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What do evolutionary researchers believe about human psychology and behavior?

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ABSTRACT

We investigated the prevalence of beliefs in several key and contested aspects of human psychology and behavior in a broad sample of evolutionary-informed scholars ($N = 581$). Nearly all participants believed that developmental environments substantially shape human adult psychology and behavior, that there are differences in human psychology and behavior based on sex differences from sexual selection, and that there are individual differences in human psychology and behavior resulting from different genotypes. About three-quarters of participants believed that there are population differences from dissimilar ancestral ecologies/environments and within-person differences across the menstrual cycle. Three-fifths believed that the human mind consists of domain-specific, context-sensitive modules. About half of participants believed that behavioral and cognitive aspects of human life history vary along a unified fast-slow continuum. Two-fifths of participants believed that group-level selection has substantially contributed to human evolution. Results indicate that there are both shared core beliefs as well as phenomena that are accepted by varying proportions of scholars. Such patterns represent the views of contemporary scholars and the current state of the field. The degree of acceptance for some phenomena may change over time as evolutionary science advances through the accumulation of empirical evidence.

1. Introduction

There are important reasons to study what evolutionary-informed researchers believe. First, we repeatedly see misrepresentations or misconceptions of these beliefs in both academic journal articles and the popular press (e.g., Eagly & Wood, 1999; Gould & Lewontin, 1979; Lickliter & Honeycutt, 2003; Park, 2007; Rose & Rose, 2000). Evolutionary scholars have devoted noteworthy effort into correcting such misconceptions, in the 1990s (Kenrick & Simpson, 1997), in the 2000s (Hagen, 2005; Ketelaar & Ellis, 2000; Krebs, 2003; Kurzban, 2002), and the 2010s (Al-Shawaf, 2020; Al-Shawaf & Buss, 2011; Al-Shawaf, Lewis, Wehbe, & Buss, 2019; Confer et al., 2010; Liddle, Bush, & Shackelford, 2011). As misconceptions endure despite numerous attempts at correction, the systematic documentation of beliefs across evolutionary-informed researchers may complement theoretical discussions in clarifying the true nature of the field.

In addition, those who integrate an evolutionary perspective in their research are often viewed uniformly by those who do not. People tend to see the uniqueness in individual in-group members while ignoring the variability across members of other groups (Boldry, Gaertner, & Quinn, 2007). There are, in fact, several topics researched under an evolutionary umbrella that are contentious or controversial, both within and outside the field.

1.1. Does human life history vary along a unified fast-slow continuum?

Life history theory is a powerful explanatory framework and is increasingly used in models of, and empirical research on, human psychology and behavior (Del Giudice, Gangestad, & Kaplan, 2015). Life history theory was developed to promote an understanding of the causes and results of the variation in organisms' life cycles. Why do some species take a long time to mature and live long lives, whereas others mature quickly, rapidly produce numerous offspring, and die young? In other words, why do elephants live so long, in largely female kin groups, and produce few young that they nurture for a long time while other species, rabbits for example, have relative short lives, with lots of young

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that are with their mother for a comparatively quite short time? Initial models proposed that "r-selected" (r is the growth rate of the population) species living in unpredictable environments would evolve clusters of traits associated with rapid and prolific breeding with relatively low investment in offspring (MacArthur and Wilson, 1967; Pianka, 1970). In contrast, "K-selected" (K is the carrying capacity of the population) species living in stable and predictable environments would have lower reproductive rates and longer intergenerational times, invest more in physiological maintenance and care of offspring. Humans as a species are strongly K-selected, more like elephants than rabbits (Hawkes & Paine, 2006; Low, 1998), so initial psychometric measures of human life history variation were proposed to assess "Differential K," variation within the upper range of the continuum (Figueredo, Vásquez, Brumbach, & Schneider, 2004).

Sæther (1987) introduced the idea of a "fast" to "slow" life history continuum, as biologists recognized that neither the assumption of a trade-off between r and K, nor the association between constant environments and the life-history traits attributed to K-strategists could be justified (Reznick, Bryant, & Bashey, 2002; Roff, 1992). Biologists no longer use the r/K terminology and instead refer to the traits of former r-strategists as fast life history and former K-strategists as slow life history (Jeschke & Kokko, 2009). Psychologists now use the terms fast(er) and slow(er) life histories to refer to individuals with lower and higher K scores, respectively. More recently, both biologists (e.g., Stearns and Rodrigues, 2020) and psychologists (e.g., Del Giudice, 2020; Zietsch & Sidari, 2020) have argued against the existence of a unidimensional continuum in human life history.

