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Evolutionary Perspectives on Personality Psychology

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INTRODUCTION AND BACKGROUND

In this chapter, we argue that the development, structure, and processes of human personality have been crafted over hundreds of thousands of generations by natural and sexual selection. We argue that there is no scientifically viable alternative framework for understanding the historical origins of human personality and that human personality is thus best conceptualized with the theoretical tools developed in the evolutionary sciences. Personality, from this perspective, represents a meta-category of the output of a suite of species-typical, relatively domain-specific, evolved psychological mechanisms designed in response to the social adaptive problems recurrently faced by our ancestors throughout human evolutionary history. This conceptualization of human personality provides for a novel and valuable reinterpretation of several areas of personality psychology including personality consistency, individual differences in personality, sex differences and similarities, and contextual determinants of personality. The reconceptualization of personality from an

evolutionary perspective already has led to novel predictions about personality, including the function of social information conveyed through standings on the Big Five personality dimensions and in topics such as social anxiety, jealousy, altruism, aggression, psychopathology, mate preferences, desire for sexual variety, and father presence versus father absence in the development of sexual strategies. We argue that the limitations of the application of evolutionary theory to personality science are surmountable and that, despite these limitations, large strides have been made in anchoring personality science to the biological sciences by evolutionary scientists.

The ontogeny, structure, and processes of human personality and of human nature, more generally, have been crafted over hundreds of thousands of generations by natural and sexual selection. The meta-theory of evolution by natural and sexual selection (Darwin, 1859/1958; 1871) has been supported, at various theoretical levels, by thousands of investigations spanning the disciplines of, for example, biology, ecology, medicine, anthropology, psychology, and

ethology (see for example Barkow et al., 1992; Daly and Wilson, 1983; Krebs and Davies, 1987; Smith and Winterhalder, 1992; Strickberger, 1990; Trivers, 1985). The efforts put forth to apply evolutionary theories in these disciplines have yielded insights into these fields lacking prior to the application of these theories. Personality psychology could be strengthened similarly by an integration of the evolutionary sciences with the personality sciences.

Human personality is often framed void of original considerations. Not only are the origins of personality often dismissed, so too are considerations of functionality dismissed regarding the development, structure, and processes of personality. Historically, we have been asked to accept the existence of personal constructs (Kelly, 1955), or needs (Freud, 1930/1949; Maslow, 1970; Murray, 1937, 1938), or traits (Allport, 1931, 1960), or factors (Eysenck, 1981; John, 1990), or drives (Freud, 1930/1949; Murray, 1936, 1938), or motives (Winter, 1973), or life tasks (Cantor, 1990), with little or no recourse to questions of adaptive design or functionality. Importantly, however, evolutionary processes are as relevant to humans as to every other life form with which we share the planet. There is no reason to expect that human nature or personality is exempt from natural or sexual selective pressures.

Human personality is thus best conceptualized within the framework of *evolutionary psychology* (see for example Barkow et al., 1992; Buss, 1990, 1991; Crawford et al., 1987; Daly and Wilson, 1983). Evolutionary psychology suggests that the way we think, feel, and behave today can be understood by considering which thoughts, feelings, and behaviors increased the relative survival and reproduction of our ancestors. Manifesting certain thoughts, feelings, and behaviors in certain contexts increased ancestral humans' abilities to out-survive and out-reproduce less successful conspecifics. These offspring had some positive probability of inheriting the genetic structure coding (in concert with

relevant environmental input) for the development of the psychological mechanisms that (in response to certain cues) produce that same pattern of thoughts, feelings and behaviors. The offspring, too, would be expected to be relatively more reproductively successful. And this would be true for *their* offspring. This process continues for hundreds of thousands of generations – for the span of human evolutionary history – such that today that pattern of thoughts, feelings, and behaviors guided by the particular psychological mechanisms is species-typical and encompasses what we call human nature.

Any comprehensive theory of personality should provide answers to the following questions: What is human nature? What underlies individual differences? Is personality age-graded? How many levels of personality should be considered? What supportive empirical evidence is there for the theory? Does the theory generate specific testable predictions, or is it based upon post hoc explanation of findings? In what ways are the sexes predicted to be different? In what ways are the sexes predicted to be similar? What causes these similarities and differences? What follows is a presentation of a developing theory of personality which aspires to answer each of these questions.

DARWINIAN CONCEPTS AND EVOLUTIONARY PRODUCTS

The observation that species change over time was known long before Charles Darwin's (1859) book *The Origin of Species*. Archeological evidence had revealed changes in morphology and had revealed structures of organisms that appeared well suited to the ecological niche occupied by the members of that species. What was lacking before publication of *The Origin of Species* was a causal mechanism to explain *how* species change over time. The theory of natural selection filled a gap in the

explanatory framework which allowed researchers to explain changes in species over time. Darwin proposed natural selection as a solution to explain how variation in morphological (including psychological) characteristics better enabled organisms to survive and reproduce. Individuals that did not have the same morphology would have been out-reproduced by those individuals in ancestral environments that did. Through this process, successful variants would have become more frequently represented among organisms of a species and organisms with the less successful variants would have become less frequently represented.

