AMERICAN PSYCHOLOGICAL ASSOCIATION

American Psychologist

ISSN: 0003-066X

2026, Vol. 81, No. 1, 1–24
https://doi.org/10.1037/amp0001529

Evolutionary Psychology Hypotheses Are Testable and Falsifiable

William Costello[1], Anna G. B. Sedlacek[1], Patrick K. Durkee[2], Courtney L. Crosby[1],
Rebecka K. Hahnel-Peeters[1], and David M. Buss[1]
[1] Department of Individual Differences and Evolutionary Psychology, The University of Texas at Austin
[2] Department of Psychology, California State University, Fresno

The field of evolutionary psychology has often been the target of allegations that its hypotheses are unfalsifiable. This article revisits this decades-old critique by examining the logic of falsifiability and the specific criteria required for a hypothesis to be considered falsified. We evaluate the multiple levels of analysis in the heuristic framework from which evolutionary psychology hypotheses are derived. We then present evidence of several evolutionary psychological hypotheses that have generated specific, falsifiable predictions; undergone multiple empirical tests; and been refuted. Specifically, we discuss the evidentiary status of (a) the ovulatory shift in mate preferences (dual-mating) hypothesis, (b) the mate deprivation hypothesis of rape, and (c) the kin altruism hypothesis for the evolution of male homosexuality. We contrast these with the wide range of evolutionary psychology hypotheses whose specific predictions have been robustly supported by empirical data. Notably, studies reveal that many academics continue to perceive evolutionary psychology as unfalsifiable, despite evidence to the contrary, a misconception that has also permeated mainstream culture. These pervasive misconceptions speak to the critical need for ongoing efforts to clarify the scientific methodologies and evidentiary standards employed in the field of evolutionary psychology. Our discussion addresses implicit beliefs underlying allegations of unfalsifiability, such as beliefs about unverifiability, the varying levels of quality among hypotheses in the field, and the necessity for enhancing conceptual and empirical precision in future research. By illustrating that hypotheses generated by evolutionary psychology can be directly tested with appropriate scientific rigor, we dispel these pervasive misconceptions and highlight the field's heuristic potential for generating valuable insights into human behavior.

Public Significance Statement

This conceptual article addresses persistent misconceptions about evolutionary psychology, focusing on the erroneous belief that its hypotheses are unfalsifiable. We demonstrate through empirical examples that evolutionary psychology adheres to rigorous scientific standards, capable of both supporting and refuting hypotheses. These findings are critical as misconceptions not only prevail in academia but also influence public perception, as evidenced by widespread discussion and misinformation in popular online media. By clarifying these issues, we aim to improve the scientific literacy surrounding evolutionary psychology and foster a more accurate understanding of its contributions to understanding human nature, benefiting educators, policymakers, and the general public.

Keywords: falsifiability, evolutionary psychology, philosophy of science

---

Philip David Zelazo served as action editor.

William Costello https://orcid.org/0000-0002-0346-6370

William Costello played a lead role in project administration and writing–review and editing and an equal role in conceptualization and writing–original draft. Anna G. B. Sedlacek played an equal role in conceptualization, writing–original draft, and writing–review and editing. Patrick K. Durkee played a supporting role in writing–review and editing and an equal role in conceptualization and writing–original draft. Courtney L. Crosby played a supporting role in writing–review and editing and an equal role in conceptualization and writing–original draft. Rebecka K. Hahnel-Peeters played an equal role in writing–review and editing. David M. Buss played a lead role in supervision and an equal role in conceptualization, writing–original draft, and writing–review and editing.

Correspondence concerning this article should be addressed to William Costello, Department of Individual Differences and Evolutionary Psychology, The University of Texas at Austin, 3.324E, SEAY Building, 108 East Dean Keeton Street, Austin, TX 78712, United States. Email: williamcostello@utexas.edu

William Costello

> False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness; and when this is done, one path towards error is closed and the road to truth is often at the same time opened. (Darwin, 1871, p. 385)

Falsifiability is widely regarded as a cornerstone of scientifically sound hypotheses. A hypothesis is considered falsifiable if it is able to generate specific predictions capable of empirical testing, resulting in confirmation or refutation (Popper, 1959). Statements lacking the capacity for falsification are often regarded as pseudoscientific speculations rather than scientific hypotheses. Since its inception, the field of evolutionary psychology has been accused of such lack of rigor by critics who often assert that evolutionary psychological hypotheses cannot, in principle, be tested empirically (e.g., Gould & Lewontin, 1979; Rutherford, 2020). In this article, we examine the concept of falsifiability and present specific examples of falsified evolutionary psychological hypotheses as evidence that evolutionary psychological hypotheses, when precisely and cogently formulated, are in fact falsifiable. Specifically, we summarize and describe the logic behind the empirical tests that falsified or refuted the following hypotheses: (a) the ovulatory shift in mate preferences (dual-mating) hypothesis, (b) the mate deprivation hypothesis of rape, and (c) the kin altruism hypothesis for the evolution of male homosexuality. For clarity, in this article, "falsification" refers to the direct empirical contradiction of a hypothesis's predictions, as per Popper's philosophy of science, while "refutation" encompasses a broader range of evidence that collectively undermines a hypothesis's credibility, even if not all individual elements meet the strict criterion of falsification.

Part of the reason that evolutionary psychological hypotheses have been subjected to such vigorous critique is the field's reliance on the logic of adaptation—a focus inherited from evolutionary biologists like George C. Williams. Williams (1966) saw adaptation in evolutionary biology as an empirically onerous concept that was often used more liberally than appropriate. To encourage scientific rigor, he proposed stringent criteria for invoking adaptationist hypotheses, arguing that proposed adaptations must exhibit *reliability*, *economy*, *efficiency*, and *improbable precision of design for a particular function*. While Williams advocated for more careful application of adaptationist logic, Gould and Lewontin (1979) extended the critique to the entire "adaptationist program" in evolutionary biology. They criticized evolutionary biologists for using mere "plausibility" and consistency with natural selection as criteria for invoking adaptationist hypotheses and for failing to consider equally plausible competing hypotheses.

The most pointed aspect of the Gould–Lewontin critique centered on the issue of falsifiability: "We would not object so strenuously to the adaptationist program if its invocation, in any particular case, could lead in principle to its rejection for want of evidence" (Gould & Lewontin, 1979, p. 153). According to Gould, among evolutionary biologists of his day, "virtuosity in invention [had replaced] testability as the criterion for acceptance" (Gould, 1978, p. 530). To characterize the speculative, almost narrative quality of many contemporary adaptationist hypotheses, Gould (1978) borrowed the title of Kipling's (1902) *Just So Stories for Little Children*—a series of fanciful accounts of the origins of animal traits. Gould painted adaptationist hypotheses as "just-so story" hypotheses—nothing more than plausible fairytales about the origin of biological traits, bearing little to no scientific validity due to their untestability.

Although Gould and Lewontin's critique focused mainly on the practices of nonhuman evolutionary biology, their condemnation also included some examples from evolutionary psychology's predecessors—evolutionary anthropology and human sociobiology. There was indeed a dearth of empirical research testing human adaptationist hypotheses at the time Gould and Lewontin (1979) were writing. However, their critique was published prior to the emergence of modern evolutionary psychology in the late 1980s and early 1990s (e.g., Buss, 1995; Cosmides & Tooby, 1987; Daly & Wilson, 1988; Tooby & Cosmides, 1992). Unlike much of human sociobiology in the 1970s and early 1980s, the emergence of evolutionary psychology was characterized by robust empirical tests of adaptationist hypotheses using a variety of methods, including properly designed surveys, observational techniques, laboratory experiments, hormonal assay studies, brain imaging techniques such as functional magnetic resonance imaging, systematic ethnographic analyses, and molecular genetic techniques (Buss, 2024; Schmitt & Pilcher, 2004).

Empirical work in evolutionary psychology has continued to proliferate over the past few decades, published not only in specialized evolutionary journals but also in high-impact

Anna G. B. Sedlacek

journals such as *Science*, *Nature*, *Behavioral and Brain Sciences*, *Psychological Review*, *Psychological Bulletin*, and *American Psychologist* (Costello & Thomas, 2024). Such studies have produced empirical evidence on a wide range of psychological phenomena, including universal criteria for social status (Buss et al., 2020) and morality (Curry et al., 2019), and the adaptive nature of depression and anxiety (Nesse, 1994, 2000). These empirical successes reflect the value of the heuristic framework provided by the consilient metatheoretical paradigm of evolutionary psychology (Buss, 1995).

Despite the dramatic shift toward empirical testing of adaptationist hypotheses, some critics of evolutionary psychology have carried over Gould and Lewontin's (1979) accusation of unfalsifiability into the 21st century. Ketelaar and Ellis (2000) convincingly argued against the critique by identifying areas where critics conflate multiple levels of analysis within evolutionary psychological theories and hypotheses (see also Al-Shawaf, 2024). They, along with Confer et al. (2010), Al-Shawaf et al. (2020), and a commentary by Haig and Durrant (2000) criticized the outdated and oversimplified version of philosophy of science underlying the persistent accusations. Yet, the same sweeping accusations of unfalsifiability have persisted despite these counterarguments (Bunge, 2011; Coyne, 2003; Richardson, 2010; Rutherford, 2020; Wallach & Wallach, 2001; Ye, 2006).

To quantify the underlying dimensions of criticisms of evolutionary psychology, Jonason and Schmitt (2016) surveyed a sample of academics ($N = 111$). The mean endorsement for the claims that "evolutionary psychology's theories are unfalsifiable" was 2.89 ($SD = 1.23$) and "assumptions are not testable" was 2.91 ($SD = 1.25$) on a 5-point scale. These findings are particularly concerning as they highlight a fairly prevalent belief among academics regarding the unfalsifiability and untestability of evolutionary psychology. These misperceptions speak to the critical need for ongoing efforts to clarify the scientific methodologies and evidentiary standards employed in the field of evolutionary psychology.

These fundamental misconceptions have even permeated mainstream cultural consciousness, as exemplified by a popular YouTube video titled "I Debunked Evolutionary Psychology" which, although erroneous in its characterization of the field, contends derisively that evolutionary psychology is "unfalsifiable." At the time of writing, this video has garnered over one million views (Münecat, 2024). The widespread dissemination of these misconceptions into mainstream culture underscores the urgency and relevance of our article. By rigorously challenging and clarifying this unfounded claim, we hope that this article not only contributes to a more nuanced understanding within the academic sphere but also combats misinformation that shapes public perception of science. This makes our article not just a scholarly endeavor but a contribution to the broader dialogue about the validity and scientific integrity of evolutionary psychology.

Our article consists of several components. We first outline the Popperian criteria for falsifiability. We then detail the metatheoretical heuristic framework from which evolutionary psychology derives hypotheses and predictions, and how this operates within a more contemporary Lakatosian falsifiability paradigm (see Ketelaar & Ellis, 2000, for an overview). Our central goal in this article was to catalogue several modern evolutionary psychological hypotheses that have been successfully falsified or refuted within the past few decades. In our discussion, we contrast these with alternative hypotheses that have been robustly supported by converging lines of empirical support, before examining some misconceptions that underlie the perception that evolutionary psychology is unfalsifiable.

Criteria for Falsifiability

Before we can determine which hypotheses are falsifiable, we have to establish criteria for our choices. In the simplest sense, a statement is *falsifiable* if and only if another statement can logically contradict it. In a scientific context, one way to frame this criterion is that any given hypothesis must have *negative* predictions as well as positive: If the hypothesis was correct, it must entail that some things would specifically *not* be the case. Philosopher of science Karl Popper, popularizer of the falsifiability criterion (Popper, 1959), referred to hypotheses with this characteristic as *prohibitive*. But in order to explain how to evaluate whether a hypothesis is prohibitive, we need to clear up a poorly understood concept: the distinction between *hypotheses* and *predictions*.

Despite the term's inconsistent use, most science textbooks recognize a *hypothesis* as a tentative explanation for an observed phenomenon (Gibbs & Lawson, 1992). A hypothesis

Patrick K. Durkee

is typically a description of a causal mechanism. A quick way to check if this definition applies to a statement is to try to formulate it with some version of "because." For example, take this Lamarckian hypothesis:

> *Hypothesis 1:* Species change over time because traits acquired during an individual organism's lifetime are passed on to their offspring.

"Species change over time" is an observed phenomenon, for which "traits acquired during an individual organism's lifetime are passed on to their offspring" is offered as a potential causal explanation. *Predictions*, by contrast, ideally take the form of explicit, concrete empirical statements about what *would happen* in a highly specific context (such as an experiment) *if* the hypothesis was correct.

Based on this simple definition of falsifiability, we run into a problem when evaluating certain hypotheses: weak or underspecified hypotheses are not easy to logically oppose with concrete observations in the form of basic statements. For instance, the hypothesis of inheritance of acquired characteristics formulated in Hypothesis 1 says only, "traits acquired during an individual organism's lifetime"; it does not specify *how* the traits may be acquired. Thus, Hypothesis 1 would not be directly contradicted by observing that, for instance, experimentally manipulated traits are not passed onto offspring. The Lamarckian could argue that traits will only be passed on if they occur as the result of *internal* changes, in which case the failed results of the experiment could be dismissed. It is easy to see how the goalposts could be continually shifted to accommodate such an imprecise hypothesis.

But what is it, precisely, about a vague, imprecisely framed hypothesis that makes it difficult to refute directly with evidence? The relevant feature is that its imprecision does not allow it to *logically entail predictions* that can be contradicted. The hypothesis is as follows:

> *Hypothesis 2:* Species change over time because traits *that are changed by external environmental influences* during an individual organism's lifetime are passed on to their offspring.

Is more precise than the previous formulation—but its precision affects falsifiability in a specific way. The new formulation Hypothesis 2 now logically entails a concrete prediction. If a trait is influenced by the external environment, then the organism's offspring will have the modified version of that trait. Consequently, the formulation in Hypothesis 2 *would* be contradicted by an observation that an experimentally induced change was not passed on, since Hypothesis 2's inherent prediction cannot logically coexist with the observation—and, therefore, with the hypothesis.

Alternatively, we could have made the hypothesis more precise in a different way from Hypothesis 2, like so:

> *Hypothesis 3:* Species change over time because traits *that an organism intentionally acquires* during their lifetime are passed on to their offspring.

Had we made *this* alteration, we would be faced with the verification problem that initially inspired Karl Popper to devise his falsifiability criterion to differentiate between scientific and nonscientific ideas. Popper (1959) illustrated the flaw in seeking verification by pointing out that the statement "all swans are white" can never be empirically verified, while it can be *falsified* by finding one black swan. Similarly, we will never be able to say for certain that *no* organism can pass on an acquired trait. As long as we never observe such an event, we will never contradict Hypothesis 3. Thus, while Hypothesis 3 may sound more precise than Hypothesis 1, this change would not realistically improve the falsifiability of the hypothesis because it does not add a prediction that can be negated by collectable evidence. It should now be evident exactly how Williams, Gould, and Lewontin's point about precision relates to falsifiability: *Precision in a hypothesis is necessary, but not sufficient, to guarantee that predictions will axiomatically follow from it.*

So, for a hypothesis to be falsifiable, its predictions must (a) be explicit and concrete in such a way that they can be contradicted unambiguously by feasibly collectable evidence and (b) logically follow from the hypothesis that generated them. Criterion (a) is simple to assess: negate the prediction and ask whether the negation is a possible observation in the experiment. For example, if Hypothesis 2 predicts that experimentally manipulated traits will be inherited by offspring, then could an experiment potentially provide evidence of experimentally manipulated traits *not* being

Courtney L. Crosby

inherited? If so, the prediction provides an opportunity to falsify the hypothesis.

