The Trait versus Situation Debate

A Minimalist View

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It has been my pleasure to participate in the conference and contribute to the book honoring the good works of my friend Walter Mischel. My invited participation arose largely from my long-term friendship with Walter, as my specialty is in cognitive psychology and decidedly not in personality psychology. Therefore, I must defer to the experts in this volume who have reviewed Walter's many contributions to personality psychology and personality assessment. I will try to honor Walter's work in a small way by recapitulating for myself the logic of his theoretical position on personality. Readers may view this exercise as a tutorial Walter has given me.

MY TRAINING BACKGROUND

I should tell readers a bit about myself, so they will know where I am coming from. I was trained in learning theory at Yale University, working primarily with Neal Miller and Frank Logan, who were eminent defenders of the behaviorist tradition of Clark Hull. I learned at Miller's side the canons of liberalized stimulus-response (S-R) reinforcement theory as illustrated in two famous books he coauthored with John Dollard, Social Learning and Imitation (1941) and Personality and Psychotherapy (1950). The latter book, which my class practically memorized in Miller's seminar (and I have kept my tattered copy as proof),
was extremely important and influential in the 1950s. It attempted to show how a liberalized version of S-R reinforcement theory could be used to interpret many aspects of personality. In particular, it aimed to understand personality and psychoneuroses by interpreting in S-R terms many of the important concepts of Freudian psychoanalysis: unconscious contents and processes, motivational conflicts, symptom formation of "defenses" (e.g., repression, projection) that reduced anxiety, and the therapeutic value of "uncovering" unconscious conflicts in order to teach patients more adaptive, discriminating ways to interpret or resolve their conflicts. Like most graduate students, I thought my mentors' theories were eminently reasonable and powerful.

MY EARLY STANFORD YEARS

With this training in learning theory, I was ready to accept the social learning theory of my colleague, Albert Bandura (1969, 1977), when I arrived at Stanford in 1959. I had merely to widen my worldview to a few more liberalizing ideas about vicarious (imitative) learning and self-control. I was also influenced at this time by the work in behavior modification and behavior therapy done by Joseph Wolpe (1958) and the researchers collaborating with Hans Eysenck (Eysenck & Rachman, 1965). In fact, I spent part of my sabbatical leave year (1965-1966) in London becoming familiar with the works of the central figures of the British behavior therapy movement, most situated around Eysenck at the Maudsley Hospital.

I was in a highly prepared, receptive stage when Walter Mischel arrived at Stanford in the mid 1960s. Walter was just publishing Personality and Assessment (1968). I read it, as I recall, in one or two sittings because I found it so congruent with my skeptical views of personality tests. I agreed with his critiques of traditional trait theories of personality and personality tests and applauded his learning-oriented views of personality. Walter’s move to Stanford coincided with his intellectual partnership with Al Bandura in supporting, extending, and publicizing the social learning theory orientation. Indeed, social learning theory was beginning to sweep the field of clinical psychology in the 1960s and 1970s. Inevitably, Walter was drawn into a long-running debate with traditional trait theorists (who were promoting personality tests) about the proper way to describe personality (e.g., Allport, 1937, 1961; Cattell, 1965; Exner, 1993; Norman, 1963). A central issue in that debate was whether the more important determiner of people’s behavior was their enduring dispositions (“traits”) or their current situation.

THE DISPOSITIONAL VERSUS SITUATIONAL DEBATE

I had not really thought about the dispositional versus situational debate until I started preparing my paper for this conference. I had simply assumed that my friends, Walter, Al, Lee Ross (1977), and Philip Zimbardo (Zimbardo & Ebbeson, 1970), were right, that the situation usually trumps or overpowers people’s dispositions in determining their behavior. After all, that is a corollary of “the fundamental attribution error” (Ross, 1977). People learn in what situations to exhibit more or less friendliness, open-mindedness, aggressiveness, or extroversion. They vary their behaviors in a manner attuned to the histories of their reinforcement contingencies that vary across social situations. For example, most of us know that Walter would be more extroverted at an artist’s party than at a funeral. This variability of behavioral expressions is so obvious that the trait versus situation debate could not be about variability of a person’s behaviors across situations. I knew I was missing something.

IF NOT VARIABILITY OF BEHAVIOR, THEN WHAT IS IT?

