1995

Mental representations of trait categoriesand their influences on person perception

William Fleeson

Sabrina Zirkel
Santa Clara University, szirkel@scu.edu

Edward E. Smith

Recommended Citation

Fleeson, W., Zirkel, S., & Smith, E. E. (1995). Mental representations of trait categories and their influences on person perception. Social Cognition, 13, 365-397. https://doi.org/10.1521/soco.1995.13.4.365

Social Cognition, Vol. 13, No. 4, 1995, pp. 365-397

MENTAL REPRESENTATIONS OF TRAIT CATEGORIES AND THEIR INFLUENCES ON PERSON PERCEPTION

WILLIAM FLEESON
Max Planck Institute, Berlin, Germany

SABRINA ZIRKEL
Saybrook Institute, San Francisco, California

EDWARD E. SMITH
University of Michigan at Ann Arbor

Three studies explored mental representations of the organization of acts into traits, and how such mental representations influence person perception. Specifically, we investigated whether acts vary in their degree of trait-category membership (prototypicality), what determines an act's prototypicality, and whether acts' prototypicalities influence conclusions about observed acts. By drawing on research on prototypicality-based models of mental representations (Osherson, Smith, Wilkie, López, & Shafir, 1990), five hypotheses were proposed about the nature of mental representations of traits and how they influence person perception. In Study 1, subjects rated three aspects of several acts: how prototypical of the trait they are, how similar they are to other acts in the trait, and how extreme they are. Subjects showed substantial agreement on all three ratings. Additionally, an act's similarity to other acts in the trait was predictive of how prototypical the act was, but the act's extremity was a stronger predictor of its prototypicality. Study 2 investigated how the prototypicality of an actor's observed acts influences person

Portions of this article were previously presented at the Meetings of the American Psychological Society in Washington, D. C., 1991. The experiments were conducted while the first and second authors were at the University of Michigan. The work was partially supported by Air Force Contract AFOSR 93-0265 to the third author, and a National Science Foundation Fellowship and a post-doctoral research fellowship from the Center for Psychology and Human Development (Dr. P. B. Baltes, Director) of the Max Planck Institute for Human Development and Education, to the first author. We would like to thank Peter Frensch, Alexandra Freund, Ulman Lindenberger, Michael Marsiske, and Richard Nisbett for comments on earlier drafts. We are also grateful to David Buss and Kenneth Craik for the act lists and prototypicality ratings.

Correspondence concerning this article should be addressed to William Fleeson, Max Planck Institute for Human Development and Education, 14195 Berlin, Germany. Electronic mail may be sent to Fleeson@mpib-berlin.mpg.de.

perception. Subjects were more willing to describe an actor's acts with a trait when the acts were prototypical or similar to each other than when the acts were not prototypical or not similar to each other. Study 3 investigated the prototypicality of predicted acts. Results showed that predictions of acts were not influenced by the prototypicality of the predicted acts. Together, the three studies suggest that mental representations of traits are consensual and that they influence person perception.

A great deal of research has explored how individuals use trait terms on the basis of observing others' behavior (for reviews, see Higgins & Bargh, 1987; Jones, 1990; Ross & Nisbett, 1991). Much less of this research has investigated how mental representations of act-trait relations influence such uses of trait terms, despite the fact that person-perception processes almost certainly draw on perceivers' stored knowledge about traits and acts. That is, in order for perceivers to be able to apply trait terms on the basis of observing behavior, perceivers must have some idea of what a trait is and how individual acts relate to a trait.

One way perceivers might represent traits is as hierarchically structured categories, with acts as low-level (subordinate) categories, and traits as higher level (superordinate) categories (Barsalou, 1985; Borkenau, 1990; Buss & Craik, 1983; Cantor & Mischel, 1979; Read, Jones, & Miller, 1990). For example, aloofness might be a category of act-categories like "standing apart from others at a party," and "pretending not to see a friend on the street." Furthermore, a trait category might not be a simple, unorganized list of act-categories, but rather have an internal structure, so that acts within a trait category differ in their degree of "belongingness" to the category. For example, "offering a monosyllabic response to a conversational overture" might be stored as a better example of aloofness than is "sitting at home and reading a book," although both acts could be called aloof. If so, then person perception might be influenced by this structure, for example, by the degree of belongingness of observed acts to a given trait category (Barsalou, 1985; Borkenau, 1990; Buss & Craik, 1983; Read et al., 1990). In other words, traits are more than just the end products of impressions, but are knowledge structures that influence the impression-formation process itself. The point of the present research is two-fold: (i) describe the internal structure of trait categories; and (ii) determine whether and how the internal structure influences person perception.

Research on mental representations of natural objects (e.g., birds and mammals) has produced a solid understanding of the structure of mental representations of such natural objects. We can draw analogies to this research as a source of predictions about categories of traits. In addition

to clarifying the lay theory of traits, such an approach might describe new constraints on person perception (Borkenau, 1990; Cantor & Mischel, 1977; Cantor, Mischel, & Schwartz, 1982; Jones, 1993; Read et al., 1990; Trope & Higgins, 1993). In this introduction, we (i) describe five principles that characterize mental representations of natural objects, and their influences on reasoning about natural objects, (ii) analogize five hypotheses for the trait domain, and (iii) describe some possible challenges to those hypotheses. The research we report examines to what extent these analogized hypotheses hold, and in the process helps clarify both person-perception processes and the lay theory of traits.

FAMILY RESEMBLANCE AND NATURAL-OBJECT CATEGORIES

Starting with the premise that people mentally organize natural objects into categories, much progress has been made in describing the properties of this organization and its influences on inferential reasoning (Medin, 1989; Shipley, 1993). We have selected five principles that we believe cover several of the major findings of the existing research (based on Osherson et al., 1990), and that result in interesting predictions for person perception. This research could be described with alternative organizations, and we do not intend this particular organization as a comprehensive review.

The domain that this research covers is natural objects that are organized into hierarchical categories. Natural objects are psychologically simple categories like birds, mammals, and furniture, and hierarchies are defined by asymmetrical class inclusion. That is, categories can be seen as distributed across levels; lower-level (subordinate) categories are included within higher-level (superordinate) categories, but do not exhaust the superordinate categories. This condition is expressed by the fact that a lower-level category can be said to be "a kind of" its superordinate category, but the superordinate category is not "a kind of" the subordinate category. For example, "sparrows" are a kind of "bird", but "birds" are not a kind of "sparrow". Thus, "sparrows" is a subordinate category of the superordinate "bird" category. The following principles apply to such hierarchical categories of natural objects.

The first two principles describe the organization of subordinate categories into superordinate categories. An impetus for this research was the insight to eschew the classic notion of categories as defined by necessary and sufficient features, in which subordinates either belong or do not belong to a given superordinate. Rosch and Mervis (1975) established *the first principle, that category membership is a matter of degree.* For example, both sparrows and ostriches are birds, although most of us

would agree that sparrows are better examples of birds than are ostriches. To demonstrate that people mentally represent categories with such a graded membership, or "prototypicality" structure, a number of experiments have shown that individuals agree in the prototypicality of a wide variety of subordinates (e.g., Smith & Medin, 1981; cf. Margolis, 1994).

What determines a subordinate's prototypicality for its superordinate category? Researchers theorized that feature-sharing organizes categories. Categories vary in their features (e.g., Robins are (i) small, (ii) red, (iii) winged, etc.), and the more features a category shares with other categories in the superordinate category, the more prototypical the category is of that superordinate. When subjects rate the similarity of all pairings of subordinate categories belonging to the same superordinate category, the *second principle emerges: a subordinate's average pairwise similarity (APS), across all pairings, strongly predicts its prototypicality rating* (Rosch, 1978; Smith & Medin, 1981). Sparrows are prototypical birds because they share many features with many other birds. This emphasis on variation in features and in feature-sharing was central to subsequent investigations.

Subsequent research has shown that inferential reasoning about natural-object categories is grounded in the structure of the mental representations (Osherson et al., 1990; Rips, 1975). Osherson and colleagues focused on two kinds of argument that involve hierarchical categories. The first kind of argument is known as "general", in which subjects are told that some subordinate categories were observed to be described by a certain predicate, and then are asked to indicate their confidence in concluding that the superordinate category is also described by the predicate. For example:

A. Observed: Sparrows have sesamoid bones.
Conclusion: Birds have sesamoid bones.

Here, sparrows is the subordinate category, birds is the superordinate category, and "have sesamoid bones" is the predicate. Importantly, such arguments are inductive, not deductive, because the conclusion is never guaranteed. Rather, such conclusions are accepted with more or less confidence, and the degree of confidence a particular argument inspires is known as its strength. Whereas Argument (A) may be relatively strong, knowing that ostriches have sesamoid bones does not provide much confidence in the conclusion that birds have sesamoid bones (and neither argument is perfectly strong). The next two principles concern how category-structural properties of the observed category affect argument strength.

