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PERSONALITY: SOCIAL LEARNING, SOCIAL COGNITION, OR SOCIOBIOLOGY?

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Much of the controversy in the field of personality during the last 15 years has been fueled by the popularity of the social learning and social cognition perspectives. These perspectives have been most popular with the social and clinical psychologists who, as Sechrest (1976) points out, have occupied large sections of the personality domain. Social learning approaches that were very popular in the late 60's (e.g., Bandura, 1969; Krasner & Ullman, 1973; Mischel, 1968) tended to focus on external determinants of behavior to the near or total exclusion of the internal factors studied by traditional personologists (Bowers, 1973; Hogan, DeSoto, & Solano, 1977). More recently, social learning theorists have tended to focus more on internal cognitions (cf. Mischel, 1973, 1979), a development which has co-evolved with the popularity of the "social cognition" school in social psychology. Although several researchers have focused upon cognitive "traits" (e.g., Markus, 1977; Mischel, 1973), much of the research and theory stemming from the cognitive approach has been incompatible with traditional approaches to personality. Kenrick and Dantchik (1983) have discussed these issues in more detail, but for now it is sufficient to note that writers in the social cognition tradition have frequently regarded dispositions as erro-

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neous constructions of the perceiver that are maintained by various errors of information processing (e.g., Jones & Nisbett, 1972; Ross, 1977).

Obviously, it is possible to maintain simultaneous beliefs in the existence of dispositions, the importance of learning processes, and the significance of information processing for human behavior. We believe it is possible to accept that the social learning and social cognition approaches each provide important and necessary constructs for the study of personality, without necessarily redefining the field as the study of situational contingencies or transient cognitive states. The idea of integrating learning and cognitive approaches with the traditional concerns of personality is certainly not a new one. We will argue, however, that the most fruitful general theory of personality will come from the integration of these psychological approaches with the recent developments in social biology.

While personality and social psychologists have been debating about the extent to which human traits exist, social biologists have begun to speculate about their evolutionary significance (cf. Lumsden & Wilson, 1981; Wilson, 1975, 1978). Sociobiologists assume not only that traits exist, but argue that many human behavioral traits have an important genetic component. In an extremely controversial claim, Wilson (1975) posited that the field of psychology (as well as the other social sciences) would ultimately be engulfed by the emerging discipline of "sociobiology." He has since rescinded this claim, but continues to argue for an integration of social science and evolutionary biology (Lumsden & Wilson, 1981).

There has of course been a long standing biological tradition in personality, beginning with Freud, Jung, McDougall, and still clearly represented in the field recently (e.g., Buss & Plomin, 1975; Cattell, 1965; Eysenck, 1970; Kenrick, Dantchik, & MacFarlane, 1983). The earlier personality theorists, however, were perhaps more akin to the modern sociobiologists in their tendency to speculate about the evolution of human behavior through Darwinian selection processes.

Viewed in one way, the social learning and sociobiological approaches make strange bedfellows indeed. As Rychlak (1973) notes, learning based views of personality owe a large intellectual debt to the empiricist philosophy of John Locke. One of Locke's more familiar ideas is that a human is born a *tabula rasa*. In summarizing his discussion of a diverse group of learning theory approaches to personality, Pervin states that "A major shared assumption (of such theories) is that nearly all behavior is learned" (1975, p. 447). Such a view fits nicely with American political beliefs (i.e., that "all men are created equal"), and Baumgardner (1977) argues that the learning viewpoint supplanted McDougall's (1908) Darwinian model of social behavior largely for this reason. More recently, Wilson's claims of a large and crucial genetic component to human behavior met with a sometimes militant outcry by proponents of the view that human behavior is not influenced in any important way by genetic factors.

Actually, most of this outcry did not come from learning theorists. For several

years now, the *tabula rasa* notion has given ground to emerging evidence that learning occurs within biological constraints (Hinde & Hinde, 1973; Rozin & Kalat, 1971; Shettleworth, 1972). It appears that certain associations between stimuli and responses are learned more readily than others, and it has been argued that such "learning preparedness" would certainly have been selected for.

Is it necessary or even useful to consider biological factors, learning processes, and cognition in developing a theory of human personality? There are at least three possible answers to this question. Perhaps one or two of these levels of analysis will prove sufficient in explaining all or most of the variance in human behavior, and the other(s) will prove superfluous. Several writers have argued that biological factors account for so little variance in the behavior of humans that these factors can be safely ignored:

Human behavior is learned, precisely that behavior which is widely felt to characterize man as a rational being, or as a member of a particular nation or social class, is learned rather than innate (Dollard & Miller, 1950, p. 25).

Except for elementary reflexes, people are not equipped with inborn repertoires of behavior. They must learn them (Bandura, 1977, p. 16).

Others have argued that cognitive factors are inappropriately viewed as causes of behavior, and that we would do well to ignore them in our psychological theorizing. Skinner has frequently advocated such a position. For instance he contended in 1975:

The philosopher at his desk asking himself what he really knows, about himself or the world, will quite naturally begin with his experiences, his acts of will, and his memory, but the effort to understand the world from that vantage point, beginning with Plato's supposed discovery, has been one of the great diversions which have delayed an analysis of the role of the environment. . . . What I have said about the introspectively observed mind applies as well to the mind that is constructed from observations of the behavior of others (Skinner, 1975, pp. 44-66).

A second possible answer to the question posed above is that learning, cognition, and biology are each important, but that one can operate at any single level without necessarily considering the others. Each level of analysis explains some portion of the variance, and perhaps these interact only in an additive sense. This second alternative may be a plausible working assumption for the individual researcher, who can only focus on one part of the universe at any given time. However, the personality theorist, who has traditionally been concerned with the *whole* behaving organism (Hogan, 1982a; Rychlak, 1973), may not be able to afford the luxury of ignoring any major components of that whole. If the second alternative were true, the decision to exclude a consideration of biological factors, for example, would not be viable if one were developing a general theory of personality.

third possible answer is that biology, learning, and cognition interact in additive ways. If this were the case, a consideration of each of these levels is necessary for a complete theory of human personality. Although it is perhaps the nature to offer a final answer to this question, we think the evidence supports the third alternative rather than either of the first two. The purpose of this paper is to briefly review some of the relevant aspects of biological, learning, and cognitive approaches, with particular attention to areas of potential overlap and interaction. We will present a rudimentary framework for considering interactions between genes, overt behavior, cognition, and the environment, emphasizing what we judge to be the most important contributions from each perspective. It should be made clear at the start that we do not intend to review fully the literature on sociobiology, social learning, or social cognition. Rather we shall provide an overview of these approaches, with some attention to the constructs we believe to be useful components of a biosocial theory of personality.

BIOLOGICAL CONTRIBUTIONS TO PERSONALITY

Three levels of biological analysis will be considered here: sociobiology, behavior genetics, and physiological approaches (in the latter we include those approaches focussing on morphology, biochemistry, and neurophysiology). These three levels of analysis are not distinct, but can be seen to differ along a continuum from ultimate vs. proximate explanation.

The "ultimate-proximate" distinction is a recognition that causation can be considered on several levels. Proximate explanations are based on immediate determinants. For instance, to state: "an operant response that is followed by a taste of sweet-flavored water will increase in probability, while a response that is followed by a bitter flavored drink will decrease in probability" is an example of a proximate explanation. An example of an ultimate explanatory statement would be: "sweet tastes are rewarding because under natural conditions, they are usually associated with nutritious ripe fruit, and animals who were able to discriminate such relatively nutritious food sources survived more successfully than those that did not." Sociobiology attempts to uncover relatively "ultimate" causes of behavior in evolutionary adaptation. Behavior genetics focuses upon the immediate or "proximate" gene-behavior relationships, rather than specifying adaptive functions for the relationships. What we are calling physiological approaches provide the most proximate explanations of behavior, examining hormonal levels, body-type, and neuroanatomic differences between people.

