

WILEY

SR Society for
CD Research in
Child Development

Self Development and Self-Conscious Emotions

Author(s): Michael Lewis, Margaret Wolan Sullivan, Catherine Stanger and Maya Weiss

Source: *Child Development*, Vol. 60, No. 1 (Feb., 1989), pp. 146-156

Published by: [Wiley](#) on behalf of the [Society for Research in Child Development](#)

Stable URL: <http://www.jstor.org/stable/1131080>

Accessed: 27/11/2013 11:43

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Wiley and *Society for Research in Child Development* are collaborating with JSTOR to digitize, preserve and extend access to *Child Development*.

<http://www.jstor.org>

Self Development and Self-Conscious Emotions

Michael Lewis, Margaret Wolan Sullivan,
Catherine Stanger, and Maya Weiss

*Institute for the Study of Child Development, Robert Wood Johnson Medical
School, University of Medicine and Dentistry of New Jersey*

LEWIS, MICHAEL; SULLIVAN, MARGARET WOLAN; STANGER, CATHERINE; and WEISS, MAYA. *Self Development and Self-Conscious Emotions*. CHILD DEVELOPMENT, 1989, 60, 146–156. In each of 2 studies, the mirror-rouge technique was used to differentiate children into those who showed self-recognition and those who did not. In Study 1, 27 children (aged 9–24 months) were observed in 2 experimental situations thought to differentially elicit fear and embarrassment behaviors. In Study 2, 44 children (aged 22 months) were seen in the situations of Study 1 and 3 additional contexts thought to elicit embarrassment behavior. The results of both studies indicate that embarrassment but not wariness was related to self-recognition.

This article explores the relation between self development as measured by self-recognition and the expression of fear and embarrassment. Fear, but not embarrassment, has been considered a primary emotion (Tomkins, 1963). Our general hypothesis is that specific cognition skills are necessary for the emergence of the secondary emotions, although they are not necessary for the primary emotions. In particular, self-referential behavior is not necessary for the emergence of fear but is necessary for the emergence of embarrassment.

The current literature on emotions in the first 2 years focuses on the appearance of what has been called the fundamental or primary emotions (Lewis & Michalson, 1983). These emotions are characterized both by their early appearance and by having prototypic and universal facial expressions. Beyond the appearance of these early emotions, the emergence of other emotions remains relatively uncharted, although some empirical work on pride and guilt, especially within an achievement situation, has recently appeared (Gepert & Kuster, 1983; Heckhausen, 1984).

Theories regarding the origins of the secondary emotions and their dynamics and relation to one another are largely untested, perhaps because measurement methods, operational definitions, and a catalog of possible emotions are not well developed. The appearance of some emotions after the emergence of the primary ones has led to their

classification as secondary or derived emotions (Lewis & Michalson, 1983; Plutchik, 1970). The use of the terms primary, secondary, or derived promotes a number of alternative views regarding the course of emotional development. One model presumes that these later emotions are derived from the earlier ones and are composed of combinations of the primary emotions, as all colors are composed from the three primary ones (Plutchik, 1970). Another model considers that these secondary emotions follow the primary ones but are not constructed from these earlier ones (Izard, 1977). Still another model holds that emotions are tied to cognitive processes; those needing the least cognitive support emerge first, and those needing more emerge later (Lewis & Michalson, 1983). To the degree that the earlier, primary emotions contribute to cognitive development, it can be said that they are indirectly related to the secondary or derived emotions (Lewis, Sullivan, & Michalson, 1984).

Although the sequence of emergence of primary emotions has yet to be fully articulated, it seems that by 12 months of age, they all have appeared. Even so, it is not until the middle of the second year that the secondary emotions are observed (Borke, 1971; Lewis & Brooks-Gunn, 1979a; Stipek, 1983). More elaborate cognitive abilities either are necessary for, or occur prior to, the emergence of this new class of emotions—abilities that appear between the end of the first year and the middle of the second year of life.

This research is supported from a grant by W. T. Grant Foundation to Michael Lewis and by HD 17205 to Margaret W. Sullivan. Reprint requests should be sent to Michael Lewis, Institute for the Study of Child Development, UMDNJ-Robert Wood Johnson Medical School, One Robert Wood Johnson Place, CN19, New Brunswick, NJ 08903-0019.

[*Child Development*, 1989, 60, 146–156. © 1989 by the Society for Research in Child Development, Inc. All rights reserved. 0009-3920/89/6001-0017\$01.00]