The process of natural selection requires three key components. Darwin proposed that selection operates on characteristics of organisms that vary, that are heritable, and that are passed on to that organism's offspring. Variation, selection, and retention of mechanisms are the bases of natural selection. Among humans, for example, we vary along a wide variety of dimensions. We vary in morphological characteristics such as height and weight and we vary along psychological dimensions such as sexual orientation, sexual desire, and personality dimensions such as dominance, extraversion, and emotional stability. There are also a variety of characteristics along which humans do not vary. We do not vary, genetic mutations excluded, along characteristics such as number of fingers, the presence of navels, and number of eyes. From Darwin's perspective, it is only along those characteristics on which we vary that natural selection can operate. Once variation on a particular trait or feature exists, natural selection operates on those features best suited for survival in the environment. The operation of natural selection requires that those characteristics be heritable (although, at the time, Darwin was unaware of the mechanism by which characteristics of individuals could be passed to offspring). Individuals with characteristics that aided their survival and reproduction passed those characteristics to their offspring at greater frequency and those characteristics

became over-represented in members of the species over the course of evolutionary history. Darwin was puzzled by the characteristics of organisms that thwart survival and that are developmentally costly to produce. Reconciliation between observations of characteristics that impeded survival through increased predation, for example, was accomplished by Darwin with a second evolutionary theory – sexual selection theory (Darwin, 1871).

Darwin's (1871) theory of sexual selection was constructed to explain traits that seemingly reduced an organism's chances of survival by virtue of evolution by natural selection. A human male's greater aggression compared to human females comes at the cost of developing bodies capable of engaging in such conflicts (e.g. larger size, greater caloric intake necessary to grow and maintain such a body, maintaining higher testosterone levels). Sexual selection was proposed to explain how such features could be selected for (or at least not selected against) in ancestral environments. Darwin's theory suggests that those features of organisms that increase (a) the chances of being selected by the other sex for copulation; or (b) success in competition with the same sex for sexual access to the other, will be selected. These facets of sexual selection are called intersexual selection and intrasexual (epigamic) selection, respectively. For nearly a century after the publication of sexual selection theory, focus was placed on biological sex as the driving force behind sexual selection. Publication of Trivers' (1972) parental investment theory forced evolutionary biologists and, later, evolutionary psychologists to reformulate the impact of biological sex on sexual selection. Trivers proposed that it is not biological sex that drives sexual selection, but differences in the *minimum* obligatory parental investment. Parental investment is defined by Trivers as any investment that a parent makes in its offspring that increases that offspring's chances of survival at the expense of the parent's ability to invest in current or future offspring. This definition

captures the metabolic costs of investing in offspring and all other forms of investment that benefit offspring. A key component of this theory is the minimum obligatory investment necessary in offspring. One well-supported prediction derived from this theory is that sexual selection operates more strongly on the sex that makes the smaller obligatory parental investment.

A critical test of this theory comes from parenting systems in which there is a sex role reversal in minimum obligatory parental investment. In such species, is there a reversal of patterns of competition among conspecifics for access to the other sex? Is there a reversal of patterns of mate selection? Trivers (1972) presented evidence that this is the case. Among several avian species, for example, females are the more brightly colored and compete for access to males. Parental investment by females in these species ends when fertilized eggs are laid, whereas male investment continues in the form of nest-tending and chick-feeding. Sexual selection theory was rendered silent when attempting to integrate such findings into existing theories. It is only when parental investment is considered can clear predictions be made about how the sexes will differ.

Among humans, females make the larger obligatory investment in their offspring (Clutton-Brock, 1991). Female sex cells are larger and metabolically more costly to produce than male sex cells. Additionally, fertilization occurs internally within females. As a result, females incur the costs of gestating an offspring, going through the process of birth, and potentially nursing an offspring for several years. A male's minimum obligatory investment can end with the placement of his sex cells in the reproductive tract of a female. Because the costs associated with parental investment are not isomorphic between the sexes, a suite of psychological characteristics are proposed to exist in human females that are not expected to exist in males. Following impregnation, a female's reproductive opportunities are constrained by the investment

that must be made during pregnancy. A male's reproductive opportunities are not constrained in similar fashion. Males can continue investing mating effort in other fertile females. A female's reproductive success is limited by her ability to manufacture eggs and a male's reproductive success is limited by his ability to fertilize eggs. Reproductive variance is therefore greater among males than among females. For every man capable of successfully impregnating multiple females, another man is shut out of the reproductive game.