In thinking about a psychological issue, I try to reduce the big issue to simple examples to clarify them. Using some examples of this type, I will reconstruct the logical steps by which I learned what the debate was all about. I also find that a useful strategy to understand an argument is to play devil’s advocate and imagine what one might say to defend the position opposed to your own. In this case, given my bias toward the situational viewpoint, I tried to think of how I might defend a dispositional trait theory of behavior. I would begin by conceding that of course people respond discriminatively to different situations; cultural customs and norms practically guarantee it. So, variability of a given type of trait-related behavior (e.g., aggressiveness) across situations for an individual cannot possibly be what the debate is about. Such variability should not upset a trait theorist at all.

THE CRITICAL POINT: CONSISTENT RANK ORDERING OF INDIVIDUALS

Rather, the critical point for the trait theorist is that the rank ordering of two or more individuals in the frequency of a given type of behavior
should remain fairly constant across situations that presumably tap into the same trait. Figure 2.1 shows the kind of evidence that would make a trait theorist happy: Walter is more extroverted than I across several different situations. Thus, traits are all about consistency of rankings of individuals on a given type of behavior across situations. This conclusion seems sort of plausible and not obviously wrong.

CHALLENGING TRAIT THEORY WITH SITUATION-BEHAVIOR INTERACTIONS

To challenge trait theory, one need only observe pairs of people and situations in which person A outranks person B on the frequency of some trait-related behavior X in situation 1, but person B outranks person A in situation 2. An interaction of this type is displayed in Figure 2.2. In other words, a situation–person interaction on trait-related behavior X would disconfirm the hypothesis that person A has (and will exhibit) more of trait X than person B in all situations—and that counterexample would weaken trait theory in general.

One has only to think for a minute to recognize that we all know many such situation–person interactions. Figure 2.2 shows a typical example. Perhaps that is the end of the matter: Frequently observed person–situation interactions obviously trump trait theories.

FIGURE 2.1. Trait consistency: Walter is more extroverted than I am at both an artist’s party and a funeral. Traits imply consistent ranking of individuals across situations.

FIGURE 2.2. Situation–behavior interaction: Walter is more extroverted than I am at an artist’s party, but I am more extroverted than he is at a party of baseball fans.

A REFORMULATION OF TRAIT THEORY

But is it the end of the matter? Let’s abide with my trait theorist for another epicycle. He could argue that the situationalists erred in describing the social situations for the two individuals; they have stupidly taken the direct, nominal characterization of the two situations as both being just social parties. A trait theorist might propose that what is more important is the individual’s subjective interpretations of the situations and argue that a more discerning way to characterize the situation is to notice whether it matches the individual’s interests and knowledge or not. In this case the proper prediction of the trait theory is that Walter and I will both be more extroverted in situations that match our respective interests and knowledge (see Figure 2.3). But people’s interests, motivations, and knowledge clearly differ according to their experiences. In this light, these situation–behavior interactions (as in Figure 2.2) might arise simply as an artifact of people differing in their interpretations of social situations.

PERHAPS TRAITS INFLUENCE PERCEPTION OF SOCIAL SITUATIONS

This position is not unreasonable; psychologists recognize many cases in which individuals differ greatly in how they perceive and interpret social situations. For example, psychologists routinely claim that patients with
anxiety disorders perceive social situations as more threatening than do nonanxious folks and that depressed or paranoid individuals interpret ambiguous feedback as more negative than do nondepressed or nonparanoid people. It is plausible that Walter would be more extroverted in situations he perceives as calling forth his extroverted behaviors, whereas I would be more extroverted in those situations I perceive as calling forth my extroverted behaviors. Moreover, after equating Walter and me on our having similar interpretations of several situations, the trait theorist might further discover that Walter is indeed usually more extroverted than I am (as in Figure 2.3). In this manner, consistency of rank ordering of our extroverted behaviors across settings is restored for the trait theorist, albeit it is now mediated by how the two individuals (Walter and I) interpret the respective social situations.

This maneuver has rescued trait theory from the jaws of defeat.

HOW GOOD IS THE RESCUE?

But how valuable is the rescue? What kind of trait theory remains after the rescue?

It seems that this maneuver has rendered trait theory almost vacuous and impotent because the trait theorist can almost always appeal to individual differences in people's interpretations of social situations to explain away embarrassing situation–behavior interactions. If we ask how we can assess an individual's interpretation of a given nominal situation, the trait theorist can always say, "Well, let's first see how our subject behaves in that situation (his level of friendliness, aggressiveness, etc.) and that will tell us how he has interpreted the situation relevant to that trait-related behavior." Rather than inferring the strength of a person's trait from a behavioral frequency, the theorist is inferring the individual's perception of the situation as well as the strength of his trait to "explain" his behavior.

