

PERSON PERCEPTION AS A FUNCTION OF QUANTITY
CHANGE IN ARTIFICIAL SOCIAL OBJECTS:
A DEVELOPMENTAL APPROACH

by

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Chapter 1

INTRODUCTION

A large part of normal human behavior consists of making judgments about other people. This study is concerned with how persons develop the ability to make judgments of others. The research strategy to be followed in this thesis is developmental in that we will attempt to investigate how certain social judgment processes emerge as children mature.

Historically, two general lines of inquiry characterize the social judgment literature. The first deals with the recognition and identification of emotions in others. Typically, recognition studies involve the presentation of a stimulus which conveys an emotion to a group of judges whose task is to label the emotion being expressed. A variety of stimuli have been used in this area. For example, a real person (Sherman, 1927); a photograph of a person (Feleky, 1924; Dunlap, 1927; F. H. Allport, 1924; Munn, 1940; and Schlosberg, 1952); and a drawing representing a person (Sherman, 1927). Although some of the findings in this area are replicable, Bruner and Tagiuri (1954) contend that most of the evidence is contradictory and inconclusive.

The second line of inquiry is concerned with the judgment or perception of personality. Early investigations in this area have focused on the accuracy of perception as determined by the characteristics of the judge in terms of a halo effect (Thorndike, 1920); the logical error (Guilford, 1936); and the leniency effect (Lemann and Soloman, 1952). Also used was the relationship between the judge and judged (Kelly, 1948); personality characteristics (Taft, 1950); intelligence (Dymond, 1949); and aesthetic sensitiveness (G. W. Allport, 1937). Again, Bruner and Tagiuri (1954) contend that these

studies "... have not progressed to a point at which firm substantive conclusions can be brought to bear..." (Bruner and Tagiuri, 1954, p. 646)

Both the identification of emotions in others and judgments of personality by a perceiver are based on the utilization of different cues. How these cues are perceived, why some are perceived and not others, and how we learn to use these cues in forming an impression of another may be viewed as a problem in cognition. Or, as Scheerer has expressed it, "From the cognitive point of view, cognition begins with perception." (Scheerer, 1959, p. 97) This viewpoint is well illustrated by the work of Michotte (1950). He performed a series of experiments using simple geometric figures which were moved toward or away from each other in order to investigate how these movements would be interpreted by subjects, and, whether specific sequences of motion would be perceived as functional causal connections. His results led him to suggest that perceptual cues are organized into cognitive formations which vary in correspondence with changes in the stimulus conditions, e.g., rate of movement, directions, and distance. Furthermore, Michotte describes causal connections between objects as being "felt" connections. He thus provides a link between the traditionally separate areas of emotion and cognition which allows us to consider the social implications of cognitive structuring relative to the use of perceptual cues.

Intensive research on cognitive development is still a comparatively recent trend in psychology. However, theory and research in this area have progressed sufficiently so that a number of generalizations are now available. Moreover, since the generalizations that are agreed upon by several theorists in this area, such as Piaget, Werner, and Bruner, are indicative of rather broad trends, they can be applied to many areas of cognitive functioning. The work reported in this thesis is based upon the belief that since person per-

ception can be viewed as a problem in cognition, it can be investigated effectively from the standpoint of cognitive development theory.

In the present study, certain general trends in cognitive development described by Piaget, Bruner, and Werner are applied to the problem of how children form impressions of others. Werner (1948) contends that a child's causal thinking may be defined as an increasing adaptation of thought to objective fact and that the law of development is here one of increasing abstraction and generalization. Piaget (1950) suggests that mental operations derive from overt operations and that these mental operations can be described in terms of four chronologically successive stages. The major division, however, is between the age periods four to seven and seven to eleven. The thinking of younger children is described as artificialistic, animistic, and egocentric, while the thinking of older children is characterized by a grasp of multiple points of view and of relational concepts. Finally, Bruner (1964) distinguishes three modes of cognitive representation: enactive, iconic, and symbolic. Bruner and his associates have shown that so long as iconic representation dominates, (that is so long as the percept is primary), it is difficult for the child to develop the higher order symbolic technique.

All these writers apparently agree that there is a progression in the child's ability to think abstractly and that there are transitional stages gone through as children achieve higher levels of cognitive development. In most instances, this means that the child moves from a technique of dealing with things one aspect at a time in terms of their perceptual appearance, to dealing with several features at the same time and in some organized hierarchical relationship.

No direct empirical application of these generalizations to social judgment are to be found in the literature. However, two writers have suggested

how these generalizations might be applied. Bruner contends that for the child, "Taking a view external to himself is as difficult for him socially as it is perceptually and intellectually." (Bruner, 1966, p. 25) Furthermore, Brown (1965), in reviewing some studies by Piaget, suggests that the young child's understanding of certain social activities begins with perceptually obvious externals.

To recapitulate briefly, it appears that a young child attends to the present aspect of stimuli when he is asked to give a valuating response. When faced with the problem of logically integrating several aspects of a situation, he cannot disregard the perceptually obtrusive. He does not concern himself with mitigating or qualifying conditions; e.g., intentionality. Higher order conceptualization occurs at a later age and involves accommodations to contexts not directly given in perception.

The general aim of this study is to examine social judgment as a function of stages of cognitive development. To carry out this aim we will test children on a social judgment task involving perceptual cues of the type that have been studied in general cognitive development research. It is expected that children in more advanced stages of cognitive development will show greater ability to derive socially relevant meanings from such cues than will younger children.

Chapter 2

BACKGROUND AND THEORY

The research reported in this thesis involves an empirical integration of two heretofore relatively separate lines of inquiry, viz: social perception and cognitive development. In the following pages these areas are discussed separately in some detail, and theoretical relations between them are explored.

Social Perception.

