Cognitive, Self-Concept, and Body Image Measures of Normal, Cleft Palate, and Obese Adolescents

HELEN T. BRANTLEY, Ph.D.
EDWARD CLIFFORD, Ph.D.
Durham, North Carolina 27710

Using discriminant function analyses, this study attempted to establish linear combinations of variables that would identify group membership correctly. Groups of *normal* (N = 100), *cleft palate* (N = 51), and *obese* (N = 22) *adolescents* responded to measures of *cognitive style and structure*, *body image*, and *self-concept*. Linear combinations of cognitive measures were not effective in differentiating group membership. Body image measures, in combination, clearly distinguished obese adolescents from the other two groups. A linear combination of self-concept measures differentiated adolescents with clefts from normals, with the former group having a pattern of higher self-esteem and lower perceived acceptability by their parents.

Previous research on cleft palate children has been fragmented and restrictive in approach. Differences on psychosocial variables between children with clefts and control populations have been small and inconsistent. Such psychological differences as do exist may be subtle and complex in nature (Clifford, In press).

The data reported here were collected as part of a larger study designed to explore the interaction between cleft palate and cognitive organization as they jointly affect self-concepts and body images. It was assumed that the person's unique organization of reality, i.e., his thinking processes and thought organization, combined with a symptom, such as cleft palate, would affect the person's estimation of himself and his concepts of his body and its functioning. Further, in order to determine whether the posited effects were unique to cleft palate, normal adolescents and adolescents who were grossly obese were included. The obese sample formed a comparative clinical group for whom body images and self-concepts might be expected to differ. Extensive cognitive, self-concept, and body image measures were selected to delineate several components of each dimension because these were perceived as complex rather than unitary constructs.

Presentation of our operational definitions of body image, self-concept, and cognitive structure is appropriate. Two aspects of cognition are involved. Cognitive style variables may be identified as characteristic ways of processing information. Structural variables are specific elements of cognition, such as memory and spatial perception.

Body image is conceptualized as a multifaceted construct. Thus, a number of body image responses are involved. These include reactions to appearance, perceptions of body parameters, satisfaction with body parts and body functioning, and attitudes about physical well-being. A number of components of self-concept are utilized encompassing self-esteem and self-satisfaction, perceptions of parental acceptance, and the relative inclusiveness-exclusiveness of the self concept.

While no single variable may consistently differentiate children with clefts from other children, a combination of variables might be obtained that would better define the cleft palate population. Specifically, using discriminant function analysis (Nie et al., 1975), our purpose is to determine whether linear combinations of cognitive, body image, or self-

Dr. Brantley is affiliated with the Division of Child Psychiatry, Department of Psychiatry, University of North Carolina, Chapel Hill, North Carolina and Dr. Clifford is affiliated with the Facial Rehabilitation Center, Duke University Medical Center, Durham, North Carolina.

This research was supported by Grant DE 01899, National Institute of Dental Research.

Revision of a paper presented at the American Cleft Palate Association, San Francisco, May 15, 1976.

Address all inquiries to Edward Clifford, Ph.D., Facial Rehabilitation Center, Box 3098, Duke University Medical Center, Durham, N.C., 27710.

concept variables can be delineated capable of predicting accurately which adolescents are cleft palate subjects. If such combinations of variables are meaningful and result in reasonable group predictions, they should contribute to our understanding of psychological processes and aid in the selection of variables for further research with cleft palate subjects or with subgroups within the cleft palate population.

For this study, the statistical procedures using discriminant function analysis were applied on a *post hoc* basis. Our data analysis approach maximizes differences among groups of adolescents. Using discriminant function analysis, the specific purpose is to delineate linear combinations of variables which allow for the greatest differentiation among groups of normal, cleft palate, and obese subjects.

Procedure

SUBJECTS. One hundred adolescents (50 boys, 50 girls) without physical defects or illnesses participated in the study. This group covered diverse socioeconomic levels and included 70% white and 30% black subjects. Fifty-one adolescents with clefts volunteered for the study, and 22 adolescents, hospitalized for obesity and starting a rigorous diet regime, also participated voluntarily. All subjects were between the ages of ten and eighteen.