It takes only a moment's reflection to see the scam hidden in this card trick: the trait theorist now has two unconstrained intervening variables (the trait and the social perception) to explain one bit of behavior (in this social situation), and neither is measured independently of the behavior to be explained. This is the kind of circular theory that explains everything and nothing.

TESTING THE RESTRICTED TRAIT THEORY

Perhaps the nearest thing we can arrange to test this restricted trait theory would begin by finding some way to measure or estimate and then equate individuals' interpretations of several different situations. If we could do those measurements before observing the behaviors to be explained, then we would have a small chance of testing the restricted trait theory. In particular, if we could establish that two individuals interpret two situations approximately the same way, and if we then observe significant situation–behavior interactions, then such results would constitute a major blow to the restricted trait theory. The critical data would look like those shown in Figure 2.4. Such results, if observed in sufficient quantity, would seem to deliver the coup de grace to the restricted trait theory, but how can we find these test cases?

THE SHODA, MISCHEL, AND WRIGHT STUDIES

It was with these thoughts in mind that I returned to Mischel and Shoda's (1995) Psychological Review article, which I had skimmed through years ago. That article described their studies, begun with Jack Wright, of the behavior of delinquent boys in a summer residential camp (Shoda, Mischel, & Wright, 1994; Wright & Mischel, 1987). I was surprised and amazed. In designing and reporting these boys' camp studies, Mischel, Shoda, and Wright had anticipated and answered practically all the objections of my beleaguered trait theorist. I will list four critical parts of their design and analysis that responded to the hedges proffered by the hypothetical trait theorist.
First, and most critical, the investigators interviewed a large sample of young boys in the residential camp to obtain many descriptions of prototypical camp situations and their perceptions of and typical reactions to them. The investigators then carried out a cluster analysis on the content of the protocols to identify what, in the children's perceptions, were the critical features of the camp's social situations and the boys' interactions. These critical features proved to be whether the boys were interacting with an adult counselor or child peer and whether the interaction was positive or negative. There was almost universal agreement on which interaction situations were positive (e.g., getting an extra dessert) and which negative (e.g., being scolded by an adult counselor).

Having obtained the boys' perceptual ratings of a variety of camp interaction situations, the investigators then drew up a list of five social interactions that exemplified combinations of the features, namely, positive or negative interactions with a peer or an adult counselor. The five social situations in which behaviors were recorded are listed along the horizontal axis in Figure 2.5. Three classes of negative interaction situations (being teased by a peer, warned off by a threatening adult, and punished by an adult) and two classes of positive interaction situations (receiving a friendly overture from a peer and praise from an adult) were distinguished. These interaction situations were described in operational terms so that observers could reliably identify them and objectively code the behaviors of a child in social interactions of each type. Whenever any of these interaction situations occurred while the observer was watching a given child, the observer would classify and record the child's behaviors in one of five categories—as showing verbal aggression, physical aggression, whining, compliance/giving in, or talking prosocially.

A methodological refinement of their data analysis is shown in Figure 2.5. These graphs of verbal aggression (or other behaviors) plot the standardized z-score for each boy for each situation relative to the whole sample of boys. A boy's z-score is like his rank order in the group for that behavior in that situation. Z-scores remove the variability caused by some situations provoking more aggression than others for all the boys.

The behavior profiles for any children for each of the five behaviors mentioned above can thus be compared. For n children observed, there will be 5 × n(n − 1)/2 (e.g., 225 if n = 10) possible comparisons of behavior profiles. Figure 2.5 shows one such comparison for verbal aggression displayed by child #9, on the left, and child #28, on the right. In a plot of this type, any person–situation interactions can be seen directly. We can see that child #9 is less verbally aggressive than child #28 when a peer initiates a friendly overture, whereas child #9 is more verbally aggressive than child #28 when an adult warns or punishes him. Frequent interactions like this in the data (e.g., Shoda et al., 1994) constitute a major embarrassment of trait theory.

Child #9 profile stability: r = 0.89
Child #28 profile stability: r = 0.49
The individual zigzag plots (solid lines) in Figure 2.5 might reflect unreliable sampling variability and measurement error, so the investigators observed and rated the verbal aggressiveness of the boys during two time periods several weeks apart. The dashed lines in Figure 2.5 show the verbal aggression profile observed during this second period. The positive correlation between the two profile samples indicates that the profile is stable and does not reflect random errors of measurement. We can see that child #9 is more stable in his behavior profile (stability coefficient of .89) than is child #28 (stability coefficient of .49).

