THE DEVELOPMENT AND ARTICULATION OF ATTRIBUTES IN PERSON PERCEPTION

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ABSTRACT

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By

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This research focused on the development and articulation of the attributes given by individuals in describing others. Of special interest was attribute utility, the generality with which the individual uses an attribute to characterize stimulus persons. Experiment 1 was designed to test the hypothesis, derived from cognitive-developmental theory, that the utility of attributes employed by perceivers increases with the development of the perceiver. It was also expected that differentiation, the total number of different attributes given by a perceiver, increases with the age of the perceiver.

Free descriptions of eight acquaintances were obtained from 88 subjects; the sample included approximately equal numbers of male and female fourth, sixth, ninth, and twelfth grade students. These descriptions were content analyzed such that the number of different attributes and the utility of every attribute used by a subject could be determined; low utility attributes were those used to describe only one of the acquaintances, while high utility attributes were those used to describe more than one of the acquaintances.

Preliminary analyses of the Experiment 1 data revealed that while differentiation was positively related to subjects' verbal intelligence, the utility ratio (the proportion of high utility attributes to total number of attributes) was not. A sex by grade unweighted means analysis of covariance of differentiation scores, with verbal intelligence as the

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covariate, indicated significant main effects for sex and for grade. Females displayed greater differentiation than males; differentiation increased with age of subject. A sex by grade unweighted means analysis of variance of utility ratios revealed a significant main effect for grade; utility ratio increased with age of subject. In sum, the results indicated that the number of different attributes identified by the perceiver increases as the perceiver develops, and that the proportion of attributes having high utility also increases developmentally.

Experiment 2 was undertaken to elucidate the function of the observed developmental increments in attribute utility. An informal model of cognitive structure, synthesizing elements of previous categorical and dimensional models, was introduced to facilitate the conceptualization of the relationship between attribute utility and attribute articulation. It was hypothesized that the articulation of an attribute, the likelihood that fine discriminations among stimulus persons are made in terms of the attribute, is a concommitant of the level of utility of the attribute. Samples of five high utility and five low utility attributes were obtained from each of ten male and ten female undergraduate subjects; the free description and content analysis procedures used in Experiment 1 were employed for this purpose. Using two independent measures of attribute articulation, for which subjects were required to rate and sort stimulus persons on attribute dimensions, it was found that subjects' judgments were more articulated when based on high utility than low utility attributes. It was proposed, in light of these results, that the development of person perception is best interpreted in terms of the increasing utility of attributes; such gains in utility enhance the probability that fine discriminations among stimulus persons may be made.

The implications of the present findings for cognitive-developmental theory and for future studies of person perception in children and adults were discussed.

THE DEVELOPMENT AND ARTICULATION OF ATTRIBUTES IN PERSON PERCEPTION

By

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INTRODUCTION

The Structure of Person Perception

The process whereby people perceive and come to understand other people has been the focus of considerable theoretical and empirical attention in recent years. Of the variety of empirical generalizations emanating from this tradition, probably the most central is the notion that the recognition of the particular attributes of a person (e.g., his attractiveness, hair color, aggressiveness, and so on) is more a function of the perceiver than of the person being perceived (Dornbusch et al., 1965). The proverb "Beauty is in the eye of the beholder" is an apt summary of the often replicated finding that there is greater commonality among reports on many people given by a single perceiver than there is among reports on a single person given by many perceivers. An immediate implication of this result is that ". . . a person has a core of generally consistent categories used in describing all people. . . . [Hastorf et al., 1958, p. 61]." An understanding of the process through which the individual develops this core of categories is the primary concern of the present investigation.

Core Categories: The Utility of an Attribute

The common assumption in most studies of person perception processes is that the perceiver's judgments of a person are a function both of the person's characteristics and the perceiver's past experience with people. Bruner and Tagiuri (1954) have suggested that this interaction

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be considered in terms of the perceiver's "implicit personality theory," a set of assumptions the perceiver has created on the basis of past experience, which he employs in the construal of new experiences with people. Perceptual and cognitive psychologists such as Gibson (1963) and Neisser (1967), who emphasize the "constructive" aspects of perception and cognition, have pointed out that the process of constructing a cognition--in this case, a cognitive representation of a person--leaves behind a residue, a record of the construction process which guides the construction of later cognitions. It is obvious that in forming a cognitive structure for processing information about people, we do not keep representations of entire persons in our heads. The observation that the mention of a person as a "redhead" conjures up an entire structure--a stereotype of what redheads are like--suggests that we process information about people in smaller units. For many theorists, these units of interpersonal cognition are the attributes of the stimulus person (Zajonc, 1968); an attribute is operationally defined as a descriptive characteristic attributed to a person (e.g., smart, nice to be with, wears glasses, female, doesn't like small children). In other words, anything a perceiver says about a person is an attribute of the person for that perceiver.

In describing a particular individual, a perceiver probably refers to some attributes which are very specific to that stimulus person; it is unlikely, for example, that a perceiver would say "he wears blue shoes" about very many of his acquaintances. On the other hand, attributes may be very general; a perceiver might well point out that many of the people he knows are "considerate." For the purposes of this discussion, the generality with which a perceiver uses an attribute to characterize stimulus persons will be termed the utility of the attribute. One attribute has higher utility than another if the perceiver employs it in the construal of a wider variety of stimulus persons. By this definition, a "high utility attribute" corresponds closely to the notion of a "core category" proposed by Hastorf et al. (1958). A study by Faguy-Coté (1965) has provided evidence in support of the utility definition of core categories. Using a variety of instruments, Faguy-Coté isolated the high utility attributes used by each of her subjects. These instruments included both adjective checklists, in which utility was defined as the frequency of usage of an adjective across a variety of stimulus persons, and a free response description task, in which the subject's high utility attributes were defined as those he gave as the "essential characteristics" of the largest variety of stimulus persons. In addition to finding a close correspondence between the two sets of high utility attributes elicited from each subject in these tasks, she also found that subjects' ratings of the "importance" of attributes were significantly correlated with utility. These results suggest not only that attribute utility can be unambiguously and reliably assessed, but also that subjects agree with such an operational definition of a "core category."

The Internal Structure of Attributes

An attribute is necessarily a judgment of a stimulus person; it is not a pure assessment of the person, but rather the perceiver's response to the person as a stimulus. As has been noted, many theorists choose to think about attributes as the product of an interaction between the immediate input--a person--and the cognitive structure of the perceiver. The assumption about the nature of the interaction that has been implicit in the present analysis is that the judgmental process can best be

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be conceptualized as an act of categorization. Congruent with a number of earlier formulations (Bruner, 1957; Gibson, 1963; Wallach, 1958), this approach includes the supposition that the perceptual inputs to which the perceiver is subject only become translated into potential responses when they have been cognitively associated with some class of similar objects or events. The basis of similarity is the recognition that all the objects or events in a particular category have some attribute in common. As Bieri et al. (1966) have pointed out, this supposition implies that cognitive structures--categories--are nominal and qualitative in nature, and may be represented mathematically using the language of set theory. A stimulus object is processed by placing it in a set or variety of sets of similar objects, at which time it may be responded to on the basis of the attributes defining these sets. If a person is standing on a railroad track, for example, and a speeding train is approaching, unless this percept is translated into the concept of "speeding train" through the process of matching the input with the cognitive category associated with speeding trains, the person will have no basis for responding to the percept, and will probably not live to worry about it.

The categorical model of judgment, however, seems difficult to apply to situations in which perceivers are asked to respond to stimuli according to their relative magnitude along some continuum. Individuals are quite capable of perceiving and responding to differences in, say, the brightness of a light, or the relative intelligence of a person. Attneave (1962), Bieri et al. (1966), and Restle (1961) have all recognized that many judgments people make can be viewed intuitively in terms of <u>dimensional model</u> of judgment. That is, the process of perceiving can be seen as the process of assigning an input some value along an attribute dimension; the perceiver bases responses upon this value. In contrast to the set-theoretic representations given to the categorical model, the dimensional model is most often represented in terms of an Euclidean n-space in which attributes are the dimensions of the space, objects of cognition are points in the space, and the projections of each object on the various dimensions represent the values or magnitudes of the object's dimensional attributes (see, e.g., the models presented by Scott, 1969; Rosenberg & Sedlak, 1972). However, since the data reduction techniques (i.e., factor analysis and multidimensional scaling) typically used to represent dimensional cognitive structure hold the central assumption that every object is construed on every attribute (cf. Coombs, Dawes, & Tversky, 1970), the dimensional model denies the intuitively obvious idea that some attributes are appropriate to only a few cognitive objects. It is difficult to conjure up a situation, for example, in which one would think seriously about the happiness of a crankshaft, the roundness of a square, or the amplitude of a window box, yet this assumption is a necessary part of the present state of conceptualization of dimensional judgments.

Various researchers have attempted to reconcile the differences between these two models of judgment, meeting in the process various levels of success. Both Attneave (1962) and Restle (1961), for example, discussed in detail the possible approaches to the representation of dimensions in terms of sets, but concluded that such representations required "stretching" mathematical set theory. A more promising avenue of reconciliation between the two approaches is suggested by evidence demonstrating that a category is not, in practice, a purely nominal and qualitative distinction. Rosch (1973) has pointed out, for example, that

> some colors to which English speakers apply the word "red" are "redder" than others. Some breeds of "dog" (such as retriever) are more representative of the "meaning" of "dog" than are others (such

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> as Pekinese). . . . However, psychological and linguistic research has tended to treat categories (whether perceptual or semantic) as though they were internally unstructured--that is, as though they were composed of undifferentiated, equivalent instances--and as though category boundaries were always "well defined" . . . [p. 111].

