

LAUGHTER IN YOUNG CHILDREN¹

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Research studies of laughter in children are reviewed, and a model describing eliciting conditions for laughter and related behavior is described. Following Spencer (1860), Berlyne (1960), and others, it is proposed that laughter occurs after conditions of heightened tension or arousal when at the same time there is a judgment that the situation is safe or inconsequential. The special case of laughter to discrepant or incongruous stimulation is described in detail, and it is suggested that laughter serves the function of signaling to a caretaker that a given stimulus is within the child's tolerable limits of arousal.

In his 1969 review of laughter, humor, and play, Berlyne asks whether there could be any selective advantage to the organism who laughs, or whether this activity is as biologically superfluous as it seems. To the developmental psychologist this is an intriguing question; taking a biological view of developmental processes has often been helpful in understanding the behavior of the child (e.g., Bowlby, 1969). At the same time, examining such behaviors as laughter in the child may lead to generalizations impossible to discern in the more complicated laughter of adults or the rare laughter of primates. The present paper reviews selected studies of laughter in young children, exploring laughter's possible adaptive value and elaborating Berlyne's arousal model of laughter to describe eliciting conditions for laughter and related emotions.

OBSERVATIONS OF INFANT LAUGHTER

In human infants, laughter is not observed during the first weeks of life and usually follows infant smiling by at least 1 month. Wolff (1963) made systematic observations of eight infants during the first weeks after birth, observing both spontaneous and elicited smiling (to auditory stimulation) in infants within

2 to 12 hours after delivery. This early smiling occurred during periods of irregular sleep or drowsiness but not when the infant was awake. Although Wolff is hesitant to call the behavior laughter, he recorded vocal responses of 5-week-old infants to a pat-a-cake game which were later identified by adults as laughter.

Wolff's observation of early laughter seems to contradict reports of the first laugh not occurring until 12 to 16 weeks (Washburn, 1929), but it should be noted that the later age was determined by laboratory observation in a strange situation. Other baby biographers tend to agree with Wolff's observation, reporting laughter in some infants as early as 5 to 9 weeks (Church, 1966; Darwin, 1872; Major, 1906). Washburn (1929) observed 8- to 52-week-old infants in a short-term longitudinal study of smiling and laughter. She found that most infants laughed to at least one stimulus situation. However, there were strong individual differences, with four children laughing as early as 12 weeks and one child not laughing until 52 weeks of age. Mothers reported laughter to have occurred later in the laboratory than in the home. Parents also stated, when asked to *make* their children laugh, that they felt foolish about performing those activities, which Washburn called "rather violently jolting in nature," that might elicit laughter. When asked to make their children laugh, parents most often tickled the child, succeeding for infants between the ages of 24 and 52 weeks. The experimenter, however, elicited laughter in response to tickling only once, instead eliciting either negative responses or

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smiling in about equal proportions from 24 to 52 weeks of age.

Home observations of laughter in infants are available to supplement Washburn's report, although they are based on maternal reports and require further investigation. Wilson (1931) had 14 mothers keep daily records of the laughter of their infant children between 1 and 29 months. Laughter was reported in response to boisterous play, tickling, and to surprising sounds, sights, or movements. Laughter was often also reported accompanying motor accomplishments of the child, such as the infant's rolling over or standing up for the first time.

Until recently, no systematic observations of infant laughter other than Washburn's have been available. Now, however, Sroufe and Wunsch (1972) have reported extensive observations of laughter in infants 4 through 12 months of age. In this study, trained observers had mothers present laughter stimuli to their own infants and reported age changes in both amount of laughter and kinds of stimuli successful in eliciting laughter. Primarily tactile or auditory stimuli (e.g., lip popping, blowing hair, kissing stomach) were more effective for younger infants, while visual items (e.g., mother sucking baby bottle, mother shaking hair) tended to gain potency as children became older. Older infants generally laughed at more kinds of stimuli than younger infants.

LAUGHTER AND THE "PLEASURABLE" STIMULUS

These studies of infant laughter force us to reconsider the view that laughter always occurs in response to a stimulus we would independently define as pleasurable. A baby laughs when he is tickled, during a mock attack from a parent, when thrown in the air or bounced on a bed, at the sight of a dog, or the sound of a sneeze or cough (Wilson, 1931). As might be expected, these situations also sometimes lead to crying rather than laughter. Wolff (1969), for example reported that the same stimuli eliciting smiling in alert, inactive 3-week-old infants elicited crying in fussy infants of the same age. Sroufe and Wunsch (1972) reported that presenta-

tion of a mask, which elicited laughter in their study, was effective in eliciting fear in a study by Scarr and Salapatek (1970). In the fear study, masks were put on by an experimenter out of the infant's view, while in the laughter study, masks were put on by the infant's mother with the infant watching.