The *third principle is that the prototypicality of the observed category*

increases argument strength (Osherson et al., 1990). Subjects are more willing to generalize to a superordinate category (e.g., birds) if the category observed to be described by the predicate is prototypical of the superordinate category (e.g., sparrows) than if it is not prototypical (e.g., ostriches). That is, if the observed subordinate is representative of the superordinate, it seems plausible that the predicate applies to the superordinate as well.

What happens where more than one subordinate category is described by the predicate?

B.	Observed:	Robins have sesamoid bones.
		Bluejays have sesamoid bones.
	Conclusion:	Birds have sesamoid bones.
C.	Observed:	Hawks have sesamoid bones.
		Sparrows have sesamoid bones.
	Conclusion:	Birds have sesamoid bones.

Just as in the case of a single observed subordinate, the crucial issue is the representativeness of the set of observed subordinates. Because the representativeness of the set increases with the representativeness of each of the individual observed categories, the average prototypicality of the observed categories remains effective in argument strength. However, the representativeness of the set also increases with the dissimilarity among the observed categories. Holding prototypicality constant, the more the categories in the observed set are dissimilar to each other, the more of the other categories in the superordinate to which they will be similar, so the more the observed categories will represent the other categories in the superordinate. Example (C) is strong because more birds are similar to either hawks or sparrows than are similar to either robins or bluejays. Thus, *the fourth principle is that, other things being equal, argument strength increases with dissimilarity among the observed categories.*[1] Note that the fourth principle is essentially an extension of the third principle, under the assumption that prototypicality (representativeness) is determined by similarity.

In the second kind of argument ("specific"), the conclusion concerns other subordinate categories rather than a superordinate category. For example:

1. A more precise statement is that argument strength is a function of the average of the maximums of the similarity of each unobserved instance to each of the observed instances, across all unobserved instances. However, dissimilarity and the above maximum function are close enough to allow conflation for expository purposes.

D.	Observed:	Eagles have sesamoid bones.
	Conclusion:	Robins have sesamoid bones.
E.	Observed:	Eagles have sesamoid bones.
	Conclusion:	Pelicans have sesamoid bones.

In such arguments, both the observed and the conclusion categories are at the same level and are included in the same superordinate, and it is concluded that the same predicate that describes the observed category describes the conclusion category. Principle 3 still applies: the more representative the observed category of the common superordinate category, the greater the confidence in the conclusion. One might expect that the prototypicality of the conclusion category would also influence argument strength: more representative categories would seem more likely to take on predicates of other categories in the same superordinate. However, Rips (1975) was surprised to discover *the fifth principle, that argument strength is not affected by the prototypicality of the conclusion category.* If the observed category warrants an inference, the inference covers all subordinates in the superordinate equally. Examples (D) and (E) have similar inferential strength, even though robins are more prototypical than pelicans. In other words, despite the fact that the prototypicality of an observed category greatly affects inferences, such inferences apply equally well to conclusion categories of all levels of prototypicality, provided they are included in the same superordinate (Osherson et al., 1990; Rips, 1975).

FAMILY RESEMBLANCE AND TRAIT CATEGORIES

Buss and Craik (1983; 1984) merged family-resemblance theories of categories with summary-labels theories of traits to propose a new approach to personality: the act-frequency approach. One common definition of traits is as "summary labels" (e.g., Alston, 1975; Borkenau & Müller, 1992; Buss & Craik, 1983; Hampshire, 1953; John, 1990; Newman & Uleman, 1993). There are two key aspects of such a definition. First, trait terms are organized in hierarchies. At the higher levels are categories like "interpersonal traits", next lower levels would include broad traits like "extraversion" or "neuroticism", one level down is composed of narrower traits (e.g., under "extraversion" might be "talkative", "active", "dominant", etc.), still lower would be act categories (e.g., "starting a conversation with a stranger"), and at the very bottom would be specific acts (Buss & Craik, 1983; Eysenck, 1947; Hampson, John, & Goldberg, 1986; John, Hampson, & Goldberg, 1991; McCrae & John, 1992; Wiggins, 1979). Note that people do not appear in this hierarchy; only behaviors and traits appear (cf., Anderson & Sedikides, 1991; Bassili,

1989; Hastie & Kumar, 1979; Sedikides & Anderson, 1994). However, the second aspect of the summary-labels definition of traits is that these categories are useful for describing people's behavior at various levels of abstraction. The higher the level the category, the more abstract the description, but the description is of the person's behavior. For example, behavior can be described at the act-category level (e.g., "slamming the door upon leaving the room is what he did") or more abstractly at the trait level (e.g., "acting quarrelsome is what he did"). That is, traits are labels for summarizing a person's behavior: saying someone has a trait is nothing more than saying that a good general description of the person's behavior is that trait term (Alston, 1975; Buss & Craik, 1983; Hampshire, 1953; John, 1990; Newman & Uleman, 1993).

Adding the notion of family-resemblance to summary-labels models of traits, Buss and Craik (1983) suggested that some act-categories are better examples of their superordinate trait than are other act-categories. As a test of this claim, they had subjects rate the prototypicality (how good of an example of the trait the act is) of several acts, and found strong agreement in subjects' ratings, suggesting that it was a meaningful task. Borkenau (1990) replicated this finding, and Hampson (1982) provided additional evidence.

However, unlike for natural-object categories, we do not know yet (i) what determines the prototypicality of an act category; or (ii) whether and how the prototypicality structure influences person perception. The five principles described above provide a good starting point for examining these two issues, and the Osherson and colleagues (1990) model is a detailed and elaborate theory that applies to hierarchical categories that have a prototypicality structure. Most importantly, when analogies are drawn from the five principles described above, five hypotheses emerge that are interesting in their own right and that extend the Buss and Craik model. The left column of Table 1 reviews the five principles described above. The middle column, as will be described below, describes analogies of these five principles into five hypotheses for the trait domain. The rightmost column, also as to be described, summarizes some possible objections to the five hypotheses.

The first hypothesis states that membership in a category is a matter of degree. This hypothesis has received empirical support (Borkenau, 1990; Buss & Craik, 1983; Hampson, 1982), and our goal is to replicate this finding.

Hypothesis 2 concerns the determinants of an act's prototypicality for its superordinate trait category. In the hierarchical structure of natural-object categories, a subordinate category is considered a good and representative member of its superordinate category (i.e., is highly prototypical) to the extent that it is similar to other subordinate catego-

TABLE 1. Summary of Five Hypotheses Analogized from the Natural-Object Domain to Describe Mental Representations of Trait Categories and Their Influences on Person Perception

Principle Describing Natural Object Representations	Analogous Hypotheses in Trait Domain	Challenges to Hypotheses
1. Degree of membership in a category is a continuous variable	1. An act's degree of membership in a trait category is a continuous variable	None
2. Category prototypicality is determined by the category's average similarity to other categories in the same superordinate	2. Act prototypicality is determined by the act's average similarity to other acts in that trait	Traits represent ideals, so act prototypicality might be determined by its extremity
3. Argument strength increases with prototypicality of the observed categories	3. Argument strength increases with prototypicality of the observed acts	Only if trait is explicitly mentioned in argument
4. Argument strength increases with dissimilarity among the observed categories	4. Argument strength increases with dissimilarity among the observed acts	Dissimilarity not relevant to ideal approximation
5. Argument strength is unaffected by the prototypicality of the conclusion category	5. Likelihood of conclusion acts is unaffected by their prototypicality	If traits are dimensional, perceivers may predict acts only of a certain level of prototypicality

ries in the same superordinate. The analogy would be that an act category (e.g., "slammed the door when he left the room") is a good and representative member of its superordinate trait category (i.e., is highly prototypical) to the extent that it is similar to other behaviors in the same trait. This hypothesis has been challenged, however, on distinctions among types of categories. Barsalou (1985) suggested that the purpose of some categories, rather than simply collecting similar subordinates, is to organize and rank means to accomplish a goal. For example, "winter clothes" is not simply a collection of similar textiles, but rather a set of subordinates that are each means to keep one warm. Thus, the relevant dimension for determining a subordinate's prototypicality (e.g., how good an example the subordinate is of "winter clothes"), might be how well the subordinate facilitates the goal. In other words, the subordinate's approximation to ideal facilitation, or its *extremity*, not its similarity to other subordinates. Borkenau (1990) suggested that traits are such categories, because the purpose of trait terms is often to

indicate whether other people are good for facilitating certain goals (Buss, 1991; John, 1990). He found that ratings of acts' extremity were highly predictive of ratings of the acts' prototypicality, providing support for the idea that act prototypicality is reflective not of similarity, but of approximation to an ideal (see also Read et al., 1990). However, neither Borkenau (1990) nor Read et al. obtained direct pairwise ratings of acts' similarity to each other, so extremity has not been pitted against the direct measure of similarity used in natural-object research (e.g., Rosch, 1978). In the present research, we obtained direct pairwise ratings of act similarity.