On the basis of subjects' judgments of "goodness of fit" of objects in categories, and subjects' reaction times to problems requiring the categorization of objects, Rosch concluded that categories of objects are internally structured, and may be conceptualized as consisting of an <u>exemplar</u>--an object which is the "best example" of a category--and other objects which are less well represented by the category. In light of these findings, it may be concluded that categories do not necessarily represent homogeneous sets of objects, and are therefore not amenable to mathematical set-theoretic explanations in any strict sense. These results may also be taken, however, as support for a more general proposition: An attribute may be thought of as a dimensional category; the objects in a category are organized along a dimension of "best fit," with the exemplar standing at one extreme of the dimension.

This analysis points to a conclusion similar to that proposed by Bieri et al. (1966), that categorical judgments involve discriminations among cognitive objects according to whether or not they are both construable on the same attribute, and that dimensional judgments involve discriminations among objects' values along an attribute. This second type of judgment requires, of course, that both objects have already been categorized on the attribute. However, the conclusion of Bieri and his colleagues may be strengthened by noting that the process of judgment involving low utility attributes is necessarily categorical, since only one or a few objects are concerned--in contrast, high utility attribute judgments may be categorical (i.e., "Does the attribute apply?") or dimensional (i.e., "How close is the object to the exemplar?"). This im

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implied flexibility of high utility attribute judgments may be analyzed in greater detail upon consideration of the relationship between the utility of an attribute and the extent to which that attribute approximates a dimension.

Attribute Utility and Articulation

Given the assumption that attributes may be viewed as "dimensional categories," distinctions among them may be made on the basis of their level of articulation. Bieri (1966) defined this property of an attribute as "the number of categories or intervals which may be discriminated along the dimension [p. 21]," and Scott (1969) arrived at a similar formulation, that the articulation of an attribute is "the number of reliable distinctions among objects that a person makes on the attribute [p. 263]." In a sense, then, the articulation of an attribute is indicative of whether the attribute is better represented as a category or a dimension. A completely unarticulated attribute is similar to a category, since reliable discriminations are not made among members; each object construed in terms of the attribute is consequently an exemplar of the attribute, and discriminations among objects are categorical. A highly articulated attribute, in turn, is one on which many reliable discriminations among objects can be made, and is therefore amenable to dimensional representation.

At the simplest level of analysis, it is obvious that the utility and the articulation of an attribute are perfectly related, since an attribute which applies to only one object cannot be articulated--only a categorical discrimination may be made. One which applies to many objects has the capacity for articulation. Scott (in press) has proposed, on the basis of significant correlations between individual difference

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measures of attribute utility and attribute articulation that ". . . refined discrimination along the attributes of appraisal tends to encourage their application to a large number of objects [p. 25]." Although Scott has no empirical ground upon which to infer such a causal relationship, his inference that the utility and articulation of an attribute are somehow linked--beyond the simple level of analysis suggested here--deserves careful consideration.

It is possible to construct an informal model of cognition in which the relationship between utility and articulation may be examined. Suppose, for example, that attributes can be represented as line segments in a multidimensional space, and that objects of cognition are points in the space. Assume further that the exemplar of an attribute is one end-point of the line segment, and that objects which are construed on the attribute are all the points in the space which have normal projections on the line segment. It is possible to think of that line segment, then, as being defined by the objects which have projections on it. In a sense, each new object added to the attribute specifies more exactly where the attribute must lie in the space, and therefore increases the probability that any two objects on the attribute will be reliably discriminated. Only when an attribute "holds still" in the space will the order of projections of points be stable enough to allow for articulation of judgments on the attribute.

Consider a specific illustration to clarify this argument. Suppose that an individual has a two-dimensional cognitive space, and that there exists in the space a single attribute line segment with its corresponding exemplar. In this case, the attribute could be any line segment originating at the exemplar (illustrated in Figure 1). With the addition of a single object (O_1) construed on the attribute, the locus of

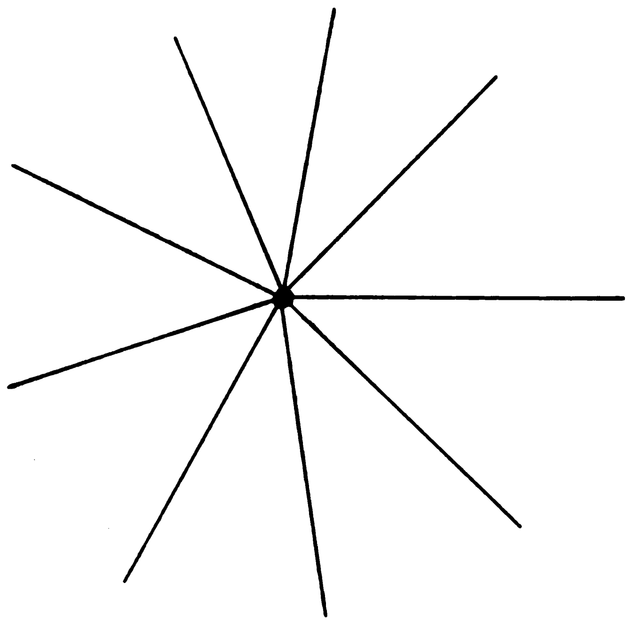

Figure 1. Locus of attributes representing one object.

line segments is halved. The requirement that an object construed on an attribute must have a normal projection on the attribute eliminates the set of line segments for which no normal projection exists. The attribute defined by an exemplar (E) and one object (O_1), as shown in Figure 2, must lie to the right of line X (a line perpendicular to a line joining E and O_1). When, as shown in Figure 3, even more objects are construed on the attribute, the locus of possible attributes decreases further, since each new object restricts the locus in the same way it was restricted with the addition of the first (O_1). According to this example, it appears that the locus of potential attributes is a decreasing function of the number of objects projected on the attribute (provided that new objects do not fall on lines between E and existing objects--in which case their contribution to the definition of the attribute is redundant).

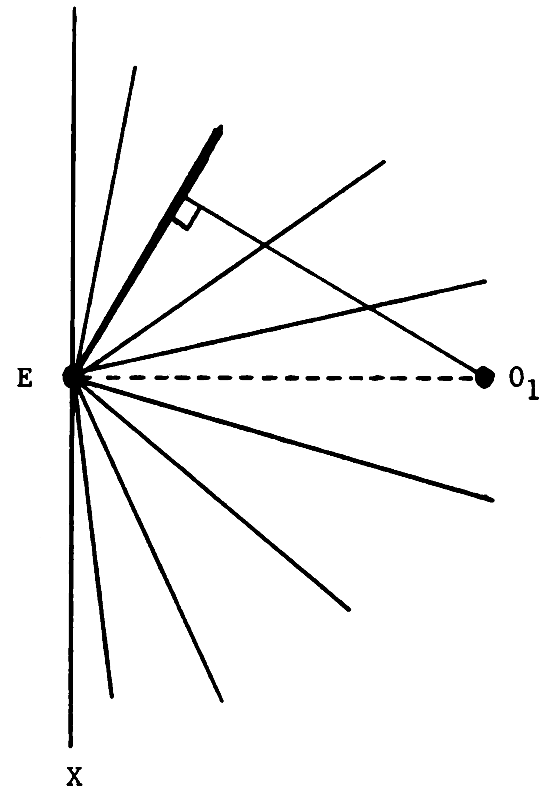

Figure 2. Locus of attributes representing two objects (E and 0_1).

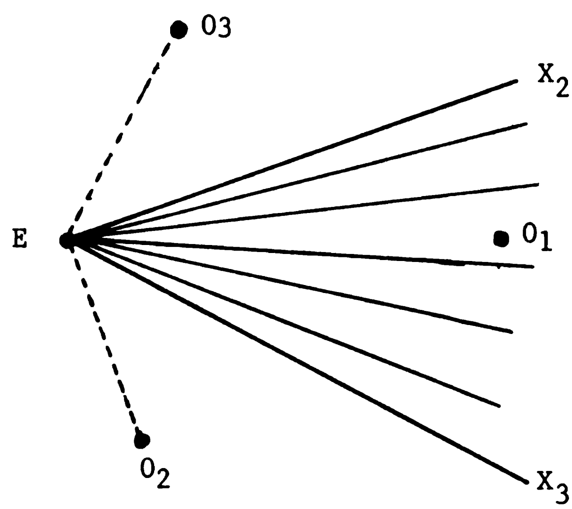

Figure 3. Locus of attributes representing four objects (E, 0_1, 0_2, 0_3).

The stability with which an attribute is located in the two-dimensional space is the determinant of the attribute's articulation. If the articulation of an attribute is defined as the reliability of ordinal object judgments on the attribute, then a decreasing locus of possible attribute line segments increases articulation. Consider the case of a line segment which has an exemplar (E) and two other objects (0_1 and 0_2). As shown in Figure 4, it is possible for the line segment to represent

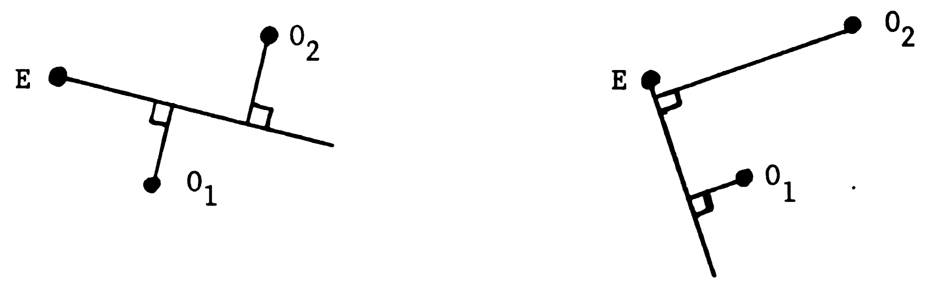

Figure 4. Alternate ordering of 0_1 and 0_2 with respect to E.

the order of the objects as (E, 0_1, 0_2) or as (E, 0_2, 0_1). For the order of objects to be consistently given as (E, 0_1, 0_2), only a restricted set of attribute line segments may be used. As shown in Figure 5, the only line segments which fulfill this requirement are those bounded by line A (a perpendicular to the line connecting E and 0_1) and line B (a

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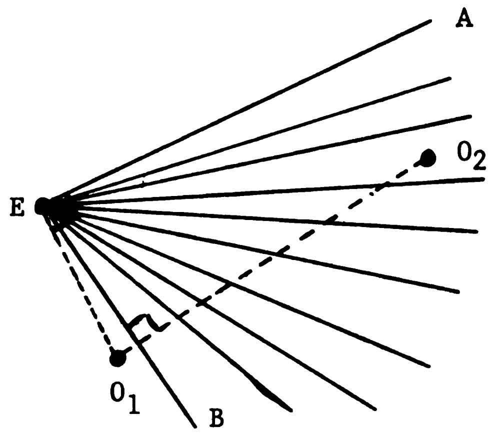

Figure 5. Locus of attributes which preserve the order (E, 0_1, 0_2).

perpendicular to a line connecting 0_1 and 0_2). Any line segment counter-clockwise past line A would not have a normal projection from 0_1; any line segment clockwise past line B would have projections from both 0_1 and 0_2, but would result in a reordering of the two objects with respect to E (i.e., E, 0_2, 0_1). An articulated judgment, in which the ordering of objects is held constant, can only be based upon a restricted locus of attributes. Since increments in the utility of an attribute serve to restrict its locus, a high utility attribute--according to the present analysis--is more likely to be articulated than is a low utility attribute.