The importance of this investigation is that a thorough attempt was made first to assess the children's perception and interpretation of a variety of prototypical interaction situations in the camp. Following such assessment, the observation and recording of the situational profiles of five behaviors (verbal and physical aggression, prosocial talking, etc.) yielded a high percentage of person-situation interactions like those shown in Figure 2.5. The data seem to disconfirm the refined trait theory.

I had to think through these simple exercises regarding the fallback hedges of the trait theorist before I could fully appreciate how well designed those residential camp studies were. Their design and analyses fully responded to and undermined the excuses and counterarguments that trait theorists could provide for these data. It is rare that we can look back at an older study—this series actually began in 1988—and see it with new eyes, gathering a deeper appreciation for the ingenuity that went into it. That is the small epiphany, the sudden appreciation of beautiful minds at work, that I experienced in rereading Mischel and Shoda's article. I recognized for the first time that the answers to my concerns were right there in these writings, some nearly 20 years old (e.g., Wright & Mischel, 1987). For me, the experience was reminiscent of these lines from a well-known poem (“Little Gidding” in Four Quarters) by T. S. Eliot:

We shall not cease from exploration,
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.

CAN TRAIT THEORY BE RESURRECTED?

How might a sufficiently motivated trait theorist respond when confronted with person-situation interactions like those shown in Figure 2.5? A fallback position would be to question the abstractions that go into the investigators' composition of the situation categories (e.g., approach by a peer, warning by a threatening adult) and the abstractions used to categorize different behaviors (e.g., verbal aggression, prosocial talking). Such abstract categories aggregate what might be significantly different sub-classes of situations and/or behaviors. Each child may be approached by many different peers in the camp and receive warnings from many different adult counselors. Some peers may be big bullies; others may be small and meek. Some may be friends, while others are long-term enemies. Some warning counselors may be harsh and well known to follow up their threats of punishment; others may be known to be lenient, basically friendly, and unlikely to follow up on punishment.

It takes only a little thought to see how such distinctions rescue trait theory. Consider the two situations of peer approach and adult warning for child #9 and child #28, which produce a large interaction in Figure 2.5. We can imagine that child #28 is a discriminating bully, aggressive with the smaller boys in his cabin with whom he primarily interacts (and is most frequently observed), but he slyly pretends to be passive and obsequious in interactions with his formidable camp counselor, who is a punitive disciplinarian. On the other hand, suppose child #9 is a puny runt who has often been beaten up when he has verbally aggressed against his larger peers, so he is passive and withdrawn with them; on the other hand, his most frequent encounters with a counselor is with the known “softie” of the group, one to whom the boys can be verbally aggressive. Moreover, suppose that this counselor and child #9 both understand that the boy's father is the employer of the counselor's mother outside the camp, so the power roles of the child and adult are reversed.

This set of imagined circumstances would produce the interaction shown in Figure 2.5: Child #28 would be verbally aggressive when a peer approaches but not when his big, stern counselor warns him off; child #9 would not be verbally aggressive when approached by his larger peers but would be when his counselor tries ineffectually to warn him away from some unruly behavior. Similar moderating circumstances might be conjectured to explain other situation-behavior interactions shown by other subjects and responses.

WHAT IS THIS SALVAGING MANEUVER?

The maneuver that perhaps saves the skin of the trait theorist is to recognize the adaptive and discriminative nature of each person's behaviors across situations. The same abstract situation can vary enormously according to the people and issues involved. The abstract category of "a
conversation between persons A and B” may have different dynamics depending on the topic; person A may be verbally domineering when they are discussing company finances, but roles reverse when they are discussing vendors. Similarly, different instances of an “abstract response class” (e.g., verbal aggression) can vary contextually according to the actors: A profane slur against one’s mother is considered humorous “bonding jive” among streetwise adolescents, but the same remark would get you fired if directed to a boss on the job.

SO, TRAIT THEORY DISAPPEARS INTO THE FOG OF IDIOSYNCRATIC HISTORIES

The simple fact of adaptive, discriminative, contextually appropriate behaviors would seem strongly to imply nominal person–situation interactions, but in the trait theorists’ hedging we have for all practical purposes lost what little substance remains for the trait construct. After all, what is a personality trait? Gordon Allport (1937) defined a trait as “an enduring characteristic . . . distinctive to each person, that serves to unify many different stimuli by leading the person to generate consistent responses to them” (quoted in Mischel, Shoda, & Smith, 2004, p. 453). The quicksand under this construct is the contextually varying definitions of “stimuli” and “responses”; nominal descriptions just will not capture regularities in behavior. If followed to its end, this line of argument leads to a radical “idiographic characterization” of each person. For a personality theorist, that outcome is an admission that there are no predictive or explanatory generalizations that hold across people. Presumably, we would like to avoid that conclusion.