A feature of this theory reveals that there are trade-offs between mating effort and parenting effort that are magnified in comparative research between species with sexually asymmetric parental investment. Among humans, for example, a host of sex differences are expected to exist (Symons, 1979) that reflect investment differences that parents recurrently made in their offspring. These sex differences are expected to have arisen by processes of sexual selection that operated as a consequence of the difference between the sexes in parental investment in ancestral environments. Parental investment theory predicts that human females will be the more discriminating sex. Research has found consistently that females are less willing to engage in sex, desire fewer sexual partners, require greater time to pass prior to consenting to sex, have higher standards for sex partners, and report being more upset over emotional aspects of a partner's infidelity compared to sexual aspects of his infidelity (for a review see Buss and Schmitt, 1993). They also have, at all time ranges, lower mortality rates compared to males.

Cross-culturally, men invest substantially less than women do in their offspring (GEARY, 2000). Even in cultures with relatively high paternal investment, maternal investment dwarfs the investments made by fathers. Parent investment theory generates expectations of many sex-differentiated psychological mechanisms. The investment asymmetry between the sexes sets the stage for the evolution of mechanisms to solve

social dilemmas posed by other family members. Offspring, for example, would have been selected to not allow the expression of genes that signaled dissimilarity to a putative father. Fertilization, being internal to women, results in paternal uncertainty for men. If men have psychological mechanisms designed to detect dissimilarities (or similarities) between themselves and their putative offspring, then selection would operate to produce phenotypic anonymity in offspring. The simple fact is that if the sexes *did not* differ in their relative contributions to parenting then the platform for which additional adaptive problems selected for other psychological mechanisms would not exist.

Future research is necessary to understand the developmental trajectories of specific psychological mechanisms designed in response to the selection pressures hypothesized by parental investment theory. One avenue of sex-differentiated psychology not fully explored is the impact of early family experiences on later mating strategies. Research on attachment styles and mating strategies reveals that female mating strategies may be calibrated to anticipate certain mating environments later in life based on the availability of parents and expectations that others will invest earlier in life. This relationship does not hold as strongly for males. Future research is necessary to examine why some features of sexual psychology and behavior related to early childhood experiences are present for females (Belsky et al., 1991) and others emerge only for males (Michalski and Shackelford, 2002). Michalski and Shackelford, for example, found that men's desired sexual strategies later in life are related to their birth order. Similar relationships do not hold for women. Why might men's mating strategy be calibrated by their birth order and women's mating strategy be calibrated by the attachment they develop with their parents? To answer these questions it is necessary to understand the products of evolutionary processes.

The filtering processes of natural and sexual selection result in three products: adaptations, by-products of adaptations, and random variation or noise. Adaptations are the primary products of natural and sexual selection and can be defined as a 'reliably developing structure in the organism, which, because it meshes with the recurrent structure of the world, causes the solution to an adaptive problem' (Tooby and Cosmides, 1992: 104). Adaptive problems refer to recurrent features of ancestral environments that impeded successful survival or reproduction. Buss (2007) presents the example of a preference for sweet, highly caloric foods. In ancestral environments, when access to food was less reliable than it is today, selection favored adaptations in humans that functioned to increase immediate caloric content. The criteria utilized to identify adaptations are stringent (Williams, 1966). Adaptations must show features of special design, including efficiency, precision, and reliability.

By-products of adaptations include features or effects that are not considered to be adaptations but that tag along with or are related to an adaptation. In this sense, and as has been debated among evolutionary psychologists, rape may be an example of one such by-product (Thornhill and Palmer, 2000). Men, more often than women, are perpetrators of rape. Men, more than women, report a greater desire for sexual variety and for short-term sexual intercourse and a greater propensity to use physical violence to secure many different types of resources. Rape therefore might represent a phenomenon that is a by-product of adaptations that performed other functions for ancestral men (e.g. increased reproductive success in ancestral environments from pursuit of a short-term mating strategy and greater resource acquisition and reputation halo through physical aggression).

Random variation or noise refers to those characteristics that are selectively neutral or 'overlooked' by natural and sexual selection but that are produced through random mutation or developmental anomalies. In the

design of certain physical characteristics, for example, the shape of one's navel serves no adaptive function but is a characteristic along which people do vary.

The focus of evolutionary psychologists has been on identification of specific classes of adaptive problems posed in ancestral environments and empirical verification of evolved solutions or evolved psychological mechanisms. The psychological adaptations are presumed to be relatively domain specific in nature. Domain-specific solutions to recurrent adaptive problems are theorized to incorporate a narrow slice of environmental input and to produce output specifically targeted toward a solution to the adaptive problem confronted in ancestral environments. Over the history of research on evolutionary theories of psychological phenomenon, confusion has surrounded and continues to surround whether invoking concepts such as domain-specific evolved psychological mechanisms implies reflexive triggering of that particular mechanism.