The informal model and supportive arguments, although not proof of a general relationship between utility and articulation, are redolent of the direction such a proof might take. Yet, however the relationship b

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between utility and articulation is eventually conceptualized, it is essential to recognize that it implies a very special function served by the "core categories" employed by the individual. That is, a high utility attribute, as contrasted with a low utility attribute, is more similar to a dimension of judgment than to a category, and as a dimension, is more likely to provide the perceiver with a stable reference scale upon which reliable discriminations among stimulus persons may be based.

The Development of Person Perception

Two relatively discrete lines of evidence can be traced to the conclusion that the development of person perception is best conceptualized in terms of the increasing utility of attributes. One, the cognitive-developmental research dealing with the child's successive cognitive representations of reality, provides evidence on person perception only by analogy, since research on physical object cognition is not immediately applicable to questions on the nature of person perception. The second, the research on the development of person perception, per se, is also somewhat distant from the present concern because previous investigations have treated attribute utility as a methodological problem and not as a variable of theoretical interest. Despite these difficuties, it is reasonable to suggest that cognitive-developmental theory provides a general perspective for viewing attribute utility, and that some specific findings may be isolated from the body of developmental person perception research that will serve to clarify this perspective.

Attribute Utility and Cognitive Development

Many theoretical treatments of cognitive development suggest that early cognition is directly tied to perceptual events, and that later cognition is more abstract, inferential, and generalized. It can be arg

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argued that the dimension of attribute utility is the analogue of this process in the realm of person perception. A low utility attribute is, indeed, directly tied to a perceptual event, whereas a high utility attribute represents a type of integrative theme wherein many objects of cognition are grouped. Evidence for this developmental hypothesis can be seen in the work of Jean Piaget, since as Wohlwill (1962) has pointed out, ". . . much of Piaget's work--particularly that on the conservation of length, weight, volume, number, and so forth--is interpretable in terms of the increasing stability of concepts in the face of (irrelevant) changes in the stimulus field [p. 87]." Continuing in this vein, Wohlwill goes on to suggest that the major dimension of psychological growth represented by Piaget's findings is that of perception--inference. In essence, it is posited that early concepts, whether they are verbalized or are preverbal, are based directly on perceptual experience. Such perceptual concepts are by nature very unstable, appearing and disappearing as the immediate environment changes. Later concepts are distinguished from earlier ones on the basis of the formation of a cognitive structure--the individual may make inferences about his present experiences not only with regard to the character of these experiences, but also as a function of the structures through which these inputs are represented. It is reasonable to suggest that the development of high utility attributes in person perception takes place through such a process. A low utility attribute is directly tied to a particular stimulus person--it is not recognized with regard to any other person, and only becomes salient to the perceiver when the associated person is present or is remembered. In contrast, a high utility attribute can be conceived of as a cognitive structure through which many stimulus persons are construed. The perceiver may make many inferences regarding a stimulus person having such an attribute, since a large variety of other people, each with their own associated attributes, are represented as "members" of the high utility attribute.

Bruner, Olver, and Greenfield (1966) have conceptualized cognitive development in a slightly different manner. For these researchers, the development of the ability to form cognitive representations of reality begins with enactive representation, in which a concept is a bodily movement that transcends the serial linking of stimuli and responses, is followed by ikonic representation, in which a concept is a visual image of reality, and is completed with symbolic representation, in which concepts are abstracted in the form of language. Despite the elaborate nature of this formulation, it seems clear that the major dimension of growth that is implied lies in the direction of increasing distance between concept and physical reality. Enactive and ikonic representations both require immediate involvement with a particular stimulus; one cannot form a generalized representation when the medium for this representation is physically or visually concrete. Symbolic representation, on the other hand, allows abstraction from the immediate environment, in that entire classes of stimulation may be grouped cognitively within a single representation. In terms of person perception, it can be inferred that a low utility attribute could conceivably be represented in any of the three modes, while a high utility attribute would most likely be represented symbolically. Again, it may be concluded that the probability of occurrence of high utility attributes increases with development.

A third line of evidence suggesting the developmental salience of attribute utility comes from the work of the developmental psycholinguist, Lev Vygotsky (1962). To understand the significance of linguistic findings for building a model of person perception, it is necessary to recognize the similarity between an attribute and a word. An attribute, like a word, is a semantic unit whose meaning is acquired through experience by the individual. Many of the processes postulated to account for the acquisition of language--a generalized symbolic system--should be applicable to the acquisition of attributes--a specific symbolic system. This supposition should be especially valid in the case of words which resemble attributes. Nouns and adjectives which refer to physical objects, for example, seem particularly similar to person attributes, since both types of symbols may be conceptualized as "categories" into which objects of cognition may be grouped.

Keeping this analogy in mind, consider the statement of Vygotsky (1962), that "There is every reason to suppose that the qualitative distinction between sensation and thought is the presence in the latter of a *generalized* reflection of reality . . . [p. 5]." According to Vygotsky, the child's major activity in development is the formation of generalizations, and words are the symbols for these generalizations. The Soviet researcher undertook a detailed investigation of the development of concept formation to demonstrate the generalizing function of words. The very young child, he found, attempted to form a concept (a generalization) by putting together a number of objects in an *unorganized congerie*--a "heap." Later, children form *complexes*, groups formed on the basis of factual, concrete bonds, such as "members of a family" or "things that all belong in the kitchen." Further in development, children form *chain complexes*, groups in which the decisive attribute keeps changing during the process of formation. The final developmental stage of concept formation is typified by groups formed on the basis of single attributes held in common by all members of the group. This developmental sequence clearly implies that the use of high utility attributes occurs only late in development. Earlier groupings, and their associated cognitive structures, are in a sense artificial, in that they are formed without respect to any overall organizing principle, and are therefore of little use in making generalized judgments about all members of the group--or about differences in "degree" of group membership.

Vygotsky argued on the basis of this analysis that the development of word meaning follows a similar course, and it may be argued along the same line that the development of attributes can be represented by these stages. This parallel is particularly vivid in light of the similarity between the idea presented earlier--that the "fixedness" of an attribute in the cognitive space is a function of the utility of the attribute--and an example of the development of a word. Vygotsky cites the example of ". . . a child's use of quah to designate first a duck swimming in a pond, then any liquid, including the milk in his bottle; when he happens to see a coin with an eagle on it, the coin is also called quah, and then any round, coinlike object [1962, p. 70]." The word "quah" undergoes endless changes, revealing the possibility recognized by Vygotsky, that "one word may in different situations have different or even opposite meanings . . . [p. 70]." From the perspective of the spatial model, the constant shifting in "meanings" of words is caused by their newness to the child--and their consequent low level of utility. For a person attribute to have a stable meaning, it must be fixed in cognitive space; the child's collection of objects to which the word "quah" refers is analogous to a collection of people to which a low utility attribute refers. Only with repeated pairings of an attribute and various objects does the "meaning" of the attribute become constant; moreover, the repetition of such pairings is function of experience and development.

What is being suggested, then, in view of the variety of cognitive developmental evidence that has been summarized, is that the utility of attributes employed in the construal of people increases with the development of the perceiver. The theme of cognitive-developmental theory, that the successive cognitive representations through which the individual interprets the world become increasingly veridical and complex as development progresses, is reflected quite clearly in this view of person perception.

The Development of Person Perception: Previous Research

Studies of the development of person perception have isolated a number of age-related changes in both structural and content variables. It has been shown, for example, that with development, descriptions of people become less egocentric (Hopkins, Press, & Crockett, cited by Olshan, 1970; Peevers & Secord, 1973), conflicting information about people is better resolved (Biskin & Crano, 1973; Crockett, 1970; Gollin, 1958), and the major dimensions representing trait co-occurrence judgments undergo changes (Olshan, 1970).

The unit of analysis of present concern--the attribute--also appears to progress with development, as is evidenced by the results of Signell (1966), who obtained a variety of measures of the structural properties of interpersonal cognition on an age cross-sectional sample (9-16) of perceivers. Two of the measures, tapping what she called the "complexity of single concepts," are of special interest, since they are similar to the measures of attribute articulation employed by Bieri et al. (1966) and Scott (1969). The data on which these measures were defined consisted of subjects' ratings of 24 different stimulus persons along 7-point semantic differential scales representing judgmental dimensions the subjects themselves had provided. The first measure of articulation was the number of intervals of the 7-point scale the subject used in rating the stimulus persons (acquaintances), while the second measure was the information theory statistic, $\underline{H}$ (cf. Attneave, 1959; Garner, 1962), computed on each scale. The $\underline{H}$ statistic is a measure of the "levelness" of the distribution of stimulus persons across intervals of the scale, and can be thought of as an index of the scale's articulation, since "levelness" implies that the scale is used as a dimension rather than a simple dichotomous category. Signell found that both measures of the articulation of attributes were highly correlated with the ages of perceivers. It is interesting to note that of twelve structural measures of person perception employed in this study, only these two (the sole measures of attribute articulation) were significantly related to level of development. This study does not, of course, provide any evidence on the proposed relationship between utility and age, but instead indicates that the hypothesized link between development, utility, and subsequent articulation has some empirical support; attribute articulation in person perception does increase with the age of the perceiver.