Sociobiology

Sociobiology is an application of modern evolutionary theory to social behavior and attempts to relate social "traits" to the ecological "pressures" that existed during their evolution. Sociobiological theory maintains that behavioral traits

differ in their contributions to "inclusive fitness," a measure of the adaptiveness of a trait as it is manifested in an individual and all others genetically related to the individual. Adaptiveness reflects the tendency for a trait to facilitate an increase in the number of organisms carrying the gene or genes for that trait. Of course, sociobiologists must posit causal links between genes and social traits. For instance, Wilson (1978) maintains that incest avoidance and bond exclusion have evolved. Because close inbreeding radically increases the likelihood of genetic defects, those who inherited a tendency to avoid sexual attraction for family members would have ultimately experienced higher reproductive success than those who did not. Sociobiologists often make comparisons between human traits and similar characteristics in other species sharing a common ecological habitat. Along these lines, van den Berghe (1983) notes the existence of incest avoidance mechanisms in other social species, such as chimpanzees.

Kenrick, Dantchik, and MacFarlane (1983) use sociobiological principles in presenting an account of personality factors associated with criminal behavior. Kendrick et al. (1983) propose that "much of what would be labeled as criminal behavior today was essential to survival for our hominid ancestors" (p. 218). Among the once adaptive behaviors cited by these authors are outgroup aggression, ingroup conflicts associated with the establishment of dominance hierarchies, deceit, "cheating" behaviors, infanticide, and sex differences associated with aggression. Other human behavioral patterns for which sociobiological explanations have been advanced include territoriality and aggression (Ardrey, 1966), alcoholism and drug addiction (Dixon & Johnson, 1980), homosexuality (Wilson, 1978), child abuse (Lenington, 1981), and depression (Averill, 1968).

Hogan (1982b) proposes a socioanalytical theory of personality based on six personality factors that have emerged from trait research. Arguing in a sociobiological vein, he discusses the cross-cultural universality of these dimensions, and emphasizes their evolutionary significance for hominids living in social groups. According to Hogan, humans have been naturally selected for attention to dimensions such as adjustment, likeability, intellectance, and ascendance. Humans will also selectively mate with individuals who load high on these dimensions, to gain access to their resources. Because being intelligent, well adjusted, likeable, and dominant all help to determine status and popularity within any social group, high levels of these traits will increase inclusive fitness.

In a similar vein, Buss and Plomin (1975) offer a theory of personality in which the "temperaments" of activity, emotionality, sociability, and possibly impulsivity are seen as the innate bases of adult personality. The authors expound on the evolutionary adaptiveness of various levels of these dispositions for group-living hominids.

Behavior Genetics

Behavior geneticists attempt to identify those portions of the variance in human behavior that are genetically determined. Primarily with the use of twin, adoptee,

and pedigree studies, they seek to establish gene-trait relationships. Ultimate questions concerning the adaptiveness of traits are not necessarily crucial to the behavior geneticist.

Selective breeding experiments with animals have demonstrated that behavioral traits can be inherited. For instance, dogs can be bred quite successfully for specific temperaments (Scott & Fuller, 1974), and white rats can be selectively bred for certain sorts of intelligence (Tryon, 1940). The fact that behavioral traits have been shown to be heritable suggests the possibility that some relationship between genes and personality might be found in humans.

The trait of intelligence has been extensively researched by behavior geneticists. Since Galton's (1892) introduction of the twin study method, dozens of subsequent studies comparing concordance rates between monozygotic (MZ) and dizygotic (DZ) pairs have surfaced in the literature (most notably Loehlin & Nichols, 1976; Merriman, 1924; Newman, Freeman, & Hulzinger, 1937). The bulk of these studies, as reviewed by Bouchard and McGue (1981) and Plomin and DeFries (1980), support the conclusion that a large amount of the variance in human intelligence is genetically determined.

Researchers have used behavior genetic approaches to study the spectrum of personality dimensions. Eysenck (1967) has found that the factors of introversion-extroversion, neuroticism, and psychoticism all show significant heritability. Cattell (1957) has developed a statistical method to partition variance according to its source, genetic or environmental, for his empirically derived factors. Other researchers have found at least moderate degrees of heritability for extraversion and sociability (Claridge, Canter, & Hume, 1973), and interpersonal style (Claridge, 1967). Buss and Plomin (1975) present behavior genetic evidence for the heritability of activity, emotionality, sociability, and impulsivity, the four "temperaments" that emerge in their work. Loehlin and Nichols (1976) studied 850 twin pairs, reporting high degrees of heritability for such factors as confidence, shyness, responsibility, adjustment, career interest, dominance, social presence, self-control, independence, conformity, diplomacy, and flexibility, to name but a few. Fuller and Thompson (1978) review numerous pedigree and adoption studies that demonstrate significant heritability for most of the range of normal and abnormal personality dimensions.

There have been numerous studies of the heritability of psychopathological characteristics. Several studies have found MZ concordance rates for schizophrenia that range from .24 to .77 (Erlenmeyer-Kimling, 1976; Gottesman & Shields, 1976; Heston, 1966; Kallman, 1946; Kringlen, 1964; Slater, 1953). For manic-depression, Rosenthal (1970) reports morbidity risks among first-degree relatives to be more than ten times that of the general population, and MZ concordance rates of .71 compared to DZ concordance rates of .19. An adoption study by Mendlewicz and Rainer (1977) provides further evidence of the heritability of manic-depressive psychosis. Other studies have indicated some genetic basis for various forms of neurosis (Shields, 1954), and alcoholism

(Goodwin, 1976). Similarly, Kenrick et al. (1983) review behavior genetic evidence indicating a genetic component in criminal and antisocial behavior.

Physiological Approaches

Sociobiological explanations presume transmission of behaviorally relevant genes, and both sociobiological and behavior genetic approaches presume that those genes act through their influence on the development and functioning of physiological mechanisms. Physiological approaches to personality directly address the proximate level of analysis implicit in the other biological approaches discussed thus far.

Genes influence human behavior in the same way that they affect any phenotype. They control the production of proteins, which interact in physiological systems, thus affecting behavior indirectly (Plomin et al., 1980, p. 274).

Morphology. One obvious influence of genes is on the physical structure and appearance, or morphology, of an organism. The best known effort to connect morphology with behavioral correlates is the work of Sheldon (1940), who proposed the dimensions of endomorphy, mesomorphy, and ectomorphy as components of the human body-type. In a review of this and other work related to this topic, Lindzey (1965) suggests several ways morphology (including body type, size, hairiness, symmetry, color, attractiveness, etc.) could be related to behavior:

1. a common experiential environment has an influence on both personality and morphology (e.g., mothers who provide security for their children [which has a favorable impact on their sociability] also overfeed them [which makes them overweight])
2. behavior is directly limited or facilitated by morphology (e.g., skinny kids don't get to be wrestlers)
3. morphology has indirect effects on behavior (e.g., attractiveness leads to greater social reinforcement, which in turn leads to friendliness)
4. different role expectations exist for particular morphological types (e.g., fat kids are expected to be jolly)
5. there are joint biological determinants of both behavior and physique (e.g., hormones that influence activity also influence body weight).

Although Sheldon (1940) may have overestimated the relationship between morphology and behavior, several reviewers have pointed out that the best available evidence supports the existence of some degree of personality-body relationship (e.g., Lindzey, 1965; Wells, 1980). Lindzey, for instance, argues that Sheldon's ideas were rejected more for ideological than for empirical reasons.

Biochemistry and neurophysiology. Substantial evidence has now accumulated to demonstrate the important effects of biochemicals, such as hormones and neurotransmitters, on human behavior (e.g., Cooper, Bloom, & Roth, 1978). Beach (1948) detailed four ways that genes affecting the production, release, or metabolism of hormones could influence behavior:

1. hormones could alter the organism's normal development and maintenance activities, as in the case of cretinism resulting from hyperthyroidism;
2. hormones may stimulate structures employed in specific response patterns, such as the genital organs;
3. hormones may sensitize peripheral receptors to particular forms of stimulation;
4. hormones may influence the integrative functions of the nervous system.

