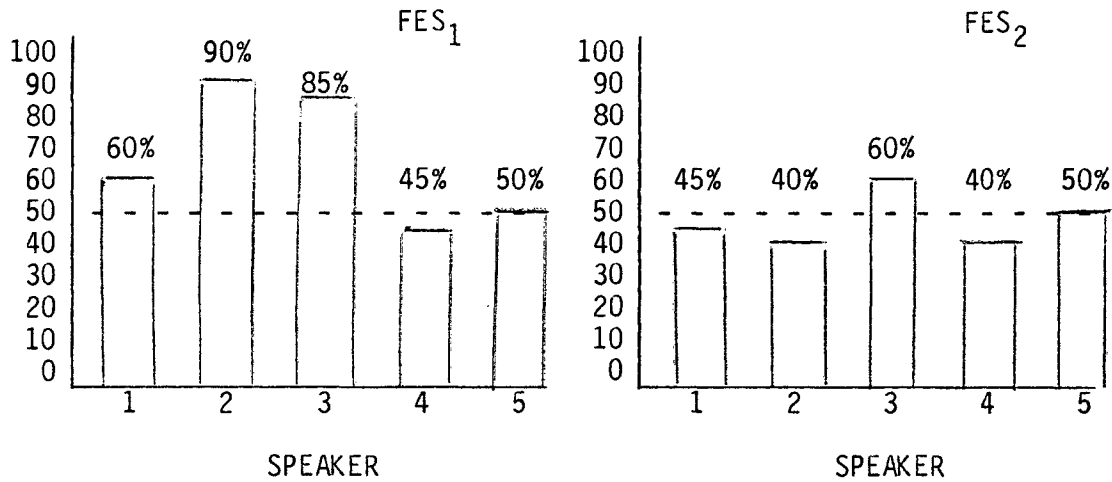


Successful conveyances were achieved in varying degrees across individuals. Specific percentages of successful conveyances were 43%, 48%, 53%, 65% and 73% with a range of 30%. The results showed that there were significant differences between speakers [$f(4,90) = 2.617, p < .05$]. An examination of speech mode and presentation mode, between subjects and within subjects will allow for further conclusions to be drawn.

Speech Mode

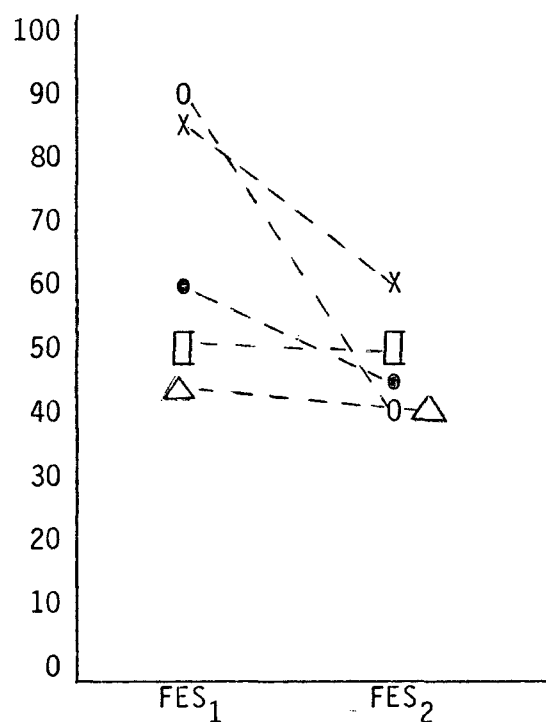
Percentage of sc ($n = 100, 5$ listeners \times 20 trials per speaker) by each speaker using each FES is illustrated in Tables 4 and 5. Percentages of sc for FES₁ are 45%, 50%, 60%, 85% and 90%,

Table 4: Sc of sentence-type as a function of FES.



varying by 45%. Percentages of sc for FES₂ are 40%, 40%, 45%, 50% and 60%, varying by 20%. In viewing the above tables, one would be inclined to conclude that FES₁, or, esophageal speech is more effective in conveying sentence-type than is electrolaryngeal, or, FES₂ speech. The results showed that there was a significant difference between FESs [$f(1,96) = 11.875, p < .01$]. The initial purpose of this study was to determine differences between speech modes using the same speaker. Graph 1 illustrates those differences.

Graph 1: Speaker vs. speech mode interaction effects.