A second relevant finding seems, by itself, rather pedestrian: the number of attributes given by the perceiver in free descriptions increases with the age of the perceiver (Biskin & Crano, 1973; Livesley & Bromley, 1973; Yarrow & Campbell, 1963). It is obvious that age-related increases in verbal skills alone might account for this finding--although a number of researchers have argued that the number of attributes is a reasonable intuitive measure of the perceiver's level of differentiation (cf. Crockett, 1965, 1970; Livesley & Bromley, 1973). This label will be adopted in the present discussion, not because of any theoretical commitment, but because it has been commonly used by previous writers. What is important to recognize, however, is that level of differentiation is pertinent to the measurement of the individual perceiver's "overall level of attribute utility," since such an overall utility measure can only be assessed in relation to the total attribute population employed by the perceiver; it is insufficient, for example, to propose that the absolute number of high utility attributes increases with development, when this number may simply be a constant fraction of the increasing total number of attributes employed. The proportion of high utility attributes in the perceiver's total set of attributes is a more meaningful measure of the "average" utility of the perceiver's cognitive structure. Scott (in press) and Kelling (1968), in defining measures of "image comparability," an individual difference variable similar in many respects to an "average" utility measure, recognized this methodological difficulty and resolved it in a similar manner, treating utility as a proportion of attributes instead of an absolute number.

Summary and Hypotheses

An informal model of interpersonal cognitive structure, the theoretical perspective of cognitive development, and evidence from developmental studies of person perception have all been discussed in the service of formulating hypotheses regarding the development of "core categories" employed by perceivers in construing others. The sum of the arguments is that the utility of attributes--the number of stimulus persons to which they refer--is positively related to the perceiver's level of development, and in addition, is positively related to the articulation of the attributes themselves. This proposition was investigated in two experiments, the first of which examined the developmental segment. One hypothesis generated for this experiment was offered for the purpose of the replication and extension of previous developmental studies, specifically those which have reported a developmental increase in differentiation (Biskin & Crano, 1973; Livesley & Bromley, 1973).

Hypothesis 1. The total number of different attributes given by subjects in free descriptions of acquaintances will be greater for older than younger subjects.

The other result expected in the developmental study was that attribute utility would increase with level of development. The statement of this hypothesis reflects the methodological considerations outlined earlier.

Hypothesis 2. The ratio of the number of high utility attributes to the total number of different attributes given by subjects in the free description of acquaintances will be greater for older than younger subjects.

The second experiment was designed to examine directly the effect of utility upon the articulation of attributes. The hypothesis associated with this experiment, derived from the model elaborated earlier, is central to the explication of the developmental function of attribute utility.

Hypothesis 3. The articulation of subjects' judgments of their acquaintances will be greater for high than low utility attributes.

EXPERIMENT 1

The principle aim of this study was to test Hypothesis 2, regarding the developmental aspects of attribute utility. The experiment was designed, in addition, to provide information on the development of differentiation (Hypothesis 1), and on the possible influences of sex and verbal intelligence upon both utility and differentiation. Since both individual differences in verbal intelligence and sex differences in verbal fluency were expected to increase the variability in differentiation among subjects (cf. Biskin & Crano, 1973; Crockett, 1965, 1970), the two variables were included in the analysis to offset potential problems in examining the relationship between differentiation and development.

Method

Subjects

A cross-sectional sample of 88 students drawn from the fourth, sixth, ninth, and twelfth grades of the Holt, Michigan public school system served as subjects. Approximately equal numbers of males and females comprised each grade level group; the exact sample sizes and mean ages of each sex by grade group are displayed in Table 1. Grade was retained as the classificatory variable for age since there was no overlap between age ranges associated with grades.

Free Description Procedure

A number of researchers have found that subjects' free response descriptions of others can be reliably coded into systems of content

TABLE 1

Sample Sizes and Mean Ages (Years, Months) by Grade and Sex

Sex		Grade			
		4	6	9	12
Males	N	10	9	10	14
	Age	10,0	12,3	15,1	18,3
Females	N	10	11	12	12
	Age	10,0	12,0	15,1	18,2

categories (see, e.g., Beach & Wertheimer, 1961; Dornbusch et al., 1965; Faguy-Coté, 1965; Livesley & Bromley, 1973; Yarrow & Campbell, 1963). The advantage of such a procedure over the more typical data collection strategies (adjective checklists, rating scales, and so on) is that the free description data is more natural--subjects use their own "person concepts" in their own way (cf. Peevers & Secord, 1973). The disadvantage, of course, is that the coding of free descriptions requires judges to make a large number of decisions about a subject's responses, many of which may misconstrue the subject's intended meanings. This response format, however, seemed clearly desirable for the present study, since the wide variation in subjects' ages was a factor which would needlessly limit the attribute vocabulary used in a more structured instrument.

For the administration of the free description task, subjects were assembled in groups of 3-5 (all members of the same grade) in a testing room in their school building. After being informed that their responses would be completely confidential ("secret" for the fourth and sixth graders), and would be used "to find out what students, in general, think about the people they know," subjects were introduced to the experimental task. Each subject was initially asked to write down the names of eight acquaintances in response to role descriptions similar to those employed by Crockett (1965). The role descriptions consisted of statements of age (peer or older person), sex (male or female), and liking (liked person, disliked person), such that each of the eight stimulus persons was specified by a different combination of the three variables. Thus two of the descriptions were, for example, "a boy near your age you dislike," and "an older woman you like."

Care was taken to make the nature of the free description task clear to all subjects. Ninth and twelfth grade subjects received written instructions which were read aloud to them by the experimenter; fourth and sixth grade subjects had no written instructions, but rather heard the experimenter explain the task twice. Subjects were asked to write (or print) "what you think about each person" on a separate page in the test booklet. The instructions, designed to elicit a full range of responses (cf. Livesley & Bromley, 1973), also included the suggestion that subjects try to answer the question, "What is this person like?" The order of appearance of stimulus persons in the test booklet was systematically varied among subjects. Although there was no time limit imposed on the description task, all subjects completed it in less than one and one-fourth hours.

Coding System

Since a number of coding systems have been designed for the analysis of free descriptions of people into the categories of description (cf. Dornbusch et al., 1965; Faguy-Coté, 1965; Livesley & Bromley, 1973), it was possible to create the present system as a reflection of both previous systems and the present data. Ten undergraduate students (who were unaware of the hypotheses of this research, and who later served as coders) were familiarized with previous systems and were asked to help devise a system suitable for the present analysis. They were first trained in identifying an "attribute," under the instructions that an attribute consists of "a unit of meaning--a word, phrase, or sentence--referring to the stimulus person, which in the context of the entire description is not divisible into smaller units."

Based on practice with applying this definition, the coders derived three preliminary "approximations" to the final system by identifying frequently used attributes in the present data, testing their efficiency in summarizing the population of attributes, and subsequently deleting or adding new categories. The final system (see Appendix A) was useful in categorizing 81% of subjects' responses, either as "true attributes" (statements similar in meaning) or as "attribute classes" (headings which served to summarize the data--"occupation," for example, was used to classify attributes such as "teacher," "lawyer," and "mailman"--but which were not treated as single attributes in the derivation of dependent measures). The remaining 19% of the attribute population, usually specific examples or little-used terms, were nevertheless included in the final analysis. In essence, then, the coding system was a method of consolidating a vast quantity of data; those attributes not summarized within the system were treated separately in the derivation of measures, but in a manner consistent with that used for coded attributes. The final system of 51 categories (47 single attributes and 4 attribute classes) was supplemented by further specification of positive and negative instances within each attribute (e.g., "helpful" and "not helpful").

Coding Procedure and Intercoder Agreement

The 10 coders who designed the system were not given individual access to all of the data during the design process, thus each was unfamiliar with the particular set of booklets he received for final coding. To assess intercoder agreement, every subject's protocol was coded twice, once by each of two coders.

Two types of intercoder agreement were assessed--the agreement on the "definition of an attribute," and the agreement on the subsequent coding of attributes into the category system. The measure of agreement on attribute definition, for a particular subject's booklet, was the number of identical attributes isolated by the two coders divided by the average total number of attributes identified in the protocol by the two coders. Expressed as a percentage, this index of agreement on a single protocol ranged from 93% to 100%, with a mean value across protocols of 96%. The second index of agreement, for a particular subject's booklet, was the number of identical attributes isolated by the two coders which were also identified as members of the same coding category, divided by the average total number of attributes identified in the protocol by the two coders. Although this second index is obviously dependent upon fluctuations in the first index, the range of values for subjects' booklets was satisfactory (77%-98%), and the mean value across subjects (82%) was also high. In sum, the intercoder agreement obtained in the analysis of the data was considered satisfactory with regard to both attribute definition and categorization.

Design and Measures

Hypothesis 1, that the total number of different attributes given by subjects describing people increases with the subjects' age, was examined using a 2 x 4 factorial design with sex and grade of subject as the independent variables. The dependent measure (differentiation score) was the number of different attributes used by the subject in describing all eight stimulus persons. This number included not only the number of attribute categories to which codable attributes were assigned, but also the number of additional different uncodable attributes. In this second case, any two attributes were judged as similar only if the same word or words appeared in both (negations were considered similar); all other attributes were classified as different.

