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# EVOLUTIONARY PERSONALITY PSYCHOLOGY

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A new discipline is emerging called "evolutionary psychology." Its central aim is to identify psychological mechanisms and behavioral strategies as



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evolved solutions to the adaptive problems our species has faced over millions of years. Because personality psychology is dedicated to studying human nature in all of its individually different manifestations, this field is uniquely positioned to contribute to, and become informed by, evolutionary psychology.

This review differs from previous ones in articulating an evolutionary metatheory to organize the diverse strands of current personality research and to clarify many of its core concerns. These include: clarifying the debate about personality consistency, clarifying the causal status of dispositions, understanding interactionism, identifying important features of context, identifying the structure of goal-directed strategies, explaining the origins of individual differences, and placing the five-factor model of personality in adaptive context. In clarifying these issues, several crucial misunderstandings must be corrected—the "sociobiological fallacy," the "fundamental situational error," and the "fallacy of genetic determinism."

## WHY DOES PERSONALITY PSYCHOLOGY NEED EVOLUTIONARY THEORY?

A recent review of the personality literature argued that "psychology in general, and personality theory and assessment in particular, have paid a high price for refusing to follow physics' model" (Rorer & Widiger 1983). My view is precisely the opposite. Physics provides a very poor model for psychology because the principles that govern purely physical phenomena are fundamentally different from those that govern organic life. If I walk around on bare feet for a few weeks, my soles and heels develop thick calluses. Callus-producing mechanisms are complex environment-contingent adaptations that become activated in response to friction; they function to protect the anatomical and physiological structures beneath the skin. If I ride around in my car for a few weeks, however, my tires do not grow thicker. My feet, as much subject to the laws of physics as my tires, are in addition shaped by organic natural selection. They exhibit adaptations that exist because of the fitness benefits they conferred in the past.

Only three theories have been proposed to account for the origins of these complex organic mechanisms known as adaptations. The first is evolution by natural selection (Darwin 1859; Hamilton 1964). The second is "creationism." The third is "seeding theory," the idea that extraterrestrial organisms visited the earth many years ago and planted the seeds of life. Creationism and seeding theory, largely incapable of being verified or disproved by observation or experiment, are not scientific theories. Evolution by natural selection, in contrast, is a powerful and well-articulated theory that has successfully organized and explained thousands of diverse facts in a principled way (Alexander 1979).



Evolutionary theory promises to circumvent the plethora of seemingly arbitrary personality theories by anchoring a theory of human nature in processes known to govern all life. There is no reason to believe that humans are exempt from the organizing forces of evolution by natural selection. Personality theories inconsistent with evolutionary theory stand little chance of being correct.

## PERSONALITY COMPRISES PSYCHOLOGICAL MECHANISMS AND BEHAVIORAL STRATEGIES

### *The Fundamental Situational Error*

It does not seem to be generally recognized in personality and social psychology that *all* observable behavior is the product of mechanisms residing within the organism, combined with environmental and organismic inputs that activate those mechanisms (Cosmides & Tooby 1987). No behavior can be produced in the absence of mechanisms. There is no such thing as a purely environmental or situational cause of behavior. If a person responds to the presence of a group by conforming (e.g. Asch 1955) or by social loafing (Latane 1981) but a cockroach, a rat, or a chimpanzee does not conform or loaf in response to identical environmental inputs, then there must be something about the *psychological mechanisms* of humans that differs from those of the cockroach, rat, or chimp.

Such mechanisms are a necessary and central part of any sensible causal explanation of observed behavior. The fundamental situational error is to assume that, because situational variance can "account for" behavioral variance (e.g. changes in situation can be correlated with changes in obedience, conformity, social loafing), a coherent explanatory account need not invoke stable psychological mechanisms (e.g. dispositions, decision-rules, structures, processes) residing within the organism. Without internal mechanisms there can be no behavior. The fundamental situational error is as often committed in sociobiology and behavioral ecology as in personality and social psychology (see Symons 1990).

At some fundamental level of description, evolution by natural selection is the process that creates physiological, anatomical, and psychological mechanisms. Therefore the crucial question is not *whether* evolution is relevant to the understanding of human behavior but how it is relevant.

### *Problem-Specificity of Psychological Mechanisms*

How has biological evolution affected psychological mechanisms? A continuum of possible answers can be evaluated. At one end is the possibility that natural selection has produced in humans a few domain-general mechanisms—e.g. a capacity to learn by operant conditioning or to reason inductively. If this were the case, then psychologists could legitimately focus on

how these domain-general mechanisms develop more or less arbitrary psychological structures during ontogeny (i.e., study learning histories and schedules of reinforcement). Evolutionary theory would not further illuminate psychology and could be largely ignored. The assumption of domain-general psychological mechanisms, promulgated in this century by Watson (1924) and Skinner, remains implicit in much current psychological theory (see Rozin & Schull 1988 and Symons 1987 for useful discussions).

At the other end of the continuum is the possibility that natural selection has created many domain-specific psychological mechanisms that solve particular adaptive problems (Cosmides & Tooby 1987; Symons 1987). Evolutionary theory can become a scientifically useful metatheory for personality psychology to the degree that human psychological mechanisms (*a*) operate according to different principles across different adaptive domains, (*b*) number in the dozens, hundreds, or thousands, and (*c*) are complex solutions to specific adaptive problems.

Human psychological mechanisms undoubtedly vary in domain-generality. Some apparently solve a specific problem (e.g. an 8–24-month-old's fear of strangers solves a safety problem), whereas others may solve several problems (e.g. mechanisms of status striving partially solve the problems of attracting mates and of securing resources for offspring). Recent work in evolutionary psychology, however, suggests that the effects of natural selection cannot have produced solely or even primarily a few domain-general mechanisms (Barkow et al 1990; Cosmides & Tooby 1987; Symons 1987, 1990; Tooby & Cosmides 1990a).

There are two bases for this conclusion, one empirical and one conceptual. First, many experiments in the past 25 years have documented systematic violations of proposed domain-general "laws" of learning (Herrnstein 1977; Rozin & Schull 1989). Consider the fact that the objects of human fears and phobias are not a random assortment: More people fear heights, snakes, darkness, spiders, and strangers than fear guns, cars, or electrical outlets (Seligman 1972). Humans are apparently predisposed to learn more easily and rapidly to avoid some things (e.g. those that were environmentally hazardous earlier in human evolution) than others (e.g. those that are environmentally novel). Recent evolutionary psychological findings in aggression, attraction (Langois & Roggman 1990), social exchange (Cosmides 1989), self-deception (Lockard & Paulhus 1988), decision theory (Cooper 1987), psychophysics of perception (Shepard 1984), language (Pinker & Bloom 1990), and many others all point to a single powerful conclusion: Human psychology involves many complex and domain-specific mechanisms, each suited to serve a particular function.

A second rationale for conceptualizing psychological mechanisms as numerous, specific, and complex derives from the nature and number of the adaptive problems that humans and their ancestors have faced. Consider, as



an analogy, animal adaptations favoring physical survival. Most terrestrial mammals have evolved solutions to the survival problems of extreme heat (sweat glands or other evaporation mechanisms), cold (shivering), diseases and parasites (immune system), predators (specific evasive capacities), wounds (blood clotting), and what food objects to consume (taste preferences for sugar, salt, and fat). In the realm of reproduction, many primate species have had to solve the social problems of intrasexual competition, mate attraction, mate selection, mate retention, hierarchy negotiation, coalition-building, dyadic reciprocal alliance formation, and parental investment, to name just a few. Now, sweat glands do nothing to solve the problem of what foods to put into one's mouth or how to combat parasites. Solutions to the problem of attracting mates contribute little toward solving the problem of detecting nonreciprocators in social exchange. Different problems typically select for different adaptive solutions; natural selection results in a multiplicity of specific adaptations over time. Evolutionary psychologists expect psychological mechanisms to be many and domain-specific.