While slightly more abstruse, criterion (b) could be assured equally easily through disproof by contraposition by asking, “If the prediction turns out to be empirically false, could the hypothesis still be true?” For example, if the prediction that experimentally manipulated traits are inherited by offspring turns out to be false, could it still be true that species change over time because traits acquired during an individual organism’s lifetime are inherited by their offspring? If the answer to that question is yes, then the hypothesis, at least with respect to that prediction, is *not* falsifiable. This recapitulates the importance of hypotheses being prohibitive—generating predictions that would contradict the hypothesis. When a hypothesis is prohibitive, empirical data should also be able to discriminate it from *other* hypotheses. But when a hypothesis can generate few negative predictions, it becomes difficult to falsify.

In summary, a hypothesis should be considered *falsifiable* if its veracity hinges on the accuracy of the concrete predictions that are entailed by it. This may sound obvious, but these criteria are often not met in practice. As a result, some hypotheses can be saved from nearly any empirical test. And when predictions and hypotheses are conflated, either the “explicit and concrete” criteria are left at the wayside or the predictions are not tied clearly enough to their hypotheses.

Evolutionary Psychology’s Progressive Heuristic Framework

The evolutionary psychology approach to falsifiability becomes clearer when we evaluate the multiple levels of analysis in the heuristic framework from which hypotheses and predictions are derived (see Figure 1). Evolutionary psychology operates under a Lakatosian framework of scientific progress, moving beyond the traditional Popperian criterion of falsifiability (Ketelaar & Ellis, 2000). A Lakatosian model focuses on the ability of a research program to adapt and progress through the iterative refinement of its auxiliary assumptions and middle-level theories. Evolutionary psychology exemplifies this process by organizing its inquiries within a structured hierarchy of metatheory, middle-level theories, specific hypotheses, and testable predictions (Buss, 1995). This multitiered framework enables evolutionary psychologists to systematically address anomalies and refine their theories, all while safeguarding the foundational principles of evolutionary theory.

At the meta-analytic level occupying the top level in evolutionary psychology’s theoretical framework sits evolution by natural selection—originally formulated by Darwin (1859) and integrated with Mendelian genetics and Hamilton’s formulation of inclusive fitness (Dobzhansky, 1937; Hamilton, 1964). Evolution by natural selection posits that heritable traits differentially promoting survival and reproduction become more common in a population over successive generations (Darwin, 1859). Individuals with physiological and psychological traits advantageous in solving specific adaptive problems were more likely to survive to reproductive maturity, have greater reproductive success compared to others without traits that solved adaptive problems, and pass those traits on to their offspring. This nonrandom selection of traits solving adaptive problems produces specially designed, functional adaptations over time (Darwin, 1859; Williams, 1966).

Although other important evolutionary processes occur, such as genetic drift and founder effects, natural selection is widely acknowledged as the only causal process responsible for complex, functional adaptations (Williams, 1966). As Tooby et al. (2003) emphasized,

> The most basic lesson is that natural selection is the only known natural process that pushes populations of organisms thermodynamically uphill into higher degrees of functional order, or even offsets the inevitable increase in disorder that would otherwise take place. (p. 862)

Other evolutionary processes, such as genetic drift and founder effects, can contribute to variation in psychological traits, but they do not create structured, domain-specific, reliably developing mechanisms that solve adaptive problems with high efficiency.

One level down sits middle-level evolutionary theories. Middle-level theories describe how selection is hypothesized to operate within delimited spheres. Middle-level theories predict subsets of adaptations within specific domains of adaptive problems. Examples of middle-level theories include parental investment theory (Trivers, 1972), parent–offspring conflict theory (Trivers, 1974), sexual conflict theory (Buss, 2017; Parker, 1979), and error management

Rebecka K. Hahnel-Peeters

theory (Haselton & Buss, 2000). Middle-level evolutionary theories are evaluated using two key criteria: (a) heuristic value in guiding empirical discoveries often not explained prior to the theory and (b) the cumulative weight of empirical evidence based on their specific empirical predictions.

The second lowest rung of our analytical ladder includes specific evolutionary hypotheses stemming from each middle-level theory. Trivers's (1972) parental investment theory, for example, hypothesizes that the sex investing more in offspring will be choosier in their selection of mates, whereas the sex investing less in offspring will compete more with same-sex others for sexual access to the higher investing sex (Figure 2). The fundamental tenets of Trivers's theory have been strongly supported by empirical evidence from a variety of species (Dugatkin, 2020).

At the lowest rung of the analytical ladder sits specific predictions generated from evolutionary hypotheses informed by middle-level theories. The hypothesis that the sex investing more in offspring will be choosier in their choice of mate predicts that—relative to men—heterosexual women have a lower desire for short-term mating, require more time before deciding to have sex to evaluate a man's long-term partner quality and possible deception, and more greatly prefer mates who display the *ability* and critically the *willingness* to invest resources in them and their offspring. These predictions are supported by multiple studies (see Buss & Schmitt, 2019, for an overview). Sex differences in choosiness have been supported by research conducted by independent scientists studying hundreds of different species ranging from fruit flies to humans (e.g., Bateman, 1948).

Specific predictions are also capable of falsifying the middle-level theory. Critical tests of Trivers's (1972) parental investment theory include specific predictions about "sex-role reversed" species. Many specific predictions testing parental investment theory examine the role of female choosiness and male competition since females have historically had the larger obligatory parental investment in offspring (e.g., Bateman, 1948). In sex-role reversed species, the males invest more in offspring compared to the females. To support Trivers' parental investment theory, the rule must also hold—males in "sex-role reversed" species should be the choosier sex, and the females should be more competitive for sexual access. All tests of these "sex-role reversed species" support Trivers's (1972) claim. The males of Mormon crickets, red phalaropes, and some species of pipefish and seahorses are choosier in their choice of copulation partners compared to the females, and the females compete more intensely with other females for sexual access to the males (Trivers, 1985; see Buss, 2024, for a review). Had the results been different, the validity of Trivers's theory of parental investment and sexual selection would have been refuted.

Evolutionary psychology's four-tier analytic framework implies that empirical evaluation must specify the importance of any test it bears on the middle-level evolutionary theory, the hypotheses derived, and the specific predictions made. Consider the three empirical predictions in Figure 1. Large-scale empirical tests confirm that women worldwide are attracted to men with high status and prefer spouses who are willing and able to contribute resources to them and their children—even across cultures varying greatly from each other (e.g., Buss, 1989; Thomas et al., 2020; Walter et al., 2020). Other studies confirm that these preferences influence actual mate choice (e.g., Conroy-Beam & Buss, 2016). Although a spouse's failure to provide economic resources is a sex-linked cause of divorce—with more women initiating divorce than men (L. Betzig, 1989; Rosenfeld, 2018)—this prediction has received less cross-cultural consistency compared to women's mate preferences. Laws in some cultures prohibit women divorcing men (e.g., Thompson, 2019; Wee & Acayan, 2023), and some women remain married to penurious men for various reasons (e.g., avoidance of inciting violence; Buss & Duntley, 2011). Although the mate preferences remain robustly confirmed supporting Trivers' middle-level theory of parental investment, the specific behavioral prediction about divorce, however, receives more mixed support due to varying ecological cues, social cues, and competing interests. The key point is that the evaluation of evolutionary formulations rests with the cumulative weight of the evidence and not necessarily with any single prediction.

Crucially, evolutionary psychology's Lakatosian model allows middle-level theories to function as a "protective belt" around the metatheory, insulating its core assumptions from disproof while enabling revisions and extensions at lower levels of analysis (Ketelaar & Ellis, 2000). When a prediction derived from a middle-level theory is not supported by empirical data, researchers can modify auxiliary assumptions or refine the hypothesis without abandoning the broader

David M. Buss

theoretical framework. For instance, early predictions about the effectiveness of spreading rumors about sexual promiscuity as a competitive tactic (Buss & Dedden, 1990) hypothesized that this strategy would be uniformly effective in undermining same-sex rivals across all mating contexts. The rationale was that accusing a rival of promiscuity would evoke concerns about infidelity, reducing the rival's desirability in the eyes of potential mates. However, subsequent research and theoretical refinement identified an important moderating factor: the temporal context of mating goals.

Schmitt and Buss (1996) demonstrated that spreading rumors about a rival's sexual promiscuity is indeed an effective tactic for women in the context of long-term mating competition. This is because men, when seeking long-term partners, prioritize traits such as fidelity and loyalty, and rumors of promiscuity undermine the rival's perceived suitability for a committed relationship. For women, signaling that a same-sex rival is promiscuous increases the perceived risk of infidelity and potential cuckoldry, making the rival less attractive to male long-term partners. However, in short-term mating contexts, where men prioritize traits signaling sexual availability and opportunity, spreading rumors about a rival's promiscuity could paradoxically enhance her desirability. For men, promiscuity in short-term mates signals greater accessibility and reduced investment requirements, leading such rumors to increase a rival's attractiveness rather than diminish it. Conversely, for women evaluating short-term partners, sexual promiscuity in male rivals rarely conveys a competitive advantage because men's perceived availability does not carry the same negative social costs.

This analysis emphasizes the asymmetry in how men and women value sexual behavior across mating contexts, revealing that the effectiveness of spreading rumors about promiscuity as a competitive tactic is not only context-dependent but also sex-specific. This nuanced understanding of sex differences and mating contexts not only resolved the apparent anomaly but also refined sexual strategies theory (Buss & Schmitt, 1993), providing a more precise framework for understanding variations in competitive tactics. The iterative revision of this prediction exemplifies how auxiliary assumptions can be adjusted to integrate new findings while preserving the integrity of both the middle-level theory and the broader evolutionary metatheory.

Ultimately, the success of evolutionary psychology as a research program is evaluated not by its ability to avoid falsification at every level but by its capacity to integrate findings, refine its theories, and generate novel insights. The flexibility to revise auxiliary assumptions without undermining the metatheory reflects a hallmark of progressive science as envisioned by Lakatos (1970). This approach distinguishes evolutionary psychology from less robust research paradigms, as it continually synthesizes anomalies into a growing body of knowledge, yielding predictive power and explanatory breadth (Buss, 1995; Tooby, 2020).

Converging Lines of Evidence for Evolutionary Psychology's Hypotheses

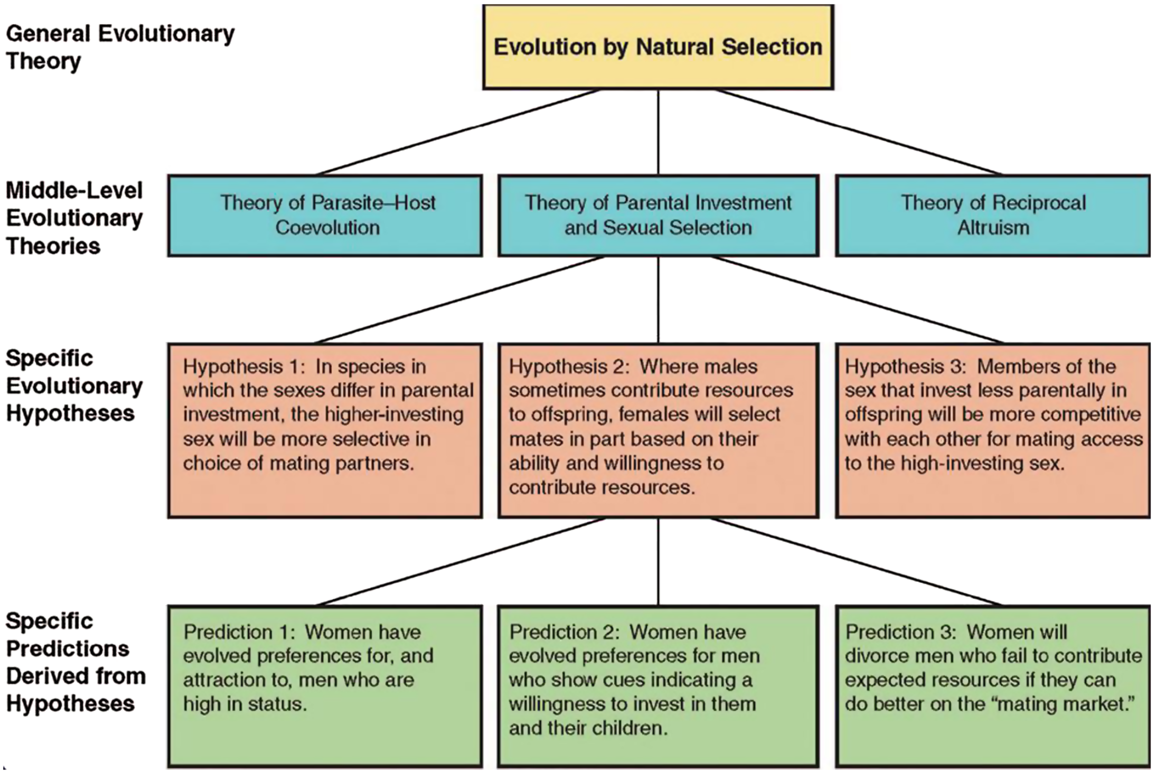
Evolutionary psychology provides a consilient framework that links together a wide range of seemingly disparate findings under an elegant set of parsimonious principles (Tooby, 2020). Its theoretical power is reflected by the many highly replicable findings emerging from the field, including functionally specialized emotions such as sexual jealousy (Buss, 2018), disgust (Tybur et al., 2013), and sex-differentiated mate preferences (Buss & Schmitt, 2019).

A critical distinction between evolutionary psychological hypotheses and most nonevolutionary hypotheses is that they contain an additional inferential step: not only do they propose that a given psychological mechanism exists and functions in a specific way but they also hypothesize that the mechanism evolved via natural selection to solve an adaptive problem. Natural selection remains the most parsimonious explanation for the emergence of complex, functionally organized cognitive mechanisms (Tooby et al., 2003). This means that when researchers identify a psychological mechanism that is highly efficient, universal, reliably developing, and functionally well-designed to solve an adaptive problem—akin to a "key fitting into a lock"—natural selection is the most likely explanation for its existence. However, while natural selection is the only known process capable of generating such structured functional complexity, adaptationist claims still require rigorous testing.

A psychological experiment can test whether a proposed mechanism exists and functions as predicted, but such an experiment alone does not directly test whether the mechanism evolved by selection. This additional inferential step does not make evolutionary hypotheses unfalsifiable because

Figure 1

Analytical Levels of Analysis Within Evolutionary Psychology: Visual Example



Note. Adapted from "Evolutionary Psychology: A New Paradigm for Psychological Science," by D. M. Buss, 1995, *Psychological Inquiry*, *6*(1), p. 3 (https://doi.org/10.1207/s15327965pli0601_1). Copyright 1995 by Lawrence Erlbaum Associates, Inc. Adapted with permission. See the online article for the color version of this figure.