APPLICATIONS OF EVOLUTIONARY PSYCHOLOGY TO PERSONALITY PSYCHOLOGY

The marriage between concepts developed within evolutionary psychology and within personality psychology has a brief history. The historical divide between these two areas lies in the historical focus of each area. Evolutionary psychological accounts of human nature have focused largely on the similarities among people and the characteristics that all humans share that have evolved in response to the problems of survival and reproduction faced by our ancestors. Personality psychology, in contrast, has been concerned largely with the ways in which humans differ. The divide between these two fields is obvious and raises questions that evolutionary psychologists need to address. If natural and sexual selection operates to filter less successful variants, why are stable,

heritable individual differences maintained? The first theoretical link between these two literatures and first attempt to reconcile this issue was provided by Buss (1984), who outlined four criteria according to which important sources of evolutionarily informed individual differences can be identified. These include heritability, inclusive fitness, sexual selection, and assortative mating. Each of these four criteria can be used to bridge the theoretical gap between evolutionary psychology and personality psychology.

Buss (1991) and Buss and Greiling (1999) propose that personality may not reflect evolutionary noise or represent by-products of other adaptations but may instead reflect the social landscape of adaptive strategies. Buss highlights that there are at least four explanations for personality and individual differences in humans:

- Differences in personality are heritable alternative strategies.
- Differences in personality are calibrations to fluctuating strategies throughout development.
- Differences in personality are due to contextual differences and personality reflects those contexts.
- Personality differences emerge through calibration to various thresholds in development.

Appreciating that personality differences between individuals may reflect social landscapes, it is reasonable to question whether personality has an impact on shaping sexual desire, motivation, and attraction. Personality can be used as a source of information that answers some of the most important social dilemmas that humans have evolved to solve. Evolutionary psychologists have argued, for example, that the Big-Five personality characteristics summarize the most important facets of social landscapes. Perceiving, attending to, and acting upon differences in others likely would have yielded important benefits in ancestral environments. For example, openness/intellect of others can be used as a criterion for seeking out advice. Conscientiousness may be evaluated to

assess whom to trust to complete important tasks. Agreeableness may be evaluated as an index of an individual's willingness to cooperate and to conform to group norms by suspending their individual concerns. Neuroticism may signify the inability to negotiate tasks effectively. Extraversion or surgency may be assessed as an index of who is likely to rise in the local status hierarchy.

From an evolutionary psychological perspective, human personality structure is comprised of a finite though numerous collection of species-typical, relatively domain-specific psychological mechanisms that have evolved over human evolutionary history because they solved the adaptive problems ancestral humans confronted. Personality is comprised of *psychological mechanisms*. Every theory of human personality – even the most environmentalistic – assumes that personality is at some basic level constructed of psychological mechanisms (Symons, 1987). If two members of a given species, or two members of two different species, are exposed to identical stimuli and respond in non-identical ways, we must infer the existence and operation of mechanisms internal to the organisms. These mechanisms can best be described as information-processing devices. These mechanisms take in certain classes of information, process that information according to a set of decision rules, and then generate output correlated with survival or reproductive success in ancestral environments. The information accepted for processing into the mechanism may come from other psychological mechanisms internal to the organism, or it may originate in the external environment – more often than not the particularly social environment comprised of other humans operating according to like mechanisms. The output generated by a psychological mechanism may be in the form of information which is channeled to and accepted by other psychological mechanisms internal to the organism. Or the output may be in the form of behavior, affect, or cognition enacted by the organism (Buss, 1991).

The psychological mechanisms underlying personality have *evolved over human evolutionary history because they solved the adaptive problems ancestral humans confronted*. Certain problems have been recurrently faced by ancestral humans. Consider the problem of which foods to ingest. To survive, certain nutrients had to be ingested (and, conversely, various toxins had to be avoided). This is a complicated problem when considered at the level of basic decision processes. Ancestral humans had to distinguish nutritive from non-nutritive goods; poisonous from non-poisonous fruits, vegetables, and organisms; higher caloric foods from less caloric foods, and so on. Those proto-humans who could not distinguish nutritive from non-nutritive foods are not our evolutionary ancestors, for they will have been out-survived and out-reproduced by their more discriminating conspecifics.