## *The Sociobiological Fallacy*

Evolutionary psychology is best regarded as a theory about the origins, rather than the content, of human nature (Symons 1990; Tooby & Cosmides 1989). Some sociobiological writings err by assuming that natural selection has produced in humans a general motivation to maximize one's inclusive fitness—i.e. a domain-general psychological mechanism such as an "inclusive fitness maximizer."[1] One problem with this view is that fitness cannot be tracked within an individual's lifetime; only correlates of fitness (such as mating success or food acquisition) can be tracked. A second problem is that what constitutes fitness differs radically across species, sexes, ages, and adaptive domains. Hence, even in principle, there can be no domain-general way to maximize fitness or reproductive success. Humans thus cannot have psychological mechanisms the goal of which is to maximize reproductive success (either consciously or unconsciously). Instead, we have mechanisms that exist in their present form because in our evolutionary past they successfully solved specific adaptive problems. The fact that successful solutions evolve through a process of differential reproductive success does not mean that the solution mechanisms are domain-general fitness maximizers.

## *Behavioral Strategies, Tactics, and Acts*

Personality psychologists seek to characterize relatively enduring or stable human *psychological mechanisms*, including the qualitative and quantitative

[1]Inclusive fitness may be defined as "the sum of an individual's Darwinian fitness (personal reproductive success) and his or her influence upon the Darwinian fitness of relatives, weighted according to their coefficients of relatedness to the focal individual" (Daly & Wilson 1983:393).

ways such mechanisms differ across individuals (e.g. Tellegen 1990). Psychological mechanisms evolve because they have behavioral consequences. Status-striving mechanisms, for example, could not evolve unless they reliably produced classes of acts that actually led to the increase or maintenance of positions within social hierarchies. Thus, behavioral strategies, tactics, and classes of acts are an essential part of a correct description of evolved psychological mechanisms. In this view, a general theory of personality must correlate evolved psychological mechanisms, their accompanying behavioral strategies, and the specific adaptive problems they were designed to solve.

## EVOLUTIONARY FOUNDATIONS OF PERSONALITY

### *Adaptive Problems and Their Solutions*

Adaptive problems are of two major kinds—those of individual survival and those of reproduction. All living organisms have ancestors who successfully solved survival and reproductive problems. Some solutions are anatomical, some are physiological, and some entail psychological mechanisms whereby information is processed according to decision rules that produce output that solves a particular adaptive problem.[2] Some adaptive solutions occurred long ago in the mammalian and primate lineages that led to humans. Each species, however, possesses adaptations that are unique as well as those shared with some other species.

SURVIVAL PROBLEMS Darwin (1859) identified many of an organism's major survival problems, subsumed by what he called the "hostile forces of nature." These include food shortages, harsh climate, disease, parasites, predators, and other natural hazards. Evolved psychological contributions to the solutions to some of these (e.g. fear of strangers) are of concern to personality psychologists. However, because differential *reproductive* success is the key process in evolution by natural selection, reproductive problems, many of which are inherently social, are more central to evolutionary personality psychology, as illustrated below.

[2]I provisionally define an evolved "psychological mechanism" as a set of processes inside an organism that 1. exist in the form they do because they (or other mechanisms that reliably produce them) solved specific problems of individual survival or reproduction; 2. take only certain classes of input, where input (*a*) can be either external or internal, (*b*) can be actively extracted from the environment or passively received from the environment, and (*c*) specifies to the organism the particular adaptational problem it is facing; and 3. transform that information into output through a procedure (e.g. decision rule) where output (*a*) regulates physiological activity, provides information to other psychological mechanisms, or produces action, and (*b*) solves a particular adaptational problem. Species have evolved psychologies to the degree that they possess mechanisms of this sort.



REPRODUCTIVE PROBLEMS Major classes of problems that humans (like many species before them) have had to solve for successful reproduction were: 1. *successful intrasexual competition:* besting members of one's own sex to gain access to desirable members of the opposite sex; 2. *mate selection:* choosing from the pool of potential mates those with the greatest reproductive value; 3. *successful conception:* engaging in the necessary social and sexual behaviors to fertilize a mate, or to become fertilized by a mate; 4. *mate retention:* preventing the encroachment of intrasexual competitors as well as preventing one's mate from defecting or deserting (this problem arises only when pursuing a long-term mating strategy, and does not apply to mating strategies tailored to brief, opportunistic copulation); 5. *reciprocal dyadic alliance formation:* initiating dyadic relationships characterized by cooperation and reciprocity; 6. *coalition-building and maintenance:* participating in cooperative groups whose interests are more closely aligned with group members than with competing groups (Manson & Wrangham 1990; Tooby & Cosmides, 1988); 7. *parental care and socialization:* engaging in actions to ensure the survival and reproductive success of one's offspring; and 8. *extra-parental kin investment:* incurring costs to self that benefit nondescendant genetic relatives.[3]

Each of these problems subsumes a host of subproblems. Successful intrasexual competition among humans, for example, probably entails: (*a*) acquisition of resources required by a potential mate (e.g. Townsend 1989), (*b*) successful negotiation of social hierarchies (Kyl-Heku 1990), (*c*) formation of successful reciprocal alliances and coalitions (Cosmides 1989), (*d*) appeasement, or at least not nonalienation, of relatives and friends of the potential mate (Buss 1988a,b), (*e*) successful courtship of the potential mate (Buss 1988a,b), and (*f*) derogation of intrasexual competitors to the potential mate (Buss & Dedden 1990). A personality psychologist who understands in detail the survival and reproduction problems confronting early humans (and their ancestor species) is in a position to identify the relatively enduring psychological solutions.

THE LIMITATIONS OF EVOLUTIONARY THEORY: CONSTRAINTS ON THE DETECTION AND PREDICTION OF ADAPTATIONS While general evolutionary theory broadly outlines what is *unlikely* to have evolved (e.g. adaptations that favor other species or conspecific competitors), it can rarely specify what *must* have evolved. Nothing in general evolutionary theory could have predicted, for example, such adaptations as a turtle's shell, a giraffe's neck, human hairlessness, bipedal locomotion, or a universal language grammar.

[3]Of course solutions to some of these problems (e.g. coalition-building and reciprocal alliance formation) contribute to individual survival as well as to reproduction.

Evolution-based models of particular adaptive domains, in contrast, can sharply constrain the range of possible adaptations and thus have predictive and heuristic value. For example, we can predict that in species (such as ours) that engage in protracted social exchange, mechanisms for detecting cheaters must evolve (Cosmides 1989). Likewise, species (such as ours) that form social hierarchies must have mechanisms for monitoring status, position, and reputation (Buss 1986; Stone 1989). There is no substitute for specific evolutionary models of particular content domains such as social exchange (Cosmides 1989), coalition formation (Tooby & Cosmides 1988), and hierarchy negotiation (Stone, 1989). It is at the level of evolution-based models of particular adaptive domains, rather than at the level of general evolutionary theory, that specific hypotheses can be confirmed or falsified.

Several other cautions should be noted. First, some biological phenomena arise through processes other than natural selection. Examples include those due to genetic drift, pleiotropy, or chance (see Dawkins 1982). Second, some mutations may be neutral with respect to natural selection, and thus endure without being adaptive. Third, the scientific standards of evidence for invoking the concept of adaptation are often difficult to meet (Williams 1966).