Rather than labeling some stimuli as fear stimuli and others as pleasurable stimuli, it might be preferable instead to locate both on a continuum of surprise or strangeness, and try to specify situational and individual variables leading on one occasion to laughter, on another occasion, crying. Laughter or fear might be expected to be evoked by the same or similar stimuli, depending upon the state of the child and the context in which the stimuli are presented.

AN AROUSAL-SAFETY MODEL OF LAUGHTER

One way of viewing the state immediately preceding laughter or distress is that it is one of general tension or arousal. In agreement with an arousal model, many theorists have described laughter as the consequence of the dissipation of "leftover" nervous energy or arousal. The principle may be seen in the writings of Herbert Spencer (1860), Freud (1963), Gregory (1924), Berlyne (1960), and Koestler (1964). Although some of these theories predict laughter only at the conclusion of an arousing event, that is, as relief, it is also possible to predict laughter in anticipation of an exciting event, assuming that anticipatory arousal may reach a threshold beyond which laughter is possible. Instances of anticipatory laughter are often observed in children, especially during tickling, when an incipient threat will often lead to strong laughter without the child ever being touched (Leuba, 1941).

An arousal concept plays a major role in several theories of emotion. Hebb (1955) and Schachter (1959), for example, distinguish between emotion as general physiological arousal and emotion as behavior directed by the individual's cognitive appraisal of the situation. In Schachter's (1964) terms, "Given such a state of arousal, it is suggested that one labels, interprets, and identifies this state in terms of the characteristics of the precipi-

tating situation, and one's apperceptive mass [p. 139]." It is important to recognize that an individual's cognitions not only direct the kind of behavior that is likely to occur; one's perception of a surprising or discrepant stimulus often produces the state of arousal itself. This perception of change or of a novel situation is also attention demanding and disruptive of ongoing activity of the individual (Sokolov, 1963).

If an arousal or tension concept is employed to describe the state preceding laughter, the laughter-evoking situations described above are less difficult to understand: A child being tickled, an infant standing up for the first time, or an older child being chased by a parent are all children who have been excited or aroused. We may in addition view various sources of arousal as having an additive effect on a person's tendency to laugh.

A general arousal concept in itself, however, is insufficient to predict a particular form of emotional expression. Typical of criticisms of arousal theories is McGhee's (1971) argument that Berlyne's theory of humor remains incomplete until it is possible to identify "factors that (*a*) are capable of raising and lowering arousal; and (*b*) distinguish between the nature of the arousal process operating in humor, fear, startle, exploratory, problem solving, etc., responses [p. 331]." The present author will attempt to elaborate Berlyne's theory by reviewing the major kinds of arousing stimuli leading to laughter in children and specifying some of the factors that appear to determine whether fear, laughter, or problem solving will be an individual's response to the perception of a discrepant stimulus.

The arousal model for laughter to be described here and schematized in Figure 1 describes the expressive consequences of arousal resulting from an individual's experiencing stimulation he does not expect, that is, sudden, intense stimulation, or stimuli discrepant with his present knowledge. The model proposes that laughter occurs when a person has experienced heightened arousal but at the same time (or soon after arousal) evaluates the stimulus as safe or inconsequential. Emotional responses other than laughter to arous-

ing stimuli are likely to occur if arousal increases to a very high level or if the stimulus is identified by the person as dangerous. Under these circumstances, the individual may attempt to escape from the situation. If the person cannot escape, he may attack the stimulus in an attempt to remove it or show freezing, crying, and distress that may be labeled by others as fear (the "Defensive Reaction"; Sameroff, 1971; Sokolov, 1963). Sroufe and Wunsch (1972) reported that when an infant cried, he tended to pull back and turn away from the stimulus; when laughter occurred, the infant maintained a positive orientation to the stimulus.

If the person's initial arousal to a stimulus is very high, his first orientation to the stimulus is thus a negative one; the person shows avoidance or distress. If, however, the person remains in proximity to the arousing stimulus long enough to judge that it is not really dangerous or of serious consequence, laughter may occur. Even if the arousing stimulus is not immediately judged to be safe, repeated presentations of the stimulus in a relatively secure situation without harmful consequences may lead to habituation of the defensive reaction. In time, a presentation of the stimulus will raise the person's arousal level only a moderate amount, and he will attend to the stimulus. Once the person attends positively to the stimulus, he may perceive that it is not dangerous but still presents a challenge to his present knowledge and expectancies, and the person may then show curiosity and attempts at problem solving rather than laughter. While working on a problem, the person's arousal level will remain heightened and his expression is likely to be serious, but positive affect may be shown when the problem is solved (Harter, Shultz, & Blum, 1971).