Hypothesis 2, that the utility of attributes given by subjects describing people increases with the subjects' age, was also examined using a 2 x 4 factorial design with sex and grade of subject as independent variables. The dependent measure (utility ratio) was defined as the number of high utility attributes used by a subject in describing the eight stimulus persons, divided by the total number of different attributes used in describing the eight persons. A high utility attribute was defined as an attribute the subject used to describe more than one of the eight persons. The utility ratio, whose numerator is the total number of such attributes, and whose denominator is the subject's differentiation score, could conceivably vary between 0 and 1. A zero utility ratio would indicate that no attribute was used to describe more than one stimulus person, while a ratio of one would indicate that every attribute mentioned was used in describing more than one stimulus person. As in the calculation of the differentiation score, the utility ratio was based on both codable and uncodable attributes. For codable attributes, the use of a category in describing more than one person defined the category as a high utility attribute; for uncodable attributes, similar attributes used in describing more than one person were defined as high utility attributes. In this second case, judgments of similarity followed the same criterion used in calculating differentiation scores, i.e., similar attributes are those stated in the same word or words, with negations considered similar to their positive instances.

Although the expected relationships between the dependent measures and the independent variable of age were of prime theoretical interest, the effect of sex was also assessed, since sex differences in verbal fluency (cf. Terman & Tyler, 1954) were expected to increase the variability of both differentiation scores and utility ratios within each grade level group. In addition, the effects of individual differences in verbal intelligence were of interest, since such differences could also increase the variability of dependent measures within age groups. Verbal IQ scores on the school-administered Lorge-Thorndike Intelligence Test (Lorge & Thorndike, 1954) were obtained for all subjects. Fourth and sixth grade subjects had been tested during their fourth grade year, while ninth and twelfth graders had taken the test in their seventh grade year. In sum, the inclusion in the experimental design of sex as an independent variable and verbal IQ as a potential covariate was planned for the purpose of increasing the salience of age (grade) as an independent variable.

Results

Preliminary Analyses

To investigate the possible biasing influence of verbal intelligence upon the dependent measures, an initial correlational analysis was undertaken. It was found that differentiation scores were significantly correlated with verbal IQ (r = .39, p < .001), whereas utility ratios were not (r = .02). (The means, standard deviations, and matrix of

correlations among age, verbal intelligence, differentiation scores, number of high utility attributes, and utility ratios are shown in Appendix B). In accord with this finding, verbal intelligence was treated as a covariate in the subsequent analysis of differentiation scores, but was not included in the analysis of utility ratios.

Differentiation

A 2 x 4 factorial unweighted means analysis of covariance (cf. Winer, 1971, p. 792) with Sex and Grade of subject as the independent variables was employed. Subjects' differentiation scores served as the criterion measure, and verbal intelligence scores served as the covariate. Table 2 shows both the original and adjusted cell means for the differentiation measure.

TABLE 2

Original and Adjusted Cell Differentiation Means by Grade and Sex

Sex		Grade			
		4	6	9	12
Males	Original	22.1	29.4	25.2	29.2
	Adjusted	22.0	29.6	27.0	28.4
Females	Original	22.2	34.0	35.3	40.2
	Adjusted	22.8	33.1	36.3	38.2

The analysis of covariance revealed significant main effects for Grade $F = 6.04$, $df = 3/79$, $p < .005$) and for Sex ($F = 8.49$, $df = 1/79$, $p < .005$); the Grade by Sex interaction was not significant. (Summary tables for the analysis of variance and the analysis of covariance are shown in Appendix C).

A decomposition of the significant main effect for Grade (Newman-Keuls procedure) revealed that the fourh grade subjects' mean differentiation scores ($\underline{M}$ = 22.4) were significantly lower than those of the sixth, ninth, and twelfth grade subjects ($\underline{M}$ = 31.4, 31.7, and 33.2, respectively; $\underline{p} < .01$ in each case). None of the other possible comparisons of differentiation means among grade levels reached statistical significance. It is interesting to note, however, that the differentiation means increased monotonically with grade level (22.4, 31.4, 31.7, and 33.2, from fourth to twelfth grades, respectively). Hypothesis 1 was generally confirmed, since these findings provide support for age-related increases in differentiation scores, especially between the ages of 10 and 12 years (fourth and sixth grade levels).

The direction of the significant main effect for Sex was toward greater differentiation by females ($\underline{M}$ = 32.6) than by males ($\underline{M}$ = 26.8). An inspection of the adjusted cell means in Table 1 shows that this effect was evident at every grade level. Since potential sex differences in verbal intelligence were removed from the data, it would seem that this result is not interpretable in terms of sex differences in verbal skills.

In sum, the results substantially support the notion that differentiation increases with level of development, and the results also suggest that females are more differentiated than males at all age levels studied. It should be noted that an analysis of variance in which verbal intelligence was not a covariate produced comparable results, both for sex and age effects.

Utility Ratio

Since the preliminary analysis indicated that verbal intelligence was not related to the utility ratio measure, IQ was not treated as a covariate in the analysis. A 2 x 4 factorial unweighted means analysis of variance with Sex and Grade of subject as the independent variables was employed. Table 3 shows the utility ratio cell means by grade and sex. The analysis of variance revealed a significant main effect for

TABLE 3

Utility Ratio Cell Means by Grade and Sex

Sex	Grade			
	4	6	9	12
Males	.153	.149	.191	.283
Females	.179	.153	.215	.292

Grade (F = 13.23, df = 3/80, $p < .001$); the main effect for Sex was not significant, nor was the interaction effect. (A summary table of the analysis of variance appears in Appendix D). Subsequent multiple comparisons among utility ratio means for all grade levels (Newman-Keuls procedure) showed that the twelfth grade subjects had significantly higher utility ratios (M = .287) than did those in the ninth (M = .204, $p < .01$), sixth (M = .151, $p < .01$), or fourth (M = .166, $p < .01$) grades. In addition, the ninth grade mean was significantly higher than the sixth grade mean (M = .204 versus .151, respectively; $p < .05$). No other differences among grades reached significance.

Although the progression in utility ratios with higher grade levels was not strictly monotonic (.166, .151, .204, and .287), the anomalous pair of means (for fourth and sixth grades) were not significantly different; the significant differences encountered were all in the direction of increasing utility with age. The pattern of results is highly supportive of Hypothesis 2, in that the proportion of high utility attributes to total number of different attributes given by subjects in their free descriptions of eight acquaintances--the utility ratio--was found to increase significantly with the age of the subject.

Summary

Both measures of interpersonal cognitive structure, differentiation scores and utility ratios, were found to increase with the age of the perceiver. For differentiation scores, the major portion of this change occurred between the ages of 10 and 12; for utility ratios, the major change occurred between the ages of 15 and 18. While sex differences in differentiation were observed, with females being more differentiated than males, no such differences were found in utility ratios. Individual differences in verbal intelligence were positively related to differentiation, but were unrelated to utility ratio.

EXPERIMENT 2

This study was designed to test Hypothesis 3, regarding the relationship between attribute utility and attribute articulation. While the results of Experiment 1, which found significant age-related increases in the proportion of high utility attributes used by perceivers, and the results of Signell (1966), who found age-related increases in mean attribute articulation, when taken together are seemingly indicative of such a relationship, they are not in any clear sense supportive of a connection between the utility and articulation of an individual attribute for a particular perceiver. Similarly, the evidence provided by Scott (in press), that individual differences in articulation and utility ("image comparability") are positively related, is only minimally applicable to Hypothesis 3. The present experiment was designed, therefore, to investigate directly the relationship between the utility and the articulation of the individual attributes used by individual perceivers.

Method

Subjects and Design

Twenty undergraduates (10 males and 10 females) enrolled in introductory psychology classes at Michigan State University agreed to take part in the study in exchange for extra course credit. Hypothesis 3, that the articulation of subjects' judgments of their acquaintances is greater for high than low utility attributes, was the focus of this study. The effect of attribute utility upon attribute articulation was assessed by measuring each subject's mean articulation for a sample of his high utility attributes and for a sample of his low utility attributes. Two independent measures of articulation were employed.

Attribute Selection Procedure

To select a sample of the high utility and the low utility attributes employed by each subject, the free description task outlined in Experiment 1 was administered; the testing sessions were attended by groups of three to five subjects. The subsequent coding of these protocols by two coders also followed the procedure of the earlier experiment. The mean intercoder agreement was 99% for attribute definition and 84% for categorization. High utility attributes and low utility attributes were identified (from both the codable population and the uncodable population) for each subject. A high utility attribute was defined, as in Experiment 1, as an attribute used in describing more than one of the eight stimulus persons, and a low utility attribute was, in turn, an attribute used to describe only one of the stimulus persons. From the two samples of attributes obtained from each subject, a set of five high utility and a set of five low utility attributes were randomly selected.

Articulation Measurement Procedure

Each subject returned for individual testing within three days of the group session. Both articulation measurement procedures required that the subject make judgments of stimulus persons (the eight acquaintances originally identified for the free description task) on each of the 10 attributes selected from his protocol. To facilitate this task, the subject was first asked to examine each attribute and to create anchors for a bipolar dimension based on the attribute. The experimenter provided the following example of this procedure:

> Suppose that you had written a description of an oak tree, and had said that it was "fairly tall." Now if I wanted you to rate a variety of trees on how "fairly tall" they were, it might be easier for you to do if you thought of a dimension of "very short" to "very tall."

The subject was told that to help along with this procedure, the experimenter would ask him to "tell me the opposite" of an attribute; this provided one endpoint of the dimension. To elicit the other endpoint, the subject was told that the experimenter would say "now, tell me the opposite of that." Subjects readily understood this procedure; the experimenter then began the task by presenting to the subject one of the 10 attributes, and eliciting from the subject his dimensional anchors. The 10 attributes were presented to the subject in a random sequence.

The order of the two tasks the subject was subsequently asked to perform, the two articulation measures, was systematically varied across the subjects. One articulation measure (number of groups) was a measure defined by Scott (1969), in which the subject is asked to sort stimulus persons into groups on the basis of a dimension. For this measure, the subject was given cards with the names of each of the eight acquaintances originally identified for the free description task. Returning to the "tree tallness" analogy, the experimenter gave the following example of the card sorting task:

> Suppose you were to sort redwood, elm, maple, and peach trees according to the "very short--very tall" dimension. Of course, a redwood would be nearest "very tall," and a peach tree might be the shortest, so you would put it nearer the "very short" end. But, say you knew an elm and a maple were between the two extremes, but you couldn't tell which was usually the taller of the two. Well, then you could put them in the same pile, in the middle of the dimension.