As a specific example, the adrenogenital syndrome is the result of a malfunctioning adrenal gland that leads to masculinization of the female genitals (Money, 1973). Even when a child with this syndrome is treated with hormones and raised as a female, she develops relatively "masculine" behavioral traits.

Other examples of biochemical influences include bloodstream adrenaline and noradrenaline, which are important for arousal and relaxation. Likewise, testosterone has been shown to play a crucial role in determining levels of aggression (Harlow, 1965; Kreuz & Rose, 1972; Watson & Moss, 1971). Similarly, changes in hormonal levels associated with menstruation have been related to mood shifts (Money & Ehrhardt, 1972). Thus, it follows that individual differences in hormone levels could very well influence individual differences in personality.

Other chemical substances have been linked to behavioral changes. The effects of psychoactive drugs on behavior and mood are quite profound, while those related to vitamin and mineral deficiencies are perhaps less so. Pitts and McClure (1967) have linked excessive levels of lactic acid with neurotic anxiety. These results provide further indication that body chemistry has important consequences for the behaviors that constitute personality.

Neurophysiological differences could also be an important source of individual differences:

Behavior is integrated through the nervous system. It is here that genetic influences on the synthesis and metabolism of neurotransmitters and on the properties of excitable membranes could exert control over behavior. Also, since the functioning of the system is dependent on the interconnections of neurons, any gene-induced modification in the developmental pattern of the nervous system could produce permanent anatomical effects through which behavior might be affected over a lifetime (Fuller & Thompson, 1978, p. 470).

Neurotransmitters are the chemical messengers of the nervous system; hence, differential concentrations of and receptivity to them should have important

implications for behavior. Although it is difficult at this time to pinpoint their action on "normal" behavior, existing research relates norepinephrine deficiencies with depression, excessive catecholamines with mania, and excessive dopamine with schizophrenia (Cooper, Bloom, & Roth, 1978).

Similarly, Eysenck (1963) believes that differences in autonomic arousability underlie his dimension of neuroticism, while reticular activating system arousability underlies the dimension of introversion-extroversion. Pribram (1968) presents evidence that the amount of neurological stimulus redundancy may be the basis for such personality dimensions as introversion-extroversion or locus-of-control.

Biological Views and The Environment

Current thinking in the field of personality converges on the view that personality traits emerge from some interaction between internal characteristics and the external environment. From a biological perspective, the environment is important at both the ultimate and the proximate levels of analysis. From an evolutionary perspective, traits that characterize our species as a whole, as well as those that are differentially possessed by certain subsets of people, are largely a function of adaptation to environmental pressures such as habitat-type, density, resource scarcity, and social organization. For these reasons, sociobiologists have gathered information from archaeological and anthropological investigations of primitive human groups to draw a picture of the social and physical environment within which humans evolved. What was this environment like? Washburn and Lancaster (1973), among others, suggest that humans have lived in small groups as hunter-gatherers for 99% of their evolutionary history, having adopted an agricultural lifestyle only within the last 10,000 years (and then only for a small percentage of the population). The hunter-gatherer lifestyle on the savanna placed a premium on the ability to make quick, efficient decisions (Kaplan, 1978). Other characteristics, such as tool use, also put a premium on cognitive development.

Perhaps most interesting for a discussion of personality is the social environment in which humans evolved. This environment consisted of small territorial groups that were arranged according to strong dominance hierarchies. Social units were probably organized around family lines, and division of labor was based upon age and gender (Wilson, 1975). Hogan (1982b) points out that under conditions like these, both status and popularity would be adaptive commodities to possess. Traits that maximize these, such as friendliness and dominance, should be selected for. Kenrick et al. (1983) maintain that both outgroup aggression and ingroup altruism would have been adaptive behavioral propensities for our ancestors. Because of this, the interrelatedness of the members of a group should be a salient environmental dimension.

Sociobiologists have tended to focus on the environmental pressures likely to

have selected the sorts of traits that characterize the human species as a whole as distinguished from other species. Different human groups, however, have adapted to different ecological conditions and would be expected to have been subjected to natural selection of somewhat different traits. Eskimos, for instance, have lived for many centuries under conditions of low density and spotty resources, while Yanomamo have existed under conditions of much higher density and regularly dispersed resources. Although cultural mechanisms can be used to adapt to these ecological variations, sociobiologists like Lumsden and Wilson (1981) argue that any genetic variations favoring differential behavioral adaptation to a particular habitat will be naturally selected over relatively brief periods of human evolutionary history (1,000 years or less). These differences may simply be characteristics that favor easy socialization of cultural adaptations (such as the aggressiveness of the Yanomamo).

From a sociobiological viewpoint, traits will also be expected to wax and wane over time as ecological pressures change. For instance, territorial defense, monogamy, and high investment in a small number of offspring have a large payoff when habitat has become densely populated, but not when a new and resource rich habitat is discovered (Daly & Wilson, 1979).

On a proximate level, traits will be expected to develop and/or be expressed only when eliciting conditions are correct. Sociobiologists would expect aggressiveness to emerge more readily when environmental cues indicate high density, low resource availability, and a low degree of genetic relatedness to the surrounding population (Kenrick et al., 1983). These issues of the relationship between genetic predispositions and the environment will be returned to in our later discussion of the interactionist perspective. From the sociobiological perspective, then, the environment is of ultimate importance to personality traits, since those traits have evolved as adaptations to the external environment.

Summary

In this section, we have discussed three biological approaches to personality: sociobiological, behavior genetic, and physiological (the latter considers morphology, biochemistry, and neurophysiology). The three approaches are not entirely distinct, but differ to the degree that they provide ultimate rather than proximate explanations of psychological phenomena. This distinction refers to the distance between a particular cause and an effect in a causal chain; ultimate causes are those relatively further from the effect of interest, while proximate causes are those relatively nearer.

Sociobiological theory is the most ultimate of the three biological approaches considered. In general, sociobiological models explain behavioral traits as products of genetic evolution, positing that certain behaviors evolve because of their adaptiveness, or contribution to the inclusive fitness of their bearers. In addition, sociobiological theories suggest that the adaptiveness of some level of a particular

trait depends, in part, on how the trait is distributed in the surrounding population of conspecifics. Thus, both central "species specific" traits, as well as trait variations within a species, may be selected for.

At a more proximate level, behavior genetic evidence was reviewed that indicates a significant genetic contribution to intraspecific variation on several personality dimensions in humans. Functional reasons for, or mechanisms of, the correlations are usually not of central concern to theorists working at the behavior genetic level.

As the most proximate of the three biological approaches discussed, physiological contributions suggest mechanisms by which genes could influence behavior. The key to this approach is that genes control the production of proteins, which in turn exert profound influence on behavioral structures and processes in a variety of ways. One way is through their influence on morphology, including the physical structure and appearance of individuals. Biochemical approaches consider behaviorally relevant chemicals, such as hormones and neurotransmitters. Similarly, neurophysiological approaches consider the extent to which individual differences in behavior are products of nervous system structure and process.

From a biological perspective, the environment is important in two ways. First, evolution always occurs relative to a particular environment. That is, characteristics of the physical and social environment determined whether or not some level on a particular trait dimension was adaptive. Second, behavior will evolve so that its expression depends on the presence or absence of relevant environmental conditions, such as resource availability. In other words, saying behavior has innate components does not necessarily imply that it is expressed automatically or invariably, because its expression may depend on the presence of particular environmental conditions.