Finally, cleaving psychological and behavioral phenomena into functionally significant units remains a central and extraordinarily difficult theoretical task for the evolution-minded psychologist. Evolutionary psychology attempts to ground its description of basic psychological mechanisms in adaptive function and by so doing escapes arbitrariness.

## *Human Nature*

All "grand" theories of personality have hypotheses about the contents of human nature as their core, be they motives for sex and aggression (Freud), self-actualization (Maslow), effectance (White), striving for superiority (Adler), or striving for status, power, popularity, or intimacy (Hogan, McAdams, McClelland, Wiggins). Even the most radical behaviorist has an implicit theory of human nature—i.e. that it consists of a few domain-general psychological mechanisms such as those of operant conditioning (Symons 1987). If humans have a nature different from that of the gorilla, dog, rat, or cockroach, what are its contents and how can we discover them?

In a recent special issue of the *Journal of Personality*, Tooby & Cosmides (1990b) argue that human nature comprises the species-typical solutions that humans have evolved in response to the selective pressures we faced in our ancestral conditions. They argue that the constraints of sexual recombination and the necessarily polygenic nature of complex adaptations virtually dictate a human nature that is unitary, although susceptible to quantitative variation. This renders unlikely the idea of distinct "personality types" based on entirely different sets of genes. Despite the clear-cut genetic distinction between them,



even males and females are expected to share a universal functional structure in most respects, differing only in those domains where they have faced recurrently different adaptive problems.

Several recent articles attempt to identify the particulars of this unitary human nature. Wiggins (1990), for example, argues that two motivational modes, agency (strivings for power and mastery that differentiate the individual) and communion (striving for intimacy, union, and solidarity with others), provide conceptual coordinates for understanding interpersonal behavior. He reviews the literature on agency and communion from a variety of theoretical perspectives, including an evolutionary one. Sex differences in agency and communion (e.g. men's greater levels of physical aggressiveness; women's greater levels of empathy) may stem from the distinct reproductive problems that men and women have faced in ancestral environments—problems of gaining access to mates through intrasexual competition and problems of elevated parental investment in children.

Hogan (1990) argues that the basic human motivators are status and popularity. According to Hogan the most important social problems early humans had to solve to survive and reproduce involved establishing cooperative relations with other members of the group and negotiating hierarchies. Achieving status and popularity likely conferred a host of reproductively relevant resources, including better protection, more food, and more desirable mates.

Like Wiggins and Hogan, Baumeister (1990) notes the importance of group living. He proposes that anxiety is a species-typical adaptation that prevents social exclusion. Those who were indifferent to being excluded by others may have experienced lower reproductive success than those whose psychological mechanisms caused them to maintain inclusion in the group by avoiding acts that might elicit criticism.

The importance of group living is also evident in the work of Cosmides (1989). She concludes, from an evolutionary analysis, that in complex reciprocal social exchange, individuals would be favored who possessed psychological mechanisms that would alert them to "cheaters"—i.e. those who take without giving. Her evidence that humans now exhibit such a mechanism for detecting cheaters shows how psychologists can experimentally document domain-specific adaptations that comprise important parts of human nature.

Daly & Wilson (1990) use evolution-based reasoning to argue that Freud's universal Oedipal complex is inconsistent with evolutionary biology. Using Trivers's (1974) theory of parent-offspring conflict, they argue that Freud failed to distinguish two sorts of conflict—an early nonsexual father-son conflict over how a mother's reproductive efforts should be expended, and a later sexual rivalry not over the mother (who is probably of low fertility at that point) but over possible mates. Daly & Wilson review previous data and

present new data refuting the central Freudian claim of a same-sex contingency in parent-offspring antagonism during the Oedipal phase. They thus use an evolutionary analysis and empirical data to provide a more accurate portrait of human nature.

These recent evolutionary trends in personality theory, however, represent exceptions to the historical norm. Personality theories have typically been formulated in innocence of the processes that shaped personality. Consider, for instance, Epstein's (1990) claim that "the person in everyday life is motivated to live his or her life in an emotionally satisfying way. . . . Personal theories of reality have four basic functions: to assimilate the data of reality . . . [, to] maintain a favorable pleasure-pain balance, to maintain relatedness to others; and to maintain a favorable level of self-esteem" (p. 166). Epstein may well have hit upon some key insights, but the theory does not explain why human nature should be so constructed.

An evolutionary perspective can provide constraints upon otherwise unanchored assertions about motivation. For example, evolutionary thinking points to particular others with whom people will strive to "maintain relatedness"—those who make good reciprocal allies (Cosmides 1989), those elevated in social hierarchies (Stone 1989), mates of high reproductive value (Buss 1989a), those who are genetically related (Hamilton 1964), and those who will make good members of one's coalition (Tooby & Cosmides 1988). These five types of relationships—dyadic alliances, hierarchical relationships, mateships, kinships, and coalitions—subsume most important human relationships. People do not simply "maintain relatedness," they nurture and train their children in particular ways (Low 1989), help their coalitions to out-compete other coalitions, cooperate with their reproductively valuable mates, protect and defend their kin, and exchange reproductively relevant resources with allies.

Progress in identifying the fundamental psychological mechanisms and behavioral strategies that comprise human nature should accelerate once the study of these mechanisms is based on careful analysis of the fitness problems that humans likely had to solve in ancestral conditions. Those who failed to solve these problems were not our ancestors; whatever mechanisms led directly to their failure we did not inherit. Current humans and their functional mechanisms are all products of evolutionary success.

## *Goal-Directed Tactics and Strategies as Units of Analysis*

Evolved psychological mechanisms do not reside passively within the skulls of humans. They propel us to act toward particular goals, the attainment of which historically led to reproductive success. The actions generated by psychological mechanisms are not mere "physicalistic acts" (Fiske 1988), but rather are charged with emotion and are specific to context. Indeed, goal-directed behavioral strategies compose part of the essential description of evolved psychological mechanisms.



An emerging trend within the field of personality psychology has been the proposal and exploration of tactics and strategies as units of analysis (Buss & Cantor 1989; Pervin 1989). These have been given different labels by different investigators: personal projects and acts that accomplish them (Little 1989), life tasks and the strategies used to accomplish them (Cantor 1990; Langston & Cantor 1989; Zirkel & Cantor 1990), personal strivings and their act instantiations (Emmons 1990), current concerns (Klinger 1975), and reproductively relevant goals and the tactics used to accomplish them (Buss 1988a,b). These investigators share the idea that humans deploy cognitive, motivational, emotional, and behavioral strategies to accomplish particular goals (e.g. Carver & Scheier 1990; Pervin 1989).

Many researchers study aspects of these units on which individuals differ. People differ, for example, in their use of defensive pessimism as a cognitive strategy (Cantor 1990), in the degree to which they feel that their various projects conflict (Little 1989), and on the efforts they apportion to intimacy and achievement (Emmons 1990). The fascinating diversity of human strategies and strivings, however, should not divert investigators from the likelihood that at some fundamental level of description many goals will be shared by all humans.

Humans speak a diversity of languages, but the "language organ" has evolved in all humans and shows strong evidence of adaptive design (Pinker & Bloom 1990). Humans eat diverse foods, but all humans share taste preferences for substances rich in fat, sugar, salt, and protein (Rozin 1976). Science usually proceeds by discovering the deep structure that accounts for the complex and variegated surface structure. Geologists, for example, were bewildered by complex and apparently unique phenomena such as volcanoes, earthquakes, continental drift, and mountain formations until plate tectonic theory showed them all to be caused by interactions among the underlying plates on which continents and oceans rest. Personality psychology may now be positioned to make an analogous scientific advance, but it cannot do so without understanding the fundamental mechanisms that underlie manifest diversity.