Hypothesis 3 begins our concern with the influence of trait categories on person perception. Our basic assumption is that the mental organization of trait categories ought to influence perceptions of others. That is, the way people represent behavior-trait relations ought to influence how they interpret others' behaviors in terms of traits. However, there is little theoretical work on how this might occur, in part because there is little work on the organization of acts into traits. We generated hypotheses by drawing analogies to Osherson et al. (1990; see also Rips, 1975). These analogized hypotheses, not the Osherson et al. model, are tested in this report.

This report concerns two kinds of person perception. The first kind is when perceivers use a trait term as an abstract but compact description of a set of an actor's observed behaviors (Hastie & Kumar, 1979; Park, 1989; Park, DeKay, & Kraus, 1994). These are the cases in which perceivers observe a small number of acts an actor has done, and go to a higher (trait) level in the trait hierarchy for a more-or-less apt description of what the actor did. For example:

F.	Observed:	Slammed the door when he left the room is what he did. Accused them of talking about him behind his back is what he did. Argued over presidential candidates is what he did.
	Conclusion:	Acting quarrelsome is what he did.

The predicate "is what he did" means that (i) something was done (an act or acts), (ii) the something was done by the indicated actor, and (iii) the something falls into the predicated category. Note the similarity to the general arguments described by Osherson and colleagues (1990): perceivers observe that given subordinate categories (here, "slammed door", "accused them", "argued") are described by a certain predicate

(here, "is what he did"), and conclude—with more or less confidence—that the superordinate category (here, "quarrelsome") has the same predicate ("is what he did").

Hypotheses 3 and 4 explore the influence of the representativeness of observed subordinate act categories on perceivers' confidence in using superordinate trait categories to describe those acts. As multiple-stage models of person perception are making increasingly clear, this is an important and non-trivial step in person perception (Bassili, 1989; Gilbert, Pelham, & Krull, 1988; Higgins, Strauman, & Klein, 1986; Reeder & Brewer, 1979; Trope, 1986; Wyer & Srull, 1986). A given behavior often can be described by multiple traits (e.g., is "slammed the door when he left the room" quarrelsome, careless, or exuberant?) or might best be described without a trait term at all. Furthermore, identifying a behavior with a trait term might have important consequences for later causal attributions or predictions of the actor's behavior (as explored in Study 3). In this way, the problem we are investigating is similar to the early (behavioral identification) stages in multiple-stage models of person perception. However, one important difference is that our perceivers are describing a set of acts, not individual acts. This will be discussed further in the discussion.

Hypothesis 3 was that the more prototypical the observed acts, the stronger the argument. That is, the more each of the observed acts are representative of the trait category, the more confidence perceivers will have that the trait is a good general description of the acts. We are aware of no direct challenge to this hypothesis, and in fact Borkenau (1990) has provided evidence supporting it. Hypothesis 4 was that argument strength will increase with dissimilarity among the observed acts. This hypothesis is based on the hypothesis that representativeness is determined by the similarity of the observed categories to the other categories in the same superordinate category (Hypothesis 2). Holding prototypicality constant, the more dissimilar the observed acts are to each other, the larger the total number of the other acts in the trait to which they will be similar, and so the more representative they will be of the trait. Thus, dissimilarity should increase representativeness for the trait and thereby aptness of the trait as a description of the acts. We are aware of no direct challenges to this hypothesis, but challenges to Hypothesis 2 stand as indirect challenges to Hypothesis 4.

The fifth and final hypothesis concerns another kind of person perception, in which trait-description of observed acts has consequences for predictions of unobserved acts. Oftentimes perceivers judge the likelihood that a specific person has performed a specific act (e.g., Is it possible that Tom picked a fight with a stranger?). We propose that the prototypi-

cality of acts that the actor is observed to have performed will be relevant to such judgments, and consider whether prototypicality of the unobserved act will also be relevant. For example:

G. Observed: Slammed the door when he left the room is what he did.
Conclusion: Picked a fight with a stranger is what he did.

Such arguments are analogous to the "specific" arguments in the Osherson et al. (1990) model: the predicate ("is what he did") is generalized from one subordinate category ("slammed the door . . . ") to another subordinate category ("picked a fight. . . . ") at the same level and included in the same superordinate (quarrelsomeness).

Hypothesis 3 was that prototypicality of observed acts increases argument strength, and we tested it also in these cases. Because the trait term is not explicitly mentioned, however, Hypothesis 3 might not extend to such cases. Hypothesis 5 was that the prototypicality of the conclusion act would be irrelevant to the judged likelihood of that act. This hypothesis seems less intuitive, for at least two reasons. First, more prototypical acts may be more or less frequent than less prototypical acts, and so prototypicality of a conclusion act should influence its judged likelihood (Read et al., 1990). The second challenge is based on the assertion that prototypicality represents facility at achieving goals, as described above (Barsalou, 1985; Borkenau, 1990). Thus, an actor who has performed a moderately prototypical act has shown only a moderate facility at achieving a goal, leaving it an open question whether the actor is capable of performing highly prototypical acts. Thus, performing a moderately prototypical act might increase the perceived likelihood of other moderately or low prototypical acts, but not increase the likelihood of high prototypical acts. More generally, an observed act might increase the judged likelihood of equal or less prototypical acts, but not the likelihood of more prototypical acts, resulting in an interaction between observed act prototypicality and conclusion act prototypicality (Buss & Craik, 1983).

OVERVIEW OF STUDIES

The present research tested the five hypotheses summarized in Table 1. In Study 1, subjects rated the prototypicality, extremity, and pairwise similarity, of 200 acts. Study 1 addressed the first two hypotheses: (i) whether an act's membership in a category is a continuous variable (i.e., does prototypicality organize act categories into trait categories?); and

(ii) whether an act's prototypicality is determined by its extremity or by its average similarity to other acts in the same trait. In Study 2, subjects used trait terms to describe actors' behaviors that varied in their prototypicality and intra-description similarity, providing evidence relevant to Hypotheses 3 and 4. Specifically, does argument strength increase with the prototypicality and/or with the dissimilarity of observed behaviors? In Study 3, subjects indicated how likely an unobserved act was to occur on the basis of an observed act. Both the unobserved and observed behaviors varied in prototypicality. Thus, this study tested Hypothesis 5, which is that an act's prototypicality is irrelevant to its predicted likelihood (and extended the test of Hypothesis 3).

STUDY 1

METHOD

SIMILARITY RATINGS

Subjects. Twenty subjects completed the materials in 2, 1-hour, individual sessions as partial course credit for an introductory-level psychology course at a large midwestern university. One subject's data were unavailable because of computer problems.

Materials and Procedure. Acts were taken from four of the traits in the Buss and Craik (1983) act lists (dominance, submissiveness, quarrelsomeness, and agreeableness). Buss and Craik obtained these lists through an act-nomination procedure. Subjects were asked to think of someone who could be described by a given trait, and to list five acts the person had performed. The nominated acts were narrowed down to 100, which represented a range of prototypicalities for each trait. For example, "He slammed the door when he left the room" is highly prototypical of quarrelsomeness, whereas "He accused them of talking about him behind his back" is moderately prototypical, and "He argued about the presidential candidates" is not very prototypical of quarrelsomeness. Although 100 acts per trait were available, getting similarity ratings on all 4950 pairs of acts would have been too great of a burden for the subjects. We therefore selected 50 acts from each trait, by taking the first and every other act from Buss and Craik's list. Additionally, as prototypicality ratings varied with gender of the target (Buss & Craik, 1983), we stayed within one arbitrarily chosen gender, and all acts were worded with males as the targets.

Each subject completed the materials for one trait, rating the similarity of each act to a random selection of 25 of the remaining 49 acts, for a total

of 625 pairwise similarity ratings.[2] The selection of pairs, the order of the presentation of the pairs, and of the order of the acts within a pair, were randomly determined for each subject.

Similarity ratings were made on an IBM personal computer. After the subject read the instructions, the computer presented two acts, in the middle-upper part of the screen, and just below them a 9-point scale (from "not at all similar" to "very similar"). After the subject indicated how similar the two acts were by pressing a number from 1 to 9, the computer presented the next pair of acts. After every 100 ratings, the computer enforced a minimum 20-second pause.

Each subject's estimate of the average pairwise similarity (APS) of an act to the other acts in the trait was computed as the mean across that subject's ratings of the 25 pairs in which the act occurred. Because subjects differed in the means of their similarity ratings (e.g., some subjects used the high end of the scale and others used the low end), each subject's ratings were standardized, before performing analyses, to a mean of 0 and a standard deviation of 1 (the results were similar on the unstandardized data). Additionally, one subject rating similarity of dominance behaviors and one rating similarity of quarrelsomeness behaviors had low item-total correlations (below .20), and were excluded from all analyses.