Empirical research has identified a second life history dimension related to mating effort that is independent of general life history speed (Differential K) indicators (Richardson et al., 2017). Nested sets of trade-offs in resource allocations are central to life history theory (Roff, 2002). An organisms' resources are limited, and energy used for one purpose cannot be used for another. A life history assessment based on the trade-off between mating effort and parenting effort found two inversely related but distinct dimensions (Kruger, 2017), whereas some research finds that the two dimensions are independent of each other (Valentova, Junior, Štìrbová, Varella, & Fisher, 2020). Network analysis of self-reported life history related measures finds mating effort and parental effort related nodes which are more central than and do not cluster with Differential K indicators (Manson & Kruger, 2022).

1.2. Do developmental environments substantially shape human adult psychology and behavior?

The relationship between nature and nurture in influencing behavior has been debated for centuries. And the question, which matters more, nature or nurture, is one discussed in every introduction to psychology course and textbooks. It is also a question debated by philosophers as well as lay-people when they question why someone turns out the way they do. Was it their parents? Their peers? Or was it their genes? In the 20th Century, there were both beliefs that traits such as criminality were inherited, as well as beliefs that people were like an empty slate whose psychological attributes were completely determined by the environments they experienced. Evolutionary approaches to psychology and behavior have been criticized as reductionistic, supposedly arguing that psychology and behavior are determined by genetic inheritance (e.g., Nelkin, 2000). However, evolutionists recognize that very few human psychological mechanisms appear fully functioning at birth and many require input or calibration from the environment (Bjorklund & Pellegrini, 2002). Early childhood and adolescent environments are suggested to play a role in shaping adult responses via conditional adaptations to cope with the environment a child is likely to face as an adult. Although developmental environments clearly have a role to play, the relative contributions of childhood environment, adult environment, and genetics toward adult behavior are still a matter of debate (e.g., Barbaro, Boutwell, Barnes, & Shackelford, 2017; Mustanski, Viken, Kaprio, Pulkkinen, & Rose, 2004; Schlomer & Cho, 2017).

1.3. Does the human mind consist of domain-specific, context-sensitive modules?

Is the mind a collection of modules solving different specific problems or is it a general problem solver? Historically, there have been two contrasting models for the functional architecture of the mind. "Horizontal" perspectives depict mental processes as interactions between faculties such as memory, perception, and judgment regardless of the content of information. "Vertical" perspectives depict different mental faculties, such as cheater detection, as precisely associated with specific innate neural structures or mental modules. The question of the degree to which the human mind is composed of domain-specific, context sensitive mental modules has been a topic of debate in evolutionary and cognitive psychology (see Barrett & Kurzban, 2006). Much of the early work in this area was shaped by Tooby and Cosmides (1992), who (following but not identical to Fodor, 1983) articulated that our mental mechanisms or information processing systems are functionally specific, processing information relevant to particular tasks, rather than encompassing a broad domain of tasks. The implication of this view is that our mental architecture consists of many specialized information processing systems with their own dedicated function rather than a small number of general-purpose mechanisms that cover a wide range of functions (Cosmides & Tooby, 1994).

Although a pillar of evolutionary psychology for many, modularity is also criticized within the field (e.g., Pietraszewski & Wertz, 2022). One aspect of the modular view of the mind that sometimes causes debate is the idea that such systems imply informational encapsulation, such that a given mechanism has access to only certain informational input (Fodor, 1983; Sperber, 2002), though this input is not a requirement of Cosmides and Tooby's (1994) account (Barrett & Kurzban, 2006). Evidence of such modularity has been found in people with psychological disorders, including those who have experienced the severing of their corpus callosum (Gazzaniga, 1998). Others have argued that humans have a capacity for domain-general processing, pointing out that factor analysis consistently reveals a single "g" factor that explains a substantial degree of variance in task performance (Carroll, 1993). This factor is typically considered a measure of general intelligence, skill across a wide range of cognitive tasks including problem solving and abstract thought (Gottfredson, 1998). There is also evidence of integration across cognitive domains as well as neural evidence suggesting brain regions are activated by tasks in different domains (Anderson, 2010; Anderson & Finlay, 2014). Recently, some studies in language processing have suggested the existence of both domain-specific and domain-general systems (Campbell & Tyler, 2018).