Every subject readily understood this procedure; groupings for each dimension (defined by the subject's own anchors) were recorded. The index of articulation for each of the high and low utility attributes, the number of groups formed by the subject on the basis of that attribute

dimension, could vary between 1 and 8, with higher scores indicating greater articulation.

The other measure of articulation was designed specifically for the present study on the basis of similar measures originally devised by Ulehla (1961) and Signell (1966). In particular, the subject's task was to "rate" each of the eight stimulus persons by writing the number corresponding to each in one of a set of five "boxes." Squares arranged horizontally on the test sheet were used to represent an attribute dimension, with the end squares labelled by the anchors the subject had provided. The instructions stressed the "rating" nature of the task, and also pointed out that boxes could be left empty, filled with all eight persons, or used to any intermediate extent. The subject completed this task for each of the selected high and low utility attributes.

The _H_ statistic, a measure derived from information theory (cf. Attneave, 1959; Garner, 1962), was calculated for each of the subject's attributes. If the proportion of the eight stimulus persons in the _i_th interval of the 5 interval dimension is p_i, then

$$\underline{H} = - \sum_{i=1}^{5} p_i \log_2 p_i$$

_H_ is the number of "bits" of information contained in the distribution of stimulus persons on the attribute dimension. It can be thought of as a measure of the "levelness" of the distribution, or, alternately, as a measure of variance which is independent of the central tendency of the distribution (cf. Coombs, Dawes, & Tversky, 1970). This statistic, a summary of the subject's sorting of eight stimulus persons into a maximum of five scale intervals, could conceivably vary between 0 (in the case of all eight stimulus persons grouped in the same interval) and 2.25 (in the case of maximum distribution of stimulus persons, i.e., any sorting of the variety 2-2-2-1-1, regardless of order), with higher values indicating greater articulation of the attribute.

Results

Relationship Between Articulation Measures

An initial analysis was performed to explore the level of relationship between the two measures of attribute articulation. One index of this relation was calculated between the two measures at the level of individual differences among subjects; the other index revealed the relationship at the level of single attributes within subjects.

For the subjects measure, a mean score on the number of groups articulation measure and a mean score on the information articulation measure were calculated for each subject across his 10 selected attributes. The correlation of these two means across subjects was not statistically significant ($r = .26$, $N = 20$, $p > .10$). Although this correlation is of the same order of magnitude as those reported by Scott (1969, in press) for similar individual difference measures of articulation, it is not indicative of any relationship between the present measures at the individual difference level.

For the attributes measure, a correlation for each subject was computed between the number of groups score and the information scores across the subject's 10 attributes. This index ranged, among subjects, from $r = .19$ to $r = .86$. The mean value for all subjects ($\bar{r} = .52$) was tested against the null hypothesis of $\bar{r} = 0$, and was found to be highly significant ($t = 12.14$, $df = 19$, $p < .0001$). It was concluded that at the level of the individual attribute, within each subject, the two measures of attribute articulation were closely related. The pattern of these two measures of relationship suggests that analysis at the level of

individual differences grossly compromises the sensitivity of articulation measures to the differences among individual attributes employed by the single perceiver.

The Effects of Attribute Utility

For each subject, means on the two measures of articulation, number of groups and information, were computed separately for the five high utility attributes and the five low utility attributes. The within subject means were then averaged across subjects; these mean articulation scores (number of groups and information) for high and for low utility attributes are shown in Table 4.

TABLE 4

Means of Within-Subject Means on Number of Groups and Information Measures of Attribute Articulation for High Utility and Low Utility Attributes

Articulation Measure	Attribute Utility	
	Low	High
Number of groups	3.80	4.48
Information (*H*)	1.58	1.74

For the number of groups articulation measure, a *t* test for related measures performed on the mean of within-subject means for high utility ($M = 4.48$) and for low utility ($M = 3.80$) attributes revealed a significant difference between means ($t = 5.51$, $df = 19$, $p < .0001$); subjects formed more groups of the eight stimulus persons on the basis of their high utility than their low utility attributes. This effect was evident for all 20 subjects--no reversals of the direction of the difference between means were observed.

The significance of the effect of attribute utility upon the information measure of articulation was similarly assessed with a *t* test for related measures. The mean of within-subject information means for high utility attributes (*M* = 1.74) was significantly greater than that for low utility attributes (*M* = 1.58; *t* = 3.63, *df* = 19, $p < .01$). Differences in the high and low utility means were in this direction for 17 of the 20 subjects.

Hypothesis 3 was generally confirmed, in that subjects displayed greater articulation in dimensional judgments of eight acquaintances based on their selected high utility attributes than on their selected low utility attributes. This result was obtained using both the number of groups measure and the information measure of attribute articulation. The two articulation measures, although not significantly related as individual differences among subjects, were highly related at the level of the individual attribute within subjects.

DISCUSSION

The results of Experiments 1 and 2, viewed as a whole, generally verify the developmental and cognitive structural significance of attribute utility. The specific results are taken up as they relate to the discussion of each of the hypotheses.

Differentiation and Development

Hypothesis 1, that the number of different attributes given by perceivers describing stimulus persons increases with the age of the perceiver, received substantial support in the first experiment. Congruent with the earlier findings of Biskin and Crano (1973), Livesley and Bromley (1973), and Yarrow and Campbell (1963), it was found that differentiation increased with the age of the perceiver. It is interesting to note that the particular age trend observed in the present sample, with the greatest increase in differentiation occurring between the 10 and 12 year old groups, has not been previously reported. It should be emphasized that the general age-related increase in differentiation obtained in the present study seems to be a reliable and replicable effect, but that the specific (10-12 year old) age trend observed was not predicted in advance and should be interpreted only with caution.

The general age-related increase in differentiation was found to hold even when the effects of verbal intelligence were eliminated. Since intelligence scores are usually represented as "mental age" divided by chronological age (IQ = MA/CA), the analysis of covariance had the

function of "homogenizing" the verbal ability of each grade level group according to their chronological age. Thus, although this methodological process reduced the variation due to verbal ability to that associated with differences in chronological age, it did not serve to rule out the possibility that developmental increases in the number of different attributes employed by perceivers are simply a function of age-related increases in verbal ability or verbal fluency.

The highly significant effect of sex upon level of differentiation, with females displaying greater differentiation than males, is not interpretable in terms of sex differences in verbal intelligence, since such differences were covaried out of the analysis. Three tentative explanations of the sex effect may be offered. Taking the result at face value, it could be suggested that females recognize more different attributes of stimulus persons than do males because their interpersonal cognitive structures are actually more differentiated. This explanation is supported by the general finding that females have greater "social sensitivity" than males (Maccoby, 1966); greater awareness of social stimuli on the part of females has been observed in a variety of empirical settings. A second line of reasoning regarding the sex difference in differentiation is that sex differences in verbal abilities may not have been sufficiently controlled. Measures of verbal intelligence may not tap differences in verbal fluency, and since females are more verbally fluent than males (cf. Terman & Tyler, 1954), the sex difference in differentiation might have been a function of the amount of verbal output elicited from each sex group. The third plausible explanation of the sex effect is that subject task motivation may have been a differential function of sex; this explanation is especially credible since a male experimenter administered the free description task to most of the subjects--a

female experimenter was used in only 15% of the testing sessions. This factor might have encouraged female subjects to become more involved in the task. Given the variety of competing explanations applicable to the observed sex effect, and the equivocal evidence provided by previous research (Biskin & Crano, 1973; Crockett, 1965; Livesley & Bromley, 1973), the present finding of greater differentiation in females than males must be viewed as merely suggestive of such a relationship.

Attribute Utility and Development

Hypothesis 2, that the "average" utility of attributes given by perceivers increases with the developmental level of the perceiver, was substantially confirmed in Experiment 1. This effect was especially pronounced in the comparison between 15- and 18-year-old subjects--the greatest increase in utility ratio occurred between these age groups. Although this particular result was not anticipated, it is suggested that future research extend the measurement of attribute utility to even older groups; such research might indicate more completely the shape of the "age--utility" curve.

The general finding of increased attribute utility with age might be considered less questionable than the finding of increased differentiation, since problems in the interpretation of the differentiation result arising from the observed relationship between differentiation and verbal intelligence are not applicable to the utility result; utility ratio was not related to verbal intelligence. A more specific statement of this finding (based on the IQ = MA/CA formula) is that utility ratios were not related to differences in mental age within chronological age groups (grades). Yet this interpretation of the lack of correlation between IQ and utility ratio must be viewed with circumspection; since the utility ratio is a ratio of number of high utility attributes to total number of attributes, it is conceivable that the variance due to verbal intelligence in both the numerator and denominator of the ratio was removed by the division process, and was therefore absent in the quotient. Because of this methodological difficulty, the question of the relationship between "average" utility and verbal intelligence must remain until a suitable measure of "average" utility (i.e., one not formulated as a ratio) is devised.

Fortunately, the exact specification of the relationship between utility and verbal intelligence is not central to an understanding of utility. Unlike differentiation, a measure which logically is dependent upon the verbal skills of the perceiver, the utility ratio is not confounded by such a connection. Thus, while the empirical independence of utility ratio and verbal intelligence cannot be examined in the present study (because of the difficulties outlined previously), the logical independence of the two variables seems obvious. At the lowest limit, of course, a person with very low verbal intelligence--who is unable to verbalize any attributes at all--would have no high utility attributes. However, this example is extremely atypical; in the main, the proportion of high utility attributes to total number of attributes given by a perceiver is independent of the verbal skills of the perceiver. In sum, the confounding influence of verbal intelligence (and verbal fluency), which rendered problematic the interpretation of the observed relation between differentiation and development, does not impinge upon the interpretation of the observed relation between utility ratio and development.

