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# Individual Differences in Behavioral Prediction: The Acquisition of Personal-Action Schemata

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*It is proposed that memory schemata connect information about a single individual's mannerisms, traits, and other characteristics to the likelihood of that individual's acting in a particular fashion. Such schemata could account for certain categorization errors in which inappropriate generalizations are made in the course of predicting the likelihood of a person's action. The study examines learning of such personal-action schemata, and evidence supportive of such schemata are obtained. Theoretical implications for clinical transference are considered.*

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A number of years ago, one of the authors worked as a classroom assistant in a kindergarten. One day, a shy young girl with whom he had built some rapport became visibly and uncharacteristically saddened. When he asked what was disturbing her, she replied, "You're wearing a belt today." When he wondered aloud why his more careful dress disturbed her, she asked, accusatorily, "And who do you hit with your belt?" Her simple reaction tells a whole story of overgeneralizing what we have learned from earlier people to new people. It also shows how we may interpret our interpersonal worlds according to cues (belts) that were paired with others' behavior. The incident further suggests that one single individual's features or mannerisms may become closely associated with certain actions. That is, individuals will construct memory representations that connect a large category of sometimes idiosyncratic features to a particular behavioral action.

Cognitive psychologists often employ the concept of a schema, or prototype, to depict such connections. A schema is a cognitive structure that contains a number of features (e.g., belt, adult, male). When a number of those features are encountered in the environment, the schema is triggered and some cognitive outcome occurs

(e.g., the classification of an abusive parent is made). Although theoretical structures besides schema can also account for such cognition (e.g., Hintzman, 1986), the similar predictions of such alternatives render them relatively unimportant at the level of analysis employed by social cognition. The schematic approach has remained the most widely used way to represent and discuss such learning.

An exploratory study is conducted here on the learning of schemata for behavioral prediction as they arise from observing a single person. The study is a laboratory analogue that employs an extremely complex and ecologically valid stimulus set to examine whether people who observe a single person over time can acquire schemata that connect the person's mannerisms and other characteristics to his or her behavior.

## SCHEMATA IN PERSON PERCEPTION

Person perception literature recognizes many sorts of schemata and related concepts, primarily differentiated according to their content (Fiske & Taylor, 1991; Wyer & Srull, 1989). For example, *type schemata* connect personality traits to types. A type schema for extroversion, for

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**Authors' Note:** This research was supported by National Institute of Mental Health Grant 1R03MH44038 for the study of Personality and Personal-Action Schemata. During the course of this research, John D. Mayer was also supported by Biomedical Research Support Grant 2 S07 RR07108-17 and a University of New Hampshire Summer Faculty Fellowship. The authors gratefully acknowledge the assistance of Susan Andersen, Steve Neuberg, Paula Niedenthal, and Peter Salovey, who read and commented on earlier versions of this article. Correspondence regarding this article may be addressed to John D. Mayer, Department of Psychology, Conant Hall, University of New Hampshire, Durham, NH 03824-3567.

*PSPB*, Vol. 19 No. 4, August 1993 443-451

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signed to mimic brief personality summaries of the sort that might appear in a newspaper clipping. Thirty descriptions were labeled members of a group, on the basis that each one shared 8 or more of its 16 features with the prototype. Thirty descriptions were nonmembers on the basis that each shared fewer than 8 features. Despite the complexity of the learning set, participants were able to acquire the schema type (e.g., discriminate group members from nonmembers) and then show the biases predicted by theories of schema-consistent learning. Because the prototype to be learned was created arbitrarily, Mayer and Bower's study provided a particularly compelling demonstration that we can learn to recognize various personality types, be they the universal types studied by Cantor and Mischel or the idiosyncratic types studied by Andersen and Cole. That earlier study, however, does not directly address whether people can learn personal-action schemata. Personal-action schemata are learned through repeated observations of a single person's mannerisms and other features and the consequent association of those features with an independent behavior. Because the schema is learned solely within-person, findings from studies examining between-person learning do not apply. Within-person characteristics are probably less variable than between-person, and may also create a greater memory interference with one another, because each episode is associated with the same person.

#### THE PRESENT STUDY

The present study investigated whether people could learn personal-action schemata. Previous person perception studies have examined the acquisition of schemata for personality types from observations of multiple individuals. The present study represents the first examination of schema acquisition from repeated observations of the same individual over time. Demonstrating the possibility of such learning is far from trivial. Within-person variability is less than between-person variability and, as a result, will create a situation analogous to list learning with highly similar items. Such high intralist similarity is known to reduce learning (Underwood & Lund, 1980). Moreover, such learning might also be impeded because multiple instances of a single individual will be stored as repetitions of the same stimulus (a person) rather than multiple instances of different people. Each instance might therefore interfere with prior instances more than do the multiple instances of different individuals that are learned, for example, in type schemata. Finally, many schema acquisition studies employ skeletal instances of individuals that vary on a limited number of dimensions. In contrast, the present study employs rich, connected-discourse descriptions of a person that vary

on 16 dimensions, thereby including a population of over 4 billion possible within-person instances.