The problem of how people judge others is variously described in the literature as "impression formation," "social judgment," "social cognition," "person perception," and "social perception." Following the literature, we view these terms as quite interchangeable, but for definition purposes we will employ Tagiuri's statement on "person perception." He says that the use of this term is appropriate "whenever the perceiver regards the object as having the potential of representation and intentionality." (Tagiuri, 1958, p. x) And he adds that "...when we speak of person perception or of knowledge of persons, we refer mostly to the observations we make about intentions, attitudes, emotions, ideas, abilities, purposes, traits--events that are, so to speak, inside the person. We make these observations as we follow...the actions of persons, but we formulate the actions in terms that are strictly psychological." (Tagiuri, 1958, p. x)

Gollin has gone on to say that "Impressions of other persons consist of representations which involve modifications of the stimulus qualities emitted by the person being judged." (Gollin, 1958, p. 139). If we assume that the observer tends to order and organize the diverse behavior being presented,

then it may also be assumed that the structure imposed by the observer is not haphazard but is systematically related to particular cues in the situation. Moreover, the type of structure imposed by the observer must also be dependent upon the unique personality of the observer. Thus, social perception can be viewed as an interaction between the stimuli available and the characteristic manner in which the observer tends to organize such stimuli. (See Werner, 1948; Heider and Simmel, 1944; Gollin, 1958; Asch, 1946; and Kelly, 1955.)

Social perception research, from about 1920 until 1950, (See Bruner and Tagiuri, 1954), dealt primarily with the recognition and identification of emotions in others and in addition, with the accuracy of judgment or the characteristics of good or poor judges. In most cases these investigations required observers to provide or select from a list terms which they felt characterized the person, emotion, or behavior that was being judged. Very little attention was given to the structuring of such social judgments.

Asch (1946) was one of the first to conduct systematic investigations into the organizational characteristics of social judgments. Asch's method was to read to a group of subjects a list of trait-names said to denote characteristics belonging to a particular person, asking them to form an impression of this person, and then to give a brief characterization in a few sentences. He concluded that the impressions formed were unified, completed, and rounded. Most important is his conclusion that as soon as two or more traits are said to belong to one person, they no longer exist as isolated traits, but instead there is a dynamic interaction among them. The whole system of relations between traits attributed to a particular individual determines which of these traits will become central. But in a critique of the Asch investigation, Luchins (1948) suggested that trait lists are inadequate for studies of impression formation because such a task is not repre-

sentative of a real-life situation in which impressions are usually formed. Luchins repeated one of Asch's experiments and in analyzing the written impressions which he obtained, reported that "...it would be far-fetched to say of most of them that they were unified, completed, and rounded." (Luchins, 1948, p. 322)

To surmount some of the weaknesses in Asch's studies and to deal with some of the methodological criticisms made by Luchins, Gollin (1954) used a different method to study impression formation. In order to obtain precise control of the behavior of persons being judged and to preserve some of the complexity and vividness of real-life situations, he used a motion picture in which a single "star" is seen behaving in various ways. His results showed that the employment of stimulus material which retains more of the complexity of live impression-formation situations yields written impressions which lend themselves to a more intensive analysis than that provided by trait-name lists. He concluded "that the formation of an impression of the personality of another is a function not only of the characteristics of the person being observed, but also to a considerable extent a function of the underlying perceptual-cognitive organizing process in the observer." (Gollin, 1954, p. 76) It seems here that having conducted the type of study suggested by Luchin's criticism of Asch, Gollin's conclusion is not very different from Asch's, viz.: the impression one forms is dependent upon organizing processes.

An alternative approach to studying person perception that is more phenomenological in nature is provided by the work of From (1957) and Cantril (1957). They have suggested that we might best understand the relation between perceived stimuli and how these cues are cognitively organized if we note that the event to which we attend is the intention or purpose of the other. In order to do what they suggest we need an effective methodology.

One feasible way to implement their suggestions is provided by Heider and Simmel (1944).

In an attempt to study how the apparent behavior of others is cognized by the observer, Heider and Simmel (1944) devised a technique utilizing geometric figures (a large triangle, a small triangle, and a circle,) which moved about. They presented these figures to adult Ss via a moving film sequence. The Ss were asked to explain what was happening by telling a story about the action in the film sequence. The use of these geometric figures in a film sequence is justified in terms of operational and quantitative precision because "The stimulus has many geometrical and temporal features which can be defined in an exact way and which can be varied infinitely." (Heider and Simmel, 1944, p. 251)

Most Ss spontaneously perceive the picture in terms of animated beings. In the main experiment, S was instructed to interpret the movements as actions of persons, which they in fact did. The experimenters felt that a causal interpretation played an important role in the organization of various aspects of the film into a story. The film was also analyzed in terms of the interpretation given to movement combinations. Successive movement with momentary contact was described by most of the subjects as an aggressive relationship wherein one object strikes the other. Simultaneous movement of two objects, with or without contact, resulted in ambiguous interpretations. The movements are organized in terms of acts of persons. The S's descriptions not only made clear which person but also what motive or need within that person, was responsible for the movement. Relative to the interpretations given by Ss, Heider and Simmel concluded that "A description of movements in terms of motives...taps environmental layers of greater invariancy." In addition "...acts of persons have to be viewed in terms of motives in order that the

succession of changes becomes a connected sequence." (Heider and Simmel, 1944, p. 258)

Person perception will be investigated in this research through the medium of short cartoon sequences using geometric figures to represent persons in varying interaction patterns. Cartoon sequences can be arranged to convey various intentions. Heider and Simmel (1944) demonstrated that adult Ss will accept such figures as persons and describe their actions as causally motivated. Pilot work with children carried out in connection with the present study indicates that they too are able to consider such material as being representative of meaningful social relations.

Cognitive Development.

The second major theoretical basis for this thesis is cognitive development theory. We rely here on three of the major theorists; Bruner, Werner, and Piaget.

Development in cognition is believed by Bruner (1964) to be most clearly demonstrated in verbal behavior. Cognition as verbal behavior is subject to certain consistent and sequential patterns. These patterns (sometimes called "stages") are seen as necessarily sequential but in no way is time per se a variable of significance. Evidence of cognitive development also depends on output in the form of measurable, appropriate performance. Bruner (1964) considers that humans represent the recurrent features of their environment in three ways: through action, imagery, and language. He calls the three modes of representation enactive, iconic, and symbolic. It is the transition from iconic to symbolic representation that is most relevant for our purposes. The children who use iconic representation are characterized by being more highly sensitive to the spatial-qualitative organization of experience and less to the ordering principles governing such organization. They can

recognize and reproduce but cannot produce new structures based on rule. An experiment by Bruner and Kenney (1966) demonstrated some of the characteristic differences between iconic and symbolic representation. In the main, the difference lies in the younger children, age 5, relying more heavily on single perceptual attributes. The older children, aged 7, attend to more than one attribute in the situation; in addition, they utilize a hierarchical grouping that goes beyond perceptual inclusion.