METHOD. Socioeconomic status, age, sex, race, grade in school, and type of presenting symptom (normal, cleft, obese) were obtained for each subject. The sample distributions are presented in Table 1. An extensive battery of psychological laboratory procedures and paper-and-pencil tests was administered to each subject. Each participant devoted an average of six contact hours in three testing sessions, for which all except the obese patients were paid.

MEASURES. The measures used ranged from traditional psychometric instruments to experimental variables created for this study. The cognitive style and cognitive structure variables utilized in this study are given in Figure 1.

Body image measures involved the use of apparatus specifically constructed for this study. In addition, several paper-and-pencil tests were used. The body image variables and their associated measures are presented in Figure 2.

TABLE 1. Sex, race, socioeconomic status (SES), and age distributions of the cleft palate, obese, and normal samples.

	cleft palate	*obese*	*normal*
Sex			
Male	31	11	50
Female	19	11	50
Race			
Black	6	2	29
White	45	20	71
SES[1]			
1	1	1	31
2	1	1	13
3	10	7	25
4	25	4	21
5	14	4	10
Age			
10–12	19	11	30
13–14	19	5	36
15–18	13	6	34

[1] Socioeconomic Status was determined using the Hollingshead (1957) scale. Highest status = 1, lowest status = 5.

All of the self-concept measures involved the use of paper-and pencil tests and these were reflected in a number of self-concept parameters. These are given in Figure 3.

ANALYSIS. Prior to the use of discriminant function analysis, each measure was factor-analyzed, using orthogonal factor analysis with varimax rotation, to determine if subsets of items or procedures yielded more internally consistent and psychologically interpretable scores. Factor analyses identified nine cognitive, 18 body-image, and 15 self-concept factors. No consistent race or sex differences were found among the factors. Since no significant differences were found among the three cleft types (lip, palate, and lip and palate), subjects with clefts were combined in further analyses.

Because our purpose was to maximize differences among the subject groups, discriminant function analyses were applied to each subset of cognitive, body image, and self-concept variables. A discriminant function analysis determines which combination of variables most clearly differentiates one group of subjects from another. The purpose of this analysis is to distinguish statistically between or among groups. The variables selected are

FIGURE 1. Cognitive Style and Cognitive Structure Variables and Measures.

Cognitive Style: Characteristic ways of processing information.	
Equivalence Range:	A measure of narrow vs. broad categorization of information. Category Width Test—modified (Wallach & Caron, 1959).
Impulsive-Reflective Thought:	A measure of speed and error in decision making. High speed and high error is characteristic of impulsive thought. Matching Familiar Figures (Kagan, 1966).
Field Dependence-Independence:	A measure of the degree to which a person is dependent upon external or internal cues in determining the upright position. Tilting Chair experiment (Witkin et al., 1954, 1962).
Cognitive Structure: Characteristics of the individual that may affect information processing.	
Vocabulary:	A measure of visual recognition vocabulary. Peabody Picture Vocabulary Test (Dunn, 1965).
Space:	The ability to localize objects in space. Space Test—Primary Mental Abilities (Thurstone and Thurstone, 1947).
Memory:	A measure of immediate auditory memory. Digit Span subtest, Wechsler Intelligence Scale for Children (Wechsler, 1949).

FIGURE 2. Body Image Variables and Measures.