Personality is comprised of a *finite though numerous* collection of evolved psychological mechanisms. The adaptive problems our ancestors faced were many and varied in nature: from mate selection, to food ingestion, to forming successful reciprocal dyadic alliances (friendships). The solution to each of these problems has evolved as a circumscribed set of decision rules that guide human behavior, thought, and affect (in concert with relevant cues). The psychological mechanisms that evolved as solutions to adaptive problems will be as numerous and varied as the adaptive problems themselves. The fact that one might be quite successful in selecting a reproductively valuable mate has little or no direct bearing on whether one can successfully select and ingest the most nutritive foods available. Mate selection and food selection are qualitatively different adaptive problems that will have selected for qualitatively different sets of psychological mechanisms over human evolutionary history. Thus, the psychological mechanisms that comprise human personality structure will be as numerous as the adaptive problems that selected for those mechanisms. Relatedly, because the number of adaptive problems

that confronted ancestral humans was finite though numerous, we expect that the number of mechanisms comprising the structure of personality are finite though numerous. Moreover, it follows that these finite though numerous mechanisms are *domain specific* – that is, they serve as evolved solutions to *specific* adaptive problems. Because ancestral humans did not confront a single ‘survive and reproduce’ adaptive problem, we have no reason to expect that personality is comprised of a single ‘survive and reproduce successfully’ psychological mechanism that evolved as a relatively domain-general adaptive solution (Buss, 1991; Symons, 1987; Tooby and Cosmides, 1990, 1992).

Finally, the basic structure of human personality is comprised of a *species-typical* collection of evolved psychological mechanisms. That is, the mechanisms that evolved as solutions to the adaptive problems confronting all ancestral humans over evolutionary history are presently characteristic of all representatives of the human species (with the exception of rare mutations and genetic drift). This is expected because all modern humans are, by definition, the evolutionary descendents of those ancestral humans who successfully solved the various adaptive problems they confronted. If it is the case then, that personality is comprised of a finite though numerous species-typical and domain-specific psychological mechanisms, does this mean that personality is stable or consistent from birth to death? Or might it be somehow dependent on the context or environment?

Evolutionary psychological theories do not imply the existence of adaptations that are incapable of change or are forever bound by our genome (Bjorklund and Pellegrini, 2002; Buss, 2004; Tooby and Cosmides, 1992). Few evolutionary psychologists actively present hypotheses and theories that stress the role that the environment has in shaping the expression of evolved modules of the mind, but these theories are nonetheless not deterministic theories. An examination of the arguments surrounding the claim that evolutionary psychology is a theory of

genetic determinism must start with an examination of what evolutionary psychologists *actually* propose. Tooby and Cosmides (1992) argue that developmental programs responsible for assembling an adaptation are also adaptations whose primary function is to reconstruct in offspring the design that enhanced reproduction in the preceding generation. They specifically note that it is useful to consider genes *together with* developmental programs as an integrated suite of adaptations. The reliable development of an organism’s phenotypic features (including personality and sexual strategies) does not imply that these features are not modifiable. Developmental adaptations do not assemble an organism of fixed design but rather a set of expressed adaptations according to variables such as age, sex, and circumstance-dependent design specifications. Adaptive problems are often specific to particular life stages. Organisms must have the necessary adaptations for the particular stage regardless of whether they appear before they are necessary or continue after they are necessary. Tooby and Cosmides argue that every feature of every phenotype is *equally determined* by the interaction of that organism’s genes and its ontogenetic environment. ‘Biology’, therefore, can be segregated to certain traits and not to others. In stressing the role of the environment, Tooby and Cosmides note that the ‘developmentally relevant environment’ refers to those features of the world that are rendered developmentally relevant by the evolved design of an organism’s developmental adaptations. The assumption that genes are, therefore, the *only* target of natural selection is a misconception. Genes and developmentally relevant environments (species-typical environments) are both products of the evolutionary process. By selecting a developmental adaptation, for example, the evolutionary process is also selecting the triggers that the mechanisms will use to build an adaptation. Functional design is revealed as much by genes as it is by the environment that those genes use to construct an adaptation.

Evolution by natural and sexual selection is recognized as the origin of the many special-purpose and domain-specific cognitive decision rules (psychological mechanisms) according to which humans function. However, and crucial to this perspective, evolutionary psychology holds as a central goal to determine the historical, developmental, and situational forms of contextual input processed by the psychological mechanisms that guide human behavior. *Evolutionary psychologists are not 'genetic determinists'*. Rather, a key message of evolutionary psychology is that the complex architecture of species-typical, domain-specific psychological mechanisms allows for the impressive *context-dependant* flexibility of human behavior, cognition, and affect (Buss, 1991; DeKay and Buss, 1992). Modern evolutionary approaches aspire to understand – in addition to our species-typical, culturally differentiated, and sex-specific human nature – the ways that individuals differ within species, within cultures, and within sex.