The general finding of increased utility of attributes employed by perceivers at higher levels of development provides a bridge between the two areas of developmental research discussed earlier--cognitive development and person perception development. The frequent finding of increased "generality" of concepts and words evident in the cognitive-developmental studies of Piaget (cf. Flavell, 1963; Wohlwill, 1962), Bruner et al. (1966), and Vygotsky (1962) is directly applicable to the process of person perception development. Given that attributes are the "concepts" and "words" of interpersonal cognitive structure, their maturation into the "core categories" of adult interpersonal thought through increasing utility is reminiscent of the parallel ongoing processes of word and concept generalization. In this sense, the development of person perception and the development of object perception are isomorphic.

It might be reasonably concluded from the present result that the final product of person perception development, a set of "core categories" used in the construal of others, is the proper subject for study in future investigations of adult person perception. Although the present research was not concerned with the content of these categories or with their interrelations, future research would do well to investigate these topics. Previous studies of adult person perception, often examining the content and interrelations of unselected sets of attributes, have been needlessly hampered by error stemming from the inclusion of low utility attributes. When a subject is presented with the task of rating a stimulus person on a low utility attribute--one on which the subject has never previously construed the person--he is actually being asked "to come up with a cognition on the spot." Such judgments may be extremely variable, since the perceiver is "guessing" rather than "reporting." What is being suggested, then, is that person perception research take a purely phenomenological viewpoint--and not assume, as has commonly been assumed, that any and every attribute presented to a subject will produce meaningful judgments of stimulus persons. Some researchers have previously

recognized this necessity (Hastorf et al., 1958; Warr & Knapper, 1968), and have argued the point out of a concern for the phenomenological validity of empirical findings. In light of the present finding of increased attribute utility with age, it should be noted that this admonition must be most seriously considered in studying person perception in children; but since even adults seldom display large proportions of high utility attributes, care must also be taken in adult studies to provide subjects with meaningful tasks.

The Utility and Articulation of Attributes

The single prediction associated with the second experiment, stated in Hypothesis 3, was confirmed; perceivers were found to be better able to make articulated judgments of their acquaintances on the basis of high utility attributes than low utility attributes. One measure of attribute articulation found to vary with attribute utility was the number of groups of stimulus persons formed by the perceiver with respect to an attribute dimension; more groups were formed for high than for low utility attributes, indicating that perceivers made finer discriminations among the eight stimulus persons when they judged the persons according to high utility attributes. The other measure of articulation was the amount of information (H) associated with perceivers' ratings of the eight stimulus persons on an attribute dimension; high utility attribute judgments contained more information than did low utility attribute judgments. This finding indicates that perceivers made more articulated judgments of stimulus persons, "spreading out" the persons along the attribute dimension rather than dichotomizing the persons or rating all the persons as the same, when the attribute dimension had higher utility. Given the admittedly coarse method of determining the utility of each

perceiver's attributes--a method based on only a meager sample of each perceiver's attributes, and dependent upon responses to only eight stimulus persons--the strength of the relationship between utility and articulation evident for both articulation measures is certainly encouraging.

The relationship between the two measures of articulation, in a sense an assessment of the reliability of attribute articulation measurement, was found to be not significant at the level of individual differences in mean articulation across subjects, but to be highly significant at the level of differences in articulation of individual attributes within each subject. Since the actual assessment of the effect of attribute utility upon articulation was based on differences in the articulation of sets of high and low utility attributes within each subject, and the effect of individual differences in mean articulation was eliminated, it may be concluded that the general finding of a positive relationship between attribute utility and articulation was based upon closely related measures of articulation.

The observed relationship between the utility and articulation of attributes is congruent with the prediction based on the informal model of interpersonal cognitive structure presented earlier. Indeed, such a structural model seems necessary to represent the result, since an analysis of the actual <u>content</u> of an attribute is not sufficient to allow prediction of such a finding. Consider, for example, the case of one subject in the experiment who provided, among others, the attributes "Michigan State University student" and "intelligent." The subject employed the "MSU student" attribute with high utility, applying it to three of the eight stimulus persons, but only mentioned the "intelligence" of one stimulus person. Later, when the subject was asked to form groups of stimulus persons according to each attribute (for the number of groups measure of articulation), the subject made strikingly different groupings. For the "MSU student--not an MSU student" dimension, the subject formed four groups--which upon later questioning, he revealed to be MSU alumni, full-time students, a student on academic probation, and nonstudents. In contrast, the subject simply dichotomized the stimulus persons on "intelligent--not intelligent," forming groups of five and three persons, respectively. Clearly, a prediction of the differential articulation of the two attributes based on the attribute content would require "MSU student" to be less articulated than "intelligence," since the former seems to be a dichotomous category and the latter a dimension amenable to fine discrimination. Yet in this case, observation of the utility of each attribute leads to a correct prediction of their differential articulation. Since the significance of the relationship between the utility and articulation of attributes was demonstrated in Experiment 2, it seems reasonable to attempt further extension of the informal model responsible for predicting the relationship.

One method of extending the usefulness of the model would be to specify the actual parameters involved, with the goal of predicting more precisely the articulation of attributes from measures of their utility. Future research might, for example, introduce novel attributes to subjects, pairing each of the attributes with a different number of stimulus persons; the utility of attributes could be manipulated experimentally. It would be predicted, then, that subjects' judgments of stimulus persons would be more articulated for higher utility attributes, and that the functional relationship between utility and articulation might be quantitatively specified. Future investigations might also dwell on the opposite question: Does training in the articulation of a particular attribute

increase the likelihood that that attribute will be applied to a greater number of stimulus persons? Since the present research was not addressed to the direction of causality in the relationship between utility and articulation, such an investigation would be of particular interest.

Conclusions

The development of person perception, as portrayed here, is a process of change in the structure of cognitive representations used in the construal of persons. One such change is simply the proliferation of attributes with development; the young child has few attributes upon which to base responses to stimulus persons, while the older child identifies many attributes. This increase in differentiation has the function of increasing the number of ways in which the perceiver may isolate a stimulus person from the field of persons in general.

A more profound developmental change takes place in the structure of the attributes themselves. With growth, some attributes increase in utility--the perceiver employs them to represent more than one stimulus person. As certain attributes are used with increasing generality, they also become more stable, since attributes are defined by the persons they represent. While the low utility, unstable attributes may change markedly in meaning with each new stimulus person to which they are applied, high utility attributes have stable meanings since they are defined by a variety of stimulus persons. Thus, the perceiver's judgments of stimulus persons are more reliable and articulated when based upon higher utility attributes.

The function of the developmental increase in attribute utility is to increase the articulation of attribute judgments. In this sense, the developing individual is becoming more competent in his perceptions

of others; fine discriminations in the judgment of people are the product of many previous experiences with people.

APPENDICES

APPENDIX A

Free Response Description Coding System

Appearance

1. weight: "100 lbs."

   A. "fat" "chubby"

   B. "skinny"

   M. "bigger than me around the waist"

2. height: "five feet tall"

   A. "tall"

   B. "short"

   M. "taller than me"

3. age: "42 years old"

   A. "real old"

   B. "young"

   M. "two months older than me"

4. attractiveness

   A. "pretty" "cute"

   B. "ugly"

Roles and activities

5. occupation: "teacher" "drives the bus" "works downtown"

   M. "a teacher of mine"

6. athletic activities: "likes to play sports" "plays baseball" "goes snowmobiling all the time"

   M. "plays frisbee with my friends and me" "we play football"

7. family position: "uncle of my friend" "Jane's dad"

    M. "my mother" "my little sister"

Intellect and competence

8. intelligence

    A. "intellectual" "smart" "knows a lot of stuff"

    B. "dumb" "talks stupid all the time"

    M. "smarter than me"

9. school grades: "gets average grades"

    A. "does well in school"

    B. "he's always getting bad grades on his card"

10. A. good at his job: "great teacher" "ideal boss"

    B. poor at his job: "worst principal we've ever had" "lousy mechanic"

11. A. good at something: "good football player" "talented singer"

    B. poor at something: "can't fix cars"

12. A. ambitious: "motivated" "hard-working" "tries hard to keep up" "busy"

    B. lazy" "never gets his work done" "never does anything" "lazy as hell"

13. A. immature: "babyish" "childish" "acts like a baby"

    B. mature: "more mature than most people her age"

Interpersonal traits

14. A. friendly: "congenial" "gets along with others" "nice to others" "understands others" "makes people feel comfortable"

    B. not friendly: "doesn't get along with others"

    M. my friend: "friendly to me" "my best friend" "my boyfriend right now"

15. A. considerate: "kind" "respects others"

    B. not considerate

M. considerate to me: "thinks of me first" "respects my feelings" "kind to me all the time"

16. A. trustworthy: "has never broken a confidence"

B. not trustworthy

M. I trust him: "I would trust her anytime, anyplace"

17. A. generaous: "she isn't stingy like her parents"

B. selfish: "he won't share things like he should"

M. generous to me: "always buys me things" "gives me things" "won't ever let me play with his stuff"

18. A. helpful: "helps people with their problems" "he helps kids when they don't know what to do"

B. not helpful

M. helps me: "he helped me through" "we talk about our problems and she gives me good advice"

19. A. humorous: "funny" "witty"

B. not humorous

M. makes me laugh: "he kids around and makes me giggle"

20. A. good sense of humor: "laughs all the time"

21. A. conceited: "bragging" "self-centered" "thinks she's somebody she's not" "snobbish" "big head" "expects people to kiss his feet"