The goal-based research programs pursued by different investigators often identify similar fundamental goals. Consider these examples: "To make attractive women [men] notice me more" (personal striving), "to have sex" (personal project), "to get a boyfriend [girlfriend]" (life task), "to attract mates" (evolutionary life task), and "to maintain my marital relationship" (current concern). From an evolutionary perspective, all these forms of effort constitute mating effort and are thematically related to reproduction. Successful mating is a task that must be accomplished for sexual reproduction.

Individuals whose psychological properties led them to succeed at this task are our ancestors. The fact that the theme of successful mating emerges repeatedly from goal-based personality research suggests that these methods provide powerful tools for exploring functionally significant life tasks.

Two other behaviors that have major evolutionary significance are the negotiation of hierarchies and the formation of reciprocal alliances (Buss 1986). Surveys repeatedly show people listing such personal goals as getting a promotion, graduating from university, being more productive at work, dominating people in certain situations, and making friends (Emmons 1990). Because position within social hierarchies historically bestowed on the successful a host of reproductively relevant resources (e.g. more food and better mating opportunities), rising in hierarchies or status-striving likely constitutes a major species-typical goal of humans (Betzig 1986; Buss 1986; Hogan, 1983; Sadalla et al 1987; Symons 1990). Because establishing cooperative social exchanges represents an effective form of reproductive competition, reciprocal alliance formation should also comprise a major motive of humans (Axelrod 1984; Cosmides 1989; Trivers 1971).

It is not by chance that so much attention has been paid to human motives such as achievement (McClelland 1989), power (Winter 1987), and intimacy (McAdams 1988). Not by chance do power and love emerge consistently and cross-culturally as the two most important axes of interpersonal behavior (Carson 1990; Kiesler 1990; White 1980; Wiggins 1990). These goals are framed in somewhat different ways for different individuals, and the strategies used to attain them vary; but such individual variability should not lead us to ignore shared features of our evolved human nature. Human effort (strivings, projects, tasks, concerns, and their attendant strategies and acts) is commonly directed by goals that historically have been linked with inclusive fitness. Goals and their attendant strategies across the life span are likely to be a central focus of personality research in the 1990s (see Caspi & Bem 1990; Eder 1989; Helson & Picano 1990; Ozer & Gjerde 1989).

Goal-directed strategic effort arises from psychological mechanisms that owe their existence and form to evolution by natural selection. Although most goal-based research has focused on consciously articulated tasks, nothing in an evolutionary perspective requires that humans be aware of either the psychological mechanisms or the ultimate functions of goal pursuit. The crucial issue is whether these strivings and their underlying psychological mechanisms show evidence of function and meet rigorous standards of evidence for adaptation. For example, such mechanisms should show evidence of efficiency, economy, precision, and complexity of design that is uniquely tailored to solving a particular problem. Furthermore, a plausible account of a history of selection that could have created them and evidence of species-typicality of functional design add greater credence to a hypothesized adaptation. The discovery of a species-typical goal-structure underlying observed behavioral strategies will constitute a major and lasting scientific advance in personality psychology.



### *Personality as the Adaptive Landscape: The Five-Factor Model in Evolutionary Perspective*

A previous *Annual Review* chapter (Digman 1990) thoroughly reviewed the empirical work on the five-factor model of personality (see also Botwin & Buss 1989; John 1990; Peabody & Goldberg 1989; Watson 1989). The five factors, variously labeled, are: surgency (extraversion), agreeableness, conscientiousness (will to achieve), emotional stability, and intellect (openness). This work is primarily descriptive and shows the robustness of the five-factor model across time, contexts, cultures, and data sources. One need not believe that there are *only* five important personality dimensions (e.g. DeRaad & Hoskens 1990; Tellegen 1985) to reach the conclusion that these five should be included in any major personality taxonomy. Descriptive work documents the robustness of these factors, but does not elucidate why they are so frequently found.

From an evolutionary perspective, there are three ways to explain the prominence of the five factors: 1. These factors may represent fundamental differences in the strategies humans use to accomplish species-typical goals; 2. they may, on the other hand, signify mere "noise" in the system—variations that were neutral with respect to natural selection, and hence evolutionarily unimportant; or 3. the five factors may summarize the most important dimensions of the social landscape to which humans have had to adapt (Buss 1989c). I consider the third option first.

The core of the "personality as the adaptive landscape" view is that perceiving, attending to, and acting upon differences in others is crucial for solving problems of survival and reproduction. One piece of evidence favoring this view is the finding that trait terms are inherently evaluative. Peabody (1985) found that fewer than 3% of trait terms were evaluatively neutral; more than 97% have definite evaluative (as well as descriptive) aspects (see also Hofstee 1990). Hogan (1990) argues that trait terms reflect observer evaluations of others as potential contributors to, or exploiters of, the group's resources. Borkenau (1990) proposes that traits are evaluative goal-based social categories and provides evidence for this view. For example, individuals must evaluate the conscientiousness (Factor III) of others in order to decide whom to trust with tasks. Borkenau argues that a selective advantage would accrue to persons with the ability to perceive and act upon these major individual differences in others. In a similar vein, Graziano & Eisenberg (1990) place agreeableness (Factor II) in evolutionary perspective, arguing that coordinated group action is best accomplished when individuals are

willing to cooperate and conform to group norms, and suspend their individual concerns for the good of the group (see Wiggins 1990 for a similar account). This implies that it is crucial for people to evaluate individual differences in agreeableness for deciding on group inclusion.

As a species humans live in groups (e.g. Tooby & DeVore 1987). Groups historically afford protection from predators, protection from marauding males, the possibility of cooperative hunting of large game, and a pool of potential mates. But groups also impose costs. With group living comes an intensification of competition, risk of communicable diseases, depletion of resources, and aggression from other group members. Other humans are our primary "hostile force of nature." Other humans define many of the problems to which we must adapt, and are capable of facilitating or interfering with our reproductive strategies (cf Byrne & Whiten 1988).

I have hypothesized (1989c) that personality traits such as surgency, agreeableness, and conscientiousness are the most important psychological dimensions of our social adaptive landscape. They provide information for answering adaptively important life questions: Who is high or low in the social hierarchy? Who is likely to rise in the future? Who will make a good member of my coalition? Who possesses the resources that I need? Who will share their resources with me? With whom should I share my resources? Who can I go to for advice? Whom can I depend on when in need? With whom should I mate? Who will be a good cooperator and reciprocator? Who might do me harm? Whom can I trust? Who will betray my trust? I hypothesize that people have evolved psychological mechanisms sensitive to individual differences in others that are relevant to answering these critical questions.

Human groups are 1. often intensely hierarchical, with important reproductive resources closely linked with position in the hierarchy (e.g. Hogan 1983; Lopreato 1984), and 2. characterized by elevated forms of *cooperation* and *reciprocal alliance formation* compared with all other mammalian species (Axelrod 1984; Tooby & Cosmides 1989; Trivers 1971). The importance of hierarchy suggests that *location* of others in the hierarchy and differences in the *proclivities* of others to ascend in the hierarchy are extremely important features of the human adaptive landscape. The prevalence of reciprocal alliance formation suggests that a second critical feature of the human adaptive landscape is the differential proclivity of others to "cooperate" or to "aggress."