PROTOTYPICALITY AND EXTREMITY RATINGS

Subjects and Procedure. Seventy subjects at a large midwestern university completed the materials in classrooms at the conclusion of class-time, in small groups, and were offered five dollars as compensation for their time. In order to be sure that extremity and prototypicality ratings did not contaminate each other, subjects were randomly assigned to rating task and to order by distribution of questionnaires.

Materials. The same 200 acts rated for similarity were used (50 acts for each of 4 traits). The first page of the questionnaire described the study, and the second page listed four examples for a trait not used in the study. The 200 acts were listed on the following pages, 11 to 13 per page. Acts from a trait were always listed together, and the trait name appeared on the top of the page. In the prototypicality rating task, subjects rated on a 7-point scale how good an example the act is of the trait (following Rosch & Mervis, 1975, and Buss & Craik, 1983), from a "poor example of T" to a "very good example of T" (with T referring to the trait being rated). In the extremity rating task, subjects rated how extreme the act is, also on

2. 50 acts x 25 partners/2 = 625. The total is divided by 2 because each time an act was a partner was also counted as one of that act's 25 comparisons, cutting the number of required comparisons in half.

TABLE 2. Inter-Rater Reliabilities of Prototypicality, Extremity, and Average Pairwise Similarity Ratings

	Dimension		
Trait	Prototypicality	Extremity	Average Pairwise Similarity
N of Raters	34	36	4 or 5 per trait
Dominance	.94	.92	.73
Submissiveness	.95	.94	.80
Quarrelsomeness	.96[a]	.94[a]	.75
Agreeableness	.88	.85	.86

Note. Table entries are Cronbach's Alphas computed with raters in the columns and behaviors in the rows. Each trait had 50 behaviors, and the alpha describes the consistency across raters in the rank ordering of the 50 behaviors.

[a]Two raters did not complete all of the ratings for the trait of quarrelsomeness, so those alphas are based on 33 and 35 raters.

a 7-point scale, from "not at all extreme T" to "very extreme T". Within each rating task, four different random orders of traits and of acts within traits were created.

RESULTS

INTER-RATER RELIABILITIES

Subjects demonstrated satisfactory agreement on each of the three ratings of acts. Table 2 shows the reliabilities for each of the traits for each of the three ratings. All of the reliabilities (Cronbach's Alphas) were above .84 for prototypicality and extremity ratings, with most in the mid-90's. The APS reliabilities, although lower, were also quite good.

The inter-rater reliability of the prototypicality ratings suggests that it was meaningful to subjects to rate prototypicality, and that subjects agreed in the task's meaning. Additional evidence concerning Hypothesis 1, that prototypicality is a continuous variable, was obtained by examining the distributions of prototypicality ratings for unimodality. No value in the original metric of the scales had an act frequency that was lower than values on both sides of it, with one exception (there were 11 quarrelsome acts with a prototypicality between 2 and 2.99, 10 with a prototypicality between 3 and 3.99, and 17 between 4 and 4.99). This lack of "gaps" in the distributions argues against the possibility that acts either were or were not a good member of their trait category. We also investigated distributions at the individual subject level. A gap was defined as a value on the prototypicality scale that had a frequency that

TABLE 3. Correlations Among Prototypicality, Extremity, and Average Pairwise Similarity (APS)

Trait	Correlated Ratings		
	Prototypicality and Extremity	Prototypicality and APS	Extremity and APS
Dominance	.77**	.64**	.48**
Submissiveness	.91**	.77**	.73**
Quarrelsomeness	.77**	.59**	.30*
Agreeableness	.58**	.28	.63**

Note. Table entries are correlations between the two variables listed at the head of the column, across the 50 acts within the trait listed on the left.
*$p < .05$, **$p < .01$.

was at most one-half of the frequency of at least one value higher than itself and of at least one value lower than itself. For dominance, submissiveness, quarrelsomeness, and agreeableness, 13, 14, 16, and 14 subjects, respectively, showed at least one such gap. Thus, about 58% of the within-subject distributions were relatively unimodal as well.

DIMENSION INTERRELATIONS

Each act received one prototypicality, one extremity, and one average pairwise similarity (APS) score by averaging over the prototypicality, extremity, and APS ratings, respectively, obtained from the raters. The following analyses are based on these scores, with act as the unit of analysis (thus, $n = 50$ per trait). Before examining the results in the present data, it bears mentioning that the present prototypicality ratings correlated highly with the ratings Buss and Craik (1983) reported (Dominance: $r(50) = .75$; Submissiveness: $r(50) = .88$; Quarrelsomeness: $r(50) = .59$; Agreeableness: $r(50) = .54$). This provides converging evidence of a high level of agreement across subjects.

Table 3 shows that all three ratings were highly intercorrelated. With the exception of agreeableness, prototypicality was highly correlated with both APS and extremity. However, because APS and extremity were also highly correlated, it is hard to decipher their relative importance in determining prototypicality. Table 4 shows the results of multiple regressions predicting prototypicality simultaneously from extremity and APS, thereby describing the relationships of extremity and APS to prototypicality while controlling for each other. Both extremity and APS had unique relationships to prototypicality, although extremity's relationship was often substantially stronger. Note also that between 73–85% of the variance in prototypicality (R^2) was explained by these two dimensions together. Agreeableness was somewhat of an exception, in that prototypicality was

TABLE 4. Regressions Predicting Prototypicality from Extremity and Average Pairwise Similarity (APS)

Prototypicality for Trait of	Extremity β	Similarity β	Explained Variance in Prototypicality
Dominance	.61**	.35**	.69**
Submissiveness	.75**	.22*	.85**
Quarrelsomeness	.65**	.40**	.73**
Agreeableness	.67**	-.15	.35**

Note. This table shows the results of four separate multiple regressions, one for each trait, with each one predicting the prototypicality of an act for a trait simultaneously from the act's extremity and its average similarity to other acts in the trait. The first two columns show standardized partial betas, and the third column shows the percentage of variance explained (R^2). There were 50 acts in each trait.
*$p < .05$; **$p < .01$

not predicted as strongly, and not at all by APS. Perhaps the anomalous results for agreeableness were due to the relatively low amount of variance in the agreeableness prototypicality ratings, a fact also noted by Buss and Craik. As a check that these results were not due to the lower inter-rater reliability of the APS ratings, we computed disattenuated bivariate correlations (with inter-rater reliabilities as estimates of error). For all four traits, the extremity-prototypicality correlation remained stronger than the APS-prototypicality correlation, although the differences between the correlations were smaller.

DISCUSSION

Study 1 revealed rater consensus about the prototypicality, extremity, and average intra-trait similarity of behaviors, suggesting that mental representations of trait categories are shared. The first hypothesis was supported, in that an act's degree of membership in a trait category can be characterized as continuous. Secondly, the multiple regressions showed that nearly all of the reliable variance in prototypicality ratings was explained by the two variables of extremity and APS, in three of four traits, suggesting that degree of category membership of an act depends on its extremity and on its similarity to other acts in the same trait. Contrary to the second hypothesis, extremity was always the predominant predictor. On the other hand, APS did explain uniquely a sizeable proportion of variance in prototypicality (note also that this was despite the fact that similarity and prototypicality ratings shared almost no method variance). Thus, these results replicated Borkenau (1990) and Read and colleagues (1990); importantly they replicated also with direct pairwise similarity ratings, which neither of the previous studies assessed. In sum, neither the extreme version of the extremity position nor the extreme version of the similarity position is tenable.

STUDY 2

Study 1 showed that acts differ in their degree of membership in trait categories, or in their prototypicality, and that an act's degree of membership is largely determined by its extremity and its average similarity to other acts in the trait. Study 2 turned to the effects such a category structure has on person perception. Specifically, Study 2 investigated the third hypothesis (whether the prototypicality of observed acts enhances argument strength), and the fourth hypothesis (whether dissimilarity among multiple observed acts enhances argument strength). Subjects read descriptions of targets' acts and indicated the aptness of the trait term as a general description. Hypothesis 3 was addressed by varying the prototypicality of the observed acts, and Hypothesis 4 was addressed by varying the intra-description similarity of the observed acts.

METHOD

SUBJECTS AND PROCEDURE

Thirty-eight subjects completed the experiment in small groups, as partial credit toward an introductory-level psychology course. After arriving at the experiment, subjects were randomly assigned to condition, read the written instructions, and completed the materials. After finishing, subjects read written feedback.

MATERIALS AND DESIGN

In the interest of sensitivity, we employed a choice methodology. Subjects read descriptions of two person's behavior, and chose which was a better example of the trait. Each description consisted of three acts from the same trait, performed by the same person. For example: Who is a better example of Quarrelsomeness?

Description 1:
Frank tried to avoid responsibility for an accident.
Another time, Frank exaggerated his personal problems.
Also, Frank changed his mind several times about where he wanted to eat.