Werner (1957) describes all development as proceeding "from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation, and hierarchic integration." (Werner, 1957, p. 126) He lists five aspects of the developmental process. They are: differentiated versus undifferentiated, diffuse versus articulated, rigid versus flexible, labile versus stable, and syncretic versus discrete. Werner's general view of mental functions involves the following assumptions. (1) Mental functioning may be analyzed into a number of differentiated functions. (2) Some of these functions are lower, developmentally, than others, and the lower ones are subordinated to the higher. (3) The same objective achievement may be brought about by different functions. (4) Functioning at any level tends to stabilize and rigidify in such a way as to be adaptive to the environment.

A study by Werner and Kaplan (1952) on the acquisition of word meaning illustrates these principles of mental functioning. The task presented to Ss in this experiment was to discover the meaning of a nonsense word from its usage in a series of 12 sentences. The groups of children ranged in age from 8 years to 13 years. Before the child can perform satisfactorily in this test situation, there are several different levels of concepts and modes of functioning he must have acquired. These concepts and levels of functioning are

indicated by such measures as rigidity of response, use of concrete realism, word sentence fusion, integration of meanings of a word, and the lability of usage of words. In his analysis of these data, Werner combined all the processes representing the more primitive types of thinking and called them A-processes. He next combined the more advanced processes and called them B-processes. By showing how often these were used for the different age groups he was able to illustrate his hypothesis that development is not a single-line process but rather a gradual replacement of primitive processes by more advanced ones.

Werner postulated a sensoritonic theory of perception which has as its basic postulate, "a perceptual property is an experience which corresponds to a particular relation between organismic state and stimuli from an object." (Werner and Wapner, 1956, p. 316) We have here an independent restatement of the notion presented earlier that representations resulting from perception are a function of both the stimuli and the organism.

In brief, Werner's contributions suggest that for any given mental process in a child of a given age, we can assume that this process will be superseded by one which is more discrete, articulated, and organizational. The developmental process may thus be divided meaningfully into stages when it is qualitatively analyzed in terms of how the child functions as judged by objective criteria.

Of decided importance to the research in this thesis is Piaget's theory of cognitive growth. Piaget (1950) believes that while physical development seems to be continuous, intellectual development progresses in discrete stages. The order of succession of stages is constant, although the ages at which different stages are attained may vary somewhat, depending on the child's unique experience and cultural milieu. As the child moves from one

stage to the next, early structures become integrated with later ones. In particular the transition from "concrete operations" to "formal operations" is of interest to us in this thesis. When Piaget describes this transition he refers to certain events which are characteristic of the two levels. At the level of concrete operations, the child's concepts and his understanding of situations are likely to be determined by what he happens to perceive, which is often a single salient aspect of a particular object or event. Ordinarily he will not relate different aspects or dimensions of a situation to one another. The ability to deal with verbal expressions of logical relations requires the use of formal operations as distinct from concrete operations and the child ordinarily does not use these until the age of 11 or 12. The adolescent can reason deductively, making hypotheses about problem solutions, and keeping in mind many variables simultaneously.

This is very similar to Bruner's discussion of the transition between the iconic mode of representation and the symbolic. Both of these theorists' considerations of the cognitive abilities of the younger versus the older child would cause us to predict that relative to person perception, the younger children will attend to perceptual cues and the older children will be able to infer intentions implied by the changes in cues.

Developmental Approaches To Social Perception.

To a certain degree, Piaget's conceptions have been applied to changes that occur in children's moral judgments and this can be considered to be a special case of social perception. Piaget's (1948) work regarding the moral judgments and understanding of children shows a developmental progression. The younger child, from four years to eight years, is characterized by what Piaget called heteronomous morality which means "subject to another's law." The young child conceives of "wrong doing in highly literal, objective terms

without regard to intentions..." (Brown, 1965, p. 403) The second morality, which develops after eight years and is complete shortly thereafter, was called autonomous by Piaget and means "subject to one's own law." The older children, when asked to judge who was the naughtier of two children in two different situations, would base their judgments on the intentions of the child rather than on the magnitude of the damage done. Kohlberg (1963) increased the difficulty of the dilemmas he presented to children and found stages of moral development beyond those of Piaget. Thus, moral judgment studies provide us with a very specific case of social perception in that judgments of transgressions and attributions of guilt do rely on an observer's perception of the intentions of another.

Some developmental studies of general social perception have already been carried out. For example, Gollin (1958) showed 11, 14, and 17 year olds silent films and obtained written descriptions about the "star" in each film. He found an increasing use of both inference and concept with age. He also found that use of local inference, based on a single aspect of behavior, occurs earlier than does general inference, which is based upon several aspects of behavior. However, there are certain difficulties with Gollin's research. First, Gollin used diverse themes to see how Ss could integrate these into a unitary impression. But in judgments of actual people the observer need not necessarily perceive diverse characteristics. For example, if a person is perceived as being kind, then it is possible that an act of promiscuous solicitation will be construed as another act of kindness, especially by a young child. A child could interpret the actions of a woman who walks up to a man, talks to him, and then they walk away together, as that of a kind woman who shows a stranger his way. Second, 40% of 26 children aged 8 to 10 in Gollin's pilot study confused the star with some other character.

Third, only 50% of these children recognized both themes. This is consistent with the finding of Heider and Simmel (1944) that when their task consisted of an understanding of the social implications of the simultaneous movement of two objects, the results were ambiguous. Finally, the necessity of having his subjects give written impressions precludes the possibility of using children in the younger age groups which would allow us to consider the relevance of Bruner's and Piaget's findings to person perception.

More recently, Signell (1966) studied cognitive complexity in person perception and nation perception. Her results offer substantial support for developmental movement toward increasingly complex single concepts, cognitive structure, and content.

Zigler, Levine, and Gould (1966) showed cartoons which required no reading skill to children and related the underlying cognitive processes to humor appreciation. Their overall findings indicate a positive correlation between expressions of humor for a particular level of cartoon and grade level of the children. As it became more difficult to see the humor in the cartoons, only the older children, grade 5, expressed any humor when shown it. They found no difference in the responses given by the different sexes.

