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**ABSTRACT**

Young children's nonverbal affective expression and communication reveals an emotional complexity and sensitivity which exceeds their verbal abilities. To investigate the development of nonverbal emotional communication in young children, two studies were undertaken. In the first study, equal numbers of 5- and 11-year-old children from two schools were videotaped using facial expressions to show affective states (happy, sad, angry). The children subsequently interpreted the expressions of unfamiliar children from the other school. An analysis of the results showed that young children were able to communicate affect through facial expressions and that the interpretative ability of 5-year-old children was on a par with 11-year-old children for the happy and angry expressions of peers. In the second study, 112 children, equally divided among 4-, 5-, 6-, and 19-year-olds, interpreted verbal/vocal and musical representations of affect (happy, sad, angry, afraid). An analysis of the results showed considerable consistency in the understanding of affective meaning in music for 4- to 6-year-old children and adults. Performance with sad and angry pieces improved from 4 to 5 years, declined between 5 and 6 years, then increased significantly between the 6 year and adult levels. The 4-year-old children were able to identify the fearful selections better than the 5- and 6-year-old children. The results of these studies led to the examination of multidimensional aspects of nonverbal affective communication between parents and children in a naturalistic setting, through the analysis of videotaped morning goodbyes of parent-child dyads at a daycare center. Preliminary results showed that, contrary to reported differences in verbal parent-child interactions by socioeconomic status, no such differences have been found in nonverbal affective exchanges. (Implications for cognitive-developmental models and clinical research and practice are discussed.) (BL)

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THEORETICAL AND CLINICAL RELEVANCE

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Nonverbal Affective Communication in Children:

Theoretical and Clinical Relevance

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The various aspects of children's emotional experience which have been discussed in today's symposium reflect the fact that, as Plutchik (1983) and others have noted, emotional development is a multidimensional process. Some aspects of the process are addressed by theorists who have emphasized the role of cognitive development in constraining or enabling affective growth and change (Kagan, 1978; Piaget, 1981; Sroufe, 1979). However my interactions with children have led me to observe other aspects of children's emotional behavior which appear to be somewhat independent of their representational or thinking ability. In particular, the nonverbal expressive and interactive behavior of preschool-aged children has appeared to reflect an emotional sophistication not easily accounted for by their concurrent conceptual capacities. The ongoing variability in their facial expression and voice tone, or patterns of change in their spatial proximity to and physical contact with others have revealed an emotional complexity and sensitivity which have also typically exceeded and/or contradicted their verbal report. Indeed, the nonverbal behavior of preschoolers in group or family treatment has often proved to be more informative of underlying group or family dynamics than the verbal report and more cautious nonverbal behavior of older children, siblings and parents.

These observations led to my involvement in a series of studies designed to investigate the development of nonverbal emotional communication in young children. In this paper I will attempt to summarize the results of several of those studies and place them in the context of related findings by other investigators. I will also relate them to models of affective development which emphasize the evolutionary origins and adaptive functions of affect (Plutchik, 1980) and some which, in addition, explicate both independent and interactive aspects of affective and cognitive processes (Buck, 1981; Izard, 1977). I will conclude with some speculative comments regarding a) similar developments occurring in recent theoretical work on the relationship between cognition and perception and b) the possible clinical utility of data and theory in the nonverbal affective domain.

I began this program of research several years ago with the assistance of Adelaide Brown in an initial study of developmental differences in the production and interpretation of affective facial expression. Existing developmental studies (Odom & Lemond, 1972; Yarkzower, Kilbride & Hill, 1979) and reviews (Ekman, Friesen & Ellsworth, 1972) suggested that older children could both produce and interpret such expressions more accurately than preschoolers. However, as I noted earlier, my own interactions with preschoolers suggested that their affective facial expressions were at least as communicative as those of older children and that their peer and family interactions often seemed to reflect an accurate reading of the facial expressions of others. For the most part, the previous developmental studies had utilized adult judges and still photos to evaluate children's expressive ability, and still photos of adult expressions to evaluate children's interpretive ability.

In designing our study, we attempted to better represent the everyday experience of children in two ways. First, to preserve the dynamic quality of expressive change, we videotaped children's facial expressions in response to our request that they simultaneously describe situations and show us how they looked when they felt happy, sad, and angry. Second, we had the same 5- and 11-year old children serve first as expressers and later as interpreters, in order to determine whether older and younger children differ in their evaluations of age peers and persons of another age group and to examine the correlation between expressive and interpretive abilities. Because we viewed the interpretation response, a forced-choice selection of the correct affective label for the depicted expression, as having a stronger representational/verbal component than the expression response, we hypothesized that the greater cognitive and verbal facility of the older children would result in more developmental differences in interpretive ability than in expressive ability. We also reasoned that a finding of no relationship between interpretive and expressive abilities would be consistent with the notion that the two measures tapped at least some different abilities. Equal numbers of male and female children at each age level came from 2 different schools, with each child interpreting the facial expressions of only unfamiliar children from the other school. A group of college-aged interpreters was also included.