LEARNING AND SOCIALIZATION

We now turn to a discussion of learning based contributions to the study of personality. Perhaps most importantly, these theories all stress the influence of environmental variables on the genesis and expression of behavior. Cognitive theories also place major emphasis on the situational determinants of behavior, and many writers (e.g., Bandura) cannot conveniently be labeled a "learning" theorist as opposed to a "cognitive" theorist. It is convenient to make the distinction between learning and cognitive theories, however, because they differ greatly in certain emphases. Learning theories, for instance, tend to consider the historical bases of response acquisition and stimulus discrimination, whereas cognitive theories tend to address the ahistorical study of information processing and cognitive structures. For the cognitive theorist, these structures are not always explicitly considered a function of learning, nor are they always explicitly connected to overt behaviors. The division of ideas based on this learning/cognition

distinction, although somewhat inexact, is nevertheless useful. Traditional learning theorists, for instance, do not consider cognition an important part of learning. In fact, Skinnerians go so far as to reject all internal explanatory concepts. On the other hand, theorists such as Bandura and Mischel consider cognition an essential component of learning processes.

Although there are several different learning theories, important commonalities can nevertheless be discerned (Pervin, 1975). First, learning theories tend to hold that most or all significant human behavior is a product of events occurring after birth (Bandura, 1977; Dollard & Miller, 1950). Except in unusual cases (e.g., trauma to the central nervous system), human organisms are seen as essentially interchangeable. Second, learning theorists tend to view behavior as largely environmentally determined and highly situation-specific. Internal influences are downplayed or accepted as given, and thus not very important for explaining the variance in behavior. Third, learning theorists view humans as basically hedonistic in nature. That is, humans will act to decrease the occurrence of negative outcomes or sensations, and to increase the occurrence of positive outcomes or sensations.

Several attempts have been made to explain personality variables in terms of Pavlovian or classical conditioning. In the early 20th century, John Watson (1916) showed that a phobic reaction could be conditioned to a previously neutral stimulus (i.e., white fur). He suggested that the existence of phobic reactions was due to chance pairings of a harmless, neutral stimulus with a naturally fear-producing stimulus. This idea of stimulus overgeneralization has also been advanced to explain psychopathologies such as sexual deviations (Rachman, 1966). Likewise, Mowrer (1950) attempted to explain the genesis of attitudes, feelings, emotions, and conscience, in terms of classical conditioning principles. In a similar vein, the secondary drives of fear, guilt, and anxiety, which are central to both Mowrer (1950) and Dollard and Miller (1950), are postulated to result from classical conditioning.

The principles of operant conditioning occupy an important position in many learning explanations of personality (Hall & Lindzey, 1978). The familiar premise is that an organism will increase the emission of a response which results in positive reinforcement (drive reduction for Hullians), and decrease the emission of a response which results in punishment. As previously alluded to, Hullians (Dollard & Miller, 1950; Mowrer, 1950; Sears, 1944) have re-explained many of the ideas of psychoanalytic theory in learning terms. For instance, the "pleasure principle" is replaced with the principles of reinforcement and the "ego" is seen to result from reinforcement, or "solution" learning (Mowrer, 1950). From this perspective, neurotic traits are viewed as the product of learning history in the same way that normal traits are:

Misery-producing, neurotic habits which the therapist must painfully unteach have been as painfully taught in the confused situation of childhood (Dollard & Miller, 1950, p. 6).

If personality is defined as a habit of emitting certain responses, instrumental conditioning provides a model for explaining how these habits develop. Nearly any response can be brought under stimulus control. For instance, Skinner (1953) suggests that sociable or friendly behavior is reinforced by a return show of friendliness, in the form of acts such as smiles and compliments. Dominant behaviors will increase if they result in reinforcers such as money or status. Similarly, nonconforming behavior will decrease if it is punished by derision or ostracism, and so on. To this view then, personality "traits" are due quite simply to regularly recurring patterns of reinforcement.

Bandura's social-learning approach (Bandura, 1969, 1977; Bandura & Walters, 1963) was a reaction against serious flaws he saw in earlier learning theories. These flaws included: (a) the problem of explaining how complex and novel response patterns are acquired without practice, (b) the denial of cognitive functions in learning, and (c) a failure to consider the larger social context in which learning occurs.

Bandura and Walters (1963) felt that the principles of operant conditioning alone were not sufficient to explain the acquisition of novel responses. Instead, Bandura and his colleagues maintained that most novel responses are acquired through observation:

In actuality, virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people's behavior and its consequences for them (Bandura, 1977, p. 12).

For Bandura's theory, as for other learning theories, reinforcement plays a crucial role in the maintenance of behaviors that constitute personality. In this case, however, reinforcers are often vicarious, resulting from the observation of others' reinforcement contingencies:

Prejudices, like other 'aggressive responses,' are acquired through imitation and direct training and make their appearance relatively early in a child's life (Bandura & Walters, 1963, p. 19).

The Learning Model of the Environment

Although specific learning models of the environment are usually not explicitly stated, descriptions of the process of response acquisition implicitly describe environments. The environment, from a social learning perspective, is conceptualized in terms of discriminative stimuli, quality and schedules of reinforcement, and response-outcome contingencies. As one classic example, Rotter (1954) suggests classifying situations according to the types of reinforcement likely to occur there.

Unlike the sociobiologists, who are frequently concerned with macroscopic environmental characteristics (like density and social group organization), social

learning theorists are likely to focus on specific stimuli. Like sociobiologists, social learning theorists view characteristic behavior patterns as ultimately shaped by the environment. Social learning theorists generally consider only the history of the particular individual, however, and not the phylogenetic history of the human species or human subgroups. Any particular individual's response to the environment is seen to be totally determined by his or her learning history. Possible "primary" or "natural" relationships between environment and behavior could exist within a social learning framework (touching a hot stove results in the same contingencies for all of us), but there tends to be a focus upon "secondary" or fortuitous pairings between environmental stimuli and responses. There is also a focus on idiosyncratic responses to the environment, and it is generally held that an individual's response to a given class of stimuli is a function of his or her particular history with that class of stimuli.

Given this individualistic approach to the environment, it is unsurprising that social learning theorists have not been able to agree on some general taxonomy of trait-environment relationships. Some researchers operating within a behaviorist perspective have generated *lists* of normatively common stimuli that determine "trait"-related behaviors like anxiety (e.g., Endler, Hunt & Rosenstein, 1962), but it is presumed that the pattern of responses to the different situations is idiosyncratic.

Summary

This section has consisted of a discussion of learning approaches to personality. While we noted that no absolute division between these and related approaches exists, there are some important dimensions on which the distinction can be made. One is that learning theories emphasize the influence of environmental contingencies on the development of behavior. Unlike cognitive theories, learning models are more often concerned with historical rather than immediate external determinants of behavior. Also, learning theories have typically considered interorganismic differences at birth to be relatively minimal and unimportant to explaining the variance in behavior. Thus, within a species, organisms are seen as more or less commutable with each other. Finally, learning approaches usually view humans as hedonistic, approaching pleasure and avoiding pain.

Several learning theory approaches to personality have applied a classical conditioning model. For instance, from this perspective, phobias are seen as tendencies to react anxiously to a particular situation because it has previously been associated with an unpleasant stimulus. In general, these theories suggest that certain situational stimuli will come to elicit certain behaviors because they have been *associated* with other relevant stimuli in the past.

Operant conditioning theories have explained the occurrence of particular behaviors as being due to the environmental consequences of these behaviors. Thus, a behavior that is reliably followed by positive outcomes will tend to be

emitted more often, while the converse is true of behaviors followed by negative outcomes. Like conditioning-based learning theories, social learning theory also suggests that the hedonic outcomes of behavior are important, but adds that these outcomes are most often vicariously observed rather than directly experienced.

To learning theories, the environment is a crucial determinant of the behaviors that make up personality. While models of the environment are not often explicitly stated, it can be seen to consist of classes of stimuli of different types. Discriminative stimuli set the stage for the occurrence of appropriate behaviors, while positive and negative reinforcers are environmental stimuli that have important hedonic consequences for the organism. Although certain stimuli (i.e., primary reinforcers) tend to influence all organisms of a species in the same way, most stimuli acquire relevance for a particular individual because of his or her unique experience with them.