Thus, the architectural unit of personality is the evolved psychological mechanism. But these mechanisms cannot and do not operate in a vacuum. The mechanisms are dependant for their activation on the contextual input for which they have evolved sensitivity. Personality is, therefore, relatively stable in the sense of being basically comprised of a finite (though numerous) collection of species-typical psychological mechanisms. At the level of the cognitive, affective, and behavioral *output* of these mechanisms, however, personality is better described as variable. The most accurate depiction of personality is that it is both consistent and variable – that it is comprised of a finite set of species-typical and domain-specific psychological mechanisms that depend for their activation on relevant contextual input. And because no two individual psychologies will receive and process identical input in an identical manner, there is room enough for individual differences. At the same time, we can expect base level similarities across a particular group of individuals, to the extent

that those individuals have historically faced similar classes of adaptive problems over evolutionary history. On these grounds, we expect sex-differentiated and age-differentiated personality structures, based on the evolved psychological architecture characteristic of the sex and of the age of the person. The issue of sex differences and similarities in evolutionary perspective will be taken up in a later section. Regarding the expected age-graded structure of human personality, different adaptive problems confronted ancestral humans at different ages or developmental stages, as is true of modern humans. Thus, for example, an adaptive problem of late infancy or early childhood, but presumably not of adolescence, or any stage of adulthood, is weaning. It is reasonable to suggest that as the lactating mother initiates the weaning process, the suckling infant or young child's personality is structured in part by mechanisms which are activated only in response to this very circumscribed conflict of interests. That is, we do not expect the personality of the typical young adult, for example, to be operative on those mechanisms which are specifically activated with the onset of weaning.

UNDERSTANDING INDIVIDUAL DIFFERENCES

There usually is not just one 'evolutionary approach' to a particular domain of human thought, behavior, and emotion. Rather, there are typically several competing or perhaps complementary evolutionary perspectives that are proposed to explain a given behavioral, cognitive, or affective phenomenon. This also is the case regarding attempts to explain the various manifestations of individual differences. There are currently at least four evolutionary approaches to the study of individual differences (Buss, 1991; DeKay and Buss, 1992). One approach is that of evolutionary developmental psychology. For example, Belsky et al. (1991) argue that

individual differences in mating strategies are in part explicable in terms of whether the father was present or absent during the offspring's childhood years. The general argument of this developmental approach is that mechanisms will be activated and operative only under certain developmental conditions or stages. Without input providing the appropriate developmental information, the mechanism presumably remains at or returns to an inactive or latent state.

A second evolutionary approach investigates the environment that is currently inhabited for an explanation of manifest individual differences. Thus, for example, Flinn (1988) finds that mate-guarding of Trinidadian females by males varies as a function of the reproductive status of the female: she is guarded against other males significantly more when she is fecund (impregnable) than when she is not fecund.

A third evolutionary approach to individual differences examines reactive individual differences. The general thesis is that there are evolved mechanisms which take as input a circumscribed class of anatomical data. Based on the processing of such information, the mechanisms guide the organism to adopt one strategy over an alternative in a given domain of behavior. For example, individuals who are small in stature and without physical size and strength will likely be most successful pursuing a strategy of diplomacy (rather than, say, aggressivity) in interacting with conspecifics. A person with a large, muscular build, on the other hand, may be anatomically and physiologically prepared to pursue an aggressive strategy in interactions with others (DeKay and Buss, 1992; Tooby and Cosmides, 1990).

A fourth evolutionary approach to explaining individual variation is exemplified by the work of Gangestad and Simpson (1990), who conceptualize the adoption of one of two general sexual strategies in terms of genetic differences arising through frequency-dependent selection. Gangestad and Simpson argue that individuals differ on the dimension

of sociosexuality. Sociosexuality refers to an individual's willingness to engage in sexual intercourse with little or no emotional investment in or commitment to the relationship. Gangestad and Simpson present evidence supporting the proposal that two alternative sexual strategies (high and low sociosexuality) have been selected for, with the result of a bimodal distribution of these strategies in the current population. They suggest that the adoption of one of the strategies is heritable and that, moreover, a variety of personality characteristics co-vary with each strategy in a way that is consistent with evolutionary reasoning.

It is important to recognize that each of these approaches to understanding individual differences is complementary, rather than competing or mutually exclusive. Each perspective offers a different window through which to glimpse the structure of human personality. Application of each of these areas has profitably proceeded in the area of human sexual psychology.

PERSONALITY AND SEXUAL PSYCHOLOGY

Examinations of the relationships between personality and sexuality began in earnest with Eysenck (1976). Following from the guidance offered from an evolutionary perspective, we can attempt to couch our understanding of the relationships between personality and sexual psychology as a function of sexual selection. Parental investment theory (Trivers, 1972) predicts that human males will devote more resources to mating effort and that human females will devote more resources to parental investment by virtue of asymmetries in assurances of parentage. It is, therefore, not surprising that we observe differences in pursuit of social status, sensation seeking, extraversion, and risk-taking favoring men and that we observe differences in love/nurturance favoring women (MacDonald, 1998).