A second possibility, however, is that when the person attends to the stimulus, he will judge (*a*) that the stimulus is not dangerous and (*b*) that the stimulus is not a serious challenge but is instead trivial or inconsequential. When this judgment is made, laughter or smiling to the stimulus is likely. A judgment of inconsequentiality is closely related to a playful or joking attitude on the part of the individual. When the person rec-

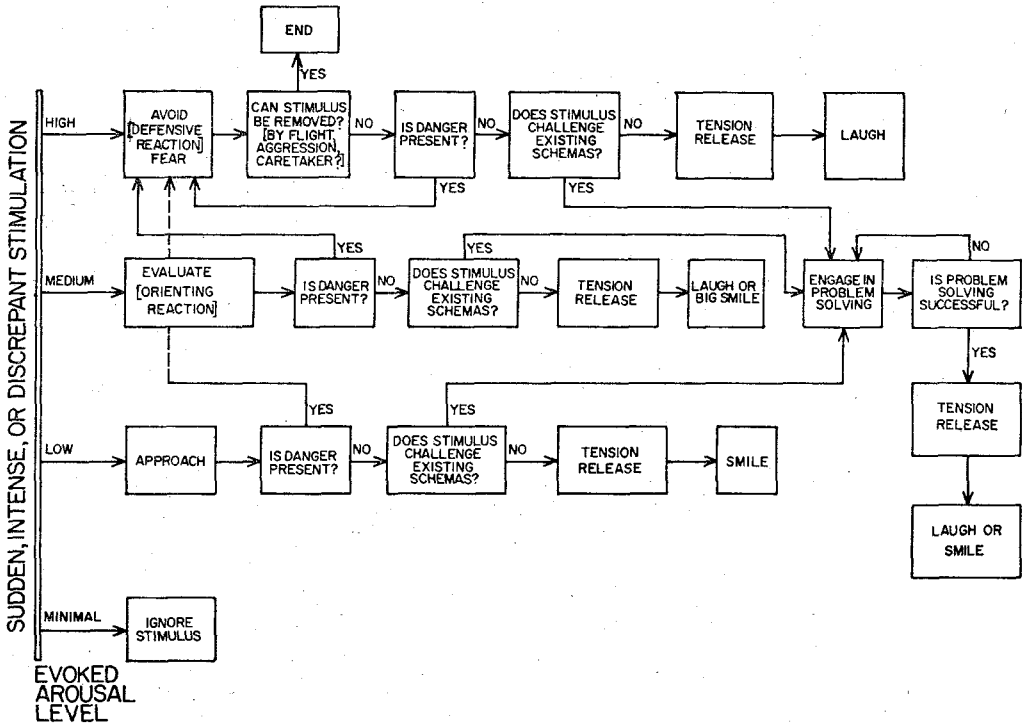


FIG. 1. Schematic representation of affective response to sudden, intense, or discrepant stimulation.

ognizes that an arousing stimulus represents "only a joke" or game, or that the discrepancy is due to magic or fantasy, there is both no danger and no problem to be solved, and laughter is likely to occur.

At lower levels of change or discrepancy, a person's behavior is disrupted, but he nevertheless attends to the disturbing stimulus. This state of disrupted activity and attention to the source of change or discrepancy has been called the Orienting Reaction (Sokolov, 1963) and is associated with skin conductance, muscle tension, and a decrease in heart rate. During this period of attention, an evaluation of the stimulus in terms of its potential harm appears to occur. If the judgment is one of safety and the stimulus does not present a problem to be solved, laughter may result. This model is similar to the model for laughter described by Sroufe and Wunsch (1972). Sroufe and Wunsch also reported that when a mask is presented to the infant, laughter on subsequent trials is most likely when the child's first response is a cessation of activity

and fixation on the mask. This behavior is correlated with "consistent, dramatic cardiac decelerations preceding laughter, with the slowest heart beat just prior to the response [p. 1341]." We might speculate that a transformation of heart rate occurs at the level of a safety or danger judgment. Symptoms of fear and distress are associated with heart rate acceleration (Sroufe & Wunsch, 1972), while heart rate acceleration has been reported as a concomitant of laughter by Fry (1971) and Langevin and Day (1972). At the point of judgment, there appears to be a transformation of arousal from a tense preparation for action and evaluation of the situation (the orienting reaction), to emotional activity: distress and flight or laughter and approach.

