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Subjective selection, super-attractors, and the origins of the cultural manifold

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Short abstract: Human societies consistently develop complex, near-universal traditions that exhibit striking similarities. These “super-attractors” span magic and religion (e.g., shamanism, supernatural punishment beliefs), aesthetics (e.g., heroic tales, dance songs), and social institutions (e.g., justice, corporate groups), and collectively constitute the “cultural manifold.” Here, I argue that the components of the cultural manifold develop primarily through “subjective selection,” or the production and selective retention of variants evaluated as useful for satisfying goals. Whereas previous explanations emphasize objective individual or group-level benefits, I highlight how subjective selection drives complex, cultural convergence worldwide, attesting to the importance of subjective selection in shaping human culture.

Long abstract: Human societies reliably develop complex cultural traditions with striking similarities. These “super-attractors” span the domains of magic and religion (e.g., shamanism, supernatural punishment beliefs), aesthetics (e.g., heroic tales, dance songs), and social institutions (e.g., justice, corporate groups), and collectively constitute what I call the “cultural manifold.” The cultural manifold represents a set of equilibrium states of social and cultural evolution: hypothetically cultureless humans placed in a novel and empty habitat will eventually produce most or all of these complex traditions. Although the study of the super-attractors has been characterized by explanatory pluralism, particularly an emphasis on processes that favor individual- or group-level benefits, I here argue that their development is primarily underlain by a process I call “subjective selection,” or the production and selective retention of variants that are evaluated as instrumentally useful for satisfying goals. Humans around the world are

motivated towards similar ends, such as healing illness, explaining misfortune, calming infants, and inducing others to cooperate. As we shape, tweak, and preferentially adopt culture that appears most effective for achieving these ends, we drive the convergence of complex traditions worldwide. The predictable development of the cultural manifold reflects the capacity of humans to sculpt traditions that apparently provide them with what they want, attesting to the importance of subjective selection in shaping human culture.

Keywords: anthropology; cultural evolution; culture; evaluation; goals; institutions; learning; music; religion; universals

1. The cultural manifold

Imagine that a new human society, free of any previous cultural influence, is established on a large, remote island. The humans successfully survive and breed for many generations, maintaining a stable population. Imagine also that anthropologists return a thousand years later and study this pristine society. What should they expect to find?

Fox (1971) envisioned such an “Experimental Eden” and argued the island would host a “recognizable human culture and society” (p. 284). It would have marriage, taboo, property, dancing, myths and legends, initiation rites, institutions for settling disputes, and supernatural practices and beliefs. “Without any exposure to cultural traditions our tribe would develop *very specific* and highly complex patterns of behavior, and probably very quickly—within a matter of a few generations, once they had developed a language” (p. 285; emphasis in the original).

Fox was far from the first person to speculate that human societies regularly develop suites of complex cultural traditions. Seventy-five years earlier, Boas (1896, p. 901) wrote about converging lines of evidence that “human society has grown and developed everywhere in such a manner that its forms, its opinions and its actions have many fundamental traits in common.” For him, this implied that “laws exist which govern the development of society”—laws that apply across time and throughout human history. “Many attempts have been made to discover the causes which have led to the formation of ideas ‘that develop with iron necessity wherever man lives,’” he wrote. “This is the most difficult problem of anthropology and we may expect that it will baffle our attempts for a long time to come” (p. 902).

In recent years, evolutionary and cognitive researchers have returned to Boas's most difficult problem. Researchers studying music have documented patterns of universality (Mehr et al. 2018, 2019; Savage et al. 2015; Singh and Mehr 2023) and experimentally investigated the processes by which they might emerge (Ravignani et al. 2017; Verhoef and Ravignani 2021). Other researchers have sought to identify similarities in legal institutions across societies, connecting them to underlying psychological foundations and cultural evolutionary processes (Fitouchi and Singh 2023; Sznycer et al. 2021; Sznycer and Patrick 2020). In line with growing research on witchcraft (Hutton 2017; Singh 2021a), divination (Boyer 2020a; Hong and Henrich 2021), and shamanism (Singh 2018, 2025; Winkelman 2004), Boyer (2020b) identified what he called “wild traditions”—beliefs and practices that are near-universal, consistently exhibit certain features, and reappear even when campaigns seek to destroy them. Aside from these domains, researchers have also worked to explain and identify patterns in narrative (Dubourg and Baumard 2022; Hogan 2003; Singh 2021b), marriage (Boyer 2018), and supernatural punishment beliefs (Bendixen, Apicella, et al. 2023; Fitouchi et al. 2025), among other ubiquitous traditions.

Here, I refer to such near-universal, complex sociocultural traditions as “super-attractors.” This term builds on “cultural attractors,” a term coined by Sperber (1996) and which scholars currently use to describe cultural possibilities favored during cultural transmission (Scott-Phillips et al. 2018). Sperber (2012) presented the happy ending of Little Red Riding Hood as an example of a cultural attractor; even if a person told the story with its happy ending cut off, others would be predisposed to reconstruct it during encoding and retelling, ensuring its reappearance and subsequent stability. Both psychological factors and aspects of the physical environment help determine which cultural traits are attractors (Miton et al. 2020; Sperber and Hirschfeld 2004).

Super-attractors qualify as Sperberian cultural attractors, yet they differ from most other attractors in two important ways (Figure 1). First, whereas many cultural attractors represent structurally simple variants, like the direction of stares in portraits (O. Morin 2013), super-attractors are necessarily complex, comprising packages of functionally interrelated attractors. Consider shamanism, or the practice in which a specialist enters apparently non-ordinary states to engage with unseen agents, such as local spirits, and provide services like healing and divination (Singh 2018, 2025). Across societies, shamanism tends to exhibit many reliably

occurring, functionally related features, including (1) altered states (and techniques for inducing them), (2) claims of otherworldly contact, (3) goal-oriented services (such as healing and divination), and (4) dramatic initiation rituals. Likewise, the sympathetic plot—a recurrent narrative structure—includes a (1) goal-directed protagonist who (2) confronts obstacles, (3) eventually triumphs, and (4) reaps rewards (Singh 2021b). In both cases, each component represents as a cultural attractor, although, through their co-occurrence and interaction, they give rise to a super-attractor. Importantly, the attractors composing a super-attractor are not merely a collection of discrete components; rather, they relate dynamically to produce new, emergent properties or functions that are not present in any individual attractor.

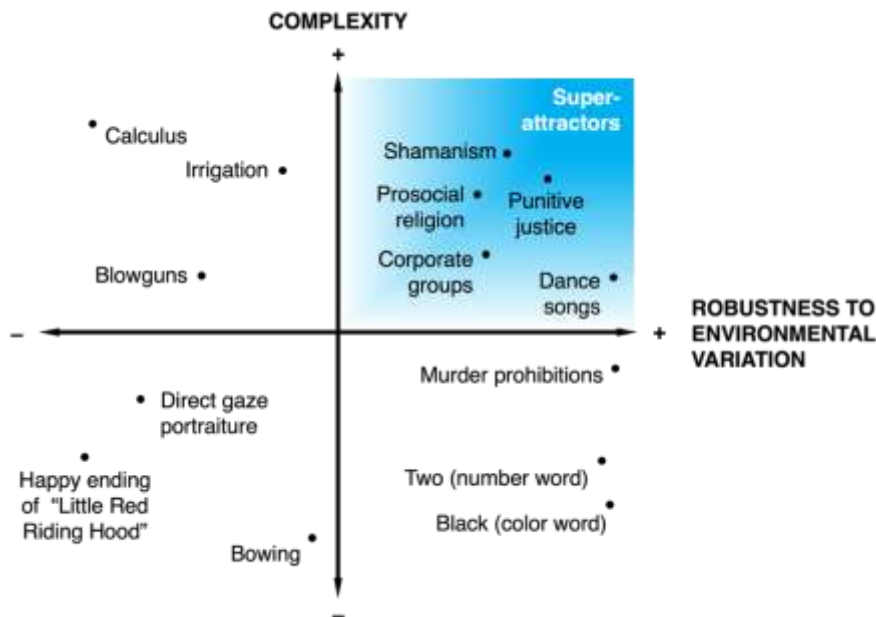


Figure 1. Cultural attractors are mapped along dimensions of complexity and robustness to environmental variation. Super-attractors are those that combine the highest complexity with the greatest reliability of emergence across diverse environments. The placement of examples is approximate and should be taken as illustrative rather than definitive.

Second, whereas many examples of cultural attractors are environment-dependent (Scott-Phillips et al. 2018), super-attractors are much less so. For example, portraits that appear to gaze directly at the viewer may represent cultural attractors (O. Morin 2013), but their existence relies

on a tradition of portraiture and its many cultural and ecological precursors, including durable pigments, techniques that enable representational accuracy (proportions, shading, perspective), and enough resources to sustain artistic specialists. Marriage, dance songs, hero stories, and justice institutions, meanwhile, exist in human societies the world over, from hunting-gathering bands to industrial, mega-urbanized states. To be sure, they are not immune to all environmental variation. Corporate groups, shamanism, and lullabies are vulnerable to disappearing when population size collapses (Singh and Hill 2025; Walker et al. 2012); utopians have briefly eradicated marriage (Vickers 2013). But super-attractors are, by definition, much more robust to ecological, social, and cultural differences than most other cultural attractors, developing around the world and in societies of diverse subsistence strategies and social organization (e.g., Boyer 2020b).

I refer to the set of super-attractors as the “cultural manifold” (Figure 2). I use the word *manifold*, because, in everyday speech, it suggests multiplicity. There are at least two reasons to devote scholarly attention to the cultural manifold. The first is for the importance of its components. Costly, widespread, ancient, and uniquely elaborated among humans, super-attractors constitute central puzzles of the social sciences. As long as our aim is to understand human behavior, super-attractors are obvious targets. The second reason is the one that Boas pointed out more than a century ago: The existence of the cultural manifold suggests general processes underlying the development of culture and society—processes that presumably play out similarly across time and space. The cultural manifold thus serves as an empirical testing ground for researchers to generate and refine social scientific theory.

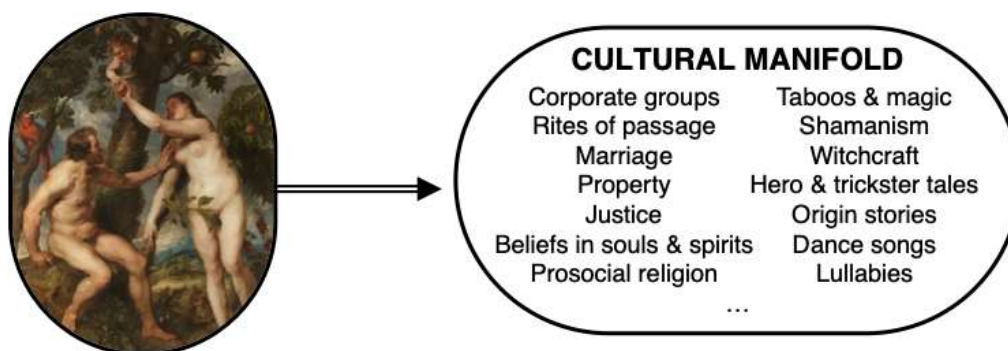


Figure 2. A new, pristine human society, or Experimental Eden, is expected to develop the set of all super-attractors, or the “cultural manifold.”

Why do humans so reliably build such strikingly similar packages of culture? Whence the cultural manifold? To date, answers to these questions have been characterized by an explanatory pluralism. Different super-attractors are explained with different explanatory frameworks. Some are understood as genetic adaptations (Bering 2006; Gintis 2007; Johnson and Krüger 2004; Mehr and Krasnow 2017); others, as cultural practices which develop to benefit the individual or the group (Leeson 2014; Schimmelpfennig and Muthukrishna 2021; D. Smith et al. 2017; Winkelman 2002); still others, as cultural variants that are most memorable or most easily reconstructed during cultural transmission (Boyer 2001).

In this paper, I acknowledge that many processes likely contribute but argue that one process—what I have called *subjective (cultural) selection*—is the most important in driving the emergence of super-attractors and producing their regularities. Subjective selection occurs as people craft and selectively retain cultural variants evaluated as useful for attaining proximate, psychologically determined goals (Singh 2022). Such goals, including changing the weather or soothing a fussy infant, are instrumental means to achieve higher-level, adaptive goals, such as securing food or caring for one's offspring (Dubourg et al. 2025; Tomasello 2022). Because humans reliably pursue similar goals and evaluate similar variants as compelling for achieving those goals, subjective selection produces comparable traditions, including super-attractors.

Many evolutionary psychologists have pushed back against mainstream cultural evolutionary theories for what they perceive to be a lack of appreciation for the sophistication of human cognition (Krasnow and Delton 2016; Sperber 2006; Tooby and Cosmides 2016). The subjective selection framework addresses such critiques, demonstrating how processes of goal-directed cognition, when iterated, can drive the evolution of much complex culture. By using this framework to explain many components of the cultural manifold, I hope both to advance our understanding of these origins of these important human behaviors and to showcase the central role of subjective selection in constructing our cultural worlds.

2. Subjective selection

I propose that super-attractors, like much of culture, evolve as people craft and selectively retain cultural variants that best satisfy evaluations of goal-oriented, instrumental utility. I have referred to this process “subjective selection” (Singh 2022).

The conceptual foundations of subjective selection have a long history in the behavioral sciences. Goals as psychological constructs have been studied for more than a century in empirical psychology and continue to attract debate, refinement, and analysis (Ach 1935; Austin and Vancouver 1996; Chu et al. 2024; Heath et al. 1999; James 1890; Lewin 1951; Locke and Latham 1990). The same goes for the processes by which individuals evaluate goal-directed behaviors, especially reinforcement learning (Ribas-Fernandes et al. 2011; Schultz et al. 1997; Sutton and Barto 1998). Rather than attempting an exhaustive review of these topics, I focus here on synthesizing these concepts with ideas from cultural evolution, which explore how complexity can develop through the selective retention and recombination of functionally relevant modifications (R. Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981; Henrich 2016; Richerson and Boyd 2008). Viewed through this lens, psychological processes like goal pursuit and instrumental evaluation, though typically analyzed at the individual level, cumulatively give rise to population-level cultural evolutionary dynamics, including subjective selection.

2.1. Presenting subjective selection

Subjective selection can happen at different timescales. On the shortest timescales, it manifests as trial and error: A person has a goal, they invent a solution, they evaluate the extent to which that solution achieves the goal, and then they either modify or retain the solution (e.g., Allen et al. 2020). But subjective selection can also occur across generations as individuals manufacture, pass along, and preferentially adopt variants evaluated as useful for regular goals.

I refer to this process as “subjective” for two reasons. First, the ends people are motivated to achieve are psychologically determined. Because of how natural selection has shaped human motivation, we pursue higher-level outcomes, such as food, sex, status, and information, as well as lower-level goals that aid in their pursuit, such as killing animals or wooing potential mates (Kenrick et al. 2010). Second, we subjectively evaluate whether a cultural variant satisfies a goal. This evaluation often works—we might tell, for instance, that a variant of a spear is better at killing a deer—but it is not perfect. Humans historically have had difficulty recognizing the value of behaviors like handwashing or boiling water (Rogers 2003), and we are predisposed to believe that ineffective techniques, or “superstitions,” are effective for influencing uncertain

outcomes (Beck and Forstmeier 2007; Burger and Lynn 2005; Vyse 2014). Evaluations of variants' effectiveness are constrained and influenced by our psychology.

In the language of proximate and ultimate causation, then, the subjective selection framework considers the ultimate function of much of culture to be to satisfy our proximate psychology. Natural selection has produced a flexible psychology with proximate goals and mechanisms of evaluation. These, in turn, become ultimate-level cultural evolutionary pressures shaping which traditions emerge, persist, and fade.

Various researchers had earlier emphasized the importance of goals and subjective evaluation in the evolution of culture (Alexander 1979; Boehm 1978; R. Boyd and Richerson 1985; Pulliam and Dunford 1980; see also Malinowski 1960). Moreover, subjective selection is broadly consistent with existing cultural evolutionary frameworks. As with much work by cultural attraction theorists, for example, it underscores the role of human psychology in shaping culture. In the context of dual inheritance theory, meanwhile, subjective selection often consists of a combination of "guided variation," as people produce variants that they expect will be useful, and "content biases" that favor the adoption of variants that seem to best achieve goals. Yet despite its simplicity and compatibility, the idea of subjective selection has remained underdeveloped in the contemporary cultural evolution literature. It thus differs in important ways from oft-invoked cultural evolutionary processes.

The main features distinguishing subjective selection from other hypothesized processes are the two sources of subjectivity: proximate goals and the psychology of evaluation. Unlike most work by cultural attraction theorists until recently (e.g., Atran 1998; Boyer 2001; O. Morin 2013; Sperber and Hirschfeld 2004), subjective selection focuses on goal-directed behavior. Unlike cultural group selection or cultural evolution through cue-biased transmission (e.g., imitating the healthy, successfully, or prestigious), meanwhile, subjective selection emphasizes subjective appeal over objective benefits. Of course, subjective appraisals of instrumental value can, and often do, correspond with objective benefits: A spear that works well for hunting can both be subjectively evaluated as useful for a goal and produce objective benefits. But this need not be the case. People can evaluate magical practices to be effective for healing illness or divining the future, even when they have no causal impact (Hong 2022a; Hong and Henrich 2021); people might believe that endorsing particular narratives will make their groupmates more cooperative, regardless of those narratives' efficacy (Fitouchi et al. 2025). Through its emphasis

on goals and the psychology of evaluation, subjective selection stresses features of individual-level psychology that, until recently, have been underemphasized in the study of cultural evolution (although see André et al. 2023; Baumard et al. n.d.; Hong and Henrich 2021; Hong and Zinin 2023; Mercier and Boyer 2020 for indications of a scholarly shift).

2.2. The psychology of goals and evaluation

According to a subjective selection framework, people's goals and evaluative processes interact to shape and constrain the design of culture. Understanding the psychology of goals and evaluation is thus critical to recognizing how subjective selection acts.

2.2.1. What are goals?

Goals are ends towards which individuals are motivated (see Table 1 for definitions). They can be represented cognitively and include both internal states (e.g., experiencing pleasure, controlling one's body temperature) and external outcomes (e.g., spearing a deer, starting a successful company). Vertebrates appear to organize their behavior in the pursuit of goals (Del Giudice 2023; Kenrick et al. 2010; Tomasello 2022); as a result, goals profoundly shape cognition, such as in how states of the world are mapped, how actions are judged and selected, and how rewards are computed (De Martino and Cortese 2023; Molinaro and Collins 2023). Decades of research on goal pursuit show that people are often not consciously aware of their goals and how those goals guide their behavior (Bargh et al. 2001; Custers and Aarts 2010).

Goals appear to be structured hierarchically (Figure 3) (Austin and Vancouver 1996; Botvinick 2008, 2012; Dubourg et al. 2025). At the apex of the hierarchy are superordinate goals, also termed “core biological goals” (Del Giudice 2023), such as sex, status, security, food, and information (Kenrick et al. 2010). That these goals ultimately guide our behavior reflects their adaptive value: Natural selection seems to have shaped human psychology to secure outcomes that reliably increased fitness in ancestral environments (Barrett 2015; Pinker 1997; Schaller et al. 2017; Tomasello 2022; Tooby and Cosmides 1990).

Table 1. Some definitions of “goal.”

Source	Definition*
Locke and Latham (1990, p. 2)	Idea of a future, desired end state.
Austin and Vancouver (1996, p. 338)	Internal representation of a desired state.
Kruglanski (1996, p. 600)	Desirable future state of affairs one intends to attain through action.
Fishbach and Ferguson (2007, p. 491)	Cognitive representation of a desired endpoint that impacts evaluations, emotions, and behaviors.
Custers and Aarts (2010, p. 47)	A desired outcome.
(VandenBos 2007/2018	End state toward which a human or nonhuman animal is striving: the purpose of an activity of endeavor.

* Definitions originally referring to “goals” (plural) have been modified to refer to a “goal” (singular) for consistency.

Hierarchically structured under superordinate goals is the second set: subordinate goals, also called “instrumental goals” (Del Giudice 2023). To acquire food, for example, we might execute the following sequence of subordinate goals: *Find stick; leave camp; walk to mango tree; knock down mangos with stick; collect mangos*. Importantly, subordinate goals are themselves composed of a hierarchy of subordinate goals (Botvinick 2008). A goal like *walk to mango tree* itself comprises complicated sub-routines, like *Step over log* and *Swat away mosquitoes*. Because of the hierarchical nature of goal pursuit, a subordinate goal (like typing the word “goal”) and its ultimate, superordinate outcome (like acquiring status or material resources) can be linked through an elaborate set of nested links (Dubourg et al. 2025). In line with the hierarchical nature of goal pursuit, experimental research suggests that humans experience simultaneous reward signals corresponding to different levels of a goal-hierarchy (Diuk et al. 2013; Ribas-Fernandes et al. 2011).

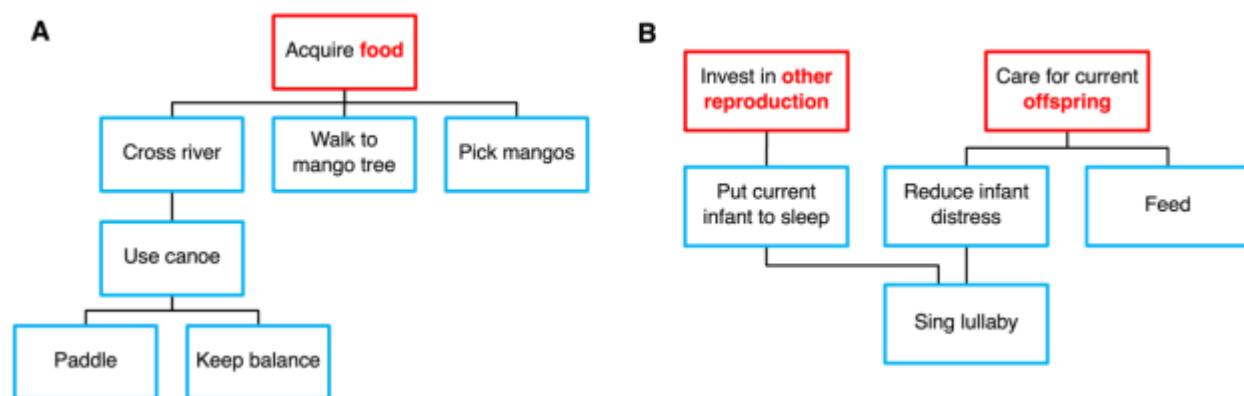


Figure 3. Goal-directed behavior is hierarchical. Superordinate or core biological goals (red) ultimately guide behavior; natural selection has shaped human motivation to pursue these ends, which reliably increased fitness in ancestral conditions. Hierarchically structured under superordinate goals are subordinate or instrumental goals (blue); these have not been defined by natural selection but are flexibly and strategically selected to advance superordinate goals. Cultural behaviors, such as using a canoe (A) or singing a lullaby (B), are adopted and evaluated in the same way as other goal-directed behaviors. Some behaviors, such as singing lullabies, may be deployed in service of several superordinate goals.

2.2.2. Humans select behaviors, including cultural ones, using goal-directed evaluation

A basic premise of subjective selection is that the cognitive processes involved in evaluating and adopting cultural behaviors are the same as those involved in selecting any goal-directed behavior. Researchers, particularly those working within a reinforcement learning framework, generally distinguish between two evaluative processes—*habit* and *planning*—involved in the selection of goal-directed behavior (Gershman 2015; Kool et al. 2018). Both can occur outside of conscious awareness. *Habit*, known also as model-free learning, occurs when the individual selects behaviors based on their previously computed rewards. It is referred to as “model-free” because the individual does not use a causal model of the environment to select a behavior, but rather tracks its expected reward, updating it based on deviations from predicted values. For example, a person may head to a tree (let’s call it *tree X*) to collect mangos only to find fewer mangos there, thus updating the value of the subordinate goal *Find mangos at tree X*.

In *planning*, known also as model-based learning, an individual uses a causal model to calculate the expected value of a behavior, selecting it based on this simulation (Kool et al. 2018). For example, an individual may see a new kind of fruit tree and use their familiarity with mango trees to simulate a novel routine to acquire the trees' fruits. Our causal models can be shaped by culturally transmitted beliefs, creating pathways by which cultural variants can affect each other's selective environments. Given tradeoffs between habit and planning—habit is frugal but inflexible; planning is the opposite—organisms benefit from integrating them (Cushman and Morris 2015; Keramati et al. 2016; Kool et al. 2018).

At first, social learning may seem a distinct process by which individuals adopt behaviors. Nevertheless, converging lines of evidence—including theoretical work (Aoki 2010; Enquist et al. 2007), studies on learning in non-human animals (Heyes 2012), and research on the neuroscience of social cognition (Olsson et al. 2020)—demonstrate that cultural learning is constrained by individual evaluations. For example, systems involved in social learning show substantial neural and computational overlap with the systems involved in self-experienced, value-based learning, including computing prediction errors that are used to update the value of learned actions (Olsson et al. 2020). Individuals not only observe others' behaviors but engage in what is called “vicarious reinforcement learning,” evaluating actions by attending to others' costs and rewards (Olsson et al. 2020). Instrumental evaluation also appears early in development: Young children, including infants, are attentive to others' goals (Baillargeon et al. 2016; Woodward 2009) and preferentially reproduce goal-directed behaviors compared to behaviors with no clear intended outcome (Elsner 2007).

The importance of individual evaluation in social learning is corroborated by sociological research. Rogers (2003), for example, reviewed an extensive body of literature on the diffusion of innovations, ultimately concluding that five characteristics—perceived relative advantage, compatibility, complexity, trialability, and observability—are most predictive of whether an innovation spreads. Critically, all relate to individual evaluation. Cultural behaviors, as with all behaviors, are more likely to be adopted when they are evaluated as effectively satisfying goals.

2.3. Selective schemes and cultural “technologies”

Because people’s goals vary, trajectories of cultural evolution driven by subjective selection should vary, too. Spears might evolve as people selectively retain implements that appear best for killing. Chocolate chip cookies might evolve as they selectively retain recipes that produce the most gustatory pleasure. Rain magic might evolve as they selectively retain esoteric practices that seem best at changing weather.

I refer to these as different “selective schemes”; each selective scheme can be reconceptualized as a cultural selection for a given trait. The evolution of spears, then, would be guided by one selective scheme: a cultural selection for effective seeming killing implements. The evolution of chocolate chip cookies would be shaped by another: a cultural selection for delicious foods. Rain magic, finally, would be shaped by a third: a selection for weather-changing techniques that seem to work best.

The design features favored under a given selective scheme depend on many factors. Some of these apply across human populations, such as the laws of physics or genetically encoded features of the human taste system. Others can vary considerably. For example, cultural beliefs about how illness works or where rain comes from (which may have themselves developed through subjective selection) can affect evaluations of healing or weather rituals—and thus the variants that are favored. In that vein, rain magic that involved lizards became popular during Song dynasty China because of their resemblance to dragons, creatures long associated with rain in China (Hong et al. 2024). We would expect much less reliance on this “lizard rainmaking method” in cultures that do not connect dragons to weather.

Selective schemes can interact. Consider, for example, narratives about witches and sorcerers. These appear partly to be shaped by a selection for compelling explanations of misfortune: People seek to understand why they suffer calamities and, particularly in ecologies that promote paranoid or conspiratorial thinking, they find compelling explanations that attribute that suffering to distrusted parties (Singh 2021a). However, witchcraft narratives also appear to be affected by a selection for demonizing narratives: Under certain conditions, people iteratively craft stories about rivals that justify violence or spur others to attack them (Cohen 1972; Cohn 1976; Goode and Ben-Yehuda 1994); in cultural ecologies in which witchcraft and sorcery narratives also serve as plausible explanations of misfortune, those can be leveraged to demonize targets, who are accused not only of using dark powers for harm but of posing existential threats

and engaging in morally abhorrent acts (Hutton 2017). A cultural tradition—the belief in heinous witches—is thus plausibly shaped by several interacting cultural selective schemes.

An implication of subjective selection and the existence of selective schemes is that many traditions can be considered “technologies” (see also Hong and Henrich 2021; Horton 1967). Arthur (2009) defined a “technology” most basically as a “means to fulfill a human purpose.” Oil refining, a diesel engine, an electrical generator, a speech recognition algorithm—all are means to carry out human purposes. If, as I have argued, much of culture evolves to satisfy psychologically determined goals, then those cultural traditions qualify as technologies by Arthur’s definition. Not only is, say, a hammer a technology to hammer in nails or a spear a technology for killing animals, but voodoo magic is a compelling but erroneous technology for making rivals sick. Divination is an effective-seeming technology to acquire hard-to-access information. Chocolate chip cookies are technologies to induce gustatory pleasure.

Researchers studying culture have long drawn fundamental distinctions between domains of culture, separating, for example, material from symbolic culture or adaptive from non-adaptive culture. Such distinctions have invited a sense that different cultural domains develop through distinct processes which parallel contrasting theoretical approaches: songs and folktales emerge through one set of processes in which psychology is paramount; food-processing techniques and bows and arrows evolve through another set of processes that optimize individual- and group-level benefits (Sterelny 2017). A subjective selection framework invites a different view of culture, however. Rather than reifying distinctions, it suggests that many traditions in our diverse cultural repertoires—from stories to cheesecake to spears to igloos—evolve as compelling solutions for instrumental ends.

2.4. Explaining culture: A subjective approach

The subjective selection framework generates hypotheses for the origins, function, and persistence of cultural traditions, including super-attractors (Box 1). Partly because people around the world pursue shared goals and evaluate cultural variants in similar ways, subjective selection drives the convergent evolution of many traditions, resulting in the regularities of the cultural manifold. It is outside of the scope of this paper to enumerate and provide explanations of all super-attractors. Instead, I will go through three domains—religion, aesthetics, and social institutions—addressing, in each domain, two super-attractors and reviewing evidence of their

regular development through subjective selection. With the exception of corporate group structure, these super-attractors have been selected, because each has been the subject of comparative research and has been analyzed within the framework of subjective selection.

Box 1. Deriving and testing hypotheses within a subjective selection framework.

Explaining design through subjective selection may seem to invite circular reasoning. If we hypothesize that traditions develop and persist because people perceive them to be effective for achieving goals, this may seem to imply that any cultural behavior must have emerged for that reason. However, this concern is misplaced. The explanatory power of any ultimate-level framework comes not from assuming that traits exist because they were selected for but from identifying the pressures that shape their emergence and persistence. Just as explaining a trait's evolution through natural selection or cultural group selection often involves clarifying its adaptive function, proposing that a tradition develops through subjective selection is most informative when the account specifies the proximate goal the tradition seems to fulfill (and, ideally, the ultimate-level reasons humans pursue that goal), as well as the factors that make it a compelling solution for achieving that goal. Such factors might include physical constraints imposed by the natural world, genetically encoded features of the human brain, and complementary cultural variants, such as beliefs that enhance the perceived efficacy of the tradition.

The predictions generated by a subjective selection hypothesis will vary depending on the specifics of that hypothesis. In sections 3 through 5, for example, I review seven hypotheses for how super-attractors develop through subjective selection, each of which makes predictions about a cultural domain. In addition to these, any subjective selection hypothesis that specifies the relevant goal will yield at least five additional, basic predictions (see also Singh 2022, pp. 276–277):

1. People pursuing that goal will adopt the tradition more frequently than people not pursuing that goal.
2. Providing an alternative tradition evaluated as better satisfying the goal will reduce people's reliance on the tradition of interest.
3. Manipulating the perceived efficacy of the tradition for satisfying the goal will affect people's reliance on it, even when holding the actual efficacy constant.
4. Manipulating the perceived efficacy of the tradition for satisfying the goal will elicit activity in brain regions associated with reward prediction error for goal-directed activities.
5. Manipulating the perceived efficacy of the tradition for satisfying the goal will affect participants' use of the tradition when pursuing that goal more than when pursuing other goals.

The main alternatives to these accounts are cultural evolutionary theories that point to objective individual- or group-level benefits—often, benefits of which individuals are unaware. For example, theorists have emphasized the importance of processes such as cultural group selection and cultural evolution driven by success-biased imitation (R. Boyd and Richerson 1985; Henrich 2004a, 2016; Richerson and Boyd 2008). These processes have been hypothesized to produce adaptive, functional cultural design without individual agency or planning and without individuals aware of the traits' benefits. In other words, magic, myths, dance songs, and justice institutions—to name a few—are often said to culturally evolve not because individuals instrumentally craft and retain similar solutions for universally occurring goals but rather because they generate objective benefits and are favored by blind cultural evolutionary processes.

I contend that such accounts are limited in their ability to explain many super-attractors, as are approaches that frame various super-attractors as cognitive by-products. A basic reason is that they often fail to explain why humans, so attentive to costs and benefits, should care to adopt, endorse, transmit, and invest in various cultural traditions (see also André et al. 2023). Culture relies on people to keep it alive. Stories survive only as long as they are told; music endures only as long it is performed; justice institutions last only as long people employ them. A subjective selection framework not only spotlights people's instrumental reasons for investing in culture; it demonstrates the powerful explanatory power that comes from centering such motivations when analyzing the recurrent features of cultural practices.

3. Religion explained

If super-attractors are testing grounds for developing and evaluating social scientific theory, religion has been the paradigmatic case study. Few if any cultural domains have attracted as much scholarly attention within the evolutionary and cognitive literature as religion (Atran 2002; Bloom 2007; Boyer 2001; Guthrie 1995; Henrich 2020; Norenzayan 2013). Paralleling larger debates in the naturalistic study of culture (Richerson 2017; Sterelny 2017), research on religion has been marked by a tension between by-product approaches and adaptationist accounts (Boyer 2001; Johnson and Bering 2006; Pyysiäinen and Hauser 2010; D. S. Wilson 2002). An influential synthesis has sought to reconcile these approaches, proposing that cultural group

selection favors variants of cognitively sticky beliefs that best promote group-level cooperation (Norenzayan et al. 2016).

In recent years, however, a subset of researchers has contributed to what might be considered a third approach—one that focuses on people’s instrumental goals and the psychology of evaluation in explaining the emergence, stabilization, and design features of magico-religious traditions (Boyer 2020a; Fitouchi et al. 2025; Fitouchi and Singh 2022; Hong 2022b; Hong et al. 2024; Hong and Henrich 2021, 2024; Hong and Zinin 2023; Mercier and Boyer 2020; Miton et al. 2015; Singh 2018, 2025). This research overcomes limitations of by-product and adaptationist accounts while demonstrating that complex, ubiquitous religious traditions plausibly develop as people convergently build them to satisfy everyday ends.

3.1. Shamanism as a compelling technology to control uncertain outcomes

Around the world, human societies have shamans, defined here as specialists who, in non-ordinary states, engage with unseen realities and provide services like healing and divination (Hultkrantz 1993; Singh 2025). Shamanism appears to be a super-attractor. Winkelman (1984, 1986) coded a subsample of 47 cultures in the Standard Cross-Cultural Sample and found shamans in more than 90% of the cultures examined, while a review of hunter-gatherer religions reported shamanism in 29 of 33 societies (Peoples et al. 2016; see Singh 2018a for details). Of the remaining four, the members of one, the Mbuti, visited the “local witch doctor” of nearby farmers (Putnam 1948, p. 340); for another, the Tiwi, anthropologists referred to “clever” men who could foretell the future (Pilling 1958, p. 115); a third, the Sirionó, seemed to have lost shamanism in recent centuries following demographic collapse (Walker et al. 2012). Centralized states and religious authorities have attempted to destroy shamanic traditions numerous times throughout history, yet their efforts usually either fail or are successful only briefly before it reappears (Bell 2005; Boyer 2020b; Meeks 2011). Aside from their defining features, shamanic traditions frequently exhibit other common features, including dramatic initiations, practices of deprivation, and claims of superhuman powers (Singh 2018, 2025).

Researchers have put forward numerous hypotheses to explain shamanism. Many outline some mechanism by which shamanism helps clients or boosts group-level success (Achterberg 1985; Blackwell and Purzycki 2018; McClenon 2001; Watson-Jones and Legare 2018). Winkelman’s theory of shamanism, for example, posits that shamanic traditions worldwide

induce a cross-culturally consistent trance state that has an “integrative” effect on cognition, enhancing capacities such as social intelligence and familiarity with natural history (Winkelman 2002). Such an account suffers from important shortcomings, however, including a lack of evidence for the benefits proposed (Singh 2018). Furthermore, whereas Winkelman’s theory predicts similar trance states and cognitive effects (particularly in terms of “integration”) across societies, research on non-ordinary states has documented very little overlap and much more diversity (Vaitl et al. 2005), even when restricting comparisons to hallucinogens used by shamans in the Americas (Singh 2025).

Despite many claims of objective benefits of shamanic practices, most evidence indicates a *perception* of benefits; people clearly often think that shamanic ceremonies work (see, e.g., van der Watt et al. 2018). A subjective selection account thus focuses on the *ostensible* efficacy of shamanism (Singh 2018, 2025). Humans are predisposed to adopt ineffective interventions, or “superstitions,” to sway important, unpredictable outcomes such as illness and the weather (Vyse 2014)—a bet-hedging tendency plausibly explained by cognitive mechanisms that have evolved to minimize costly errors (Johnson et al. 2013; see also the smoke detector principle: Nesse 2019). As specialists compete to provide magical services and clients preferentially choose the services that subjectively seem most effective, shamanism develops. What makes shamanic traditions compelling is that the specialist uses various practices to “xenize,” or apparently become distinct from normal humans, bolstering their claim that they can engage with the gods, spirits, and other agents believed to oversee uncertain outcomes (Singh 2025).

A subjective selection account of shamanism attributes its existence and design features to (a) clients’ goals in seeking out shamanic services (namely, controlling uncertain, fitness-relevant events such as illness) and (b) the features of specialists that clients use to evaluate their ability to provide services (often, otherness as a sign of special powers). It therefore makes clear predictions about the design features of shamanism. It predicts, for example, that, despite variation in their activities, shamans will act foremost to help clients control uncertain outcomes, an expectation borne out by cross-cultural analysis (Singh 2018). It also predicts that the various practices so often associated with shamanism should promote perceptions of otherness and special powers. I have elsewhere reviewed ethnographic evidence that altered states and dramatic initiations have these effects (Singh 2018) and, in field experiments, demonstrated that, as predicted, Mentawai participants (Indonesia) infer fundamental difference and supernatural

power from shamanic self-denial (Singh and Henrich 2020). In shamanism, we find a super-attractive tradition that develops everywhere, because it assures clients they have some control over uncertain events.

3.2. Supernatural punishment beliefs as technologies for mutual policing

Across societies, people claim that antisocial acts are punished by supernatural forces such as gods, spirits, or karmic forces. Although such prosocial religious beliefs were long assumed to be limited to large-scale societies (Baumard and Boyer 2013; Roes and Raymond 2003; Tylor 1920a), this conclusion seems partly an artifact of datasets biased against detecting moralistic punishment in smaller-scale societies (Lightner et al. 2023; Purzycki et al. 2023). Recent research, including coding of the ethnographic record (Boehm 2008), detailed ethnographic studies (Purzycki 2016; Singh et al. 2021; Townsend et al. 2020), and cross-cultural surveys (Bendixen, Lightner, et al. 2023; Purzycki et al. 2022), show that moralistic supernatural punishment is much more widespread.

According to the leading theory in the evolutionary and cognitive literature, supernatural punishment beliefs have culturally evolved to promote cooperation (Norenzayan 2013; Norenzayan et al. 2016; Norenzayan and Shariff 2008). Such an approach permits that religious beliefs emerge as by-products of cognitive biases but adds that competition among groups selects for those religious packages with group-level benefits (Norenzayan et al. 2016). Nonetheless, the central assumption that moralistic punishment beliefs make people more cooperative has become increasingly debated in recent years (Bendixen, Lightner, et al. 2023; Jacquet et al. 2021; Kavanagh et al. 2020). Moreover, group-adaptive accounts overlook the critical fact that people endorse supernatural beliefs for strategic purposes, using threats of mystical sanctions to motivate self-serving behavior (Fitouchi and Singh 2022; Moon 2021; Singh et al. 2017).

A subjective selection account overcomes these limitations and shows that focusing on a critical and common goal—controlling others' cooperation—can explain much of supernatural punishment (Fitouchi et al. 2025). Whatever the effects of religious beliefs on cooperation, a less contested claim is that people *believe* that holding supernatural punishment beliefs makes others more cooperative (Gervais et al. 2017, 2024). Prosocial religions thus plausibly develop from people crafting and selectively endorsing beliefs that they intuit, based on their folk psychology, will encourage others to cooperate (Fitouchi and Singh 2022). When each individual, lacking full

confidence in others' cooperation, strategically pushes supernatural punishment beliefs, their micro-level interactions can give rise to a dynamic of collective, mutual policing, such that everyone pays trivial costs to maintain shared moralistic beliefs (Fitouchi et al. 2025). As people preferentially adopt and endorse those variants they subjectively believe will best achieve the goal of encouraging others' cooperation, the beliefs should evolve into their most subjectively appealing forms.

Fitouchi et al. (2025) derived, and found support for, nine predictions of such a subjective selection account of supernatural punishment beliefs. These include, for example, that individuals who desire higher levels of social control are more likely to endorse punitive religious beliefs (Atkinson and Bourrat 2011; Jackson et al. 2021), that lower social trust is associated with greater endorsement of such beliefs (Berggren and Bjørnskov 2011; Jacquet et al. 2021), and that punitive religious beliefs are not only prosocial but, under some circumstances, extractive and self-serving, as well (Bentzen and Gokmen 2023; Singh et al. 2017; Strassmann 1992; Strassmann et al. 2012). Moralistic supernatural punishment beliefs also target behaviors that people are motivated to control in everyday life (Bendixen, Apicella, et al. 2023) and that are difficult to police by secular means; see, for example, that the Mentawai water spirit Sikameinan oversees food-sharing, one of the few domains of cooperation unregulated by secular justice (Singh et al. 2021; Singh and Garfield 2022). Although some of these predictions are shared by group-adaptationist theories, the subjective selection account critically predicts that changes should be driven not by any proposed process of cultural group selection (e.g., interdemic selection, payoff-biased migration) but by shifts in individual-level motivations to control others' behavior, an expectation supported by survey data (Houtman and Aupers 2007; Houtman and Mascini 2002; Tamir et al. 2020).

4. Aesthetic behaviors explained

Aesthetic behaviors, including music, storytelling, and visual adornment, are not only longstanding topics of anthropological interest (Boas 1928; Lévi-Strauss 1955; Malinowski 1948; Merriam 1964; Tylor 1920b) but also common, costly, and puzzling enough to have attracted considerable evolutionary theorizing (B. Boyd 2009; Carroll 2012; Dutton 2009; Mehr et al. 2021; Savage et al. 2021; Tooby and Cosmides 2001). These ubiquitous behaviors

plausibly develop through subjective selection as people fashion sound and word (and image, although not covered here) to fit universal goals.

4.1. Dance songs and lullabies as behavioral technologies

Music has appeared in every society where researchers have looked (Mehr et al. 2019; Savage et al. 2015). Moreover, several domains of music exhibit remarkable internal consistency. Across diverse populations—including among young children (Hilton, Thierry, et al. 2022), in smaller-scale societies (Yurdum et al. 2023), in massive online experiments with English speakers (Hilton, Moser, et al. 2022; Mehr et al. 2018, 2019), and in experiments with speakers of 29 languages across 48 countries (Yurdum et al. 2023)—naïve listeners can identify the function of foreign dance songs and lullabies from audio recordings alone (Singh and Mehr 2023). Moreover, analyses of recordings have identified acoustic features that tend to characterize these song domains and which distinguish them not just from each other but from other musical and non-musical vocalizations, as well (Hilton, Moser, et al. 2022; Mehr et al. 2018, 2019). Given their complex forms, universality, and similarity worldwide, dance songs and lullabies seem clear examples of super-attractors.

What accounts for these musical super-attractors? One explanation is biological adaptation, which posits that humans have been shaped by natural selection to produce and respond to dance songs and lullabies. Universal patterns would thus reflect dance- and lullaby-specific adaptations. In line with such an explanation, some researchers argue that human musicality has been shaped by natural selection (at least in part), with dance songs and lullabies serving as credible signals or a mechanisms for social bonding (Mehr et al. 2021; Savage et al. 2021).

A biological-adaptation explanation of musical super-attractors runs into at least three limitations, however. First, observations of the lack of dancing and lullabies among the Northern Aché, whose ancestors experienced a series of population bottlenecks in recent centuries and lost much of their complex culture, suggest that dance songs and lullabies require cultural transmission to be maintained (Singh and Hill 2025.; see also Aubinet 2024). Second, although dance songs and lullabies are highly stereotyped across societies, other song types also are widespread and exhibit regular features cross-culturally (Bertolo et al. 2025). Naïve listeners can identify foreign healing songs; people in different societies have similar conceptions of what a

healing song should like; and analyses of acoustic features have identified some features that tend to distinguish healing songs from other song domains (Hilton, Thierry, et al. 2022; Mehr et al. 2018, 2019; Yurdum et al. 2023). Despite these similarities, there is little reason currently to expect that humans have genetically evolved to produce healing songs. When it comes to musical domains, ubiquity and regularity of structure are not necessarily indications of specialized, biological adaptation.

A final limitation of biological-adaptation explanations of musical super-attractors is the absence of evidence of adaptation. Psychological research on the universality, domain-specificity, and ontogeny of behavioral responses to music has struggled to identify signatures of adaptation (Singh and Mehr 2023). For instance, many lines of evidence suggest that our capacity to respond to dance songs—that is, our capacity to perceive beat and spontaneously entrain to it—is a by-product of vocal learning. The only other animals that spontaneously entrain to beats are parrots (also sophisticated vocal learners), while recent research has shown substantial overlap between the genetic and neural mechanisms involved in vocal learning and those involved in beat perception and entrainment (Cahill et al. 2021; Niarchou et al. 2022; Patel et al. 2009; Rouse et al. 2021; Schachner et al. 2009). Although some researchers posit that gene-culture coevolution has subsequently shaped rhythmic perception and response (e.g., Patel 2021), there is currently no indication that the psychological mechanisms involved in beat perception and entrainment are music-specific adaptations as opposed to features of our psychology that exist for non-musical ends (Singh and Mehr 2023).

The framework of subjective selection provides alternatives to biological-adaptation explanations of musical super-attractors. Consider dance songs. Dance songs plausibly develop because, like pornography or chocolate chip cookies, they are technologies for feeling good (see Box 2). Action synchronized to music is pleasurable (Foster Vander Elst et al. 2021; Witek et al. 2014), seemingly as an incidental consequence of vocal learning mechanisms, which entail intrinsic rewards for accurately predicting and reproducing the temporal structures of auditory sequences (Patel 2021). As people shape songs into forms that best facilitate enjoyable vocal and motor entrainment, they produce convergent structures in dance songs (Singh and Mehr 2023). Of course, people can then build on this common, super-attractive structure for other ends, such as signaling coalitional formidability, inducing altered states, feeling bonded, or promoting cooperation, as often proposed (B. Campbell 2023; Hagen and Bryant 2003; Mogan et al. 2017;

Tarr et al. 2014). But these other ends do not explain why music is pleasurable in the first place, and the ubiquity and structural commonalities of dance songs seem to reflect this common aim of experiencing the rewards of temporal prediction.

Box 2. Technologies of pleasure. I argue in the main text that traditions such as dance songs and hero stories are technologies of pleasure, engineered to deliver psychological reward. However, the claim raises a basic question: Should pleasure be considered analogous to the other goals discussed, such as restoring cooperation or putting an infant to sleep? In one sense, no. Hedonic reward is often experienced when achieving superordinate, fitness-relevant goals, such as eating, having sex, and interacting with friends and loved ones (Berridge and Kringelbach 2015; Bloom 2010; Kringelbach and Berridge 2009). Contrasts between pleasure and other goals, whether superordinate or subordinate, may thus seem like comparisons at different levels of analysis and thus dubious. Yet pleasure can also become decoupled from the adaptive outcomes it was meant to motivate, and its pursuit can interfere with other goal-directed behavior (Hofmann and Van Dillen 2012; Stroebe 2022). Eating cheesecake and watching pornography are pleasurable because the activities provide cues of states that tended to advance fitness in ancestral environments—yet consuming cheesecake often harms nutritional status while viewing pornography bypasses the actual behaviors and relationships that would normally increase reproductive success. Conceptualizing these and other traditions as technologies for inducing pleasure captures this decoupling, further highlighting that many traditions develop and persist because they satisfy a subjective end in the absence of adaptive benefits.

Lullabies, too, plausibly develop through subjective selection as parents experiment with and preferentially retain songs effective for soothing infants. Although humans seem to respond most to lullabies during infancy (suggesting specialized cognitive mechanisms expressed during relevant developmental stages), adults also rely on lullaby-like music to fall asleep. Studies of Canadians and Finns find that substantial numbers of people—up to 56% of respondents, in one study (Brown et al. 2017)—report using music to fall asleep (C. M. Morin et al. 2006; Urponen et al. 1988). Furthermore, a recent analysis of sleep playlists on the streaming platform Spotify found that the soporific songs that adults rely on share features with lullabies, such as softness

and a slow tempo (Scarratt, Heggli, Vuust, and Jespersen 2023). These findings question the conclusion that responses to lullabies are infant-specific adaptations, instead raising the possibility of a pan-human predisposition to be calmed by soft, slow music (see also Scarratt, Heggli, Vuust, and Sadakata 2023). Parents attempting to calm fussy infants try a variety of techniques, learning their infants' preferences and repeatedly using what seems to work. Such a process conceivably fuels the development of calming songs, especially as people learn effective songs from others, resulting in global convergences in the acoustic structure of lullabies.

4.2. The sympathetic plot as a technology of entertainment

Storytelling is a human universal. Even supposed cultural exceptions, such as the Sirionó of Bolivia and the Pirahã of Brazil, tell stories, including particular variants over and over (Everett 2005; Holmberg 1969). Aside from their universality, stories include super-attractive variants. Scholars of the world's literature have long provided evidence that certain, complex narrative structures recur across diverse contexts (Raglan 1936; Rank 1914; Scheub 2007). Many of their projects converge on the "hero's story" or the "sympathetic plot" (Booker 2004; J. Campbell 1949; Hogan 2003, 2011; Raglan 1936; Rank 1914; Singh 2021b; von Hahn 1876). The sympathetic plot features a goal-directed protagonist who confronts obstacles, overcomes them, and wins rewards (Singh 2021b). Stories with such a structure tend to exhibit other common features: protagonists are often appealing (e.g., strong, caring); they start out alone and suffer early misfortunes (e.g., they are orphaned or abandoned); they are high-status or at least tied to high-status individuals (e.g., they are adopted by royalty or the offspring of a deity); their opponents are repulsive and formidable; and their opponents eventually suffer or are reformed. Such features appear not only in many (or most) popular Western stories but also in the myths, folktales, and legends of peoples around the world (Booker 2004; Hogan 2003, 2011; Thompson 1946).

The sympathetic plot exhibits features suggesting that it is the product of subjective selection—and, in particular, a cultural selection for entertainment (Singh 2021b; see also Dubourg and Baumard 2022). Humans are motivated to feel pleasure (Box 2), and storytellers benefit from providing entertainment, such as through greater status. As audiences demand their favorite stories, and storytellers preferentially tell them, they jointly drive a cultural selection for entertaining stories—that is, for those that best capture human attention and eventually provide

pleasure. Scheub (1975) observed the selective retention of entertaining material working with *ntsomi* storytellers among the Xhosa. He wrote that “an artist includes and emphasizes those elements that she delighted in during *ntsomi* performances that she witnessed, and she does not fail to recall those details that particularly delighted her audiences during her own productions” (p. 90). He saw this subjective selection as important for the tradition’s evolution: “Considering that this process of borrowing, influencing, innovating, and combining has been going on for decades, there should be no surprise that such an involved form has developed” (p. 81).

The sympathetic plot seems to entertain through two pathways (Singh 2021b). First, by presenting a protagonist who has a goal but difficulty achieving it, it triggers psychological mechanisms for learning about obstacles. Several lines of experimental evidence demonstrate that humans are intrigued and attentive when hearing about obstacles that others confront (Delatorre et al. 2018; Fine and White 2002; Gerrig 1989; Iran-Nejad 1987; Jose 1988)—a response that likely reflects psychological adaptations for vicarious learning (Thouzeau 2023).

Second, the sympathetic plot is exquisitely designed to evoke sympathetic joy, or the pleasure experienced when a cooperative beneficiary succeeds. It presents the kinds of individuals we would want to befriend: warm, competent, attractive, in-group members who are in-need (Gottschall 2005; Jobling 2001; Kimball 1999; Mattix 2012). Audiences often engage in parasocial relationships with these individuals, representing them as people they know (Giles 2010; Hoffner and Cantor 1991; Klimmt et al. 2006) and feeling positive affect—sympathetic joy—when those characters ultimately succeed (Trabasso and Chung 2004; Zillmann 1995; Zillmann and Cantor 1977).

Viewing the sympathetic plot from the perspective of these psychological responses reveals its ubiquitous features to be sensitively assembled to attract attention, induce sympathy, and produce pleasure. The overlapping aims of storytellers to entertain and audiences to be entertained creates a selective scheme for pleasure-inducing stories that results in the heroic archetype.

5. Social institutions explained

Subjective selection can also explain the evolution of social institutions. Social institutions differ from the other domains discussed in at least two important ways. First, more than religious or aesthetic traditions, social institutions are shaped by how individuals negotiate conflicts of

interest (Molho et al. 2024). Because their existence hinges on many individuals adhering to them, the evolution and stability of social institutions depends not only on whether people evaluate them as instrumentally useful but also on variables such as the degree of overlapping interests among parties and the relative power differentials among them (Singh et al. 2017). Second, whereas the perceived utility for religious and aesthetic traditions was often illusory (in the case of shamanism) or targeted at producing pleasure (in the case of dancing and the sympathetic plot), social institutions represent a domain of culture where subjective benefits and objective group-functional benefits seem often to align. In the examples considered here, people design social institutions to restore or mobilize cooperation, and the capacity for different institutions to produce these outcomes is likely critical for their long-term maintenance.

5.1. Justice institutions as technologies to satisfy retribution and restore cooperation

Human societies regularly develop institutions of justice for dealing with social transgressions. Rather than taking any form, however, those institutions tend to exhibit four common features: (1) They impose costs on transgressors; (2) they transfer benefits to victims; (3) they involve a sense of proportionality between the severity of the transgression and the magnitude of costs imposed or benefits transferred; and (4) the imposition of costs or transfer of benefits follows institutionalized procedures, sometimes accompanied by ritualized ceremonies (Black 2000; Fitouchi and Singh 2023; Hoebel 1954; Strathern and Stewart 2012).

A common explanation for such responses to wrongdoing, particularly the imposition of costs, is that they serve to enforce cooperative norms. According to a popular view, punishment generally—and thus punitive justice, in particular—functions to increase the cost of free-riding and thereby incentivize group-beneficial, cooperative behaviors (R. Boyd 2018). Such a norm-enforcement hypothesis explains some punitive institutions, such as those used to protect common-pool resources (Ostrom 1990), yet it fails to describe punitive justice in many societies, particularly those with dense kin networks in which people have long time horizons and interdependent obligations (Baumard 2010; Black 2000; Wiessner 2020).

According to the alternative relation-restoration hypothesis, many justice systems develop through subjective selection as people design procedures to restore cooperation between transgressors and victims following violations of reciprocal obligations (Fitouchi and Singh 2023). The logic is simple: Victims are less willing to cooperate with transgressors until they pay

costs (Ohtsubo and Watanabe 2009), a desire that likely evolved to deter future exploitation from the transgressor and other onlookers (McCullough et al. 2013). Although victims can satisfy this urge by directly attacking the aggressor, doing so risks cycles of feuding (Glowacki 2024). Furthermore, victims prefer to be compensated following transgressions, with experimental work demonstrating that compensatory payments encourage forgiveness (Komiya et al. 2018). The relation-restoration hypothesis thus proposes that justice systems evolve through subjective selection as interacting partners create and preferentially employ procedures that repair dyadic cooperation in ways that satisfy both parties while constraining rash retaliation (Fitouchi and Singh 2023).

The relation-restoration hypothesis generates at least seven predictions. These include that third parties should care more about reconciliation than imposing costs on offenders, that victims should prefer transfers of benefits over brute cost-infliction, and that punitive institutions should be accompanied by practices that constrain retaliation and facilitate reconciliation. These predictions were tested, and supported, using observations of justice systems in three-small societies: the Kiowa of the American Great Plains, Mentawai horticulturalists on Siberut Island, Indonesia, and the Nuer of South Sudan (Fitouchi and Singh 2023; see also Wiessner 2020). The relation-restoration hypothesis also explains a quirk of punitive justice: Contrary to the predictions of a norm enforcement account, some societies create systems to pay victims that end up barely imposing costs on transgressors and thus have little deterrence value. In northern Somalia, for instance, people formed groups with as many as several thousand members to pay blood-money following a killing. In these cases, observed Lewis (1961, p. 174), “the amounts paid by individual members may be infinitesimal. Thus, while exchange of blood-price removes immediate enmity between lineages it often provides little economic deterrent to continued bloodshed.” A system was constructed to appease victims’ desire for payment but with little apparent effect on enforcing norms.

Unlike most of the other super-attractors considered here, there has been less systematic, cross-cultural research on how justice systems compare worldwide. It is thus possible that the relation-restoration hypothesis explains a subset of justice institutions with, perhaps, a substantial proportion of punitive justice systems developing as people construct, through subjective selection, systems to generally deter wrongdoing (e.g., Leeson 2007; McDowell 2004; Ostrom

1990). Future investigations will better clarify patterns in the world's justice systems and the processes by which they develop.

5.2. Corporate groups as technologies to mobilize cooperation

Humans are often organized into corporate groups, which are defined by at least five features: (1) They exist in perpetuity; (2) they have clear, restrictive membership; (3) they are cooperative units in which membership carries duties (e.g., helping defend a territory) and privileges (e.g., hunting on it); (4) they have mutually exclusive membership (e.g., an individual typically cannot be a member of two clans); and (5) they recruit members through qualifications that usually build on existing connections, such as kinship or residence (Befu and Plotnicov 1962; Hayden and Cannon 1982). These features define rule-created social groupings as diverse as clans, guilds, lineages, and age sets—even the gangs of lobster fishermen working in the harbors of coastal Maine (Acheson 1988; Glowacki 2020).

Corporate groups are widespread. When Murdock and Wilson (1972) surveyed the 186 societies of the Standard Cross-Cultural Sample, they found that 117 had clans or similar kinship-based corporate groups. Although a comprehensive examination of the societies in the SCCS purportedly lacking such groups has yet to be conducted, ethnographic reports of several, such as the Pawnee and Torajans, reveal them to have residence-based corporate groups (Beierle and Malone 1997; Dorsey et al. 1940). Others—such as the Eastern Pomo, Copper Inuit, and !Kung—had kin-based corporate groups in recent memory but lost them by the time that anthropologists described them (Singh and Glowacki 2022, p. 420; see also the Ifugao (Beyer and Barton 1911)). In fact, cultural phylogenetics suggest that the cultural ancestors of various South American nomadic hunter-gatherer societies, including the Aché and Sirionó, lost corporate group structure recently in history, likely in the wake of demographic collapse (Walker et al. 2012). Although corporate groups may not be a cultural universal, they are more widespread than the SCCS suggests.

The features of corporate groups seem well-designed to mobilize cooperation. By specifying mutual obligations among a closed group of individuals, they prune competing loyalties and assure fellow group members of each other's future cooperation. According to a subjective selection framework, then, they can emerge as individuals deliberately create closed groups to promote mutual benefits, further tweaking them in ways that best mobilize

cooperation. After one such group appears in a social landscape, other people hoping to compete would then borrow the initial structure, refining it in ways that seem to further encourage cooperation.

Such a subjective selection account is consistent with perhaps the best documented instance of a newly emerged system of corporate groups: the rise of prison gangs in the United States. According to Skarbek (2014), before the 1950s, inmates in the United States grouped together in “tips” or “cliques,” informal groups held together by preprison acquaintances. These were not corporate groups: They lacked membership requirements or a clear group identity, and people could be members of multiple, overlapping cliques.

Starting in the late 1950s, however, the social organization transitioned (Morrill 2013; Skarbek 2014). In 1957, young Mexican American inmates in the Deuel Vocational Institution (DVI) in California formed a new kind of social unit to defend themselves against black and white inmates. Rather than being fluid, membership in the gang was official, exclusive, and a lifetime commitment; recruits had to give up street gang affiliations and pledge their allegiance to the new group. They eventually called themselves the Mexican Mafia and, later, La Eme. As the new group refined its rules and organizational structure, it came to dominate the DVI, robbing non-gang members of their possessions and eventually metastasizing into prisons throughout California. To contend, other inmates established similar corporate groups, such as La Nuestra Familia, the Black Guerilla Family, the Blue Bird Gang, the Aryan Brotherhood, and the Texas Syndicate, which likewise recruited based on race and geography. Gang membership subsequently became so crucial and commonplace in U.S. prisons that, prior to a Supreme Court ruling in 2005, reception forms asked new inmates to check a box indicating gang affiliation (Goodman 2008).

The rise and spread of American prison gangs illustrates two key points about the role of subjective selection in producing corporate groups specifically and social institutions more broadly. First is the role of instrumentality: The first such group, the Mexican Mafia, seems to have been deliberately created with the goal of mobilizing cooperation, specifically for mutual defense. As the innovation spread, other people assembled into similar groups for the same end. Second is the fact that subjective selection seems to have fueled a process of cultural group selection (at least if “group” is defined at the level of the prison gang): People designed and

adopted those cultural traits that served their individual goals (e.g., safety) but, because of their overlapping interests, ended up honing institutions that encouraged groupwide cooperation.

6. Addressing potential criticisms

6.1. Addressing the possibility of deep, shared cultural ancestry

I have argued that much of the cultural manifold develops through subjective selection; as people worldwide selectively produce and retain cultural variants evaluated as useful for instrumental ends, they produce similarities in complex culture. An alternative perspective, however, emphasizes shared cultural ancestry. By this perspective, global similarities in complex traditions stem not from convergent subjective selection but from a cultural “African Eve” to which each super-attractor might be traced (see, e.g., Witzel 2012). Although complex cultural packages can certainly diffuse over large expanses (e.g., Stépanoff 2021), there are at least three reasons to suspect that shared cultural ancestry cannot by itself account for the cultural manifold.

First is what Morin (2016) called the Wear-and-Tear Problem. Humans adopt and pass on traditions but rarely, if ever, with 100% transmission fidelity. Such errors and modifications mean that neutral cultural variation evolves alarmingly quickly and that, without other stabilizing mechanisms, traditions quickly transform beyond recognizability. Language, for example, evolves fast enough that many linguists consider it futile to reconstruct phylogenetic relationships beyond about six to ten thousand years. The Wear-and-Tear problem does not necessarily mean that super-attractors have evolved numerous times. But, at the least, it suggests that stabilizing mechanisms have maintained core features of each domain as humans spread around the world. The evidence reviewed above indicates that their subjective appeal—and, specifically, their apparent usefulness for regular instrumental ends—qualifies as a powerful stabilizing mechanism. Even if humans worldwide did inherit the cultural manifold from a common cultural ancestor many millennia ago, the Wear-and-Tear Problem nevertheless suggests that subjective selection has maintained them.

Second is the diversity exhibited within a class of super-attractors. Justice institutions function in a variety of ways, from transferring pigs and durian trees to victims (Singh and Garfield 2022) to spearing the legs of offenders and their kin (Warner 1958). Supernatural punishment beliefs may often target uncooperative behavior, although the nature of the supposed

punishers and the behaviors targeted exhibit substantial variation (Bendixen, Apicella, et al. 2023; Boehm 2008; Singh et al. 2021; Townsend et al. 2020). Likewise, although shamanic traditions all involve altered states, those states are understood in many ways, from consulting spirits in dreams (Radcliffe-Brown 1922) to spirit possession (Kendall 1985) to boiling energy (Katz 1982). This variation suggests analogy rather than homology—that, rather than each super-attractor deriving from an ancestral ur-tradition, human societies convergently construct traditions with common structural features.

Finally, human populations have frequently experienced bottlenecks dramatic enough that they have lost substantial complex culture, including many super-attractors (Henrich 2004b; Holmberg 1969; Singh and Hill 2025; Walker et al. 2012). It's plausible that, following such bottlenecks, most human populations re-established connections with other societies, allowing lost traditions to diffuse back in. However, one set of populations represents a possible, albeit speculative, instance in which such connections seem not to have been re-established: the Andaman Islanders. Despite likely undergoing a bottleneck small enough to destroy much of their cultural complexity, the Andaman Islanders exhibited most or all of the cultural manifold, including rites of passage, dance music, shamanism, origin myths, and marriage (Radcliffe-Brown 1922). Genetic analyses are consistent with the Andamanese have remained genetically isolated since arriving in the islands many millennia ago (Mondal et al. 2016; Mondal, personal communication). Although the British had set up a penal colony before concerted ethnographic description began, and Malay, Burmese, and European pirates had long raided the islands for slaves, it is unlikely that these interactions transmitted the super-attractors studied here, especially as Radcliffe-Brown (1922) noted that the British presence had the effect of destroying indigenous institutions. All of this suggests that Andamanese culture may be as close to a societal rebirth—Fox's Experimental Eden, essentially—as researchers might discover, potentially confirming that super-attractors develop anew under near-pristine conditions.

6.2. Addressing assumptions of adaptiveness

The subjective selection framework is agnostic to individual- or group-level benefits. What matters instead is that individuals perceive a cultural variant to be useful. This agnosticism clashes with a widespread and enduring assumption in the analysis of culture, according to which, “any expensive and long-lasting cultural trait (such as traditions passed down within a

lineage for thousands of years) should be presumed to be adaptive” (Heying and Weinstein 2021). By subscribing to this assumption, many researchers implicitly treat processes such as cultural group selection as decisive sieves for preserving and filtering adaptive cultural variation.

Such prioritization is unjustified for at least two reasons, however. The first is that processes such as cultural group selection require variation (R. Boyd and Richerson 1985, 2010). Imagine, for instance, that groups with witchcraft beliefs are less competitive than groups without them. Will cultural group selection select against witchcraft beliefs, or at least the non-adaptive versions? Not necessarily, in part because the subjective appeal of witchcraft beliefs may compel people in all groups to adopt and endorse them, removing the variation necessary for selection. Even if groups without witchcraft beliefs somehow emerge and spread at the expense of other groups, it is not clear that they can necessarily keep witchcraft beliefs out. The reliable development of some traditions can weaken the capacity for blind, adaptive cultural evolutionary processes to act.

Another reason to be skeptical of the key role sometimes ascribed to adaptive cultural evolutionary processes is that it remains unresolved how important they are in naturalistic settings. Using group extinction rates in New Guinea, Soltis et al. (1995) concluded “that a minimum of 500 to 1,000 years would be required for the spread of a single group-beneficial trait under the influence of [cultural group selection by interdemic selection].” As this is the minimum, it presumably requires a very strong selection coefficient; insofar as any super-attractors have negative or neutral fitness effects, those would be expected to be relatively small and so cultural group selection by natural selection would be expected to be much slower. Faster mechanisms of cultural group selection have since been proposed and modeled. Selective migration, for example, has been posited as a mechanism by which cultural group selection might occur (R. Boyd and Richerson 2009), although empirical research has yet to demonstrate its importance in shaping culture. Boyd and Richerson (2002) also showed that cultural group selection might occur via selective imitation, yet adding psychological richness, such as by considering people’s instrumental aims in adopting variants and the constraints of the psychology of evaluation, would turn such a process into subjective selection.

Whereas the role of such blind adaptive cultural evolutionary processes remains unclear, the centrality of individual evaluations of usefulness is well-demonstrated. As pointed out earlier, sociological research has concluded that the most important factors determining whether an

innovation spreads through a population—including trialability, compatibility, and, most importantly, perceived relative advantage—reflect individual evaluation (Rogers 2003). Indeed, cultural transmission experiments corroborate the central role of individual evaluation in the development of complex culture (Miton and Charbonneau 2018). In a common paradigm, participants are given an objective, such as building a plane to throw as far as possible or assembling a basket to hold rice (e.g., Caldwell and Millen 2009; Zwirner and Thornton 2015). Over generations, as individuals iteratively tinker with and pass on their attempts, it is the repeated evaluation of success that acts as the primary selective mechanism. The reason that planes evolve to fly farther or that baskets evolve to hold more rice is, simply, that people introduce variations, judge the extent to which they work, and retain the variants judged to be the best. In fact, even Derex et al.'s (2019) experiment showing that people can improve technologies while lacking a causal understanding nevertheless relies on iterative, instrumental evaluation: Individuals judged the efficacy of innovations for achieving a goal (minimizing the time for a wheel to go down a track) and decided whether to retain them on the basis of the evaluation. Although factors like group size and connectedness are clearly pivotal in affecting cultural evolutionary dynamics (Derex et al. 2018; Derex and Boyd 2016; Henrich 2004b; Muthukrishna and Henrich 2016), the diverse experimental literature suggests that instrumental evaluation is the filter through which most variants must pass. Culture evolves foremost as people keep what seems to best satisfy their ends.

7. Discussion

7.1. Subjective selection beyond the cultural manifold

I have demonstrated the power of a subjective selection framework by focusing on super-attractors across religion, aesthetics, and social institutions. Nevertheless, viewing culture as shaped by subjective selection generates proposals for how other super-attractors may be crafted to achieve people's instrumental ends. Rites of passage may be constructed through several interacting selective schemes, such as a selection for practices that establish common knowledge about shifting social roles (Thomas et al. 2014), a selection for hazing-like practices that increase trust in newcomers (Cimino 2011), and a selection for practices that seem to change the essence of a person. Marriage plausibly develops as partners and their families establish shared

contractual expectations, such as about sex and property, and other unions borrow and build on such arrangements (see the evolution of pirate ship constitutions for an analogy: E. T. Fox 2013). Although ownership is sometimes considered a genetically evolved strategy or inclination (e.g., Gintis 2007; Tibble and Carvalho 2018), studies of the emergence and evolution of property regimes among people of roughly similar power show them iteratively designing and negotiating over property rules, apparently in an effort to design standards that are both fair and efficient (Ellickson 1989, 1993, 2006; Kimbrough et al. 2010; B. J. Wilson et al. 2012). Future research will develop more precise accounts for how a broader set of super-attractors might develop through subjective selection which can then be tested against existing alternative theories.

Of course, there is no reason that subjective selection should be limited to the development of super-attractors. As with many existing frameworks, subjective selection plausibly explains the development of much adaptive technology. Assuming people accurately evaluate whether modifications better serve to satisfy their goals, they should adopt those variants, driving culture towards evermore useful forms (see, e.g., Allen et al. 2020; Caldwell and Millen 2009; Zwirner and Thornton 2015). A subjective selection framework also explains cultural inefficiencies (Singh 2022). First, it helps explain why effective practices are sometimes suboptimal. As long as people's evaluations include faulty cues—such as baseball managers looking to footspeed rather than to a player's ability to withstand bad pitches when judging their performance (Thaler and Sunstein 2004)—we should expect systematic inefficiencies in otherwise effective cultural traits. Second, a subjective selection framework explains why adaptive behaviors such as boiling water or handwashing (even with ash or water) often fail to emerge or spread. Despite these behaviors producing substantial benefits (Hoque and Briend 1991; Luby et al. 2011), their effects are noisy and time-lagged, making them difficult to evaluate and thus less likely to be retained. Finally, as illustrated with the example of shamanism, a subjective selection framework explains why some ineffective cultural practices spread. Specifically, cognitive biases can lead us to infer efficacy when there is none, maintaining practices that have no effect on their stated outcome, such as superstitions.

I focused on near-universals here, but subjective selection should also drive the development of variable cultural practices. There exist numerous contributors to cultural variety, including diverse ecological conditions (Diamond 1997; E. A. Smith and Coddling 2021), variable exposure to neighboring societies (Diamond and Bellwood 2003), and historical

contingency (such as the outsized impact of the Catholic Church in Europe: Henrich 2020). As a result of these and other factors, people in different environments will have different goals, different means of satisfying those goals, and different evaluation criteria for what constitutes a solution. Indeed, Arthur (2009) noted that technological innovation is self-reinforcing because of how new technologies breed new “human needs”: in seventeenth century Europe, for example, mining led to water seepage, creating a need for drainage and, in turn, a primitive version of the steam engine. Our goals engender both universality and variety in our cultural repertoires.

7.2. Subjective functionalism and the emic as etic

Analyses of culture in anthropology have long centered on the question of function. Traditions appear functional, and, although theorists have debated over what exactly their functions are, a common approach has been to view function in the context of objective benefits, usually at the group level. Whether we consider the structural-functionalism of scholars like Radcliffe-Brown and Durkheim (Pope 1975; Radcliffe-Brown 1935), the functionalism of ecological anthropologists and cultural materialists (Harris 1974; Orlove 1980; Ross et al. 1978; Vayda 1974), or the functionalism implied by cultural group selection (R. Boyd and Richerson 2010; D. S. Wilson 2002), diverse approaches convergently frame cultural traits as adaptations critical for the survival and reproduction of the social group.

The framework of subjective selection, in contrast, suggests what might be called “subjective functionalism.” The subjective function of many traditions is, as established, to be perceived as useful for achieving proximate goals. The subjective function of dance music is to incite dancing, that of shamanism is to appear to control uncertain outcomes, that of a spear is to kill, that of a hammer is to hammer nails, that of corporate groups is to mobilize cooperation, and that of cheesecake is to evoke gustatory pleasure.

Because of the emphasis here on goals and individual evaluation, an important difference between subjective functionalism and other forms of functionalism is the degree to which it treats the emic as a causal force behind the etic. In the behavioral sciences, an emic explanation of a behavior is produced by a cultural insider, while an etic account examines the behavior from outside the cultural context. Functional accounts have often entailed large disparities between the emic and the etic, reflecting a sense that people are unaware of the reasons various cultural traditions persist. Classic examples are witchcraft beliefs: Emically, people often cite them to

explain misfortune (e.g., Evans-Pritchard 1937), yet, in seeking to explain them, researchers have often turned to supposed group-level benefits, such as their alleged role in promoting cooperation (Faulkingham 1971; P. Leeson 2021; Schimmelpfennig and Muthukrishna 2021).

As with any behavior they engage in, of course, people may often be unaware of, or unwilling to share, the instrumental ends for which they are evaluating and maintaining cultural variants. Nevertheless, the framework presented here—perhaps to a greater extent than any other functional approach in the history of the study of culture—sees great value in people’s reported reasons for why they rely on a tradition or what its function is. Our traditions are mirrors of our deepest goals and the problems we confront in their pursuit. If we want to understand why people engage in some practice, a useful starting place is to ask them.

8. Summary

Since 1896, when Franz Boas proposed that the ubiquity of some traditions attests to universal laws of cultural development, the study of human behavior has undergone an efflorescence. Psychologists have probed the mechanics of the human mind. Anthropologists have traveled the world and systematically documented the richness and myriad manifestations of human culture. Evolutionary theorists have mapped the population-level processes shaping our and other species’ phenotypes. This paper attempts to synthesize these threads, proposing that the cultural manifold—the set of reliably developing, complex cultural practices—emerges not from blind cultural evolutionary processes but from subjective selection, wherein people build, evaluate, and retain cultural traits that appear to best serve their goals. This account is surely incomplete. But, like the traditions it seeks to explain, it is one iteration in a longer arc of refinement—fated to be judged, modified, and eventually replaced by something that seems to better achieve its stated aims.

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References

- Ach, N. (1935) *Analyse des willens*. Urban & Schwarzenberg.
- Acheson, J. M. (1988) *The lobster gangs of Maine*. University Press of New England.
- Achterberg, J. (1985) *Imagery in healing: Shamanism and modern medicine*. Shambhala.
- Alexander, R. D. (1979) *Darwinism and human affairs*. University of Washington Press.
- Allen, K. R., Smith, K. A., & Tenenbaum, J. B. (2020) Rapid trial-and-error learning with simulation supports flexible tool use and physical reasoning. *Proceedings of the National Academy of Sciences* 117:29302–29310. doi:10.1073/pnas.1912341117
- André, J.-B., Baumard, N., & Boyer, P. (2023) Cultural evolution from the producers' standpoint. *Evolutionary Human Sciences* 5:e25. doi:10.1017/ehs.2023.20
- Aoki, K. (2010) Evolution of the social-learner-explorer strategy in an environmentally heterogeneous two-island model. *Evolution* 64:2575–2586. doi:10.1111/j.1558-5646.2010.01017.x
- Arthur, W. B. (2009) *The nature of technology: What it is and how it evolves*. Allen Lane.
- Atkinson, Q. D., & Bourrat, P. (2011) Beliefs about God, the afterlife and morality support the role of supernatural policing in human cooperation. *Evolution and Human Behavior* 32:41–49. doi:10.1016/j.evolhumbehav.2010.07.008
- Atran, S. (1998) Folk biology and the anthropology of science: Cognitive universals and cultural particulars. *Behavioral and Brain Sciences* 21:547–609. doi:10.1017/S0140525X98001277
- Atran, S. (2002) *In gods we trust: The evolutionary landscape of religion*. Oxford University Press.
- Aubinet, S. (2024) Lullabies and Universality: An Ethnographic Review. *Cross-Cultural Research* 1–36. doi:10.1177/10693971241272406
- Austin, J. T., & Vancouver, J. B. (1996) Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin* 120:338–375. doi:10.1037/0033-2909.120.3.338
- Baillargeon, R., Scott, R. M., & Bian, L. (2016) Psychological reasoning in infancy. *Annual*

- Review of Psychology* 67:159–186. doi:10.1146/annurev-psych-010213-115033
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001) The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology* 81:1014–1027. doi:10.1037/0022-3514.81.6.1014
- Barrett, H. C. (2015) *The shape of thought: How mental adaptations evolve*. Oxford University Press.
- Baumard, N. (2010) Has punishment played a role in the evolution of cooperation? A critical review. *Mind and Society* 1–22. doi:10.1007/s11299-010-0079-9
- Baumard, N., André, J.-B., Nettle, D., Fitouchi, L., & Scott-Philipps, T. (n.d.) The gene's-eye view of culture. In: *Handbook of Evolutionary Psychology* . doi:10.4324/9780203763889
- Baumard, N., & Boyer, P. (2013) Explaining moral religions. *Trends in Cognitive Sciences* 17:272–280. doi:10.1016/j.tics.2013.04.003
- Beck, J., & Forstmeier, W. (2007) Superstition and belief as inevitable by-products of an adaptive learning strategy. *Human Nature* 18:35–46. doi:10.1007/BF02820845
- Befu, H., & Plotnicov, L. (1962) Types of corporate unilineal descent groups. *American Anthropologist* 64:313–327.
- Beierle, J., & Malone, M. J. (1997) Culture summary: Eastern Toraja. In: *eHRAF World Cultures Database* . Human Relations Area Files.
- Bell, K. (2005) The trouble with charisma: Religious ecstasy in Ch'öndogyo. *Asian Studies Review* 29:3–18. doi:10.1080/10357820500139471
- Bendixen, T., Apicella, C., Atkinson, Q., Cohen, E., Henrich, J., McNamara, R. A., et al. (2023) Appealing to the minds of gods: religious beliefs and appeals correspond to features of local social ecologies. *Religion, Brain and Behavior* . doi:10.1080/2153599X.2023.2178487
- Bendixen, T., Lightner, A. D., Apicella, C., Atkinson, Q., Bolyanatz, A., Cohen, E., et al. (2023) Gods are watching and so what? Moralistic supernatural punishment across 15 cultures. *Evolutionary Human Sciences* 5:e18. doi:10.1017/ehs.2023.15
- Bentzen, J. S., & Gokmen, G. (2023) *The power of religion Journal of Economic Growth* Vol. 28. Springer US. doi:10.1007/s10887-022-09214-4
- Berggren, N., & Bjørnskov, C. (2011) Is the importance of religion in daily life related to social trust? Cross-country and cross-state comparisons. *Journal of Economic Behavior and Organization* 80:459–480. doi:10.1016/j.jebo.2011.05.002

- Bering, J. M. (2006) The folk psychology of souls. *Behavioral and Brain sciences* 29:453–462; discussion 462–498. doi:10.1017/S0140525X06009101
- Berridge, K. C., & Kringelbach, M. L. (2015) Pleasure systems in the brain. *Neuron* 86:646–664. doi:10.1016/j.neuron.2015.02.018
- Bertolo, M., Snarskis, M., Kyritsis, T., Yurdum, L., Bainbridge, C. M., Atwood, S., et al. (2025) The Expanded Natural History of Song Discography, a global corpus of vocal music. *PsyArxiv Preprints*. https://osf.io/preprints/psyarxiv/d2ftg_v1
- Beyer, H. O., & Barton, R. F. (1911) An Ifugao burial ceremony. *Philippine Journal of Science* 6:227–252.
- Black, D. (2000) On the origin of morality. *Journal of Consciousness Studies* 7:107–119. <http://www.ingentaconnect.com.proxy.lib.umich.edu/content/imp/jcs/2000/00000007/F0020001/1142>
- Blackwell, A. D., & Purzycki, B. G. (2018) Shamanism and efficacious exceptionalism. *Behavioral and Brain Sciences* 41:e69.
- Bloom, P. (2007) Religion is natural. *Developmental Science* 10:147–151. doi:10.1111/j.1467-7687.2007.00577.x
- Bloom, P. (2010) *How pleasure works: The new science of why we like what we like*. W. W. Norton & Company.
- Boas, F. (1896) The limitations of the comparative method of anthropology. *Science* 4:901–908.
- Boas, F. (1928) *Primitive art*. Harvard University Press.
- Boehm, C. (1978) Rational Preselection from Hamadryas to Homo Sapiens: The Place of Decisions in Adaptive Process. *American Anthropologist* 80:265–296. [http://links.jstor.org/sici?sici=0002-7294\(197806\)2:80:2%3C265:RPFHTH%3E2.0.CO;2-W](http://links.jstor.org/sici?sici=0002-7294(197806)2:80:2%3C265:RPFHTH%3E2.0.CO;2-W)
- Boehm, C. (2008) A biocultural evolutionary exploration of supernatural sanctioning. In: *Evolution of religion: Studies, theories, and critiques* eds. J. Bulbulia, R. Sosis, E. Harris, R. Genet, C. Genet, & K. Wyman, pp. 143–152. Collins Foundation Press.
- Booker, C. (2004) *The seven basic plots: Why we tell stories*. Continuum.
- Botvinick, M. M. (2008) Hierarchical models of behavior and prefrontal function. *Trends in Cognitive Sciences* 12:201–208. doi:10.1016/j.tics.2008.02.009
- Botvinick, M. M. (2012) Hierarchical reinforcement learning and decision making. *Current*

Opinion in Neurobiology 22:956–962. doi:10.1016/j.conb.2012.05.008

- Boyd, B. (2009) *On the origin of stories: Evolution, cognition, and fiction*. Harvard University Press.
- Boyd, R. (2018) *A different kind of animal: How culture transformed our species*. Princeton University Press.
- Boyd, R., & Richerson, P. J. (1985) *Culture and the evolutionary process*. University of Chicago Press.
- Boyd, R., & Richerson, P. J. (2002) Group beneficial norms can spread rapidly in a structured population. *Journal of Theoretical Biology* 215:287–96. doi:10.1006/jtbi.2001.2515
- Boyd, R., & Richerson, P. J. (2009) Voting with your feet: Payoff biased migration and the evolution of group beneficial behavior. *Journal of Theoretical Biology* 257:331–9. doi:10.1016/j.jtbi.2008.12.007
- Boyd, R., & Richerson, P. J. (2010) Transmission coupling mechanisms: Cultural group selection. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences* 365:3787–95. doi:10.1098/rstb.2010.0046
- Boyer, P. (2001) *Religion explained: The evolutionary origins of religious thought*. Basic Books.
- Boyer, P. (2018) *Minds make societies: How cognition explains the world humans create*. Yale University Press.
- Boyer, P. (2020a) Why divination? Evolved psychology and strategic interaction in the production of truth. *Current Anthropology* 61:100–123. doi:10.1086/706879
- Boyer, P. (2020b) Informal religious activity outside hegemonic religions: Wild traditions and their relevance to evolutionary models. *Religion, Brain and Behavior* 10:459–472. doi:10.1080/2153599X.2019.1678518
- Brown, C. A., Qin, P., & Esmail, S. (2017) “Sleep? Maybe later...” A cross-campus survey of university students and sleep practices. *Education Sciences* 7:66. doi:10.3390/educsci7030066
- Burger, J. M., & Lynn, A. L. (2005) Superstitious behavior among American and Japanese professional baseball players. *Basic and Applied Social Psychology* 27:71–76. doi:10.1207/s15324834basp2701
- Cahill, J. A., Armstrong, J., Deran, A., Khoury, C. J., Paten, B., Haussler, D., & Jarvis, E. D. (2021) Positive selection in noncoding genomic regions of vocal learning birds is associated

- with genes implicated in vocal learning and speech functions in humans. *Genome Research* 31:2035–2049. doi:10.1101/gr.275989.121
- Caldwell, C. A., & Millen, A. E. (2009) Social learning mechanisms and cumulative cultural evolution: Is imitation necessary? *Psychological Science* 20:1478–1483. doi:10.1111/j.1467-9280.2009.02469.x
- Campbell, B. (2023) San trance dance: embodied experience and neurological mechanisms. *Religion, Brain and Behavior* 13:18–34. doi:10.1080/2153599X.2022.2118360
- Campbell, J. (1949) *The hero with a thousand faces*. Pantheon Books.
- Carroll, J. (2012) *Literary Darwinism: Evolution, human nature, and literature*. Routledge.
- Cavalli-Sforza, L. L., & Feldman, M. W. (1981) *Cultural transmission and evolution: A quantitative approach*. Princeton University Press.
- Chu, J., Tenenbaum, J. B., & Schulz, L. E. (2024) In praise of folly: flexible goals and human cognition. *Trends in Cognitive Sciences* 28:628–642. doi:10.1016/j.tics.2024.03.006
- Cimino, A. (2011) The evolution of hazing: Motivational mechanisms and the abuse of newcomers. *Journal of Cognition and Culture* 11:241–267. doi:10.1163/156853711X591242
- Cohen, S. (1972) *Folk devils and moral panics: The creation of the Mods and Rockers*. MacGibbon and Kee.
- Cohn, N. (1976) *Europe's inner demons*. Paladin.
- Cushman, F., & Morris, A. (2015) Habitual control of goal selection in humans. *Proceedings of the National Academy of Sciences* 112:13817–13822. doi:10.1073/pnas.1506367112
- Custers, R., & Aarts, H. (2010) The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science* 329:47–50. doi:10.1126/science.1188595
- De Martino, B., & Cortese, A. (2023) Goals, usefulness and abstraction in value-based choice. *Trends in Cognitive Sciences* 27:65–80. doi:10.1016/j.tics.2022.11.001
- Del Giudice, M. (2023) A general motivational architecture for human and animal personality. *Neuroscience and Biobehavioral Reviews* 144:104967. doi:10.1016/j.neubiorev.2022.104967
- Delatorre, P., León, C., Salguero, A., Palomo-Duarte, M., & Gervás, P. (2018) Confronting a paradox: A new perspective of the impact of uncertainty in suspense. *Frontiers in Psychology* 9:1–13. doi:10.3389/fpsyg.2018.01392

- Dere, M., Bonnefon, J.-F., Boyd, R., & Mesoudi, A. (2019) Causal understanding is not necessary for the improvement of culturally evolving technology. *Nature Human Behaviour* 3:446–452. doi:10.1038/s41562-019-0567-9
- Dere, M., & Boyd, R. (2016) Partial connectivity increases cultural accumulation within groups. *Proceedings of the National Academy of Sciences* 201518798. doi:10.1073/pnas.1518798113
- Dere, M., Perreault, C., & Boyd, R. (2018) Divide and conquer: Intermediate levels of population fragmentation maximize cultural accumulation. *Philosophical Transactions of the Royal Society B: Biological Sciences* 373. doi:10.1098/rstb.2017.0062
- Diamond, J. M. (1997) *Guns, germs, and steel: The fates of human societies*. W. W. Norton & Company.
- Diamond, J. M., & Bellwood, P. (2003) Farmers and their languages: The first expansions. *Science* 300:597–603. doi:10.1126/science.1078208
- Diuk, C., Tsai, K., Wallis, J., Botvinick, M. M., & Niv, Y. (2013) Hierarchical learning induces two simultaneous, but separable, prediction errors in human basal ganglia. *Journal of Neuroscience* 33:5797–5805. doi:10.1523/JNEUROSCI.5445-12.2013
- Dorsey, G. A., Murie, J. R., & Spoehr, A. (1940) Notes on Skidi Pawnee society. *Field Museum Press* 27:65–119.
- Dubourg, E., & Baumard, N. (2022) Why and How Did Narrative Fictions Evolve? Fictions as Entertainment Technologies. *Frontiers in Psychology* 13. doi:10.3389/fpsyg.2022.786770
- Dubourg, E., Chambon, V., & Baumard, N. (2025) Human motivation is organized hierarchically, from proximal (means) to ultimate (ends). *Behavioral and Brain Sciences* 48:e31.
- Dutton, D. (2009) *The art instinct: Beauty, pleasure, & human evolution*.
- Ellickson, R. C. (1989) A hypothesis of wealth-maximizing norms: Evidence from the whaling industry. *Journal of Law, Economics, & Organization* 5:83–97.
- Ellickson, R. C. (1993) Property in Land. *The Yale Law Journal* 102:1315–1400.
- Ellickson, R. C. (2006) Unpacking the household: Informal property rights around the hearth. *The Yale Law Journal* 116:226–328.
- Elsner, B. (2007) Infants' imitation of goal-directed actions: The role of movements and action effects. *Acta Psychologica* 124:44–59. doi:10.1016/j.actpsy.2006.09.006

- Enquist, M., Eriksson, K., & Ghirlanda, S. (2007) Critical Social Learning: A Solution to Rogers's Paradox of Nonadaptive Culture. *American Anthropologist* 109:727–734. doi:10.1525/aa.2007.109.4.727
- Evans-Pritchard, E. E. (1937) *Witchcraft, oracles, and magic among the Azande*. Clarendon Press.
- Everett, D. L. (2005) Cultural constraints on grammar and cognition in Pirahã: Another look at the design features of human language. *Current Anthropology* 46:621–646. doi:" "
- Faulkingham, R. H. (1971) *Political support in a Hausa village*. Michigan State University.
- Fine, G. A., & White, R. D. (2002) Creating collective attention in the public domain: Human interest narratives and the rescue of Floyd Collins. *Social Forces* 81:57–85. doi:DOI 10.1353/sof.2002.0046
- Fishbach, A., & Ferguson, M. J. (2007) The Goal Construct in Social Psychology. *Social Psychology: Handbook of Basic Principles* 29:792–797.
- Fitouchi, L., & Singh, M. (2022) Supernatural punishment beliefs as cognitively compelling tools of social control. *Current Opinion in Psychology* 44:252–257. doi:10.1016/j.copsyc.2021.09.022
- Fitouchi, L., & Singh, M. (2023) Punitive justice serves to restore reciprocal cooperation in three small-scale societies. *Evolution and Human Behavior* 44:502–514. doi:10.1016/j.evolhumbehav.2023.03.001
- Fitouchi, L., Singh, M., Andé, J.-B., & Baumard, N. (2025) Prosocial religions as folk-technologies of mutual policing. *Psychological Review* . <https://osf.io/preprints/psyarxiv/qdhka>
- Foster Vander Elst, O., Vuust, P., & Kringelbach, M. L. (2021) Sweet anticipation and positive emotions in music, groove, and dance. *Current Opinion in Behavioral Sciences* 39:79–84. doi:10.1016/j.cobeha.2021.02.016
- Fox, E. T. (2013) *“Piratical schemes and contracts”: Pirate articles and their society, 1660-1730*. University of Exeter.
- Fox, R. (1971) The cultural animal. In: *Man and beast: Comparative social behavior* eds. J. F. Eisenberg & W. S. Dillon, pp. 273–296.
- Gerrig, R. J. (1989) Suspense in the absence of uncertainty. *Journal of Memory and Language* 28:633–648.

- Gershman, S. J. (2015) Reinforcement learning and causal models. In: *Oxford Handbook of Causal Reasoning* ed. M. Waldmann, pp. 295–306. Oxford University Press.
- Gervais, W. M., Ross, R. M., McKay, R. T., Brown-iannuzzi, J. L., Pennycook, G., & Lanman, J. A. (2024) Belief in belief: Even atheists in secular countries show intuitive preferences favoring religious belief. *PsyArxiv* 1–19. doi:<https://doi.org/10.31234/osf.io/nv2ge>
- Gervais, W. M., Xygalatas, D., McKay, R. T., Van Elk, M., Buchtel, E. E., Aveyard, M., et al. (2017) Global evidence of extreme intuitive moral prejudice against atheists. *Nature Human Behaviour* 1:1–6. doi:10.1038/s41562-017-0151
- Giles, D. C. . (2010) Parasocial relationships. *Characters in fictional worlds: understanding imaginary beings in literature, film, and other media* 442–457. doi:10.1515/9783110232424.4.442
- Gintis, H. (2007) The evolution of private property. *Journal of Economic Behavior and Organization* 64:1–16. doi:10.1016/j.jebo.2006.02.002
- Glowacki, L. (2020) The emergence of locally adaptive institutions: Insights from traditional social structures of East African pastoralists. *BioSystems* 198:104257. doi:10.1016/j.biosystems.2020.104257
- Glowacki, L. (2024) The evolution of peace. *Behavioral and Brain Sciences* 47:e1. doi:10.1017/S0140525X22002862
- Goode, E., & Ben-Yehuda, N. (1994) *Moral panics: The social construction of deviance* 1st ed. Blackwell.
- Goodman, P. (2008) “It’s just Black, White, or Hispanic”: An observational study of racializing moves in California’s segregated prison reception centers. *Law and Society Review* 42:735–770. doi:10.1111/j.1540-5893.2008.00357.x
- Gottschall, J. (2005) The heroine with a thousand faces: Universal trends in the characterization of female folk tale protagonists. *Evolutionary Psychology* 3:147470490500300. doi:10.1177/147470490500300108
- Guthrie, S. E. (1995) *Faces in the clouds: A new theory of religion*. Oxford University Press.
- Hagen, E. H., & Bryant, G. A. (2003) Music and dance as a coalition signaling system. *Human Nature* 14:21–51. doi:10.1007/s12110-003-1015-z
- Harris, M. (1974) *Cows, pigs, wars, and wtiches: The riddles of culture*. Random House.
- Hayden, B., & Cannon, A. (1982) The corporate group as an archaeological unit. *Journal of*

- Anthropological Archaeology* 1:132–158. doi:10.1016/0278-4165(82)90018-6
- Heath, C., Larrick, R. P., & Wu, G. (1999) Goals as Reference Points. *Cognitive Psychology* 38:79–109. doi:10.1006/cogp.1998.0708
- Henrich, J. (2004a) Cultural group selection, coevolutionary processes and large-scale cooperation. *Journal of Economic Behavior & Organization* 53:3–35. doi:10.1016/S0167-2681(03)00094-5
- Henrich, J. (2004b) Demography and cultural evolution: How adaptive cultural processes can produce maladaptive losses - the Tasmania case. *American Antiquity* 69:197–214.
- Henrich, J. (2016) *The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter*. Princeton University Press.
- Henrich, J. (2020) *The WEIRDest people in the world: How the West became psychologically peculiar and particularly prosperous*. Farrar, Straus and Giroux.
- Heyes, C. (2012) What's social about social learning? *Journal of Comparative Psychology* 126:193–202. doi:10.1037/a0025180
- Heying, H., & Weinstein, B. (2021) *A hunter-gatherer's guide to the 21st century: Evolution and the challenges of modern life*. Penguin.
- Hilton, C. B., Moser, C. J., Bertolo, M., Lee-Rubin, H., Amir, D., Bainbridge, C. M., et al. (2022) Acoustic regularities in infant-directed speech and song across cultures. *Nature Human Behaviour* 6:1545–1556. doi:10.1038/s41562-022-01410-x
- Hilton, C. B., Thierry, L. C., Yan, R., Martin, A., & Mehr, S. (2022) Children infer the behavioral contexts of unfamiliar foreign songs. In: *Journal of Experimental Psychology: General*.
- Hoebel, E. A. (1954) *The law of primitive man: A study in comparative legal dynamics*. Harvard University Press.
- Hoffner, C., & Cantor, J. (1991) Perceiving and responding to mass media characters. In: *Responding to the screen: Reception and reaction processes* pp. 63–101. Lawrence Erlbaum Associates.
- Hofmann, W., & Van Dillen, L. (2012) Desire: The New Hot Spot in Self-Control Research. *Current Directions in Psychological Science* 21:317–322. doi:10.1177/0963721412453587
- Hogan, P. C. (2003) *The mind and its stories: Narrative universals and human emotion*. Cambridge University Press.

- Hogan, P. C. (2011) *Affective narratology: The emotional structure of stories*. University of Nebraska Press.
- Holmberg, A. R. (1969) *Nomads of the long bow: The Siriono of eastern Brazil*. The Natural History Press.
- Hong, Z. (2022a) Ghosts, divination, and magic among the Nuosu: An ethnographic examination from cognitive and cultural evolutionary perspectives. *Human Nature* 33:349–379. doi:10.1007/s12110-022-09438-8
- Hong, Z. (2022b) A cognitive account of manipulative sympathetic magic. *Religion, Brain and Behavior* 1–17. doi:10.1080/2153599X.2021.2006294
- Hong, Z., & Henrich, J. (2021) The cultural evolution of epistemic practices: The case of divination. *Human Nature* 32:622–651. doi:10.1007/s12110-021-09408-6
- Hong, Z., & Henrich, J. (2024) Instrumentality, empiricism, and rationality in Nuosu divination. *Religion, Brain and Behavior* . doi:10.1080/2153599X.2024.2363761
- Hong, Z., Slingerland, E., & Henrich, J. (2024) Magic and empiricism in early Chinese rainmaking: A cultural evolutionary analysis. *Current Anthropology* 65:343–363. doi:10.1086/729118
- Hong, Z., & Zinin, S. (2023) The psychology and social dynamics of fetal sex prognostication in China: Evidence from historical data. *American Anthropologist* 125:519–531. doi:10.1111/aman.13848
- Hoque, B. A., & Briend, A. (1991) A comparison of local handwashing agents in Bangladesh. *The Journal of tropical medicine and hygiene* 94:61–64.
- Horton, R. (1967) African traditional thought and western science. Part I: From tradition to science. *Africa* 37:155–187.
- Houtman, D., & Aupers, S. (2007) The spiritual turn and the decline of tradition: The spread of post-Christian spirituality in 14 Western countries, 1981-2000. *Journal for the Scientific Study of Religion* 46:305–320.
- Houtman, D., & Mascini, P. (2002) Why Do Churches Become Empty, While New Age Grows? Secularization and Religious Change in the Netherlands. *Journal for the Scientific Study of Religion* 41:455–473. doi:10.1111/1468-5906.00130
- Hultkrantz, Å. (1993) Introductory remarks on the study of shamanism. *Shaman* .

- Hutton, R. (2017) *The witch: A history of fear, from ancient times to the present*. Yale University Press.
- Iran-Nejad, A. (1987) Cognitive and affective causes of interest and liking. *Journal of Educational Psychology* 79:120–130. doi:10.1037/0022-0663.79.2.120
- Jackson, J. C., Caluori, N., Abrams, S., Beckman, E., Gelfand, M., & Gray, K. (2021) Supplemental Material for Tight Cultures and Vengeful Gods: How Culture Shapes Religious Belief. *Journal of Experimental Psychology: General* 150:2057–2077. doi:10.1037/xge0001033.supp
- Jacquet, P. O., Pazhoohi, F., Findling, C., Mell, H., Chevallier, C., & Baumard, N. (2021) Predictive modeling of religiosity, prosociality, and moralizing in 295,000 individuals from European and non-European populations. *Humanities and Social Sciences Communications* 8:1–12. doi:10.1057/s41599-020-00691-9
- James, W. (1890) *Principles of psychology*. Holt.
- Jobling, I. (2001) The psychological foundations of the hero-ogre story. *Human Nature* 12:246–272.
- Johnson, D. D. P., & Bering, J. (2006) Hand of God, mind of man: Punishment and cognition in the evolution of cooperation. *Evolutionary Psychology* 219–233. <http://www.qub.ie/schools/InstituteofCognitionCulture/FileUploadPage/Fileupload,90239,en.pdf>. Accessed 22 January 2013
- Johnson, D. D. P., 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* 28:474–481. doi:10.1016/j.tree.2013.05.014
- Johnson, D. D. P., & Krüger, O. (2004) The good of wrath: supernatural punishment and the evolution of cooperation. *Political Theology* 5:159–176.
- Jose, P. E. (1988) Liking of plan-based stories: The role of goal importance and goal attainment difficulty. *Discourse Processes* 11:261–273. doi:10.1080/01638538809544703
- Katz, R. (1982) Accepting “boiling energy”: The experience of !kia-healing among the !Kung. *Ethos* 10:344–368.
- Kavanagh, C., Jong, J., & Whitehouse, H. (2020) Ritual and Religion as Social Technologies of Cooperation. In: *Culture, Mind, and Brain: Emerging Concepts, Models, and Applications* eds. L. J. Kirmayer, C. M. Worthman, S. Kitayama, R. Lemelson, & C. Cummings, pp. 325–361. Cambridge University Press.

- Kendall, L. (1985) *Shamans, housewives, and other restless spirits: Women in Korean ritual life*. University of Hawaii Press.
- Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010) Renovating the pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science* 5:292–314. doi:10.1177/1745691610369469
- Keramati, M., Smittenaar, P., Dolan, R. J., & Dayan, P. (2016) Adaptive integration of habits into depth-limited planning defines a habitual-goal-directed spectrum. *Proceedings of the National Academy of Sciences of the United States of America* 113:12868–12873. doi:10.1073/pnas.1609094113
- Kimball, M. A. (1999) From folktales to fiction: Orphan characters in children's literature. *Library Trends* 47:558–578.
- Kimbrough, E. O., Smith, V. L., & Wilson, B. J. (2010) Exchange, theft, and the social formation of property. *Journal of Economic Behavior and Organization* 74:206–229. doi:10.1016/j.jebo.2010.03.017
- Klimmt, C., Hartmann, T., & Schramm, H. (2006) Parasocial interactions and relationships. In: *Psychology of Entertainment* eds. J. Bryant & P. Vorderer, . Routledge.
- Komiya, A., Ohtsubo, Y., Oishi, S., & Mifune, N. (2018) Providing compensation promotes forgiveness for replaceable, but not irreplaceable, losses. *Journal of Social Psychology* 158:680–693. doi:10.1080/00224545.2017.1395792
- Kool, W., Cushman, F. A., & Gershman, S. J. (2018) *Competition and cooperation between multiple reinforcement learning systems Goal-Directed Decision Making: Computations and Neural Circuits* . doi:10.1016/B978-0-12-812098-9.00007-3
- Krasnow, M. M., & Delton, A. W. (2016) The sketch is blank: No evidence for an explanatory role for cultural group selection. *Behavioral and Brain Sciences* 39:e43.
- Kringelbach, M. L., & Berridge, K. C. (2009) Towards a functional neuroanatomy of pleasure and happiness. *Trends in Cognitive Sciences* 13:479–487. doi:10.1016/j.tics.2009.08.006
- Kruglanski, A. W. (1996) Goals as knowledge structures. In: *Linking cognition and motivation to behavior* eds. P. M. Gollwitzer & J. A. Bargh, pp. 599–618. Guilford Press.
- Leeson, P. T. (2007) An-arrgh-chy: the law and economics of pirate organization. *Journal of Political Economy* 115:1049–1094. doi:10.1086/526403

- Leeson, P. T. (2014) Oracles. *Rationality and Society* 26:141–169. doi:10.1177/1043463113512997
- Leeson, P. T. (2021) Harmful magic, helpful governance. *Current Anthropology* 62:17–18.
- Lévi-Strauss, C. (1955) The structural study of myth. *The Journal of American Folklore* 68:428–455. <http://www.jstor.org/stable/10.2307/536768>. Accessed 18 October 2013
- Lewin, K. (1951) Intention, will and need. In: *Organization and pathology of thought: Selected sources* ed. D. Rapaport, . Columbia University Press.
- Lewis, I. M. (1961) *A pastoral democracy: A study of pastoralism and politics among the northern Somali of the Horn of Africa*. Oxford University Press.
- Lightner, A. D., Bendixen, T., & Purzycki, B. G. (2023) Moralistic supernatural punishment is probably not associated with social complexity. *Evolution and Human Behavior* 44:555–565. doi:10.1016/j.evolhumbehav.2022.10.006
- Locke, E. A., & Latham, G. P. (1990) *A theory of goal setting and task performance*. Prentice-Hall.
- Luby, S. P., Halder, A. K., Huda, T., Unicomb, L., & Johnston, R. B. (2011) The effect of handwashing at recommended times with water alone and with soap on child diarrhea in rural Bangladesh: An observational study. *PLoS Medicine* 8. doi:10.1371/journal.pmed.1001052
- Malinowski, B. (1948) *Myth in primitive psychology Magic, science and religion and other essays* . Free Press. doi:10.1136/bmj.e7786
- Malinowski, B. (1960) *A scientific theory of culture and other essays*. Oxford University Press.
- Mattix, A. A. (2012) *The orphan among us: An examination of orphans in Newbery Award winning literature*. University of Pittsburgh. Retrieved from http://www.dt.co.kr/contents.html?article_no=2012071302010531749001
- McClenon, J. (2001) *Wondrous healing: Shamanism, human evolution, and origin of religion*. Northern Illinois University Press.
- McCullough, M. E., Kurzban, R., & Tabak, B. A. (2013) Cognitive systems for revenge and forgiveness. *Behavioral and Brain Sciences* 1–58. doi:10.1017/S0140525X11002160
- McDowell, A. G. (2004) Real property, spontaneous order, and norms in the Gold Mines. *Law & Social Inquiry* 29:771–818. <http://onlinelibrary.wiley.com/doi/10.1111/j.1747-4469.2004.tb01076.x/abstract>. Accessed 13 December 2014

- Meeks, L. (2011) The disappearing medium: Reassessing the place of miko in the religious landscape of premodern Japan. *History of Religions* 59:208–260.
- Mehr, S. A., & Krasnow, M. M. (2017) Parent-offspring conflict and the evolution of infant-directed song. *Evolution and Human Behavior* 38:674–684. doi:10.1016/j.evolhumbehav.2016.12.005
- Mehr, S. A., Krasnow, M. M., Bryant, G. A., & Hagen, E. H. (2021) Origins of music in credible signaling. *Behavioral and Brain Sciences* 44.
- Mehr, S. A., Singh, M., Knox, D., Ketter, D. M., Pickens-Jones, D., Atwood, S., et al. (2019) Universality and diversity in human song. *Science* 366:eaax0868. doi:10.1126/science.aax0868
- Mehr, S. A., Singh, M., York, H., Glowacki, L., & Krasnow, M. M. (2018) Form and function in human song. *Current Biology* 28:356–368. doi:10.1016/j.cub.2017.12.042
- Mercier, H., & Boyer, P. (2020) Truth-making institutions: From divination, ordeals and oaths to judicial torture and rules of evidence. *Evolution and Human Behavior* . doi:10.1016/j.evolhumbehav.2020.11.004
- Merriam, A. P. (1964) *The anthropology of music*. Northwestern University Press.
- Miton, H., & Charbonneau, M. (2018) Cumulative culture in the laboratory: Methodological and theoretical challenges. *Proceedings of the Royal Society B* 285:20180677.
- Miton, H., Claidière, N., & Mercier, H. (2015) Universal cognitive mechanisms explain the cultural success of bloodletting. *Evolution and Human Behavior* 36:303–312. doi:10.1016/j.evolhumbehav.2015.01.003
- Miton, H., Wolf, T., Vesper, C., Knoblich, G., & Sperber, D. (2020) Motor constraints influence cultural evolution of rhythm. *Proceedings of the Royal Society B: Biological Sciences* 287. doi:10.1098/rspb.2020.2001rspb20202001
- Mogan, R., Fischer, R., & Bulbulia, J. A. (2017) To be in synchrony or not? A meta-analysis of synchrony's effects on behavior, perception, cognition and affect. *Journal of Experimental Social Psychology* 72:13–20.
- Molho, C., Peña, J., Singh, M., & Derex, M. (2024) Do institutions evolve like material technologies? *PsyArxiv* . doi:https://doi.org/10.31234/osf.io/3uy7b
- Molinaro, G., & Collins, A. G. E. (2023) A goal-centric outlook on learning. *Trends in Cognitive Sciences* 27:1150–1164. doi:10.1016/j.tics.2023.08.011

- Mondal, M., Casals, F., Xu, T., Dall’Olio, G. M., Pybus, M., Netea, M. G., et al. (2016) Genomic analysis of Andamanese provides insights into ancient human migration into Asia and adaptation. *Nature Genetics* 48:1066–1070. doi:10.1038/ng.3621
- Moon, J. W. (2021) Why are world religions so concerned with sexual behavior? *Current Opinion in Psychology* 40:15–19. doi:10.1016/j.copsyc.2020.07.030
- Morin, C. M., LeBlanc, M., Daley, M., Gregoire, J. P., & Mérette, C. (2006) Epidemiology of insomnia: Prevalence, self-help treatments, consultations, and determinants of help-seeking behaviors. *Sleep Medicine* 7:123–130. doi:10.1016/j.sleep.2005.08.008
- Morin, O. (2013) How portraits turned their eyes upon us: Visual preferences and demographic change in cultural evolution. *Evolution and Human Behavior* 34:222–229. doi:10.1016/j.evolhumbehav.2013.01.004
- Morin, O. (2016) *How traditions live and die*. Oxford University Press.
- Morrill, R. (2013) *The Mexican Mafia, the story*.
- Murdock, G. P., & Wilson, S. F. (1972) Settlement patterns and community organization: Cross-cultural codes 3. *Ethnology* 11:254–295.
- Muthukrishna, M., & Henrich, J. (2016) Innovation in the Collective Brain. *Philosophical Transactions of the Royal Society B: Biological Sciences* .
- Nesse, R. M. (2019) The smoke detector principle: Signal detection and optimal defense regulation. *Evolution, Medicine and Public Health* 2019:1. doi:10.1093/emph/eoy034
- Niarchou, M., Gustavson, D. E., Sathirapongsasuti, J. F., Anglada-Tort, M., Eising, E., Bell, E., et al. (2022) Genome-wide association study of musical beat synchronization demonstrates high polygenicity. *Nature Human Behaviour* . doi:10.1038/s41562-022-01359-x
- Norenzayan, A. (2013) *Big gods: How religion transformed cooperation and conflict*. Princeton University Press.
- Norenzayan, A., & Shariff, A. F. (2008) The origin and evolution of religious prosociality. *Science* 322:58–62. doi:10.1126/science.1158757
- Norenzayan, A., Shariff, A. F., Gervais, W. M., Willard, A. K., McNamara, R. A., Slingerland, E., & Henrich, J. (2016) The cultural evolution of prosocial religions. *Behavioral and Brain Sciences* 39:e1. doi:10.1017/S0140525X14001356

- Ohtsubo, Y., & Watanabe, E. (2009) Do sincere apologies need to be costly? Test of a costly signaling model of apology. *Evolution and Human Behavior* 30:114–123. doi:10.1016/j.evolhumbehav.2008.09.004
- Olsson, A., Knapska, E., & Lindström, B. (2020) The neural and computational systems of social learning. *Nature Reviews Neuroscience* 21:197–212. doi:10.1038/s41583-020-0276-4
- Orlove, B. (1980) Ecological anthropology. *Annual Review of Anthropology* 9:235–273. <http://www.jstor.org/stable/10.2307/2155736>. Accessed 28 January 2014
- Ostrom, E. (1990) *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
- Patel, A. D. (2021) Vocal learning as a preadaptation for the evolution of human beat perception and synchronization. *Philosophical Transactions of the Royal Society B: Biological Sciences* 376. doi:10.1098/rstb.2020.0326
- Patel, A. D., Iversen, J. R., Bregman, M. R., & Schulz, I. (2009) Experimental evidence for synchronization to a musical beat in a nonhuman animal. *Current Biology* 19:827–830. doi:10.1016/j.cub.2009.03.038
- Peoples, H. C., Duda, P., & Marlowe, F. W. (2016) Hunter-gatherers and the origins of religion. *Human Nature* 27:261–282. doi:10.1007/s12110-016-9260-0
- Pilling, A. R. (1958) *Law and feud in an aboriginal society of north Australia*. University of California, Berkeley.
- Pinker, S. (1997) *How the mind works*. W. W. Norton & Company.
- Pope, W. (1975) Durkheim as a functionalist. *Sociological Quarterly* 16:361–379. doi:10.1111/j.1533-8525.1975.tb00954.x
- Pulliam, H. R., & Dunford, C. (1980) *Programmed to learn: An essay on the evolution of culture*. Columbia University Press.
- Purzycki, B. G. (2016) The evolution of gods' minds in the Tyva Republic. *Current Anthropology* 57:S000–S000. doi:10.1086/685729
- Purzycki, B. G., Bendixen, T., & Lightner, A. D. (2023) Coding, causality, and statistical craft: the emergence and evolutionary drivers of moralistic supernatural punishment remain unresolved. *Religion, Brain and Behavior* 13:207–214. doi:10.1080/2153599X.2022.2065349

- Purzycki, B. G., Willard, A. K., Klocová, E. K., Apicella, C., Atkinson, Q., Bolyanatz, A., et al. (2022) The moralization bias of gods' minds: a cross-cultural test. *Religion, Brain and Behavior* 12:38–60. doi:10.1080/2153599X.2021.2006291
- Putnam, P. (1948) The Pygmies of the Ituri Forest. In: *A reader in general anthropology* ed. Carleton S. Coon, pp. 322–342. Henry Holt and Company.
- Pyysiäinen, I., & Hauser, M. (2010) The origins of religion: evolved adaptation or by-product? *Trends in Cognitive Sciences* 14:104–109. doi:10.1016/j.tics.2009.12.007
- Radcliffe-Brown, A. R. (1922) *The Andaman islanders: A study in social anthropology*. Cambridge University Press.
- Radcliffe-Brown, A. R. (1935) On the concept of function in social science. *American Anthropologist* 37:394–402.
- Raglan, F. R. S. (1936) *The hero: A study in tradition, myth, and drama*. Watts & Co.
- Rank, O. (1914) *The myth of the birth of the hero: A psychological interpretation of mythology*. The Journal of Nervous and Mental Disease Publishing Company.
- Ravignani, A., Delgado, T., & Kirby, S. (2017) Musical evolution in the lab exhibits rhythmic universals. *Nature Human Behaviour* 1:1–7. doi:10.1038/s41562-016-0007
- Ribas-Fernandes, J. J. F., Solway, A., Diuk, C., McGuire, J. T., Barto, A. G., Niv, Y., & Botvinick, M. M. (2011) A neural signature of hierarchical reinforcement learning. *Neuron* 71:370–379. doi:10.1016/j.neuron.2011.05.042
- Richerson, P. J. (2017) Recent critiques of dual inheritance theory. *Evolutionary Studies in Imaginative Culture* 1:203–212.
- Richerson, P. J., & Boyd, R. (2008) *Not by genes alone: How culture transformed human evolution*. University of Chicago Press.
- Roes, F., & Raymond, M. (2003) Belief in moralizing gods. *Evolution and Human Behavior* 24:126–135. doi:10.1007/s12110-014-9214-3
- Rogers, E. (2003) *The diffusion of innovations*. The Free Press.
- Ross, E. B., Arnott, M. L., Basso, E. B., Beckerman, S., Robert, L., Forbis, R. G., et al. (1978) Food taboos, diet, and hunting strategy: the adaptation to animals in Amazon cultural ecology [and comments and reply]. *Current Anthropology* 19:1–36.
- Rouse, A. A., Patel, A. D., & Kao, M. H. (2021) Vocal learning and flexible rhythm pattern perception are linked: Evidence from songbirds. *Proceedings of the National Academy of Sciences*

Sciences of the United States of America 118. doi:10.1073/pnas.2026130118

- Savage, P. E., Brown, S., Sakai, E., & Currie, T. E. (2015) Statistical universals reveal the structures and functions of human music. *Proceedings of the National Academy of Sciences* 112:8987–8992. doi:10.1073/pnas.1414495112
- Savage, P. E., Loui, P., Tarr, B., Schachner, A., Glowacki, L., Mithen, S., & Fitch, W. T. (2021) Music as a coevolved system for social bonding. *Behavioral and Brain Sciences* 44. doi:10.1017/S0140525X20000333
- Scarratt, R. J., Heggli, O. A., Vuust, P., & Jespersen, K. V. (2023) The audio features of sleep music: Universal and subgroup characteristics. *PLoS ONE* 18:e0278813.
- Scarratt, R. J., Heggli, O. A., Vuust, P., & Sadakata, M. (2023) Music that is used while studying and music that is used for sleep share similar musical features, genres and subgroups. *Scientific Reports* 13:4735.
- Schachner, A., Brady, T. F., Pepperberg, I. M., & Hauser, M. D. (2009) Spontaneous motor entrainment to music in multiple vocal mimicking species. *Current Biology* 19:831–836. doi:10.1016/j.cub.2009.03.061
- Schaller, M., Kenrick, D. T., Neel, R., & Neuberg, S. L. (2017) Evolution and human motivation: A fundamental motives framework. *Social and Personality Psychology Compass* 11:e12319.
- Scheub, H. (1975) *The Xhosa ntsomi*. Clarendon Press.
- Scheub, H. (2007) *Trickster and hero: Two characters in the oral and written traditions of the world*. The University of Wisconsin Press.
- Schimmelpfennig, R., & Muthukrishna, M. (2021) What ultimately predicts witchcraft and its variation around the world? *Current Anthropology* 62:20–22.
- Schultz, W., Dayan, P., & Montague, P. R. (1997) A neural substrate of prediction and reward. *Science* 275:1593–1599. doi:10.1126/science.275.5306.1593
- Scott-Phillips, T., Blanke, S., & Heinz, C. (2018) Four misunderstandings about cultural attraction. *Evolutionary Anthropology* 27:162–173. doi:10.1002/evan.21716
- Singh, M. (2018) The cultural evolution of shamanism. *Behavioral and Brain Sciences* 41:e66. doi:10.1017/S0140525X17001893
- Singh, M. (2021a) Magic, explanations, and evil: The origins and design of witches and sorcerers. *Current Anthropology* 62:2–29.

- Singh, M. (2021b) The sympathetic plot, its psychological origins, and implications for the evolution of fiction. *Emotion Review* 13:183–198. doi:10.1177/17540739211022824
- Singh, M. (2022) Subjective selection and the evolution of complex culture. *Evolutionary Anthropology* 31:266–280. doi:10.31234/osf.io/4t2ud
- Singh, M. (2025) *Shamanism: The timeless religion*. Knopf.
- Singh, M., & Garfield, Z. H. (2022) Evidence of third-party mediation but not punishment in Mentawai justice. *Nature Human Behaviour* 6:930–940.
- Singh, M., & Glowacki, L. (2022) Human social organization during the Late Pleistocene: Beyond the nomadic-egalitarian model. *Evolution and Human Behavior* 43:418–431. doi:10.1016/j.evolhumbehav.2022.07.003
- Singh, M., & Henrich, J. (2020) Why do religious leaders observe costly prohibitions? Examining taboos on Mentawai shamans. *Evolutionary Human Sciences* 2:e32. doi:10.1017/ehs.2020.32
- Singh, M., & Hill, K. (2025) Loss of dance and infant-directed song among the Northern Aché. *Current Biology*.
- Singh, M., Kaptchuk, T. J., & Henrich, J. (2021) Small gods, rituals, and cooperation: The Mentawai water spirit Sikameinan. *Evolution and Human Behavior* 42:61–72. doi:10.1016/j.evolhumbehav.2020.07.008
- Singh, M., & Mehr, S. (2023) Universality, domain-specificity, and development of psychological responses to music. *Nature Reviews Psychology* 2:333–346.
- Singh, M., Wrangham, R. W., & Glowacki, L. (2017) Self-interest and the design of rules. *Human Nature* 28:457–480. doi:10.1007/s12110-017-9298-7
- Skarbek, D. (2014) *The social order of the underworld: How prison gangs govern the American penal system*. Oxford University Press. doi:10.1017/CBO9781107415324.004
- Smith, D., Schlaepfer, P., Major, K., Dyble, M., Page, A. E., Thompson, J., et al. (2017) Cooperation and the evolution of hunter-gatherer storytelling. *Nature Communications* 8. doi:10.1038/s41467-017-02036-8
- Smith, E. A., & Coddig, B. F. (2021) Ecological variation and institutionalized inequality in hunter-gatherer societies. *Proceedings of the National Academy of Sciences of the United States of America* 118:e2016134118. doi:10.1073/pnas.2016134118

- Soltis, J., Boyd, R., & Richerson, P. J. (1995) Can group-functional behaviors evolve by cultural group selection? An empirical test. *Current Anthropology* 36:473–494. <http://www.jstor.org/stable/10.2307/2744054>. Accessed 9 September 2013
- Sperber, D. (1996) *Explaining culture: A naturalistic approach*. Blackwell Publishers Ltd.
- Sperber, D. (2006) Why a deep understanding of cultural evolution is incompatible with shallow psychology. In: *Roots of Human Sociality: Culture, Cognition and Interaction* eds. N. Enfield & S. Levinson, pp. 431–450. doi:10.4324/9781003135517-21
- Sperber, D. (2012) Cultural attractors. In: *This will make you smarter* ed. J. Brockman, . Harper.
- Sperber, D., & Hirschfeld, L. A. (2004) The cognitive foundations of cultural stability and diversity. *Trends in Cognitive Sciences* 8:40–46. doi:10.1016/j.tics.2003.11.002
- Stépanoff, C. (2021) Shamanic ritual and ancient circumpolar migrations: The spread of the dark tent tradition through North Asia and North America. *Current Anthropology* 62:239–246. doi:10.1086/713536
- Sterelny, K. (2017) Cultural evolution in California and Paris. *Studies in History and Philosophy of Biological and Biomedical Sciences* 62:42–50. doi:10.1016/j.shpsc.2016.12.005
- Strassmann, B. I. (1992) The function of menstrual taboos among the Dogon: defense against cuckoldry. *Human Nature* 3:89–131.
- Strassmann, B. I., Kurapati, N. T., Hug, B. F., