Listening Preference and Discrimination for Cries of Non-Cleft Palate Children, Repaired Cleft Palate Children, and Non-Repaired Cleft Palate Children*

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Introduction

Infant cries have been studied for purposes of reporting normative data for acoustic analysis (*1*), comparison with adult phonation and associated vocal tract activity (*9*), correlative data pertaining to pathologic conditions in the upper pharynx among infants (*1*), general spectrographic characteristics (*4*), and ability of a mother to judge cause of infant crying from live and recorded cry stimuli (*3*).

It has been hypothesized that infant cries and other types of vocalizations might profitably be studied in conjunction with total neurological diagnostic appraisal (*7*). Similar interest has been expressed regarding ability of judges to differentiate between the cries of cleft palate and normal neonatal cries. Massengill *et al* (*6*) reported no difference of judges to identify cries from these two groups of babies within a dichotomous task. Their judges were not able to recognize the type of cleft involvement of the lip/palate babies on the basis of listening. In a subsequent report of cry characteristics of cleft palate neonates (six), Massengill (*5*) reported inability of judges to differentiate among groups of young cleft palate children on the basis of type of cleft lip/palate involvement when the criterion for judgment was the degree of perceived nasality.

In this study three independent tasks were presented to test whether there are differences in listener preferences and/or discrimination between cries from the following groups: non-cleft palate children, unrepaired cleft palate children, repaired cleft palate children. Tasks one and two tested for listener preference. An initial task involving paired cries from normal and repaired cleft palate children was performed to determine whether judges would express preference for the normal cry. For the second task a control group of unrepaired cleft children was added.

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The third task tested for listener discrimination. Judges were asked to determine if individual cries were those of cleft palate or normal children.

Procedure

SUBJECTS. Twenty-six samples of cries from ten repaired cleft palate children, six unrepaired cleft palate children and ten children with normal palates were studied. The repaired cleft palate subjects ranged in age from five months to 40 months of age, with a mean age of 15.2 months. Ten non-cleft palate children ranged in age from two months to 28 months, with a mean age of 18 months. The six unrepaired cleft palate children had a mean age 17.3 months. Children with repaired clefts were matched with those with open clefts by age and type of cleft.

The repaired cleft palate children had undergone appropriate stages of surgical treatment as described by Mylin, Hagerty and Hess (*2*).

RECORDING PROCEDURE. Each child was held in the lap of the mother during the recording procedure. Recordings were obtained by Wollensak Tape Recorder (Model 320) with a dynamic microphone located approximately eight inches from the infant's mouth. Induced crying consisted of a slight pinch by the mother on the buttocks or sole of the foot of the child. Two seconds of sustained crying were selected from each child's recorded sample. A selected sample from each child was re-recorded on standard Language Master cards.

PLAYBACK EQUIPMENT. The equipment for all the listening tasks consisted of a modified Language Master Recorder (Model 771B). The recorded cries were fed through a McIntosh amplifier (Model MC-30) into six matched Grason-Stadler binaural headphones (Model HD-30). One set of headphones was used by the experimenter for monitoring purposes. Prior to listener judgments, all recordings were adjusted to yield approximately 75 dB (SPL) through the listener earphones. By listening to various pairs further equal loudness level adjustments were made by the experimenter.

JUDGMENT PROCEDURE. The individual cries of the ten repaired cleft palates and ten non-cleft palate children were paired for all possible combinations. Thus, a 20×20 matrix yielded 380 paired combinations (individual cries were not compared with themselves). These 380 pairs were assigned numbers from a table of random numbers. Fifty Speech Pathology students served as judges and were divided into 10 listener panels of five members. Each panel heard a different random sequence of 38 pairs. A panel member noted his preference from his given sample of 38 pairs. Judges were not aware that ten of the stimulus cries were from repaired cleft palate children.

For the second study, eighteen cries (six unrepaired cleft palates, six repaired cleft palates, and six normal palates) were paired for all possible comparison combinations. Judgmental procedures were the same as the previous task.

In the third study a simple discrimination task was performed by twenty judges. Each heard individual cries from six repaired cleft palates, six unrepaired cleft palates and six non-cleft palates. Each judge was instructed to determine whether the cry was from a cleft palate child or a non-cleft palate child. Each judge heard the series of eighteen cries in a different random order.

METHOD OF ANALYSIS. Analysis of data for the task was conducted in the following manner. The proportion of preferred judgments for any given cry was obtained against all other cries. These proportions were then averaged for all cries within each group. From the proportion matrix for all pairs compared in terms of preference, z-scores (normal deviation scores) were computed to determine a discriminal dispersion scale of preference for all individual cries. The individual dispersion scale values were corrected for direction of dispersion, with preferred and non-preferred cries identified by a cut-off value of one standard deviation. The discrimination scores by the twenty judges was computed as a percent correct for each cry sample. The discrimination scores were computed as a proportion of correct identification.

Results

Shown in Table 1 are the overall proportion from the judgments for the repaired cleft palates and the non-cleft palates by paired comparison. These proportions yield no significant difference. There were proportions of preference for those cries from normal palate children, compared with themselves, and cleft palate babies, compared with themselves. Using these proportions of preference as a control, a resultant chi-square test was not significant.

The differences in proportions in Tables 1 and 2 are illustrated by the z-score distribution shown in Figure 1. The extreme proportions of preference or non-preference was limited to seven individuals (three repaired cleft—two non-cleft—two unrepaired cleft) and these distributed themselves in both directions of preferred to non-preferred.

The proportions of preference from the second study which consisted of a control group of unrepaired cleft palate (open-clefts) children are shown in Table 2. These proportions are comparable to those proportions reported in Table 1. The proportion of correct responses in the discrimination test are shown in Table 3. None of these values significantly exceeded change expectancy.