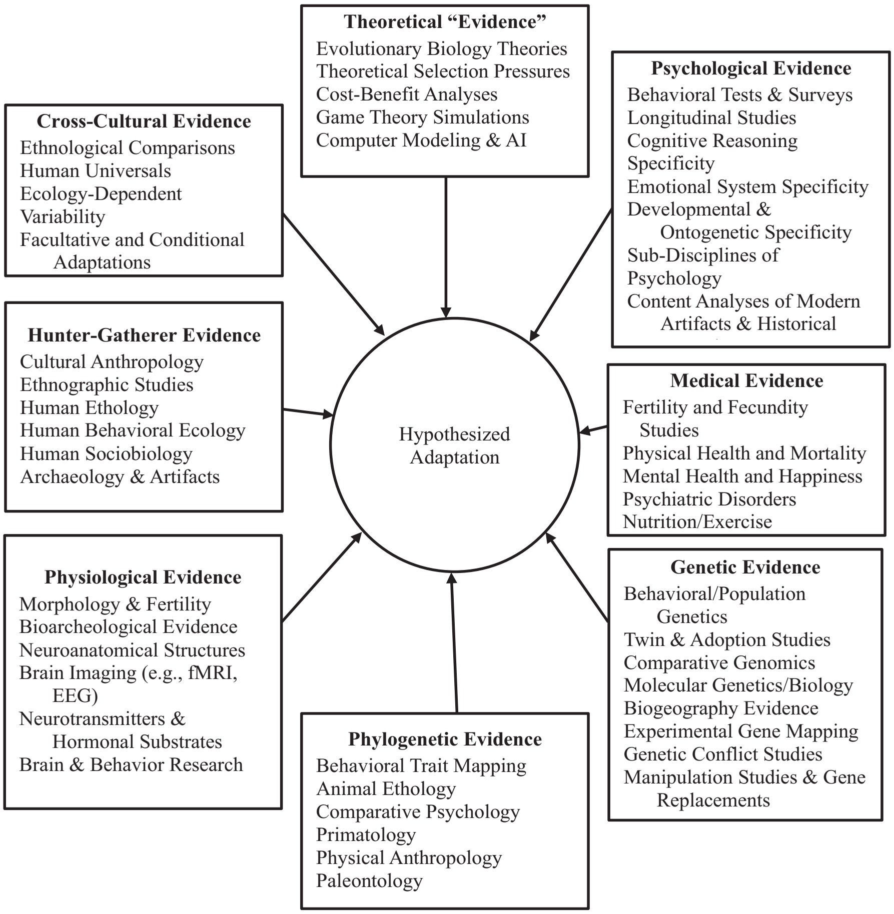
if the predicted mechanism is not found, then there is no reason to infer that it evolved, thereby falsifying the adaptationist claim at its foundation. However, because any single study in line with an evolutionary prediction could, in principle, be explained by nonadaptive mechanisms (e.g., cultural transmission or domain-general processes), evolutionary psychologists employ converging lines of evidence to bolster adaptationist claims.

To assess whether a hypothesized psychological mechanism is an adaptation, evolutionary psychologists integrate multiple sources of evidence. Each type of data—whether from behavioral experiments, cross-cultural studies, comparative biology, or developmental trajectories—has inherent limitations. Fossil records are fragmentary, self-reports risk inaccuracies due to biases or self-deception, and laboratory experiments can lack real-world applicability. Genetic studies demonstrate heritable variation in traits but do not establish species-typical design, which is critical for identifying adaptations. Consequently, no single data source alone is definitive, and evolutionary psychologists must synthesize findings across multiple domains to strengthen adaptationist conclusions (Schmitt & Pilcher, 2004).

This need for multiple levels of evidence aligns with Tinbergen's (1963) four levels of analysis, which emphasize that to fully understand a trait, researchers must examine its proximate mechanisms, ontogeny, ultimate function, and phylogeny. Tinbergen's framework clarifies both how behaviors develop and function and why they evolved. (a) Proximate (mechanism): This level focuses on the immediate physiological, genetic, or environmental mechanisms that trigger specific traits; (b) ontogeny (development): This level examines how a trait develops over an individual's lifetime, considering the influence of genetic, experiential, and environmental factors; (c) ultimate (function): This level asks why a trait evolved by analyzing its adaptive value—how it contributes to survival and reproductive success; (d) phylogeny (evolutionary history): This level explores the origins of a trait across species, tracing how it evolved over time in response to ancestral selection pressures.

A single psychological experiment might suggest the existence of a functional cognitive mechanism, but its adaptationist status is only strengthened when supported by converging evidence from these multiple levels of analysis. This inferential rigor highlights an often-overlooked aspect of evolutionary psychology: It holds itself to a higher

Figure 2
Sources of Evidence for Evaluation of a Hypothesized Adaptation



Note. Adapted from "Evaluating Evidence of Psychological Adaptation: How Do We Know One When We See One?" by D. P. Schmitt and J. J. Pilcher, 2004, *Psychological Science*, *15*(10), p. 645 (https://doi.org/10.1111/j.0956-7976.2004.00734.x). Copyright 2004 by Association for Psychological Science. Adapted with permission. AI = artificial intelligence; fMRI = functional magnetic resonance imaging; EEG = electroencephalography.

standard than many other human behavioral sciences regarding evidentiary burden.

Much of the criticism of evolutionary psychology stems from the impression that adaptationist conclusions are drawn prematurely from one or two psychological experiments. In reality, a well-supported adaptationist claim requires robust evidence from multiple domains, including universality, comparative biology, and developmental trajectories. If an evolutionary hypothesis fails these tests—if the proposed mechanism does not reliably develop, is not universal,[1] or lacks evidence of design features consistent with an adaptation—then it has not met the burden of proof, and the evolutionary explanation is weakened or falsified. In this sense, evolutionary psychology is not only falsifiable but also operates with a more stringent evidentiary standard than many competing approaches.

Evolutionary psychological hypotheses, nonetheless, vary greatly in the precision, number, and specificity of hypothesized design features, which informs the number and precision of empirical predictions that can be generated. Many design

---

[1] Importantly, evolutionary psychology predicts universality at the level of the underlying information-processing mechanisms, rather than at the level of behavioral output (Tooby & Cosmides, 1992). Psychological mechanisms are designed to be sensitive to environmental cues, operating through algorithmic decision rules that generate context-dependent behaviors (Buss, 1995). Evolutionary psychology has long articulated interactionist expectations, recognizing that evolved mechanisms do not function in isolation but are activated in response to socioecological inputs. This distinguishes evolutionary psychology from earlier sociobiological models and counters the common misconception that it assumes fixed, universal behaviors. Instead, evolutionary psychology investigates how human nature and cultural variation dynamically shape each other, emphasizing that adaptations require environmental input at every stage of their development, from their initial evolution to their present activation (Al-Shawaf et al., 2020).

features are initially underspecified, and over time, new design features are hypothesized and either supported or refuted, domains of input cues are identified, decision rules are specified, and behavioral outputs are documented. This iterative process reflects the progressive nature of evolutionary psychology as a scientific discipline—refining hypotheses in response to accumulating evidence and maintaining a commitment to empirical scrutiny.

Falsified Evolutionary Psychological Hypotheses

To illustrate the falsifiability of evolutionary psychological hypotheses, we combed through the literature for hypotheses that made clear and potentially falsifiable predictions that have been empirically tested to render an evaluation of confirmation or refutation within the past few decades. The hypotheses that we included for special focus are, of course, not exhaustive. We found many hypotheses that also met the criteria for falsification, but those included in this article were among those we evaluated as the most convincingly refuted (see Ketelaar & Ellis, 2000, for other examples). Here, we summarize and describe the logic behind the empirical tests that allow for an assessment of falsification for the following hypotheses: (a) the ovulatory shift in mate preferences (dual-mating) hypothesis, (b) the mate deprivation hypothesis of rape, and (c) the kin altruism hypothesis for the evolution of male homosexuality.

The Ovulatory Shift in Mate Preferences (Dual-Mating) Hypothesis

Perhaps the most high-profile example of a falsified hypothesis within the field of evolutionary psychology is that of the dual-mating (good genes) or ovulatory shift hypothesis, which represents a conceptually sound hypothesis. The hypothesis states that while women generally seek long-term resource investment from a committed partner, they also seek genetic benefits from short-term mating opportunities with different men during their fertile ovulatory phase. A prediction that stems from this hypothesis is that women's mate preferences should vary throughout their ovulatory cycle, seeing as their fertile window is the only time in which they can obtain presumptively "good genes." Specifically, during the ovulatory phase, women are hypothesized to show heightened preferences for hypothesized indicators of "good genes"—traits such as masculinity, facial symmetry, intelligence, and dominance and competitive behaviors, which putatively signal superior genetic fitness (see Gangestad et al., 2023, for an overview).

Initial studies supported this hypothesis by demonstrating increased preferences for masculinity (Penton-Voak et al., 1999; Penton-Voak & Perrett, 2000), symmetry (Gangestad & Thornhill, 1998), dominant and competitive behavior (Gangestad et al., 2004, 2007; Havlicek et al., 2005), and lower frequency voices (Puts, 2005) in women during the fertile phase of their cycle. A wide range of evidence suggests that women particularly prefer certain attributes when short-term mating, some of which may reflect good genes sexual selection. For instance, women tend to place more emphasis on men's physical attractiveness when evaluating them for one-night stands compared to marriage partners (Kenrick et al., 1993; Li, 2007), and women tend to prefer masculine male faces for short-term more than for long-term mateships (Jones et al., 2018; Valentine et al., 2014). Moreover, sociosexually unrestricted women tend to emphasize physical attractiveness and sex appeal in potential mating partners more than do sociosexually restricted women (Muggleton & Fincher, 2017; Simpson & Gangestad, 1992). Additionally, a comprehensive meta-analysis reviewing 134 effects from 50 different studies found cycle shifts in women's preferences for cues of (ancestral) genetic quality when evaluating men's attractiveness in short-term contexts, although effects tended to be small (Gildersleeve et al., 2014a). Notably, these shifts were absent in assessments of long-term attractiveness, suggesting a specific, context-dependent effect aligned with the dual-mating hypothesis.

However, large-scale replication attempts have mostly failed, raising significant questions about the robustness of the dual-mating hypothesis (e.g., Arslan, Driebe, et al., 2021; Arslan, Schilling, et al., 2021; Dixson et al., 2018; Harris, 2011, 2013; Marcinkowska et al., 2016; Thomas et al., 2021). For example, Wood et al. (2014) conducted a meta-analysis of 58 studies and found no significant preference for traits associated with hypothesized "good genes" indicators during the fertile phase (cf. Gildersleeve et al., 2014b). Additionally, a large-scale longitudinal study of 584 women also found no correlation between hormonally assessed ovulation status and preference for masculinity in male faces, although it did find that the general preference for masculine faces was more pronounced for short-term rather than long-term mateships (Jones et al., 2018).

Early studies testing the dual-mating hypothesis relied on imprecise ovulation tracking methods, such as self-reported cycle days. However, Jünger et al. (2018) conducted a preregistered study using precise ovulation measurements (urine luteinizing hormone tests) in 157 women and found no evidence that women's preferences for masculine traits varied across the cycle. While women rated men as more attractive during their fertile phase, this effect was not specific to masculinity, contradicting the key prediction of the dual-mating hypothesis. Finally, Stern et al. (2020) analyzed actual male–female interactions and found that women rated men's sexual attractiveness higher during the fertile phase. However, there was no preference for masculine behaviors during this phase, and long-term relationship desirability was consistent across the cycle.

An intriguing aspect of the dual-mating hypothesis is the absence of an ovulation shift in preferences for intelligence. If women showed an ovulation shift to prefer intelligence, which has some of the highest heritability of any psychological trait (see Plomin & Deary, 2015, for a review), during their fertile window, it would have been touted as major support for the dual-mating hypothesis. Yet, despite it being a highly desirable mate preference, empirical studies have demonstrated no cyclical preference shift for intelligence during women's fertile phases (Buss & Schmitt, 2019). It may be that intelligence, as a slowly revealed trait, does not typically impact short-term mating decisions that are often based on quicker assessments.

Furthermore, if the ovulatory shift hypothesis were true, one prediction includes a nontrivial rate of genetic cuckoldry of long-term partners by women. Larmuseau et al. (2016) reviewed genetic data spanning premodern contraception eras and found that extra-pair paternity rates were extremely low (1%–2%), challenging the idea that women routinely seek "good genes" from extra-pair copulations. In other large samples where paternity is not disputed, the rates of extra-pair paternity are also low, with results rarely exceeding 3% (Bellis et al., 2005; Scelza et al., 2020).

However, it is important to note the caveat that cuckoldry rates may not directly correspond to mating and attraction patterns in a straightforward way. The proportion of children with a different genetic father is influenced by a number of interactive factors, including attraction, partner availability, and anticuckoldry adaptations such as jealousy (Buss, 2018) and mate guarding (Buss, 2002). Without an explicit model specifying what cuckoldry rates should be under the dual-mating hypothesis, it remains unclear what precise rates might serve as evidence for or against the hypothesis. While we recognize that the hypothesis need not predict a specific rate of cuckoldry, if dual mating for genetic benefits was a widespread strategy among women, we might reasonably expect higher rates of extra-pair paternity as an outcome. Although these low rates of cuckoldry do not "falsify" the dual-mating hypothesis alone, they do contribute to a broader accumulation of evidence suggesting that women's mating strategies may not align with the predictions of this hypothesis.

Recently, some of the originators of the dual mating hypothesis, such as Gangestad et al. (2023), reviewed the literature and concluded that current evidence does not support the hypothesis in its original form;

> Repeated findings through the first decade of this century apparently show that preferences across multiple male features shift across the cycle. … Now, it seems apparent that early claims were too bullish. Preference shifts appear to be relatively weak overall, limited to specific male traits, and/or conditional. In light of contrasting results, a number of research teams have sought to assess the replicability of key findings in reasonably high-powered studies. Results have been mixed, though findings have been more negative than positive. What, then, can be concluded at this point in time? In our view, uniform null hypotheses, across all preferences, are unlikely. At the same time, claims based on early studies were likely too bold. (Gangestad et al., 2023, p. 713)

The dual-mating hypothesis was a compelling, cogent, and logically consistent evolutionary hypothesis. However, the core prediction—that mate preferences shift during ovulation toward traits indicative of "good genes"—has not been consistently replicated, especially in larger scale studies. Despite its initial popularity and the intuitive appeal, scientific testing has largely failed to support this critical prediction. This serves as a clear example of how hypotheses within evolutionary psychology are rigorously tested and, when necessary, refuted—demonstrating the field's commitment to empirical scrutiny and potential falsification.

Although future methods may eventually demonstrate the significance of ovulatory shifts for understanding mating and infidelity, the effects now appear to be much smaller than initially believed and may not exist at all. The current available evidence suggests that ovulatory shift effects are inconsistent at best, weakening support for the dual-mating hypothesis in its original form. The hypothesis may also in time undergo theoretical refinement as per the field's progressive Lakatosian approach. Indeed, there have been attempts to distance the dual-mating hypothesis from its core prediction of ovulatory shifts (e.g., Murphy et al., 2024).

The Mate Deprivation Hypothesis of Rape

Thornhill and Palmer's (2001) *A Natural History of Rape* reviews several evolutionarily informed hypotheses regarding the ultimate cause of rape. Some theories posit potential adaptations facilitating male rape, while others suggest that rape is a by-product of other aspects of male-typical psychology. One adaptationist hypothesis they advance is the mate deprivation hypothesis (Thornhill, 1980; Thornhill & Thornhill, 1983). The mate deprivation hypothesis posits that a specialized, context-dependent adaptation has been selected in men to lower their psychological threshold for committing rape when they "lack alternative reproductive options" (Thornhill & Palmer, 2001, p. 67). According to this mate deprivation hypothesis, a key predictor of men's lack of mating options would be their inability to acquire resources or status that women typically find attractive in potential mates (Buss, 1989; Walter et al., 2020). Three key empirical predictions follow that can be tested: (1) men who lack resources will be more likely to rape than men with more resources; (2) men who lack sexual access to women will be more likely to rape than men with more sexual access to women (see Thornhill & Palmer, 2000, for review); (3) men who possess status and resources will have less need to resort to sexual violence because they can attract women as sexual or romantic partners by embodying the qualities women desire.

The most direct tests of these predictions come from specifically designed psychological studies. In a sample of 156 heterosexual young adult men, Lalumiere and his colleagues measured rape proclivity with items such as "Have you ever had sexual intercourse with a woman even though she didn't really want to because you used some degree of physical force?" (Lalumière et al., 1996, p. 303). Separately, they measured self-reported mating success (e.g., "Members of the opposite sex are attracted to me"), sexual history (e.g., age at first sexual intercourse, number of previous sex partners, number of sex partners within the past year), and relative earning potential (e.g., "Relative to my peer group, my potential income is: Much higher-much lower"). The results did not support the predictions from the mate deprivation hypothesis. Against prediction (1): There was no correlation between estimated earning potential and rape nor between parental income and rape. Against predictions (2) and (3): Men's mating success positively predicted the likelihood to self-report using force to obtain sex. Men who reported a lot of consensual sexual partners were also more likely to report using force to obtain additional sexual partners. A second study using similar methods corroborated Lalumière et al.'s (1996) results (Malamuth, 1998). A third study including a community sample of Canadian men found that more sexual partners during adolescence—a key marker of short-term mating success—was one of the strongest predictors of sexual coercion (Senn et al., 2000). In short, assuming the validity of these studies, the results are in the precise opposite direction of the prediction posited by the mate deprivation hypothesis.