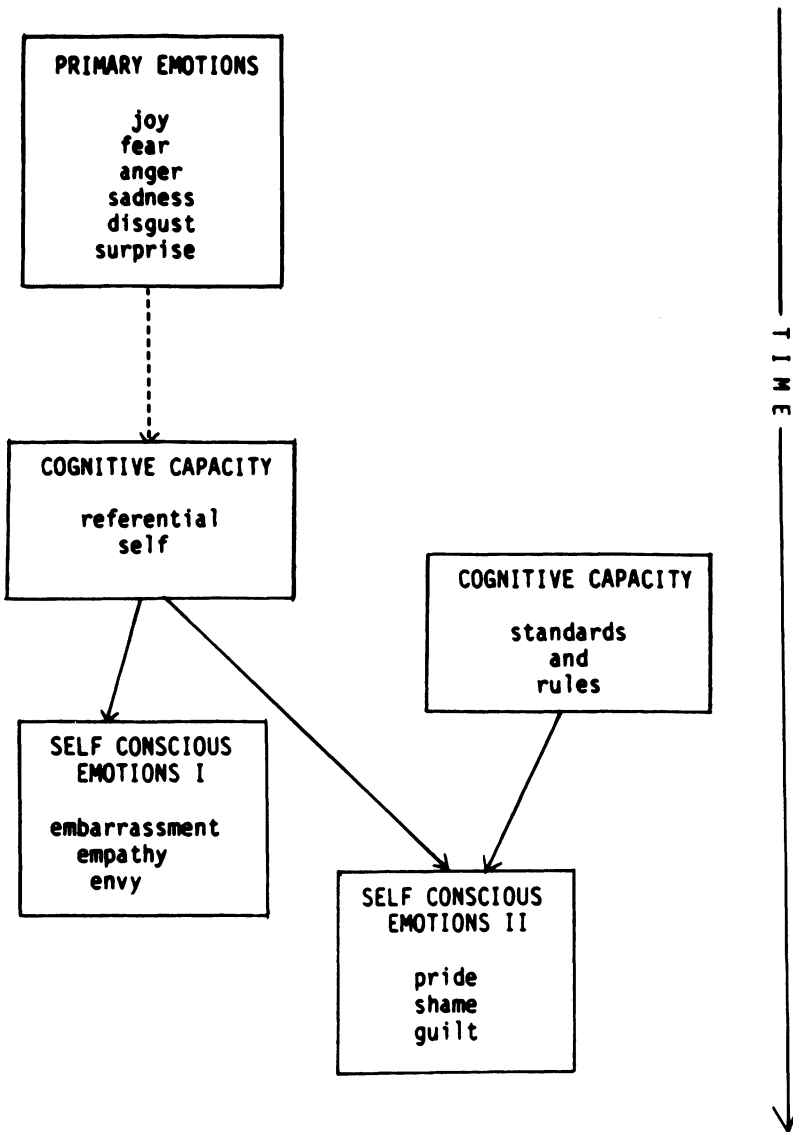


FIG. 1.—A general model of the interface between cognition and the development of self-conscious emotions.

Figure 1 presents a general developmental model. In Stage 1, the primary emotions appear. The timing of the emergence of particular primary emotions is undetermined as yet; interest, joy, physical distress, and disgust expressions appear to be present at or shortly after birth (Izard, 1977).¹ Anger expressions have been observed as early as 4 months (Stenberg, Campos, & Emde, 1983),

surprise by 6 months (Charlesworth, 1969), and given the appropriate eliciting circumstances, surprise, anger, fear, and sad expressions can be observed in 10-week-old infants (Sullivan & Lewis, in press).

In Stage 2, self-referential behavior emerges, although the self system has been undergoing development over the first 2 years

¹ The distinction between emotional state, expression, and experience has been made (Lewis & Michalson, 1983; Lewis & Rosenblum, 1974). Here we refer to emotional states and expressions. Emotional experiences require more elaborate cognitive ability (Lewis & Brooks-Gunn, 1979b; Lewis & Michalson, 1983).

148 Child Development

of life. Self-other differentiation appears first, followed by object permanence, which appears around 8 months, even though permanence is not consolidated until 18 months or so (Piaget, 1954). Self-referential behavior has a developmental course and appears between 15 and 24 months of age (Bertenthal & Fischer, 1978; Lewis & Brooks-Gunn, 1979b).

The appearance and consolidation of these cognitive skills provide the underpinning for the emergence of Stage 3, the first class of secondary emotions. Self-conscious emotions are characterized by self-referential behavior and include embarrassment, empathy, and perhaps envy. These emotions appear before or around the second birthday. At the same time, children learn about other aspects of their social world, including emotional scripts (Michalson & Lewis, 1985) and rules of conduct that allow them to evaluate their own production and behavior (Kagan, 1981). This leads to the second class of self-conscious emotions—self-evaluative emotions, such as guilt, shame, and pride. Self-evaluative emotions emerge after the self-conscious emotions since they require more cognitive capacity.

In order to observe the relation between self-referential behavior and these secondary emotions, it is necessary (1) to observe the development of two classes of emotion, one associated with primary, the other with self-conscious emotions, and (2) to study their relation to self-referential behavior. The primary emotion of fear (or wariness) will appear early and not require self-referential behavior, while embarrassment should emerge with or following self-referential behavior.

Study 1

METHOD

Subjects

The subjects were 27 infants divided into three age groups: nine were between 9 and 12 months (\bar{X} age: 10.5 months); 10 were aged 15–18 months (\bar{X} age: 17 months); and eight were aged 21–24 months (\bar{X} age: 22.5 months). Data from three additional subjects were omitted from analysis because of an uncooperative child, a videotape problem, and failure of the mother to follow instructions.

Apparatus and Procedure

Each subject was given a Bayley Test of Mental Maturity in addition to the three experimental conditions, the order of which was counterbalanced across all subjects. All conditions were videotaped.

Facing the stranger.—The child was seated in a high chair while the mother sat close by in a laboratory room (3 × 4 m). At a signal, an unfamiliar woman appeared in the door and slowly walked toward the child, taking about 15 sec to reach the infant, whereupon she touched the subject's hand, turned, and left the room.