Yarrow and Campbell (1963) studied person perception in children aged 8 through 13. From the examination of children's perceptions of others as reflected by interviews, they concluded that their descriptions of others were dominated by social relevance. Evidence of social relevance was provided by the emphasis of the child on interaction and the common use of evaluative appraisals. Yarrow and Campbell also contended that "When perceptual complexity is considered there were no consistent sex differences, but age trends appear. Older children tended to give more complex perceptual reports." (Yarrow and Campbell, 1963, p. 64)

Whiteman (1967) studied children's conceptions of psychological causality in 5, 6, 8, and 9 year olds. They interviewed these children with respect to their understanding of the motivations of a child in seven different story situations. They found that significant age differences appeared with respect to individual stories and to a composite Motivation Index that they devised. Whiteman concluded with two remarks that are particularly relevant to the present study. "The relative difficulty of the younger child in...decentering from a focus on overt behavior to a more covert intent would not be inconsistent with Piaget's distinction between the 'intuitive' child (ages 4-7) and the 'concrete operational' child (ages 7-11)." In addition, he felt that "One would expect the growth of understanding of psychological causality to parallel the growth of moral judgments based on the other's underlying intentions, rather than on his overt behaviors." (Whiteman, 1967, p. 155)

Dubin and Dubin (1965), in a review of research on children's social perceptions, concluded that some important generalizations could be made which could prove to be very useful, especially in the clinical area. They divided the research into the global areas of self-perception, perception of parents, and perception of other authority figures. In general, it was demonstrated in the various studies reviewed that there were changes in the nature of the child's phenomenal world which corresponded to changes in age. However, it would be difficult to say specifically how this came about. They say "The most parsimonious conclusion that can be reached about these age related perceptions is that, with increasing age, children's perceptions of adults become more realistic, that is, corresponds more accurately with objective characteristics of persons. At the same time distinctions among adults become grounded in more subtle perceptual characteristics." (Dubin and Dubin, 1965, p. 831) Relative to methodological criticisms of the research they reviewed, they make

two main points. One of the major problems in research concerned with children's perceptions is the use of research designs that hold age constant. They feel that holding age constant interferes with the development of the kind of process-models that are needed. In addition, they contended that new techniques are needed for measuring social perception in young children "where socialization is incomplete and language facility limited." (Dubin and Dubin, 1965, p. 835)

While the direct purpose of this research is to investigate the hypothesis that as children grow older, they depend less on the perceptual qualities of artificial social stimuli, and more on their structured relationships which convey intentional meanings; our specific aims include varying age and testing a new technique for the investigation of social perception in children that does not depend on facility with written language.

Chapter 3

DESIGN AND PROCEDURE

The general research plan involves testing different aged children on a standard social judgment task. In order to carry out the aim of the study, the task was arranged so that children could respond either in terms of the perceptual qualities or in terms of the intentions conveyed by changes in these perceptual qualities.

The Social Judgment Task.

Our stimulus material consists of cartoon sequences which portray artificial social objects in socially meaningful interactions. Following ideas suggested by Heider and Simmel (1944), we have found that adult Ss will readily accept geometric figures as representative of people. Also, they will accept as socially meaningful, multibox cartoon sequences showing these artificial social objects in varying interaction patterns. (See Heider, 1967) Intentional meanings are conveyed here by physical and behavioral changes in the objects. For example, see cartoons 1 & 2 in Figure 1. Rappoport (1967) has obtained data which indicate that in such cartoons the figure reduced in size is judged as more friendly and generous.

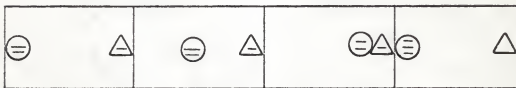
The four cartoons used in this study are shown in Figure 1. Quantity Change is the perceptual quality manipulated in these cartoons. In cartoon one, the large circle on the left approaches the small circle on the right, they touch, and in the last slide they are back in their original position with the circle on the left even larger than it was before and the small circle on the right even smaller. (It might be noted here that in all four cartoons, the movements of geometric figures are held constant.) In cartoon



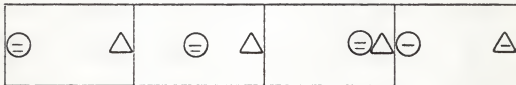
Cartoon #1: Change in size; increase in the larger object.



Cartoon #2: Change in size; reduction in the larger object.



Cartoon #3: Change in number; inequality increases.



Cartoon #4: Change in number; inequality is eliminated.

Figure 1: Cartoon Sequences

two, the large circle on the left ends up smaller than before and the small circle becomes larger with the result that in the last slide they are the same size. In cartoon three, the inequality, in terms of the number of objects contained by the circle and triangle, is increased with the result that in the last slide the circle has all the objects and the triangle has none. In cartoon four, the inequality is eliminated with the end result of equality being obtained.

Each cartoon was presented as a sequence of four slides with a five second exposure time for each slide. Cartoons 1 & 2 show changes in the relative size of two social objects. Cartoons 3 & 4 show changes in the numerical quantities associated with two social objects. The size and quantity changes are parallel. That is, cartoon 1 shows an initially larger figure approach a smaller one and grow still larger. Cartoon 3 shows a figure with two objects approach a figure with one object and end with three objects. The changes shown in these cartoons are parallel in that an initial inequality is shown to increase. In cartoons 2 & 4, an initial inequality is shown to be eliminated.

The changes in quantity described above are designed to convey the intentions of give and take. When a quantitatively larger social object (either in size or number) is shown to approach another social object and the result is that its size is decreased, the action can only be meaningfully construed as giving. Unpublished results obtained by Rappoport (1967) show that college SS, when forced to categorize such a situation, almost unanimously see it as giving. In the reverse situation, that of a larger social object approaching another social object and the result being an increase in size, the impression is of taking. Pilot testing, carried out in connection with preparation of this thesis, showed that older children also indicated that give-take intentions were apparent to them. One of the hypotheses to be tested in this

thesis follows from the above discussion of intentions, viz., if children can perceive the intentions, they should select the object seen as giving.

These cartoons were designed so that if the cartoon was construed in socially meaningful terms, the result would be that the object reduced in quantity would be considered as being nicer or better liked than the object which had an increase. For example, in cartoon 1, if the large circle is seen as taking something from the small circle, the small circle will be liked better or, if the small circle is seen as sharing or giving something to the large circle it still will be the better liked of the two. This observation holds for cartoons 2, 3, and 4 as well. In effect, the quantity changes that take place in the cartoons were designed so that they would convey intentions of give or take.