After a correlational analysis revealed no significant relationship between the interpretive and expressive measures ( $r = .148$ ,  $p > .05$ ), the data were analyzed in a five-way ANOVA for the effect of Sex and Age of both Expresser and Interpreter and of the Affect Expressed. Significant main effects of Age of Interpreter, Age of Expresser and Affect were qualified by a significant 3-way interaction among those factors.

Table 1 of your handout contains the group means and results of tests of simple effects of Age of Expresser and Age of Interpreter for each Affect. All mean values were significantly above chance and inspection of the  $F$  values for the expresser simple effects comparisons (presented in brackets) reveals that there were no significant differences between 5 and 11 year olds in expressive ability. Several age differences in interpretations of sadness and anger were demonstrated; however, four of the five instances resulted from 11- and 19-year-old subjects being more accurate than 5-year-olds in interpreting angry and sad expressions of 11-year-olds. When interpreting the expressions of their age peers, the 5-year-olds showed less accuracy than 19-year-olds only in judgments of sadness.

In general, then, the present study demonstrated the ability of young subjects in communicating affect through facial expression. Five- and 11-year-old expressions were communicated above chance and were of similar quality, the interpretive ability of 11-year-olds was on a par with that of adults, and 5-year-olds were as accurate as the older children and adults in interpreting the happy and angry expressions of their peers. Similar findings evidencing communicative competence in the affective facial expressions of young children have been reported recently (Carlson, Felleman & Masters, 1983; Carlson, Gantz & Masters, 1983; Oster, 1981).

The second study to be reviewed here was designed to extend research on the development of nonverbal affective communication to the domain of music. I became interested in music as a channel of communication for several reasons. Generally, I saw it as an nonverbal channel which had an intriguing pattern of similarities and differences in relation to such channels as facial expression and voice tone. First, like those channels,

Music conveys affective meaning nonverbally and is found in all cultures. Also, some theorists (Clynes, 1982) have reported evidence that the representation of affect in music may be characterized in terms of cross-culturally invariant spatial-temporal forms like those which have been suggested for facial expression (Ekman, 1982) and voice tone (Scherer, 1982). In contrast to facial expression and voice tone however, music does not characterize most or even many of our everyday interpersonal exchanges and there appears to be much more individual expressive and interpretive variability in the musical communication of affect among adults.

The dearth of existing data on music precluded the development of precise predictions. However, it was hypothesized that earlier development of the ability to understand interpersonal verbal and nonverbal communications of affect might support the emergence of similar abilities with musical affective representations as early as the 4th or 5th year of life. The study was conducted with the assistance of Rebecca Smith and included 112 male and female subjects divided equally among four age levels: 4 yrs., 5 yrs., 6 yrs., and 19 yrs. of age. Each subject listened to a series of 20-second audiotape-recorded segments of verbal/vocal affective expressions and musical affective expressions, and made a forced-choice interpretation of the affective meaning (happy, sad, angry or afraid) of each segment. The tape was comprised of 3 verbal/vocal representations and 3 musical representations of each affect, with each representation included twice on the tape to provide a measure of intra-rater reliability. The verbal/vocal selections were brief spoken passages in which the semantic content and tone of voice specified one of the four affects. They were included to insure that the task requirements, including the verbal labeling method, were not beyond the problem solving competence of the youngest subjects.

Musical stimuli were 20-second segments of orchestral recordings of classical music which were characterized as representing one of the four affects by at least 70% of 400 adult subjects who listened to them in pilot testing (E attempted to exclude popular selections [e.g., Nutcracker Suite, Swan Lake] from the initial pool).

Subjects were instructed that they would hear a series of "things to listen to which have a feeling about them," and that their job was to decide whether each one sounded happy, sad, angry, or afraid," with the order of affective terms randomized across subjects. The four choices of affect were verbally presented and the subject's verbal response recorded during each 10-second inter-segment interval.

