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ABSTRACT

This report describes a naturalistic observational study concerned with the functions of aggression in children and how they change with age. Background on aggression is provided through a discussion of the problems of definition and ontogenesis, which have led to a general shortage of relevant developmental data. This study involved 102 children, 64 between the ages of 4 and 6, and 38 between 6 and 8. They were involved in six groups operating under a common program philosophy. Each aggressive act was coded as to general function: (1) Hostile, or person-directed, and (2) Instrumental, or object-directed. A finer analysis of function involved nine categories ranging from bodily injury and property destruction to rejection, derogation, and defiant non-compliance. Antecedent events were coded into three basic types: blocking, bodily contact, and derogation. Results are discussed in terms of age, sex, and race comparisons. It is concluded that the results support the hypotheses that the developmental course of human aggression can best be studied through a differentiated "functional analysis" of the problem, and that the instrumental-hostile differentiation is useful in such an analysis, at least for studying early childhood. (DP)

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Violence in Development:

The Functions of Aggression in Childhood

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Little empirical research has been devoted to the developmental course of human aggression. Although the literature dealing with aggressive behavior in children runs to hundreds of articles (Feshbach, 1970), little of it concerns ontogenetic issues and not much of it derives from developmental theory. Given this state of affairs, one purpose of the present paper is to describe an observational study which was focussed on the functioning of harm-doing in children's peer interactions and how these functions change with age. First, however, two more general problems relating to aggression research are discussed: a) the problem of definition, and b) the problem of ontogenesis.

The Problem of Definition

Aggression commonly refers to "behavior which is intended to produce injury." Note that this definition includes reference to both an antecedent (intention) and a consequence (injury), each of which invests the concept with a certain elasticity. Some of this elasticity derives from the consequent-dependent aspects of the definition. When, for example, aggression is defined as behavior which produces injury, items will be included which possess widely varying eliciting conditions. Similar elasticity stems from the antecedent-dependent portions of the definition. When aggression is defined in terms of its instigators, it is likely to subsume a group of extraordinarily diverse action patterns.

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The practice of defining aggression in terms of its antecedents and its consequences has precipitated more than a little chaos in the various fields in which aggression research is conducted. It has even produced nonfindings: The statement that "aggression has multiple causes" pales into triviality when one considers that we define aggression in a manner which guarantees the inclusion of behaviors with heterogeneous elicitors. The statement that "aggressive instigation is associated with a wide variety of overt acts" is similarly artifactual.

One special problem with conventional conceptualizations is that they do not facilitate the study of the functional nature of aggression, particularly as aggression occurs in everyday life. Consider the following incident:

Moira is on the swing. Buddy comes over and shoves Moira and shakes the swing. He says, "I had it first." David comes over and tells Moira that she has to get off. They shake the swing and punch her until she starts to cry. David stops hitting then, but Buddy continues.

This incident consists of "instrumental aggression" (Feshbach, 1964)-- activity which produces injury, but injury which appears to be secondary to the acquisition of some other goal. Note, however, that the shaking and shoving in this incident cannot be labelled as instrumental aggression unless reference is made to the context in which the violence occurs, including reference to the antecedent circumstance that Moira was occupying the swing. Thus, the co-variance between this antecedent (Moira in the swing) and this type of aggression (shaking the swing and punching Moira) must be tested with observational components which are not independent of one another. The concept of instrumental aggression itself builds in much of this interdependence. And yet, no statement about the functions

of a behavior is meaningful unless it is based on components which are defined and observed so as to be independent of one another.

Several noteworthy attempts have been made to define aggression in a manner which is independent of the antecedents and the consequences of the behavior. In some of these efforts, the primary referents have consisted of characteristic motor patterns. Blurton Jones (1967), for example, defined beat (hit) as "an overarm blow with palm side of the lightly clenched fist; the arm is sharply bent at the elbow and raised to a vertical position then brought down with great force on the opponent, hitting any part of him that gets in the way." Subsequently, McGrew (1972) distinguished four sub-types of beating in his observations of nursery school play: open beat, beat up, object beat, and incomplete beat. These behaviors can be observed reliably and with considerable frequency in the social interactions of young children. The findings, however, suggest that these particular categories do not produce very meaningful generalizations; they seem not to pertain to what is ordinarily called aggression. For example, when the children's play behaviors were differentiated into "agonistic" and "nonagonistic" interactions, according to whether the action produced injury, fear, or defensiveness, McGrew (1972) found that instances of beating were no more frequent in the former interactions than in the latter. True, agonistic interactions did include significantly more frequent instances of "face thrusts," "flinches," "points," "turns," and "verbalizes," but only when the agonistic interaction eventuated in the separation of the combatants. Even then, these same motor patterns also occurred during quasi-agonistic and non-agonistic interactions. Thus, there is considerable question as to the psychological meaning of these particular patterns.