It is important to note that the four cartoons are designed to show two types of quantity change in two different ways. Cartoons 1 & 2, showing size changes, are considered to be relatively abstract because a change in relative size is open to more interpretation regarding interpersonal relations than is a discrete change in number. Everyday experience provides many examples involving transfer of objects between persons, but few changes in size. Moreover, to enhance the abstract and concrete character of the material, cartoons 1 & 2 were presented to Ss with an abstract introductory statement which states "I am going to show you a cartoon about two people." Cartoons 3 & 4 were presented to Ss with a more concrete introductory statement which said "I am going to show you a cartoon about two children who have some toys." In brief, both the cartoon material and the mode of presentation were arranged so that cartoons 1 & 2 were relatively more abstract than cartoons 3 & 4. It was therefore hypothesized that children would be better able to infer intentions conveyed in cartoons 3 & 4 than in cartoons 1 & 2.

Procedure.

The subjects tested were 64 male and female grade school children. Of these, 21 were in the first grade, 22 were in the fourth grade, and 21 were in the sixth grade. These particular grades were selected because they contain children whose ages are comparable to different levels of cognitive development as described by Piaget and Bruner. Mean age of Ss in grade 1 was 6:7, grade 4 was 9:7, and grade 6 was 12:0. All Ss were tested individually in a small room which contained a table with a projector on it and a projection screen on the wall. Seated at the table beside E, S was instructed as to how he was to proceed. Briefly, he was told that he would be shown a cartoon on the screen in front of him. He was to watch it and tell E a story about what was happening in the cartoon. Before testing any of the children, the whole class was told by E that they would be shown cartoons using circles and triangles. After receiving instructions in the experimental room, E then started the projector and showed S a cartoon which consisted of the sequence of four slides with a five second exposure for each slide and with the last slide remaining on the screen. The S was then asked to proceed with his story. While S told the story, E recorded it. After S indicated he was finished with the story, he was then asked to either tell E which object he liked best, or go up to the screen and point to the object that he liked best. After making his preference he was then asked why he liked that one best. The S was then given the appropriate instructions for the next cartoon and the same procedure was followed. In brief, the procedure involved;

(A) Instructions; (B) Cartoon was shown; (C) Story was told by S; (D) S indicated object preference; (E) Reason given for object choice. Then the following cartoons were shown using the same procedure.

Order Effects.

Since each S saw the four cartoons there could be uncontrolled order effects. To control for this, which of the cartoons he saw first was determined in advance in order that each of the four cartoons would be first an approximately equal number of times for any one class. Since the cartoons can be classed according to whether they were abstract (A) or concrete (C) and also as to whether an inequality was increased (I) or eliminated (E), it was decided to follow a cartoon of a particular type, e.g., AI, with one that differed on both dimensions. Since it was not possible to have both dimensions different for the third cartoon shown any particular S, the dimension which was changed was that of abstract-concrete since this dimension was more relevant for the purposes of this research. This resulted in the following four orders: (1) AI, CE, AE, CI; (2) AE, CI, AI, CE; (3) CI, AE, CE, AI; (4) CE, AI, CI, AE. These four orders resulted in an arrangement in which each of the cartoons is shown in each position an equal number of times.

Content Analysis of Responses.

As originally planned, S's performance on the task was to be analyzed according to two criteria: object preference and the reason given to justify his choice. Subsequent to testing all the subjects, it was decided to analyze the stories by devising categories which would exhaust the content of the statements made in telling the stories. This decision was made in order to provide a further test of the hypothesis that social object preferences are mediated by intentional meanings. It was assumed here that children who preferred the objects reduced in size would provide stories that contained references to intention more frequently than children who do not prefer the reduced objects.

The stories told by Ss were typed and submitted to judges for scoring in four categories. The categories were: (A) Statements of affect concerning the social objects; (B) Statements of physical changes, i.e., a gain or loss relating to the objects; (C) Statements made of movement, and (D) Statements of intention, i.e., giving, taking, or sharing. The average agreement among three judges across the categories was 93%. The following criteria were used to determine if any of the statements in a given story were to be scored in a particular category.

(A) Affect. If S considers the objects as liking each other; If S refers to the objects as friends; If S sees people as fighting; If one person is bad or good. An example would be: "The circle boy goes over to the triangle boy, fights with him and takes his toy."

(B) Quantity Change. If S comments specifically that there has been effected a gain or loss in either size or number. An example would be: "John went over to Joe and took his toy and now John has them all and Joe doesn't have any."

(c) Movement. If S refers to one person going to another place or going for a walk or running. Example: "The boy went over to the girl's house to play."

(D) Intention. If reference was made in the story to one person giving, taking, sharing, or grabbing something from another. For example: "The boy went over to the girl and shared one of his candy bars with her because she hadn't any."

The criteria used to analyze the reasons given by S to justify his choice for one or another of the various social objects was simply whether or not the statements involved a specific or implied value judgment concerning the act of giving, taking, or sharing. A statement made as a justification met the

criteria if it reflected the idea that one person was better or worse than another; any statement about the individual being a bully, one who shares, is selfish, generous, or kind; or if he has taken or given something to another. For example: "I don't like John because he is a bully." The average agreement among three judges here was 94%.

The third response measure, social object preference, required no content analysis since Ss had to select one of two objects.

Design Summary.

To recapitulate, the study was designed so that different aged children were required to respond to a set of four standard cartoons showing quantity changes in artificial social objects. The changes shown involved an increase or decrease in number and size. In general it was hypothesized that older children would respond to the cartoons in terms of social meanings conveyed by these changes. They were expected to prefer the objects reduced in quantity, and they were expected to justify their preference by referring to the positive intentions of the preferred object. By contrast, younger children were expected to assign relatively arbitrary meanings to the cartoon sequences. And the reasons given to justify their preference for an object were expected to relate to that which is perceptually given rather than to intentions which can be inferred from the actions of objects.

Chapter 4

RESULTS

The data in this research results from response measures which fall into three groupings: Object choices, stories, and justifications. Since all of these data consist of nominal frequencies, the chi square technique is used throughout for significance testing.

Social Object Preferences.

After Ss had seen the cartoon and told a story about it, they were then asked "Which of these children (people) do you like better?" They could either respond verbally or they were allowed to point to the object. The object preferences are shown in Table 1. Chi square analysis of these data shows that grade level is significantly related to object preference only on the more concrete cartoons (3 & 4).