Although the model presented here is imprecise regarding whether a smile or a laugh is likely to occur, it does make some predictions about transitions in arousal level and intensity of response: (a) It is predicted that level of initial tension must exceed a basic threshold before laughter as opposed to smile

ing or no response will occur; (b) it is assumed that not *all* transformations of arousal will lead to laughter, only those equivalent to a judgment of safety or inconsequentiality; and (c) it is predicted that either positive or negative affect will be greater, the higher the initial tension aroused by the stimulus. While laughter may appear to be tension reducing, it is clearly not completely so: Each repeated presentation of the stimulus may result in a slightly heightened level of arousal so that a final repetition of a stimulus may result in a distress reaction from a child. When an initial arousing experience has led to laughter, the person may also seek out a repetition of the stimulus "for fun" or entertainment. In this case, a defensive reaction to the stimulus will be short circuited, and laughter may occur immediately after (or even before) a repetition of the stimulus.

What additional research evidence supports this arousal model? First, Hebb's (1946) observations of primate fear in response to the strange or discrepant are relevant to the description of the "defensive reaction." Same-roff (1971) has also reviewed evidence suggesting that the infant's initial defensive reactions to auditory stimulation habituate over repeated presentations to an orientation reaction. Berlyne (1960) has presented numerous studies documenting the tendency of organisms to approach novel stimulation, and Schneirla (1959) reviewed both comparative and developmental data to support the proposition that "low intensities of stimulation tend to evoke approach reactions, high intensities withdrawal reactions with reference to the source [p. 3]."

Kagan's (1971) observations of smiling in infants are also important. When Kagan and his associates presented a standard stimulus (a hand moving a rod in an arc until it contacts 3 different colored lights) to infants 5½ to 11½ months old, the children did not typically smile on the first presentation: Smiling increased during stimulus repetition until maximum smiling was seen on the sixth trial, with decreased smiling from Trials 7 through 10. When a transformation of the stimulus was then presented, smiling dropped on the first transformed presentation, increasing to a

peak on the third presentation. Kagan interprets smiling to mean that the child has formed a "schema" for the event. Frequency of smiling in Kagan's view drops when the child is assimilating the event more quickly. According to the arousal model, however, the child is smiling less when he is less aroused by the stimulus on succeeding presentations, and familiarity is only one factor influencing degree of tension or arousal. The present model would predict that events matched for complexity, but eliciting different arousal levels due to suddenness or intensity, would lead to distinctive patterns of emotional response: Very low arousal presentations would habituate quickly; high arousal presentations (such as tickling) might not habituate at all. The effectiveness of tickling in inducing laughter suggests a further hypothesis: Some classes of stimuli appear to be inherently more arousing than others. Included here might be "looming," a characteristic of stimuli leading to both laughter and fear (Sroufe & Wunsch, 1972) and the two-eyed configuration so effective in inducing smiling (Spitz, 1946).

It may be helpful now to examine a concrete example of a child's laughter. If a man suddenly appears to a child and says "I'm going to get you," and the man is a stranger, the child is likely to cry and run away. If, however, the man saying "I'm going to get you" is the child's father, the child may laugh and beg the father to repeat the threat. In the former case, the child is aroused in a situation subsequently labeled as dangerous; in the latter case, he is aroused in a "safe" situation. An excellent example of this phenomenon was reported in a recent study of fear of strangers carried out by Lewis and Brookes-Gunn.³ Eight- to 18-month-old infants' responses to strangers, mother, and self (in a mirror) were observed. The child's affective reaction depended on the distance of the stimulus person from the child; *both* positive (smiling and laughing) and negative (crying) reactions were most likely when the person walked up to and touched the child

³ M. Lewis and J. Brookes-Gunn. Self, other, and fear: The reaction of infants to people. Paper presented at the meeting of the Eastern Psychological Association, Boston, April 1972.

and least likely when the stimulus person stood just inside the door. Moreover, the direction of affect depended on the characteristics of the stimulus person: The mother and self generally evoked a highly positive reaction, the strange child a moderately positive reaction, and the strange adults a negative reaction.

In addition to situations involving discrepant stimulation as described above, laughter may also result from a high level of excitement generated by anticipating an event, performing a motor activity, or mastering a difficult task. Harter et al. (1971) have demonstrated that young children are likely to smile when they give correct responses; smiling here appears to be associated with a sense of mastery or recognition.