Body Image Measures: Individual reactions to the appearance, structure, and functioning of the body.	
Resistance to Perceived Body Distortion:	Using aniseikonic lenses, this experiment assessed the amount of distortion present before the person recognized that his projected image was distorted. This laboratory apparatus was, in part, based on the work of Wittreich (1953).
Reactions to Viewing Body Parts:	Individuals chose liked and disliked body parts. Photographs of these body parts were projected in a size-distance estimation apparatus designed to obtain judgements about the size of each body part (Ittelson, 1952; Kilpatrick, 1952).
Body Height and Width Estimation:	This apparatus allowed the individual to estimate his own height and width. Self-estimation was compared to the estimation of the height and width of neutral objects.
Body Comparison to Assumed Norms:	A measure of the degree to which the person perceives himself to be at, above, or below an assumed norm in various aspects of body functioning. This paper-and-pencil measure contained 40 items and was constructed for this study.
Self vs Ideal-Self Body Comparisons:	A measure of the discrepancy between a series of perceived self-body measurements and the perceived ideal measurements.
Intrusiveness of Physical Problems:	A measure of the degree to which the person perceives a physical problem to be affecting himself (Meissner et al, 1967).
Sophistication of Body Drawings:	The person was asked to draw a picture of a person and then to draw a picture of a person opposite in sex to the first-drawn. Scoring is in terms of the sexual differentiation of the figures drawn (Witkin 1954; personal communication).

presumed to measure characteristics on which groups are expected to differ (Nie et al., 1975). Three separate, but overlapping, discriminant function analyses were performed: (1) comparing normal, cleft, and obese adolescents; (2) comparing normal and cleft subjects; (3) comparing cleft and obese subjects on each of the subsets of variables.

Results

COGNITIVE VARIABLES. Normal adolescents scored higher than cleft or obese subjects on field-independence, short term memory, and vocabulary measures. However, the discriminant function analyses on the combination of cognitive variables were not significant, i.e., group membership could not be discriminated statistically.

BODY IMAGE VARIABLES. Adolescents with clefts did not differ significantly from normals on body-image variables. However, obese subjects differed from other subjects. Comparing normal, cleft, and obese groups, the discriminant function analysis produced a significant linear combination of 11 variables which accurately classified 72% of the subjects (Table 2).

Subjects most consistently misclassified

FIGURE 3. Self-Concept Variables and Measures.

Self-Concept Measures: Individual reactions to examining various aspects of his behavior and/or attitudes.

Self-Acceptance and Self-Esteem:	A measure of the degree to which a person values himself and the degree to which he is acceptable to himself. Self-Description and Self-Rating Scales (Clifford and Clifford, 1967).
Perceived Parental Acceptance:	A projective measure of the person's estimate of the degree of his parent's acceptance of him. When I Was Born test (Clifford and Brantley, 1977).
Self-Satisfaction:	A measure of the degree to which a person is satisfied about a number of personal characteristics. Self-Satisfaction Scale (Secord and Jourard, 1953).
Inclusive-Exclusive Self:	A measure of the extent to which the person includes or excludes a variety of concepts within the self-concept. Self-Inclusion Test—modified (Prelinger, 1959).

TABLE 2. Discriminant function analysis: body image variables of normal, cleft palate, and obese subjects.

comparison groups	*predicted as normal*		*predicted as cleft*		*predicted as obese*		*total*
	N	%	*N*	%	*N*	%	
Normal Subjects	89	89.0	7	7.0	4	4.0	100
Cleft Subjects	32	62.7	19	37.3	0	0.0	51
Obese Subjects	7	31.8	0	0.0	15	68.2	22

Percent of Cases Correctly Classified = 72.10

were adolescents with cleft palate who were placed in the normal group. The discriminant function analysis obtained by comparing only the normal and cleft samples was not significant and resulted in classifying 63% of the cleft subjects as belonging in the normal group.

When subjects with cleft palate were contrasted with obese subjects, eight variables formed a linear combination that classified 96% correctly. The pattern of responses and weightings of the variables indicate that obese subjects are more concerned about health problems and are less satisfied with their appearances than either cleft palate or normal adolescents (Table 3).

SELF-CONCEPT VARIABLES. In general, adolescents with clefts had different self-concepts from either normal or obese subjects. Subjects with clefts generally scored higher on self-concept variables than either normal or obese adolescents. Greater significant differences were obtained on variables related to subjects' projected feelings about parental acceptance at birth. On these variables, adolescents with clefts scored significantly lower than the other adolescents.

Using all three groups, a linear combination of nine variables accurately predicted group membership for 74% of the subjects. Cleft palate subjects, if misclassified, were placed in the normal group (Table 4).