A different attempt to define aggression in a manner which would be antecedent- and consequent-independent was made by Walters (1964), who proposed the study of high-magnitude responses. Much aggression, particularly physical aggression, involves responses of relatively high levels of intensity. Thus, it is not unreasonable to suppose that the principles governing the maintenance of high-intensity responding may have relevance to the problem of interpersonal aggression. But not all high-intensity responses are aggressive and not all aggression consists of high intensity responding. Consequently, generalizations from the literature on high-intensity responding cannot be made straightforwardly to the problem of aggression prediction.

Although the conceptual difficulties mentioned here are well-known, social scientists refuse to refrain from picking at the sore of aggressive behavior. Nor should they. But three prescriptions are in order: First, conceptual pluralism should be supported. There is no body of data to suggest that one definition of aggression is purer than another. Second, a rationale should accompany whichever definition of aggression the investigator proposes. Unfortunately, tradition and practical demands seem to determine the choice of an investigator's definition more often than the demands of a particular hypothesis or theory. Third, a general reductionist effort should be made with respect to the aggression concept. Sub-categories are needed which are less elastic than those in current vogue but which, at the same time, are sufficiently inclusive to ensure a modicum of ecological validity.

The Problem of Ontogenesis

The development of aggression from its earliest beginnings has not been traced in detail for homo sapiens or any other species. The following

can be cited as especially important gaps in our knowledge of aggressive ontogenesis:

1. For no species do we know from which early motor patterns the components of later aggression are shaped. From time to time there have been suggestions that the rage reaction (tantrums) may be the well-spring of early aggressive behavior (Munroe, 1955; Hamburg & Van Lawick-Goodall, in press). Tantrums occur early in ontogenesis, they have great capacity for eliciting reaction from the environment (they are noxious), and both the occurrence of tantrums and their behavioral components are sensitive to feedback contingencies (Etzel & Gewirtz, 1957; Goodenough, 1931). Because tantrums produce both positive and negative feedback (parents capitulate to tantrum behavior as well as punish it), these behaviors probably serve as opportunities for the young child to learn the efficacy of aggressive action as well as the efficacy of aggressive inhibition. As yet, however, the contributions of such patterns to aggressive ontogenesis are unknown.

2. The contexts which serve as origins for aggressive development have not been specified for most species. Both field research and laboratory studies (Jay, 1968; Harlow & Harlow, 1965) suggest that the context which accounts for most of the variance in the development of non-human primate aggression is rough-and-tumble contact with peers. Conditions allowing for rough play to escalate into aggression and, in turn, to de-escalate into playful interaction appear to facilitate the acquisition of two repertoires: a) an armamentarium of effective aggressive behaviors, and b) mechanisms for coping with the affect and other outcomes of aggressive interaction. Although Patterson and Cobb (1971) have suggested that peer

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interaction is also the primary context for aggression development in human children, we can only conjecture that rough-and-tumble play during the preschool years serves the same functions for homo sapiens as it appears to serve for Presbytic entellus (the common langur).

3. Age changes in the aggressive activity of human children have been documented in an astonishingly small number of studies (Feshbach, 1970).

a. The form of the behavior. About all that can be said about age changes in the morphology of human aggression is that, from two through six years of age, there is an increase in the utilization of language in aggressive outbursts. Verbal aggression remains the preferred mode of attacking other humans among elementary-school-aged girls, but the evidence is inconsistent about changes in the deployment of various types of physical attack after the age of six. Again and again, social psychologists come back to Florence Goodenough's (1931) fascinating data about age differences in children's angry behavior. She said: "With advancing age, the forms of behavior displayed during anger become more definitely directed toward a given end, while the primitive bodily responses of the infant and young child are gradually replaced by substitute reactions commonly of a somewhat less violent and more symbolic character (p. 69)." Then she added the information that frequency and duration of "after reactions," including sulking, whining, and brooding, showed a marked increase after the age of four even though the duration of the violent phases of angry outbursts changed but little during the preschool and the early elementary school years.