The general relationship among object preference and cartoon type, abstract (1 & 2) and concrete (3 & 4) was further examined by analyzing object preference by cartoon type within each grade. No significant relations were found in grades one ($\chi^2 = .315$) or four ($\chi^2 = 1.886$). But for grade six, the relationship was significant ($\chi^2 = 4.20$, d.f. = 1, p .05). Inspection of Table 2 shows that sixth grade children choose the smaller object more often in the concrete cartoons.

Thus, it is clear that older children choose the object that is reduced in quantity in the concrete cartoons but no significant trend appears for the abstract cartoons across the grades.

TABLE 1

Chi square analysis of social object preferences stated in answer to the question, "Which of these persons do you like better?"

Larger/Smaller and More/Less refers to the status of the two figures shown in the last box of each cartoon.

Grade	Cartoons #:							
	1		2		3		4	
	Larger	Smaller	Larger	Smaller	More	Less	More	Less
1 (N-21)	12	9	8	11	11	9	12	9
4 (N-22)	9	13	8	14	7	15	4	18
6 (N-21)	7	14	7	14	3	18	3	18
χ^2	2.43 (N.S.)		.36 (N.S.)		7.60 (.05)		11.40 (.01)	

TABLE 2

Chi square analysis of relation between social object preferences and cartoon type in grade 6.

Cartoon Type	Social Object Preferences		
		Larger	Smaller
	Abstract 1 & 2	14	28
Concrete 3 & 4	6	36	

Content Analyses of Stories.

After S had seen a cartoon, and with the last slide remaining on the screen, he was asked to tell a story about what had taken place in the cartoon. The E made notes of S's stories, trying to capture the essential points of the stories although it was not possible to record it verbatim. For example, a story recorded from an S in grade 6 to cartoon 3: "The circle boy came over to the triangle boy. Circle boy had more toys than the triangle boy but he wanted more so he took the toy from the triangle boy." The stories were coded into categories designed to exhaust the person-relevant content. These categories were: (A) Affect, (B) Quantity Change, (C) Movement, (D) Intention. Two independent judges and the author then scored the stories according to these content criteria. The above example would be scored for movement, quantity change, and intention, but not affect. Table 3 shows category frequencies arranged by grade and cartoons. Table 4 presents the chi square analysis used to test the relationship between story content and cartoon type across all three grade levels. The result ($\chi^2 = 59.567$, d.f. = 3, $p < .001$) shows a highly significant relation between cartoon type and story content categories.

In order to further analyze this effect, analyses were made for each category by arranging 3 X 2 contingency tables for separate tests of the relation between grade level and cartoon type. None of these results reach the standard (.05) level of significance.

Inspection of Table 4 shows a general relationship between cartoon type and scores received in a particular category but the chi square analysis of the difference between the cartoon types was not significant.

Chi square analyses were then made of the effect of cartoon type on each individual category. Table 5 presents these analyses. Movement is the only

TABLE 3

Content analysis of childrens' stories.
Frequencies for the content categories
are arranged by grade level and cartoon
type.

	Cartoons #:						
		Abstract 1 & 2			Concrete 3 & 4		
Grade		1	2	Total	3	4	Total
1	Affect	4	4	8	2	2	4
	Quantity Change	1	3	4	2	1	3
	Movement	15	13	28	12	16	28
	Intention	1	1	2	1	0	1
4	Affect	6	6	12	0	4	4
	Quantity Change	8	10	18	3	4	7
	Movement	16	20	36	12	9	21
	Intention	5	3	8	17	19	36
6	Affect	4	2	6	4	1	5
	Quantity Change	10	13	23	1	1	2
	Movement	15	17	32	13	9	22
	Intention	7	4	11	20	21	41

TABLE 4

Chi square analysis of relation between Story Content Categories and Type of Cartoon for all grade levels.

	Cartoon Type	
	Abstract 1 & 2	Concrete 3 & 4
Story Content Categories		
Affect	26	13
Quantity Change	45	12
Movement	96	71
Intention	21	78

TABLE 5

χ^2 analysis of the relation between cartoon types and story content categories across grade levels.

Categories	χ^2
Affect	$\chi^2 = 4.34$ $p < .05$
Quantity Change	$\chi^2 = 9.55$ $p < .01$
Movement	$\chi^2 = 3.74$ N.S.
Intention	$\chi^2 = 32.82$ $p < .001$

category for which cartoon type has no effect. This demonstrates that cartoon type does have a significant effect on the number of times stories will be scored in a particular category .

Several statements about the data seem justified here.

(1) Analyses of the interaction chi square of Table 4 is highly significant.

(2) When chi squares are used on individual comparisons to see if there is a significant difference between the scores in a particular category by cartoon type, we find, with the exception of Movement, that there is, especially for Quantity Change and Intention.

Since Quantity Change and Intention seem to be contributing a large part of the significant interaction X^2 for Table 4, it was decided to analyze the relation between these two categories and type of cartoon. Table 6 results in a chi square of (49.377, d.f. = 1, $p < .001$.) Table 7, which is only for grades 4 and 6, results in an even larger chi square; (52.55, d.f. = 1, $p < .001$.)

Tables 6 & 7 and accompanying X^2 's show that there is a highly significant interaction between the Quantity Change and Intention categories and the two types of cartoons. Inspection of the tables shows that the type of cartoon affects the content of stories in such a manner that as scorings in Quantity Change increase, Intention decreases (in abstract cartoons) and if a preponderance of the stories are scored in the Intention category there is a concomitant drop in the content of the stories which meets the criteria of the category Quantity Change.

Justifications For Object Preferences.

After S had seen the cartoon, told a story about it, and given an object preference, he was then asked why he liked that particular one the best.

TABLE 6

Chi square analysis of the relation between cartoon type and the Quantity Change and Intention categories across grade levels.

	Cartoon Type	
	Abstract 1 & 2	Concrete 3 & 4
Quantity Change	45	12
Intention	21	78

TABLE 7

Chi square analysis of the relation between cartoon type and the Quantity Change and Intention categories for grades 4 and 6.

Categories	Cartoon Type	
	Abstract 1 & 2	Concrete 3 & 4
Quantity Change	41	9
Intention	19	77

After all Ss had been tested, the justifications were typed on separate cards and then judged to determine if they met the criteria outlined in Chapter 3. Table 8 presents the number of acceptable justifications by cartoon type for each of the three grades. A chi square analysis of the overall interaction between cartoon type and grade level was not significant, ($X^2 = 3.89$, d.f. = 2).