Description 2:
Evan told his friend not to buy the car.
Another time, Evan criticized someone for smoking.
Also, Evan chastised a friend for not putting his napkin in his lap.

In order to consider whether the prototypicality of the observed acts increases aptness of the trait term, the acts in one description were more prototypical than in the other description. To minimize the influence of similarity of the acts within a description ("intra-description similarity", IDS), IDS was equal in the two descriptions. In one item-type, IDS was low in both descriptions, in a second item-type IDS was high in both descriptions. Thus, two item-types contrasted high prototypical acts against low prototypical acts.

The other hypothesis was that low IDS would increase argument strength, and two more item-types were designed to test this hypothesis. In these items, one description consisted of acts highly similar to each other (high IDS), and the other description consisted of acts not similar to each other (low IDS). To minimize the effects of prototypicality, in one of these item-types, both descriptions had low prototypical acts, and in the other item-type, both descriptions had high prototypical acts.[3]

Thus, there were four types of items, and each item-type appeared once for each trait, for a total of 16 items (there were two additional item-types that were not relevant to the present hypotheses and will not be described).

Act Selection. Acts and prototypicality ratings were taken from the Buss and Craik (1983) list of acts for the four traits of aloofness, quarrelsomeness, agreeableness, and gregariousness. As prototypicality ratings varied with gender of the target (Buss & Craik, 1983), we stayed within one arbitrarily chosen gender, and all acts were worded with males as the targets. Of the 100 acts available for each trait, 24 were needed to create 4 choices, each with 2 descriptions and 3 acts in each description. Given that no act appeared twice, the pool of available acts was strained to meet the demands imposed by the design, and we were forced to be somewhat flexible in our description creation. (Study 1 provided ratings on only 50 acts, which would not have been enough to create the materials; recall that there was high agreement between the prototypicality ratings we observed and those Buss and Craik [1983] reported.)

Description Creation. Each description consisted of three acts. High prototypical descriptions had average prototypicalities above the mean prototypicality for the trait; low prototypical descriptions had average prototypicalities below the mean prototypicality for the trait. In items which contrasted prototypicality, the difference between the average prototypicalities of the two descriptions was as large as possible. Given the differences in means and variances, across traits, of prototypicality

3. Although this method gains the sensitivity of a choice methodology, it loses the simplicity of a 2 x 2 ANOVA design. This is because each item (and thus each response) referred to two cells of the 2 x 2 table, not just one, which is required for an ANOVA model.

ratings (Buss & Craik, 1983), these differences varied with the trait. For agreeableness, the two differences in prototypicality ratings were 1.16 and 1.43; for aloofness, 1.28 and 1.78; for gregariousness, 1.28 and 1.59; and for quarrelsomeness, the differentials were 2.97 and 3.05. In items holding prototypicality constant across descriptions, the difference between the average prototypicalities of the two descriptions was as small as possible. In seven of the eight items, the prototypicality differential was less than .13. In one of the quarrelsomeness items, we were unable to keep the differential below .85.

When intra-description similarity was high, the three acts were chosen to be similar to each other; when intra-description similarity was low, the acts were chosen so that none were similar to each other. In order to guarantee that acts were not similar to each other for superficial reasons, when two acts in the same description shared a major word, the word was changed to a synonym in one of the two acts (e.g., "alone" was changed to "by himself"; "club" was changed to "team"), in 9 of the 144 acts.

In order to insure that it was clear to subjects that the same target performed all three acts in a description, the first line of each description listed an arbitrarily selected name and a couple of irrelevant pieces of information (e.g., "Robert is 26, lives in a moderate climate, and reads the newspaper."). The next line listed the first performed act. The second act followed on the next line, preceded by the words, "Another time,". The third act followed on the next line, preceded by the word, "Also,". The target's name was repeated within each act.

For half of the subjects, printed below the two descriptions was the question: "Who is more T?" (T was replaced with the trait label), and the two names of the targets. However, we also added a judgment task that was more focused on the descriptive function of trait terms, so as to avoid possible causal inferences: The other half of the subjects answered "Who is a better example of a T person?" Assignment to this variable ("judgment task") was randomly determined by questionnaire distribution. We predicted no effects of judgment task.[4]

Questionnaire Layout. For the three traits of Agreeableness, Aloofness, and Gregariousness, the items were organized systematically: 1. prototypicality held constant at a high level; 2. IDS held high; 3. IDS held low; 4. prototypicality held low. Within each contrast, the description with higher prototypicality or higher intra-description similarity was always

4. As will be discussed later, we assume that subjects treat these judgments as equivalent to each other and as summary descriptions of the actor's acts. That is, when multiple acts, performed by the same actor, are observed as part of an impression-formation task, referring to the actor is simply a convenient way to summarize the actor's acts, and is not an attribution of a causal disposition (e.g., Buss & Craik, 1983; Hastie & Kumar, 1979; Park et al., 1994).

the first description. In order to make sure that order was not a factor, quarrelsomeness items were presented in a random order, and within each item, the order of descriptions was reverse to the other items. Comparing the quarrelsomeness results with the averages of the results from the other three traits showed that within-choice description order did not appear to influence responses.

RESULTS

JUDGMENT TASK

None of the results involving judgment task was significant at $p < .10$. Thus, we can conclude that subjects responded in the same way whether they were choosing the actor that was a better example of the trait or choosing the actor that was more of the trait. Therefore, in all further analyses, the data were collapsed over judgment task.

EFFECT OF PROTOTYPICALITY

Hypothesis 3 was that descriptions with higher prototypicality would be more readily described with the trait term. Two item-types contrasted high against low prototypical descriptions. As each item-type appeared four times, a subject could choose the high prototypical description between 0 and 4 times. If prototypicality had no effect on subjects' choices, then the high prototypical description would be chosen half of the times (2). Thus, the average number of times the high prototypical description was chosen was tested against 2, using the t distribution. When IDS was low in both descriptions, the high prototypical description was chosen an average of 3.2 times, which was significantly greater than 2, t (36) = 8.62, $p < .001$. Similarly, when both alternatives had high IDS, high prototypical descriptions were chosen 2.8 times, also significantly greater than 2, t (36) = 6.36, $p < .001$. In both cases, the more prototypical the observed behaviors, the more subjects thought that the trait was a good description, supporting Hypothesis 3. However, a within-subjects t-test revealed that the two values differed from each other, t (36) = 2.32, $p < .05$. Thus, the effect of prototypicality was stronger when behaviors within a description were not similar to each other.

INTRA-DESCRIPTION SIMILARITY OF ACTS.

Hypothesis 4 was that descriptions with low IDS would be more readily described by the trait term than would descriptions with high IDS. Two item-types contrasted low IDS against high IDS descriptions. The average number of times the low IDS description was chosen was tested

against 2, using the t distribution. When prototypicality was low in both descriptions, the low IDS description was chosen as reflecting more of the trait an average of 1.5 times, which was significantly lower than 2, t (36) = 3.86, $p < .001$. When both descriptions were highly prototypical, there was no effect of IDS ($M = 2.1$), t (36) = .42, ns. A within-subjects t-test verified that the effect of intra-description similarity depended on the prototypicality of the behaviors, t (36) = 2.41, $p < .05$. Thus, Hypothesis 4 was not supported: dissimilarity among observed behaviors did not increase use of the trait term, and in one case, decreased it.

DISCUSSION

Four independent analyses converged in supporting the hypothesis that argument strength was influenced by the structure of acts in trait categories. Hypothesis 3 was supported: prototypicality of observed behaviors enhanced the aptness of the trait term as a general description of the acts. Hypothesis 4 was not supported: intra-description similarity did not decrease use of the trait term (and in one case, the results were reverse in direction). Additionally, prototypicality and intra-description similarity moderated each other, so that each provided less strength if the other variable was high. The failures of Hypothesis 4 and Hypothesis 2 (in Study 1) make a strong case that, for perceivers, feature similarity of behaviors is not the primary dimension of behaviors.

Why did intra-description similarity unexpectedly enhance the use of trait terms? For example:

High Intra-description Similarity:
Steve pledged a fraternity
Another time, Steve joined the country club.
Also, Steve participated on a ski team.

Low Intra-description Similarity:
James arrived late at the meeting because he conversed with a friend en route.
Another time, James went to a bar.
Also, James was argumentative at a discussion.

Hypothesis 4 was that, because James' three acts exhibited more kinds of gregariousness than did Steve's three acts (only one kind of gregariousness), James' behavior would be more representative of gregariousness than Steve's behavior, and so James would be chosen as a better example of gregariousness. This hypothesis was not supported, and in fact, the data were in the opposite direction. One possible explanation is that, rather than

representing diverse aspects of the trait, each of the low similarity acts remained ambiguous as to whether they represented the trait at all.