Participants were shown 60 instances of a single individual and asked to identify those 30 instances when the individual engaged in a target behavior (e.g., starting a fight). The schema to be learned was composed of information about the person at a given moment, such as his appearance. Appearance was one of 16 dimensions, or information sets, each of which could take on any of four specific features (e.g., "overweight," "at ease," "healthy," or "sickly"). Thus, each instance of the person was described in terms of one feature chosen on each of 16 different dimensions. To decide whether one of the 60 person descriptions predicted the target behavior, a subject had to determine whether it matched the particular prototype he or she was attempting to learn (two different random prototypes were employed, counterbalanced over condition). A given prototype was constructed by randomly designating a particular feature on each of 16 dimensions as the prototypical value. This prototypical value was called a positive feature on that dimension, whereas the three nonprototypical values on that dimension were called negative features. When a person-instance overlapped with the prototypical personal-action schema on more than 8 of the 16 features, the given target behavior was said to occur.

The central hypothesis was that individuals would be able to acquire the personal-action schemata. Acquisition would be demonstrated if participants could successfully decide which person-description matched more than eight characteristics of the personal-action schema for engaging in a behavior such as starting an argument. This is not a trivial task, as subjects were told nothing about the prototype or the rule. The person-description targets were structured so that there were  $4^{16}$ , or slightly over 4 billion, possible variations from the prototype. For people to learn which among the descriptions closely match the schema for starting an argument may not be less complicated than real-life learning.

Whereas the first hypothesis predicted that the schema could be learned, the second hypothesis predicted that schema learning could lead to affective overgeneralization. Specifically, initially neutral-valenced attributes that were paired with the argument-starting schema were predicted to take on the emotionally aggressive connotations of starting an argument.

#### METHOD

##### *Overview*

All subjects first learned to predict the behavior of the target individual by reading descriptions of him. Subjects were randomly assigned to one of two comparison con-

television? (circle one:) YES NO," in the television condition. The correct answer could be viewed by unfolding the flap. Exemplars were generated in such a fashion that the positive features on each dimension appeared with an average frequency of 75% in the behavior-present and 25% in the behavior-absent exemplars. This 75%-25% split was chosen to provide realistic covariance between a feature and a prototype. The three negative features of each dimension occurred with a mean frequency of 8.3% among behavior-present examples and 25% among behavior-absent examples (see Table 1). For instance, if, in the example just mentioned, "his eyes are closed" had been chosen to be the positive feature of the appearance dimension for Prototype 1, then "his eyes are closed" would occur in roughly 75% of the behavior-present examples and 25% of the behavior-absent examples, whereas a negative feature like "his eyes gaze at you" would occur in 8.3% of the behavior-present examples and 25% of the behavior-absent examples. The stimulus pattern is identical to that used in an earlier study of group-prototype acquisition (Mayer & Bower, 1986).

**Ranking-test materials.** The ranking test consisted of a set of eight person descriptions that contained 1, 3, 5, 7, 9, 11, 13, and 15 positive features on the 16 dimensions. On the bottom of each slip was the question "How likely is A.L. to start an argument now?" in the argument condition, or "How likely is A.L. to watch television now?" in the television condition. Subjects were instructed to examine their condition's eight person descriptions and to rank them from most to least likely to engage in the target behavior by marking their ranking directly on the page containing the person description.

**Clue questionnaire.** The clue questionnaire asked participants the relation between each of the 64 features (16 dimensions  $\times$  4 features) and the target behaviors. The clue questionnaire listed the 64 features ordered to correspond with the 16 dimensions, with the set of four within-dimension features block-randomized (e.g., "dressed in colorful clothes," "dressed in warm clothes," and so on). Instructions differed between the argument and television groups, so as to test the two separate hypotheses. Subjects in the television condition were asked whether a feature was a likely indicator that A.L. would watch television. This question tested whether subjects had learned which features signaled the behavior. Subjects in the argument condition were asked to indicate whether they believed each attribute was "aggressive or hostile." This question tested whether positive-for-schema features became more highly associated with the affective connotations of the target behavior (i.e., aggression, for starting an argument). Participants made their responses on a 0-to-5 scale, where 5 was anchored by *aggressive/hostile*.

TABLE 1: Probabilities of Features and Behavior-Present Instances

Feature	Present	Not Present	Marginal P
Positive	0.3750	0.125	0.500
Negative 1	0.0417	0.125	0.167
Negative 2	0.0417	0.125	0.167
Negative 3	0.0417	0.125	0.167
Marginal P	0.5000	0.500	1.000

**Key clues questionnaire.** This exploratory questionnaire asked participants to describe in their own words the rule for deciding when the person would engage in the target behavior.

#### Procedure

Participants were tested alone or in groups of two to six. They were asked to learn about a person by first reading the person description at the top of a stack of 20 descriptions, answering the question at the bottom of the description (e.g., "Is A.L. going to start an argument? [circle one:] YES NO"), and then unfolding the flap to see the correct answer. They were then to go on to the next description and complete it accordingly, proceeding until they finished 20 descriptions. After 9 min, subjects moved on to the next set of 20 whether or not they had finished. After another 9 min, they completed the third packet of 20 person descriptions. Only six subjects failed to complete all 60 descriptions, and their data were excluded. At the end of learning, subjects were given 5 min to arrange the eight new exemplars of the rank-order set according to how likely the person was to engage in the target behavior. The remaining clue and key clues questionnaires were then completed untimed (they took about 15 min). Instructions were repeated or clarified individually whenever necessary.