It was possible to separately test the significance of the difference between grade levels across cartoons and the difference between cartoon types across grade levels. The chi square for the first analysis, difference between grade levels, was obtained by finding the difference of each grade level from a mean of the three, ($X^2 = 48.647$, d.f. = 2, $p < .001$). Using the same method, the chi square for cartoon type was: ($X^2 = 21.314$, d.f. = 1, $p < .001$). These analyses only confirm what is apparent from an inspection of Table 8; viz.: that there are an increasing number of acceptable justifications as children increase in age and that almost all (38 of 42) of the 6th graders give acceptable justifications for the concrete cartoons and about half (19 of 42) do so for the abstract cartoons.

In sum, then, analyses of the three measures obtained in this research yeild the following results.

When we compare the effect of grade level on social object preference, we find that this effect occurs only for the concrete cartoons. In other words, whether or not they choose the object reduced in quantity does not allow us to differentiate among the grades for the abstract cartoons. When we compare the effect of type of cartoon on social object preference for each individual grade, we find this only has a significant effect for grade six.

By separating the content of the stories into four categories, some interesting relations become apparent. The number of times a category is

TABLE 8

Chi square analysis of the effects of cartoon type and grade level on the number of acceptable social object justification statements given by children.

Grade	Cartoons:	
	Abstract 1 & 2	Concrete 3 & 4
1 (N-84)	0	2
4 (N-88)	6	30
6 (N-84)	19	38

scored depends on the type of cartoon and the categories Quantity Change and Intention tend to vary inversely given a particular type of cartoon.

The reasons given to justify S's object preference are increasingly acceptable as Ss increase in age. Three times as many sixth graders give acceptable justifications for the abstract cartoons as do the fourth graders. A striking progression is noted if we compare the percentage of Ss who give acceptable justifications relative to the number possible, for the three grades.

Grade 1 -- 2%

Grade 4 -- 41%

Grade 6 -- 68%

Thus we see that all three response measures give support in varying degrees for the hypothesis that as children increase in age there is an increasing sophistication in their use of perceptual cues relative to a social perception situation.

Chapter 5

Discussion and Summary

Findings.

In general, the results support the hypothesis that as children grow older, they depend less on the perceptual qualities of artificial social stimuli, and more on their structured relationships which convey intentional meanings. Specifically, it was found that older children prefer social objects reduced in quantity and justify their preference by referring to the positive intentions of the preferred object. This was substantiated for the fourth and sixth graders in the concrete cartoons but only partially so for the abstract cartoons. The social object choice data show that for the concrete cartoons there is a dramatic change between the younger and older children, i.e., the younger children tend to prefer the larger object and the older children (grades 4 & 6) prefer the smaller. This finding coincides with that of the developmental cognitive theorists in which they find a major shift in cognitive processes in the age groups 4-7 and 7-11.

The content of the stories provided by children to fit the cartoons appears to depend on the child's ability to attend to more than one cue at a time and his ability to understand the underlying meaning these cues provide. First graders pay attention mainly to the movement of the social objects regardless of the type of cartoon. However, the comparison of fourth and sixth grader's responses to the abstract and concrete cartoons is particularly revealing. When these children can handle the information provided by the perceptual cues, as in the concrete cartoons, their stories emphasize the underlying intentions of the social objects. But when the cartoon is

more difficult, as in the abstract cartoons, they apparently are less able to see the underlying intentional structure and comment on two perceptually obvious cues, viz., quantity changes and movement. This result is also in line with cognitive development findings. Here we see evidence that even though a child can attend to more than one cue, this in itself is not sufficient for higher level cognition. In reference to the number of perceptual attributes being attended to, Bruner remarks "The younger child is attending to one... The older child can attend to two features, but he does not yet have the means for relating them..." (Bruner, 1964, p. 8)

Finally, the reasons given by the children to justify their choice of a social object are highly indicative of an awareness of the social meaning of the intentions conveyed in the cartoons. The older children, who can understand the underlying intentions in the cartoons, seem to be aware of the implications of these intentions for personality. Their justificatory statements make their understanding of these implications quite clear. For example, some of the reasons which met the criteria of acceptable justifications were: "Because he was nice and let the circle boy borrow the toy." "Because he wasn't selfish and he shared with others." "Because he was nice to the girl." Some which did not meet the criteria were: "Because he knows how to ride a horse." "Because he is the littlest." "Because he looks like a boy." "Because he is a man." Virtually all of the justifications were as clear as the above examples therefore the three judges who scored the justifications had no difficulty determining whether or not the children were responding to the intentions conveyed by the cartoons.

While effectively all the sixth graders give acceptable justifications for the concrete cartoons, only about half of them do so for the abstract cartoons. We would have expected that nearly all the sixth graders would have

given acceptable justifications for all the cartoons since at age 12 their cognitive processes should be characteristic of the level described by Bruner (1964) as "symbolic" and by Piaget (1950) as "formal operations." The fact that they do not, indicates that developmental levels in social judgment are not yet clearly delineated and probably more precision will be required to show subtle differences. Relatively small changes in the figures and instructions used in this research have significant effects on children's ability to perceive intentionality. While we are not able to specify exactly which of these changes is causing the effect, or if it is an interaction of the two, these findings do suggest some interesting possibilities for future research. The variables which define our concrete and abstract cartoons are instructions and type of quantity change. These could be manipulated in future research to determine which has the stronger effect. A preliminary check made in connection with this study, was in fact designed to examine relations between instructions and quantity change. Several subjects in grade 5 were shown concrete cartoons with abstract instructions and abstract cartoons with concrete instructions. This check was inadequate to answer the substantial question raised for two reasons. (1) Proper investigation of this question requires a full scale study. That is, one should really show children of different ages all the different combinations of the two variables. (2) The check was inadequate because it turned out that this particular group of 5th graders were a conspicuously slow class; i.e., they were not representative.

Methodology.

Object choices. The methodology employed here of having children respond by pointing at the object liked best requires some further discussion. It was pointed out previously that some investigators have not worked with

younger children in the area of social perception because of their inability to perform effectively with trait scales or sociometric devices. It was also noted that the manner in which an adult observer construes a child's interactions and the way the child sees them constitute two different "realities." (See Dubin and Dubin, 1965, and Yarrow and Campbell, 1963). The method used here of having the child point at the object worked very well, especially with the younger children (grade 1). For example, after watching cartoon three and telling a story about it, a boy in the first grade was then asked which of these children he liked better. He pointed to the circle with the three objects and said "That one." If E had any doubts about the exact direction the child was pointing, or even if he didn't, the child was generally asked to go up to the screen and point directly at the object he preferred. This served two purposes, viz., for the younger children, who are apt to be fidgety, this provided four breaks in the experimental routine and in addition it also served as an effective device to make sure that E was recording the actual object the child preferred. Verbal checks are difficult to employ here since younger children aren't as yet facile with concepts of left and right.