Surely, there is something bizarre about this conclusion of “nonpredictability,” as it so grossly violates common experience. Everyone relies upon his or her commonsense understanding of the personalities of friends and uses it to predict their reactions with some success. Similarly, people rely upon each other to follow societal norms in their behavior (e.g., in the United States, we drive on the right side of the road). So, what creates the layperson’s impression of the predictability of his or her friends?

Is belief in consistency an illusion? Walter has written extensively about how the apparent consistency (and predictability) in the behavior of our acquaintances could arise from biases in our samples of their behavior and from distortions in our inferences and judgments about them (Mischel, 1969, 1984). Nonetheless, underlying the inflated impressions of consistency is the collection of situation–behavior profiles of our acquaintances that we hold in memory. These “common-ground” profiles doubtless foster our belief that individuals are consistent within themselves. What is the nature of these profiles?

IF . . . THEN . . . CONDITIONAL RULES

Michael and Shoda (1995) argue that what we all have is an incomplete but nonetheless serviceable collection of “if condition, then action” conditional rules describing for us the behaviors of ourselves and acquaintances. Therefore, in place of trait descriptions, Mischel and colleagues want to substitute a collection of “if condition, then action” conditional rules for each target person. These rules are situation–action pairs of the form “If situation S occurs, then predict behavior B.” Such rules can be used for summarizing and forecasting one’s own behavior—for example, “If I’m in situation S, then I will (or am likely to) carry out behavior B”—and they can be used to predict others’ behavior, as in “If person P is in situation S, then P will (or is likely to) carry out behavior B.” The behavioral profiles seen in Figure 2.5 are a small sample of such collections.

Although if . . . then . . . rules are similar to the traditional S-R associations, they really most resemble what cognitive scientists call “production rules” (or just “productions”). Starting with the seminal work on problem-solving programs by Newell and Simon (1972), production systems have become routine tools for use in computer programs that simulate cognitive processes. Such programs can simulate not only behaviors reflecting reasoning, problem solving, and decision making (see, e.g., Anderson, 1993; Anderson & Lebiere, 1998; Lovett & Anderson, 2005), but also emotional reactions (Bower & Cohen, 1982; Sloman, 1987), attitude consistency (Abelson, 1973; Carbonell, 1980), and personality dynamics (Colby, 1963, 1982; Dyer, 1987).

Productions are like steps in a computer program that move it forward in a manner resembling the sequential flow of thought, but they differ in several important respects from traditional S-R associations. Firstly, the condition and the action sides of a production can be reasonably abstract instead of the concrete specificity typically assumed by S-R associations. The rules are not just concrete ones like “If John Budue calls me a slacker, then I punch him.” They can also be of the form “If anyone insults me, then I do something to harm that anyone.” Note the abstractions on both sides of the rule. It leaves for determination (by other productions) the classification of what constitutes an insult and leaves me to search for some action in my repertoire that will harm the target person. The use of “anyone” in the rule exemplifies an “abstract variable.” It specifies whoever should fill that role; moreover, the “any-
one" in the condition side is bound to the same "anyone" on the action side of the rule.

A second, powerful aspect of productions is that the condition side of the rule may consist of any logical (Boolean) combination of situational features, such as "If features 1 and 2 are present in the situation but not feature 3, then do such and such." Similarly, the action side of the rule may consist of a chain of behaviors, such as "If I hear my cell phone ring, then I locate the phone, open it, press the Listen button, and say "hello."

Third, the condition side and the action side of the rule need not respectively be external stimuli and overt responses. The condition can be internal feeling states (e.g., "If I'm feeling depressed") or memories (e.g., "If I just remembered my promise to call Mother"). Similarly, the action can be to fetch something from memory, to turn on an emotion, to take the next step in a chain of covert reasoning, or to transform the contents of short-term working memory to achieve some goal. Especially important conditions are the person's momentary low-level goals, such as "If I want to go to the airport, then hire a taxi."