TABLE 3. Discriminant function analysis: body image variables of cleft palate and obese subjects.

comparison groups	*predicted as cleft*		*predicted as obese*		*total*
	N	%	*N*	%	
Cleft Subjects	49	96.1	2	3.9	51
Obese Subjects	1	4.5	21	95.5	22

Percent of Cases Correctly Classified = 95.89

The discriminant function analysis using the normal and cleft samples resulted in a significant linear combination of variables predicting group membership with 83% accuracy (Table 5). Fewer normal subjects than cleft subjects were misclassified.

When cleft palate and obese subjects were compared, the resultant discriminant function classified 90% of the cases accurately with only one cleft subject being misclassified (Table 6). Considering the pattern of responses and the weightings of the variables, cleft pal-

TABLE 4. Discriminant function analysis: self-concept variables of normal, cleft palate, and obese subjects.

comparison groups	*predicted as normal*		*predicted as cleft*		*predicted as obese*		*total*
	N	%	*N*	%	*N*	%	
Normal Subjects	92	92.0	6	6.0	2	2.0	100
Cleft Subjects	19	37.3	32	62.7	0	0.0	51
Obese Subjects	16	72.7	2	9.1	4	18.2	22

Percent of Cases Correctly Classified = 73.99

TABLE 5. Discriminant function analysis: self-concept variables of normal and cleft palate subjects.

comparison groups	*predicted as normal*		*predicted as cleft*		*total*
	N	%	*N*	%	
Normal Subjects	94	94.0	6	6.0	100
Cleft Subjects	19	37.3	32	62.7	51

Percent of Cases Correctly Classified = 83.44

TABLE 6. Discriminant function analysis: self-concept variables of cleft palate and obese subjects.

comparison groups	*predicted as cleft*		*predicted as obese*		*total*
	N	%	*N*	%	
Cleft Subjects	50	98.0	1	2.0	51
Obese Subjects	6	27.3	16	72.7	22

Percent of Cases Correctly Classified = 90.41

ate adolescents expressed a greater degree of self-esteem and self-confidence than did obese subjects. However, the cleft group expressed a lower degree of perceived parental acceptance than did either the normal or the obese samples.

Discussion

Clearly, the cognitive variables are the least discriminating set of variables in the study. Although cleft and obese groups may perform more poorly on specific cognitive measures than normals, a linear combination of cognitive variables does not provide a more accurate prediction of group membership, that is whether any given adolescent has a cleft, is obese, or is normal. Differences that do occur may be related to variability within groups rather than to the adolescent's physical characteristics. For example, within the cleft palate sample, pre-existing problems with speech and/or hearing may account for lowered performances on specific cognitive tasks, although these may not be discriminable when they are merged with other cognitive variables. The overall analysis, however, leads us to conclude that linear combinations of cognitive structures and styles do not discriminate these samples.

Body-image measures exhibit greater discriminability with obese subjects than with the other two groups of adolescents. Since the obese adolescents in this study were grossly and visibly overweight, it is not too surprising that the combination of body-image variables was successful in distinguishing them. The body-image concept, in large part, was formulated to account for reactions to gross body distortions (Schilder, 1950). It is of considerable interest to note that errors in classifying adolescents with clefts misclassified them as normals. In terms of discriminability on body image variables, the cleft sample fell between the normal and the obese groups. The discriminant analyses clarify the difficulties of the obese adolescent with body image, while confirming that subjects with clefts express no pervasive feelings of body distortion.

The data do delineate a combination of self-concept variables that discriminate adolescents with clefts from the obese and normal adolescents. Adolescents with clefts expressed a greater degree of self-confidence and self-esteem. Simultaneously, they expressed strong feelings about their nonacceptability to their parents; two of the most discriminating self-concept variables come from the *When I Was Born* test (Clifford and Brantley, 1977), which asks the subject to imagine how his parents

reacted at the time of his birth. Apparently, cleft palate subjects are able to recognize adverse effects on parents of giving birth to a child with a cleft. At the same time, however, self-esteem, at least in this study, is high. Perhaps heightened self-esteem arises after they have managed to cope successfully with the experience of having had clefts. Perhaps cleft palate management over a period of years provided the means by which they could "overcome" a potentially handicapping condition. Denial or reaction formation may be present, but such explanations are not really congruent with the expressed recognition of probable parental reactions to the birth. Studies other than this one will have to address themselves more specifically to aspects of self-regard.