For example, is James' "arriving late at the meeting because he conversed with a friend en route" gregarious or unreliable? When the acts in a set are dissimilar to each other, such alternative traits remain salient as descriptions of the acts. In contrast, when the three acts in a set are similar to each other, the trait-relevant aspects of each act become highlighted. The "joining" aspect of Steve's acts is highlighted, and joining is gregarious. That is, the set-as-a-whole is relevant to how individual acts are described. In the case of dissimilar low prototypicality behaviors, alternative descriptions remained salient and the acts remained ambiguous, lowering perceivers' confidence in the trait term.

STUDY 3

Study 2 showed that the prototypicality of observed behaviors, and their similarity to each other, influenced the use of trait terms to describe them. Study 3 turns to another aspect of person perception, in which perceivers observe one act that an actor has performed, and judge the likelihood of the actor performing another, unobserved act. By varying the prototypicality of the observed behavior, we test Hypothesis 3 in this context as well. Specifically, Hypothesis 3 predicts that prototypicality of the observed act will increase the likelihood of the unobserved act. However, because the superordinate trait category is not explicitly mentioned in these cases, the observed act's prototypicality for the trait may not be relevant, predicting no effect of the observed act's prototypicality.

Hypothesis 5, that the prototypicality of the conclusion (unobserved) act would be irrelevant to the strength of such arguments, is the main focus of Study 3. There are at least two challenges to Hypothesis 5. First, there may be baseline differences in act frequencies, and they may be correlated with prototypicality. For example, if high prototypical acts are more frequent than low prototypical acts [as Read et al.'s (1990) subjects believed], then their judged likelihoods should be greater than for low prototypical acts, which would be evident in a main effect of conclusion act prototypicality. The second challenge to Hypothesis 5 is based on reasoning about the nature of prototypicality. Borkenau (1990) argued that prototypicality might track extremity because extremity indicates how capable an actor is of achieving certain goals, and this level of capability is important to perceivers. This suggests that perceivers might be interested in more than simply whether the actor has any capability at all, but also in the degree of capability that the actor has. As the prototypicality of the observed behavior indicates what the actor is at least minimally capable

of, observed acts might increase the likelihood of equal or less prototypical acts, but not affect the likelihood of more prototypical acts. This line of reasoning would predict an interaction between observed-act prototypicality and conclusion-act prototypicality.

METHOD

SUBJECTS AND PROCEDURE

Fifty-three subjects completed the experiment in small groups, as partial credit towards an introductory-level psychology course at a large midwestern university. After arriving at the experiment, subjects were randomly assigned to condition, read the written instructions, and completed the materials. After finishing, subjects read written feedback.

DESIGN AND MATERIALS

This study used a rating format, and consisted of a fully factorial 2 (observed act prototypicalities) x 2 (conclusion act prototypicalities) x 2 (item-orders) design. The item-orders factor was between subjects, and the other two factors were within subjects. The observed act was either high or low in prototypicality and the conclusion act was either high or low in prototypicality. Crossing the within-subjects factors created 4 types of descriptions, each appearing 4 times, once for each trait.

Description Creation. Each description consisted of an observed act and a conclusion (unobserved) act. Because this study required fewer total acts than Study 2, the acts and prototypicality ratings were drawn from Study 1 (50 acts in each of the four traits of agreeableness, dominance, quarrelsomeness, and submissiveness). The acts in Study 1 were split at the mean of the prototypicality ratings within each trait into high and low prototypicality acts. Study 2 revealed the ambiguity inherent in dissimilar acts; given this, all act pairs were similar to each other.[5] Thus, all act-pairs were those that had higher than average similarity ratings in Study 1. Both of the behaviors in a description came from the same trait.

It was important to be clear to subjects that the conclusion act had not been observed; we considered that future tense would be effective in this regard. That is, subjects were instructed to predict how likely it would be that the actor will perform the second action. Each item was given a

5. Subjects also rated dissimilar act-pairs in Study 3. However, because the results of Study 2 indicated that dissimilar acts are ambiguous, these are not described here.

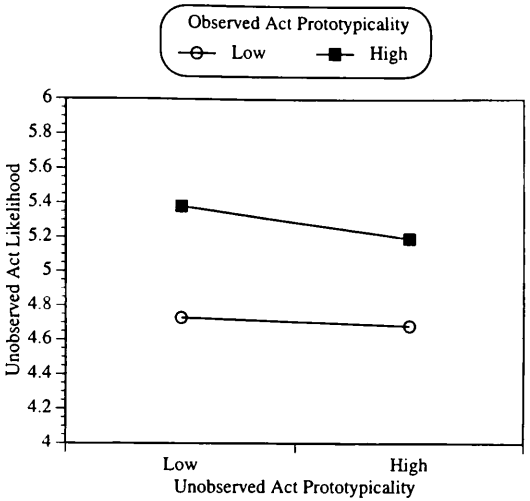

FIGURE 1. The effects of observed act prototypicality and conclusion (unobserved) act prototypicality on the rated likelihood of the unobserved act.

number and an arbitrary name, and presented as in the following example:

a) Doug did not complain when someone used his car without permission.
b) Doug will let a casual acquaintance borrow his record album.

How likely do you think it is that Doug will do the second action?

Subjects responded on a 7-point scale, from 1 (not at all likely) to 7 (very likely). Each description-type appeared four times, once per trait. For each subject, a score was created for each description-type by taking the mean across the four times the description-type occurred.

Questionnaire Format. The first page of the questionnaire instructed the subjects and gave an example. In the trait-order condition, the following pages listed the descriptions by trait, with the name of the trait written at the beginning. The items for one trait appeared in random order within the trait over three pages, and the traits were ordered as follows: submissiveness, dominance, quarrelsomeness, and agreeableness. In the no-order condition, all items were randomly ordered, and appeared three per page.

RESULTS AND DISCUSSION

In a 2 (observed act prototypicality) x 2 (conclusion act prototypicality) x 2 (item-order) ANOVA, only the main effect of observed act prototypicality was significant, F (1, 51) = 52.87, $p < .001$. There was no effect for conclusion act prototypicality, F (1, 51) = 2.07, $p > .15$, no interaction between conclusion act and observed act prototypicality, F (1, 51) < 1, nor a main effect of order, F (1, 51) = 3.15, $p < .10$ (the trend suggests that trait-order led to slightly higher ratings in general). Furthermore, all interactions between order and other effects in the model were not significant, all F's < 2.53, all p's > .10. As can be seen in Figure 1, the highly prototypical observed acts led to greater judged likelihood than the low prototypical observed acts. Thus, at least for similar act pairs, judged likelihood was enhanced by the prototypicality of the observed behavior, and was unaffected by the prototypicality of the conclusion behavior. The results supported Hypothesis 3, demonstrating that prototypicality also had consequences for conclusions about predictions of unobserved acts. Hypothesis 5 was also supported: the prototypicality of conclusion acts was not relevant to argument strength.

GENERAL DISCUSSION

Starting with Buss and Craik's (1983) joining of family-resemblance and summary-labels models of traits, and analogizing from research on natural objects (Osherson et al., 1990; Rips, 1975), we tested five hypotheses about the internal structure of trait categories and the influence of this structure on person perception. We had two goals. First, we wished to replicate findings that subjects agree on the degree of belongingness of an act to a category, and to provide evidence about the determinants of these ratings. Second, we wished to explore some of the effects that relative belongingness has on conclusions perceivers draw from observing actors' behaviors.

RELATIVE BELONGINGNESS AS A STRUCTURAL FEATURE OF TRAIT REPRESENTATIONS

We followed several theorists in assuming that there is a hierarchical structure of personality descriptors (Buss & Craik, 1983; Eysenck, 1947; Hampson et al., 1986; John et al., 1991; McCrae & John, 1992; Wiggins, 1979). At the upper levels of this structure are categories like "extraverted" and "conscientious"; at lower levels are categories of acts. Two aspects of hierarchies were particularly relevant to this research (Hampson et al., 1986). First was asymmetrical class-inclusion, which is

that all subordinate categories (e.g., "striking up conversations with strangers") are included within at least one of the superordinate categories (e.g., "talkativeness"), but that the superordinates are not included in the subordinates (e.g., "striking up conversations with strangers" is a way of being "talkative", but being "talkative" is not a way of "striking up conversations with strangers"). The second relevant aspect of hierarchies was that categories that differ in level in the hierarchy differ in breadth (abstractness, generality), that is, in the number of bottom-level categories they include.