The relevance of if...then... productions for capturing behavioral regularities and personality dynamics has been frequently noted (e.g., Bower & Cohen, 1982; Colby, 1963; Dyer, 1987). For example, in a speech at a convention of the Association for Advancement of Behavior Therapy (Bower, 1978), I proposed production systems as a way to characterize the automatic, unconscious inferences that all of us make about social situations and the people we meet. Relevant to cognitive-behavioral theorists would be the dysfunctional inferences and irrational thinking of some neurotic patients. Such automatic, irrational inferences that underlie and drive neurotic cognitions were called "thought schemas" by Aaron Beck (1964, 1976) and "irrational beliefs" by Albert Ellis (1958; Ellis & Harper, 1961). Several examples (Bower, 1978, Fig. 3, p. 127) were rules of the form "If person P disagrees with me, then P dislikes me" and "If anyone dislikes me, then I feel sad"; or "If I fail at task T, then I believe I fail at everything" and "If I fail at everything, then my life is hopeless"; or "If person P compliments me, then that means that person P pities me" and "If anyone pities me, then I am unlovable" and "If I am unlovable, then I feel sad and I don't deserve to live." It is obvious how habitual activation of unconscious rules such as these "could move the stream of thought along automatically to its inescapable, morbid conclusion" (Bower, 1978, p. 127).

This use of production rules to describe automatic inferences and thoughts was apparently not foremost in the thinking of Mischel and Shoda (1995). Rather, they were mainly interested in if...then... rules that referred to situations as interpreted by a person and overt behavior-related actions taken in that situation. Such rules provide a fairly good description of interpersonal behaviors. Insofar as the situations and behaviors are characterized at the right level of abstraction and granularity, they are useful for making predictions of others' behaviors, allowing us to adjust our behavior toward them in light of our predictions. From a scientific perspective, it would be more satisfying to have a somewhat deeper understanding of the factors that generate the if...then... regularities for a given individual. It was that goal that motivated Mischel and Shoda (1995) to develop their Cognitive-Affective Processing System (CAPS) theory of personality. We turn to a discussion of it now.

THE CAPS THEORY

The CAPS theory was proposed for understanding the intrapersonal and interpersonal dynamics underlying the collection of if...then... regularities exhibited by a given individual. In so doing, CAPS could also explain how and why individuals may differ radically in their behavioral profiles. The authors propose a very complex system of interacting parts composed of cognitive-affective (CA) units that mediate between the nominal interpersonal situation and the person's response (see Mischel & Shoda, 1995, Table 1, p. 253). Some proposed CA mediating units encode and interpret the personal and social situation in terms of the person's categories for the self, other people, and events; some of these categories will be chronically more accessible than others, thus biasing the person's social perceptions. Other CA units represent the person's expectancies and beliefs about the world and about outcomes for behaviors in different situations (self-efficacy). Still other CA units represent affects (feelings, emotions), values, and goals that motivate the person's plans and life projects and the person's repertoire of behavioral competencies that can be performed as well as strategies the person uses to control and regulate his or her behavior.

The architecture of the overall system is shown in Figure 2.6. Situations are characterized by a collection of features, some of which are "turned on" by a given situation. When stimulated, these input features send "activation" into the CA mediating units to which they are connected. The amount of activation reaching a given CA mediating unit from an activated input feature is determined by the "weight" (importance) of that input feature's connection to that mediating unit. The aroused CA units pass this recent wave of activation around among themselves, eventually settling into some internal state that will cause a response to be emitted. That response may in turn change the external...
situation, thus initiating the next cycle of responding. Each person has his or her own collection of cognitive–affective units and own set of connection weights, reflecting how his or her learning experiences have brought about particular CA units and their connection (importance) weightings.

To illustrate the operation of this system, Mischel and Shoda (1995) constructed a small computer simulation of CAPS for a single individual (see their Appendix, p. 267). The simulation is simple and concrete, affording better understanding of how the CAPS operates. Their illustration used six situational features, some two of which were turned on, thus allowing for 15 different situations (i.e., $6 \times 5/2$). Each feature was connected to the same four mediating units but with different connection weights. No connections were assumed to exist between the mediating units. The “response” of the system (say, the simulated subject’s degree of “friendly behaviors”) was generated from the weighted sum of the activation of the four CA mediating units. Different responses (friendliness, aggressiveness) would be characterized by different weights to the output units. As noted above, the differences between people would be represented in different connection weights to the mediating units and to the response units.

The authors ran the simulation model for a given individual twice through the 15 situations; for the second run, the connection weights were each perturbed a small random amount to reflect moment-by-moment variability of effective factors. The model produced variable situation–behavior profiles like those shown for three simulated individuals in the panels of Figure 2.7. The solid curve in each panel illustrates how this person’s friendliness varies across the 15 situations; the dashed curve depicts the model’s second run through these situations and illustrates the day-to-day variability in the individual’s profile.