Subjects' responses were scored as correct if they were in agreement with the interpretation of the adult pilot subjects. Mean correct interpretations for verbal/vocal and musical stimuli are presented in Tables 2 and 3 of your handout. Time limits preclude discussion of the verbal/vocal data, except to note that tests of all means in Table 2 for deviation from chance performance (chance  $\bar{X} = 1.5$ ), with alpha limited by the Bonferroni procedure, found all  $t$  values significant at or beyond  $p < .003$ . Similar tests of all music data means, contained in Table 3, for deviation from chance performance indicated that all groups were above chance, except 4-year-old interpretations of sad and angry stimuli and 5-year-old interpretations of fearful stimuli. These data were analyzed in a 4 (Subject Age) x 2 (Subject Sex) x 4 (Stimulus Affect) analysis of variance with repeated measures on the last factor. Significant main effects of Subject Age, Subject Sex and Stimulus Affect were qualified by two significant two-way interactions, Subject Age x Stimulus Affect,  $F(9, 312) = 11.55$ ,  $p < .001$ , and Subject Sex x Stimulus Affect  $F(3, 312) = 3.18$ ,  $p < .02$ .



Tests of simple effects on the data involved in the Age x Affect interaction revealed that a steady developmental improvement was evidenced only with happy pieces of music. Performance with sad and angry pieces improved from 4 to 5 years, declined somewhat between 5 and 6 years, then increased significantly between the 6-year and adult levels. The fearful selections reflected the most surprising pattern, with the youngest group of subjects showing the highest performance, significantly better than both the 5- and 6-year olds.

Table 4 contains the means involved in the significant Sex x Affect interaction, which was revealed by subsequent analysis to be a function of the lack of a sex-related performance difference with Angry pieces, while females were more accurate than males in interpreting Happy, Sad and Fearful pieces. These findings are of particular interest in relation to the sex differences which have been discussed in other papers in this symposium and to several recent reviews of sex differences in empathy and related behaviors (Berman & Zahn-Waxler, 1983; Eisenberg & Lennon, 1983; Feshbach, 1982).

In general, these results indicate that there is considerable consistency in the understanding of affective meaning in music between 4-6-year-old children and adults. The pattern of below chance agreement levels for 4-year-old judgments of sad and angry selections and 5-year-old judgments of fearful selections are difficult to interpret given the verbal nature of the response measure, particularly in the context of the remarkably high agreement among 4-year-olds with fearful selections. Indeed, while both of these studies have provided evidence that preschool-aged children are adept at nonverbal affective communication, the precision of measurement has been limited by the use of verbal response measures. It might well be the case that the several instances of age-related similarities in performance, rarely reported

in cognitive areas of developmental research, might themselves reflect underestimations of the affective sensitivity of young children. For example, recent research in nonverbal affective communication with newborn babies has demonstrated the reliable and situationally specific facial expression of several discrete categories of emotion (Emde, Gaensbauer & Harmon, 1976), peer and species sensitivity to vocal distress (Martin & Clark, 1982) and reliable imitation of happy, sad and surprised facial expressions (Field, Woodson, Greenberg & Cohen, 1982).

These considerations have led us to extend the previous studies in several ways. Walker (1982) has utilized the entirely nonverbal response of visual attention in demonstrating that 4- and 7-month-old infants match affective vocal expressions to corresponding affective facial expressions. With the assistance of Christine Sickle, we have adopted the procedure to determine if infants and 1- to 2-year-old children will give evidence of matching the affective musical passages to corresponding affective facial expressions.

Robin Hornik-Parritz and I have also begun an examination of multi-dimensional aspects of nonverbal affective communication between parents and children in a naturalistic setting by videotaping morning goodbyes in day care centers. An intriguing finding has already emerged in a preliminary analysis of this ongoing project. The parent-child dyads were sampled along lower and middle socioeconomic levels. Although previously reported (Hess & Shipman, 1965; White, 1971) SES differences in components of observed parent-child verbal interaction (e.g., lower-class parents issuing more commands than middle-class parents) have been replicated, the dyads in the two SES groups have demonstrated strikingly similar and functional patterns of nonverbal affective exchange.

In terms of theory, the considerable proficiency demonstrated by infants and young children in all of these studies of nonverbal affective communication provides support for accounts which emphasize the evolutionary origins and adaptive significance of affect and its expression (Plutchik, 1980; Chance, 1980), and those which explicate independent and interactive aspects of cognitive and affective processes (Buck, 1981; Izard, 1977; Zajonc, 1980). These findings, together with those involving more cognitive aspects of emotion, such as awareness, reflection and attribution, suggest that consideration of the areas of convergence between such models and the cognitive-developmental models noted earlier (Kagan, 1981; Piaget, 1981; Sroufe, 1979) will be important. Similar considerations about the best way to characterize the relationship between cognition and perception (Odom & Cunningham, 1980; Tighe & Shepp, 1983; Ullman, 1980) may be useful in that regard, particularly to the extent that affect is conceptualized as a system for channeling information about the internal environment as perception channels information from the external environment (Doner, 1983).