I have argued (1989c) that the persistent emergence of surgency (Factor I) and agreeableness (Factor II) as the two major axes in interpersonal taxonomies and as the first two factors in personality-descriptive taxonomies (McCrae & Costa 1989; Trapnell & Wiggins in press) results from the advantage humans gain from discerning others' hierarchical positions and proclivities to form reciprocal alliances. During the course of human evolution, individuals



who were able to discern accurately and act upon these dimensions of their social context likely attained a reproductive advantage over those who failed to discern them. Studies of competition and mating support specific predictions from an evolutionary analysis of these features of the human adaptive landscape (Buss 1989c).

In sum, the five factors of personality, in this account, represent important dimensions of the social terrain that humans were selected to attend to and act upon. Whenever individuals differ in ways relevant to the problems of survival and reproduction that humans must solve, a selective advantage would accrue to those whose capacity to discern the differences enabled them to increase their inclusive fitness.

We turn now to the question of why there would be such important differences among individuals to begin with.

## *Explaining the Origins of Individual Differences—Dispositions as Evolved Problem-Solving Strategies*

Evolutionary accounts of the origins of individual differences fall into three basic categories: 1. Individuals may differ in their adaptive *strategies*; 2. individual differences could be incidental by-products of strategy differences; or 3. individual differences could be the product of noise in the system (e.g. mutations that were selectively neutral, and hence not eliminated by natural selection). Although the "incidental by-product" and "noise" accounts are viable alternatives, the "strategic differences" account is the most intriguing theoretical possibility, and so I examine it in detail.

There are four major evolutionary routes to the emergence of consistent individual differences in dispositional strategies (discussed further below): 1. *heritable alternative strategies:* genetically based strategy differences due to frequency-dependent selection or selection within alternative niches (cf Tooby & Cosmides 1990a; Hamilton 1987); 2. *heritable calibration of psychological mechanisms:* where the adaptive optimum has changed or fluctuated over time or place, producing heritable variation in the calibration or threshold of a species-typical mechanism; 3. *situationally contingent alternative strategies:* situational activation of different strategies, all of which comprise a species-typical repertoire inherent in each individual; and 4. *developmental calibration of psychological mechanisms:* where individually different experiences during development calibrate or set a threshold on a species-typical mechanism in a continuous fashion, producing a distribution of individual differences.

To illustrate these alternatives, consider the findings on individual differences in mating strategies in frogs (Howard 1981). Dominant males emit loud croaks that attract female frogs. Smaller male frogs sometimes sit silently nearby and intercept females as they approach the resonant croaks—a

"satellite" strategy. If genetic differences limit each frog to one of the two behaviors then we have here an example of heritable alternative mating strategies. In contrast, if all male frogs can use either strategy and the observed behavior varies directly with the circumstances (e.g. whether or not larger frogs dominate the pond), then this example shows environmentally contingent alternative strategies. A third possibility might occur when the optimum threshold for shifting from a dominant strategy to a satellite strategy has fluctuated over time or across niches occupied by these frogs. In this case, there could be heritable differences in the threshold for shifting from one strategy to another *or* environmental calibration of the threshold for shifting from one strategy to another.

HERITABLE ALTERNATIVE STRATEGIES Tooby & Cosmides (1990a) outline the observations that would support heritable determination of dispositional strategies: 1. For each putative strategy a range of personality variables should covary in an organized, coordinated fashion; 2. the variables must covary in ways that fulfill criteria for adaptation, and 3. the alternative dispositions should show evidence of frequency-dependent selection (i.e. that the adaptive payoff of any one type decreases when the relative frequency of that type increases in the population). Of course behavioral genetic methods must show that the individual differences are heritable.

These standards of evidence are extraordinarily difficult to meet. The male-female difference does meet these rigorous standards (cf Buss 1990; Savin-Williams & Weisfeld 1989). Men and women differ on a suite of personality and physiological variables that covary in an adaptive fashion and show evidence of frequency-dependent selection (Symons 1979). Although no other proposed personality types or differences have yet been shown to meet these standards, there are several promising candidates.

Snyder et al (1986) and Gangestad & Simpson (1990) have identified a suite of personality characteristics that covary with female "sociosexual orientation" (the latter captures an individual's tendency to form long-lasting mateships rather than seek brief sexual encounters); and there is evidence that this suite is heritable (see also Rowe et al 1989). These researchers argue that women using the short-term strategy increase their chances of being inseminated by men with greater attractiveness, whereas women using the long-term strategy elicit more substantial male parental investment. Gangestad & Simpson (1990) report empirical evidence of bimodality in sociosexual orientation, thus supporting one prediction from their theory. This theory (which requires further empirical testing—e.g. to determine whether the characteristics in question are maintained through frequency-dependent selection) illustrates the possibility of heritable alternative strategies within sex. In addition, because sociosexual orientation is clearly linked with surgency (Factor I) and conscientiousness (Factor III), this research provides compelling links among traditionally conceived personality variables, the concept of dispositions as strategies, and evolutionary theory.



HERITABLE CALIBRATION OF THRESHOLDS ON PSYCHOLOGICAL MECHANISMS Most personality dispositions seem to be continuously distributed in the population, an observation that raises doubt that they represent heritable alternative adaptations. However, the moderate heritability associated with these continuous distributions (e.g. Bouchard & McGue 1990; Eysenck 1990; Goldsmith 1989; Loehlin et al 1990) is compatible with the hypothesis that the adaptive optima for some strategies have fluctuated over time or place.

Zuckerman (1990), for example, argues that heritable individual differences in sensation-seeking may represent variation in tendencies or thresholds for approaching or avoiding resources (including mates), with different thresholds carrying costs as well as benefits. In ancestral environments, those with a greater tendency to seek sensation may have obtained reproductive resources through vigorous approach behaviors but may have incurred substantial risk in the process. Those with a lesser tendency to seek sensation may have avoided these risks but also failed to accrue the reproductive benefits probabilistically associated with approach. Because sensation-seeking is normally rather than bimodally distributed, different thresholds for sensation seeking are evidently not distinct alternative strategies. But they may represent differences in threshold setting that signify past environments or niches that imposed different adaptive optima. Niches where food resources were scarce, for example, may have favored a lower threshold for risk-taking and sensation-seeking, whereas niches where resources were reliably present may have favored a higher threshold for risk-taking.

Personality dimensions tend to be continuously rather than bimodally distributed. Variation in surgency, conscientiousness, emotional stability, and openness-intellect (but not agreeableness) is moderately heritable (Plomin & Nesselroade 1990). These findings are consistent with, but do not prove, the hypothesis that these major personality dimensions represent heritable calibration of basic psychological mechanisms. They rule out the hypothesis that such individual differences represent disjunctive alternative strategies. This explanation of individual differences remains speculative because we lack precise knowledge of the relevant environmental fluctuations.

DEVELOPMENTAL OR SITUATIONAL CALIBRATION OF PSYCHOLOGICAL MECHANISMS Evidence of low heritability of personality factors is compatible with the hypothesis of environmentally contingent strategies of either the disjunctive or the continuous variety (cf Crawford & Anderson 1989). Since these strategies are possessed by all members of a species, genetic variation cannot account for them. Instead, individuals differ as a function of variable external conditions.

Two programs of research in personality psychology have explored environment-contingent species-typical strategies. Draper & Belsky (1990) propose that people whose fathers were present during early childhood exhibit delayed puberty, delayed onset of sexual activity, stability in adult pair-bonding, and a set of personality characteristics that includes low self-monitoring and high cooperativeness (high agreeableness in five-factor models). People whose fathers were absent during early childhood develop an alternative personality constellation and reproductive strategy involving early onset of puberty and sexual activity, unstable pair-bonding in adulthood, low parental investment, high self-monitoring, and high aggressiveness.