GRAPH 1

- S₁ ●
 S₂ ○
 S₃ X
 S₄ △
 S₅ □
- S = Speaker

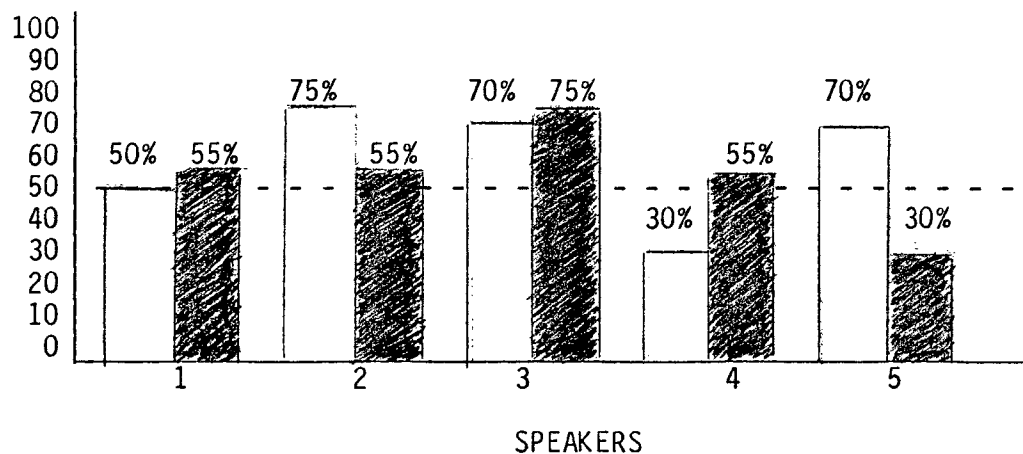
The results showed that the effect of speech mode (FES) was not consistent across speakers, and an interaction effect between speaker and speech mode was present [$f(4,90) = 3.01, p < .05$]. The differences between modes of speech within the same speaker when described by percentages of sc are 0%, 5%, 15%, 25%, and 50%. Comparing modes of speech revealed that individuals who are relatively unsuccessful in conveying sentence-type through one mode of

alaryngeal speech, namely esophageal, are likely to have limited success through another mode of alaryngeal speech (in this case, Servox electrolarynx). The differences in successful conveyances between speech modes became less significant as overall success decreased. Conversely, an individual who had good success overall demonstrated a wider gap between speech modes. If a speaker was successful, he was more successful with FES₁ than with FES₂ in conveying sentence-type.

Presentation Mode

Percentages of sc (n = 100, 5 listeners x 20 trials per speaker) by each speaker given the type of presentation (audio-only vs. audio-visual) that is depicted in Table 6. Percentages of sc

Table 5. Sc of sentence-type based on presentation mode.



audio-only = □

audio-visual = ■

for auditory presentations are 30%, 50%, 70%, 70% and 75%, while percentages of sc for audio-visual presentations are 30%, 55%, 55%, 55%, 75%. The results showed that there was not a significant difference between presentation modes [$f(1,96) = 3.94, p > .05$] although as with speech mode, it becomes apparent that the effect of presentation mode was not consistent across speakers.

In summary, the results of this two-way analysis of variance showed that a significant difference was present for two of the three main effects--speaker [$f(4,90) = 2.617, p < .05$], and speech mode [$f(1,96) = 11.875, p < .01$]. These findings show that, on an overall basis, there was significant variation in the degree to which individual speakers were able to convey sentence-types. In addition, there was significant variation in the degree to which FES_1 and FES_2 aided the speaker's conveyance of sentence-type. No significant variation in the conveyance of sentence-type could be attributed to presentation mode. One of the two-way interactions reached significance ($p < .05$); there was a significant interaction between speaker and speech mode [$f(f,90) = 3.01$].

CHAPTER IV

DISCUSSION

A primary aim of the present study was to determine if the ability to convey sentence-type in alaryngeal speech differed when based solely on the mode of speech. A second aim was to determine to what degree the sentence-type was conveyed when visual cues were added. This work was motivated by a desire to add information to one major unresolved issue: although systematic control over voice fundamental frequency is regarded essential to the production of intonational contrasts in speech, the extent to which it is essential in the perception of and functional conveyance of contrasting sentences spoken by the laryngectomized speaker seems quite a different matter.

The results indicated that for this group of laryngectomized individuals, mode of speech was a factor in ability to convey sentence-type. Overall, the speakers were more successful when they used esophageal voice vs. electrolaryngeal voice. The significance of this difference was apparent when examined within individuals as well as across individuals. Presentation mode was not a significant factor in conveyances across individuals although the effect of presentation mode was not consistent across speakers.

These findings highlight a bias inherent to most comparisons between artificially aided and esophageal speech. An individual

who experiences limited success in conveying sentence-type through esophageal speech will not necessarily be less successful in the use of the artificial device. On the other hand, it appears that if one is to be successful with one form of alaryngeal speech in conveying contrastive sentences, it is likely to be through the use of esophageal speech. A surprising finding was that visual cueing was, in general, not sufficient in aiding successful conveyance. Results showed, however, that more sentences were conveyed successfully when esophageal speech was used if the presentation mode was audio-visual. On the other hand, more sentences were successfully conveyed through electrolaryngeal speech when presentation mode was auditory alone.

