Psychological Implications of Articulation Disorders in Cleft Palate Children

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The nature of speech problems in children with cleft palate has been discussed broadly in the literature (*4, 6, 8, 9, 11, 15, 18, 19, 22*). Investigations of the type and extent of articulation errors, speculations about their etiology, attempts to relate their presence to velopharyngeal anatomy and physiology—even the conflicts in evidence—have led gradually to a level of understanding that could hardly have been envisioned twenty years ago. However, the psychological components of the problem are still an enigma, and the suspected relationships between the adequacy of speech and the adequacy of the person have been difficult to delineate.

Children with clefts have often been described as maladjusted (*2*), and, indeed, have, in certain studies, given evidence of such problems as oral fixation (*1*), distortion of body image (*5, 14*), reduction in verbal output (*17*), lowered creativity (*16*), increased bodily tension (*21*), more extrapunitive needs, and greater aggression (*7*). Conversely, they have also been characterized as essentially normal (*3, 20, 23, 24*). In actual practice, clinicians often reflect the uncertainty in the literature by suspecting emotional deviations but doing little of a direct nature to assess or treat them.

SUBJECTS. The present study was undertaken in an effort to discover whether or not psychological factors are related to speech performance. One hundred seventy children were divided into three groups on the basis of nasality ratings made by a speech pathologist and a plastic surgeon and consonant articulation inventories prepared by experienced speech pathologists. Group I consisted of 32 children judged to have normal voice quality and accurate consonant production. Group II was composed of 77 children whose voice quality was considered to be normal but who had varying degrees of consonant misarticulation that seemed unrelated to velopharyngeal function. Group III contained 61 children who were judged to have hypernasality with consonant articulation patterns at least partially related to velopharyngeal seal.

Intelligibility was rated by the speech pathologists on a six-point scale with one representing complete intelligibility and six representing unintelligible speech. Intelligibility was not a problem for Group I speakers. For Group II, ratings were from one to four with a mean of 1.2. Ratings for

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TABLE 1. Comparison of chronological age in months in groups I, II, and III.

	group I $n = 32$	*group II* $n = 77$	*Group III* $n = 61$
mean c.a.	123.68	109.81	113.84
age range	59–196	62–196	58–190
σm	6.904	3.293	4.842
t			
group I		1.80	1.166
group II			.672

Group III speakers ranged from one through six with a mean of 3.12. It should be noted that only two speakers in Group III were assigned ratings of 6. It is clear, however, that Group III was composed of speakers whose intelligibility, while not seriously impaired, was reduced in comparison with the two other groups. The three groups were then compared in order to discover how they differed from each other on certain variables including type of cleft, measures of velopharyngeal closure, intelligence, and behavioral characteristics.

The children ranged in age from 37 to 196 months, with a mean chronological age of 116 months. The *t* test for significance of difference was applied to the mean chronological ages in each of the three groups. The *t*'s failed to reach significant levels, and the groups were considered to be comparable in age (Table 1).

TYPE OF CLEFT. The three groups were evaluated according to two broad classifications of clefts—clefts of the lip and palate and clefts of the palate only. Chi squares revealed a significantly higher proportion of clefts of the palate only in the group composed of normal speakers than in either of the other two groups (Table 2). This finding should be interpreted with caution since all three groups contained a variety of cleft types. However, it seems logical that speech disorders might become more pronounced as the deformity increases in extent. It is also possible that

TABLE 2. Comparison of types of cleft in groups I, II, and III.

	group I	*group II*	*group III*	*total*
cleft of the lip and palate	14	58	43	115
cleft of the palate	18	19	17	54
velopharyngeal insufficiency			1	1
totals	32	77	61	170
chi square:				
group I		9.62*	7.335*	
group II			.15	

* Significant beyond the one per cent level of confidence.

the defect which can be seen and responded to by society has greater implications than a deformity which is not obvious. These questions are beyond the scope of this paper, but they should be explored in the future.

VELOPHARYNGEAL CLOSURE. Telefluoroscopic studies were available for 29 of the Group I speakers, 77 of Group II, and 59 of Group III. Judgments of closure achieved with the head in an extended position were made from video-tape-recorded x-ray studies described extensively elsewhere (*10, 12, 13*). Chi square was applied to these data and revealed no significant difference in closure by the perfect speakers and by the speakers judged to have articulation errors only. When these two groups were compared with the hypernasal speakers, however, chi squares of 16.689 and 39.468 were significant beyond the one per cent level of confidence. This indicated that the hypernasal speakers were, as a group, experiencing difficulty with velopharyngeal seal, whereas the two groups judged to have normal voice quality were in a more favorable position in this regard (Table 3). This finding was logical and expected.