Mealey (2003) described another study that found that college men who admit to behavior that legally meets the definition of rape tend to be more popular, have higher status, and have more consensual sex partners than other college men, the opposite of what the mate deprivation hypothesis of rape predicts. Mealey concluded that popular, high-status, "macho" men, not mate-deprived men, are most likely to rape. All three studies testing specific predictions of the mate deprivation hypothesis, supplemented by Mealey's (2003) review, lead to the same conclusion: men who lack sexual access appear *less* likely to use coercive tactics and men who have *more* sexual access appear *more* likely to use physical force and other coercive means such as verbal threats. These findings do not just fail to support the mate deprivation hypothesis of rape. They directly contradict its key predictions.

Findings from Lankford et al. (2024) provide further evidence against the mate deprivation hypothesis. Their study analyzed sexual harassment and assault among 200 of the most famous celebrities in America. The results strongly indicated that celebrity men, who are often wealthy and high-status, are far more likely to commit sexual transgressions than men in the general population and showed a substantially increased risk of also committing sexual harassment and sexual assault. These findings challenge the mate deprivation hypothesis, as high-status men are often the most likely to engage in sexual misconduct and violence, directly contradicting the idea that mate deprivation is the primary driver of sexual violence.

Each of these studies, taken in isolation, of course, has methodological limitations. For example, self-report measures are particularly vulnerable to biases when studying socially undesirable behaviors like rape proclivity. Participants may underreport or misrepresent their behavior due to social desirability bias or fear of judgment. To address this, future research should aim to triangulate self-reported data with alternative methodologies, such as criminal records, observational studies, and experimental paradigms, to provide a more comprehensive evaluation. However, taken together, barring future studies that yield different results, the available evidence strongly challenges the validity of the mate deprivation hypothesis.

Beyond these direct tests of the hypothesis, there are several converging lines of indirect evidence against the mate deprivation hypothesis of rape. One such comes from an analysis of incels (involuntary celibates): a subculture of men who forge a sense of identity around their perceived inability to form sexual or romantic relationships (Costello et al., 2022). Incels often express misogynistic hostility toward society at large for a perceived failure to include them. They are typically less-educated, live with their parents into adulthood, and perceive themselves to be much lower than average in mate value (Costello et al., 2023, 2024). Although some scientists have speculated about the potential for sexual violence among this group (e.g., Lindner, 2023), Costello and Buss (2023) reviewed evidence that suggests they are less inclined toward sexual violence than other groups of men. Specifically, although estimates of rape proclivity among men in the general population range from 19% to 35% (Hahnel-Peeters et al., 2022; Malamuth, 1981; Palmer et al., 2021; Young & Thiessen, 1992), only 13.6% of incels report some willingness to rape if they could get away with it (Speckhard et al., 2021).

Another source of evidence originally cited by Thornhill and colleagues in support of the mate deprivation hypothesis was that convicted rapists and those serving prison time for rape were more likely to be low in socioeconomic status (Thornhill & Thornhill, 1983). However, this finding may reflect women's greater reluctance to report high-status men due to their ability to leverage resources for retaliation or evade consequences. High-status men, such as Jeffrey Epstein, Bill Cosby, and Harvey Weinstein, used wealth and social power to escape punishment for decades despite repeated accusations of sexual violence (Farrow, 2019; Lankford et al., 2024). These men were not "mate-deprived" in the sense implied by the hypothesis.

Historians and anthropologists have further documented examples of high-status men, such as kings and religious leaders, using their power to engage in sexual coercion (L. L. Betzig, 1986; Hartman, 1997). In modern contexts, plural marriages among certain Mormon sects institutionalize coercive relationships with underage girls, illustrating that high-status individuals often use their position to engage in sexual violence rather than being driven by deprivation (Krakauer, 2004).

Although additional studies are needed, the available evidence leads to the conclusion that the mate deprivation hypothesis of rape, at least in the form initially proposed by Thornhill and Thornhill (1983), appears to be almost certainly scientifically false. Although some mate-deprived men undoubtedly sometimes rape, the available evidence suggests that men with money, status, popularity, and power are more likely to rape. The weight of the current empirical evidence, combined with historical and contemporary examples, refutes the hypothesis that men evolved a psychological mechanism to lower their threshold for committing rape in response to mate deprivation. Research testing predictions from the mate deprivation hypothesis exemplifies the point that evolutionary psychological hypotheses can indeed be formulated to be testable and falsifiable.

The Kin Altruism Hypothesis of the Evolution of Male Homosexuality

The principle of natural selection entails that future generations will be populated by individuals whose ancestors were able to successfully replicate their genes. Sexual reproduction is the main form of genetic replication in vertebrates—apart from aiding the survival and reproductive success of genetic relatives (inclusive fitness theory; Hamilton, 1964). Thus, the existence of exclusive homosexuality in sexually reproducing organisms has long been an evolutionary puzzle, sometimes called a “Darwinian paradox” (Camperio-Ciani et al., 2004). Given that natural selection typically favors traits that recurrently promote reproductive success, the persistence of exclusive same-sex attraction at low but stable frequencies within human populations invites inquiry into its evolutionary origins or its resilience in selection over time.[2]

Several evolutionarily informed hypotheses, along with some physiological explanations (e.g., Bailey et al., 2016; Swift-Gallant et al., 2023), have been proposed to explain the persistence of exclusive male homosexuality in humans, considering this apparent evolutionary puzzle. Wilson (1975) hypothesized that genes associated with homosexuality could be maintained if homosexual men’s investment in their heterosexual relatives increased the fitness of their genetic relatives (inclusive fitness) enough to offset the fitness costs of not reproducing directly through heterosexual mating. This hypothesis leads to the predictions that homosexual men would (a) invest more resources in their genetic relatives and the offspring of those relatives than heterosexual men and (b) that such investment more than compensates for the fitness costs of forgoing direct reproduction.

These predictions have been tested. Some studies suggest that avuncular tendencies (investing resources in nieces and nephews) are somewhat higher in transgender androphilic biological males, such as Samoan fa’afafine (VanderLaan & Vasey, 2012; Vasey et al., 2007) and the Istmo Zapotec muxes of Oaxaca, Mexico—specifically among muxe gunaa (transgender androphilic males) and muxe nguiiu (cisgender androphilic males; Gómez Jiménez & Vasey, 2022). However, studies of the kathoeys of the Urak Lawoi—another group of androphilic males who typically present as women—find no evidence that sexual orientation predicts generosity to kin (Camperio-Ciani et al., 2016).

Furthermore, contrary to predictions, cisgender homosexual men in several industrialized nations (e.g., Canada, Japan, Spain, United States, United Kingdom) do not report higher investment in the offspring of relatives compared to cisgender heterosexual men (Abild et al., 2014; Bobrow & Bailey, 2001; Forrester et al., 2011; Rahman & Hull, 2005). Directly conflicting with the prediction, Bobrow and Bailey (2001) found that homosexual men gave less money to siblings than heterosexual men. Although it is possible that various sociocultural factors (e.g., perhaps gay men are ostracized by their family) suppress the expression of kin altruism in homosexual men, no strong evidence has been offered for specific adaptations for generosity toward kin in cisgender homosexual men (Forrester et al., 2011). There is therefore, at best, mixed evidence that androphilic males reliably contribute more to kin than cisgender gynephilic males.

Beyond the lack of empirical support, the kin selection hypothesis faces fundamental theoretical challenges. The hypothesis requires androphilic males to be extraordinarily effective at increasing their kin’s reproductive success—essentially requiring them to act as “superuncles” who compensate for their lack of direct reproductive output. Under Hamilton’s rule, the fitness benefit to kin must outweigh the cost of not reproducing, meaning that

---

[2] It is important to clarify that this line of inquiry does not imply that all behaviors require adaptive explanations. Exclusive male homosexuality may reflect mechanisms that are not directly adaptive but instead arise as developmental by-products or as part of broader genetic (Felesina & Zietsch, 2025) or hormonal influences (e.g., Swift-Gallant et al., 2023). Evolutionary psychology recognizes that some traits exist as by-products of other adaptations rather than as direct products of selection (Buss et al., 1998). Some examples may include the female orgasm as a by-product of male orgasm (Symons, 1980; cf. Wheatley & Puts, 2015), music as a by-product of language (Pinker, 1997), and religion as a by-product of a suite of psychological mechanisms (Boyer, 2023). The persistence of exclusive male homosexuality may also be less puzzling when we consider historical social contexts. In many societies, strong social pressures and kin-arranged mateships (Apostolou, 2007) ensured that individuals, including androphilic men, reproduced despite not being attracted to women. This suggests that reproduction could have occurred independently of personal sexual preferences, reducing the strength of selection against genes associated with exclusively androphilic sexual orientation. However, this does not explain why exclusive same-sex attraction evolved in the first place—only why it may not have been strongly selected against.

androphilic males would need to facilitate the survival of at least four additional nieces or nephews for every two children they forgo (because nieces and nephews share half as many genes as direct offspring). No existing evidence comes close to meeting this requirement.

Moreover, if we consider apparent functional design as a category of evidence for adaptive explanations, androphilia does not appear to be especially well-designed for kin altruism. While some androphilic males in specific cultural contexts exhibit higher avuncular tendencies, the overall pattern does not strongly suggest an adaptation explicitly shaped for kin-directed altruism. This example further demonstrates that evolutionary psychological hypotheses can be rigorously tested and, when unsupported, falsified.

Discussion

In this article, we examined an oft-repeated claim that evolutionary psychological hypotheses are not falsifiable. After outlining criteria necessary for the falsification of a hypothesis, we evaluated evolutionary psychology's metatheoretical framework from which its hypotheses and predictions are derived. We then examined several evolutionary psychological hypotheses that have been refuted based on the weight of empirical work that has tested predictions derived from them. Specifically, we evaluated specific empirical tests from multiple studies that have falsified, or at least soundly refuted, the following hypotheses: (a) the ovulatory shift in mate preferences prediction from the dual-mating hypothesis, (b) the mate deprivation hypothesis of rape, and (c) the kin altruism hypothesis for the evolution of male homosexuality. These examples provide compelling evidence that evolutionary psychological hypotheses, when they generate precise empirical predictions, are testable and falsifiable.

Our discussion now presents a wide range of strongly supported evolutionary psychology hypotheses and echoes calls for greater precision in hypothesis testing in evolutionary psychology. We then address some pervasive misconceptions that may underlie critics' claims of unfalsifiability and conclude by demonstrating that it is often competing theories, rather than evolutionary psychology, that neglect to acknowledge when their hypotheses are falsified.

Strongly Supported Evolutionary Psychology Hypotheses

It is also important to acknowledge the many hypotheses in evolutionary psychology have been formulated precisely enough that they *could* have been falsified but in fact have received exceptionally strong empirical support. Examples in the perceptual and cognitive domains include error management hypotheses about the auditory looming bias (Neuhoff, 2001), the vertical descent illusion (Hahnel-Peeters et al., 2020; Jackson & Cormack, 2007). Similarly, the gathering hypothesis (Silverman & Eals, 1992) predicted that women would excel in spatial tasks related to resource location, a domain previously overlooked by researchers. Subsequent studies validating this hypothesis (e.g., McBurney et al., 1997; Silverman et al., 2007; see Voyer et al., 2007, for a meta-analysis) emphasize evolutionary psychology's capacity for uncovering entirely new dimensions of human cognition. In the social domain, examples include kin investment as a function of genetic relatedness (e.g., Burnstein et al., 1994), the emotion of disgust as an adaptation for incest avoidance (e.g., Lieberman et al., 2003) and pathogen avoidance (Tybur et al., 2013), a cheater detection adaptation in social exchange (e.g., Cosmides & Tooby, 2015), the sexual overperception bias in men as an adaptation to avoid missed reproductive opportunities (e.g., Haselton & Buss, 2000), sex differences in the psychological design of sexual jealousy as adaptations to sex-differentiated adaptive problems of sexual and emotional infidelity (e.g., Buss, 2018), and kin altruism directed in gradient fashion as a function of genetic relatedness (see summaries by Hames, 2015, and Buss, 2024). Because all these hypotheses generated clear, testable predictions, they could have been falsified had the numerous relevant empirical tests turned out differently.

A Call for Greater Precision in Hypothesis Testing

Although we have highlighted several evolutionary psychological hypotheses that have been articulated precisely enough to generate specific and falsifiable predictions, the field has by no means been unsullied by vague and imprecise hypotheses and speculations that yield no specific empirical predictions. As in every scientific field, hypotheses range in quality and precision. Evolutionary psychology, like others, contains the full gamut of good and bad exemplars. While we argue that the field of evolutionary psychology is no more vulnerable to unfalsifiable ideas than others, we agree with critics in one respect: It is all too easy to popularize vague, sloppy hypotheses. We echo previous calls by Williams (1966), Gould and Lewontin (1979), and Tooby and Cosmides (1992) for a focus on precision in formulating and testing evolutionary hypotheses.

Like most of the social sciences, evolutionary psychology relies heavily on verbal descriptions of models, hypotheses, and predictions, a practice that has significant limitations (Gigerenzer, 1998; Smaldino, 2017). Verbal models are inherently imprecise because they depend on researchers interpreting constructs in the same way, yet subtle differences in definition, emphasis, or assumed mechanisms can lead to divergent understandings. This lack of precision can make it difficult to generate clear, testable predictions and to evaluate competing explanations rigorously. In contrast, fields such as economics have placed a stronger emphasis on developing formal models—that is, mathematical or computational representations of theoretical ideas. Formal models help to explicitly define assumptions, constructs, and mechanisms, reducing ambiguity and making it easier to derive precise, falsifiable predictions. By adopting more formal modeling approaches, evolutionary psychology can develop even stronger tests of evolutionary hypotheses. For instance, error management theory, as originally formulated, may be underspecified regarding whether behavioral tests of bias can directly assess the proposed cognitive bias (Johnson et al., 2013). More precise modeling could clarify such ambiguities and strengthen the robustness of the theory.

Our call for precision aligns with recommendations from Lewis et al. (2017), who highlighted the ambiguity surrounding "best practices" for applying evolutionary principles in psychology due to the field's relative novelty and lack of formal training for many researchers. Their article provides a practical guide for avoiding common pitfalls, generating testable hypotheses, testing empirical predictions, and interpreting results. By outlining tools like task analysis, explication of design features of psychological mechanisms, and cost–benefit analysis, they offer a framework for developing rigorous evolutionary psychology hypotheses about universal psychological mechanisms, their cultural modulation, and cross-culturally variable behavioral manifestations (Lewis et al., 2017).

Misconceptions Underlying "Unfalsifiable" Claims

Several implicit misconceptions about evolutionary hypotheses may have motivated some of the accusations relating to falsifiability. These include the (a) notion that behavior *does not fossilize*, (b) observational approach to hypothesis formulation is "just-so storytelling," and (c) misconception that the development of multiple competing evolutionary hypotheses somehow undermines the validity of the field. We will now dispense with each misconception in turn.