1.4. Has group-level selection substantially contributed to human evolution?

Does evolution occur primarily at the level of the individual (and their associated genes), or could it also happen with groups? Many early biological explanations of social behavior argued that individual behaviors occurred for the good of the species, including those of zoologist Wynne-Edwards (1962) and naturalist Konrad Lorenz (1963). Darwin (1871) suggested synergistic effects between the successes of individuals and the groups in which they lived. Fisher (1930) and Haldane (1932) proposed genetic relatedness as an explanation for altruistic behavior. Lack (1954) determined that birds regulated their clutch size based on the largest number of offspring that parents could regularly provision, rather than what would be best for the group, as was commonly thought at the time. Hamilton's (1964a, 1964b) mathematical model of inclusive fitness theory demonstrated that even tendencies for altruistic behaviors could be naturally selected for based on the benefits to genes shared by closely related individuals. Dawkins', 1976 book *The Selfish Gene* popularized the idea of the gene as the unit of selection and

consequently group selection fell out of favor as an explanation for behavior. However, Sober and Wilson (1998) revived interest in group selection (see also Wilson, 1997, 2003), sometimes framed as multilevel selection theory, to emphasize that selection simultaneously takes place on multiple levels. Wilson and Sober received support from other prominent academics, such as economist Herbert Gintis (2000).

Krebs (2014) notes that although the existence of altruistic behaviors deriving from group-selection is a theoretical possibility, most scientists believe that few, if any species have met conditions necessary for group selection. Arguments for evolutionarily stable strategies of cooperation to promote the "good of the species" are usually rejected because natural selection operates more effectively *within* breeding populations than *between* them (Reeve, 1998). If the tendency to sacrifice oneself for the sake of one's group varies among individuals within groups, those with more selfish tendencies will survive better than their more altruistic neighbors. This trend would lead the group to eventually become more selfish in nature.

Notable Sociobiologist E.O. Wilson caused a stir when he expressed support for group selection during his plenary talk at the 2005 meeting of the Human Behavior and Evolution Society. Nowak, Tarnita, and Wilson (2010) published an article in *Nature* defending group selection (or attacking inclusive fitness) across species. One hundred and thirty-seven evolutionary researchers co-authored a response article stating that Nowak et al.'s (2010) arguments were based upon a misunderstanding of evolutionary theory and a misrepresentation of the empirical literature (Abbot et al., 2011).

1.5. Sources of differences in human psychology and behavior

1.5.1. Are there sex differences in psychology and behavior resulting from sexual selection?

Human sexuality is a popular and controversial topic in contemporary "Western" cultures. Recently, a lecturer in an Ivy League university biology class describing the existence of two sexes and the using the terms "male" and "female" generated considerable debate in academic departments, media, and on-line discussions (Xu, 2021). In *The Descent of Man*, Darwin (1871) identifies characteristics that influence reproductive competition or success, leading him to distinguish sexual from natural selection (Clutton-Brock, 2017). Darwin outlined how males tend to engage in more intense forms of intrasexual competition for reproductive access and opportunities than females, whereas the latter are more selective of mates. Bateman (1948) showed high reproductive variability in male *Drosophila* (fruit flies), leading to sex differences in traits associated with winning mating competitions. He concluded that egg production limited female reproduction, but male fertility was unlikely to be restricted by sperm production, and instead limited by access to available females. Parental investment theory (Trivers, 1972) leads to the conclusion that women are the more investing sex because of disproportionate costs related to their gametes, gestation, and postpartum childcare. Further, males profit more readily than females from repeated mating opportunities, males are more eager and less discriminating in mating than females, and male reproductive success is more variable than female reproductive success. However, some have challenged Bateman's (1948) methods, results, and conclusions (Gowaty, Steinichen, & Anderson, 2003; Snyder and Gowaty, 2007). For example, female mating success is tied to their number of partners (Tang-Martinez & Ryder, 2005), but this trend is not as applicable to primates, including humans (Hrdy, 1986). Further, there are advantages in child survival when men supplement a mother's ability to gather resources when she is breastfeeding, the most sensitive period of investment (Marlowe, 2000).

Social psychologists have proposed alternative explanations of human sex differences, most notably social role theory (Eagly, 1987) which argues that sex (or rather gender) differences are a product of the social roles that regulate behavior in adult life. In this framework, there are societal stereotypes about gender based on observations of behavior, such as women having caretaking roles in industrialized societies. Eagly and colleagues (e.g., Eagly & Wood, 1999; Wood & Eagly, 2002) have explicitly challenged evolutionary accounts of human sex differences, including the mate selection criteria observed cross-culturally by evolutionary psychologists (e.g., Buss, 1989).