Facing the mirror.—The same infants received two different procedures using a mirror. In both situations, the infant was placed in front of a one-way mirror (46 × 89 cm) mounted on a large (1.22 × 2.44 cm) sheet of plywood behind which a videocamera was placed.

In the first procedure, on the experimenter's signal the infant was placed in front of the mirror by the mother. The child's facial and gestural response in front of the mirror was obtained from the videotape. In the second procedure, nonscented rouge was applied to the infants' noses by their mothers, who pretended to wipe their child's face. The children were placed in front of the mirror and their behavior toward the marked nose was observed (see Lewis & Brooks-Gunn, 1979a, for a more specific description).

Measures

Self-recognition.—Mark-directed behavior (touching of the spot on the nose) during the mirror-rouge episode has been found to be the most reliable indicator of self-recognition in numerous studies (Lewis & Brooks-Gunn, 1979a), and served as the index of self-referential behavior. Nose touching was scored from videotape for all subjects by two coders; reliability was 100%. Coding of self-recognition was carried out independently of coding the emotions and was done by different coders.

Fear/wariness.—The prototypic situation for studying fear in young children has been the approach of a stranger. The appearance of full-blown fear or distress reactions to the stranger approach is not a universal reaction (Rheingold & Eckerman, 1973); however, mild negative reactions and inhibited behavior have been noted and termed wariness (Lewis & Rosenblum, 1974).

Wariness was defined as an attentive look characterized by a neutral or sober facial expression accompanied by a sudden inhibition of ongoing vocal or other behavior and was followed by gaze aversion. All three components were required to be present in the designated sequence in order for wariness to be scored. Whenever they occurred, fear expressions and crying were coded. A fear face was

TABLE 1
DISTRIBUTION OF SUBJECTS AT EACH AGE WHO EXHIBIT VARIOUS EMOTIONAL BEHAVIORS
DURING STRANGER APPROACH AND BEFORE A MIRROR

AGE (in Months)	N	Cried (n)	Fear (n)	Wary (n)	Embarrassed (n)
Stranger:					
9-12	9	7	1	7	1
15-18	10	1	3	10	1
21-24	8	1	1	6	0
Total	27	9	5	23	2
Mirror:					
9-12	9	2	1	0	2
15-18	10	0	0	0	3
21-24	8	0	0	0	5
Total	27	2	1	0	10

defined as it is described in the MAX coding system (Izard & Dougherty, 1982). Crying also was scored. Interobserver reliability, the number of agreements over number of agreements plus number of disagreements, was (90%) fear, (92%) wariness, and (98%) cry.

Embarrassment.—Darwin (1872/1965) was the first to describe self-conscious emotions, including the phenomenon of blushing, although he used self-conscious emotion terms somewhat interchangeably. Izard (1977) and Tomkins (1963) treated shame and embarrassment as behaviorally identical. Embarrassment has been defined to include blushing (originally identified by Darwin in 1872) and a “silly smile” and/or laughter, particularly giggling (Buss, 1980). Hand gestures and body movements also have been implicated as components of embarrassment and serve to distinguish it from amusement (Edelman & Hampson, 1981; Geppert, 1986).

A prototypical eliciting situation does not exist for embarrassment. Buss (1980) has discussed several situations, including breaches of privacy, public self-consciousness, and overpraise. Public self-consciousness, which may be a quite useful procedure with young children, may be elicited by viewing the self in a mirror as others watch. Although it may seem counterintuitive to expect a mirror to elicit embarrassment (it is not a social situation, for example), viewing oneself in a mirror is an attentional manipulation, and one which can direct attention to specific aspects of the self. Amsterdam (1972), Dixon (1957), and Schulman and Kaplowitz (1977) all reported instances of self-conscious behavior in young children viewing themselves in mirrors.

The behavioral criteria for embarrassment were selected by relying primarily on

the descriptions of Buss (1980), Edelman and Hampson (1981), and Geppert (1986). The behaviors necessary to score embarrassment were a smiling facial expression followed by a gaze aversion and movement of the hands to touch hair, clothing, face, or other body parts. These hand gestures appear to capture the nervous movements previous investigators state are characteristic of embarrassment. Such body touching could accompany smiling/gaze avert, or follow it immediately. All three behaviors were required for a person to be scored as having shown embarrassment, although very similar findings as those to be reported were found when only smiling and gaze aversion were used as the criteria. Blushing was not used as a criterion for embarrassment since it appears to be an infrequent response, even in older preschool children (Buss, 1980). Interobserver reliability for embarrassment was 85%.

RESULTS

A dichotomous (yes/no) score for self-recognition, crying, fear, wariness, and embarrassed faces was obtained. Table 1 presents these data by age and condition.

Stranger condition.—Few subjects cried or showed a fear face, although most showed a wary face. There was a significant difference between wary (and cry) and embarrassed faces ($Z = 4.83, p < .01$) and cry and embarrassed faces ($Z = 5.00, p < .01$). While there were no age differences in wary face, there were age differences in the cry face, $\chi^2(2) = 12.02, p < .01$, with the younger subjects showing the most cry.