Linked with those characteristics that the sexes appear to differ on are characteristics that men and women view as desirable in a long-term partner. Surbey and Conohan (2000) found that female undergraduate students desired personality characteristics such as brightness, generosity, and having a sense of humor in a hypothetical partner with whom they would consider having sexual intercourse. Jensen-Campbell et al. (1995) report that females prefer as mates males high on altruism and agreeableness, with the highest ratings of attraction provided for agreeable and dominant males. Buss and Barnes (1986) report that women rank characteristics such as considerate, honest, dependable, kind, and understanding higher in a prospective mate than do men. Given that the obligatory parental investment costs are greater for women than for men, ancestral women with preferences that guided them toward prospective mates who were more likely to provide for them and their offspring would have been at a selective advantage relative to those women in ancestral environments that were indifferent to the personality characteristics linked with status and resources in men (Buss, 2003).

Research has revealed that personality plays a key role in human sexual psychology. Personality is a critical component of human mate choice (Buss, 2003) and is associated with the dissolution of relationships (Betzig, 1989). Figueredo et al. (2006), for example, report that men and women rate ideal romantic partners higher than themselves on the personality dimensions of extraversion, agreeableness, and conscientiousness, and lower than themselves on neuroticism. A significant difference between self-openness ratings and ideal partner openness ratings did not emerge in this study.

Sex differences are expected only in those domains of behavior, cognition, and affect for which males and females have historically to solve qualitatively different adaptive problems. Conversely, for those domains in which ancestral males and females

confronted similar problems, there is no reason to expect that the related behavioral, cognitive, or affective output of the psychological mechanisms that evolved as solutions to these problems will be sex-differentiated. Here, we relate an example of the sort of sex differences and similarities that are expected, from research conducted on perceptions of relationship betrayal (see Shackelford and Buss, 1996).

Feelings of betrayal are expected when a relationship partner fails to provide, accept, or exchange benefits or resources expected in that relationship context. *Extra-relationship sexual involvement* will incite intense feelings of betrayal in the context of a committed, romantic, sexual relationship. This is expected to be true for both males and females: exclusive sexual access is a resource expected of and by both partners in a mate-ship (Buss et al., 1992; Buss and Schmitt, 1993; Wiederman and Allgeier, 1993; Wilson and Daly, 1992). Importantly, however, human reproduction is characterized by fertilization and gestation internal to the female. Consequently, males – but not females – over evolutionary history confronted the adaptive problem of uncertain parentage. A mate's sexual infidelity placed males at risk of investing in offspring to whom they were genetically unrelated. Those males who were indifferent to the sexual fidelity of their mates are thus not our ancestors, for they will have been out-reproduced by males who invested effort in and were sensitive to retaining exclusive sexual access to their mates. Feelings of betrayal incited in a male in response to the real or imagined sexual infidelity of his mate can thus be understood as a response to the threat of cuckoldry.

Although females have not faced the adaptive problem of uncertain parentage, the sexual infidelity of their mate likely served as a cue to the potential or current loss of other reproductively valuable and typically mate-ship-specific resources. That is, a woman may fear that the resources her mate contributes to their relationship (historically in the form of, for example, protection of her

and their offspring from predation and hostile conspecifics; social and political support of her and their offspring; and basic provision of food, shelter, and related resources to her and their offspring) will be diverted to another woman and the other woman's offspring (Buss and Schmitt, 1993; Daly and Wilson, 1988). The ubiquitous phenomenon of female prostitution supports the observation – implied in the mated woman's concern over the sexual infidelity of her mate – that men often barter reproductively valuable resources for sexual access to females (Daly and Wilson, 1988). Feelings of betrayal incited in a woman in response to the real or imagined sexual infidelity of her mate can thus be understood as a response to the threatened loss of reproductively valuable resources (Buss et al., 1992; Buss and Schmitt, 1993).

Similarly, *extra-relationship romantic emotional involvement* will incite intense feelings of betrayal in the context of a mate-ship. This is true for both males and females (Buss et al., 1992; Buss and Schmitt, 1993; Wiederman and Allgeier, 1993; Wilson and Daly, 1992). Accordingly, a woman may fear that the resources her mate contributes to their relationship will be diverted to another woman and the other woman's offspring (Buss and Schmitt, 1993; Daly and Wilson, 1988). A man, on the other hand, may fear that the romantic emotional involvement of his mate with another male will escalate to sexual involvement, potentially rendering him a cuckold (see Buss, 2000, for a review of research).