Misconception 1: Cognition and Behavior Do Not Fossilize

Schaller and Conway (2000) noted that scientists sometimes intuitively mistake *unverifiability* for unfalsifiability. In an article titled "Is Evolutionary Psychology Possible?" Smith (2020) challenged the feasibility of evolutionary psychology on the grounds of unverifiability by highlighting what she calls the "matching problem." This argument can be likened to saying that evolutionary psychology is *impossible* because *cognition and behavior do not fossilize*. The argument suggests that without direct fossilized evidence tracing psychological traits from their origins in the environment of evolutionary adaptedness (Tooby & Cosmides, 1990) to the present, evolutionary psychology relies on unverifiable assumptions about the continuity and function of ancient cognitive mechanisms in modern contexts. Although Smith does not speak to whether evolutionary psychology's hypotheses are falsifiable or not per se, she concludes that this lack of direct evidence renders the discipline, as currently practiced, fundamentally impossible (cf. Hagen, 2020; Nettle & Scott-Phillips, 2023). The temporal remoteness of evolutionary psychological models compounds these inferential challenges. Unlike sociocultural theories, which typically propose causal mechanisms rooted in the relatively recent past, evolutionary models often rely on processes occurring tens of thousands of years ago (Conway & Schaller, 2002). This temporal distance increases the perceived likelihood that other, more proximate processes—such as sociocultural influences—could account for the same psychological phenomena.

Critics may assume that because we cannot peer directly into the past, evolutionary psychological hypotheses are ultimately untestable and must therefore be just-so stories. This type of criticism misunderstands the nature of hypothesis testing. First, consider the fact that if it was true that hypothesis testing is ultimately impossible in any field that contains a historical element, this would make all the following fields unfalsifiable: cosmology, astrophysics, paleontology, archeology, geology, and evolutionary biology. This is obviously wrong and should serve as a warning sign to those who think the historicity of evolutionary psychology automatically renders its hypotheses unfalsifiable (Al-Shawaf et al., 2020). To illustrate, in cosmology, the theory of galaxy expansion suggests that the universe is expanding, a prediction traceable back to the conditions of the big bang. Similarly, in psychology, the prevalent fear of snakes among modern humans can be seen as a trace of ancestral environments where such fears could have offered survival benefits (Öhman & Mineka, 2003). Stated more directly, the design of the human body, brain, and mind *is* a rich collection of living fossils. These living fossils have the added advantage that hypotheses about their design features and the functions of those design features can be tested and confirmed or refuted.

Although it is certainly true that some claims about events millions of years in the past cannot be *verified*, such claims can still make predictions about what we would expect to be the case in the present day and what we would expect *not* to be the case. Evolutionary psychologists do not need to travel into the past to test their hypotheses at all. Instead, their hypotheses may be informed by their knowledge of the past, but these hypotheses need to yield empirical predictions about what we should expect to see in the modern world. For example, consider the hypothesis that disgust evolved as a specialized mechanism to protect against disease. This hypothesis would be falsified if humans showed no systematic relationship between disgust sensitivity and pathogen cues, if disgust was not cross-culturally recurrent, or if disgust was not functionally linked to disease avoidance behaviors.

Key tests include whether individuals with higher disgust sensitivity experience fewer infections (Curtis et al., 2004) or whether disgust responses are selectively triggered by pathogen-relevant cues rather than arbitrary aversions (Curtis & Biran, 2001). If people exhibited equal disgust toward pathogenic and nonpathogenic stimuli, or if disgust did not correlate with actual disease risk and avoidance behaviors, this would call into question its function as an adaptation for pathogen defense. Additional findings, such as whether humans can detect sickness via body odor (Olsson et al., 2014) or whether disgust is upregulated during pregnancy-related immunosuppression (Fessler et al., 2005), serve as additional supporting predictions—but would not necessarily falsify it if they failed to hold. For example, if humans could not detect sickness via odor that would not fundamentally disprove the broader claim that disgust functions as a pathogen avoidance system; it would only challenge one proposed mechanism by which it operates. The fact that these multiple predictions have been tested and supported empirically reinforces the legitimacy of evolutionary psychology's methodological approach.

Just as the disgust system illustrates how evolutionary hypotheses can be tested in modern populations, Tinbergen's (1963) four levels of analysis provides a structured framework that helps clarify how psychological adaptations can be systematically studied despite their historical origins. While evolutionary psychologists cannot directly observe the selection pressures that shaped ancestral traits, they can (a) make predictions and test how proximate mechanisms might manifest in modern environments if they were functionally designed to solve recurring ancestral problems; (b) investigate ontogenetic development to determine whether traits emerge predictably across an individual's lifespan in response to the relevant adaptive problem—for instance, mating-related adaptations such as sexual jealousy tend to emerge in adolescence, coinciding with reproductive maturity (Larsen et al., 2021); (c) assess phylogenetic patterns by comparing homologous traits across species; and (d) evaluate ultimate function by examining how these traits may have contributed to reproductive success. By integrating these levels of analysis, evolutionary psychology ensures that adaptationist claims are subjected to rigorous empirical testing rather than speculative inference.

To illustrate, comparative studies of humans and other primates, such as chimpanzees and macaques, challenge the critique that behavior does not fossilize by illustrating the evolutionary continuity of brain systems and their associated behaviors. For instance, the expansion of the default mode network in humans (Buckner & DiNicola, 2019) reflects key anatomical and functional developments that support self-referential thinking, memory, and complex problem solving—cognitive abilities essential for mental time travel and future planning. Likewise, genetic research mapping human-expanded cognitive networks has identified evolutionary changes in brain architecture that are linked to advanced cognition and behavior (Wei et al., 2019). These comparative findings highlight how structural and functional similarities across species can provide insight into the evolutionary origins of human cognition.

Importantly, Tinbergen's (1963) four levels of analysis are not competing explanations but instead provide an integrated, multilevel approach to explaining traits. Each level offers a necessary component of a holistic explanation, and they mutually inform one another (e.g., understanding ontogeny and mechanisms can be enhanced by considering function and phylogeny, and vice versa). All human traits emerge through interactions between developmental processes and evolutionary pressures—there is no meaningful distinction between traits shaped by ontogenetic processes and traits shaped by selection, as all developmental processes themselves are evolutionary products.

Ultimately, the inferences about ancestral selection pressures are not untestable assumptions; rather, they generate predictions about contemporary human psychology that can be empirically evaluated. Additionally, evidence from comparative cognition, brain structures, and genetic continuity of psychological traits further supports the evolutionary origins of psychological mechanisms. In this way, evolutionary psychology's backward-looking claims about ancestral selection pressures accumulate support through an empirical research and converging lines of evidence. In short, the design features of universal human psychology serve as living fossils, preserving evidence of ancestral selection pressures.

Misconception 2: Observation-Driven Hypotheses Are Just-So Stories

Although many hypotheses in evolutionary psychology follow the theory-driven approach that we have detailed in this article, beginning with a middle-level evolutionary theory and proceeding to specific hypotheses and testable predictions, the observation-driven approach offers an equally valid method of scientific inquiry. The observation-driven method begins with an already observed phenomenon and works backward to generate hypotheses about its evolutionary function. This process, sometimes called *reverse engineering*, starts with a well-documented behavioral pattern—such as an observed mate preference (e.g., a low waist-to-hip ratio) and then seeks to infer its evolutionary function.

Evolutionary psychology suggests that to understand attractiveness, one can observe men's current preferences (e.g., a low waist-to-hip ratio) and then consider the ancestral selection pressures that shaped these preferences and the information-processing mechanisms that guide them. Ancestral males who possessed mechanisms that (a) attended to cues correlated with fertility and reproductive value and (b) generated preferences for mates displaying those cues would have had greater reproductive success than those who lacked such mechanisms. Over generations, these preferences would have become species-typical features of male psychology. Because fertility itself is not directly observable, men's preferences are hypothesized to track reliable visual indicators of reproductive potential, such as a low waist-to-hip ratio. Robust cross-cultural evidence now confirms men's preference for a low waist-to-hip ratio (e.g., Singh, 1993; Singh et al., 2010) and its link to reproductive potential and fertility (Lewis et al., 2022).

To illustrate further, a compelling example of the theory driven approach in evolutionary psychology is the discovery that men exhibit a specific preference for a particular degree of lumbar curvature in women—predicted a priori based on evolutionary logic before being empirically confirmed (Lewis et al., 2015). This research began with a theoretical understanding of the adaptive problems faced by ancestral human females during pregnancy, which led to a clear functional hypothesis about how selection pressures might have shaped mate preferences.

Human females, as the only bipedal primates who also undergo pregnancy, face a unique biomechanical challenge: As the fetus grows, a woman's center of mass shifts forward, increasing stress on the lower back. If left unmitigated, this shift could have resulted in increased fatigue, spinal injury, compromised mobility, and reduced foraging efficiency—each of which would have posed serious fitness costs in ancestral environments (Whitcome et al., 2007). To address this, women evolved a specific morphological adaptation: wedging of the third-to-last lumbar vertebra, which allows for more effective redistribution of weight and reduces strain on the spine during pregnancy.

From this known adaptation, evolutionary psychologists predicted that men's mate preferences would be attuned to lumbar curvature as an indicator of a woman's ability to successfully bear children without incurring biomechanical costs. According to this evolutionary logic, the fetal load hypothesis specifically predicted that men would find an optimal lumbar curvature as most attractive, as this angle best facilitates pregnancy without excessive strain (Lewis et al., 2015). To test this, researchers first examined orthopedic literature to determine spinal curvature angles that minimize risks of hypolordosis (insufficient curvature) and hyperlordosis (excess curvature), which was 45.5°. They then manipulated lumbar curvature in images of women and assessed men's attractiveness ratings. As predicted, men exhibited a strong preference for women with lumbar curvatures closest to 45.5°—precisely the angle that optimizes functional benefits for pregnancy.

Although this research originated from a theory-driven approach, the same discovery could have emerged from an observation-driven approach. Instead of beginning with an adaptationist hypothesis about pregnancy biomechanics, researchers could have first observed men's preference for a specific spinal curvature and then sought to explain its potential adaptive function. This observation-driven approach would begin with the empirical observation that men systematically favor a particular lumbar curvature and then generate testable hypotheses about whether such a preference aligns with selection pressures related to reproductive success. Predictions could then be formulated—such as the expectation that the preferred lumbar curvature enhances biomechanical efficiency during pregnancy—and tested through interdisciplinary research.

Thus, whether one starts with evolutionary theory or with an observed behavioral pattern, the key criterion for scientific validity remains the same: the generation of novel, testable, and falsifiable predictions. In the case of lumbar curvature preferences, both approaches would have led to core empirical tests and, ultimately, to the same novel insights about human mate preferences.

Critics sometimes dismiss the observational approach to hypothesis generation as "just-so storytelling," suggesting that it retrofits explanations to observed behaviors rather than producing falsifiable predictions. However, this misconception fails to recognize that observation-driven hypotheses must generate novel, testable predictions to be considered scientifically valid. A hypothesis generated via the observation method does not become an unfalsifiable "just-so story" unless researchers fail to test its predictions or fail to accumulate converging empirical evidence.

Together, the theory- and observation-driven approaches ensure that evolutionary psychology remains a rigorous, predictive, and falsifiable science. The former provides a priori theoretical guidance to generate hypotheses before empirical testing, while the latter ensures that observed phenomena are not taken at face value but instead subjected to rigorous testing. Importantly, both approaches require researchers to move beyond mere description and formulate hypotheses that generate new, testable predictions—thus avoiding the charge of being mere "just-so stories."

Misconception 3: There Can Only Be One Evolutionary Hypothesis for a Given Trait

Sometimes we are asked "What is the evolutionary hypothesis of X?" Sometimes, perhaps often, there are competing evolutionary hypotheses about an observed phenomenon, just as theoretical astrophysicists proposed different hypotheses that could explain three-degree black body radiation once it had been observed (Weinberg, 2008). Critics of evolutionary psychology sometimes seem to view competing evolutionary hypotheses or the replacement of one adaptationist hypothesis with another as post hoc goalpost shifting. This is especially true in mainstream psychological articles that pit a single evolutionary or "biological" hypothesis against numerous "nonevolutionary" hypotheses (e.g., Bourgeois & Perkins, 2003). The idea that there is a single evolutionary or biological account for any given phenomenon is a surprisingly prevalent implicit misconception. In fact, two or more evolutionary hypotheses for the same phenomenon *can* be pitted against one another, just as they are in astrophysics. For example, though the kin altruism hypothesis has been largely falsified, the front-runner in explaining the evolution of male homosexuality is now the sexually antagonistic selection hypothesis (see Felesina & Zietsch, 2025, for a recent review), which suggests that male homosexuality is related to genes that increase fitness when they occur in female relatives (Zietsch et al., 2008; cf. Fořt et al., 2025). Despite the fact that hypotheses like these are clearly distinct, some critics of evolutionary psychology erroneously treat hypothesis revisions and replacements as attempts to sidestep disconfirmation.

Competing Theories and the Uneven Application of Falsification

Throughout this article, we have provided evidence that evolutionary psychology generates hypotheses that are falsifiable by design and that evolutionary psychologists routinely falsify their own hypotheses when empirical evidence contradicts them. Can the same be said of proponents of competing theories? A key illustrative example is the gender equality paradox, the counterintuitive finding that some psychological and behavioral sex differences become more pronounced—not less—in highly gender-egalitarian societies such as Norway, Sweden, and Denmark.

Proponents of competing perspectives, particularly social constructivist theories like social role theory (now rebranded as biosocial role theory), have long argued that increasing gender equality should diminish sex differences (Eagly & Wood, 1999). Eagly et al. (2004) explicitly predicted that greater gender equality would lead to the diminution or elimination of many sex differences in personality, preferences, and behaviors. However, empirical findings have overwhelmingly contradicted this prediction. For instance, Schmitt (2005) found that sex differences in sociosexuality (openness to short-term mating) were actually *largest* in nations with the most egalitarian values—precisely the opposite of what biosocial role theory predicts. This pattern extends well beyond sociosexuality. As reviewed by Schmitt et al. (2017), and later by Balducci (2023) and Herlitz et al. (2024), psychological and behavioral sex differences—including personality traits, emotional expressiveness, mental health patterns, and occupational choices (Stoet & Geary, 2022)—have not diminished in more egalitarian societies but have actually grown larger.

Evolutionary psychology provides a coherent explanation for these otherwise paradoxical findings. As constraints on individual choice diminish in wealthier and more gender-egalitarian societies, men and women are freer to express their preferences. For example, men's predisposition toward short-term mating becomes more pronounced under these conditions, amplifying sex differences in attitudes toward casual sex (Schmitt, 2005). More broadly, as Geary (2021) has argued, sex differences tend to be expressed most strongly in environments that enable individual traits to emerge without constraints. This evolutionary perspective is entirely compatible with cultural explanations: greater resources and fewer social restrictions allow underlying sex differences to manifest more fully.

This same pattern is evident in broader biological domains. Just as psychological sex differences become more pronounced in gender-equal societies, so too do biologically based sex differences under favorable conditions. Geary (2021) noted that many biologically based sex differences become more pronounced as environmental conditions improve. This follows from Darwin's theory of sexual selection, which posits that certain sex differences, whether physical, behavioral, or cognitive, are costly to develop and maintain, making them more pronounced in individuals raised in resource-rich environments.

One clear-cut example is height. As human living conditions improve, men gain twice as much in height and weight as women, amplifying the sex difference in stature (Giofrè et al., 2025). This pattern results from sexual selection, as taller and more muscular men have historically had a mating advantage due to female mate preferences (Fan et al., 2005; Stulp et al., 2013) and intrasexual contest competition (Puts, 2010). Similarly, sex differences in cognitive abilities, preferences, and behaviors also increase in wealthier, healthier societies. For instance, men's advantage in certain spatial abilities (such as mental rotation) is largest in countries with higher life expectancy (Lippa et al., 2010), suggesting that better early life conditions allow cognitive traits to reach their full potential. Likewise, women's advantage in episodic memory and verbal fluency (see Asperholm et al., 2019; Hirnstein et al., 2023, for meta-analyses) is most pronounced in economically developed nations. These patterns are challenging to reconcile with purely cultural explanations but align well with an evolutionary framework (see Geary, 2021).