Wood and Eagly (2002) later developed a "biosocial approach," in which men's and women's social roles originate primarily in humans' evolved physical sex differences, specifically men's greater size and strength and women's reproductive abilities of gestating and nursing children, which interact with a society's circumstances and culture to make certain activities more efficiently performed by one sex or the other. People carry out gender roles as they enact specific social roles based on their physical capacities and physiological constraints. Eagly and Wood (1999) also call into question the causal direction of the endocrine system and behavioral roles and believe that social influences have separate origins are independent of biological or evolutionary influences.

1.5.2. Are there individual differences in psychology and behavior based on different genotypes?

One question that arises from the debate over the relative roles played by genes and environment in shaping behavior is whether different genotypes are related to individual differences in traits such as personality or intelligence. The radical behaviorism of B.F. Skinner strongly emphasized the environment as a cause of behavior, a perspective that dominated much of 20th Century Psychology. Evolutionary psychology emerged with an emphasis on human universals, in part to emphasize the contrast with blank slate models of human psychology (Pinker, 2002). Some evolutionary psychologists focus on universal human adaptations and assume that there are no individual differences in such adaptations because natural selection would eventually result in a single fitness enhancing mechanism (Buunk & Fisher, 2009). For example, Tooby and Cosmides (1992, p. 38) argue that "heritable variation in a trait generally signals a lack of adaptive significance." On the other hand, other pioneers of the modern field of evolutionary psychology hold that heritable variation in individual differences may continue to exist because they reflect equally adaptive strategies (Buss, 1989; Gangestad & Simpson, 2000). Although a considerable amount of contemporary evolutionary research focuses on individual differences, there is often disproportional attention to foundational works, especially by those who are not actively researching in the field.

1.5.3. Are there within-person differences in psychology and behavior across the menstrual cycle?

How accurate is the notion that women's emotional states, cravings, or other behaviors change depending on where they are in their menstrual cycle? Fields such as cognitive neuroscience historically excluded women as research participants because it was believed that hormonal fluctuations during different phases of the menstrual cycle would increase variance in results (Beltz & Moser, 2020). In contrast, some social psychologists argued that the notion of hormonal fluctuations across the cycle leading to maladjustment and premenstrual syndromes was a social stereotype that influenced women's self-reported menstrual syndromes (e.g., Wood & Carden, 2014). An adversarial research collaboration established to resolve differences between evolutionary and social constructivist perspectives on cycling effects devolved into separate meta-analyses with contrasting conclusions (Gildersleeve, Haselton, & Fales, 2014; Wood, Kressel, Joshi, & Louie, 2014).

Gildersleeve et al. (2014)'s meta-analysis supports the ovulatory shift hypothesis whereby women have elevated sexual attraction to men with characteristics that signal, via proxy, genetic quality during ovulation. These characteristics are present only when women evaluate men for short-term but not long-term mating. Wood & Carden, 2014; see also Wood et al., 2014) contend that using more precise estimates of menstrual phase reduces these effects. Likewise, Harris, Pashler, and Mickes (2014) argued that the studies on which Gildersleeve and

colleagues use in their meta-analysis reflect 'p-hacking' (i.e., collecting data or performing statistical analyses to the extent that non-significant findings become significant; Head, Holman, Lanfear, Kahn, & Jennions, 2015). Stern, Gerlach, and Penke (2020) likewise report no ovulatory cycle shifts in women's preferences for men's behavior. Study results also differ in whether affect changes with menstrual phase (e.g., Harvey, Hitchcock, & Prior, 2009; Hengartner et al., 2017; Pierson, Althoff, Thomas, Hillard, & Leskovec, 2021; Van Goozen, Wiegant, Endert, Helmond, & Van de Poll, 1997). Research conducted since the meta-analyses has mixed results, for example a lack of cycle effects on self-reported sociosexuality (Thomas, Armstrong, Stewart-Williams, & Jones, 2021; van Stein, Strauß, & Brenk-Franz, 2019), but significant cycle effects on sexual desire and body image (van Stein et al., 2019), assertiveness, and self-efficacy (Blake, McCartney, & Arslan, 2022).

1.5.4. Are there population differences in psychology and behavior resulting from different ancestral ecologies and environments?