The Draper-Belsky theory is consonant with a recent report that the agreeable-aggressive dimension on five-factor models differs from the other four in showing low heritability (Plomin & Rende 1991). Individual differences in agreeableness appear to stem from environmental, not genetic differences. The fact that developmental studies show aggressiveness to be fairly stable over time (Olweus, 1979) suggests that developmental calibration probably occurs early in life. Thus if any important personality difference results from developmental calibration of genetically invariant psychological mechanisms, the agreeableness factor is the most promising candidate.

These are not, of course, the only possibile explanations for the origins of individual differences. The "incidental by-product" and "noise" accounts cannot be ruled out (Tooby & Cosmides 1990a). Similarly, some personality differences may be the incidental by-product of assortative mating or other processes known to increase genetic variance. There is evidence, for example, that at least some individual differences in IQ are due to the incidental effects of assortative mating for intelligence over the past four or five generations—a process in part attributable to cultural institutions such as places of higher education. In cases like these, it would be mistaken to view individual differences as evolved strategic differences.

All these accounts are recent and require more systematic research before firm conclusions can be reached. Personality psychologists in the 1990s will likely focus on testing these alternative explanations of the origins and nature of individual differences. The concept of dispositions as strategies (whether due to basic genetic differences, to heritable calibration of psychological mechanisms, to situational elicitation of strategies possessed by all, or to developmental threshold calibration of psychological mechanisms) should stimulate personality study in the next decade.

### *Interim Summary*

Evolutionary personality theory involves the following essential components:

1. *Identification of the adaptive problems confronted by ancestral human populations* (with an emphasis on social problems). This task includes characterizing the probable *human adaptive landscape* of that period—that is, the challenges and benefits produced by conspecific competitors and cooperators. These fellow humans likely differed in major ways, as in their hierarchical proclivities (surgency), their willingness to cooperate (agreeableness), their capacity for reliable work and enduring commitment (conscientiousness), their ability to handle stress (emotional stability), and their propensity for innovation or astuteness in solving problems (openness, intellect).

2. *Correlation of currently observable personality factors with the proposed problems of ancestral populations,* to support the hypothesis that the former evolved because they were solutions to the latter. Such adaptations include relatively enduring psychological mechanisms and the behavioral strategies they produce.

3. *Identification of the major individual differences in the ways humans adopt and deploy dispositional strategies.*



## CLARIFYING CORE CONTROVERSIES IN PERSONALITY PSYCHOLOGY

Evolutionary thinking can guide personality theory and research in several ways: 1. It can suggest important domains of inquiry (e.g. hierarchies, coalitions, alliances, kinships, mateships); 2. it "prevents certain kinds of errors . . . and raises suspicions of certain explanations or observations" (Lloyd 1979:18); 3. it "provides a sound criterion for recognizing significant observations on natural phenomena" (p. 18); 4. it lends precision to otherwise unanchored and vague assertions about human nature (e.g. predicts the specific others with whom people will strive to "maintain relatedness"); 5. it explicates observed personality phenomena within a broader theoretical framework (e.g. views five-factor models in the context of the problems of adaptation humans must have solved); and 6. in delimited domains it can sometimes correctly predict previously unobserved phenomena (e.g. Cosmides 1989).

Evolutionary psychology also provides a useful framework for reevaluating several core controversies in the field. It can, for example, help to clarify the debate about personality consistency, clarify the causal status of personality dispositions, explain interactionism, identify the most important features of context and environment, and clarify the roles of emotion, motivation, and culture in personality functioning.

### *An Evolutionary Resolution of the Personality Consistency Debate: Enduring Psychological Mechanisms and Discriminative Manifest Behavior*

The issue of personality consistency has generated much debate over the past two decades (see Ozer 1986). It is now clear that many of the alternative

hypotheses about traits (e.g. that findings of consistency reflect mere "semantic similarity" of trait judgments, or that traits are constructs residing solely "in the eyes of the beholder") can be ruled out (Kenrick & Funder 1988; Mervielde & Pot 1989). Modest agreement can be found across different observers for some traits (Funder 1989). Factors such as friendliness appear to generalize across target persons varying in sex and familiarity (Moskowitz 1988). Nonetheless, high cross-situational consistency in manifest acts is rarely found, and behavior shows marked sensitivity to even slight variations in situations (e.g. Wright & Mischel 1987).

Evolutionary psychology offers one conceptual clarification relevant to issues of personality consistency debate by distinguishing (*a*) evolved psychological mechanisms from (*b*) manifested psychology and behavior (Tooby & Cosmides 1990a). According to an evolutionary psychological perspective, basic psychological mechanisms that have evolved because they solved problems of survival and reproduction will be relatively stable over time. Exceptions would be those that change as a function of life history—e.g. intensification of mating effort at the onset of puberty and a shift from mating effort to parental effort after the birth of a child. Personality, in the sense of a collection of psychological mechanisms, will typically be reasonably consistent over time.

Manifest psychology and behavior, however, result from the interaction between evolved psychological mechanisms and the environmental factors that activate them differentially across individuals. Behavior will thus be highly context dependent and discriminative for at least three reasons. First, each person confronts different problems over time and over situations (e.g. problems of social exchange, hierarchy negotiation, coalition formation), which activate different psychological mechanisms and produce different behavior. The mechanisms activated when threatened by an angry man with a clenched fist differ from those activated when engaged in a mutually beneficial cooperative exchange. Although the manifest behavior will differ along the agreeable-aggressive dimension, the psychological mechanisms remain stable and reliably activated when confronted with those classes of contextual inputs.

Second, each psychological mechanism can generate a host of diverse acts, depending on context, each of which performs the mechanism's function. The status-striving mechanisms hypothesized to underlie surgency, for example, produce acts as diverse as working long hours, socializing selectively, suggesting a new idea to the group, and deceptively exaggerating one's current status (Kyl-Heku 1990). Different acts can express a mechanism that evolved because it once solved a single kind of problem. Third, an act may represent the merged outputs of several psychological mechanisms. According to this view, consistency in personality must be sought at the level of basic psychological mechanisms and the events that reliably activate them, not [as has typically been the case in personality psychology (e.g. Mischel & Peake 1982)] at the level of manifest behavior.



The apparent opposition frequently drawn between "personality consistency" and "behavioral discriminativeness and specificity" disappears according to this analysis. Evolutionary accounts predict that manifest behavior will be highly discriminative and sensitive to context, while the underlying psychological mechanisms remain stable over time and reliably activated when exposed to the same contextual inputs. Variable contextual inputs into stable psychological mechanisms produce discriminative manifest behavior.

Within this formulation, there are four primary contexts in which personality is expected to differ in consistent ways between individuals:

1. When there exist alternative genetic determinants of personality strategies or thresholds (e.g. those that specify male and female personality differences, the restricted and unrestricted types of sociosexuality posited by Gangestad and Simpson, and the heritable differences in sensation-seeking postulated by Zuckerman).

2. When early environments shunt different individuals into different developmental strategies or set different thresholds on psychological mechanisms (e.g. the personality effects of the early absence or presence of the father, posited by Belsky & Draper).

3. When different individuals currently occupy different niches that reliably evoke different behavioral frequencies (e.g. inhabiting a local environment populated with cheaters may elicit consistent noncooperation whereas an environment populated with cooperators would elicit cooperation).

4. When individual differences in ability or morphology produce differences in the effectiveness with which alternative strategies can be adopted or carried out (e.g. mesomorphs may adopt a more aggressive, physically intimidating strategy because they can enact it with greater effectiveness than can ectomorphs).