Surely it is time to recognize, within a developmental perspective, the functional differences existing among verbal aggressive episodes such

as the following: a) "Don't talk to Rachel. She is the most dumb in the world." b) "I'm gonna pull that fucking Moira's hair out." c) "Sucker, get out of here." Similarly, there would appear to be no reason to assume that all acts of physical aggression have common functions: a) John comes over and takes the steering wheel from Rachel. She whimpers and grabs and pinches his arm. b) Bruce has some chewing gum and one of the boys asks for some. Bruce asks him to open his mouth. When the boy does this, Bruce shoves some paper into it and laughs. c) Marian rushes into the playroom, seemingly on her way to the teacher. Cathy looks up from her place on the fringes of the doll corner and hits Marian in the back with a purse. d) Moira comes down the stairs with two boys to 'get' Elaine and Linda. They leave the room, but Moira follows. Suddenly they turn and chase her and Elaine pulls Moira's hair. Although body-to-body contact is involved in each of these episodes, the motor patterns are widely varied and the apparent functions more widely varied still. It is inconceivable that, with increasingly sophisticated social-cognitive functioning, qualitative age changes would not be found in children's aggression in addition to the amount of language used.

b. The instigators of aggressive behavior. The earlier studies (Goodenough, 1931; Dawe, 1934) also contain the most differentiated information in the literature concerning age changes in the elicitors of aggression. Goodenough found (based on logs kept by 45 children's mothers) that, in infancy, angry outbursts are principally keyed to physical discomforts and needs for attention. During the second and third years, however, such episodes are triggered increasingly by "habit training." Social difficulties with peers emerge at about this time as instigators of angry outbursts and

predominate in the years that follow. Dawe's (1934) study of 200 quarrels occurring in a nursery school also tells us about age changes in the events that elicit aggression: a) although possession-instigated quarrels predominated at every age level from 18 months of age through 65 months, 78% of the youngest children's quarrels were instigated in this manner while only 38% of the oldest children's quarrels began in this way. Physical violence increased as an instigator of quarreling from 8% to 27%, and "social adjustment" increased as an instigator of quarreling from 3% to 15% during the period covered. These data hint at two concomitant developmental changes in the functional character of young children's aggression" a) a relative decrease during the preschool period in straightforward instrumental aggression; b) an increase in person-directed, retaliatory, and hostile outbursts. More about these trends later.

4. Longitudinal studies of individual differences in aggression are few in number. The famous studies by Kagan and Moss (1962); Bayley and Schaeffer (1964), and Emmerich (1964) stand nearly alone in elucidating sex-related differences in the stability of aggressive traits. Stabilizing of individual differences in aggressiveness appears earlier in males than in females and seems to be independent of the discontinuities in aggression development mentioned above. Evidence for developmental transformations in the area of aggression is much more tenuous, although the findings reported by Kagan and Moss (1962) are intriguing: early aggression in girls was predictive of later competitiveness and rejection of feminine sex-typing rather than later aggressiveness. All that needs to be noted here, however, is the general paucity of data on individual differences in aggression development.

Overall, then, data concerning the developmental course of aggression are in short supply. The shortage extends to information about changes in the form of the aggressive acts themselves, the contexts in which aggression originates, the circumstances that trigger aggressive episodes, and stability in individual propensities to respond aggressively across time and circumstance.

A New Study

A new study was organized at the University of Minnesota to extend Dawe's (1934) work of 40 years ago. We aimed to test three hypotheses: a) there is a greater proportion of hostile, "person-directed" aggression relative to "object-oriented," instrumental aggression in the interactions of grade school children than in the interactions of preschool children; b) threats to self-esteem lead more frequently to hostile attempts to injure the agent of frustration than to object-oriented aggression, particularly for older children, and c) blocking is associated primarily with aggression which has instrumental value in gaining or preserving objects, territory, or privileges and in which injury to the other person appears to be a secondary goal. This latter relationship, however, should be more consistent for younger than for older subjects.