INTELLIGENCE. The next variable to be considered was intelligence. Either Binet, Form L-M, or WISC Intelligence Quotients were available for 168 of the 170 children. Information from the two instruments was evaluated separately. The *t* test for significance of difference was the statistic used. The children judged to have normal speech were not significantly different from the children with normal voice quality and articulation errors on either of the intelligence batteries. In fact, the *t*'s of .208 for Binet and .26 for the WISC fell far short of significance. These children had Binet mean IQ's of 108.88 and 107.76 respectively, indicating average ability. The Full-Scale WISC IQ's resulted in means of 104.26 and 105.24, again indicative of average ability. On the other hand, both groups of children with normal voice quality differed significantly on the Binet from the children with hypernasal speech. The latter group had a Binet mean IQ of only 96.68, still within average limits. The *t*, however, was significant beyond the five per cent level of confidence when the normal and poor speakers were compared and beyond the one per cent level of confidence when the poor speakers were compared with the speakers with nor-

TABLE 3. Comparison of velopharyngeal closure in groups I, II, and III.

	group I	*group II*	*group III*
appeared to close	23	65	19
appeared not to close	6	12	40
totals	29	77	59
chi square:			
group I		.333	16.689*
group II			39.468*

* Significant beyond the one per cent level of confidence.

TABLE 4. Comparison of intelligence quotients for subjects in groups I, II, and III.

	group I	*group II*	*group III*	*total*
Stanford-Binet, L-M				
n	17	46	41	104
IQ range	61–142	77–147	57–138	
mean	108.88	107.76	96.68	
median	109	106	97	
σ	18.44	18.51	16.86	
σm	4.61	2.75	2.66	
t				
group I		.208	2.29**	
group II			2.90*	
WISC (Full-Scale)				
n	15	29	20	64
IQ range	80–113	75–129	63–136	
mean	104.3	105.2	96.4	
median	109	108	99	
σ	9.84	11.502	17.9	
σm	2.68	2.19	4.07	
				168
t				
group I		.26	1.60	
group II			1.91	

* Significant beyond the one per cent level of confidence.
** Significant beyond the five per cent level of confidence.

mal voice quality and articulation errors. Comparisons of the WISC scores fell short of significance, but the trends were the same. This information is summarized in Table 4.

It is of some interest to note in Table 4 that excellent speech is not invariably accompanied by good intelligence nor is poor speech invariably associated with a reduced intelligence quotient. The ranges reported show that Group I contained dull children while Group III contained gifted children.

Perusal of the data suggested that children examined by the WISC usually showed a discrepancy between verbal and performance IQ's. In Group I, consisting of 15 children, all of the children showed this difference. Seven subjects had higher verbal IQ's than they had performance. The mean of these differences was 13.8 IQ points. The seven subjects with higher performance IQ's showed a mean difference of 11.0 IQ points. The mean difference for the group was 11.6 IQ points.

This pattern was not significantly altered in Group II. The 27 children examined by the WISC all showed differences between the two scales, and the mean difference was 10.9 IQ points. Fifteen had higher performance than verbal scores, and these differences resulted in a mean of 10.8. For twelve subjects, verbal scores were higher than performance, and the mean was 11 points.

Twenty subjects in Group III had the WISC. Three showed no difference between the two scales while eleven had better performance than verbal scores. The mean difference was 10.6 points. Six children in this poor speaker group had higher verbal scores than they had performance with the mean falling at 8.16 points.

Chi square applied to these data failed to show that any one group had a significantly higher proportion of children with higher performance than verbal scores. All three groups were similar in this regard. These data are summarized in Table 5.

These data suggest that we cannot justify discussing intelligence in a cleft palate population *per se*. Children with clefts are not homogeneous, and serious misconceptions may result when we fail to recognize their differences. Although these data must be interpreted cautiously, it would appear that cleft children with good velopharyngeal valving mechanisms may be somewhat brighter than children who do not have this capacity—or, at least, that they function on a somewhat higher mental level. It is outside the scope of this paper to answer why this is so. Is it that better ability makes maximum compensation possible? Or is it that bad mechanisms impose such burdens that the children are unable to cope satisfactorily with life's demands? Do they perhaps suffer from "intellectual depression" rather than from mental inferiority? These are questions that must ultimately be answered.