Prior accounts of personality consistency (or apparent inconsistency) have sometimes emphasized consistency at the "intrapsychic" level (e.g. Allport 1937; Block 1968; Wachtel 1973). These accounts, however, provide no explanation for why there would be stable psychological mechanisms in the first place. Evolutionary personality psychology is an attempt to lend precision to otherwise vague assertions about "intrapsychic consistency" by providing specific accounts of (*a*) psychological mechanisms as evolved solutions to adaptational problems and (*b*) the conditions that reliably activate these mechanisms (e.g. Buss 1989; Cosmides 1989).

## *An Evolutionary Perspective on Interactionism*

Formulating an adequate concept of interactionism has been a major goal of personality psychology at least since Murray (1938). Although interactions in

the ANOVA (analysis of variance) sense generally fail to capture the essence of interactionism in any dynamic sense (Golding 1975), no subsequent interactionist framework has gained broad endorsement, in spite of the fact that most personality psychologists claim to be interactionists.

Recent developments have centered on the role of persons in selecting, evoking, cognitively restructuring, and manipulating features of their environments (e.g. Buss 1987; Caspi & Bem 1990; Caspi & Herbener 1990; Coyne et al 1990; Emmons et al 1986; Hettema 1989; Kenrick et al 1990a; Plomin et al 1977; Scarr & McCartney 1983; Swann et al 1989; Van Heck 1990). These active and reactive person-generated processes create links between features of persons and features of their environments.

Aggressive children, for example, apparently expect others to be hostile, thereby eliciting hostility from others and creating an environment populated with more belligerent acts than the one created by children who are less aggressive (Dodge & Coie 1987). People selectively attend to and elicit behaviors from others that confirm their prior self-concepts (cf Markus & Cross 1990; Swann et al 1989). Adults select as mates those with similar personality dispositions, attitudes, and interests, thus creating an enduring environment that they may inhabit for years or decades (Caspi & Herbener 1990). Ill-tempered boys tend to discontinue their educations earlier, achieve lower occupational status, and suffer divorce more frequently than better-tempered ones (e.g. Caspi & Bem 1990). Selection, evocation, and manipulation describe interactional processes that link features of persons with features of their environments, creating person-environment correspondences.

Specific evolutionary models of goals and life tasks provide theoretical frameworks to predict particular forms of person-environment interaction. There is replicable evidence, for example, that reproductively valuable[4] women can and do select as mates surgent men capable of providing abundant social and material resources for them and their children, thus creating a material and experiential world different from that obtainable by women of lower mate value (Borgerhoff Mulder 1988; Buss 1989a). Similarly, reproductively damaging acts and attributes evoke social revulsion in others (e.g. incompetence, deviance, unattractiveness, adultery, mate poaching, aggression) (Baumeister & Tice 1990). Finally, manipulation is predictably directed toward the same proximate goals (e.g. status attainment, competition for mates, and alliance formation) that led to reproductive success among our ancestors (Buss 1988a,b).

[4]Reproductive value is defined actuarially in units of expected future reproduction—the extent to which persons of a given age and sex will contribute, on average, to the ancestry of future generations.



These evolution-based examples of person-environment interactions are merely illustrative, and provide no magical formula for predicting interactions in other content domains. Because many psychological mechanisms are expected to be domain-specific, there is no substitute for developing specific conceptual models of person-environment interactions within each particular adaptive domain. The processes of selection, evocation, and manipulation, however, represent interactive processes that occur in many domains of personality functioning. Conjoined with evolution-based models, they provide a powerful interactionist framework.

### *Context, Situation, and Environment*

Personality psychologists know that human behavior is highly sensitive to context, but we have not yet determined which features or dimensions of context are important or the ways they are important (but see Van Heck 1990). From an evolutionary psychological perspective, the organism is the final arbiter of important contextual dimensions. Indeed, the psychological mechanisms produced by natural selection are sensitive only to certain forms of environmental input: "The environment, per se, is powerless to act on the psyche of an animal, except in ways specified by the developmental programs and psychological mechanisms that already happen to exist in that animal at a given time. . . . The actual relationship between environment and behavior is created . . . by the nature and design of the information processing mechanisms that happen to exist in the animal" (Tooby & Cosmides 1990a:4).

"Organism" and "situation" do not independently affect personality or behavior. It makes no sense to create a "taxonomy of situations" independent of the psychological mechanisms within humans. Psychological mechanisms evolved because they receive, process, and respond only to certain forms of environmental input. In this view, the dimensions of contextual input important for persons depend on the proximate goals toward which humans direct action and the specific psychological mechanisms activated by each proximate goal. When hunger mechanisms are activated and the proximate goal is food consumption, the relevant contextual dimensions involve substances that differ in their nutritive value, locations that vary in the likelihood of containing such substances, and the costs and benefits of actions that could be used to acquire those substances. Because our personality strategies are facilitated and obstructed primarily by other humans, our most important contextual input is social (see the section above on personality as the adaptive landscape). Evolved psychological mechanisms ensure that these key contextual dimensions will be value-laden. Just as fruits of varying ripeness differ in nutritive value, potential mates differ in mate value, potential cooperators differ in coalition value, and potential friends differ in dyadic alliance value.

Natural selection has created in humans psychological mechanisms that are

highly sensitive to context, not rigid "instincts" that operate regardless of context. Progress in understanding which dimensions of context are important will rest on jettisoning the view that context can be understood independently of the proximate goals and psychological mechanisms of the person. Understanding the importance of context depends on progress in understanding our evolved psychological mechanisms. The environment experienced by an organism is itself the product of evolution.

### *Emotions, Desires, Preferences: Evolved Psychological Mechanisms That Signal Adaptively Significant Features of the Environment*

The study of emotions, broadly conceived to include affect, mood, desire, arousal, attraction, repulsion, and preference, provides one path for identifying adaptively relevant environmental input. These organismic processes have received increasing attention within personality psychology in the past decade (e.g. Clark & Watson 1988; Kagan 1989; Larsen & Kasimatis 1990; Lazarus 1990; Revelle 1990; Tellegen 1985; Watson 1989). Several lines of work have explored the adaptive functions of the emotions, preferences, and desires.

Ellsworth & Smith (1988), for example, documented patterns of appraisal that support the hypothesis that emotions solve adaptational problems. Sadness, for example, produces an expression of distress that elicits aid from others. In a related series of studies, I (1989b) proposed that the exhibition of anger alerts others to the angry person's sense that his/her strategy has been interfered with, and signals a demand that the interference be removed (see also Frijda 1988). Because men and women enact somewhat different sexual strategies, the events that lead to strategic interference in this domain should differ between the sexes. I found that women were far angrier than men about sexual aggressiveness in the opposite sex, whereas men were angrier than women about sexual withholding by the opposite sex. This observation supports Trivers's hypothesis of a link between parental investment and choosiness and the hypothesis that anger functions to alert people to strategic interference. In another line of work, Nesse (1990) developed a taxonomy of the specific functions of different forms of fear and panic. Social anxiety, for example, apparently alerts the organism to threats to status and group membership (see also Baumeister & Tice 1990). Panic, to take another example, is provoked by imminent attack.

People anticipate with pleasure or revulsion the prospect of eating certain foods in ways that reveal our evolved adaptations to food consumption problems (e.g. positive affect to sweet food; negative affect to bitter, sour, or putrid food). Analogously, our affective reactions to potential coalition members, rivals, or mates reveal our evolved adaptations to social problems.



The universal desire of women for men who show cues to resource acquisition (e.g. ambition, industriousness, status) and the universal desire that men express for women who show cues to reproductive value (e.g., youth, physical attractiveness) are affective reactions that reveal our evolved solutions to two types of mating problem (Buss 1989a).