The conceptual ancestry of these hypotheses is apparent to anyone familiar with the literature on aggression. We have utilized the distinction originating with Feshbach (1964), Buss (1966), Rule (in press), and others between "hostile" and "instrumental" aggression. Basically, the distinction has been used as a means of refining the frustration-aggression hypothesis. According to this line of theorizing, the prerequisites of hostile aggression (i.e., person-oriented aggression) include: a) frustration-produced stimuli which have ego-threatening properties, and b) an inference by the subject

that the agent of frustration has behaved intentionally. Other attributions may also be involved in eliciting this form of aggression, but the literature particularly emphasizes the linkage between hostile outbursts and frustrations which involve ego-threats or threats to one's self-esteem. In contrast, instrumental aggression, (i.e., aggression which is aimed at the retrieval of an object, territory, or privilege) should be linked to simple goal blocking.

The distinction between hostile and instrumental aggression is far from clean. First, as Feshbach (1970) has pointed out, both instrumental and hostile elements are often involved in the same social interchange. Additionally, this distinction suggests that there is no "instrumental" value to be found in hostile aggression. Clearly, the attempt to restore one's self-esteem by making someone else feel bad is instrumental behavior. Thus, the terminology is imprecise, to say the least. Additionally, Rule and Percival (1971) have raised questions as to whether the psychological processes operating during outbursts of instrumental and hostile aggression are really very different. They found, with adult subjects, that both goal-blocking and insult raised their subjects' level of aggression, but these manipulations produced perceptions and attitudes toward the agent of frustration which were virtually indistinguishable. Regardless of whether the aggressor was insulted or frustrated, he reported himself to be more annoyed with the frustrating agent, and indulged in derogation and devaluation of the agent of frustration in similar degree.

On such grounds one may question the ultimate usefulness of the instrumental vs. hostile dichotomy. Nevertheless, these rubrics continue to serve reasonably well for an attempt to examine the functional properties of

children's aggression. First, these concepts may be easily integrated with the existing data. Recall that Dawe (1934) found, among preschool children, decreasing proportions of aggressive quarrels which were triggered by thwartings involving possessions but increasing proportions involving altercations that somehow involved "social adjustment." Goodenough's (1931) data suggest a similar progression. Thus, in contemporary language, the very young child's aggression is more instrumental than hostile, although hostile aggression may occur in greater proportion as the child grows older.

Second, the known facts about children's social/cognitive development also suggest that hostile aggression should not be as strongly characteristic of the aggressive activity of younger as of older children. Under the age of six, children have limited capacities for role-taking and the generation of inferences and attributions about other people (Flavell, 1968). To the extent that hostile aggression is dependent on attributions about the agent of frustration (especially his intentions), this type of aggression should be less evident in younger than in older children. Furthermore, self-esteem, valuations of self-competence, and notions about one's status are relatively rudimentary in young children. Just as the young child's conceptions of morality are heteronomous, his conceptions of the dimensions of self-competence and self-worth are unstable. Since reference to self-esteem is a prerequisite to hostile aggression, a lesser proportion of such aggression for younger than for older children would also be expected on these grounds. From still another vantage point, one can argue that the young child's use of personal constructs (Kelly, 1955) is "superficial" and "undifferentiated." While most preschoolers know that "dumb" is something reprehensible, few understand the full ramifications of being called a "dummy." Such conditions are also not conducive to hostile activity.

Prediction of developmental changes in instrumental aggression is a bit more difficult. Dawe (1934) reported a declining percentage of such aggression in association with increased age. But should there be a change in the functional quality of the aggression which is elicited by goal blocking as children grow older? Feshbach (1964), Rule (in press), and others have suggested that goal blocking should elicit object-oriented aggression (rather than person-oriented aggression), whatever the individual's age. But the data of Rule and Percival (1971) suggest that, among adults, blocking produces attitudes and perceptions which are very similar to those produced by insult and derogation. Such an admixture of instrumental and hostile aggression in response to goal blocking should occur, however, only if the individual possesses those cognitive/inferential skills which are prerequisite to the hostile components of the activity. In other words, there is the strong possibility that children's responses to goal blocking are more purely instrumental during the preschool years than during the elementary school years because of the lesser socio-cognitive maturity of the younger children. By seven and eight, we would expect considerable inconsistency in the way children respond to blocking (i.e., hostile activity on some occasions and instrumental activity at other times as well as activity which is "mixed" with respect to its components). This is the basis for our expectation that goal blocking would be less consistently associated with instrumental aggression (purely defined) in older children than in younger children.