The arousal-safety model may also accommodate adult laughter at jokes appreciated on a more wholly cognitive level. Koestler (1964) has analyzed our understanding of jokes in terms of a bisociation between initially conflicting realms of discourse, resulting in a kind of problem solution of a joke. When a joke is understood but the resolution is a "silly" one, that is, it does not lead to any instrumental activity, the tension from the effort of solving the joke, and probably also positive excitement at having solved the joke, result in laughter. A third source of arousal may result from introducing taboo subject matter, for example, sex or aggression in the "safe" context of a joke. Godkewitsch (1972) had one group of college student subjects rank order jokes for "sexiness," and a second group rank order the jokes for funniness, finding a significant positive ($r = .62$) correlation between the two rankings. It should be noted, in addition, that one of the first reports of heart rate deceleration to visual stimuli involved males' responses to sexually suggestive pictures (Davis, 1957).

For adults, the occasions for laughter, given arousal, are difficult to predict; in addition to the impulse to laugh, the adult has usually learned when laughter is appropriate and when it is not. To the extent that laughter results from surprise, however, we may be able to make specific developmental predictions about when a child is likely to laugh.

Justin (1933) tested various laughter situations on children between the ages of 3 and 6, finding that laughter increased between the ages of 3 and 5 but that there were variations for specific stimuli: Tickling was more effective for younger children; 5-year-olds laughed more at a picture of a boy being kicked. Naturalistic studies of nursery school children (Ames, 1949; Ding & Jersild, 1932) determined that young children laughed most often during their own gross motor activity but that motor laughter declined for older children, with older children laughing increasingly at visual incongruities or silly language. In terms of a theory of cognitive development, we may expect that a young child will find different stimuli incongruous or surprising than will older children or adults, and indeed the findings of these early researchers seem to parallel suggestions that a child functions in enactive (motoric), later iconic (visual), and symbolic modes of representation of stimuli (Bruner, 1964). When a child becomes older, an experience that formerly led to laughter may either (a) lead to lower arousal through habituation, or (b) be consistent with his expectancies when formerly it was discrepant with them. In either case, laughter may no longer occur. Instead, the child's increasing knowledge of the world will provide many new possibilities for incongruity, and sources of high arousal (roller coasters, tickling) will always be available. McGhee (1971) has written a comprehensive review of developmental studies of humor, relating them to a Piagetian theory of cognitive development. Sroufe and Wunsch's (1972) description of a developmental shift in the relative efficacy of tactile and auditory stimuli to visual laughter stimuli also parallels the increasing role of distance receptors in social development described by other theorists (Walters & Parke, 1965).

There are other sources of arousal leading to laughter. Laughter among older children is often prompted by disobedience, with either the guilty child or young onlookers laughing at the forbidden deed (Ames, 1949). Such an act may be seen to be both incongruous and fear arousing for the child. Under these circumstances, parents may tell the child, "That

isn't funny" or even punish the child for his laughter. These kinds of learning may result in the older child inhibiting laughter under circumstances where the younger child may freely laugh, for example, when an old lady falls on the street. Not only do older children learn that laughter is inappropriate; to the extent that they sympathize with the old lady, the event will not be an inconsequential one; it may lead to problem-solving behavior as the older child comes to her aid.

The older child's attitude toward an incongruous situation also seems to affect his tendency to laugh. Kreitler and Kreitler (1970) asked Israeli children to express their opinions about incongruous pictures, for example, a giraffe with an elephant's head and an ice cream cone mountain. Laughter and smiling were most often observed when the child noted and at the same time criticized or wondered at the incongruity. If the child merely listed the details of the picture, he was unlikely to laugh. Laughter at an intermediary level was found when the child attempted to reconcile or deny the incongruity on a real or fantasy level. This author⁴ attempted to determine (*a*) whether the simple perception of a discrepant event could lead to laughter in children and (*b*) whether there was a connection between laughter and a child's searching for a solution to the discrepancy. Four- to 6-year-old children were shown a Piagetian water transfer from a short, wide jar to a tall, thin jar and told that the experimenter was "turning a little water into a lot of water." Children rated independently as conservers of liquid quantity did not laugh as much at the "trick" as nonconservers. Older nonconservers, however, some of whom were trying to solve the trick, laughed less at the trick than younger nonconservers. A problem-solving attitude toward the discrepancy appeared to conflict with laughter at the trick. On the basis of these two studies, it might be predicted that laughter to the perception of incongruities requires (*a*) that an incongruity be recognized while (*b*) there is no perceived need to make further sense of the

incongruity. Laughter to more complicated jokes or cartoons appears to require both the recognition of an incongruity and the resolution of the incongruity within the temporal context of the joke (Shultz, 1972). This type of laughter would be observed more often in older children or adults than in young children.