Behavioral Characteristics. The three groups of children were explored in yet another way. Their mothers, as part of a comprehensive case history, were questioned about the presence or absence of 28 behavioral characteristics. These were not selected with the view to developing a list of behaviors typical of cleft children. They were included because they represented problems frequently found in childhood and provided a means

TABLE 5. Comparison of WISC performance and verbal IQ's for 62 children.

	groups		
	I	*II*	*III*
n	15	27	20
mean verbal IQ	104.4	105.9	95.3
range	75–120	85–135	58–128
mean performance IQ	103.2	106.7	99.2
range	72–115	85–125	75–139
mean difference between verbal and performance IQ's	11.6	10.9	8.3
range of differences	4–19	1–29	0–19
performance and verbal IQ's the same—n	0	0	3
verbal > performance—n	7	15	11
mean IQ difference	11.0	8.8	10.6
verbal < performance—n	7	12	6
mean IQ difference	13.8	10.7	8.16

Chi square: .110 (not significant)

for assessing the relative frequency with which such symptoms might be found in the groups being studied.

Mothers of the normal speakers reported a mean of 1.97 symptoms, while the mothers of Group II children reported a mean of 3.76 behavioral symptoms. In order to assess this difference by chi square, children with zero to three symptoms and those with four or more such characteristics in Groups I and II were compared. The value of the chi square was 9.24, significant beyond the one per cent level of confidence. Therefore, on the basis of what the mothers reported about their children, those with normal speech presented fewer behavioral problems than did the children with normal quality and articulation errors.

The poor speakers had a mean of 3.05 behavioral problems reported for them; and they, too, differed from the normal speakers when compared by chi square. The value of 5.61 was significant at the two per cent level of confidence.

Group II and Group III speakers did not differ from each other in regard to the number of symptoms exhibited. These data are included in Table 6.

An analysis of the symptoms which appeared most frequently in the three groups was also made. With some variation in order for the three groups, the ten symptoms most often reported included nervousness, excitability, bad temper, restlessness, bed wetting, difficulty in disciplining, fearfulness, moodiness, preferring to be alone, and nail biting (Table 7). This list is impressive when it is remembered that cleft children have so frequently been described as passive. Several of these symptoms are not passive in nature. Indeed, they suggest aggressive behavior. In view of this, an attempt was made to see if any of the symptoms occurred with more frequency in any one group.

Table 8 provides a summary of specific behavioral disorders found to occur significantly more frequently in one group than in another. No single behavioral manifestation was found more frequently in group I than in the other two groups with the possible exception of fighting others. The chi square of 3.678 approached significance at the five per cent level.

In Group II several symptoms were outstanding. Forty-five per cent of

TABLE 6. Comparison of behavioral characteristics in groups I, II, III.

	mean no. symptoms	*number of children*		*chi square*	
		0–3 symptoms	*4+ symptoms*	*group II*	*group III*
group I	1.97	27	5	9.24*	5.61**
group II	3.75	41	36		1.08
group III	3.05	38	23		

* Significant beyond the one per cent level of confidence.

** Significant at the two per cent level of confidence.

TABLE 7. Behavioral symptoms most frequently reported in groups I, II, and III.

	groups combined (170)			*group I (32)*			*group II (77)*			*group III (61)*		
	n	%	*rank*	*n*	%	*rank*	*n*	%	*rank*	*n*	%	*rank*
nervousness	62	36	1	9	28	1	29	38	2.5	24	39	1
excitability	57	34	2	7	22	2	29	38	2.5	21	34	2
bad temper	56	33	3	6	18	3.5	35	45	1	15	25	4
restlessness	39	23	4	6	18	3.5	19	25	5.5	14	23	5
bed wetting	38	22	5	3	9	8.5	25	32	4	10	16	7
difficult to discipline	37	21	6	5	16	5.5	19	25	5.5	13	21	6
fearfulness	33	19	7.5	4	13	7	21	27	7	8	13	9
moodiness	33	19	7.5	5	16	5.5	12	16	10	16	26	3
prefers to be alone	28	16	9	1	3	10	16	21	8	11	18	7
nail biting	22	13	10	3	9	8.5	13	17	9	6	10	10

these children were described by their mothers as having bad tempers. When this frequency was compared with the 18 and 15 per cent reported for Groups I and III respectively, the chi squares were significant beyond the one per cent level of confidence. They were more often fearful than the poorest speakers, and this was significant at the one per cent level of confidence. They wet the bed more frequently than either the good or poor speakers with confidence levels at five and two per cent respectively.

Only one Group I speaker was reported to have a preference for being alone while this was true for 16 Group II speakers. The chi square, corrected for the smallness of the cell in Group I, was significant beyond the one per cent level of confidence. Chi squares comparing Groups I and III and Groups II and III failed to reach significance.