Buss and Craik (1983) extended this model by adding the notion of prototypicality. That is, some subordinates are better examples of their superordinates than are other subordinates. Buss and Craik (1983) showed that subjects agree on how good of an example of a trait a given act is, as did Borkenau (1990) and Hampson (1982). The results of Study 1 replicated this finding. Furthermore, almost 60% of the subjects showed no obvious gaps in their ratings, suggesting relatively unimodal distributions of act prototypicalities

The second hypothesis concerned the determinants of the prototypicality of an act. A direct analogy from natural-objects would suggest that an act's similarity to other acts in the category would determine its prototypicality. In contrast, the possible role of traits as information about an individual's capability to achieve certain goals would suggest that an act's extremity determines its prototypicality (Barsalou, 1985; Borkenau, 1990). Borkenau (1990) found that extremity was a better predictor of prototypicality than was central tendency, and Read et al. (1990) reported that goal facilitation was a better predictor of prototypicality than was similarity to the most prototypical acts (although Read et al. were more concerned with goal-facilitation from the point-of-view of the actor). In this paper, we compared extremity with similarity obtained from direct pairwise ratings of acts. The results were consistent with Borkenau (1990) and Read et al. in that extremity was the stronger predictor. Nonetheless, similarity had a strong prediction of its own.

Why similarity and extremity both were associated with prototypicality is still unclear. First, other variables might be involved. For example, perceived covariation among acts, either purely associationistic or typological, might be related to both perceived similarity and to prototypicality (Anderson & Sedikides, 1991; Sedikides & Anderson, 1994). Second, we did not constrain perceivers' natural uses of "extremity" by assuming a particular definition of extremity (e.g., as degree of goal facilitation), but rather left it simple with the intent to capture the notion of approximation to the end-point. Whereas this approach netted solid results (e.g., high inter-rater reliability and strong correlations between extremity, similarity, and prototypicality), it certainly left ambiguity in

the meaning of extremity to our subjects. Although extremity probably means approximation to an end-point, the end-point need not be ideal, nor need it be ideal for goal facilitation. For example, extremity could track extremity of *desire* for a goal, but not the effectiveness of achieving that goal (e.g., yelling at a superior might be an extreme behavior because of its expression of a strong desire to be dominant, but actually be very ineffective at achieving dominance). Alternatively, extremity might be unrelated to motivational variables, and instead summarize properties of the behavior itself, such as its effect size (Kelley, 1971) (e.g., extremely dominant acts make others very unhappy), or even the vigor with which it is enacted (e.g., commanding is more vigorous than requesting). Further research is needed to (a) clarify the meaning of extremity, (b) explain the relationship between extremity and average pairwise similarity, and (c) untangle why prototypicality is related to both extremity and average pairwise similarity.

One challenge to this research enterprise questions our assumption that traits are organized hierarchically. Gross, Fischer, and Miller (1989) argued that adjectives (possibly including traits) do not have a hierarchical structure, but rather a "dumbbell" shape. For example, all traits are organized into a multi-dimensional space, with each dimension having one word to express each pole (e.g., "extraverted" and "introverted"). All other trait words are simply variants of these words, which are arranged in (spherical) clouds around such poles. For example "talkative" is not a subordinate of "extraverted", but rather is a variant of "extraverted". A central argument for this claim is that it does not make sense to say that an adjective "is a kind of" another adjective (Gross et al., 1989). For example, it does not make sense to say that "talkative is a kind of extraverted". As such class-inclusion relations are central to the meaning of hierarchies, one cannot use hierarchy-based models to understand traits. However, as Miller and Fellbaum (1991) allowed for verbs, Hampson et al. (1986) argued that adjectives are describable with slightly modified class-inclusion statements, specifically, with "is a way of being". In a series of experiments (see also John et al., 1991), Hampson et al. (1986) showed that such class-inclusion statements deliver the necessary judgment asymmetries. For example, subjects agree that "to be talkative is a way of being extraverted", but do not agree that "to be extraverted is a way of being talkative", suggesting that talkative is a subordinate category of extraverted. Thus, there is at least some evidence to support the assumption that traits are organized hierarchically.

Aside from this debate, a modified version of the Gross et al. (1989) model might be consistent with our results. Assuming that acts are organized in this multi-dimensional space, that similarity is determined by distance in the space, and that prototypicality equals closeness to the

poles, our results are not consistent with a spherical distribution of acts, for then extremity would be unrelated to prototypicality (acts beyond the pole would have high extremity but low prototypicality). However, it is possible that the distribution of acts around the poles looks more like an hourglass than a dumbbell. That is, few acts are more extreme than the poles, and acts closer to the middle of the dimensions are relatively closer to the dimensions. Such a model might explain all three inter-correlations among prototypicality, extremity, and similarity. Future research is needed to address this issue.

EFFECTS OF RELATIVE BELONGINGNESS ON PERSON PERCEPTION

In this research, we investigated two kinds of person perception. Our assumptions were that (1) trait categories are represented mentally as a hierarchy (Buss & Craik, 1983; Eysenck, 1947; Hampson et al., 1986; John et al., 1991; McCrae & John, 1992; Wiggins, 1979); (2) trait terms are often applied to people as summary descriptions of their behavior rather than as enduring causal explanations of behavior (Alston, 1975; Buss & Craik, 1983; Hampshire, 1953; John, 1990; Newman & Uleman, 1993); and (3) perceivers apply such summary trait labels with more or less confidence, but rarely with certitude (Park, 1989; Park et al., 1994). Our general proposal was that the hierarchical trait structure would influence perceivers' conclusions about actors' behaviors.

The first kind of person perception we examined was the conclusion that a trait is a good summary label of an actor's observed behavior. We conceived of such conclusions as the use of a higher-level category in the trait hierarchy to describe what an actor did. Results supported Hypothesis 3, in that the more prototypical (representative) the observed acts were of their superordinate trait, the more confidence perceivers had in using the trait to summarize the acts. Hypothesis 4 was not supported, in that dissimilarity among the observed behaviors did not increase this confidence. Together with the limited support for Hypothesis 2, it is probable that representativeness of an act (or of an act set) for a trait is not determined primarily by similarity.

Person-perception is increasingly being described by (at least) two-stage models (Bassili, 1989; Gilbert et al., 1988; Higgins et al., 1986; Reeder & Brewer, 1979; Trope, 1986; Wyer & Srull, 1986). In the first stage, perceivers describe an observed act with a trait term, and in the second stage, perceivers attribute a causal disposition to the actor. This distinction between the two stages is close to the distinction between using a trait term to refer to an act (Stage 1) and using the trait term to refer to an actor (Stage 2), as can be seen most clearly in the case of single

observed acts. For example, it is easy to imagine thinking that a given act is rude without thinking that the actor is generally rude. This distinction is important for at least two reasons. On the one hand, situational information has been shown to have very different effects on attributions of causality than on descriptions of acts. On the other hand, it is rarely obvious which trait term (if any at all) is a good description of an act, but such descriptions can have consequences for further interpretations or predictions about the actor (as explored in Study 3). The goal of Study 2 was to contribute to the understanding of such behavioral descriptions.

However, when perceivers use a single trait term to describe a set of multiple observed acts, referring to the actor may not be part of the second stage (i.e., may not involve an attribution of a causal disposition). Rather, referring to the actor with the trait term may simply be an efficient way to represent the description of multiple acts (e.g., Hastie & Kumar, 1979; Park, 1986; Park et al., 1994). In fact, this is the central claim of summary-labels models of traits: saying an actor has a trait only describes a set of the actor's acts and does not attribute a causal disposition to the actor (e.g., Buss & Craik, 1983). Newman and Uleman (1993) pointed this out when arguing that "trait-related terms can be used in at least five ways: (a) to describe a particular behavior, (b) to describe a person at a particular time, (c) to describe behaviors that a person does frequently, (d) to describe a person over time, and (e) to describe a dispositional cause." (p. 515). The (c) and (d) senses refer to the actor, but only as a way of describing the actor's acts, not as a causal disposition (e). Future research is needed to clarify (1) where summary-labels uses of trait terms fit into multiple-stage models, (2) the extent to which descriptions of sets of behaviors refer to actors, and (3) the effects of trait-category mental representations on the other three uses of trait terms. The focus of our work was rather on demonstrating the effects of prototypicality of observed acts on the use of trait terms as descriptive summary labels.

Hypothesis 5 concerned another aspect of person-perception. In these cases, perceivers judge the likelihood that an actor performed an act on the basis of observing other actions of the actor. The results extended the confirmation of Hypothesis 3 to such cases, and also supported Hypothesis 5. Specifically, the surprising result Rips (1975) reported was extended to person perception: prototypicality of a conclusion act was not relevant to its judged likelihood. We find the lack of an interaction between observed-act and conclusion-act prototypicality particularly surprising. This result means that perceivers did not distinguish between people in which acts of a trait were expected of them, only in whether acts in a trait were expected of them. Some researchers have argued that one purpose of trait categories is to keep track of who is

capable of achieving certain socially-valued goals, and that more prototypical acts are better for achieving those goals. Thus, we might expect that perceivers would distinguish people who are best able to achieve the goals (perform highly prototypical acts) from those who are also capable, but only moderately so (perform moderately or low prototypical acts). For example, a highly skilled runner is not expected to run more often, but rather to run faster when running. In the trait domain, it appears that perceivers distinguish between actors only in their relative frequency or likelihood of performing skill-relevant acts, not in how effective or capable those acts are. More generally, and independently of whether prototypicality represents skill, perceivers might be expected to track the quality of the acts expected of actors. For example, highly dominant people seem to perform dominant acts not only more often, but also dominant acts that are more "intensely" dominant (e.g., McCrae & Costa, 1990, p. 23). However, the present results suggest that within-trait dimensional thinking about the expected behaviors of actors is limited to frequency, and does not include level of prototypicality of acts.