Mirror condition.—No subjects showed wariness (two showed crying), but 10 subjects showed embarrassment (Wilcoxon $T = 2.00$,

150 Child Development

$p < .005$). Nine subjects cried and five showed a fear face in the stranger approach, but only two subjects cried, and one showed a fear face in the mirror condition ($Z = 4.89$, $p < .01$, $Z = 3.77$, $p < .01$, respectively). While 10 subjects showed embarrassment in the mirror condition, only two showed it in the stranger approach ($Z = 2.74$, $p < .01$). The number who showed embarrassment increased with age, $\chi^2(2) = 9.90$, $p < .01$.

Self-recognition behavior.—Ten of 27 children showed mark-directed behavior. None touched their noses either during the non-rouge mirror situation or the stranger condition. Age changes were significant, $\chi^2(2) = 5.5$, $p < .01$, and consistent with prior findings (Lewis, Brooks-Gunn, & Jaskir, 1985).

Relationship between Self-Recognition and Emotional Expression

A chi-square analysis was conducted to determine the relation of both wariness and embarrassment to self-recognition. Yates's corrected chi squares for the total sample ($n = 27$) and Fischer's exact probability, when the data for the 15–24-month-olds were examined ($n = 18$), were used. Wariness was not significantly associated with self-recognition; touchers and nontouchers were equally likely to exhibit wariness, 80% versus 82%, respectively. Embarrassment was more likely to occur for subjects who touched their noses than for those who did not, $\chi^2(1) = 5.32$, $p < .02$.² Of these subjects who showed embarrassment, 80% also touched their noses. Thus, despite the low level of embarrassment exhibited in the study, almost all subjects who exhibited embarrassment touched their noses.

Relationship between Self-Recognition, Emotional Expression, and General Cognitive Ability

The significant relation between self-recognition and embarrassment and the lack of relation between self-recognition and wariness might be due to a third factor, that is, the child's general cognitive ability. To test for this, we examined children's scores on the Bayley Scales of Infant Development and found no relation between the MDI scores and their performance on any of the three tasks.

DISCUSSION

Infants' responses to the stranger approach situation were consistent with the

literature (Rheingold & Eckerman, 1973). Infants showed wariness more than fear. Wariness was expressed when infants faced a stranger and not when they were exposed to a mirror. Wariness, like fear, theoretically need not involve a referential self, although it does require detection of the familiar versus novel and possibly self-other discrimination.

Embarrassment was seen in the mirror, but not in the stranger situation. Mirrors direct the child's attention to itself and result in embarrassment (Amsterdam, 1972). The relatively moderate frequency of embarrassment may be attributable to the situation used to elicit it. Even so, embarrassment in the older two age groups (15–24-month-olds) was moderately high; 44% of the subjects exhibit this behavior.

The relation between self-recognition ability and embarrassment but not wariness was supported. The overwhelming number of subjects who showed embarrassment also touched their noses in self-recognition. No evidence was found for a relation between recognition and wariness or the effects of general cognitive ability on these associations.

Study 2

A second study was undertaken to further pursue these results. Besides seeking to replicate the findings, Study 2 addressed some of the specific issues raised. Age changes in self-recognition and embarrassment may have produced a spurious association between self-referential behavior and embarrassment. Use of more subjects all of the same age would not confound the age variable. Although other variables may affect the relation between self-recognition and embarrassment, the results of Study 1 indicate that general cognitive ability is not one of these factors.

The use of more than one situation to elicit embarrassment provides an opportunity to explore situations likely to elicit this emotion. Since Buss (1980) has suggested that exposure and overpraise may elicit embarrassment, we chose, besides the mirror situation, to look at three other conditions likely to lead to embarrassment. Moreover, looking at four situations as elicitors of embarrassment permits an assessment of the amount of embarrassment each child shows by looking at the number of times the child exhibited this emotion.

² When the 15–24-month-olds were combined in an attempt to unconfound age, which is related both to self-recognition and embarrassment, embarrassment was associated with recognition (Fischer's exact probability, $p < .02$).

TABLE 2
EMOTIONAL EXPRESSION BY EXPERIMENTAL CONDITION

Condition	N	EXPRESSION							
		Wary		Fear		Cried		Embar- rassed	
		n	%	n	%	n	%	n	%
Stranger:									
Total	44	24	55	0	0	2	5	2	5
Males	25	19	76	0	0	2	8	2	8
Females	19	5	26	0	0	0	0	0	0
Mirror:									
Total	44	2	5	2	5	4	9	11	25
Males	25	1	4	1	5	3	12	6	24
Females	19	1	5	1	4	1	5	5	26
Compliment:									
Total	41	4	10	0	0	1	2	13	32
Males	22	4	18	0	0	0	0	5	23
Females	19	0	0	0	0	1	5	8	42
Dance for mother:									
Total	43	0	0	0	0	4	9	10	23
Males	22	0	0	0	0	3	12	3	13
Females	19	0	0	0	0	1	5	7	37
Dance for experimenter:									
Total	41	2	5	0	0	2	5	13	32
Males	23	2	9	0	0	0	0	4	17
Females	18	0	0	0	0	1	5	9	50

METHOD

Subjects

The subjects were 44 children, 19 females and 25 males, who were part of a short-term longitudinal study of emotional development. The mean age of the sample was 22 months (± 2 weeks).

Procedures

Each subject received five emotion-eliciting situations administered in a random order. Each was videotaped, and close-up views of the child's face and upper body were obtained. The situations were as follows.