Method. The strategy we chose for studying the functional relations outlined above was the most difficult known to social psychology--naturalistic observation. (Specimen records are not noted for the ease with which functional

analyses may be performed on them. Each element in such records is beclouded with contaminants produced by other elements in the record, the perceptions and biases of the recorder, and the peculiarities of the language in which they are written. Those who would employ such observations for purposes of functional analysis have little defense against the charge that the findings are inevitably contaminated and that the findings can never approach the purity of those derived from experimental analysis.) But the functions of children's aggression are extremely difficult to study with experimental techniques and some aspects of children's aggressive functions are simply not open to experimental attack (e.g., the manner in which children respond to insult). Thus, current interest in specimen records as the basis for testing hunches about functional relations is very high (e.g., Patterson & Cobb, 1971).

Our study was centered in six children's groups, all in one children's program in St. Paul, Minnesota. All groups, including both preschool children and first- and second-graders, operated under a common program philosophy. The six groups were located in three different buildings, with one younger and one older group in each building. Building populations varied somewhat according to racial composition and social class, although all of the subjects came from the lower socio-economic strata of the city. Sub-sample (i.e., center) differences will not be emphasized here, but we are aware of the possibility of their existence. Particularly important, in our view, is to know that the staff was supervised through a single administrative organization and that the structure of the groups was similar in the case of both older and younger children. All groups were "open" groups in the sense that the schedule permitted the children to have

a range of choice among activities and minimal constraints on peer contact. Program activities, of course, were not identical: older children simply do not engage in the same play activities as younger children. But gross ecological differences between settings for older and younger children were minimal.

One hundred and two children, 56 boys and 46 girls were enrolled in these groups. Sixty-four were between four- and six-years of age; 38 were between six- and eight-years of age. Note that the distinction between younger and older is completely confounded with school status; no child in our older group was not attending school in the first, second, or third grade.

Observations were conducted over a ten-week period. Our method of observation was a combination of time and event sampling in which both aggressive and non-aggressive activities were recorded. The time sampling component, utilizing two-minute periods, governed the overall progression of the observations. From one to five "target" children were observed during each two-minute segment. Any one target was not observed again for two full minutes until all other children in the group had been observed as targets, at which time one round of observation was considered to be complete. The procedure was modified to an event sampling strategy whenever an aggressive act occurred elsewhere in the room. Observers recorded all such behavior regardless of who was engaged in it, i.e., whether it involved the target or some different child. The event observation was counted as a round (equivalent to a two-minute observation) only if it actually extended for two minutes. Everything that a target child did during the observation was noted in the record, but the detail varied somewhat with the events that were occurring. If the observation focussed on

subjects who were engaged in non-aggressive activities, the observers noted the behaviors and context in brief, general terms. If the observer was focussed on an aggressive behavior, however, the sequence was described in as much detail as possible.

Aggressive events were defined as intentional physical and verbal responses which are directed toward an object or another person and that have the capacity to damage or injure. Instructions to the observers were to record as much information about the aggressive act as he or she could reconstruct. A sample of one episode (not necessarily consuming two minutes) is given below:

Marian (a seven-year old)...is complaining to all that David (who is also present) had squirted her on the pants she has to wear tonight. She says "I'm gonna do it to him to see how he likes it." She fills a can with water and David runs to the teacher and tells of her threat. The teacher takes the can from Marian. Marian attacks David and pulls his hair very hard. He cries and swings at Marian as the teacher tries to restrain him; then she takes him upstairs...Later, Marian and Elaine go upstairs and into the room where David is seated with a teacher. He throws a book at Marian. The teacher asks Marian to leave. Marian kicks David, then leaves. David cries and screams, "Get out of here, they're just gonna tease me."

This incident included an initial aggressive outburst followed by counter-aggression and continued fighting. Other outbursts, however, were less protracted. Observers were encouraged to use clear language that would not telescope the event and to avoid inferences about the particular intentions,

motivations, or feelings of the subjects (Wright, 1960). The role played by each child in the interaction was to be recorded straightforwardly and specifically. Four observers were employed in this task.