Many recognize that different ancestral environments created differential pressures that produced anatomical or physiological features adapted to those environments, such as lighter skin among those whose ancestors lived in northern climates with less sunlight. However, there is more debate in terms of differences in behavioral traits or psychological mechanisms. Also, has human evolution ended, perhaps with the rise of agriculture or metalworking technology? Some depictions of evolutionary perspectives, both critical caricatures and supportive simplifications, feature "stone age" people surrounded by modern cultural artifacts. Bowlby (1969) introduced the concept of an environment of evolutionary adaptedness (EEA) for a specific adaptation. Some accounts depict the human EEA as the Pleistocene in general, or more specifically the African Savannah. Although the human EEA is sometimes thought of as a specific constant ecology, with the resulting mental adaptations as fixed human universals, Bowlby (1969) defined EEAs as the set of historically recurring selection pressures that shaped a specific adaptation. Thus, these environments are a statistical abstraction rather than a specific time and place.

Are humans somehow separated from or immune to basic biological processes that affect all other species, as depicted in the Medieval great chain of being and arguments by contemporary theistic creationists? Darwin (1859) noticed wide variation in the morphology of finches on the Galápagos islands, especially in the shapes of their beaks, some of which resembled the beaks of much more distantly related birds. Darwin deduced that all the finches had a common ancestor, but their forms diverged because of the different ecologies (including food sources) on the islands on which they lived. This process of adaptive radiation is central to speciation and is one of the cornerstones of evolutionary biology. However, this cornerstone of evolutionary theory can become controversial when applied to our own species, even among those who teach and study biology at the university level (Kelly & Littlejohn, 2019).

2. Material and methods

In this study, we address misunderstandings of the evolutionary approach, as well as controversies within the field, by documenting patterns of beliefs held by evolutionary scholars in several domains.

2.1. Study population

These data were gathered as part of the Survey of Evolutionary Scholars, an effort to systematically document the state of the evolutionary approach to human research. Participants ($N = 581$) were 61% men, 38.3% women, and 0.7% with another sex/gender identity; and an average age of 45.61 years (SD = 14.36, range 20–89). Participants were based in North America (59.7%; 49.4% United States, 6.0% Canada, 1 from Mexico), Europe (28.6%), South America (4.6%), Asia (4.3%), and Oceania (2.8%). Participants' major fields of study were primarily Psychology (58%), Anthropology (18%), and Biology (6%), with <2% in any other specific field. Participants were mostly (74%) based in Doctoral level universities (i.e., those awarding Doctoral degrees in most departments where this is the typical practicing degree), with 12% in Masters Level colleges or universities, 6% in liberal arts colleges or universities (where the Bachelor's degree is the highest awarded), 3% in academic research institutes, 1% in community colleges (where the Associates degree is the highest awarded), and 4% with other affiliations. Most (58%) participants were tenure-track faculty (12% Assistant Professor or equivalent, 20% Associate Professor or equivalent, 27% Full Professor or equivalent), 10% were non-tenure track teaching or research faculty, 18% were students (1% undergraduate, 13% graduate, 4% post-doctoral fellow), 2% were academic or industrial research staff, 6% were emeritus or retired professor, and 3% had some other position.

2.2. Recruitment procedure

E-mail invitations were sent to 1) participants in the first wave of the Survey of Evolutionary Scholars who agreed to participate in future research and provided an e-mail address; 2) The membership of the International Society for Human Ethology; 3) The membership of the Northeastern Evolutionary Psychology Society and other individuals listed in conference programs (2008–2019); 4) individuals listed in conference programs of the Human Behavior and Evolution Society (2014–2019). *E*-mail invitations were sent on 31 July 2020 with reminders for those who had not completed surveys on 8 November and 22 November 2020. Officers for the European Human Behavior and Evolution Association and the Polish Society for Human and Evolution Studies distributed invitations to participate to the societies' contact lists. Responses that were >70% complete were retained for analyses.

2.3. Measures

Participants completed a Qualtrics on-line survey. A matrix of items was presented with the question stem: "Please indicate whether or not you believe the following statements are true:" Statements were: "The human mind consists of domain-specific, context-sensitive modules," "Developmental environments substantially shape human adult psychology and behavior," "Group-level selection has substantially contributed to human evolution," and "Behavioral and cognitive aspects of human life history vary along a unified fast-slow continuum." Response options were "Yes," "No," and "Don't Know." On the next survey page, a second matrix of items was presented with the question stem: "Please indicate whether or not you believe there are differences in human psychology and behavior resulting from the following factors:" Factors were: "Sex differences from sexual selection," "Individual differences from different genotypes," "Population differences from different ancestral ecologies/environments," and "Within-person differences across the menstrual cycle." Response options were "Yes," "No," and "Don't Know."