Additional data on heart rate may be relevant. When overt or covert verbalization of a problem solution is required, heart rate acceleration is generally observed (Campos & Johnson, 1967), while attention to a stimulus change or the relatively passive processing of visual stimuli is correlated with heart rate deceleration (Lacey, Kagan, Lacey, & Moss, 1963). Preparation of a response may require an expenditure of tension that will no longer be accessible to a laughter response. Laughter at jokes, in fact, usually occurs in situations where no response is required or expected. The only persons asking subjects to report "joke solutions" or to make judgment on the humor of the joke are usually psychologists of humor (e.g., McGhee, 1971), who rarely observe actual laughter. If making judgments about the quality of humorous material does affect the level of emotional response, autonomic measures or observations of affect may prove to be more sensitive indices of reaction than humor judgments. A further variable leading to arousal and laughter may be the amount of effort required to understand the meaning of a joke or cartoon (Zigler, Levine, & Gould, 1966, 1967). It should be noted, however, that effort required to understand a joke may be confounded with other arousal-enhancing variables, for example, enjoyment of a joke for which we know the punch line may be enhanced by anticipatory tension about the humorous ending.

Individual differences in both the likelihood of laughter occurring and the intensity of laughter when it does occur are clearly very important. As suggested above, the child's experience and general level of cognitive development will influence whether laughter is likely to occur. In addition, a concept of individual differences in temperament, defined perhaps as "the strength of external stimulation necessary to produce a given amount of

⁴M. K. Rothbart. Discrepancy, problem-solving, and laughter. Unpublished manuscript. University of Oregon, 1972.

physiological excitation [Bridger & Birns, 1971, p. 84]" along with the ability of a person to adopt a playful or joking attitude, is necessary to account for differences in the tendency to laugh.

Several unanswered questions remain concerning the arousal-safety model. One concerns the smiling (and possible laughter) occurring before the infant shows a positive (stimulus-maintaining) or negative reaction to changes in stimulation. Early smiling may be a reflex response to transitions in arousal level, as suggested by Emde and Koenig (1969), who observed that infants whose mothers had been given depressant medication during labor smiled significantly less than infants of mothers who had received no depressant drugs.

LAUGHTER AND CONTINGENCY LEARNING

One problem with the model of laughter proposed here is that if laughter is so frequently elicited in apparently stressful situations, why do we tend to identify laughter with pleasure? One possibility is that the phenomenal experience of laughter itself is pleasurable. A second possibility, suggested by Berlyne (1960), is that moderate fluctuations in level of arousal are rewarding. Third, the excitement or arousal preceding laughter is in many cases a pleased excitement, as in laughter following motor accomplishments or the understanding of jokes, and this mastery pleasure may be associated with the activity of laughter.

In any case, people do associate laughter with pleasure, and prolonging an infant's laughter appears to be a very satisfying event for his caretaker. When an infant laughs, the caretaker usually assumes the child is pleased, and if it is possible for the caretaker to repeat the eliciting stimulus in order to make the child laugh again, he will usually do so. This general pattern of responses has been described as the original "game" (Holt, 1967).

Laughter games are frequently described by biographers of infant development as in this description of laughter in a 6-month-old boy (Church, 1966):

His father covered his face with his hands, then took them away and said "Bang!" Benjamin began to laugh and continued to react with the greatest glee

as his father repeated the action again and again. Finally, Benjamin got so wound up that his laughter turned into crying—either because the "Bangs" got louder or he had just had more excitement than he could take [p. 123].

Considered in the context of the "game," laughter appears to serve an additional function to dissipating tension in the infant: The child's earliest response to a disturbing or fear-provoking stimulus is usually crying or fretting (Ambrose, 1963). The caretaker's response to the child's crying is then to comfort the child or to remove the disturbing stimulus. If, however, negative responses were *always* to be evoked in situations discrepant or strange to the child, the infant would have little opportunity to gain familiarity with new situations or to learn to cope with them. Since, however, the infant responds to discrepant stimulation under some conditions by laughing, thus inducing the caretaker to reproduce the disturbing stimulus instead of removing it, the child's opportunity to experience the world is greatly enhanced. Piaget (1963) describes the activities of the 4-month-old as being directed toward "making an interesting spectacle last." Laughter has the effect of making interesting spectacles last through the intermediary of a caretaker who can present stimulation to the child that the child cannot produce directly himself. Lewis and Goldberg (1969) have proposed that a mother's care of her infant contingent upon his cry allows the child to begin setting up expectations about his own effects on his environment. If this argument may be made with respect to the infant's crying (to which the caretaker may respond with many different behaviors), then the effects of the child's laughter in inducing the caretaker to reproduce the *same* stimulus again and again may be even stronger. These early laughter games may promote at least two general kinds of learning: (a) the development of general expectations (Watson, 1967) and (b) the social experience of learning that other people are affected by one's actions, an important aspect of Erikson's (1968) concept of basic trust.