The rejection of these findings by some competing theorists demonstrates an uneven application of falsification. If the data had shown that sex differences diminished in gender-equal societies, this would undoubtedly have been heralded as a triumph for biosocial role theory. Yet, when confronted with robust evidence to the contrary, there has been little acknowledgment from its proponents that a central prediction of their framework has been decisively falsified. Instead, some scholars have attempted post hoc revisions of the theory, such as suggesting that gender-equal societies have stronger gender stereotypes, which paradoxically reinforce sex differences rather than diminishing them (Breda et al., 2020; Cheryan et al., 2025). The problem here is that there is often more than a kernel of truth to many stereotypes (Jussim et al., 2015; McCauley et al., 1995), so stronger stereotypes could just as easily arise from, rather than cause, larger sex differences in gender-equal countries.

Refining theories in light of new evidence is a hallmark of scientific progress, and we do not criticize the modification of hypotheses per se. However, scientific progress requires that theoretical adjustments generate precise, falsifiable predictions—rather than ad hoc explanations that completely insulate a framework from refutation. The issue here is not that biosocial role theorists have revised their model, but rather that these revisions have yet to yield novel predictions that can be empirically tested, rather than serving as post hoc rationalizations.

As we have shown throughout this article, evolutionary psychologists frequently construct hypotheses in a way that allows for falsification and acknowledge when their predictions are not supported (Confer et al., 2010). The gender-equality paradox serves as a striking case study in which it is competing theorists—not evolutionary psychologists—who have resisted conceding when central theoretical predictions have been refuted by empirical data.

Conclusion

Many disciplines using adaptationist logic have experienced accusations of just-so storyism and unfalsifiability. We have demonstrated that many evolutionary psychological hypotheses are indeed falsifiable by the standards of some of the most influential philosophers of science of the past century. In support of our argument, we have described and explained the empirical falsification of (a) the ovulatory shift in mate preferences prediction from the dual-mating hypothesis, (b) the mate deprivation hypothesis of rape, and (c) the kin altruism hypothesis for the evolution of male homosexuality. In short, to handle a theory scientifically is to expose its tenets to refutation. By this criterion, evolutionary psychology, when proffering hypotheses that yield specific empirical predictions, meets this scientific standard.

References

Abild, M. L., VanderLaan, D. P., & Vasey, P. L. (2014). Does geographic proximity influence the expression of avuncular tendencies in Canadian androphilic males? *Journal of Cognition and Culture*, *14*(1–2), 41–63. https://doi.org/10.1163/15685373-12342109

Al-Shawaf, L. (2024). Levels of analysis and explanatory progress in psychology: Integrating frameworks from biology and cognitive science for a more comprehensive science of the mind. *Psychological Review*. Advance online publication. https://doi.org/10.1037/rev0000459

Al-Shawaf, L., Lewis, D. M., Barbaro, N., & Wehbe, Y. S. (2020). The products of evolution: Conceptual distinctions, evidentiary criteria, and empirical examples. In D. M. Buss (Ed.), *The Sage handbook of evolutionary psychology: Foundations of evolutionary psychology* (pp. 70–95). Sage Publications.

Apostolou, M. (2007). Sexual selection under parental choice: The role of parents in the evolution of human mating. *Evolution and Human Behavior*, *28*(6), 403–409. https://doi.org/10.1016/j.evolhumbehav.2007.05.007

Arslan, R. C., Driebe, J. C., Stern, J., Gerlach, T. M., & Penke, L. (2021). The evidence for good genes ovulatory shifts in Arslan et al. (2018) is mixed and uncertain. *Journal of Personality and Social Psychology*, *121*(2), 441–446. https://doi.org/10.1037/pspp0000390

Arslan, R. C., Schilling, K. M., Gerlach, T. M., & Penke, L. (2021). Using 26,000 diary entries to show ovulatory changes in sexual desire and behavior. *Journal of Personality and Social Psychology*, *121*(2), 410–431. https://doi.org/10.1037/pspp0000208

Asperholm, M., Nagar, S., Dekhtyar, S., & Herlitz, A. (2019). The magnitude of sex differences in verbal episodic memory increases with social progress: Data from 54 countries across 40 years. *PLOS ONE*, *14*(4), Article e0214945. https://doi.org/10.1371/journal.pone.0214945

Bailey, J. M., Vasey, P. L., Diamond, L. M., Breedlove, S. M., Vilain, E., & Epprecht, M. (2016). Sexual orientation, controversy, and science. *Psychological Science in the Public Interest*, *17*(2), 45–101. https://doi.org/10.1177/1529100616637616

Balducci, M. (2023). Linking gender differences with gender equality: A systematic-narrative literature review of basic skills and personality. *Frontiers in Psychology*, *14*, Article 1105234. https://doi.org/10.3389/fpsyg.2023.1105234

Bateman, A. J. (1948). Intra-sexual selection in *Drosophila*. *Heredity*, *2*(3), 349–368. https://doi.org/10.1038/hdy.1948.21

Bellis, M. A., Hughes, K., Hughes, S., & Ashton, J. R. (2005). Measuring paternal discrepancy and its public health consequences. *Journal of Epidemiology and Community Health*, *59*(9), 749–754. https://doi.org/10.1136/jech.2005.036517

Betzig, L. (1989). Causes of conjugal dissolution: A cross-cultural study. *Current Anthropology*, *30*(5), 654–676. https://doi.org/10.1086/203798

Betzig, L. L. (1986). *Despotism and differential reproduction: A Darwinian view of history*. Aldine Publishing.

Bobrow, D., & Bailey, J. M. (2001). Is male homosexuality maintained via kin selection? *Evolution and Human Behavior*, *22*(5), 361–368. https://doi.org/10.1016/S1090-5138(01)00074-5

Bourgeois, M. J., & Perkins, J. (2003). A test of evolutionary and sociocultural explanations of reactions to sexual harassment. *Sex Roles*, *49*(7–8), 343–351. https://doi.org/10.1023/A:1025160120455

Boyer, P. (2023). *The naturalness of religious ideas: A cognitive theory of religion*. University of California Press. https://doi.org/10.2307/jj.8501200

Breda, T., Jouini, E., Napp, C., & Thebault, G. (2020). Gender stereotypes can explain the gender-equality paradox. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(49), 31063–31069. https://doi.org/10.1073/pnas.2008704117

Buckner, R. L., & DiNicola, L. M. (2019). The brain's default network: Updated anatomy, physiology and evolving insights. *Nature Reviews Neuroscience*, *20*(10), 593–608. https://doi.org/10.1038/s41583-019-0212-7

Bunge, M. (2011). Knowledge: Genuine and bogus. *Science & Education*, *20*(5–6), 411–438. https://doi.org/10.1007/s11191-009-9225-3

Burnstein, E., Crandall, C., & Kitayama, S. (1994). Some neo-Darwinian decision rules for altruism: Weighing cues for inclusive fitness as a function of the biological importance of the decision. *Journal of Personality and Social Psychology*, *67*(5), 773–789. https://doi.org/10.1037/0022-3514.67.5.773

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*(1), 1–14. https://doi.org/10.1017/S0140525X00023992

Buss, D. M. (1995). Evolutionary psychology: A new paradigm for psychological science. *Psychological Inquiry*, *6*(1), 1–30. https://doi.org/10.1207/s15327965pli0601_1

Buss, D. M. (2002). Human mate guarding. *Neuroendocrinology Letters*, *23*(Suppl. 4), 23–29.

Buss, D. M. (2017). Sexual conflict in human mating. *Current Directions in Psychological Science*, *26*(4), 307–313. https://doi.org/10.1177/0963721417695559

Buss, D. M. (2018). Sexual and emotional infidelity: Evolved gender differences in jealousy prove robust and replicable. *Perspectives on Psychological Science*, *13*(2), 155–160. https://doi.org/10.1177/1745691617698225

Buss, D. M. (2024). *Evolutionary psychology: The new science of the mind* (7th ed.). Routledge. https://doi.org/10.4324/9781003230823

Buss, D. M., & Dedden, L. A. (1990). Derogation of competitors. *Journal of Social and Personal Relationships*, *7*(3), 395–422. https://doi.org/10.1177/0265407590073006

Buss, D. M., & Duntley, J. D. (2011). The evolution of intimate partner violence. *Aggression and Violent Behavior*, *16*(5), 411–419. https://doi.org/10.1016/j.avb.2011.04.015

Buss, D. M., Durkee, P. K., Shackelford, T. K., Bowdle, B. F., Schmitt, D. P., Brase, G. L., Choe, J. C., & Trofimova, I. (2020). Human status criteria: Sex differences and similarities across 14 nations. *Journal of Personality and Social Psychology*, *119*(5), 979–998. https://doi.org/10.1037/pspa0000206

Buss, D. M., Haselton, M. G., Shackelford, T. K., Bleske, A. L., & Wakefield, J. C. (1998). Adaptations, exaptations, and spandrels. *American Psychologist*, *53*(5), 533–548. https://doi.org/10.1037/0003-066X.53.5.533

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, *100*(2), 204–232. https://doi.org/10.1037/0033-295X.100.2.204

Buss, D. M., & Schmitt, D. P. (2019). Mate preferences and their behavioral manifestations. *Annual Review of Psychology*, *70*(1), 77–110. https://doi.org/10.1146/annurev-psych-010418-103408

Camperio-Ciani, A., Battaglia, U., & Liotta, M. (2016). Societal norms rather than sexual orientation influence kin altruism and avuncularity in tribal Urak-Lawoi, Italian, and Spanish adult males. *Journal of Sex Research*, *53*(2), 137–148. https://doi.org/10.1080/00224499.2014.993748

Camperio-Ciani, A., Corna, F., & Capiluppi, C. (2004). Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity. *Proceedings of the Royal Society B: Biological Sciences*, *271*(1554), 2217–2221. https://doi.org/10.1098/rspb.2004.2872

Cheryan, S., Lombard, E. J., Hailu, F., Pham, L. N. H., & Weltzien, K. (2025). Global patterns of gender disparities in STEM and explanations for their persistence. *Nature Reviews Psychology*, *4*(6), 6–19. https://doi.org/10.1038/s44159-024-00380-3

Confer, J. C., Easton, J. A., Fleischman, D. S., Goetz, C. D., Lewis, D. M., Perilloux, C., & Buss, D. M. (2010). Evolutionary psychology: Controversies, questions, prospects, and limitations. *American Psychologist*, *65*(2), 110–126. https://doi.org/10.1037/a0018413

Conroy-Beam, D., & Buss, D. M. (2016). Do mate preferences influence actual mating decisions? Evidence from computer simulations and three studies of mated couples. *Journal of Personality and Social Psychology*, *111*(1), 53–66. https://doi.org/10.1037/pspi0000054

Conway, L. G., III, & Schaller, M. (2002). On the verifiability of evolutionary psychological theories: An analysis of the psychology of scientific persuasion. *Personality and Social Psychology Review*, *6*(2), 152–166. https://doi.org/10.1207/S15327957PSPR0602_04

Cosmides, L., & Tooby, J. (1987). From evolution to behavior: Evolutionary psychology as the missing link. In J. Dupre (Ed.), *The latest on the best: Essays on evolution and optimality* (pp. 277–306). MIT Press.

Cosmides, L., & Tooby, J. (2015). Adaptations for reasoning about social exchange. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 1–44). Wiley.

Costello, W., & Buss, D. M. (2023). Why isn't there more incel violence? *Adaptive Human Behavior and Physiology*, *9*, 252–259. https://doi.org/10.1007/s40750-023-00220-3

Costello, W., Rolon, V., Thomas, A. G., & Schmitt, D. P. (2022). Levels of well-being among men who are incel (involuntarily celibate). *Evolutionary Psychological Science*, *8*(4), 375–390. https://doi.org/10.1007/s40806-022-00336-x

Costello, W., Rolon, V., Thomas, A. G., & Schmitt, D. P. (2023). The mating psychology of incels (involuntary celibates): Misfortunes, misperceptions, and misrepresentations. *The Journal of Sex Research*, *61*(7), 989–1000. https://doi.org/10.1080/00224499.2023.2248096

Costello, W., & Thomas, A. G. (2024). The scientific revolution of evolutionary psychology: Current status and future directions. A commentary on Zagaria (2024). *Adaptive Human Behavior and Physiology*, *10*, 232–244. https://doi.org/10.1007/s40750-024-00240-7

Costello, W., Whittaker, J., & Thomas, A. G. (2024). *Predicting harmful attitudes and beliefs among incels (involuntary celibates): How potent is the black-pill?* PsyArXiv. https://doi.org/10.31219/osf.io/avhnf

Coyne, J. A. (2003). Of vice and men: A case study in evolutionary psychology. In C. B. Travis (Ed.), *Evolution, gender, and rape* (pp. 176–197). MIT Press.

Curry, O. S., Mullins, D. A., & Whitehouse, H. (2019). Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies. *Current Anthropology*, *60*(1), 47–69. https://doi.org/10.1086/701478

Curtis, V., Aunger, R., & Rabie, T. (2004). Evidence that disgust evolved to protect from risk of disease. *Proceedings of the Royal Society B: Biological Sciences*, *271*(Suppl. 4), S131–S133. https://doi.org/10.1098/rsbl.2003.0144

Curtis, V., & Biran, A. (2001). Dirt, disgust, and disease: Is hygiene in our genes? *Perspectives in Biology and Medicine*, *44*(1), 17–31. https://doi.org/10.1353/pbm.2001.0001

Daly, M., & Wilson, M. (1988). Evolutionary social psychology and family homicide. *Science*, *242*(4878), 519–524. https://doi.org/10.1126/science.3175672

Darwin, C. (1859). *On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life*. John Murray. https://doi.org/10.5962/bhl.title.82303

Darwin, C. (1871). *The descent of man, and selection in relation to sex*. John Murray.

Dixson, B. J. W., Lee, A. J., Blake, K. R., Jasienska, G., & Marcinkowska, U. M. (2018). Women's preferences for men's beards show no relation to their ovarian cycle phase and sex hormone levels. *Hormones and Behavior*, *97*, 137–144. https://doi.org/10.1016/j.yhbeh.2017.11.006

Dobzhansky, T. (1937). Genetic nature of species differences. *American Naturalist*, *71*(735), 404–420. https://doi.org/10.1086/280726

Dugatkin, L. A. (2020). *Principles of animal behavior* (4th ed.). University of Chicago Press.

Eagly, A. H., & Wood, W. (1999). The origins of sex differences in human behavior: Evolved dispositions versus social roles. *American Psychologist*, *54*(6), 408–423. https://doi.org/10.1037/0003-066X.54.6.408

Eagly, A. H., Wood, W., & Johannesen-Schmidt, M. C. (2004). Social role theory of sex differences and similarities: Implications for the partner preferences of women and men. In A. H. Eagly, A. E. Beal, & R. J. Sternberg (Eds.), *The psychology of gender* (2nd ed., pp. 269–295). Guilford Press.

Fan, J., Dai, W., Liu, F., & Wu, J. (2005). Visual perception of male body attractiveness. *Proceedings of the Royal Society B: Biological Sciences*, *272*(1560), 219–226. https://doi.org/10.1098/rspb.2004.2922

Farrow, R. (2019). *Catch and kill*. Little, Brown.