One final and related issue worth considering is the role of the predicate in person-perception arguments. Because we were interested in the summary-labels usage of trait terms, we used "is what P did" as our predicate. In addition, this was a "blank predicate" (i.e., subjects did not know anything about the actors except their acts), so that we could focus on the role of categories in such arguments. However, if interest were in individuals' reasoning about behaviors, a different predicate could be used, as noted by one reviewer. For example, the predicate "is performed by people who experienced quintic childhoods" would be useful in understanding how subjects make inferences about associates of behaviors. The Osherson and colleagues (1990) model would suggest interesting hypotheses about such inferences as well, and future research could explore whether similar results to those found in the present research obtain.

In sum, part of the interest in mental representations of traits arises in their implications both for the "how" and for the "what" of person-perception (Trope & Higgins, 1993). The data indicated that person perception processes draw on stored, structured knowledge about traits. In contrast to characterizations of perceivers as rather broad-banded categorizers, who pay attention only to the mere membership of a behavior in one trait or another, this research showed that perceivers can be relatively sophisticated in the fine distinctions they make between behaviors. From a perceiver's point of view, behaviors carry information about their degree of membership in a category, their degree of extremity, and their similarity to other members of the trait, and this information has consequences for the conclusions perceivers draw. A full

account of any person-perception calculus would include the operations performed on this information.

REFERENCES

Alston, W. P. (1975). Traits, consistency and conceptual alternatives for personality theory. *Journal for the Theory of Social Behavior, 5*, 17-48.

Anderson, C. A., & Sedikides, C. (1991). Thinking about people: Contributions of a typological alternative to associationistic and dimensional models of person perception. *Journal of Personality and Social Psychology, 60*, 203-217.

Barsalou, L. W. (1985). Ideals, central tendency, and frequency of instantiation as determinants of graded structure in categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 11*, 629-654.

Bassili, J. N. (1989). Traits as action categories versus traits as person attributes in social cognition. In J. N. Bassili (Ed.), *On-line cognition in person perception* (pp. 61-89). Hillsdale, NJ: Lawrence Erlbaum.

Borkenau, P. (1990). Traits as ideal-based and goal-derived social categories. *Journal of Personality and Social Psychology, 58*, 381-396.

Borkenau, P., & Müller, B. (1992). Inferring act frequencies and traits from behavior observations. *Journal of Personality, 60*, 553-573.

Buss, D. M. (1991). Evolutionary personality psychology. *Annual Review of Psychology, 42*, 459-491.

Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review, 90*, 105-126.

Buss, D. M., & Craik, K. H. (1984). Acts, dispositions, and personality. In B. A. Maher & W. B. Maher (Eds.), *Progress in experimental personality research: Volume 13. Normal personality processes* (pp. 241-301). Orlando, FL: Academic Press.

Cantor, N., & Mischel, W. (1977). Traits as prototypes: Effects on recognition memory. *Journal of Personality and Social Psychology, 35*, 38-48.

Cantor, N., & Mischel, W. (1979). Prototypicality and personality: Effects on free recall and personality impressions. *Journal of Research in Personality, 13*, 187-205.

Cantor, N., Mischel, W., & Schwartz, J. C. (1982). A prototype analysis of psychological situations. *Cognitive Psychology, 14*, 45-77.

Eysenck, H. J. (1947). *Dimensions of personality*. London: Routledge & Kegan Paul.

Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive busyness: When person perceivers meet persons perceived. *Journal of Personality and Social Psychology, 54*, 733-740.

Gross, D., Fischer, U., & Miller, G. A. (1989). The organization of adjectival meanings. *Journal of Memory and Language, 28*, 92-106.

Hampshire, S. (1953). Dispositions. *Analysis, 14*, 5-11.

Hampson, S. E. (1982). Person memory: A semantic category model of personality traits. *British Journal of Psychology, 73*, 1-11.

Hampson, S. E., John, O. P., & Goldberg, L. R. (1986). Category breadth and hierarchical structure in personality: Studies of asymmetries in judgments of trait implications. *Journal of Personality and Social Psychology, 51*, 37-54.

Hastie, R., & Kumar, P. A. (1979). Person memory: Personality traits as organizing principles in memory for behaviors. *Journal of Personality and Social Psychology, 37*, 25-38.

Higgins, E. T., & Bargh, J. A. (1987). Social cognition and social perception. *Annual Review of Psychology, 38*, 369-425.

Higgins, E. T., Strauman, T., & Klein, R. (1986). Standards and the process of self-evalu-

ation: Multiple affects from multiple stages. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition* (Vol. 1) (pp. 23-63). New York: Guilford.

John, O. P. (1990). The "big five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 66-100). New York: Guilford.

John, O. P., Hampson, S. E., & Goldberg, L. R. (1991). The basic level in personality-trait hierarchies: Studies of trait use and accessibility in different contexts. *Journal of Personality and Social Psychology, 60,* 348-361.

Jones, E. E. (1990). *Interpersonal perception.* New York: W. H. Freeman.

Jones, E. E. (1993). Afterword: An avuncular view. *Personality and Social Psychology Bulletin, 19,* 657-661.

Kelley, H. H. (1971). *Attribution in social interaction.* New York: General Learning Press.

Margolis, E. (1994). A reassessment of the shift from the classical theory of concepts to prototype theory. *Cognition, 51,* 73-89.

McCrae, R. R., & Costa, P. T., Jr. (1990). *Personality in adulthood.* New York: Guilford.

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality, 60,* 175-215.

Medin, D. L. (1989). Concepts and conceptual structure. *American Psychologist, 44,* 1469-1481.

Miller, G. A., & Fellbaum, C. (1991). Semantic networks of English. *Cognition, 41,* 197-229.

Newman, L. S., & Uleman, J. S. (1993). When are you what you did? Behavior identification and dispositional inference in person memory, attribution, and social judgment. *Personality and Social Psychology Bulletin, 19,* 513-525.

Osherson, D. N., Smith, E. E., Wilkie, O., López, A., & Shafir, E. (1990). Category-based induction. *Psychological Review, 97,* 185-200.

Park, B. (1989). Trait attributes as on-line organizers in person impressions. In J. N. Bassili (Ed.), *On-line cognition in person perception* (pp. 39-59). Hillsdale, NJ: Lawrence Erlbaum.

Park, B., DeKay, M. L., & Kraus, S. (1994). Aggregating social behavior into person models: Perceiver-induced consistency. *Journal of Personality and Social Psychology, 66,* 437-459.

Read, S. J., Jones, D. K., & Miller, L. C. (1990). Traits as goal-based categories: The importance of goals in the coherence of dispositional categories. *Journal of Personality and Social Psychology, 58,* 1048-1061.

Reeder, G. D., & Brewer, M. B. (1979). A schematic model of dispositional attribution in interpersonal perception. *Psychological Review, 86,* 61-79.

Rips, L. (1975). Inductive judgments about natural categories. *Journal of Verbal Learning and Verbal Behavior, 14,* 665-681.

Rosch, E. (1978). Principles of categorization. In E. Rosch & B. B. Lloyd (Eds.), *Cognition and categorization* (pp. 27-48). Hillsdale, NJ: Erlbaum.

Rosch, E., & Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology, 7,* 573-605.

Ross, L., & Nisbett, R. E. (1991). *The person and the situation: Perspectives of social psychology.* New York: McGraw-Hill.

Sedikides, C., & Anderson, C. A. (1994). Causal perceptions of intertrait relations: The glue that holds person types together. *Personality and Social Psychology Bulletin, 20,* 294-302.

Shipley, E. F. (1993). Categories, hierarchies, and induction. In D. Medin (Ed.), *The psychology of learning and motivation: Volume 30. Representation and processing of categories and concepts* (pp. 265-301). Orlando, FL: Academic Press.

Smith, E. D., & Medin, D. (1981). *Categories and concepts*. Cambridge, MA: Harvard University Press.

Trope, Y. (1986). Identification and inference processes in dispositional judgment. *Psychological Review, 93*, 239-257.

Trope, Y., & Higgins, E. T. (1993). The what, when, and how of dispositional inference: New answers and new questions. *Personality and Social Psychology Bulletin, 19*, 493-500.

Wiggins, J. S. (1979). A psychological taxonomy of trait descriptive terms: I. The interpersonal domain. *Journal of Personality and Social Psychology, 37*, 395-412.

Wyer, R. S., Jr., & Srull, T. K. (1986). Human cognition in its social context. *Psychological Review, 93*, 322-259.