A valuable point to be gained from examining interactions involving laughter and crying is that in both cases it is the *child* who initiates the behavior sequence. For crying, this is

clearly the case. Concerning laughter, it may be argued that the parent often initiates the sequence by stimulating the child to laugh. The important point, however, is that if the child does not laugh, the sequence is likely to be terminated; only if the child laughs is the "game" begun. This means finally that laughter games are likely to be gauged to the child's level of cognitive and emotional development: If the experience is too frightening or arousing, the child is likely to cry; if it is dull or overly familiar, the child will not respond with laughter.

Viewing laughter as an important social response of the young child leads to the study of both conditions for eliciting laughter and the relation of laughter to other emotional reactions in the child. Laughter following tension or arousal appears to allow both the dissipation of tension and the repetition of interesting experiences for the young child. An analysis of the laughter of young children suggests some very real advantages for the animal who laughs. The phenomenon of laughter may thus be perhaps a little less superfluous than has been suggested; it is certainly a topic worthy of systematic research and thought.

REFERENCES

- AMBROSE, A. The age of onset of ambivalence in early infancy: Indications from the study of laughing. *Journal of Child Psychology and Psychiatry*, 1963, 4, 167-181.
- AMES, L. B. Development of interpersonal smiling responses in the preschool years. *Journal of Genetic Psychology*, 1949, 74, 273-291.
- BERLYNE, D. E. *Conflict, arousal, and curiosity*. New York: McGraw-Hill, 1960.
- BERLYNE, D. E. Laughter, humor, and play. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology*. Vol. 3. Reading, Mass.: Addison-Wesley, 1969.
- BOWLBY, J. *Attachment*. New York: Basic Books, 1969.
- BRIDGER, W. H., & BIRNS, B. Experience and temperament in human neonates. In G. Newton & S. Levine (Eds.), *Early experience and behavior*. Springfield, Ill.: Charles C Thomas, 1971.
- BRUNER, J. S. The course of cognitive growth. *American Psychologist*, 1964, 19, 1-15.
- CAMPOS, J. J., & JOHNSON, H. J. Affect, verbalization and directional fractionation of autonomic responses. *Psychophysiology*, 1967, 3, 285-290.
- CHURCH, J. (Ed.) *Three babies: Biographies of cognitive development*. New York: Random House, 1966.
- DARWIN, C. *The expression of the emotions in man and animals*. London: Murray, 1872. (Appleton Authorized Edition reprinted: Chicago: University of Chicago Press, 1965.)
- DAVIS, R. C. Response patterns. *Transactions of the New York Academy of Sciences*, 1957, 19, 731.
- DING, G. F., & JERSILD, A. L. A study of the laughing and smiling of preschool children. *Journal of Genetic Psychology*, 1932, 40, 452-472.
- EMDE, R. N., & KOENIG, K. L. Neonatal smiling and rapid eye movement states. *Journal of the American Academy of Child Psychiatry*, 1969, 8, 57-67.
- ERIKSON, E. H. *Identity, youth and crisis*. New York: Norton, 1968.
- FREUD, S. *Jokes and their relation to the unconscious*. New York: Norton, 1963. (Original German edition: 1905.)
- FRY, W. F. Laughter: Is it the best medicine? *Stanford M. D.*, 1971, 10, 16-20.
- GODKEWITSCH, M. The relationship between arousal potential and funniness of jokes. In J. H. Goldstein & P. E. McGhee (Eds.), *The psychology of humor*. New York: Academic Press, 1972.
- GREGORY, J. C. *The nature of laughter*. New York: Harcourt, Brace, 1924.
- HARTER, S., SHULTZ, T. R., & BLUM, B. Smiling in children as a function of their sense of mastery. *Journal of Experimental Child Psychology*, 1971, 12, 396-404.
- HEBB, D. O. On the nature of fear. *Psychological Review*, 1946, 53, 259-276.
- HEBB, D. O. Drives and the C.N.S. (conceptual nervous system). *Psychological Review*, 1955, 62, 243-254.
- HOLT, J. *How children learn*. New York: Pitman, 1967.
- JUSTIN, F. A genetic study of laughter-provoking stimuli. *Child Development*, 1933, 3, 114-136.
- KAGAN, J. *Change and continuity in infancy*. New York: Wiley, 1971.
- KOESTLER, A. *The act of creation*. New York: Macmillan, 1964.
- KREITLER, H. S., & KREITLER, S. Dependence of laughter on cognitive strategies. *Merrill-Palmer Quarterly*, 1970, 16, 163-177.
- LACEY, J. I., KAGAN, J., LACEY, B. C., & MOSS, H. A. The visceral level: Situational determinants and behavioral correlates of autonomic response patterns. In P. H. Knapp (Ed.), *Expression of the emotions in man*. New York: International Universities Press, 1963.
- LANGVIN, R., & DAY, H. I. Physiological correlates of humor. In J. H. Goldstein & P. E. McGhee (Eds.), *The psychology of humor*. New York: Academic Press, 1972.
- LEUBA, C. Tickling and laughter: Two genetic studies. *Journal of Genetic Psychology*, 1941, 58, 201-209.
- LEWIS, M., & GOLDBERG, S. Perceptual-cognitive development in infancy: A generalized expectancy model as a function of the mother-infant interaction. *Merrill-Palmer Quarterly*, 1969, 15, 81-100.