The emotion of jealousy has received increasing research attention. The evidence is strong that jealousy is a major cause of intersexual violence worldwide, particularly violence perpetrated by men against their mates (Daly & Wilson 1988). Among men, jealousy is elicited by suspicions or evidence of sexual infidelity, likely functioning as an evolved mechanism to guard against paternity uncertainty (Daly et al 1982). Consistent sex differences in the focus of jealousy have been documented, with men focusing on the sexual aspects and women focusing more on the loss of time, attention, and resources from the primary relationship (Teismann & Mosher 1978; White & Mullen 1989). Finally, there is evidence that women sometimes intentionally elicit male jealousy (e.g. by showing interest in, or attention to, another man) as a tactic for retaining their mates (Buss 1988b).

Emotions, mood states, preferences, and desires are clearly products of natural selection. The structure of affect and social preferences shows remarkable cross-cultural generality (e.g. Buss et al 1990; Russell et al 1989). Emotions signal adaptationally significant features of context and environment. The field should experience a surge of interest in linking these states to traditional dimensions of personality and understanding their functions in the evolved psychology of humans (e.g. Tellegen 1985; Tooby & Cosmides 1990b).

### *Culture and Personality*

Most personality research tends to be parochial in that it is formulated and carried out within one culture. With the recent establishment of the *European Journal of Personality* there has been an increasing output of cross-cultural personality research (e.g. Angleitner et al 1990; Hettema 1989; Hofstee 1990; Strelau et al 1989; Van Heck 1990). There are both conceptual and empirical benefits to be derived from cross-fertilization among personality psychologists from around the world.

Some of the most important and enduring questions in the field require cross-cultural study. The question posed by Goldberg (1981) a decade ago and more recently by John (1990), "Is the five-factor model of personality universal?", has yet to be answered. However, using Filipino samples Church & Katigbak (1989) provide non-Western support for the five-factor model. A recent study of 37 societies from around the world found that kindness (Factor 2), dependability (Factor 3), emotional stability and maturity (Factor 4), and intelligence (roughly Factor 5) were among the most highly valued of 31

possible characteristics in potential mates (Buss et al 1990). These findings point to the intriguing possibility that the five-factor model may indeed describe universal adaptation-relevant dimensions of human action and value.

Although evolutionary hypotheses often concern species-typical, sex-typical, or age-graded mechanisms, culture provides important input to those mechanisms. The premium placed on physical courage and aggressiveness among the Yanomamo of South America (Chagnon 1988), for example, is apparently linked with levels of violence higher than those in Iceland, Denmark, or Canada (Daly & Wilson 1988). Indeed, there is evidence that among the Yanomamo killing rivals currently leads to elevated status and reproductive success (Chagnon 1989).

Socialization practices are widely believed to influence the personality characteristics of children, but little is known about them cross-culturally. In perhaps the most extensive cross-cultural study yet conducted, Low (1989) examined the socialization training of personality (e.g. surgency, agreeableness, and conscientiousness) in 93 societies. Low found striking support for three evolution-based predictions about childhood training: 1. Boys, across cultures, are trained to show greater fortitude, aggression, and self-reliance than girls; 2. girls, across cultures, are trained to be more responsible, obedient, and restrained than boys (especially sexually restrained); and 3. the more polygynous the society, the more intensely boys were trained to be competitive strivers. These findings highlight the heuristic value of evolutionary thinking in identifying important variation, as well as uniformity, across cultures.

Culture, however, cannot be understood independently of our evolved psychological mechanisms (Tooby & Cosmides 1989). Individuals are not passive receptacles of cultural influence, they are active self-interested strategists whose psychological mechanisms dispose them to act selectively on adaptationally relevant dimensions of environmental input—perhaps most importantly on input from one's social group and culture. Our evolved psychology is necessary for, not separate from, cultural processes. In spite of the tremendous practical difficulties, cross-cultural research will be indispensable for answering many of the most important questions in evolutionary personality psychology.

## CONCLUSION

Evolutionary metatheory provides a systematic framework for the central conceptual issues in personality psychology. Personality theory, in this view, must include a nonarbitrary characterization of human nature, including specification of 1. the major goals toward which humans direct action (problems that historically had to be solved to enable reproductive success), 2. the psychological mechanisms that have evolved because they solved these problems, and 3. the species-typical and individually different behavioral strategies, activated by psychological mechanisms, that people deploy to reach goals or solve adaptive problems.



Goal-directed tactics and strategies, therefore, are promising units for personality psychology. Although there exists substantial variability in how individuals frame their goals and devote their problem-solving effort, evolutionary considerations suggest a non-arbitrary species-typical structure to both the goals and the means of their attainment. Discovery of the underlying species-typical goal structure and the corresponding evolved strategic solutions will constitute a major and lasting scientific contribution of personality psychologists informed by evolutionary theory.

Coherent individual differences of the sort embodied by the five-factor model of personality will be analyzed at two related levels. The first focuses on individual strategists and conceptualizes dispositions as evolved problem-solving mechanisms, either heritably based or differentially activated by environmental contingencies. The second focuses on the environment composed of other people, who are the main facilitators and obstructors of our social strategies. The five personality factors, in this view, represent important features of the human "adaptive landscape." Those who had the capacity to perceive and act upon these major individual differences in others had a selective advantage when it came to negotiating hierarchies, selecting and attracting mates, and forming effective coalitions with other humans.

The debates about personality consistency, the importance of environmental context, and interactionism are clarified within an evolutionary metatheory. The consistency debate is clarified by distinguishing between evolved psychological mechanisms and manifest behavior. Consistency will be found at the level of psychological mechanisms and the environmental inputs that predictably activate them; specificity of behavior will be found in the adaptational problems that humans confront across different situations and in the context-dependent strategic solutions that they deploy to solve them. Personality is expected to be highly consistent at the level of psychological mechanisms but highly discriminative at the level of overt behavior.

Although the field has increasingly recognized the importance of context and the discriminativeness of behavior, commensurate gains have not been made in identifying which dimensions of context or situation are important. From the perspective of evolutionary psychology, evolved mechanisms within the organism determine which environmental inputs will be attended to, processed, and acted upon. Therefore, the importance of a given situational dimension depends on the adaptational problems that humans have confronted over evolutionary history and on the psychological and behavioral strategies that have evolved as solutions to those problems. Contexts, environments,

and situations cannot affect behavior except through these mechanisms. Therefore, the relevant environmental dimensions are themselves a product of human evolution; they cannot be properly understood without understanding the evolved mechanisms of the organism. Studies of emotion, affect, desire, and preference provide important routes for revealing the environmental problems to which we are the evolved solutions.

Evolutionary personality psychology, however, is neither simple nor easy. It requires a non-trivial mastery of evolutionary biology. Many attempts to use evolutionary theory have been conceptually sloppy. Some have committed the "sociobiological fallacy" by assuming that humans have as a psychological goal the maximization of inclusive fitness. Others have erred in seeking in evolution a justification of particular political views. Still others err in adopting the view that evolutionary theory implies genetic determinism in the sense of intractability and lack of environmental influence. These misunderstandings must be eliminated before the field can progress.

Evolutionary metatheory, properly conceived, provides for personality psychology the grand framework it seeks, and which has been missing almost entirely from its core formulations. Such theory links the field with what is known about the processes that govern all forms of life. It provides a powerful heuristic for identifying the central human goals and the psychological and behavioral strategic means deployed to obtain those goals. Evolutionary personality psychology gives us the tools for understanding the core of our human nature and the most important ways in which we differ from one another.

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