2.4. Data analysis

Frequencies were calculated for each item. Chi-Square tests compared the proportion of participants responding "Yes" for items within each set (See Tables 1 and 2). Post-hoc comparisons with Chi-Square tests also identified differences between those who were primarily trained in Anthropology and those who were primarily trained in Psychology, and differences in beliefs by participant age, and correlations among beliefs.

3. Results

Nearly all participants (92%) believed that developmental environments substantially shape human adult psychology and behavior (See Table 1). The majority (62%) believed that the human mind consists of

Table 1
Proportions of participants who believe statements are true.

Item	Yes	No	Don't Know
Developmental environments substantially shape human adult psychology and behavior.	91.9%[a]	3.3%	4.7%
The human mind consists of domain-specific, context-sensitive modules.	62.2%[b]	21.9%	15.9%
Behavioral and cognitive aspects of human life history vary along a unified fast-slow continuum.	46.9%[c]	20.9%	32.2%
Group-level selection has substantially contributed to human evolution.	38.6%[d]	41.6%	19.8%

Note. Values with different superscripts (a, b, c, d) indicate significantly different proportions ($p < .005$).

Table 2
Proportions of participants who believe there are differences in human psychology and behavior resulting from each factor.

Item	Yes	No	Don't Know
Sex differences from sexual selection	95.2%[a]	2.1%	2.6%
Individual differences from different genotypes	93.1%[a]	2.5%	4.4%
Population differences from different ancestral ecologies/environments	74.4%[b]	11.1%	14.5%
Within-person differences across the menstrual cycle	72.4%[b]	6.0%	21.6%

Note. Values with different superscripts ([a, b]) indicate significantly different proportions ($p < .001$).

domain-specific, context-sensitive modules. About half of participants believed that behavioral and cognitive aspects of human life history vary along a unified fast-slow continuum. Two-fifths of participants believed that group-level selection has substantially contributed to human evolution. Nearly all participants believed that there are differences in human psychology and behavior based on sex differences from sexual selection and individual differences resulting from variation in genotypes (See Table 2). About three-quarters of participants believed that there are population differences resulting from distinct ancestral ecologies/environments and within-person differences across the menstrual cycle.

Those primarily trained in Psychology were more likely to believe that behavioral and cognitive aspects of human life history vary along a unified fast-slow continuum (49.2%) than those who were primarily trained in Anthropology (30.0%; $\chi^2_{(1)} = 11.44$, $p < .001$, See Fig. 1). Those primarily trained in Psychology were more likely to believe that the human mind consists of domain-specific, context-sensitive modules (68%) than those who were primarily trained in Anthropology (54%; $\chi^2_{(1)} = 6.56$, $p = .010$, See Fig. 1). Those primarily trained in Psychology were more likely to believe that there are differences in human psychology and behavior resulting from within-person differences across the menstrual cycle (75.3%) than those who were primarily trained in Anthropology (62.2%; $\chi^2_{(1)} = 6.56$, $p = .010$, See Fig. 2). There were no other significant differences in beliefs held by primary field of training.

Post-hoc analyses indicated that younger participants were more likely to believe that developmental environments substantially shape human adult psychology and behavior, $t(519) = 3.17$, $p < .001$, $d = 0.49$, and that there are within-person differences across the menstrual cycle. $t(519) = 2.13$, $p = .033$, $d = 0.21$. There were no significant relationships between age and beliefs in population differences from contrasting ancestral environments, $t(519) = 0.46$, $p = .646$, $d = 0.05$, a unified human life history continuum, $t(519) = 0.71$, $p = .480$, $d = 0.06$, individual differences from different genotypes, $t(519) = 0.64$, $p = .526$, $d = 0.10$, mental modularity, $t(519) = 1.27$, $p = .205$, $d = 0.12$, group-level selection, $t(519) = 1.74$, $p = .082$, $d = 0.16$, or sex differences from sexual selection, $t(519) = 1.05$, $p = .293$, $d = 0.20$. There were extensive moderate correlations among beliefs, endorsements of most items were correlated with each other (See Table 3).

4. Discussion

4.1. Diversity of beliefs within the field

Results indicate that there are both core beliefs shared among evolutionary scholars, as well as phenomena accepted by varying proportions of scholars, with a few notable differences between those trained in Anthropology and Psychology. This pattern demonstrates that the evolutionary science of human psychology and behavior is not consistent with a rigid and inflexible set of dogmatic beliefs. There are varying levels of theory, and more variation in the beliefs that lead to predictions that are derived from elaborated models as compared with basic principles. Evolutionary theory provides a powerful framework and common language for researchers but does not require specific mechanisms.