Like the normal speakers, the poorest speakers presented no single behavioral characteristic that was more outstanding for them than for the other groups. This finding alone lends some support to the conclusion that the children with normal voice quality and articulation errors seem to present a picture of emotional development that is different from that of

TABLE 8. Symptoms which occurred more frequently in one group (group II) than in another.

symptom	*chi squares*	
	groups I–II	*groups II–III*
bad temper	6.79*	6.45*
fearfulness		22.21*
bed wetting	5.85**	4.71***
prefers to be alone	4.48***	

* Significant at or beyond the one per cent level of confidence.
** Significant at or beyond the two per cent level of confidence.
*** Significant at or beyond the five per cent level of confidence.

cleft children who speak normally and from that of cleft children who have hypernasality.

Visual inspection of the symptom array for each subject suggested that children who had the symptom "bad temper," regardless of their speaker group, appeared also to have more other symptoms than did their peers. This was borne out in all the groups. The six children with normal speech who were reported to have bad tempers had a mean of 3.66 symptoms as opposed to the mean of 1.97 for the entire group of 32 and a mean of 1.57 for the 26 children who were not reported to have bad tempers. However, two of the six children with bad temper had only one symptom, and two had only two. The mean was inflated by the two remaining children who had seven and nine symptoms respectively. The 36 speakers with normal voice quality and articulation errors said to have bad tempers had a mean of 5.61 symptoms compared to the mean of 3.76 for the entire group of 77 and of 2.12 for the 41 children who were not reported to have bad tempers. Chi square (22.15, significant beyond the one per cent level of confidence) revealed that significantly more children with bad temper fell above the group mean on number of behavioral symptoms. (See Tables 9 and 10).

The 15 poor speakers with bad tempers averaged 6.26 symptoms while the mean for the entire group of 61 was only 3.05. For the 46 children who did not have bad tempers, the mean was 2.0. A chi square of 17.16, significant beyond the one per cent level of confidence, resulted when poor speakers with and without bad temper and falling at or below the group mean and above the group mean were compared.

Children from Group II who did not exhibit bad temper were then compared with Group I speakers on the basis of their falling at or below the mean for Group I or above that mean. The chi square of .170 was not significant, indicating that, in the absence of bad temper, the groups were similar.

The same finding can be reported for a similar comparison of Groups II and III. The chi square of .209 was not significant. A comparison of Group I and Group III speakers resulted in a chi square of zero, again indicating group similarity when bad temper was not a factor. These data appear in Table 11.

Summary

The results of this study suggest that children with normal voice quality and no articulation errors have velopharyngeal valving mecha-

TABLE 9. Comparisons of number of behavioral symptoms for children with and without bad temper in groups I, II, and III.

	group I	*group II*	*group III*
number with bad temper	6	36	15
mean number of symptoms	3.66	5.61	6.26
number without bad temper	26	41	46
mean number of symptoms	1.57	2.12	2.0

TABLE 10. Comparison of numbers of children at or below and above their group means for groups I, II, and III.

	group I	*group II*	*group III*
number at or below mean			
bad temper	4	13	5
without bad temper	26	36	41
number above mean			
bad temper	2	23	10
without bad temper	0	5	5
chi squares		22.15*	17.16*

* Significant beyond the one per cent level of confidence.

nisms that achieve closure, that they tend to earn higher scores on intelligence tests than do children with hypernasal speech, that clefts of the palate with no lip involvement occur in this group more frequently than chance would allow, and that they have no outstanding behavioral characteristics.

Children with normal voice quality and articulation errors also tend to achieve velopharyngeal closure and to be as bright as their normally speaking counterparts. However, they have a higher incidence of clefts with lip involvement, have more behavioral symptoms, are reported more frequently to have bad temper and bed wetting than are their normally speaking peers. They, like the poor speakers, have more other problems when bad temper is a part of the symptom complex.

Children with hypernasality, on the other hand, tend to have inadequate valving mechanisms, to earn lower scores on intelligence tests, to have clefts of the lip and palate, to have more behavioral symptoms than normal speakers, and to show no single outstanding behavioral characteristic. However, if they have bad tempers, they are also likely to have a wide range of other problems.

While these data should be viewed with caution, there is sufficient evidence of emotional difficulties in the puzzling children who *seem* to have most of the requirements for good speech but who fail to develop it nonetheless to warrant careful consideration of the possibility that the poor speech springs from the psychology rather than from the physiology.

TABLE 11. Comparison of behavioral symptoms in children without bad temper in groups I, II, and III.

	group I	*group II*	*group III*
0–2 symptoms	18	27	32
3 or more symptoms	8	14	14
chi squares			
group I		.170	0
group II			.209

There is evidence, too, to support the contention that some children with inadequate mechanisms may also be children who hurt psychologically and who may be in need of assistance in this area just as surely as they require physical restoration.

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