The stranger situation.—The situation was conducted as in Study 1 except that a small table and chair were used in lieu of the high chair. An unfamiliar female other than the experimenter served as the stranger during the approach sequence.

The mirror situation.—The mirror procedure was the same as in Study 1 and included two segments—one without rouge, which served as the embarrassment situation, and one with rouge, which provided the index of self-referential behavior.

Overcompliment situation.—The experimenter initiated interaction with the child, during which she lavishly complimented the

child in an effusive manner. A series of four to five compliments were made about the child or his or her appearance. For example, the child was told he was smart, cute, had beautiful hair, and had lovely clothes, etc.

Request-to-dance situations (mother and experimenter).—In these two situations, the experimenter handed the mother a small tambourine and asked the mother to coax the child to dance, or did so herself. They each said, "Let's see you dance, dance for me, I'll sing 'Old MacDonald' [or a song familiar to the child]." The dance situation was utilized since conspicuousness is thought to be an elicitor of embarrassment (Buss, 1980). The episode terminated either when the child complied and danced, or upon direct refusal.

Measures

Fear, cry, wariness, and embarrassment, along with self-recognition, were defined and coded as in Study 1. Interobserver reliabilities were fear face (92%), wariness (92%), cry (95%), embarrassment (87%), and self-recognition (100%).

RESULTS

Table 2 presents the numbers and percentage of subjects by sex showing fear face, crying, wariness, and embarrassment for each

TABLE 3
 NUMBER OF TIMES EMBARRASSMENT AND
 WARINESS WERE OBSERVED
 OVER THE SITUATIONS USED TO ELICIT THEM

	EMBARRASSMENT (Mirror, Compliment, Dance-M, Dance-E Conditions)				
	0	1	2	3	4
Total	20	9	7	5	3
Males.....	14	6	2	2	1
Females	6	3	5	3	2
Touchers	7	7	6	4	2
Nontouchers	13	2	1	1	1

	WARINESS (Stranger Condition)	
	0	1+
Total	17	27
Males.....	4	21
Females	13	6
Touchers.....	10	16
Nontouchers.....	7	11

of the five conditions. Given the frequencies, only wariness and embarrassment were analyzed. Wariness showed an overall condition effect (Cochran Q test, $Q = 30.15, p < .001$) such that wariness is more likely in the stranger situation than in any of the others: stranger versus mirror, $\chi^2(1) = 50.22, p < .001$; stranger versus compliment, $\chi^2(1) = 17.3, p < .001$; stranger versus dance/m, $\chi^2(1) = 60.00, p < .001$; stranger versus dance/e, $\chi^2(1) = 22.38, p < .01$. Wariness, rather than embarrassment, was seen in the stranger condition ($Z = 4.08, p < .01$).

Embarrassment also shows an overall condition effect (Cochran Q test, $Q = 14.04, p < .01$) and was less likely to occur in the stranger situation than in any of the others: stranger versus mirror, $\chi^2(1) = 5.78, p < .02$; stranger versus compliment, $\chi^2(1) = 8.99, p < .003$; stranger versus dance/m, $\chi^2(1) = 4.92, p < .025$; stranger versus dance/e, $\chi^2(1) = 8.99, p < .003$. Embarrassment did not differ by condition.

Self-Recognition and Emotional Behavior

Across conditions, an aggregate count of the number of subjects who showed a range of behavior was obtained (see Table 3). This

range varies from never showing the emotion on any of the four conditions to showing the emotion on each condition.³ Table 4 presents by condition the number and percentage of subjects who showed wary and embarrassment behavior as a function of self-recognition. It was predicted that while there would be no difference between touchers and nontouchers for wary behavior, touchers would show significantly more embarrassed behavior than nontouchers.

The first analysis looked at the numbers of subjects who did and did not show the two emotions across conditions as a function of self-recognition. Of the touchers, seven did not show any embarrassment, while 19 showed embarrassment on at least one condition. Likewise, there were 13 nontouchers who showed no embarrassment, while there were only five nontouchers who showed embarrassment, a significant difference, $\chi^2(1) = 8.08, p < .005$. Of those subjects who showed at least one occasion of embarrassment, approximately 80% touched their noses. Moreover, 32 out of 44 subjects showed the predicted relation between embarrassment and self-recognition. Observation of the number who showed wary behavior as a function of self-recognition revealed no significant differences; only self-recognition is related to embarrassment.

A condition analysis (see Table 4) revealed that for the stranger condition, there was no significant difference in wariness as a function of self-recognition, while there were several significant (or near significant) effects for embarrassment. Subjects who showed self-recognition also exhibited more embarrassment in the compliment (Fischer's exact, $p < .055$), dance/m (Fischer's exact, $p < .11$), and dance/e (Fischer's exact, $p < .02$) conditions. Thus, the overall effect was replicated by observing each of the conditions individually.

Sex Differences

Two classes of sex differences can be observed: first, sex differences in embarrassment and wariness independent of self-recognition; and second, sex differences in the relation between self-recognition and embarrassment. Table 3 allows us to observe these effects. With respect to wariness, four males showed none, while 21 subjects showed at least one occasion of wariness, while for females the numbers were 13 versus six, re-

³ Table 3 also shows the aggregate score for wary behavior. However, since wariness was exhibited so seldom in the other conditions, the aggregate scores of more than 1 occurred for only five subjects, and we have combined them into the 1+ category.