Examining these profiles, several patterns of interest stand out. First, the three individuals’ behavior frequencies vary greatly across situations. Second, the individuals’ profiles differ appreciably from one another, showing many person–situation interactions. Both of these effects were created, of course, by the different connection weights assigned to the three individuals by the authors. Third, these three indi-
Individuals are fairly stable from one to another time sample (simulation run). This stability depends, of course, on the size of the random “error” terms the theorist added to the weights from one run to the next. Fourth, averaging across situations, we can see that person 1 is usually above average in friendliness, person 2 is near the average of the population (i.e., z-score near zero), and person 3 is below average in friendliness.

These simulation results help us appreciate how the simulation model captures many behavioral facts that are central to the person versus situation controversy—that is, the model shows how individuals can vary their behavioral profiles across situations but in a pattern that is more or less stable. Moreover, the average of their behavior frequencies across situations can be considered as a composite index reflecting the individual differences that trait theorists emphasize.

A HOLE IN THE CAPS

How good is CAPS for predicting and explaining behavior? If the simulation model is to be taken seriously, then we must conclude that the model is egregiously underconstrained when we consider data from only a single response class. There are far too many unknown parameters (the weights) given the amount of data to be explained. For example, to produce one of the profile panels in Figure 2.7, containing its 15 behavior frequencies, the theorist needs to assign weights to the 24 connections for that subject, from the six stimulus features to the four mediating CA units. Then for each subject four more weights must be assigned to the connections from each mediating unit to each response-output unit. Thus, at a minimum, there are 28 arbitrary constants for fitting each subject’s 15 data points. (I am ignoring the issue of transforming “response-output activation” into behavioral frequencies.) A stringent test of a model cannot be done unless there are at least more independent data points than unknown parameters of the model to be estimated.

The situation in this simulation could be rectified by including more data from other responses the model might be predicting. For each of $R$ response classes, we would observe 15 response frequencies (for the 15 situations), comprising $15R$ data points in all; this number is to be compared to the number of unknown constants, which is $24 + 4R$, that is, four output weights for each of the $R$ response classes. So the number of data points, $15R$, exceeds the number of parameters, $24 + 4R$, whenever the number of categories of responses, $R$, is more than 2.

TRAINING THE WEIGHTS

For toy-simulation purposes, the underconstraint problem can be relieved a little by training the model to learn weights that will produce adaptive responses to the 15 situations. The CAPS architecture in this illustration can be reconfigured into a simple connectionist (PDP) feedforward network model with one “hidden layer,” such as shown in Figure 2.8 (see Rumelhart, McClelland, & the PDP Research Group, 1986).

The six input features are shown at the bottom of the net, each connected with a certain weight to the four hidden CA units, which in turn have weighted connections to the output units (only two are shown here, for friendliness and verbal aggression). The advantage of representing the CAPS architecture in this format is that there are well-known training methods for feedforward networks.

The training would proceed as follows: presented with a situation (i.e., “turn on” or activate some features of the input layer), the response made by the network is calculated at the output layer and then compared to the response the trainers want the learner to have for that situa-

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**FIGURE 2.8.** The CAPS theory reconfigured as a feedforward connectionist network. Activation flows from the bottom situational features up through the “hidden” CA units, and then into the behavioral output units, yielding either a friendly or aggressive response. Each connection has a weight or association strength attached to it. (Only a few are shown.)
tion. (The trainers could be the physical and social environments, parents and teachers, or the learner him- or herself.) Comparing the actual response to the trainers’ desired response on a given trial, the weights on all the connections are then adjusted a small amount so as to bring the network’s response closer to the desired response. The "back-propagation" learning algorithm (Rumelhart, Hinton, & Williams, 1986) adjusts these weights trial-by-trial in a manner that minimizes the expected errors of the network across the full range of situation–behavior pairings. By repeatedly cycling through the many stimulus patterns, reinforcing the trainer’s desired response to each, the network eventually adjusts (or learns) those weights that will produce a close approximation to the desired response for each. In this way, the hidden mediating units can be trained to reflect a person’s reinforcement history, and the CAPS theorist avoids the arbitrariness of assigning the connection weights for each simulated subject. This method does require, however, that a trainer know the desired response profiles.

WILL THIS MODEL SCALE UP TO MORE COMPLEX SITUATIONS?

Of course, even with the connection weights learned in this manner, this is still a toy simulation in a toy social world, well short of the reality in which we would like the theory to operate. Real situations differ in far more than six features; there will be far more than four CA units; and these units will probably interact among themselves in determining the output. We can imagine how much worse the underconstraint problem would become with these more realistic circumstances, having many more situations with many more features and many more CA units that interact with one another. How will the model scale up to situations of greater complexity?