COGNITIVE VIEWS OF PERSONALITY

The cognitive perspective has been associated with two somewhat different approaches to the conceptualization of personality. Some cognitive theorists have studied "cognitive traits," or individual differences in information processing. Other cognitive theorists, rather than viewing personality traits as characteristics of the *observed* individuals, have considered how "traits" are constructed by the *observer*. We are less concerned with the latter issue in this paper, but it is probably necessary to diverge briefly to address a radical version of this second approach, which was expressed clearly by Fiske (1974):

... we could simply and explicitly define the field (of personality) as the way people perceive, interpret, and construe other people and their behavior (p. 4).

This sort of reasoning is based upon the presumption that personality research has failed to demonstrate any trait-like regularities in behavior, and that the layperson's perception of traits in his or her colleagues is based largely upon distorted projections. This presumption has been the basis of a great deal of controversy (Block, Weiss, & Thome, 1979; Epstein, 1980; Hogan, DeSoto, & Solano, 1977; Jones & Nisbett, 1972; Kenrick & Dantchik, 1983; Mischel, 1968, 1973; Schweder & D'Andrade, 1979). Recently, however, there appears to be some consensus that personality characteristics are to be found neither in indiscriminate cross-situational consistencies in behavior nor solely in the "eye of the beholder" (as implied by Jones & Nisbett, 1972). Different observer's eyes seem to behold something that they can agree about, at least when they are sufficiently familiar with the target person. A number of studies have found high correlations between raters' personality attributions, frequently and reliably in the .50 range and above (e.g., McCrae, 1982). While measures of individual behaviors rarely correlate very strongly with each other, aggregate indices, in-

cluding sufficient samples of different behaviors within a given behavioral domain, do correlate reasonably well with ratings and questionnaire data (Block, Weiss, & Thorne, 1979; Epstein, 1980; Hogan, DeSoto, & Solano, 1977; Mischel & Peake, 1982). We therefore reject the radical claim made by some social cognition theorists that personality is only a projection. For reasons we will discuss below, we also reject the reactionary response to that claim, which would hold that the cognitive approach has nothing to offer the field of personality.

One of the earliest cognitive formulations of individual differences was provided by George Kelly (1955). Kelly rejected the passive view of humanity provided by biological and learning models of behavior, positing that people actively process stimuli and make conscious choices that determine their behavior. In the preface to *The Psychology of Personal Constructs* (1955), Kelly states:

... the term learning, so honorably embedded in most psychological tests, scarcely appears at all. That is wholly intentional, we are for throwing it overboard altogether. There is no ego, no emotion, no motivation, no reinforcement, no drive, no unconscious, no need (p. 6).

Kelly viewed personality as consisting of one's construct system, which determines the way one perceives, interprets, transforms, and reacts to stimuli:

... man looks at his world through transparent patterns or templates which he creates and then attempts to fit over the realities of which the world is composed. ... Let us give the name constructs to these patterns that are tried on for size. They are ways of construing the world (1955, pp. 8-9).

Thus, important differences in behavior will be due to the nature and number of one's constructs, which are presumably a product of one's experience with testing hypotheses about the world.

Other theorists have developed specific cognitive theories to deal with abnormal personality processes. For instance, Lazarus (1969) has proposed that stress is primarily dependent upon the different ways people believe they can cope with environmental stressors, rather than the stressors themselves. Similarly, Beck (1967) presents a reconceptualization of depression as a pattern of maladaptive and self-perpetuating cognitions.

In recent years, the foremost proponent of the cognitive-trait approach has been Walter Mischel (1973, 1977; Mischel & Peake, 1982). In his more recent views, cognitive traits are seen as the crucial mediators between situations and behavior:

The proposed cognitive social learning approach to personality shifts the unit of study from global traits inferred from behavioral signs to the individual's cognitive activities and behavior patterns ... (Mischel, 1973, p. 265).

The cognitive personality variables suggested by Mischel include: (1) construction competencies, (2) encoding strategies and personal constructs, (3) behavior-outcome and stimulus-outcome expectancies in particular situations, (4) subjective stimulus values, and (5) self-regulatory systems and plans.

Similar cognitive-trait approaches to personality have been taken by several researchers working in the social cognition area. Snyder (1979) has discussed *self-monitoring* as a personality variable, dividing people into those who monitor their behavioral choices on the basis of either situational information (high) or relevant inner states (low). Rotter's (1966) *locus of control* characterizes people according to the typical attributions they make for the causes of the outcomes they experience (internals vs. externals). Cohen (1981) identifies one's characteristic *observational goals* (the purposes one intends for the information gathered from observing behavior) as a personality dimension. Individual differences in the *accessibility of categories* (Higgins & King, 1981) and *serial recall ability* (Lyon, 1977) have also been identified. Graziano, Feldesman, and Rahe (1979) have recently produced evidence that introversion/extroversion is associated with *memory* and *attentional biases* in processing information about potentially aversive social encounters.

Bolstered by advances in cognitive psychology, social cognition researchers have theorized that people's personalities consist of their *schemas* (cognitive structures they carry around) about what they are like (Markus, 1977), as well as schemas about the nature of situations (Cantor, 1981). Cantor (1981) posits that social behavior is a function of the cognitive structures one brings to a situation, sensory input from the situation, and the cognitive processing that results. Carver (1979) presents a model of information processing about the self, while Schank and Abelson's (1977) presentation of *script* theory describes the plans that people have developed to determine their conduct in familiar situations.

Cognitive Views of The Environment

Unlike the sociobiological and social learning viewpoints, which see the *objective* environment as the determinant of trait-like behaviors, the cognitive view is more likely to focus on the way in which the person determines or "constructs" his or her environment.

... the situation is a function of the observer in the sense that the observer's cognitive schemas filter and organize the environment in a fashion that makes it impossible ever to completely separate the environment from the person observing it (Bowers, 1973, p. 328).

Similar reasoning can be found in other cognitively based views of person-environment interactions (Endler & Magnusson, 1976; Ekehammer, 1974). Several researchers have examined the applicability of cognitive prototypes to person-environment interactions (Cantor, Mischel, & Schwartz, 1982; Schutte, Kenrick, & Sadalla, in press). Schutte et al., for instance, examined the way

that memory for situational details follows a prototype model, and found that there was more consensus about appropriate behaviors for situations that most closely matched cognitive prototypes. Another cognitive approach to the environment is exemplified in the work of Mehrabian and Russell (1974), who categorize environments according to stimulus information rate, or cognitive "load."

Like the social learning viewpoint, the cognitive view frequently focusses upon idiosyncracies in person-environment interactions. These idiosyncracies result partly from implicit historical factors. That is, individual learning histories result in the differential development of and accessibility of templates or schemas through which environmental information is filtered. Another level of idiosyncrasy is added by the immediate effects of incidental factors on attention, and much of the laboratory research on phenomena like "priming," "salience," and "contrast effects" deals with these relatively ahistorical determinants of individual differences in response to the same environmental inputs. Of course, unless such immediate effects are related to individual differences, or become self-perpetuating, they are outside the domain of personality psychology.

Although cognitive approaches do not focus on the macroscopic environmental variables dealt with by sociobiologists, they are also unlikely to focus on microscopic "stimuli." Instead, the focus is more frequently on the holistic organization of patterns of stimuli. Here, the historical influence of the gestalt school of perception is obvious in social cognition approaches.

Summary

The cognitive perspective has actually taken two rather different approaches to the questions of personality. Of greatest importance to this discussion are those theories addressing individual differences in information processing. In addition, many cognitive theorists of the last decade and a half have been concerned with the extent to which personality measures reflect the construct systems of the observers, rather than the actual behaviors of those they are observing. While this latter view has created a great deal of beneficial discussion for the field of personality, we concluded that its extreme versions are untenable.