Finally, the results of the reviewed studies have relevance for clinical research and practice alike. Work in this area may provide a more powerful method for empirical investigation of the relative importance of emotional and cognitive processes in the development of psychopathology. Recent longitudinal investigations of the developmental origins of alcoholism (Valliant, 1983) and schizophrenia (Knight & Roff, 1983; Knight, Roff, Barnett & Moss, 1979) have indicated that early measures of affective health and impairment were more predictive of long-range outcome in both disorders than were measures of intellectual ability or thought disorder. However, measures of emotional processes (e.g., flatness or appropriateness of affect; rated warmth of childhood) have generally been more global and less

reliable than measures of intellectual processes (I.Q., thought disorder). Further refinements in the measurement of nonverbal affective behavior, such as frame by frame segmentation analysis of videotaped behaviors (Buck, 1981; Newton, 1976), may enhance our ability to measure emotional processes with greater specificity and reliability. Such an improvement in measurement could also facilitate more rigorous investigation of hypotheses regarding the unconscious influences of emotion on behavior.

In more applied terms, our understanding of the complexity and variability of young children's emotional experience in clinical work may be enhanced by incorporating the advances in measurement of expressive behaviors into clinical training curricula. Evidence for the utility of such an approach is provided by Gaensbauer's (1982) use of affective facial expression as an effective monitor of an infant's response to treatment in a case study of child abuse.

In sum, it would seem that the nonverbal communicative competence of infants and young children has the potential to enhance our verbal understanding of emotional processes and problems. For that to occur however, we must work on learning about their language with the same enthusiasm and effort that they demonstrate in learning about ours.

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Table 1

Mean Correct Interpretations<sup>a</sup> by Age of Interpreter, Age of Expresser, and Emotion

Emotion	Age of Expresser	Age of Interpreter			F Values for Interpreter Simple Effect Comparisons		
		5 yrs. Mean	11 yrs. Mean	19 yrs. Mean	5 yrs. w/11 yrs.	5 yrs. w/19 yrs.	11 yrs. w/19 yrs.
Happiness	5	9.08	10.13	10.08	4.03	3.72	.006
		[.06] <sup>b</sup>	[.04]	[.12]			
	11	9.29	9.96	9.79	1.65	.93	.103
Sadness	5	6.29	7.33	8.67	4.03	20.96*	6.61
		[.01]	[.73]	[.12]			
	11	6.38	8.04	8.96	10.32*	15.36*	3.12
Anger	5	5.92	7.00	6.79	4.36	2.85	.16
		[.01]	[3.86]	[7.96]			
	11	5.83	8.63	9.13	28.96*	40.26*	.93

<sup>a</sup>Maximum of 12

<sup>b</sup>Brackets contain F values for Expresser Simple Effect Comparisons

\*p < .01

Table 2

Mean Correct Interpretations<sup>a</sup> of Verbal Stimuli as a Function of Subject Age and Stimulus Affect.

		<u>Stimulus Affect</u>				
		Happy	Sad	Angry	Afraid	Combined
<u>Subject</u> <u>Age</u>	4 yrs.	4.71	4.43	2.62	2.32	3.53
	5 yrs.	5.86	5.14	4.18	3.18	4.59
	6 yrs.	5.14	4.64	4.25	3.57	4.40
	19 yrs.	6.00	5.71	5.85	5.67	5.81
	Combined	5.43	4.98	4.23	3.68	

Table 3

Mean Correct Interpretations<sup>a</sup> of Musical Stimuli as a Function of Subject Age and Stimulus Affect.

		<u>Stimulus Affect</u>				
		Happy	Sad	Angry	Afraid	Combined
<u>Subject</u> <u>Age</u>	4 yrs.	3.25	1.79*	1.39*	4.29	2.88
	5 yrs.	4.43	3.50	2.86	2.18*	3.24
	6 yrs.	4.89	2.86	2.36	3.50	3.40
	19 yrs.	5.82	5.68	4.21	3.93	4.91
	Combined	4.60	3.46	2.71	3.47	

Table 4

Mean Correct Interpretations<sup>a</sup> of Musical Stimuli as a Function of Subject Sex and Stimulus Affect.

		<u>Stimulus Affect</u>				
		Happy	Sad	Angry	Afraid	Combined
<u>Subject</u> <u>Sex</u>	M	4.15	3.00	2.75	3.21	3.28
	F	5.05	3.91	2.66	3.73	3.84
	Combined	4.60	3.46	2.71	3.47	

<sup>a</sup> Maximum of 6.

\* Not significantly ( $p < .003$ ) beyond chance ( $\bar{X} = 1.5$ )