Overall, these observations support the view that although speakers are sometimes able to exhibit appropriate control over fundamental frequency, this control is not consistent. These results do, however, support the contention made by Green and Hutts (1982) and others that electrolaryngeal or pneumatic devices are viable alternatives to poor esophageal speech.

Theoretical Implications

According to these preliminary results, one concludes that 1) some alaryngeal speakers are more successful in conveying sentence-type through esophageal speech than they are through electrolaryngeal speech and 2) overall success in conveying sentence-type could, potentially, be increased with visual cues.

Let us examine the first of the above two conclusions more closely. In comparing across tasks for each speaker producing both

methods of alaryngeal speech, the direction of difference for four of the five speakers shows more success through esophageal speech. However, the degree of this difference was not consistent across speakers. Although contrastive sentences or intonation characteristics is just one of many aspects of alaryngeal speech under preliminary investigation, one general pattern seems to prevail throughout: longstanding and continued discrepancies as to the number of laryngectomized persons who are reportedly more effective using esophageal speech.

Unquestionably, this study lends support to Gandour and Weinberg's (1983) study and observations that esophageal speech is more effective in conveying sentence-type. However, the contention made by Kalb and Carpenter (1981) is also supported by the findings in this study: minimal differences were noted on sentences produced by some of the same speaker groups. Of the individuals who have limited success with intonational aspects in esophageal speech, it is evident that they will have equal, if not more limitations with electrolaryngeal speech. The variations in fundamental frequency which can be produced by the laryngectomized speaker are much more limited than those which can be made by laryngeal speakers. The reasons are quite obvious, as stated by Van den Berg, "in the larynx we have a complicate(sic) and delicate complex of muscles which allow for . . ." these variations ". . . while in the pseudoglottis only one muscle is present" (Hartman, 1979). Furthermore, the failure through the use of the Servox electro-larynx was not surprising as the voicing source of this device can-

not be altered systematically during speech production. The electrolarynx presents with a steady pulse amplitude and fundamental frequency which increases limitations.

The second conclusion drawn from this study can appropriately be addressed at this point. If it is, in fact, possible to increase successful conveyance of contrastive sentences by visual signals, why did some speakers become less successful in conveying the sentence-type with visual signals? To predict that audio-visual presentation would highlight the nonverbal and other pragmatic features of communication (Green and Hutts, 1982) seemed reasonable at the onset of this investigation. As results were analyzed and examined the evidence that esophageal speech more successfully conveyed sentence-type with visual cues became apparent. Conversely, artificially aided speech more successfully conveyed sentence-type with auditory cues alone. These results may suggest that a negative reaction to the electrolarynx is taking place. Or, the distractibility of a foreign device during speech or communication may be evident.

Clinical Implications

Important clinical implications to be drawn from this study are, from the author's viewpoint, numerous. Foremost, the influence of individual speaker characteristics not only on conveyance of contrastive sentences, but also on alaryngeal communication effectiveness in general, warrants serious consideration in clinical decision making. Discrepancies in existing literature, including this study, demonstrate the vast variability in the reha-

bilitation of post-laryngectomy speakers.

Selection of a means of communication by a particular alaryngeal speaker (as assisted by the speech pathologist), exclusive of physical limitations, will best be based on individual comparisons and considerations. We, as speech and language pathologists, can assess how well laryngectomized speakers are able to achieve these types of linguistic contrasts. In view of the increased number of aids being marketed as well as the promotion of esophageal speech, it is difficult to know which is optimal for a given individual at a specific point in the rehabilitation process. Therefore, it is this author's opinion that these speakers would benefit most if offered a range of possible communication techniques, including more than one aid.

With specific regard for pitch, evidence suggests that differences in intensity, duration, etc. can compensate in a limited way in giving an impression of pitch modulation (Lanham and Kerr, 1975). Van den Berg has said that "the pitch of a clever patient, sometimes gives the illusion of agreeable changes of pitch which objectively are not present" (Hartman, 1979). An auditory impression of pitch modulation can be achieved by varying prosodic properties other than harmonic pattern.

As stated by Curry and Snidecor in 1961,

the frequency of an auditory stimulus can be measured in complete absence and independence of any listener. Frequency is a physical attribute of the auditory stimulus. Pitch is an auditory experience identified by the listener. Pitch is the listener's reaction to the auditory stimulus.