The earliest information-processing theories of personality stated that humans construct reality as a function of established cognitive structures interacting with incoming information. The resulting conceptions of the world determine an individual's behavior. Thus, it is not external "reality" that causes behavior, but the way a person construes that reality. More current theorists have expanded this line of reasoning, positing a host of important cognitive traits that determine individual differences in human behavior. These include such dimensions as self-monitoring and locus-of-control. Individual differences in such cognitive structures as schemas and scripts are also thought to contribute greatly to personality.

Cognitive views have generally considered the environment as it is "con-

structed" by the individual. Thus, cognitive models have focussed not only on stimulus information contained in the environment, but on cognitive filters and schemas with which individuals interpret that information. This view of the environment as subjectively constructed has led to an emphasis on idiosyncracies in person-environment interactions. In this way, cognitive approaches differ from the biological and learning approaches, which have conceptualized the environment in objective terms.

TOWARD A BIOSOCIAL INTEGRATION

In this section we will argue for the advantages of a biosocial interactionist model that incorporates elements of each of the three major positions we have outlined. We will briefly describe some of the unique features of such a model, and also address some of the theoretical and empirical problems it suggests.

It should be obvious that the sort of integrative approach we will suggest is hardly revolutionary. For one thing, it is becoming harder to find someone these days who will not acknowledge that genetic determinants interact with learning history, or that the human organism transforms and interprets the stimulus configurations it confronts in everyday life. For another, theories that are truly interactionist have been around since the modern beginnings of the field of personality. Freud was much concerned with the processes by which individuals often "distorted" their perceptions of themselves and their social situations (e.g., the study of "ego-defense mechanisms"), and this is a concern he would share with many modern researchers in the social cognition area. However, unlike most modern social cognition theorists, Freud was deeply interested in the specific ways such cognitive strategies reflected an earlier learning history, and ultimately how that learning history was directed and limited by evolutionary constraints (Leak & Christopher, 1982). Likewise, Gardner Murphy (1947) held a view that is an intellectual forerunner of the viewpoint we will advance here. Among more recent writers, we would note that the biosocial theories of Eysenck (1970) and Cattell (1965) share several points in common with ours.

Proximate vs. Ultimate Causal Analysis

Before proceeding further, it may be fruitful to recall the distinction between proximate and ultimate causes that we discussed earlier. Very generally, we can order the models we have been discussing along this proximate/ultimate continuum. Modern social cognition approaches tend to focus most upon proximate explanations, considering the immediate interpretation of a situation, recent "priming" factors, and so on (cf. Cantor & Kihlstrom, 1981). Social learning theorists also focus upon the immediate situation, but are more likely to consider how that situation relates to a learning history. Often this learning history is remote and may be largely inferred (cf. Dollard & Miller, 1950; Kenrick, Bau-

mann, & Cialdini, 1979). Social biological theorists tend to advance more ultimate explanations, relating behavior to the selection pressures of the evolutionary past. As noted earlier, however, these explanations are often connected to immediate processes such as biochemical responses to specific environmental stimuli, and some biological approaches to human personality have focused on such proximate factors without speculation as to their ultimate evolutionary bases.

It is possible to argue that the level of analysis appropriate to the psychologist is best restricted to the proximate end of this continuum. We disagree. Instead, we would argue that any attempt at a proximate explanation of person/situation interactions will be better informed by a consideration of ultimate questions regarding the important dimensions of persons and environments. We therefore think that an explicit integration of modern biological thought with personality theory is crucial.

In the next section, we will briefly address how each of the models can contribute to such an integrated approach to personality, and advance some specific suggestions about the interaction of proximate and ultimate mechanisms.

Biology

We believe that sufficient evidence has accumulated to justify the position that some of the variance in human behavior is genetically determined. At a proximate level, such differences are actualized in biochemical, morphological, and neurological variations which predispose some individuals to be differentially attentive or responsive to certain environmental events.

One problem that has been addressed by several theorists is that of determining *which traits are biologically predisposed*. At least three approaches to answering this question have been advanced. Hogan (1982b) presumes that those traits that personality psychologists have found people to attend to and value (i.e., those emerging in empirically derived factor lists and circumplexes) are likely to be those that were relevant to the survival of our ancestors. Buss and Plomin (1975) suggest that it is the innate temperamental differences in infants that underlie later differences in traits. David Buss (1983) suggests the alternative strategy of using behavior genetics data (based on adult personality similarities) to uncover the crucial biological substrata of individual differences.

It is unlikely that there is one set of biologically predisposed traits that is equally heritable for all humans, in all environments. There are a number of reasons for this, but let us list three. First, "powerful" environments may reduce genetic variance in traits. Second, inherited characteristics may remain latent, depending upon appropriate environmental cues for their emergence. Third, heritability may not be evenly distributed at all ranges along a trait continuum. Each of these points will now be elaborated.

A simple demonstration of how a powerful environment can mask the heritability of a behavioral tendency is given by Wilson (1978). He notes that Tai-

wanese children are all required to write with their right hands. Although one would estimate a high degree of heritability in "handedness" using a sample of Americans, there would be none apparent for Taiwanese since the variance has been reduced to zero by environmental conditions. That such a relationship is likely to hold for more complex social traits studied by personologists is given indirect support by findings such as those obtained by Monson, Hesley, and Chernick (1982). These authors found that certain environments constrained the operation of individual differences. In their study, extroverted behavior correlated with a personality-test measure of extroversion, but only in flexible situations without strong norms to guide subjects' behaviors. Individuals chronically exposed to constraining environments during the course of development would not be expected to manifest relevant genetic dispositions to the same extent as would individuals exposed to low constraint environments.

A second possible moderator of trait heritability, i.e., that inherited characteristics may remain latent unless the individual encounters certain critical "sensitization" experiences, is not unfamiliar to personality psychologists. Meehl (1962), for instance, argued that schizophrenia involves such an inherited predisposition, and speculated that a conflicted relationship with the child's mother might be crucial in eliciting this tendency. Without stressful social experiences, the "schizotype" would remain normal, according to Meehl. Only those individuals with such an inherited tendency, however, would respond with the schizophrenic pattern, although some genetic patterns might result in a lower threshold than others. Regardless of whether Meehl's choice of environmental elicitors of schizophrenia is correct, such a relationship between a genetic tendency and a sensitizing environmental experience seems reasonable to posit for less extreme social traits.

Ethologists have clearly documented that the demonstration of patterns of social behavior such as aggressiveness depends quite critically upon eliciting conditions in the physical and social environment, and that some behaviors may rarely or never be manifested by most species members. For instance, although most indigo buntings are quite capable of engaging in polygynous mating strategies, and will do so if ecological conditions are right (high variability in food yield between isolated territories), most will never engage in such a strategy. By the same reasoning, a child with characteristics that might ordinarily facilitate dominance related behaviors (e.g., mesomorphic body build, low anxiety) may nevertheless fail to demonstrate such behavior if there are many highly dominant peers in his adolescent social group. That is, the dominant strategy will only emerge when the appropriate niche is available.

Our third point was that heritability may not be evenly distributed at all ranges along a trait continuum. For instance, there is evidence that chronic depressiveness (or "endogenous" depression) is heritable, while milder "exogenous" depression is not (Angst, 1974). Were we to include both these types of depressed individuals in the same analysis, as well as including the full range of the

population that has never been diagnosed as clinically depressed, we would probably conclude that depressed behavior was minimally heritable (especially if our sampling was representative of the actual frequencies of individuals at each point along the "depressive/nondepressive" continuum).

A familiarity with the biological literature may also yield insights regarding which environmental variables are relevant to which behavioral strategies. As indicated above, there is evidence that behavioral repertoires associated with mating strategies and aggression, for instance, are importantly related to ecological factors such as density, resource scarcity, and genetic interrelatedness in a social group (Kenrick et al., 1983). That is, behavioral strategies will not be fortuitously linked with random environmental conditions, but will occur only in a relatively constrained set of ecologically relevant environments. This point will be addressed further in the next section.