The specimen records were then reproduced in multiple copies. One pair of coders combed all of the records to identify all interactions which conformed to our definition of aggression. This was accomplished with agreement of 83%. At the same time, the coder underlined all of the words which described the aggressive act itself. Words referring to antecedent events and to the consequences of the aggression were not so underlined. A second copy of the records was prepared in which the words describing each aggressive act were blacked out in the manner in which journal editors black out authors' names. A pair of coders then examined each specimen containing a blacked out space, knowing it indicated the presence of an aggressive episode, to determine whether an identifiable instigator was present in the record. This judgment was accomplished with 92% agreement and then the words depicting the instigator were blacked out on yet another copy of the protocols. Thus, we ended up with two copies of each protocol: one showing that aggression had taken place but revealing nothing else about the verbal or motoric components of the act, and another which revealed the full description of the aggressive act but which concealed the description of the instigator. This was our device for preserving independence in our assessment of the nature of the aggression and the nature of the instigating events. The device does not perfectly delete every subtle cue about the instigating event from the descriptions of the aggressive episodes nor does it always conceal every facet of the forthcoming aggression from the description of the instigator. But this system works remarkably well, and

far better than anything that could be effected in the direct coding of instigators and aggressive acts from various other types of records (e.g., films).

Other sets of coders then proceeded to classify the two sets of protocols. Each aggressive event was classified by one set of coders as either hostile (person-directed) or instrumental (object-oriented) in one round of coding. (Agreement reached 92%.) In another round, with other coders, the aggressive events were separated according to a finer-grained analysis of function. Here, nine categories were used ranging from bodily injury and destruction of property to rejection, derogation, and defiant non-compliance. More molecular components of these acts were also coded such as whether the aggression involved grabs, pinches, hits, slaps, insults, spitting, criticism, etc. Finally, the antecedents were classified. Eighteen categories were used for this purpose but, for this report, these have been collapsed into three: a) blocking (involving possessions, space, and activity), b) bodily contact (either accidental or deliberate), and c) derogation (negative social comparisons, tattling, ridicule, criticism). The functional classification of the aggressive episodes and their antecedents was accomplished with an overall percentage of agreement that reached 94%.

one last note about this method of handling the protocols: counter-aggression is an act whose antecedent consists of an aggressive act by another child. This interdependence, and other considerations, suggest that initial outbursts and total outbursts require separate treatment in examination of the data. For purposes of this presentation, our results will be couched in terms of initial units, i.e., those outbursts which occurred first in an

aggressive sequence. Supplemental information will be provided which is based on the entire group of 758 units of aggression observed, even though the interdependence among these units prevents statistical analysis in any depth.

Results. 1. Age. The older children were less aggressive per unit time, overall, than the younger children ($p = .007$). This is the clearest indication in the observational literature that aggression declines in the period immediately after early childhood. The difference was comparable for both sexes. There was a significant race x age interaction ($p = .006$): among younger children, the rate of aggression for black and for white children did not differ but the older black children were significantly more aggressive than the older white subjects.

The age difference in total aggression derives primarily from an age difference in the rate of occurrence of instrumental aggression. As expected, this type of outburst occurred significantly more frequently among the younger children ($p = .001$). A tendency for more hostile aggression to be shown by the younger children than by the older children did not reach significance ($p = .06$). The significant race by age interaction also derives from instrumental aggression ($p = .006$). That is, there was no race difference in instrumental aggressive activity among the younger children, but the older black children showed more aggression of this type than did the older white children.

The age difference which bears most directly on the hypotheses of the study concerns the proportion of aggressive units which is hostile. Indeed, for those 84 children who initiated aggressive activity, a significantly higher percentage of the aggression was classified as hostile among the older subjects than among the younger subjects ($p = .002$). Correspondingly, a lesser proportion was classified as instrumental ($p = .002$) for the older subjects.

We next separated units of aggression according to two criteria: those elicited by blocking and those elicited by derogation, tattling, and rejection. The percentage of each child's aggression which was instrumental was then computed, along with the percentage which was hostile. Blocking produced a significantly higher percentage of instrumental aggression among the younger children than among the older children ($p = .004$), in line with our expectations and supporting the notion that there is a greater admixture of instrumental and hostile reactions to this type of frustration for older children. For aggression produced by derogation, we found that a higher percentage was rated as hostile for the younger children than for the older children ($p = .02$). Although we had expected that, when derogation produced aggression, much of it would be hostile, we did not expect that a greater proportion of such linkages would be observed among the younger subjects.