TABLE 4

FOR TOTAL SAMPLE, THOSE WHO HAVE ATTAINED SELF-REFERENTIAL BEHAVIOR (Touchers)
AND THOSE WHO HAVE NOT (Nontouchers)

	% OF SUBJECTS SHOWING WARY OR EMBARRASSMENT									
	Stranger		Mirror		Compliment		Dance-Exp		Dance-Mother	
	W	E	W	E	W	E	W	E	W	E
Total.....	55	5	5	25	10	32	5	32	0	23
Touchers.....	54	8	4	31	4	42	8	44	0	27
Nontouchers.....	56	0	6	17	18	18	0	13	0	18

	NO. OF SUBJECTS SHOWING WARY OR EMBARRASSMENT									
	Stranger		Mirror		Compliment		Dance-Exp		Dance-Mother	
	W	E	W	E	W	E	W	E	W	E
Total.....	24	2	2	11	4	13	2	13	0	10
Touchers.....	14	2	1	8	1	10	2	11	0	7
Nontouchers.....	10	0	1	3	3	3	0	2	0	3

spectively, $\chi^2(1) = 10.32, p < .002$. Across all four conditions, females showed more embarrassment than males. For males, 15 showed none, while 10 showed at least one occasion of embarrassment, while for females the numbers were 6 versus 13, respectively, $\chi^2(1) = 2.60, p < .10$. Of the subjects who showed two or more occasions of embarrassment, 20% of males and 52% of females showed this effect ($p < .001$). When the same analysis is performed by condition, similar findings appear, especially for the conditions on which there was a high degree of wariness observed. For the stranger and compliment conditions, there is a significant sex difference, with males showing more wariness than females, $\chi^2(1) = 10.74, p < .005$; $\chi^2(1) = 3.84, p = .05$, respectively. Sex differences in embarrassment by condition indicated that females showed more embarrassment than males for the dance/e condition, $\chi^2(1) = 3.57, p < .05$.

Observation of the relation between embarrassment and self-recognition by sex indicates that both sexes show a strong relation between this cognitive milestone and emotional development. Of males who showed embarrassment, 10 out of 11 touched their noses, while of the females who showed embarrassment, nine of 13 touched their noses. Likewise, there was no relation between wariness and self-recognition for either sex.

DISCUSSION

The general discussion will consider three issues: (1) situations eliciting emotions

and measures, (2) the interface of cognition and emotion, and (3) individual and sex differences in the development of embarrassment.

Situations and Measures

The data from both studies agree, even though Study 1 varied age. Embarrassment, but not wariness, was related to self-recognition when observed either by looking at age changes in the ability to recognize oneself in the mirror or by looking at individual differences in this ability during the period of time when it is being acquired.

The approach of a stranger has long been used as a situation to elicit fear, although wariness rather than fear is usually observed (see Lewis & Rosenblum, 1974). Embarrassment is elicited by situations that produce exposure of the self, although Buss (1980) describes embarrassment also as being elicited by impropriety or lack of social competence, as well as conspicuousness. There are many situations that might be used to elicit this emotion, and we found that four were successful: viewing oneself in the mirror (in both studies), being complimented, and being asked to perform (to dance). Self-conspicuousness is the central feature of these situations. While these situations are different in terms of the amount of embarrassment elicited, they did not produce much wariness/fear. Likewise, few subjects showed embarrassment during stranger approach. These situations, therefore, are adequate to observe embarrassment.

154 Child Development

Although the measurement of wariness/fear has been well established, the measurement of embarrassment has received less attention, although since Darwin (1872/1965) it has been described and seen in young children (Amsterdam, 1972; Dixon, 1957; Lewis & Brooks-Gunn, 1979a; Schulman & Kaplowitz, 1977). In this study, the measurement approach used provides an easy criteria for observing its presence.

One problem with using nervous touching as part of the criteria is that this is a behavior also used in the self-recognition measure. In order to eliminate any confusion, we limited our definition of embarrassment to smiling and gaze averting, a procedure used by some (Buss, 1980). Using this new measure to compare embarrassment with self-recognition resulted in findings quite similar to those when nervous touching is included. Under this measurement procedure, many more subjects would be said to show embarrassment. For example, in Study 1, 21 rather than 10 subjects showed embarrassment. Although the numbers of subjects increase, the percentage of subjects who show embarrassment, without using nervous touching as a criteria, and who show self-recognition is 78%, while 22% show embarrassment and no self-recognition. These figures are similar to the findings using nervous touching; thus, there is no reason to believe that our definition of embarrassment affects the results reported.

The Role of Cognition and Affect

We have suggested that in order for all secondary emotions, both self-conscious and self-evaluative, to emerge, a referential self is necessary. It is important to note that a self system and its development consists of several features (Lewis & Brooks-Gunn, 1979b). While details of this system are still being worked out (see, e.g., Pipp, Jennings, & Fischer, 1987), self-other differentiation, self-per-

manence, and the ability to consider the self as a separate entity are some of the features of this system. The ability to consider one's self—what has been called self-awareness or referential self—is one of the last features of self to emerge, occurring in the last half of the second year of life. The ability to consider one's self rather than the ability to differentiate or discriminate self from other is the cognitive capacity that allows for all self-conscious emotions such as embarrassment and empathy, although the development of standards is also needed for self-conscious evaluative emotions such as shame, guilt, and pride. Self-referential behavior has been defined operationally as the ability of the child to look at its image in the mirror and to show, by pointing and touching its nose, that the image in the mirror *there* is located in space *here* at the physical site of the child itself. In the results reported in both studies, embarrassment, in general, does not occur unless self-referential behavior exists.⁴

While a third factor may be related to our findings, given the observed relation between embarrassment, but not wariness, and self-referential behavior, it would seem that self-recognition behavior represents an important milestone in the child's development of a self system and in its general cognitive and emotional development.