TABLE 1. Proportion matrix for the 20 baby cries (10 normal–10 cleft palate) judged for preference by paired comparison

	normal	*repaired cleft palate*
normal	.549	.588
repaired cleft palate	.446	.533

TABLE 2. Proportion matrix for the 18 baby cries (6 normal, 6 repaired cleft palates; 6 unrepaired cleft palates) judged for the preference by paired comparison.

	normals	*repaired cleft palates*	*unrepaired cleft palates*
normal	.553	.544	.505
repaired cleft palates		.560	.453
unrepaired cleft palates			.573

.500 = chance.

Discussion

As a group, the cries of young cleft palate children treated by the early prosthetic-surgical approach are indistinguishable from those of young children with normal palates and unrepaired clefts insofar as listener choice for the cries are concerned. These findings are different from those of Massengill, et al. (*6*), whose judges were able by consensus to identify

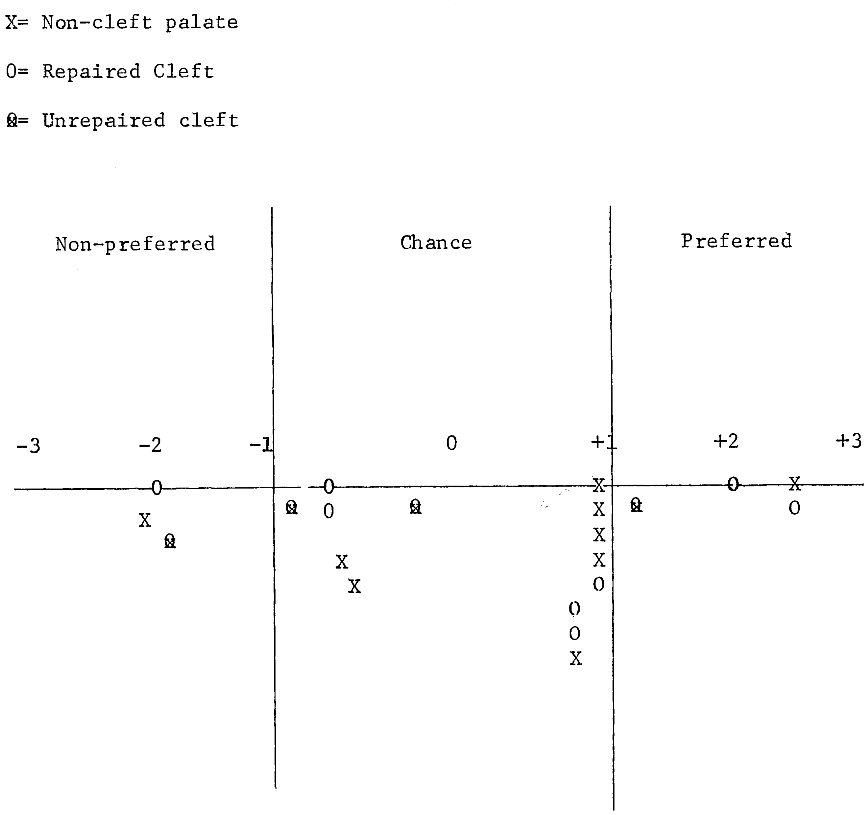

FIGURE 1. Dispersion displacement (z-scores) of the cries were judged for preference that exceeded chance.

TABLE 3. Discrimination proportions by 20 judges each responding to a series of eighteen cries (six cleft palate children, six repaired cleft palate children; six non-cleft palate children.

	normal	*repaired cleft*	*unrepaired cleft*
proportion correct responses............	.52	.54	.48

correctly 10 of 16 recordings with respect to whether the child was cleft palate or normal. The five judges employed by Massengill et al. (*6*) also achieved unanimity of identification on eight of the 16 cries under judgment. From those results, it may be inferred that judges correctly discriminated cleft palate babies from non-cleft palate babies in at least 52 of the total 80 judgments (65 percent correct).

Several possible explanations for the discrepancy between the present findings and those of Massengill et al. (*6*), are offered:

a. Listener preference tasks and Massengill et al. (*6*) identification tasks may represent different levels of expectation from the judges on the basis of prior information. However, the identification scores of the present study did not verify their results.

b. Listener preference tasks, as employed in this study, may involve a more difficult or more ambigious judgmental task, as compared with the trained speech clinicians used in the Massengill et. al. study; where identification of cries of cleft palate babies may have been abetted by expectation of perception of nasality, for example, in such cries. However, such possibility would differ sharply with Olson, who is cited by Westlake (*8*) as unable to detect nasality in recordings of cleft palate babies under the age of 30 months, or the time of attempted speech.

c. Certain discriminable features among the cleft palate infants identified by the judges in the Massengill et al. (*6*) study may not have typified those cleft palate infants considered in the present study.

d. Acoustic features of the recorded cries in the two studies may have been different. Among such differences might be sustained *vs.* interrupted crying, balanced loudness vs. imbalanced loudness regarding playback of paired cry stimuli, and possible distrotions introducted by attempts to balance pair presentation. In the latter regard, it must be admitted that there is no standard acoustic reference for 'cleft palate crying' as compared with 'non-cleft palate crying,' particularly since there is no demonstrable evidence that the cries of cleft palate infants are different from normal palate infants, except as the findings of Massengill et al. (*6*) may suggest.

Twenty-six narrow band sections (amplitude vs. frequency) of each cry sample were recorded using the Kay-Elemetric Sonagraph (Model 6061 A). Overlapping all the sections for a given group and then plotting the average curve (by inspection) yielded similar spectrum curves for all three groups.

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