There appear to be several factors contributing to differences in beliefs, including primary field of training. The degree of acceptance for some phenomena may change as evolutionary science advances with accumulating, additional empirical evidence. There appears to be a modest level of generational differences, in that younger participants were more likely to believe in menstrual cycle effects and psychological shaping by developmental environments. Some beliefs are nearly universally accepted, and thus show little variation between scholars (i.e.,

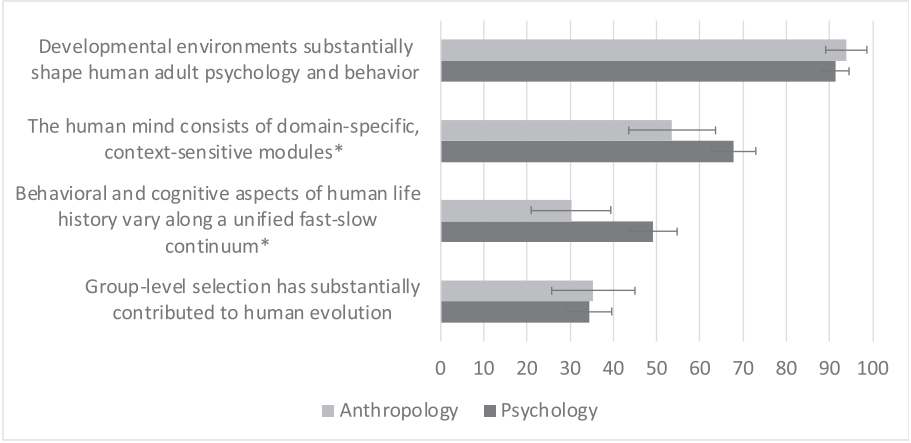

Fig. 1. Proportion believing in statements by field of training with 95% Confidence Intervals.
*Indicates significant difference in level of belief between those trained in Anthropology and Psychology, $p < .05$.

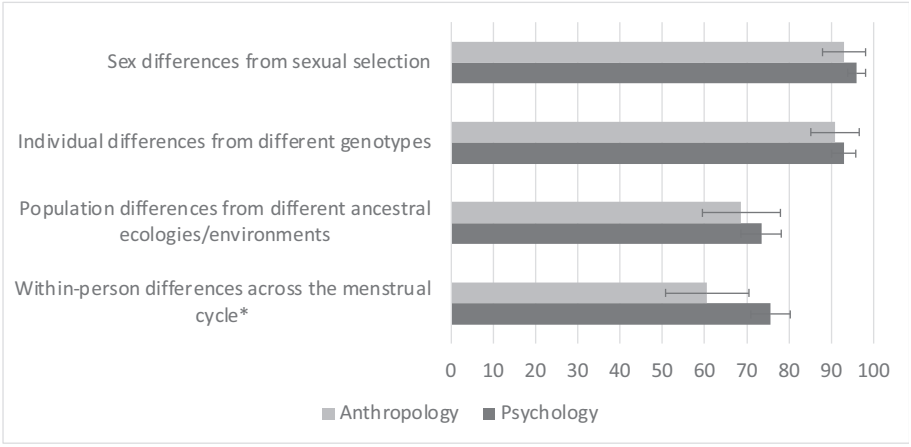

Fig. 2. Proportion believing in differences in human psychology and behavior from factors by field of training with 95% Confidence Intervals.
*Indicates significant difference in level of belief between those trained in Anthropology and Psychology, $p < .05$.

Table 3
Correlations for endorsements among items.

Item	2	3	4	5	6	7	8
1. Developmental environments	0.126**	0.134***	0.168***	0.195***	0.145***	0.132***	0.181***
2. Modularity		0.147***	−0.096*	0.278***	0.156***	0.080	0.185***
3. Unified LH continuum			0.079	0.166***	0.072	0.201***	0.175***
4. Group selection				0.025	0.008	0.134***	0.007
5. Sexual selection					0.494***	0.222***	0.267***
6. Genotypes						0.242***	0.237***
7. Population differences							0.127**
8. Menstrual cycle							

* < 0.05, ** < 0.01, *** < 0.001.
Note. See Tables 1 and 2 for item descriptions.

beliefs in sex differences from sexual selection, individual differences from different genotypes, and substantial influences of developmental environments). There were also no significant differences due to field for beliefs concerning whether group-level selection has substantially contributed to human evolution, though this argument had the lowest overall level of support, with about the same proportion disbelieving as believing. Notably, those who believed in modular minds were less likely to believe in group selection, the only inverse association among the set of beliefs.