B. not conceited

M. "thinks he's bigger than me"

22. A. stubborn: "narrow-minded" "set in his ways" "sticks to her beliefs"

B. not stubborn

23. A. critical: "finds fault" "says when people do things wrong"

B. not critical

M. critical of me: "tells me I'm not doing things right"

24. A. gossips: "talks about her neighbors"

B. doesn't gossip

M. gossips about me

25. A. liar: "lies all the time" "tells stories I don't believe" "exaggerates"

B. doesn't lie

M. lies about me: "tells my boyfriend things about me that just aren't true"

26. A. outspoken: "loud" "loudmouth" "talks too much" "has a very big mouth"

27. A. "know-it-all" "always thinks she knows best"

28. A. phony: "two-faced" "backstabbing" "different person to different people"

B. not phony: "genuine" "sincere"

29. A. bothersome: "pest" "bugs people all the time"

M. pesters me

30. A. show-off: "always showing off in front of the girls" "he's good at sports and makes sure everyone knows when we play"

31. A. aggressive (verbally): "yells at people for nothing" "crabby" "grouchy" "acts mean to everyone"

M. mean to me: "yells at me" "tries to scare me and telling me what he's going to do"

32. A. aggressive (physically): "slugs people" "hits girls" "breaks things that aren't his" "bully"

M. hits me, breaks my stuff

33. A. always gets in trouble

M. always gets me in trouble

34. A. dominating: "wants things her own way" "never asks you, always tells you" "can't wait to get his hands on power"

M. dominates me: "thinks he can tell me what to do"

35. A. hot temper: "gets mad over little things" "quick temper" "always angry"

M. gets mad at me: "when I do stuff she doesn't like, she really gets mad"

36. A. easy going: "you can talk together without him getting angry" "never in a bad mood" "happy all the time"

37. A. cries: "cries always when she wants things" "pouts when he can't have his way"

38. A. polite: "well-mannered" "a real gentleman"

M. polite to me

39. A. manipulating: "uses people" "makes people let her have her way"

40. A. likes kids: "understands kids" "relates to us like most adults can't"

Relationship with subject

41. M. time span of relationship: "known her since junior high" "I have seen him every summer for the last few years" "we just met"

42. M. my neighbor: "lives down the street" "lives next door"

43. M. we do things together: "we're always going places together"

44. M. we talk together

45. M. likes me: "enjoys my company"

46. M. similar to me: "sees things the same as I do" "we are a lot alike"

Global evaluations

47. A. nice person: "good person" "sweet guy" "fantastic"

B. not a nice person: "weird" "asshole" "strange" "rotten old man"

48. A. I like the person

B. I dislike the person

49. A. I love the person

B. I hate the person

50. M. fun to be with: "we have fun together" "she's great to just be with"

51. A. people like the person

B. people don't like the person

APPENDIX B

Preliminary Analyses for Experiment 1

TABLE B1

Means and Standard Deviations of Variables Assessed in Experiment 1

	Mean	S.D.
Grade	8.07	3.10
Verbal intelligence	105.93	13.78
Differentiation score	30.10	11.24
Number of high utility attributes	6.27	3.69
Utility ratio	.208	.0937

TABLE B2

Correlations Among Variables Assessed in Experiment 1

	1	2	3	4	5
1. Grade	-	$.12_a$	.33	.62	.54
2. Verbal IQ		-	.39	.30	$.03_a$
3. Differentiation			-	$.57_b$	$-.04_b$
4. High utility attributes				-	$.73_b$

NOTE: Variables 3, 4, and 5 are interdependent, thus the significance of correlations among them is indeterminate. The subscript (b) identifies these correlations. The criterion value of *r*, in all other cases, is .27 for $p < .01$. Correlations with subscript (a) are not significant.

APPENDIX C

Analyses of Differentiation Scores

TABLE C1

Summary of Sex by Grade Unweighted Means Analysis of Variance of Differentiation Scores

Source	df	MS	F
Sex	1	895.35	9.22 ($p < .005$)
Grade	3	622.06	6.41 ($p < .001$)
Sex x Grade	3	139.99	1.44 ns
Error	80	97.09	

TABLE C2

Summary of Sex by Grade Unweighted Means Analysis of Covariance with Differentiation Scores as the Criterion Measure and Verbal Intelligence Scores as the Covariate

Source	df	MS	F
Sex	1	721.66	8.49 ($p < .005$)
Grade	3	512.96	6.04 ($p < .005$)
Sex x Grade	3	107.87	1.27 ns
Error	79	84.99	

APPENDIX D

Analysis of Utility Ratios

TABLE D1

Summary of Sex by Grade Unweighted Means Analysis of Variance of Utility Ratios

Source	df	MS	F
Sex	1	.0052547	< 1
Grade	3	.0805704	13.23 ($p < .001$)
Sex *x* Grade	3	.0007039	< 1
Error	80	.0060881	

REFERENCES

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Attneave, F. Applications of information theory to psychology. New York: Holt, 1959.

Attneave, F. Perception and related areas. In S. Koch (Ed.), Psychology: A study of a science. Study II, Vol. 4. New York: McGraw-Hill, 1962.

Beach, L., and Wertheimer, M. A free response approach to the study of person cognition. Journal of Abnormal and Social Psychology, 1961, 62, 367-374.

Bieri, J. Cognitive complexity and personality development. In O. J. Harvey (Eds.), Experience, structure, and adaptability. New York: Springer, 1966.

Bieri, J., Atkins, A. L., Briar, S., Leaman, R. L., Miller, H., and Tripodi, T. Clinical and social judgment. New York: Wiley, 1966.

Biskin, D., and Crano, W. D. Structural organization of impressions derived from inconsistent information: A developmental study. E. Lansing: Michigan State University, 1973 (mimeo).

Bruner, J. S. On perceptual readiness. Psychological Review, 1957, 64, 123-152.

Bruner, J. S., Olver, R. R., and Greenfield, P. M. Studies in cognitive growth. New York: Wiley, 1966.

Bruner, J. S., and Tagiuri, R. The perception of people. In G. Lindzey (Ed.), Handbook of social psychology. Reading, Mass.: Addison-Wesley, 1954.

Coombs, C. H., Dawes, R. M., Tversky, A. Mathematical psychology. Englewood Cliffs, N.J.: Prentice-Hall, 1970.

Crockett, W. H. Cognitive complexity and impression formation. In B. A. Maher (Ed.), Progress in experimental personality research, Vol. 2. New York: Academic Press, 1965.

Crockett, W. H. Structural analysis of the organization of written impressions. Unpublished manuscript, University of Kansas, 1970.

Dornbush, S., Hastorf, A. H., Richardson, S. A., Muzzy, R. E., and Vreeland, R. S. The perceiver and the perceived: Their relative influence on the categories of interpersonal perception. Journal of Personality and Social Psychology, 1965, 1, 434-440.

Faguy-Coté, E. Cognitive centrality: Conceptualization and measurement. Boulder: University of Colorado, 1965 (mimeo).

Flavell, J. H. The developmental psychology of Jean Piaget. Princeton, N.J.: Van Nostrand, 1963.

Garner, W. R. Uncertainty and structure as psychological concepts. New York: Wiley, 1962.

Gibson, E. J. Perceptual learning. Annual Review of Psychology, 1963, 14, 29-56.

Gollin, E. S. Organizational characteristics of social judgment: A developmental investigation. Journal of Personality, 1958, 26, 139-54.

Hastorf, A. H., Richardson, S. A., and Dornbush, S. M. The problem of relevance in the study of person perception. In R. Tagiuri and L. Petrullo (Eds.), Person perception and interpersonal behavior. Stanford: Stanford University Press, 1958.

Kelling, G. Measuring cognitive integration. Unpublished manuscript, University of Colorado, 1968.

Livesley, W. J., and Bromley, D. B. Person perception in childhood and adolescence. New York: Wiley, 1973.

Lorge, I., and Thorndike, R. L. Lorge-Thorndike Intelligence Tests. Boston: Houghton-Mifflin, 1954.

Maccoby, E. E. The development of sex differences. Stanford: Stanford University Press, 1966.

Neisser, U. Cognitive psychology. New York: Appleton-Century-Crofts, 1966.

Olshan, K. M. The multidimensional structure of person perception in children. Unpublished Ph.D. dissertation, Rutgers University, 1970.

Peevers, B., and Secord, P. F. Developmental changes in attribution of descriptive concepts to persons. Journal of Personality and Social Psychology, 1973, 27, 120-128.

Restle, F. Psychology of judgment and choice: A theoretical essay. New York: Wiley, 1961.

Rosch, E. H. On the internal structure of perceptual and semantic categories. In T. E. Moore (Ed.), Cognitive development and the acquisition of language. New York: Academic Press, 1973.

Rosenberg, S., and Sedlak, A. Structural representations of implicit personality theory. In L. Berkowitz (Ed.), Advances in experimental social psychology. Vol. 6. New York: Academic Press, 1972.

Scott, W. A. Structure of natural cognitions. Journal of Personality and Social Psychology, 1969, 12, 261-278.

Scott, W. A. Varieties of cognitive integration. Journal of Personality and Social Psychology, in press.

Signell, K. A. Cognitive complexity in person perception and nation perception: A developmental approach. Journal of Personality, 1966, 34, 517-537.

Terman, L. M., and Tyler, L. E. Psychological sex differences. In L. Carmichael (Ed.), Manual of child psychology. New York: Wiley, 1954.

Ulehla, Z. J. Individual differences in information yields of raters. Unpublished M.A. thesis, University of Colorado, 1961.

Vygotsky, L. S. Thought and language. Cambridge, Mass.: M.I.T. Press, 1962.

Wallach, M. On psychological similarity. Psychological Review, 1958, 65, 103-116.

Warr, P. B., and Knapper, C. The perception of people and events, New York: Wiley, 1968.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill, 1971.

Wohlwill, J. F. From perception to inference: A dimension of cognitive development. In W. Kessen and C. Kuhlman (Eds.), Thought in the young child. Monographs of the Society for Research in Child Development, 1962, 27, 87-112.

Yarrow, M. R., and Campbell, J. D. Person perception in children. Merrill-Palmer Quarterly, 1963, 9, 57-72.

Zajonc, R. B. Cognitive theories in social psychology. In G. Lindzey and E. Aronson (Eds.), Handbook of social psychology, Vol. 1, Reading, Mass.: Addison-Wesley, 1968.