The relation between the primary emotions and the development of the self has been suggested (Lewis et al., 1985; Schneider-Rosen & Cicchetti, 1984; Stern, 1985), but little empirical work has been conducted relating these two systems. The mother-child relationship has been proposed to affect the development of self, but only two studies have shown any relation (Lewis et al., 1985; Schneider-Rosen & Cicchetti, 1984). While it appears likely that socioemotional behavior and its socialization affect the child's

⁴ The relation between embarrassment display and self-referential behavior is not perfect. In both studies, a very few subjects showed embarrassment but did not show self-referential behavior. We cannot explain why this occurred, except to point out that very few subjects did so and that the measurement systems, for either self-recognition or embarrassment, are not perfect. It may be the case that a child was scored as embarrassed and was not, or the child did not touch their noses during the test for some reason and should have, given that they possess self-referential ability. The latter seems more likely, since we had only one situation of self-recognition but four situations in which to measure embarrassment. In fact, in Study 2 there were five children who showed embarrassment but did not touch their noses. Review of their behavior before the mirror indicates that four of the five can be said to have recognized themselves. One subject labeled her image by name. The utterance was unintelligible but apparently was accepted by the mother as her name. Three other children showed concern over the rouge on their noses and appeared to be upset by its appearance. Although those four subjects did not touch their noses when they looked in the mirror, they appeared to recognize themselves since they complained about the rouge on their noses. If this is so, then of the subjects who showed embarrassment ($n = 24$), 96% had some type of self-referential behavior.

developing self system, there is only weak evidence to indicate any direct effect of early emotional life on the referential self. Nevertheless, the development of the self system impacts on the child's subsequent emotional life.

Sex Differences

While males are more wary than females in the stranger approach situation, females are more embarrassed than males. Sex differences in fear/wariness, when they appear, indicate that females are more wary than males (Maccoby & Jacklin, 1974). For embarrassment, there are still fewer data, unless we look to variables such as sociability or shyness, where there is some evidence that at adolescence females are more shy and less sociable than males (see Crozier, 1979; Gould, 1987). It is difficult to determine exactly why these sex differences appear. Differential socialization practices might account for differences in emotional expressivity (Brooks-Gunn & Lewis, 1982; Malatesta & Haviland, 1982). Although there are few studies in this regard, data from the classroom indicate that teachers are more apt to direct their comments pertaining to the self's action (how well or poorly a problem was handled) to boys than to girls, while they are more apt to direct comments pertaining to the self (good or bad child) to girls than to boys (Cherry, 1975). Differential socialization may produce these sex differences.

Individual differences were determined by obtaining a total score of embarrassment over four conspicuous situations. While most children exhibited either no embarrassment or one embarrassment over the four situations, there were eight children who showed embarrassment 75% or more of the time. Maternal reports confirm that these children are most easily embarrassed. Data collected on these same children at 3 years indicate that these eight children remain easily embarrassed (Lewis, Stanger, & Sullivan, in press). The etiology of individual differences in embarrassment has not been studied; some have suggested, however, that besides differences in parental behavior, temperament differences might play some role (Kagan, Garcia-Coll, & Reznick, 1984; Zimbardo, 1977; Jones, Check, & Briggs, 1986; Zimbardo, 1977). Clearly, more work, both on individual as well as sex differences, needs to be undertaken. Given an adequate measurement system and situations now available to elicit these emotions, such an undertaking is possible.

References

- Amsterdam, B. K. (1972). Mirror self image reactions before age two. *Developmental Psychology*, 5, 297-305.
- Bertenthal, F. I., & Fischer, K. W. (1978). The development of self-recognition in the infant. *Developmental Psychology*, 11, 44-50.
- Borke, H. (1971). Interpersonal perception of young children: Egocentrism or empathy. *Developmental Psychology*, 5, 263-269.
- Brooks-Gunn, J., & Lewis, M. (1982). Affective exchanges between normal and handicapped infants and their mothers. In T. Field & A. Fogel (Eds.), *Emotions and early interaction* (pp. 161-188). Hillsdale, NJ: Erlbaum.
- Buss, A. H. (1980). *Self-consciousness and social anxiety*. San Francisco: W. H. Freeman.
- Charlesworth, W. R. (1969). The role of surprise in cognitive development. In D. Elkind & J. H. Flavell (Eds.), *Studies in cognitive development: Essays in honor of Jean Piaget* (pp. 257-314). London: Oxford University Press.
- Cherry, L. (1975). The preschool child-teacher dyad: Sex differences in verbal interaction. *Child Development*, 46, 532-535.
- Crozier, W. R. (1979). Shyness as anxious self-preoccupation. *Psychological Reports*, 44, 959-962.
- Darwin, C. (1965). *The expression of emotion in animals and man*. Chicago: University of Chicago Press. (Original edition 1872)
- Dixon, J. C. (1957). The development of self-recognition. *Journal of Genetic Psychology*, 91, 251-256.
- Edelman, R. J., & Hampson, S. E. (1981). The recognition of embarrassment. *Personality and Social Psychology Bulletin*, 7, 109-116.
- Geppert, U. (1986). *A coding system for analyzing behavioral expressions of self-evaluative emotions*. Munich: Max-Planck Institute for Psychological Research.
- Geppert, U., & Kuster, U. (1983). The emergence of "wanting to do it oneself": A precursor of achievement motivation. *International Journal of Behavioral Development*, 6, 355-370.
- Gould, S. J. (1987). Gender differences in advertising response and self-conscious variables. *Sex Roles*, 5/6, 215-225.
- Heckhausen, H. (1984). Emergent achievement behavior: Some early developments. In J. Nicholls (Ed.), *The development of achievement motivation* (pp. 1-32). Greenwich, CT: Jai.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum.
- Izard, C. E., & Dougherty, L. M. (1982). Two complementary systems for measuring facial expressions in infants and children. In C. E. Izard (Ed.), *Measuring emotions in infants and chil-*