Two of the areas of diverging beliefs between fields appear to be in somewhat discipline specific research areas. Studies examining within-person differences across the menstrual cycle use psychological research methods and are typically published in Psychology journals, including the two competing meta-analyses emerging from the adversarial collaboration (Gildersleeve et al., 2014; Wood et al., 2014). Further, although philosophers and anthropologists are involved in discussions and debates regarding the functional architecture of the mind, including modularity, research in this area also tends to use psychological methods such as the Wason selection task. Domain-specificity and domain-generality might both be true, at least in the sense the human mind may contain both domain-general and domain-specific cognitive capacities.

Central to Biology, Life History Theory has been extensively utilized in both Anthropology and Psychology and is increasingly utilized as an integrative framework. However, Nettle and Frankenhuis (2019) argue that life history applications to Psychology have diverged so substantially from life history content in Biology that they no longer have a common core of shared ideas. Anthropologists tend to use bio-demographic measures of life history (e.g., Hill & Hurtado, 1996), rather than psychometric life history assessments.

4.2. Relationships to common misunderstandings

Although we did not address all areas where common misunderstandings of evolutionary approaches arise, our results do speak to several of them. For example, the claim that evolutionary approaches invoke genetic determinism and ignore environmental influences does not reflect the view of nearly all those who take an evolutionary approach (see for example, Confer et al., 2010). A substantial proportion of those in the general field report believing that early developmental environments can influence behavior across the lifespan and that, in some cases, life history strategy may be shaped by developmental ecologies (Confer et al., 2010).

In fact, our results demonstrate that beliefs in heritability (that individual differences are shaped different genotypes) were associated with beliefs that developmental environments shape human psychology and behavior.

The misperception that everyone who approaches the study of human behavior from an evolutionary perspective holds the same views was challenged by variation in agreement across items; as high as 92% acknowledging the role of developmental environments to a minority who believed group selection played a substantial role in human evolution (38.6% yes, 41.6% no, and 19.8% unsure). Moreover, an increasing number of evolutionary scholars focus on individual differences while still attending to mechanisms that are likely more universal (Buss & Hawley, 2010; Del Giudice, 2020; Maner & Ackerman, 2020). Universal mechanisms and individual differences are not necessarily opposed to each other (Al-Shawaf et al., 2019).

4.3. Limitations

Participants were recruited from members of relevant scientific societies and respondents to a previous survey of the field conducted in

2010. Participants in the 2010 survey were recruited both from scientific societies and by contacting those expressing relevant interests (interests in evolutionary psychology, evolutionary or Darwinian anthropology, or making other references to evolution and human psychology and/or behavior) on faculty and graduate student webpages for North American four-year colleges and universities. Thus, there may be scholars who research and/or teach evolutionary approaches to human psychology and behavior who were not recruited because they do not attend topical academic conferences and began working in this area in the past decade. Further, the survey was conducted in English and thus the results are limited to those who are fluent in the English language.

Last, we intentionally used forced choice items to provide clear indications of the relative level of support for specific beliefs. Many respondents indicated that their beliefs were more nuanced than indicated by the choice categories or felt that the statements were overly simplistic. For example, several participants made remarks that such influences (e.g., differential ancestral ecology) existed, but may differ in their extent of influence. Other participants reported believing in human cultural group selection, but not human biological group selection. A handful of participants remarked that these topics were important areas of debate and study, whereas others felt that the answers should be obvious to someone trained in evolutionary theory.

4.4. Conclusions

We demonstrate both convergence and divergence in beliefs regarding elements of theory regarding evolved human psychology and behavior. Convergent beliefs are notable for the refutation of popular misconceptions, such as the notion that evolutionary scholars are genetic determinists. Natural selection depends on variation, and academic progress is facilitated by tests of competing hypotheses from different theoretical models or research programs. Results indicate that evolutionary scholarship regarding humans is not monolithic in belief. Some beliefs are held by most scholars but are not universal, for example massive cognitive modularity, differences due to menstrual cycle phase, and differences based on different ancestral environments. There is evidence for moderate differences in perspectives based on field of training, especially for topics addressed by psychological research methods. The extent of specific beliefs may change over time, as research accumulates additional evidence to support or refute specific claims.

Author note

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