It is clear that these findings indicate that adolescents with clefts are psychologically like physically normal adolescents in terms of cognitive structure and body image. Using large numbers of variables in linear combinations do not reflect, however, subtle differences between the two groups. An adolescent with a cleft is more likely to be classified as a normal subject than as a member of a unique group. Only in the area of self-concept, particularly with regard to perceived familial acceptance and enhanced self-esteem, does the cleft palate adolescent appear to be different.

Reprints: *Helen T. Brantley, Ph.D.*
Division of Child Psychiatry
Department of Psychiatry
North Carolina Memorial Hospital
Chapel Hill, N.C. 27514

References

CLIFFORD, E. Psychosocial aspects of cleft lip and palate. In K. R. Bzoch (Ed.), *Communicative disorders related to cleft lip and palate.* Boston: Little, Brown & Co., In press.

CLIFFORD, E., and BRANTLEY, H. T., When I was born: Perceived parental reactions of adolescents, *J. Personal. Assess., 41,* 604–609, 1977.

CLIFFORD, E., and CLIFFORD, M., Self-concepts before and after survival training, *Brit. J. Soc. Clin. Psych., 6,* 241–248, 1967.

DUNN, L. M., *Peabody picture vocabulary test.* Minneapolis: American Guidance Service, Inc., 1965.

HOLLINGSHEAD, A. B., *Two factor index of social position.* New Haven, Conn: 1965.

ITTELSON, W. H., *The Ames demonstrations in perception.* Princeton: Princeton University Press, 1952.

KAGAN, J., Reflection-impulsivity: The generality and dynamics of conceptual tempo, *Journal of Abnormal Psychology, 71,* 17–24, 1966.

KILPATRICK, F. P. (Ed.), *Human behavior from the transactional point of view.* Hanover, N.H.: Institute for Advanced Research, 1952.

MEISSNER, A. L., THORESON, R. W., and BUTLER, A. J., Relation of self-concept to impact and obviousness of disability among male and female adolescents, *Perceptual and Motor Skills, 24,* 1099–1105, 1967.

NIE, N.H., HULL, C. H., JENKINS, J. G., STEINBRENNER, K., and BENT, D. H., *SPSS Statistical Package for the Social Sciences.* Second Edition. New York: McGraw Hill Book Co., 1975.

PRELINGER, E., Extension and structure of self-concept, *J. Psych., 47,* 13–23, 1959.

SCHILDER, P., *The image and appearance of the human body.* New York: International Universities Press, 1950.

SECORD, P. F., and JOURARD, S. M. The appraisal of body cathexis: Body cathexis and the self. *J. Consult. Psych., 17,* 243–247, 1953.

THURSTONE, L. L., and THURSTONE, T. G., *SRA primary mental abilities.* Chicago: Science Research Associates, 1947.

WALLACH, M. A., and CARON, A. J., Attribute criteriality and sex-linked conservatism as determinants of psychological similarity, *J. Abnorm. Soc. Psych., 59,* 43–50, 1959.

WECHSLER, D., *Wechsler intelligence scale for children,* New York: The Psychological Corp., 1949.

WITKIN, H. A., DYK, R. B., PATERSON, H. F., GOODENOUGH, D. R., and KARP, S. A., *Psychological differentiation: Studies of development.* New York: Wiley, 1962.

WITKIN, H. A., LEWIS, H. B., HERTZMAN, M., MACHOVER, K., MEISSNER, P. B., and WAPNER, S., *Personality through perception: An experimental and clinical study.* New York: Harper, 1954.

WITTREICH, W. J., Aniseikonia and distortion of the self-image, *Amer. J. Psych., 8,* 457–458, 1953.