156 Child Development

- dren (pp. 97–126). New York: Cambridge University Press.
- Jones, W. H., Check, T. M., & Briggs, S. R. (Eds.). (1986). *Shyness*. New York: Plenum.
- Kagan, J. (1981). *The second year: The emergence of self-awareness*. Cambridge, MA: Harvard University Press.
- Kagan, J., Garcia Coll, C., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development*, *55*, 1005–1019.
- Lewis, M., & Brooks-Gunn, J. (1979a). *Social cognition and the acquisition of self*. New York: Plenum.
- Lewis, M., & Brooks-Gunn, J. (1979b). Toward a theory of social cognition: The development of self. In I. Uzgiris (Ed.), *New directions in child development: Social interaction and communication in infancy* (pp. 1–20). San Francisco: Jossey-Bass.
- Lewis, M., Brooks-Gunn, J., & Jaskir, J. (1985). Individual differences in early visual self-recognition. *Developmental Psychology*, *21*, 1181–1187.
- Lewis, M., & Michalson, L. (1983). *Children's emotions and moods: Developmental theory and measurement*. New York: Plenum.
- Lewis, M., & Rosenblum, L. (1974). (Eds.). *The origins of fear*. New York: Wiley.
- Lewis, M., & Rosenblum, L. (1978). Introduction: Issues in affect development. In M. Lewis & L. Rosenblum (Eds.), *The development of affect: The genesis of behavior* (Vol. 1, pp. 1–10). New York: Plenum.
- Lewis, M., Stanger, C., & Sullivan, M. W. (in press). Deception in three year olds. *Developmental Psychology*.
- Lewis, M., Sullivan, M. W., & Michalson, L. (1984). The cognitive-emotional fugue. In C. E. Izard, J. Kagan, & R. B. Zajonc (Eds.), *Emotions, cognition and behavior* (pp. 264–288). London: Cambridge University Press.
- Maccoby, E. E., & Jacklin, C. N. (1974). (Eds.). *The psychology of sex differences*. Stanford, CA: Stanford University Press.
- Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotional expression in infancy. *Child Development*, *53*, 991–1003.
- Michalson, L., & Lewis, M. (1985). What do children know about emotions and when do they know it? In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 117–140). New York: Plenum.
- Piaget, J. (1954). *The origins of intelligence in children* (M. Cook, trans.). New York: Norton.
- Pipp, S., Jennings, S., & Fischer, K. W. (1987). Acquisition of self and mother knowledge in infancy. *Developmental Psychology*, *23*, 86–96.
- Plutchik, R. (1970). Emotions, evolution and adaptive processes. In M. Arnold (Ed.), *Feelings and emotion* (pp. 384–402). New York: Academic Press.
- Rheingold, H. L., & Eckerman, C. O. (1973). Fear of the stranger: A critical examination. In H. Reese (Ed.), *Advances in child development and behavior* (Vol. 8, pp. 186–223). New York: Academic Press.
- Schneider-Rosen, K., & Cicchetti, D. (1984). The relationship between affect and cognition in maltreated infants: Quality of attachment and the development of visual self-recognition. *Child Development*, *55*, 648–658.
- Schulman, A. H., & Kaplowitz, C. (1977). Mirror-image response during the first two years of life. *Developmental Psychology*, *10*, 133–142.
- Stenberg, C., Campos, J., & Emde, R. (1983). The facial expression of anger in seven-month-old infants. *Child Development*, *54*, 178–184.
- Stern, D. N. (1985). *The interpersonal world of the infant*. New York: Basic.
- Stipek, D. J. (1983). A developmental analysis of pride and shame. *Human Development*, *26*, 42–54.
- Sullivan, M. W., & Lewis, M. (in press). Emotion and cognition in infancy: Facial expressions during contingency learning. *International Journal of Behavioral Development*.
- Tomkins, S. S. (1963). *Affect, imagery and consciousness: Vol. 2. The negative affect*. New York: Springer.
- Zimbardo, P. G. (1977). *Shyness: What it is, what I do about it*. New York: Addison-Wesley.