A note might be appropriate here regarding E's interpretation of how Ss construed the experimental situation. Typically, they seemed to enjoy it and were enthusiastic in telling their stories. To account for this attitude and their lack of reticence, it must be remembered that their participation in the research was in the nature of a special treat. They were allowed to leave their normal class routine in order to view cartoons that might be used on T.V. Hence, E was able to establish rapport quickly.

Stories. After watching the cartoon, and with the last slide on the screen, the child then proceeded to tell his story about what he considered

to be happening in the cartoon sequence. In giving their story S would sometimes look at E, who would appear attentive to what S was saying while at the same time writing it down, but S would most often look at the screen. The stories generally were cohesive units about boys and girls, mothers and fathers, or brothers and sisters engaging in some interaction. For example, consider a typical story given by a first grader after seeing cartoon 1.

"There are two people. They didn't like each other. (pause) They didn't like each other so they turned and walked off. They weren't friends. They tossed their heads and walked off. When asked which of these people he liked better, S said "The little girl, because the other one is a big fat women." When asked why he liked the little girl, S said "Because I like skinny people." Or, in effect, he likes the girl because he doesn't like the big fat woman. This story is typical of the first graders in several ways. It takes note of the fact that there is movement of the objects but no reference is made to anything that would account for the change in size of the objects. Also, the story was typical in length. The E was generally able to record almost verbatim what was being said. In the few instances where this was not possible, shorter notes preserved the essential points in the child's story.

A tape recorder was not used for two reasons. In some pilot work a tape recorder was used several times and children generally responded to its presence in one of two ways. Either they were awed by it and would continually glance at it, so much so that it made them lose the thread of their story, or they seemed concerned with saying something unrelated to the cartoon in the hope of hearing it replayed. In addition, when the recordings that were made were subsequently played back after the experimental session, the background noise of the projector, etc., rendered the recording almost unintelligible. Consequently, if S does not speak directly into a microphone

the recordings are useless because of background noise. If he does speak directly into the microphone he may become preoccupied with the recording apparatus. Suitable conditions could be devised to obtain a recording of the experimental session without S being aware of it and this would be preferred, but such facilities were not available for this research.

Another point relative to how the stories were recorded is that when the older children construed the cartoon in socially meaningful terms, as was the case for most Ss for cartoons 3 & 4, the stories they told were brief and E could in fact record them verbatim. For example, a story given by a sixth grader to cartoon 3: "The circle boy is older and he sees a younger child with a toy that he likes so he takes it away from him." This observation is especially interesting since it fits the idea of higher levels of cognitive processes being more efficient. In fact, Bruner stated that "...in one respect cognitive growth might be conceived as achieving a capacity for simplicity in dealing with information." (Bruner, et al, 1966, p. xi)

The pattern of frequencies shown in Table 3 suggests some important conclusions. The category of Affect shows a trend to being scored more often in the younger children's stories and more often in the abstract cartoons but as the frequencies are small no conclusions would seem warranted. Movement is scored relatively consistently across grades and there seems to be a trend for the older children to comment on the movement less in the concrete cartoons. The two remaining categories, Quantity Change and Intention, do show some consistent changes relative to both grade level and cartoon type. The important conclusions that seem justified on the basis of analyses made are as follows. In all their stories the young children emphasize Movement but not Quantity Change or Intention. This shows that they are attending to only one perceptual cue. In addition, all three response measures indicate that

the younger children are unable to understand intentions conveyed in the cartoons. The older children also mention movement; however, when they understand the material their stories emphasize intentions. When they do not understand the material they emphasize quantity changes. It is felt that when the intentions are understood, quantity changes are not mentioned specifically because they are incorporated into the statements of intention. For future research, this implies that specific hypotheses could be tested about the content of children's stories when they understand and when they do not understand the intentions conveyed by the stimulus material.

Conclusions.

1. The use of cartoon sequences using geometric figures as artificial social objects is an effective device for the study of person perception in children.

2. The three response measures all provide support for the existence of developmental levels in person perception.

3. Statements made by developmental cognitive theorists relating to the use of perceptual cues and their integration are applicable to psychological causality in a social situation as well as to physical causality.

4. Implications for future research lay in the fact that more sophisticated designs could be employed to test specific hypotheses concerning the development of social judgment processes.

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PERSON PERCEPTION AS A FUNCTION OF QUANTITY
CHANGES IN ARTIFICIAL SOCIAL OBJECTS:
A DEVELOPMENTAL STUDY

by

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As part of a larger project concerning the use of cartoon sequences for studies of social perception, this study investigates children's ability to infer socially meaningful intentions from changes in physical quantities associated with artificial persons. Following Piaget, it is hypothesized that younger children will respond in terms of the apparent intentions underlying these differences. Moreover, changes in relative number should be seen as socially meaningful at an earlier age than changes in relative size.

Sixty-four first, fourth and sixth grade children were tested individually on four cartoons showing changes in either size or number. Each cartoon was presented as a sequence of four slides shown in rapid succession. After viewing each cartoon, the subject was asked (1) to explain its story, (2) to point out which "person" he liked better, and (3) to justify his choice.

Three response measures were used; object choices, stories, and justifications. The object choices significantly differentiated between the three grades for concrete but not abstract cartoons. The stories were analyzed in terms of categories and two of them, Quantity Change and Intention, varied inversely relative to grade level and cartoon type. Justifications given for selection of a particular object was the most sensitive of the three measures in showing developmental levels and differences in the two types of cartoons.

The use of cartoon sequences using geometric figures as artificial social objects is an effective device for the study of person perception in children. The three response measures all provide support for the existence of developmental levels in person perception. Statements made by developmental cognitive theorists relating to the use of perceptual cues and their integration are applicable to psychological causality in a social situation as well as to physical causality. Implications for future research lies in the fact that

this method could be used in a more sophisticated fashion by increasing the variety of cues and the various interactions of the stimuli.