Felesina, T., & Zietsch, B. P. (2025). Emerging insights into the genetics and evolution of human same-sex sexual behavior. *Trends in Genetics*. Advance online publication. https://doi.org/10.1016/j.tig.2024.12.005

Fessler, D. M., Eng, S. J., & Navarrete, C. D. (2005). Elevated disgust sensitivity in the first trimester of pregnancy: Evidence supporting the compensatory prophylaxis hypothesis. *Evolution and Human Behavior*, *26*(4), 344–351. https://doi.org/10.1016/j.evolhumbehav.2004.12.001

Forrester, D. L., VanderLaan, D. P., Parker, J. L., & Vasey, P. L. (2011). Male sexual orientation and avuncularity in Canada: Implications for the kin selection hypothesis. *Journal of Cognition and Culture*, *11*(3–4), 339–352. https://doi.org/10.1163/156853711X591288

Fořt, J., Valentova, J. V., Hudáčová, K., Kunc, B., & Havlíček, J. (2025). An evolutionary perspective on homosexuality: Testing the sexually antagonistic genes hypothesis through familial fertility analysis. *Evolution and Human Behavior*, *46*(1), Article 106649. https://doi.org/10.1016/j.evolhumbehav.2024.106649

Gangestad, S. W., Dinh, T., Lesko, L., & Haselton, G. M. (2023). Understanding women's estrus and extended sexuality: The dual sexuality framework. In D. M. Buss (Ed.), *The Oxford handbook of human mating* (pp. 700–738). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197536438.013.9

Gangestad, S. W., Garver-Apgar, C. E., Simpson, J. A., & Cousins, A. J. (2007). Changes in women's mate preferences across the ovulatory cycle. *Journal of Personality and Social Psychology*, *92*(1), 151–163. https://doi.org/10.1037/0022-3514.92.1.151

Gangestad, S. W., Simpson, J. A., Cousins, A. J., Garver-Apgar, C. E., & Christensen, P. N. (2004). Women's preferences for male behavioral displays change across the menstrual cycle. *Psychological Science*, *15*(3), 203–207. https://doi.org/10.1111/j.0956-7976.2004.01503010.x

Gangestad, S. W., & Thornhill, R. (1998). Menstrual cycle variation in women's preferences for the scent of symmetrical men. *Proceedings of the Royal Society B: Biological Sciences*, *265*(1399), 927–933. https://doi.org/10.1098/rspb.1998.0380

Geary, D. C. (2021). Now you see them, and now you don't: An evolutionarily informed model of environmental influences on human sex differences. *Neuroscience and Biobehavioral Reviews*, *125*, 26–32. https://doi.org/10.1016/j.neubiorev.2021.02.020

Gibbs, A., & Lawson, A. E. (1992). The nature of scientific thinking as reflected by the work of biologists & by biology textbooks. *The American Biology Teacher*, *54*(3), 137–152. https://doi.org/10.2307/4449435

Gigerenzer, G. (1998). Surrogates for theories. *Theory & Psychology*, *8*(2), 195–204. https://doi.org/10.1177/0959354398082006

Gildersleeve, K., Haselton, M. G., & Fales, M. R. (2014a). Do women's mate preferences change across the ovulatory cycle? A meta-analytic review. *Psychological Bulletin*, *140*(5), 1205–1259. https://doi.org/10.1037/a0035438

Gildersleeve, K., Haselton, M. G., & Fales, M. R. (2014b). Meta-analyses and *p*-curves support robust cycle shifts in women's mate preferences: Reply to Wood and Carden (2014) and Harris, Pashler, and Mickes (2014). *Psychological Bulletin*, *140*(5), 1272–1280. https://doi.org/10.1037/a0037714

Giofrè, D., Geary, D. C., & Halsey, L. G. (2025). The sexy and formidable male body: Men's height and weight are conditfion-dependent, sexually selected traits. *Biology Letters*, *21*(1), Article 20240565. https://doi.org/10.1098/rsbl.2024.0565

Gómez Jiménez, F. R., & Vasey, P. L. (2022). Kin-directed altruism and the evolution of male androphilia among Istmo Zapotec Muxes. *Evolution and Human Behavior*, *43*(3), 224–233. https://doi.org/10.1016/j.evolhumbehav.2022.02.002

Gould, S. J. (1978). Sociobiology: The art of storytelling. *New Scientist*, *80*(1129), 530–533. https://hdl.handle.net/10822/536362

Gould, S. J., & Lewontin, R. C. (1979). The spandrels of San Marco and the Panglossian paradigm: A critique of the adaptationist programme. *Proceedings of the Royal Society B: Biological Sciences*, *205*(1161), 581–598. https://doi.org/10.1098/rspb.1979.0086

Hagen, E. (2020, January 21). Is evolutionary psychology impossible? [Blog post]. *Ed Hagen's*. https://blog.edhagen.net/posts/2020-01-21-is-evolutionary-psychology-impossible/

Hahnel-Peeters, R. K., Goetz, A. T., & Goetz, C. D. (2022). Do environmental cues to discovery influence the likelihood to rape? *Evolutionary Psychology*, *20*(4), Article 14747049221141078. https://doi.org/10.1177/14747049221141078

Hahnel-Peeters, R. K., Idoine, J. L., Jackson, R. E., & Goetz, A. T. (2020). Is the vertical-horizontal illusion a byproduct of the environmental vertical illusion? *Evolutionary Psychology*, *18*(4), Article 1474704920961953. https://doi.org/10.1177/1474704920961953

Haig, B. D., & Durrant, R. (2000). Theory evaluation in evolutionary psychology. *Psychological Inquiry*, *11*(1), 34–38. https://www.jstor.org/stable/1449664

Hames, R. (2015). Kin selection. In D. M. Buss (Ed.), *The handbook of evolutionary psychology: Vol. 1. Foundations* (2nd ed., pp. 505–523). Wiley.

Hamilton, W. D. (1964). The genetical evolution of social behaviour. II. *Journal of Theoretical Biology*, *7*(1), 17–52. https://doi.org/10.1016/0022-5193(64)90039-6

Harris, C. R. (2011). Menstrual cycle and facial preferences reconsidered. *Sex Roles*, *64*(9–10), 669–681. https://doi.org/10.1007/s11199-010-9772-8

Harris, C. R. (2013). Shifts in masculinity preferences across the menstrual cycle: Still not there. *Sex Roles*, *69*(9), 507–515. https://doi.org/10.1007/s11199-012-0229-0

Hartman, S. V. (1997). *Scenes of subjection: Terror, slavery, and self-making in nineteenth-century America*. Oxford University Press.

Haselton, M. G., & Buss, D. M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, *78*(1), 81–91. https://doi.org/10.1037/0022-3514.78.1.81

Havlicek, J., Roberts, S. C., & Flegr, J. (2005). Women's preference for dominant male odour: Effects of menstrual cycle and relationship status. *Biology Letters*, *1*(3), 256–259. https://doi.org/10.1098/rsbl.2005.0332

Herlitz, A., Hönig, I., Hedebrant, K., & Asperholm, M. (2024). A systematic review and new analyses of the gender-equality paradox. *Perspectives on Psychological Science*. Advance online publication. https://doi.org/10.1177/17456916231202685

Hirnstein, M., Stuebs, J., Moè, A., & Hausmann, M. (2023). Sex/gender differences in verbal fluency and verbal-episodic memory: A meta-analysis. *Perspectives on Psychological Science*, *18*(1), 67–90. https://doi.org/10.1177/17456916221082116

Jackson, R. E., & Cormack, L. K. (2007). Evolved navigation theory and the descent illusion. *Perception & Psychophysics*, *69*(3), 353–362. https://doi.org/10.3758/BF03193756

Johnson, D. D., Blumstein, D. T., Fowler, J. H., & Haselton, M. G. (2013). The evolution of error: Error management, cognitive constraints, and adaptive decision-making biases. *Trends in Ecology & Evolution*, *28*(8), 474–481. https://doi.org/10.1016/j.tree.2013.05.014

Jonason, P. K., & Schmitt, D. P. (2016). Quantifying common criticisms of evolutionary psychology. *Evolutionary Psychological Science*, *2*(3), 177–188. https://doi.org/10.1007/s40806-016-0050-z

Jones, B. C., Hahn, A. C., Fisher, C. I., Wang, H., Kandrik, M., Han, C., Fasolt, V., Morrison, D., Lee, A. J., Holzleitner, I. J., O'Shea, K. J., Roberts, S. C., Little, A. C., & DeBruine, L. M. (2018). No compelling evidence that preferences for facial masculinity track changes in women's hormonal status. *Psychological Science*, *29*(6), 996–1005. https://doi.org/10.1177/0956797618760197

Jünger, J., Motta-Mena, N. V., Cardenas, R., Bailey, D., Rosenfield, K. A., Schild, C., Penke, L., & Puts, D. A. (2018). Do women's preferences for masculine voices shift across the ovulatory cycle? *Hormones and Behavior*, *106*, 122–134. https://doi.org/10.1016/j.yhbeh.2018.10.008

Jussim, L., Crawford, J. T., Anglin, S. M., Chambers, J. R., Stevens, S. T., & Cohen, F. (2015). Stereotype accuracy: One of the largest and most replicable effects in all of social psychology. In T. D. Nelson (Ed.), *Handbook of prejudice, stereotyping, and discrimination* (2nd ed., pp. 31–63). Psychology Press.

Kenrick, D. T., Groth, G. E., Trost, M. R., & Sadalla, E. K. (1993). Integrating evolutionary and social exchange perspectives on relationships: Effects of gender, self-appraisal, and involvement level on mate selection criteria. *Journal of Personality and Social Psychology*, *64*(6), 951–969. https://doi.org/10.1037/0022-3514.64.6.951

Ketelaar, T., & Ellis, B. J. (2000). Are evolutionary explanations unfalsifiable? Evolutionary psychology and the Lakatosian philosophy of science. *Psychological Inquiry*, *11*(1), 1–21. https://doi.org/10.1207/S15327965PLI1101_01

Kipling, R. (1902). *Just so stories for little children*. Oxford University Press.

Krakauer, J. (2004). *Under the banner of heaven: A story of violent faith*. Anchor.

Lakatos, I. (1970). History of science and its rational reconstructions. *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* (pp. 91–136). Cambridge University Press.

Lalumière, M. L., Chalmers, L. J., Quinsey, V. L., & Seto, M. C. (1996). A test of the mate deprivation hypothesis of sexual coercion. *Ethology and Sociobiology*, *17*(5), 299–318. https://doi.org/10.1016/S0162-3095(96)00076-3

Lankford, A., Evans, H. R., & Bowling, A. (2024). Celebrity infidelity and sex crimes: An empirical investigation of cheating, sexual harassment, sexual assault, and solicitation. *Sexuality & Culture*, *28*(1), 333–353. https://doi.org/10.1007/s12119-023-10119-6

Larmuseau, M. H. D., Matthijs, K., & Wenseleers, T. (2016). Cuckolded fathers rare in human populations. *Trends in Ecology & Evolution*, *31*(5), 327–329. https://doi.org/10.1016/j.tree.2016.03.004

Larsen, P. H. H., Bendixen, M., Grøntvedt, T. V., Kessler, A. M., & Kennair, L. E. O. (2021). Investigating the emergence of sex differences in jealousy responses in a large community sample from an evolutionary perspective. *Scientific Reports*, *11*(1), Article 6485. https://doi.org/10.1038/s41598-021-85997-7

Lewis, D. M. G., Al-Shawaf, L., Conroy-Beam, D., Asao, K., & Buss, D. M. (2017). Evolutionary psychology: A how-to guide. *American Psychologist*, *72*(4), 353–373. https://doi.org/10.1037/a0040409

Lewis, D. M. G., Evans, K. C., & Al-Shawaf, L. (2022). The logic of physical attractiveness: What people find attractive, when, and why. In D. M. Buss (Ed.), *The Oxford handbook of human mating* (pp. 178–205). Oxford University Press.

Lewis, D. M. G., Russell, E. M., Al-Shawaf, L., & Buss, D. M. (2015). Lumbar curvature: A previously undiscovered standard of attractiveness. *Evolution and Human Behavior*, *36*(5), 345–350. https://doi.org/10.1016/j.evolhumbehav.2015.01.007

Li, N. P. (2007). Mate preference necessities in long-and short-term mating: People prioritize in themselves what their mates prioritize in them. *Acta Psychologica Sinica*, *39*(3), 528–535. https://ink.library.smu.edu.sg/soss_research/723

Lieberman, D., Tooby, J., & Cosmides, L. (2003). Does morality have a biological basis? An empirical test of the factors governing moral sentiments relating to incest. *Proceedings of the Royal Society B: Biological Sciences*, *270*(1517), 819–826. https://doi.org/10.1098/rspb.2002.2290

Lindner, M. (2023). The sense in senseless violence: Male reproductive strategy and the modern sexual marketplace as contributors to violent extremism. *Adaptive Human Behavior and Physiology*, *9*(3), 217–251. https://doi.org/10.1007/s40750-023-00219-w

Lippa, R. A., Collaer, M. L., & Peters, M. (2010). Sex differences in mental rotation and line angle judgments are positively associated with gender equality and economic development across 53 nations. *Archives of Sexual Behavior*, *39*(4), 990–997. https://doi.org/10.1007/s10508-008-9460-8

Malamuth, N. M. (1981). Rape proclivity among males. *Journal of Social Issues*, *37*(4), 138–157. https://doi.org/10.1111/j.1540-4560.1981.tb01075.x

Malamuth, N. M. (1998). An evolutionary-based model integrating research. In R. W. Bloom & N. Dess (Eds.), *Advances in psychological science: Social, personal, and cultural aspects* (Vol. 1, pp. 151–172). Psychology Press.

Marcinkowska, U. M., Ellison, P. T., Galbarczyk, A., Milkowska, K., Pawlowski, B., Thune, I., & Jasienska, G. (2016). Lack of support for relation between woman's masculinity preference, estradiol level and mating context. *Hormones and Behavior*, *78*, 1–7. https://doi.org/10.1016/j.yhbeh.2015.10.012

McBurney, D. H., Gaulin, S. J., Devineni, T., & Adams, C. (1997). Superior spatial memory of women: Stronger evidence for the gathering hypothesis. *Evolution and Human Behavior*, *18*(3), 165–174. https://doi.org/10.1016/S1090-5138(97)00001-9

McCauley, C. R., Jussim, L. J., & Lee, Y.-T. (1995). Stereotype accuracy: Toward appreciating group differences. In Y.-T. Lee, L. J. Jussim, & C. R. McCauley (Eds.), *Stereotype accuracy: Toward appreciating group differences* (pp. 293–312). American Psychological Association. https://doi.org/10.1037/10495-012

Mealey, L. (2003). Combating rape: Views of an evolutionary psychologist. In R. W. Bloom & N. Dess (Eds.), *Evolutionary psychology and violence: A primer for policymakers and public policy advocates* (pp. 83–113). Greenwood Publishing. https://doi.org/10.5040/9798400648724.ch-004

Muggleton, N. K., & Fincher, C. L. (2017). Unrestricted sexuality promotes distinctive short- and long-term mate preferences in women. *Personality and Individual Differences*, *111*, 169–173. https://doi.org/10.1016/j.paid.2017.01.054

Münecat. (2024, May 18). *I debunked evolutionary psychology* [Video]. YouTube. https://www.youtube.com/watch?v=31e0RcImReY

Murphy, M., Phillips, C. A., & Blake, K. R. (2024). Why women cheat: Testing evolutionary hypotheses for female infidelity in a multinational sample. *Evolution and Human Behavior*, *45*(5), Article 106595. https://doi.org/10.1016/j.evolhumbehav.2024.106595

Nesse, R. M. (1994). Fear and fitness: An evolutionary analysis of anxiety disorders. *Ethology and Sociobiology*, *15*(5–6), 247–261. https://doi.org/10.1016/0162-3095(94)90002-7

Nesse, R. M. (2000). Is depression an adaptation? *Archives of General Psychiatry*, *57*(1), 14–20. https://doi.org/10.1001/archpsyc.57.1.14

Nettle, D., & Scott-Phillips, T. (2023). Is a non-evolutionary psychology possible? In A. du Crest, M. Valković, A. Ariew, H. Desmond, P. Huneman, & T. A. C. Reydon (Eds.), *Evolutionary thinking across disciplines* (Vol. 478, pp. 31–50). Springer. https://doi.org/10.1007/978-3-031-33358-3_2

Neuhoff, J. G. (2001). An adaptive bias in the perception of looming auditory motion. *Ecological Psychology*, *13*(2), 87–110. https://doi.org/10.1207/S15326969ECO1302_2

Öhman, A., & Mineka, S. (2003). The malicious serpent: Snakes as a prototypical stimulus for an evolved module of fear. *Current Directions in Psychological Science*, *12*(1), 5–9. https://doi.org/10.1111/1467-8721.01211

Olsson, M. J., Lundström, J. N., Kimball, B. A., Gordon, A. R., Karshikoff, B., Hosseini, N., Sorjonen, K., Olgart Höglund, C., Solares, C., Soop, A., Axelsson, J., & Lekander, M. (2014). The scent of disease: Human body odor contains an early chemosensory cue of sickness. *Psychological Science*, *25*(3), 817–823. https://doi.org/10.1177/0956797613515681

Palmer, J. E., McMahon, S., & Fissel, E. (2021). Correlates of incoming male college students' proclivity to perpetrate sexual assault. *Violence Against Women*, *27*(3–4), 507–528. https://doi.org/10.1177/1077801220905663

Parker, G. A. (1979). Sexual selection and sexual conflict. In M. S. Blum & N. A. Blum (Eds.), *Sexual selection and reproductive competition in insects* (pp. 123–166). Academic Press.