I think Mischel and Shoda's response to this situation is well illustrated by the path they have followed in their several writings on the CAPS model. They use the model as an "in-principle" theoretical framework, showing how many different social behavior patterns can be generated from simple assumptions but without moving to the level of quantitative predictions. In applications of the theory to individual cases, they first gather many useful facts about an individual that they use to assess his or her expectancies, self-concepts, self-efficacy, habitual interpersonal strategies, values, goals, and motivations. The constructs of the theory guide the kind of data collected. They then use the theory as a framework for generating plausible explanations of an individual's behavior (see, e.g., the example of Gary in Mischel et al., 2004, pp. 284-287). The theory enables them to construct plausible causal stories that help us understand why the individual behaved as he or she did in a given situation (e.g., Ayduk et al., 2000; Ayduk, Mischel, & Downey, 2002).

I view this level of understanding as an important advance, albeit short of the quantitative predictions so dear to the hearts of experimental psychologists. There are still many questions to be asked about the CAPS theory, and a lot of research work lies ahead to fashion it into a more satisfactory explanatory tool. One question, for example, arises when we notice that the CAPS theory is silent on the issue of which processes are available to consciousness; it makes no commitment about which CA units are conscious and which unconscious, or how unconscious CA units become conscious by virtue of exceeding some threshold of activation. Since much of modern social-cognitive research is aimed at uncovering automatic and unconscious factors influencing judgment, motivation, mood, memory, and social behavior (e.g., Banaji, 2001; Bargh & Chartrand, 1999; Fazio & Olson, 2003), the CAPS theory should probably begin addressing this issue in the coming years.

CAPS IS A FITTING CAPSTONE TO WALTER’S CAREER

I believe that with his proposal of the CAPS theory, Walter has created a fitting CAPstone to his illustrious and productive career, a career that has years yet to run its course. CAPS is truly a social learning theory insofar as each individual acquires most of his or her CA units by virtue of an idiosyncratic and discriminative learning history. The idiosyncrasies of individual histories allow for the almost infinite variation we see in human personalities; CAPS uses principles that capture many of the stable regularities in a given individual's behavior. The theory provides a guiding light for researchers to follow in fleshing out the details of the relevant factors and their interactions. In that path to progress, filled with many eager researchers on personality, we can be sure that Walter and his collaborators will be pointing the way.

I will end with a few laudatory comments. For one who inveighs against behavioral consistency, Walter himself is amazingly consistent in his virtues. He has been a witty, generous, and constant friend of mine for 40 years. He writes with grace and elegance and makes a sincere effort to respond respectfully to his critics. He has been a master mentor to some of the leading investigators in the field of personality, including many who contributed to this volume. Moreover, he continues to generate original and creative ways of looking at personality, and, despite his
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many contributions, he continues as one of the leading innovators in the field of personality.

Perhaps that is why in a recent scientific survey focused on significant contributors (Hagggbloom et al., 2002) Walter was recognized as one of the 100 most important psychologists of the 20th century. For all his many contributions, it is altogether proper and fitting that we honor him with our contributions to this volume.

REFERENCES


Thomas Mann’s gracefully phrased comment “For every great truth there is an equally great opposite truth” is an appropriate way to describe Walter Mischel’s contribution to the social sciences. While most psychologists were confining their attention to the foreground, he appreciated that the meaning and consequences of the foreground event always depended on its background (Mischel, 1973). The problem with most terms for personality traits is a failure to specify the context in which a presumed characteristic is actualized. Walter Mischel is part of a grand tradition in biology. The significance of the ecological context is the central idea in Darwin’s magnificent thesis. Hans Krebs, who discovered the citric acid cycle, told a journalist inquiring why he, rather than a more eminent European chemist, made this important discovery was that the chemist imagined the critical reaction occurring in a test tube, whereas Krebs imagined it occurring in a living person.

An individual is a worker and consumer in the context of the economy, a transmitter of genes in the context of evolutionary biology, and an agent with intentions in the context of psychology. When a professional football game is viewed on television, the players and their talents have psychological prominence. When the same contest is viewed from a seat high in the stadium, with attractive, gyrating cheerleaders, perceptually compelling advertisements, varied foods for purchase, and frequent, blaring announcements demanding attention, the players’ physical size and psychological significance are reduced by so many orders of magnitude that they become merely one element in an extravagantly complex event serving commercial interests.