Learning

Although biological factors may ultimately be found to underlie differences in morphology, temperament, sensitivity to certain environmental cues, and perhaps even in thresholds for certain simple motor patterns (such as smiling, Eibl-Eibesfeldt, 1975), it seems undeniable that a good deal of the *variance* in response topography (within the genetically predisposed reaction range) is a function of social learning. Classical and operant conditioning, as well as modeling and complex verbal learning of norms and expectations (or "contingencies"), no doubt play an important role in individual differences. We are as yet quite limited in our understanding of the extent to which such learning processes interact with genetically programmed constraints. The *tabula rasa* assumption has become increasingly questionable, as evidence demonstrating biological constraints on learning continues to emerge (Hinde & Hinde, 1973; Seligman & Hager, 1972; Shettleworth, 1972). This literature suggests that some connections between stimuli and responses are more readily conditioned, and some operants are innately prepotent over others. This also suggests that the important person-environment interactions may not be infinite in number, but that characteristic response patterns are most likely to be manifested in certain stimulus contexts (cf. Kenrick & Dantchik, 1983). For instance, Marks (1969) has found that phobic anxiety is likely to be conditioned to stimuli that may have been threatening to our ancestors (potentially dangerous animals and heights, for instance), and not randomly conditioned to environmental stimuli likely to be associated with unpleasantness in modern life (electric stoves and automobiles, for instance).

The learning constraint literature has thus far dealt with simple conditioning processes, but it may be that more complex chains of S-R connections are influenced by genetic factors. Ethologists have observed such prewired interactive chains in infrahuman organisms. Mating sequences, for instance, usually involve response patterns that emerge only after a lock-step sequence of previous response

patterns, each of which is elicited by a particular stimulus context in a fixed order.

A consideration of possible biological constraints on complex learning sequences leads to a number of interesting questions that relate to personality. For instance, are there important individual differences in the tendency to learn certain "scripts"? Highly sociable people may differ from those who are less socially adept not only in their frequency of smiles, head nods, or verbal reinforcements, but also in their facility at learning appropriately timed and sequenced interaction patterns, matching and complementing the moves of their social partners.

From the present biosocial interactionist perspective, it becomes crucial to determine how biologically based individual differences are related to learning experiences. It is important to determine (a) *what individual differences exist in the prepotency of certain reinforcers*, and (b) *what individual differences exist in sensitivities to certain stimuli*. As indicated earlier, Eysenck's pioneering work in this area has suggested that basic differences in "conditionability" may underlie one of the two major personality factors emerging from his analyses. We suspect that a somewhat more complex set of such interactive mechanisms will emerge with further research.

The literature on "imprinting" and "sensitive periods" (e.g., Rajecki, Lamb, & Obmascher, 1978) provides one model for the sort of interactions between organism and learning environment that we are proposing here. To simplify greatly, this literature suggests the existence of flexible biologically programmed periods of sensitivity, during which environmental inputs will have powerful effects on learning. The familiar example is the young duckling, who will condition powerful attachment to its mother very shortly after birth. That this attachment involves learning, rather than innate recognition of its mother, is attested to by the fact that the duckling can be induced to form an attachment to various substitutes (e.g., a wooden decoy, or a bearded ethologist) if those are provided during this sensitive period. This learning may also provide a template for later species recognition. For instance, birds who have imprinted upon a member of an inappropriate species may, upon reaching maturity, attempt to mate with members of that incorrect species (Immelman, 1972).

Some suggestive evidence for the existence of such interactive learning mechanisms in humans comes from Shepher's (1971) finding that Israeli children raised like siblings in small, mixed-sex groups do not develop strong sexual attachments to each other as adults. In fact, of nearly 3,000 kibbutz marriages recorded, Shepher did not find a single instance of intra-peer group marriage, despite the existence of no normative pressure to the contrary, and despite the existence of the traditional positive propinquity effect on marriage choice which held for the kibbutz data. Shepher argues that this "negative imprinting" effect stems from a biologically adaptive learning predisposition (matings between siblings result in drastic increases in the incidence of harmful recessive trait combinations). The literature on incest avoidance has been recently reviewed by

van den Berghe (1983), who concludes that the evidence strongly supports a biology/learning interaction model.

Storms (1981) has also recently reviewed evidence to suggest the existence of a biologically based "sensitive period" in humans. Specifically, he argues that puberty onset may be a sensitive period for conditioning erotic preference. Storms reviews findings to suggest that individuals who do not have access to members of the opposite sex when they reach puberty (either because they reach puberty early and have not yet made the transition to heterosocial peer groups, or because they remain in homosocial groups for an unusually long period) are more likely to become homosexual.

Cognition

The literature on social cognition is extremely important in understanding behavior at the proximate level of analysis. No matter how strongly a woman's learning history and innate proclivities predispose her toward friendliness, she may nevertheless remain aloof if a friendly smile is interpreted as the leer of a potential rapist. It is obvious that a response pattern, no matter how "characteristic," is unlikely to be evoked until an appropriate stimulus is attended to and interpreted. It is also obvious that the "stimulus as perceived" is not always isomorphic with the "objective stimulus". It is nevertheless important not to lose sight of the fact that perceptions are generally correlated with a consensually agreed upon reality. As discussed earlier, experimental social psychologists are often guilty of focusing too heavily upon perceptual errors, and thus presenting a view of humans as existing in a world of idiosyncratic illusion (Kenrick & Dantchik, 1983).

Although we would argue that the bulk of behavior occurs in response to objective (or consensually verifiable), as opposed to solipsistically constructed events, it is nevertheless important to understand the processes of stimulus selection and interpretation. For the field of personality, it is of central interest to understand individual differences in such processes, and in particular, how these differences relate to learning history and biological constraints. From the present perspective, we would expect that phenomena such as stimulus transformations and perceptual biases are not unlimited in number, but are importantly limited by biological constraints. We are thus squarely allied with the "nativist" school of perception. In recent years, researchers have demonstrated the existence of cortical neurons that are selectively sensitive to complex patterns of visual stimulation (Hubel & Weisel, 1959, 1968). There is also evidence that human color discrimination is based upon innate organization, as opposed to arbitrary cultural name learning (Rosch, 1973). Lumsden and Wilson (1981) have discussed a number of such innate perceptual biases, and have even speculated on the possibility that cognitive heuristics discovered by experimental psychologists (like the "availability" heuristic) are innate organizational patterns that have been

selected in the course of human evolution. The existence of such prewired perceptual biasing mechanisms opens the possibility that humans may differ in the tendency to acquire such biasing mechanisms, and that these differences may underlie important divergences in behavior.

Partly because of their commitment to laboratory experimental methods, researchers in the area of social cognition have tended to focus on immediate or proximate determinants of behavior (Kenrick & Dantchik, 1983). From the present perspective, it becomes crucial to understand how individual differences in perception and cognition are related to learning history (as well as to innate differences). The literature on cognitive development can provide an important service in this regard. Fischer (1980), for instance, has suggested a framework for understanding the relationship between social learning and cognitive development. Additionally, there is an important literature addressing the existence of biological constraints on cognitive development (Kiel, 1981).

Application of The Model: The Example of Depression

To illustrate how a biosocial interactionist approach differs from the other three approaches we have discussed, it is useful to consider how the different perspectives would explain some concrete behavior. We will briefly address the problem of explaining depressive behavior, although such an analysis could as well be applied to nonclinical behaviors (e.g., altruism or sexual attraction). Depression has been chosen simply because it is of sufficient interest to have generated explanations that fall within each of the models we have been discussing.