Both sexes are predicted to feel betrayed by the sexual or romantic emotional infidelity of their long-term mate. Indeed, research paradigms that do not definitively disassociate sexual from romantic mate infidelity (reviewed in Wiederman and Allgeier, 1993) find no significant quantitative sex differences in what are effectively global measures of incited betrayal or jealousy. However, and consistent with the logic of evolutionary psychology, when the disassociation of sexual from romantic infidelity is made, men dis-

play greater psychological, physiological, and behavioral distress to a mate's sexual infidelity, whereas women display greater distress to a mate's romantic emotional infidelity (Buss et al., 1992; Buss et al. 1999; Buunk et al., 1996; DeSteno and Salovey, 1996; Geary et al., 1995; Harris, 2000; Harris and Christenfeld, 1996; Shackelford et al., 2002; Wiederman and Allgeier, 1993; Wiederman and Kendall, 1999; but see Harris, 2000, and Grice and Seely, 2000, for partial failures to replicate the sex difference using physiological measures). To reiterate, the pressing adaptive problem for mated men is the threat of cuckoldry – associated directly with a mate's *sexual* infidelity. The pressing adaptive problem for mated females is the threatened loss of reproductively valuable time and resources contributed by her mate – associated with her mate's *romantic emotional* involvement (and concomitant resource investment) in another woman and the other woman's offspring. That is, for the mated woman, the adaptive problem is not the sexual infidelity of her mate *per se*; rather, it is the threatened diversion of his time and resources to another woman in a bartering effort to gain (and perhaps retain) sexual access to her. Thus, assuming that the two types of infidelity are disassociated, men will experience more intense feelings of betrayal in response to their mate's sexual infidelity. Women, on the other hand, will experience more intense feelings of betrayal in response to the romantic emotional infidelity of their mate.

Evolution by natural and sexual selection is recognized as the origin of the many special-purpose and relatively domain-specific psychological mechanisms that comprise the structure of human personality. As noted earlier, however, these mechanisms are dependant for their activation on the appropriate contextual or environmental input. Only certain classes of information will be accepted and processed by a given psychological mechanism. Consider again the case of extra-relationship sexual involvement (see Shackelford and Buss, 1996).

Evolutionary logic suggests that the betrayal felt by *a mate's* extra-relationship sexual involvement will be most intense when it occurs with an enemy/rival of the mate's partner: Not only is exclusive sexual access (and perhaps various other forms of reproductively valuable resources) lost, in addition, it is lost to one's competitor. Similarly devastating would be the case where one's mate engages in sexual relations with one's close same-sex friend. Again, exclusive sexual access (and perhaps other forms of reproductively valuable resources) is lost; in addition, a close reciprocal alliance is disrupted in the process.

In the context of the typical close *same-sex friendship* or *same-sex coalition*, sexual involvement outside of the friendship or coalitional relationship will not generate feelings of betrayal, assuming otherwise appropriate relationship participation. Exclusive sexual access is not the (or even a) resource garnered from these relationships. If sexual involvement does occur, the relationship between the parties by definition is no longer *only* a friendship or coalitional relationship. The friendship or coalitional relationship may remain, but a new twist has been added, necessitating a reconsideration of the relational boundaries (Buss, 1990). However, if the sexual involvement of a close friend or fellow coalition member is with one's mate, feelings of betrayal are likely to arise. And if the extra-relationship sexual involvement is with a personal enemy of the other relationship member (in the friendship context), or with someone associated with an enemy/rival coalition (in the coalitional context) – another form of the 'double whammy', feelings of betrayal are likely to arise. In both relationship contexts, these feelings of betrayal will be greater when the sexual involvement is with the mate of the other relationship member, relative to when such involvement is with an enemy of the other relationship member. This is expected because loss of exclusive sexual access to a mate is likely to be far more (negatively) reproductively consequential than the loss associated with losing

an alliance to a personal or coalitional enemy. Moreover, loss of exclusive sexual access and perhaps other forms of reproductively valuable resources to a mate is *direct* and *certain*. The benefit gained by a personal or coalitional enemy, however, is *indirect* and *uncertain*. That is, if indeed the close friendship or coalitional relationship is lost, this does not guarantee that a new alliance will be formed between the previous friend or coalition member and the personal or coalitional enemy.

Clearly then, an evolutionary perspective on human personality – and on human nature more generally – recognizes the relevance of context in attempting to understand the manifest behavioral, cognitive, and emotive output of the evolved psychological mechanisms that comprise the structure of human personality. Without input to the system, the mechanisms underlying personality can generate little in the way of output.

CONCLUDING COMMENTS

An evolutionary reconceptualization of the development, structure, and processes of human personality provides for a novel and valuable reinterpretation of several areas of personality psychology. These areas include the issue of personality consistency/variability, individual differences as well as a ubiquitous human nature, sex differences and similarities, age-graded and developmentally contingent personality phenomena, and the contextual determinants of personality. The scientific value of evolutionary theory offers guidance to areas that have largely operated outside of the evolutionary sciences. One such area is an understanding of psychopathology. An appreciation of the adaptive output of evolved psychological and physiological mechanisms can result in a richer and more strongly theoretically grounded understanding of psychopathology and personality disorders than what currently exists (Nesse and Williams, 1994;

Nesse, 2005). Applications of evolutionary theory to understanding human personality will improve the scope and viability of personality psychology. Inroads have already been made into developing a richer theoretical understanding of human personality and a more complete merging of evolutionary psychology and personality psychology, we believe, lies ahead.

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