## RESULTS

### Learning

Participants' performance was first examined to see whether they could learn the complex personal-action schemata studied here. Our first test was for whether the accuracy of responding on the last 20 exemplars of the learning set was above chance levels. Although learning was still expected to continue over this final trial block, knowledge of the personal-action schemata for the target behavior should have begun to accrue even over the very first exemplars. Recall that two randomly assigned stimulus sets had been used, counterbalanced within the two action conditions. These were divided into three sets of 20 instances each. Across the two conditions, subjects classified 64% of the last 20 exemplars correctly, which is significantly greater than the 50% performance ex-

tive for schema in the argument prototype were emotionally unpleasant relative to those for television watching. To investigate this impression further, four judges blind to the hypothesis rated each feature for its pleasant-unpleasant content on a 7-point scale. Interrater reliability was good,  $\kappa(158) = .62$  to  $.71$ . Consistent with our observations, perceived argument features were more unpleasant than television-watching features,  $t(156) = -2.47$ ,  $p < .01$ , despite the fact that they were equally diagnostic in each group. Thus the more negative target behavior of starting an argument appeared to draw subjects' attention to more affectively unpleasant covarying features.

## DISCUSSION

This article developed the concept of a personal-action schema that was modeled to connect the ongoing characteristics of a single person to his or her probability of engaging in a particular behavior. We sought evidence that such schema-content could be acquired and could influence perception. Individuals did learn schemata that connected a repeatedly observed person's features to the behaviors those features signal. As people encountered instances of a target individual's actions such as starting an argument, they gradually learned to discriminate between such instances and noninstances. They could further rank instances of the target individual according to the likelihood of that individual's engaging in the behavior, as well as identify clues indicative of when the behavior would take place. There was some evidence that learning was better in the more neutral, television condition, which was consistent with earlier findings that extraneous affective content can interfere with the acquisition of schemata (Mayer & Bower, 1986, Study 3). Our tests also indicated that otherwise neutral features predictive of an argument took on the hostile and aggressive connotations of the target behavior. Collectively, this information is highly supportive of the notion that personal-action schemata will be acquired and will influence subsequent judgment.

### *Generalization of Findings*

The present research has shown that people can acquire personal-action schemata from observation. This is convergent with the research on schema acquisition. One could maintain that people in part acquire biases through cultural transmission rather than observation and that different schemata are transmitted to different people, but the demonstration of observational learning in the present study increases the plausibility that such biases are also learned through observation of significant others (as suggested by additional evidence in Anderson & Cole, 1990, and Mayer & Bower, 1986).

In the present article, personal-action schemata were sometimes treated as discrete mental structures for the sake of avoiding complications when addressing an already challenging topic. It is worth repeating that personal-action schemata are differentiated from type and/or significant-other schemata on the basis of content alone; they may easily form subschemata of type and significant-other schemata and may be learned, for example, with significant-other schemata as one observes one's parents.

### *The Utility of Personal-Action Schemata in Explaining Everyday Classification and Misclassification*

Personal-action schemata may be the psychological means by which individuals address real-life context-specific behaviors, such as those studied by Mischel (1984). People do behave differently under different conditions, and this sort of schema could encode knowledge of that sort.

The acquisition of such schemata will secondarily lead to biases. Personal-action schemata may be useful for explaining such everyday misclassifications as those that occur in clinical transference. In transference, a person might learn as a child that particular transient features are associated with hostility. When, as an adult, that individual encountered a new person whose features overlapped with what had previously been learned, a match would be obtained. The individual would consequently repeat a form of the earlier relationship, which might often be inappropriate to the actual adult situation. In fact, earlier schema acquisition may be more influential than subsequent exposure (Hill, Lewicki, Czyzewska, & Schuller, 1990). Luborsky and his colleagues (Luborsky & Crits-Christoph, 1988; Luborsky, Crits-Christoph, & Mellon, 1986) have analyzed psychotherapeutic transcripts by applying thematic coding and other interjudge rating methods to them. They obtained evidence for individually unique and specific relationship patterns showing consistency over time within each person's transcript. For example, one individual they studied repeatedly perceived a wide variety of others, including her teaching assistant, husband, and children, to be dominating and controlling.

Moreover, future research can make the link stronger. We would expect that, should learning of a personal-action schema be extensive enough (e.g., over several sessions), it might be generalizable to a more naturalistic target such as a person in a videotape or an experimental accomplice. Another generalization might involve having people describe parental features predictive of their parent's behaviors (e.g., aggression) and subsequently embedding such features in new person descriptions to see whether the features lead to biased predictions of the

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Received March 4, 1992

Revision received June 23, 1992

Accepted June 27, 1992