Penton-Voak, I. S., & Perrett, D. I. (2000). Female preference for male faces changes cyclically: Further evidence. *Evolution and Human Behavior*, *21*(1), 39–48. https://doi.org/10.1016/S1090-5138(99)00033-1

Penton-Voak, I. S., Perrett, D. I., Castles, D. L., Kobayashi, T., Burt, D. M., Murray, L. K., & Minamisawa, R. (1999). Menstrual cycle alters face preference. *Nature*, *399*(6738), 741–742. https://doi.org/10.1038/21557

Pinker, S. (1997). *How the mind works*. W.W. Norton.

Plomin, R., & Deary, I. J. (2015). Genetics and intelligence differences: Five special findings. *Molecular Psychiatry*, *20*(1), 98–108. https://doi.org/10.1038/mp.2014.105

Popper, K. R. (1959). *The logic of scientific discovery*. Routledge.

Puts, D. A. (2005). Mating context and menstrual phase affect women's preferences for male voice pitch. *Evolution and Human Behavior*, *26*(5), 388–397. https://doi.org/10.1016/j.evolhumbehav.2005.03.001

Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, *31*(3), 157–175. https://doi.org/10.1016/j.evolhumbehav.2010.02.005

Rahman, Q., & Hull, M. S. (2005). An empirical test of the kin selection hypothesis for male homosexuality. *Archives of Sexual Behavior*, *34*(4), 461–467. https://doi.org/10.1007/s10508-005-4345-6

Richardson, R. C. (2010). *Evolutionary psychology as maladapted psychology*. MIT Press.

Rosenfeld, M. J. (2018). Who wants the breakup? Gender and breakup in heterosexual couples. In D. Alwin, D. Felmlee, & D. Kreager (Eds.), *Social networks and the life course: Integrating the development of human lives and social relational networks* (pp. 221–243). Springer. https://doi.org/10.1007/978-3-319-71544-5_11

Rutherford, A. (2020). *How to argue with a racist: History, science, race and reality*. Hachette.

Scelza, B. A., Prall, S. P., Swinford, N., Gopalan, S., Atkinson, E. G., McElreath, R., Sheehama, J., & Henn, B. M. (2020). High rate of extrapair paternity in a human population demonstrates diversity in human reproductive strategies. *Science Advances*, *6*(8), Article eaay6195. https://doi.org/10.1126/sciadv.aay6195

Schaller, M., & Conway, L. G. (2000). The illusion of unfalsifiability and why it matters. *Psychological Inquiry*, *11*(1), 49–52. https://www.jstor.org/stable/1449668

Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, *28*(2), 247–275. https://doi.org/10.1017/S0140525X05000051

Schmitt, D. P., & Buss, D. M. (1996). Strategic self-promotion and competitor derogation: Sex and context effects on the perceived effectiveness of mate attraction tactics. *Journal of Personality and Social Psychology*, *70*(6), 1185–1204. https://doi.org/10.1037/0022-3514.70.6.1185

Schmitt, D. P., Long, A. E., McPhearson, A., O'Brien, K., Remmert, B., & Shah, S. H. (2017). Personality and gender differences in global perspective. *International Journal of Psychology*, *52*(S1), 45–56. https://doi.org/10.1002/ijop.12265

Schmitt, D. P., & Pilcher, J. J. (2004). Evaluating evidence of psychological adaptation: How do we know one when we see one? *Psychological Science*, *15*(10), 643–649. https://doi.org/10.1111/j.0956-7976.2004.00734.x

Senn, C. Y., Desmarais, S., Verberg, N., & Wood, E. (2000). Predicting coercive sexual behavior across the lifespan in a random sample of Canadian men. *Journal of Social and Personal Relationships*, *17*(1), 95–113. https://doi.org/10.1177/0265407500171005

Silverman, I., Choi, J., & Peters, M. (2007). The hunter–gatherer theory of sex differences in spatial abilities: Data from 40 countries. *Archives of Sexual Behavior*, *36*(2), 261–268. https://doi.org/10.1007/s10508-006-9168-6

Silverman, I., & Eals, M. (1992). Sex differences in spatial abilities: Evolutionary theory and data. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 533–549). Oxford University Press. https://doi.org/10.1093/oso/9780195060232.003.0015

Simpson, J. A., & Gangestad, S. W. (1992). Sociosexuality and romantic partner choice. *Journal of Personality*, *60*(1), 31–51. https://doi.org/10.1111/j.1467-6494.1992.tb00264.x

Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology*, *65*(2), 293–307. https://doi.org/10.1037/0022-3514.65.2.293

Singh, D., Dixson, B. J., Jessop, T. S., Morgan, B., & Dixson, A. F. (2010). Cross-cultural consensus for waist–hip ratio and women's attractiveness. *Evolution and Human Behavior*, *31*(3), 176–181. https://doi.org/10.1016/j.evolhumbehav.2009.09.001

Smaldino, P. E. (2017). Models are stupid, and we need more of them. In R. R. Vallacher, S. J. Read, & A. Nowak (Eds.), *Computational social psychology* (pp. 311–331). Routledge. https://doi.org/10.4324/9781315173726-14

Smith, S. E. (2020). Is evolutionary psychology possible? *Biological Theory*, *15*(1), 39–49. https://doi.org/10.1007/s13752-019-00336-4

Speckhard, A., Ellenberg, M., Morton, J., & Ash, A. (2021). Involuntary celibates' experiences of and grievance over sexual exclusion and the potential threat of violence among those active in an online Incel forum. *Journal of Strategic Security*, *14*(2), 5–30. https://doi.org/10.5038/1944-0472.14.2.1910

Stern, J., Gerlach, T. M., & Penke, L. (2020). Probing ovulatory-cycle shifts in women's preferences for men's behaviors. *Psychological Science*, *31*(4), 424–436. https://doi.org/10.1177/0956797619882022

Stoet, G., & Geary, D. C. (2022). Sex differences in adolescents' occupational aspirations: Variations across time and place. *PLOS ONE*, *17*(1), Article e0261438. https://doi.org/10.1371/journal.pone.0261438

Stulp, G., Buunk, A. P., & Pollet, T. V. (2013). Women want taller men more than men want shorter women. *Personality and Individual Differences*, *54*(8), 877–883. https://doi.org/10.1016/j.paid.2012.12.019

Swift-Gallant, A., Aung, T., Rosenfield, K., Dawood, K., & Puts, D. (2023). Organizational effects of gonadal hormones on human sexual orientation. *Adaptive Human Behavior and Physiology*, *9*(4), 344–370. https://doi.org/10.1007/s40750-023-00226-x

Symons, D. (1980). The evolution of human sexuality revisited. *Behavioral and Brain Sciences*, *3*(2), 203–214. https://doi.org/10.1017/S0140525X00004386

Thomas, A. G., Armstrong, S. L., Stewart-Williams, S., & Jones, B. C. (2021). Current fertility status does not predict sociosexual attitudes and desires in normally ovulating women. *Evolutionary Psychology*, *19*(1), Article 1474704920976318. https://doi.org/10.1177/1474704920976318

Thomas, A. G., Jonason, P. K., Blackburn, J. D., Kennair, L. E. O., Lowe, R., Malouff, J., Stewart-Williams, S., Sulikowski, D., & Li, N. P. (2020). Mate preference priorities in the East and West: A cross-cultural test of the mate preference priority model. *Journal of Personality*, *88*(3), 606–620. https://doi.org/10.1111/jopy.12514

Thompson, S. (2019). Feminist relational contract theory: A new model for family property agreements. *Journal of Law and Society*, *46*(1), 141–168. https://doi.org/10.1111/jols.12132

Thornhill, R. (1980). Rape in *Panorpa* scorpion flies and a general rape hypothesis. *Animal Behaviour*, *28*(1), 52–59. https://doi.org/10.1016/S0003-3472(80)80007-8

Thornhill, R., & Palmer, C. T. (2000). Why men rape. *The Sciences*, *40*(1), 30–36. https://doi.org/10.1002/j.2326-1951.2000.tb03465.x

Thornhill, R., & Palmer, C. T. (2001). *A natural history of rape: Biological bases of sexual coercion*. MIT Press.

Thornhill, R., & Thornhill, N. W. (1983). Human rape: An evolutionary analysis. *Ethology and Sociobiology*, *4*(3), 137–173. https://doi.org/10.1016/0162-3095(83)90027-4

Tinbergen, N. (1963). On aims and methods of ethology. *Zeitschrift für Tierpsychologie*, *20*(4), 410–433. https://doi.org/10.1111/j.1439-0310.1963.tb01161.x

Tooby, J. (2020). Evolutionary psychology as the crystallizing core of a unified modern social science. *Evolutionary Behavioral Sciences*, *14*(4), 390–407. https://doi.org/10.1037/ebs0000250

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, *11*(4–5), 375–424. https://doi.org/10.1016/0162-3095(90)90017-Z

Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). Oxford University Press. https://doi.org/10.1093/oso/9780195060232.003.0002

Tooby, J., Cosmides, L., & Barrett, H. C. (2003). The second law of thermodynamics is the first law of psychology: Evolutionary developmental psychology and the theory of tandem, coordinated inheritances: Comment on Lickliter and Honeycutt (2003). *Psychological Bulletin*, *129*(6), 858–865. https://doi.org/10.1037/0033-2909.129.6.858

Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136–179). Aldine.

Trivers, R. L. (1974). Parent–offspring conflict. *American Zoologist*, *14*(1), 249–264. https://doi.org/10.1093/icb/14.1.249

Trivers, R. L. (1985). *Social evolution*. Benjamin-Cummings Publishing.

Tybur, J. M., Lieberman, D., Kurzban, R., & DeScioli, P. (2013). Disgust: Evolved function and structure. *Psychological Review*, *120*(1), 65–84. https://doi.org/10.1037/a0030778

Valentine, K. A., Li, N. P., Penke, L., & Perrett, D. I. (2014). Judging a man by the width of his face: The role of facial ratios and dominance in mate choice at speed-dating events. *Psychological Science*, *25*(3), 806–811. https://doi.org/10.1177/0956797613511823

VanderLaan, D. P., & Vasey, P. L. (2012). Relationship status and elevated avuncularity in Samoan fa'afafine. *Personal Relationships*, *19*(2), 326–339. https://doi.org/10.1111/j.1475-6811.2011.01364.x

Vasey, P. L., Pocock, D. S., & VanderLaan, D. P. (2007). Kin selection and male androphilia in Samoan fa'afafine. *Evolution and Human Behavior*, *28*(3), 159–167. https://doi.org/10.1016/j.evolhumbehav.2006.08.004

Voyer, D., Postma, A., Brake, B., & Imperato-McGinley, J. (2007). Gender differences in object location memory: A meta-analysis. *Psychonomic Bulletin & Review*, *14*, 23–38. https://doi.org/10.3758/BF03194024

Wallach, L., & Wallach, M. A. (2001). Experiments in social psychology: Science or self- deception? *Theory & Psychology*, *11*(4), 451–473. https://doi.org/10.1177/0959354301114001

Walter, K. V., Conroy-Beam, D., Buss, D. M., Asao, K., Sorokowska, A., Sorokowski, P., Aavik, T., Akello, G., Alhabahba, M. M., Alm, C., Amjad, N., Anjum, A., Atama, C. S., Atamtürk Duyar, D., Ayebare, R., Batres, C., Bendixen, M., Bensafia, A., Bizumic, B., … Zupančič, M. (2020). Sex differences in mate preferences across 45 countries: A large-scale replication. *Psychological Science*, *31*(4), 408–423. https://doi.org/10.1177/0956797620904154

Wee, S.-L., & Acayan, E. (2023, November 4). 'Just like medicine': A new push for divorce in a nation where it's illegal. *The New York Times*. https://www.nytimes.com/2023/11/04/world/asia/philippines-divorce-illegal-legislation.html

Wei, Y., de Lange, S. C., Scholtens, L. H., Watanabe, K., Ardesch, D. J., Jansen, P. R., Savage, J. E., Li, L., Preuss, T. M., Rilling, J. K., Posthuma, D., & van den Heuvel, M. P. (2019). Genetic mapping and evolutionary analysis of human-expanded cognitive networks. *Nature Communications*, *10*(1), Article 4839. https://doi.org/10.1038/s41467-019-12764-8

Weinberg, S. (2008). *Cosmology*. Oxford University Press. https://doi.org/10.1093/oso/9780198526827.001.0001

Wheatley, J., & Puts, D. (2015). Evolutionary science of female orgasm. In T. Shackelford & R. Hansen (Eds.), *The evolution of sexuality* (pp. 105–123). Springer. https://doi.org/10.1007/978-3-319-09384-0_7

Whitcome, K. K., Shapiro, L. J., & Lieberman, D. E. (2007). Fetal load and the evolution of lumbar lordosis in bipedal hominins. *Nature*, *450*(7172), 1075–1078. https://doi.org/10.1038/nature06342

Williams, G. C. (1966). Natural selection, the costs of reproduction, and a refinement of Lack's principle. *American Naturalist*, *100*(916), 687–690. https://doi.org/10.1086/282461

Wilson, E. O. (1975). Some central problems of sociobiology. *Social Sciences Information*, *14*(6), 5–18. https://doi.org/10.1177/053901847501400601

Wood, W., Kressel, L., Joshi, P. D., & Louie, B. (2014). Meta-analysis of menstrual cycle effects on women's mate preferences. *Emotion Review*, *6*(3), 229–249. https://doi.org/10.1177/1754073914523073

Ye, H. (2006). Theoretical thinking about the limitations of evolutionary psychology. *Acta Psychologica Sinica*, *38*(5), 784–790. https://journal.psych.ac.cn/acps/EN/Y2006/V38/I05/784

Young, R. K., & Thiessen, D. (1992). The Texas rape scale. *Ethology and Sociobiology*, *13*(1), 19–33. https://doi.org/10.1016/0162-3095(92)90004-N

Zietsch, B. P., Morley, K. I., Shekar, S. N., Verweij, K. J., Keller, M. C., Macgregor, S., Wright, M., Bailey, J., & Martin, N. G. (2008). Genetic factors predisposing to homosexuality may increase mating success in heterosexuals. *Evolution and Human Behavior*, *29*(6), 424–433. https://doi.org/10.1016/j.evolhumbehav.2008.07.002

Received September 4, 2024
Revision received February 11, 2025
Accepted February 18, 2025 ■