- MAJOR, D. R. *First steps in mental growth*. New York: Macmillan, 1906.
- MCGHEE, P. E. Development of the humor response: A review of the literature. *Psychological Bulletin*, 1971, 76, 328-348.
- PIAGET, J. *The origins of intelligence in children*. (Trans. by Marjorie Cook) New York: Norton, 1963. (Original French edition: 1936.)
- SAMEROFF, A. J. Can conditioned responses be established in the newborn infant: 1971? *Developmental Psychology*, 1971, 5, 1-12.
- SCARR, S., & SALAPATEK, P. Patterns of fear development during infancy. *Merrill-Palmer Quarterly*, 1970, 16, 53-87.
- SCHACHTER, S. *The psychology of affiliation*. Stanford: Stanford University Press, 1959.
- SCHACHTER, S. The interaction of cognitive and physiological determinants of emotional state. In P. H. Liederman & D. Shapiro (Eds.), *Psychobiological approaches to social behavior*. Stanford: Stanford University Press, 1964.
- SCHNEIRLA, T. C. An evolutionary and developmental theory of biphasic processes underlying approach and withdrawal. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation: 1959*. Lincoln: University of Nebraska Press, 1959.
- SHULTZ, T. R. The role of incongruity and resolution in children's appreciation of cartoon humor. *Journal of Experimental Child Psychology*, 1972, 13, 456-477.
- SOKOLOV, Y. N. *Perception and the conditioned reflex*. (Trans. by S. Waydenfeld) New York: Pergamon, 1963. (Original Soviet Edition: 1958.)
- SPENCER, H. Physiology of laughter. *Macmillan's Magazine*, 1860, 1, 395. (Reprinted: *Essays, scientific, political and speculative*. Vol. 2. New York: Appleton, 1910.)
- SPITZ, R. A. The smiling response: A contribution to the ontogenesis of social relations. *Genetic Psychology Monographs*, 1946, 34, 57-125.
- SROUFE, L. A., & WUNSCH, J. C. The development of laughter in the first year of life. *Child Development*, 1972, 43, 1326-1344.
- WALTERS, R. H., & PARKE, R. D. The role of the distance receptors in the development of social responsiveness. In L. P. Lipsitt & C. C. Spiker (Eds.), *Advances in child development and behavior*. Vol. 2. New York: Academic Press, 1965.
- WASHBURN, R. W. A study of the smiling and laughing of infants in the first year of life. *Genetic Psychology Monographs*, 1929, 6, 397-537.
- WATSON, J. S. Memory and "contingency analysis" in infant learning. *Merrill-Palmer Quarterly*, 1967, 13, 55-76.
- WILSON, C. O. A study of laughter situations among young children. Unpublished doctoral dissertation, University of Nebraska, 1931.
- WOLFF, P. H. Observations on the early development of smiling. In B. M. Foss (Ed.), *Determinants of infant behavior*. Vol. 2. New York: Wiley, 1963.
- WOLFF, P. H. The natural history of crying and other vocalizations in early infancy. In B. M. Foss (Ed.), *Determinants of infant behavior*. Vol. 4. London: Methuen, 1969.
- ZIGLER, E., LEVINE, J., & GOULD, L. Cognitive processes in the development of humor. *Child Development*, 1966, 37, 507-518.
- ZIGLER, E., LEVINE, J., & GOULD, L. Cognitive challenge as a factor in children's humor appreciation. *Journal of Personality and Social Psychology*, 1967, 6, 332-336.

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ERRATUM

In the article by Robert Hogan in the April 1973 issue, the last line on page 231 was omitted. The last sentence of the article should read: "Consequently, since little beyond that seems possible, the practical endpoint of moral development, social conformance, must be taken seriously."