Several explanations of depressiveness have been offered from the learning perspective. Taking an operant approach, Ferster (1973) views depression as a function of lack of reinforcements for appropriately active behaviors. Similarly, Lewinsohn (1974) views depressed behavior as resulting from reinforcement contingencies that serve to reward self-deprecatory verbalization and/or nonverbal behavior, while failing to reward outgoing behavior. Note that such explanations focus heavily upon *objective* contingencies in the environment and pay little attention to possible biological differences between people that might predispose a depressive response.

From the cognitive perspective, depression is viewed as a set of self-derogatory beliefs or attributions. From this perspective, depression will result from *beliefs* that one cannot control important outcomes in one's life (Abramson, Seligman, & Teasdale, 1978), regardless of the veracity of those beliefs. Similarly, Beck (1967) views depression as resulting from cognitive exaggeration of personal faults, losses, or obstacles. As noted earlier, there is a good deal of overlap between the cognitive and social learning approaches, and these cognitive models assume a faulty learning history. When it comes to treatment, however, more stress would generally be placed upon altering the individual's *construal* of events

in his or her life, with less concern for altering objective contingencies, and still less for possible biological mechanisms underlying the clinical problem.

From a biological perspective, depression would be viewed as a heritable response pattern that evolved because it served some purpose for our ancestors. Averill (1968), for instance, views grief at the loss or threatened loss of another as an adaptive pattern that served to facilitate group cohesiveness. Bowlby (1969) points out that the pattern of agitation followed by depression occurs in young children and many young animals when they are separated from their parents, and that such a response could well have served to facilitate the necessary mother-child attachment. Schmale (1970) argues that depression may be part of an adaptive "conservation-withdrawal response" that facilitates rest and recuperation in physically or emotionally exhausted animals. At another biologically based level of analysis, the behavior-genetic approach to depressive behavior has tried to establish the degree of heritability of clinical depression (Angst, 1974). At the most proximate biological level of analysis, researchers have searched for biochemical bases of depression (Cooper et al., 1978). Biologically based treatment for depression primarily involves medication or the induction of convulsions, treatments that are presumed to act directly by altering physiological states.

From the present biosocial interactionist position, each of these perspectives is necessary, but not sufficient. Objective contingencies no doubt play a role in eliciting and maintaining depressive behavior, but subjective interpretation certainly plays an important role in how those objective contingencies are responded to. At the same time, the depressive reaction to perceived events is a biological phenomenon that cannot be fully understood with reference solely to an objective situation, nor to cognitive interpretation of a set of events. We would view depressive behavior in the following way (Kenrick, Friedlander, MacFarlane, & Cialdini, in preparation):

$$D = f(ExCxO)$$

where:

- D = *depressive behavior*
 E = *environmental events* [composed of repeated failure experiences, demands requiring prolonged energy expenditure, or separation from another to whom one is attached, as well as relevant larger ecological factors (resource availability, density, climate, relatedness to other individuals in the area)].
 C = *cognitive appraisal* of those environmental events [which can be divided into immediate factors (like salience and recency of activation) and long term factors (expectancies and attributions based upon past learning history)].
 O = *organismic factors* [referring here to individual differences in the threshold for the biochemical conservation-withdrawal re-

sponse. This biochemical threshold is seen to be largely genetically determined, but may critically interact with early sensitization experiences (such as maternal separation, resource scarcity, or low position in a dominance hierarchy)].

It is important to note that such a model implies that a value of zero for *E* or *C* or *O* will result in no depressive behavior. For example, no amount of self-debasing cognition will result in "depression" if the organismic response and some combination of appropriate environmental events (or cues associated with such events) are not present. Likewise, a very low organismic threshold for the biochemical depressive state will not result in depression if appropriate environmental clues are either not present or are not perceived.

With regard to the role of objective environmental events, there is a wealth of evidence suggesting that depression is precipitated by factors such as repeated failure experience (Seligman, 1975), separation from another to whom one is attached (Bowlby, 1969; McKinney, 1976), lack of material resources (Levitt & Lubin, 1975), lowered position in a dominance hierarchy (Price, 1967) and so on. At the same time, depressed individuals seem to cognitively appraise situations they encounter in less self-flattering ways than nondepressed individuals (Alloy & Abramson, 1979). As indicated above, there is evidence not only of a biological substratum for the depressive response (McKinney, 1976; Schmale, 1970; Seligman, 1975), but also for genetic variation in the predisposition toward that response (Angst, 1974). What remains to be determined is precisely *how* objective events, cognition and organism factors interact with one another.

Such an interactionist model has a number of heuristic implications. For instance, research is required to determine what ontogenetic pathways allow for the expression of any genetic inclinations toward depression. As examples, predispositions toward depression could act through:

- differential susceptibility to certain learning experiences (e.g., are predisposed individuals more physiologically affected by early separation experiences?);
- differential attention to certain events in the environment;
- morphological features predisposing low dominance;
- a tendency to more readily learn a depressive cognitive style.

On a more proximate level, an interactionist perspective would suggest an examination of the possible causal links between various biochemical states and depressive cognition, to give one example.

There are also practical ramifications of adopting such a perspective. For instance, it may require more "cognitive therapy" to alleviate depression for

certain individuals in some circumstances than it will take for others (who might be better served with an environmental or a biochemical intervention).

Although this is not the place to develop this model of depression further, or to apply this sort of biosocial interactionist framework to other sorts of behavior, one point should be clear from this discussion. To the extent that such a model is correct, it will not be productive to focus solely at the behavioral, or the cognitive, or the biological level of analysis if one is to develop comprehensive and maximally practical models of human behavior.

CONCLUSION

In this chapter, we have argued that the field of personality would be best served by models that consider the interaction of biological factors, learning experiences, and cognitive interpretation. The case of depressive behavior has been used to illustrate our argument that variables at one of these levels of analysis interact in crucial ways with events at the other levels.

Learning, cognitive, and biological theories have been compared with regard to their use of proximate vs. ultimate causal explanations. Cognitive theories usually focus on relatively proximate or immediate causes while biological (especially sociobiological) theories tend to focus more on ultimate historical causes of behavior. Although proximate and ultimate explanations are sometimes seen as competing with one another (Campbell, 1975), they often operate in concert. For instance, someone with a genetic predisposition toward high intelligence is also likely to be raised in a home environment that fosters intelligence. Of course, it is frequently the case that particular proximate and ultimate explanations are simply regarding the same events from different vantage points. Proximate explanations involve fine-grained, "up close" analyses, while ultimate explanations involve molar analyses, viewing the same phenomena "from a distance." Just as ultimate and proximate explanations should therefore augment one another, so should cognitive, learning and biological explanations. Rather than arguing for the inherent righteousness of our own domain of blind pachyderm exploration, then, it is time for us to stand back and see the whole elephant.

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SELF-HANDICAPPING AND SELF-HANDICAPPERS: A COGNITIVE/ATTRIBUTIONAL MODEL OF INTERPERSONAL SELF-PROTECTIVE BEHAVIOR

Steven Berglas

A story is told of the famous chessplayer Deschappelles who succeeded his teacher to become the champion of his region. Prior to this, his claim to fame was that he mastered the game of chess in two days. When he was no longer certain of beating all challengers, he refused to have a match at all unless his opponent would accept "pawn and move" (a one piece advantage plus the opening gambit). If Deschappelles lost he would claim it was because of the odds. This strategy came to be known as the Deschappelles coup.

The coup effected by Deschappelles through forcing an advantage on his opponents is both elegant and pragmatic: A poor performance or failure cannot be held up to him as reflective of his actual competence. By "sacrificing" pawn and move, the source of potential failure has been externalized to factors other than components of his competence image. Moreover, should Deschappelles defeat his opponent while playing against the odds, judgments of his inherent ability would soar: "Look how he triumphed *despite* the handicap."

In 1978 the concept of "self-handicapping strategies" was introduced to explain the tactical behavior that Deschappelles and countless other individuals employ to protect their self-esteem. The original self-handicapping formulation (Berglas & Jones, 1978; Jones & Berglas, 1978) proceeded from the assumption