Examining the data from another viewpoint (and utilizing all of the units of aggression recorded), a functional pattern emerges which is generally consistent with the preceding pattern of results. A clear age difference was found, for example, in the types of hostile behavior which derogation elicits. For younger children, when such antecedents elicit hostile outbursts, half (48%) take the form of bodily injury (hitting) and half consist of reciprocated derogation, threats, and tattling (52%). Among the older children, however, derogation shows a decided tendency to produce reciprocal derogation: only 22% of hostile responses to derogation involved hitting while 78% involved some type of insult or reciprocated threat to self-esteem. A parallel age difference in types of hostile aggression was not found in the aggression elicited by blocking: about 25% of blocking-produced hostility involved derogation, rejection, tattling, and threats

for each age group. Thus, when elementary school children are insulted and the insult leads to aggression, the likelihood of insulting retaliation is very great; not so for preschool children. On the other hand, when either older or younger children are blocked, the proportion of insulting hostile reactions does not vary with age. The developmental significance of this finding requires more extensive follow-up in our analyses of counter-aggression (now in progress), but the pattern of these findings again agrees with our hypotheses.

2. Sex. Earlier, it was noted that age was not involved in any interactions with the sex variable insofar as the sheer incidence of aggression was concerned. It will come as no surprise, however, that our male subjects were more aggressive totally than the females ($p = .015$). This difference was primarily due to a sex difference in the incidence of hostile aggression ($p = .05$); no significant sex difference was obtained in the rate of occurrence of instrumental aggression. Most important of all, none of our functional analyses, i.e., those relating the nature of the aggressive outburst to the nature of the antecedent, have revealed significant sex differences. Thus, there is no evidence that boys and girls are differently "wired" with respect to the operation of hostile and instrumental aggression. Such differences were not expected and the data confirm those expectations.

3. Race. A similar situation prevails with respect to race. As noted, more frequent total aggression was observed among older black children than among older whites, owing primarily to the higher incidence of instrumental aggression in the former group. Although we are not aware of extensive social research showing such race differences, they seem to have been evident in the lower class milieu in which we worked. The validity of this

finding cannot easily be questioned: There had been no reference to race differences in our instructions to observers. Moreover, such differences were in no way related to our research; we conducted the analyses only because of their obvious necessity. Indeed, the only way in which these findings could have been produced by observer bias is through more subtle racist stereotypes (the observers were white). But here, too, the more critical race differences would be those relating to the functional properties of the aggression in the interactions of the children. As with sex, no significant differences were found. The patterning of antecedents for hostile aggression and the elicitors of instrumental aggression were not different for our white and black samples.

Conclusion

These results lend support to two hypotheses: a) the developmental course of human aggression may be best understood by means of a differentiated "functional analysis" of the problem; b) the distinction between instrumental and hostile aggression is heuristically valuable for studying the functions of aggression in early childhood even though it may have more limited usefulness in studies of adolescent or adult aggression.

What is meant by the word "function" in the context of this paper? Simply put, this word implies the question "how does aggression work?" Answers to this question may be sought from many different vantage points, using many different levels of analysis. One type of such analysis might involve the generation of mathematical relational statements between levels of brain stimulation and differentiated aggressive outbursts; other analyses may concern the long-term biological consequences of aggression--that is,

whether it serves to maintain an individual's genes in the population. Still other types of functional analysis might concern relations between specific instigating stimuli and the qualities of aggression in particular individuals or groups and how these vary in accordance with the maturation of those response capabilities necessary for a specific type of aggressive display or the social ecological conditions in which the aggression occurs. Each of these functional perspectives is based on the assumption that understanding how aggression "works" requires an understanding of how the specific aggressive outburst fits into the complicated nexus of events that precede and follow it (Hinde, in press). To this end, the ontogenetic history of the individual and the biological/evolutionary outcomes of the activity must be taken into consideration as well as stimuli which function as "instigators," "goals," or "reinforcers" in individual behavioral sequences. To specify aggressive functions at only one level of analysis is to risk a myopic conception of the problem like that of the elephant produced by the blind man who only touches the beast's trunk. And in this regard, it is contended here that an ontogenetic perspective on aggression is sorely needed.

Our own research only points the way toward a more complete functional analysis of aggression on children's social interaction. Our data are descriptive; we have not elucidated the assumed relation between those social/cognitive processes and aggression on which we based our hypotheses. Do, in fact, changes in the child's use of attributions about intent and the developmental events we have described emerge in parallel sequence? And, if so, is there a systematic functional relation between advances in social cognition and changes in aggressive morphology and elicitation? These are the commencements to which this work brings us.

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Footnote

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