# Cross-cultural evolutionary psychology

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Perhaps no field of psychology is more strongly motivated and better equipped than evolutionary psychology to respond to the recent call for psychologists to expand their empirical base beyond WEIRD (Western Educated Industrialized Rich Democratic) samples. Evolutionary psychologists have historically focused their efforts on identifying species-specific psychological traits, for which evidence often hinged on the extent to which traits were generalizable across human groups. Now, a new generation of researchers is embracing cultural and environmental variation to test evolutionary hypotheses. Here we discuss how comparative research with diverse societies, while challenging, can help inform the complex nature of our species' psychology and in doing so, we outline best theoretical and methodological practices as well as common pitfalls in cross-cultural investigations. We end with a recommendation for the use of publicly available databases for cataloging psychological variation across the world's many diverse populations. Because of rapid culture change and globalization, it is more important now than ever to document what we know about the world's cultures in ways that can be used by future researchers.

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## Introduction

A growing body of research suggests that widespread variation in numerous psychological domains, including visual cognition [1,2], emotion regulation [3–6], the self-concept [7,8], psychological biases [9•,10], and social [11,12,13•,14–16] and attractiveness preferences [17,18•] exists cross-culturally (for reviews [19–21]). These findings have challenged the generalizability of Western samples and have underscored the need for cross-cultural comparisons. This urgency for comparative studies may be surprising to researchers in some fields of psychology, but it has long been in the tool-kit of evolutionary psychologists who concern themselves with identifying species-specific adaptations. Even in early days of evolutionary psychology (EP), seminal tests for universality were conducted (e.g., sex differences in mate preferences [22] and rates of violence [23] were studied across societies).

Recognizing that humans are uniquely endowed with a suite of cognitive and developmental capacities for social and cultural transmission — capacities that have led to diverse, and often adaptive, phenotypes [24] — researchers are increasingly interested in how behavior develops and manifests in divergent environments and are capitalizing on variation between groups for empirical tests [25]. A new wave of evolutionary research concerns itself with identifying evolved psychological mechanisms that respond plastically to environmental conditions. For instance, cross-cultural studies of mate choice have revealed that preferences for traits such as body fat [17,26] and body shape [27] vary in adaptively meaningful ways. Other cross-cultural studies on attractiveness show how evolved biases interact with local environments to produce differences in preferences between groups. For example, the preference for statistically average faces appears to be universal, but experience in the local environment defines the average shape for a given population and this leads to different preferences between groups [28].

From an evolutionary perspective, true universality of a trait is expected only under certain conditions. Even traits closely tied to fitness are frequently observed to exhibit variation [29]. Moreover, developmental plasticity is consistent with, and often predicted by, an evolutionary perspective. What matters for a proper cross-cultural EP is not strict universality per se, but rather, a fit between theory and predictions for the trait in question, across the range of human environmental and cultural conditions. 'Human nature' does not imply strict phenotypic uniformity but rather a shared set of evolved developmental resources, which are responsible for building psychological phenotypes that may vary depending on the local developmental environment [30]. Thus, the observation that substantial psychological variation exists across the globe should not be misinterpreted as evidence against a pan-human nature; instead it should be viewed as a promising opportunity for testing evolutionary hypotheses.

## Using hypothesis-relevant variation

Evolutionary hypothesis testing commonly proceeds by studying the relationship between the trait in question and the environment in which it evolved (for discussion [31]). Critics, however, claim that the entire enterprise is flawed because the relevant environments, or *environments of evolutionary adaptedness* (EEA), no longer exist. While use of past inferences to study the present is epistemologically difficult, extreme versions of this critique make several flawed assumptions. First, the fact that past environments must be inferred is not insurmountable for other historical sciences (e.g., geology and paleontology). Second, evolutionary psychologists recognize that EEAs are trait-specific, with different ecological histories and selection pressures for distinctive aspects of the phenotype [30]. For example, the EEA for mechanisms of color vision is different, both in temporal scope and relevant ecological problems, from the EEA for mechanisms of human cooperation. This means that 'the EEA' is not singular and that theories of environmental conditions that shaped a given trait should be pertinent to the trait in question. Inferring the relevant EEA may be difficult for some traits and easy for others. Moreover, the relevant EEA conditions for many human traits — color vision being a good example — are probably to still exist. Thus, while it is a mistake to suppose that any modern human lives under perfect 'EEA' conditions, it is equally mistaken to suppose that we cannot use present-day ecological and cultural diversity to test evolutionary hypotheses.

The promise of EP lies in researchers' ability to use existing variation in theoretically sound ways to test evolutionary hypotheses, including both hypotheses about universals and hypotheses about variation. Which population(s) will be most relevant for study will depend on the inferences being made regarding when, and under what conditions, a trait evolved, and whether its expression is hypothesized to be flexible. To this end, EP need not confine itself to data from populations that live in environments thought to approximate the ancestral past. Instead, attention should be directed to identifying hypothesis-relevant dimensions of variability across cultures. All human cultures are the products of evolutionary history, and therefore, all humans, even city-dwellers in Philadelphia or Quito, are fair game. We draw on two examples that illustrate how cultural variation can be used to test evolutionary hypotheses about mechanism and design (Figures 1 and 2).

## Generating and testing evolutionary hypotheses

EP is grounded in a rich body of formal theory that can, at least in some domains, predict when we expect to see universals or variation, how much, and why [25]. Such predictions make use of two ingredients: evolutionary history (descent with modification, including constraints and selection, which shapes traits to be plastic when flexibility is adaptive. These ingredients generate predictions about expected patterns across individuals and populations.

The first ingredient, evolutionary history, provides an important baseline for the patterns of variation we might expect. All traits are homologous if traced back far enough, and phylogenetic patterns of descent with modification provide information about the nature of ancestral traits from which human-specific traits evolved. For example, the distribution of sex differences in body size, morphology, and behavior across primates provide a baseline for expectations about human sex differences and how they might vary across cultures as a function of environmental factors. First, assuming some degree of polygyny (on average) in ancestral populations, we would expect some degree of sexual dimorphism in humans homologous to that seen in other primates — and indeed, men are taller than women, on average, across all human populations [32]. Second, however, the fact that men invest more in their offspring than most other primates suggests a greater degree of monogamy and an operating sex ratio closer to parity than seen in many other primates, predicting that the degree of sexual dimorphism will be lower than that seen in some of our closest relatives [33,34]. Already, we do not have an 'anything goes' prediction for universality; we can predict both a statistically consistent direction of the sex difference and even a relative magnitude, compared to other primates. For those interested in variation — because there is certainly variation in sex differences across cultures — this provides a baseline expectation from which to work.

The second ingredient, selection, traffics in the logic of adaptive design, including constraints, tradeoffs, and cost–benefit calculations. Here, modeling of the kind employed in population genetics and evolutionary game theory is of particular importance. Predicting when and how traits will vary across cultures is not easy, because evolutionary predictions depend on the underlying design tradeoffs — complex interactions between costs, benefits, and constraints — which we almost never know with certainty. However, evolutionary models can make assumptions about those tradeoff functions, which can be tested against data. Often, models can be constructed using measurable proxies (e.g., parasite load) with plausible assumptions about the shape of tradeoff functions with other measurable variables (e.g., growth). Of course, data gathered in support of one hypothesis may be consistent with multiple models; ensuing debates should, ideally, force theorists toward greater precision in their predictions, moving the field forward.

A criticism of psychological research is that inferences about the nature of our species' psychology are often drawn from research based on Western college students,