As a speech and language pathologist then, one may likely have a clinical impression that some persons are not good listeners when

confronted with alaryngeal speakers for one or more of several reasons. Ryan and Gates et al. (1982) reported observations that, indeed, some individuals are simply not good listeners, adding that this becomes critical when the listener is the patient's spouse. They suggested that attention be given to identifying the listener's ability to comprehend esophageal speech, and that remedial training be given to those found to need it. Why are particular individuals "bad" listeners? In keeping with the observation made by several patients that they are better understood over the telephone than face to face, the suggestion has been made that background noise may be a factor. Another, and in my view, more likely consideration is that of negative listener reaction to the laryngectomized speaker when confronted face to face.

Ways and means to improve understanding and affectiveness are major concerns to the laryngectomized as well as the laryngectomized family, friends and close contacts. Within the clinical setting one of the responsibilities of the speech pathologist in laryngectomy rehabilitation is the counseling of the alaryngeal speaker as well as the counseling of the caring listener regarding the development and enhancement of newly developing skills--both within the speaker and the listener.

Recovery from any type of cancer surgery is affected by three elements: cancer control, physical alterations, and psychosocial adjustment. Since removal of the cancerous larynx leaves the patient without his primary means of communication and emotional expression, efforts to rehabilitate the laryngectomized have cen-

tered on restoration of vocal communication by acquisition of esophageal speech. Other consequences of laryngectomy, particularly its effects on emotional health, social interaction, and self-image, have received less attention (Gates and Ryan et al., 1982). In keeping with this train of thought, the issue of type of alaryngeal speech has also become an "emotional issue" with the speech pathologist dealing with the laryngectomized. Reasonably, the chief goal should be measured in terms of effectiveness rather than mode.

Future Implications

Caution should be taken in generalizing the results of this study for several reasons: 1) small number of speakers threatens internal and external validity; 2) amount of therapeutic hours was not controlled for; 3) other psychosocial factors, such as familiarity with the examiner, premorbid use of facial expressions (demonstrativeness), and internal biases for and against particular speech modes.

Perhaps administering this type of task to larger groups of alaryngeal speakers who had acquired both FESs would lend further support to the literature and these results--that selection of means of communication might best be based on individual comparisons and considerations. The fundamental criterion of achievement of--or failure to achieve--functional speech, regardless of voice type, is seldom considered.

Test-retest measures over time might also yield interesting results. Does conveyance of contrastive sentences improve over

time? Many authors argue that the quality of alaryngeal speech (overall effectiveness) improves well past the six-month mark. How would this time extension, barring training of rising-falling intonations, effect this particular aspect of alaryngeal speech?

At this time the benefits of training alaryngeal speakers in contrasting sentence-types remains minimally explored. Many investigators, including Schaefer, Johns, and others, express concerns of the lack of systematic research designed to increase our understanding of and/or our suggestion of alternative appropriate therapy procedures for these individuals. Volin states the clearly defined criteria by which to measure success are also lacking (1980).

The basic question in the rehabilitative process may well be what do we, as clinicians in speech pathology, contribute to the rehabilitation process?

Summary

This study was designed to investigate the ability of alaryngeal speakers to convey sentence-types through the use of two different modes of speech: esophageal and electrolaryngeal. The study further investigated the effects of presentation mode, audio-only vs. audio-visual, on the degree of success in conveying sentence-type. These results indicated that overall, esophageal speech aided the conveyance of sentence-type over electrolaryngeal speech. However, because this study used the same speaker for both modes of speech, there was evidence to suggest within-subject differences are not as great as between-subject differences.

Therefore, the possibility exists that between-subject variables may have been a contributing factor in previous research in this area. No definitive conclusions could be drawn regarding presentation mode. Clinically, these results imply that selection of an alaryngeal speech mode be based on the individual speaker's abilities rather than routinely choosing one mode over another.

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APPENDIX

APPENDIX A

SENTENCE-TYPE: as conveyed by esophageal and electrolaryngeal methods of speech.*

Subject #1 1. __question 2. __question 3. __question 4. __question
 __statement __statement __statement __statement
 5. __question 6. __question 7. __question 8. __question
 __statement __statement __statement __statement

Subject #2 1. __question 2. __question 3. __question 4. __question
 __statement __statement __statement __statement
 5. __question 6. __question 7. __question 8. __question
 __statement __statement __statement __statement

Subject #3 1. __question 2. __question 3. __question 4. __question
 __statement __statement __statement __statement
 5. __question 6. __question 7. __question 8. __question
 __statement __statement __statement __statement

Subject #4 1. __question 2. __question 3. __question 4. __question
 __statement __statement __statement __statement
 5. __question 6. __question 7. __question 8. __question
 __statement __statement __statement __statement

Subject #5 1. __question 2. __question 3. __question 4. __question
 __statement __statement __statement __statement
 5. __question 6. __question 7. __question 8. __question
 __statement __statement __statement __statement

*Feel free to ask that the tape be stopped if you should need additional time to record a sentence.

Thanks for participating!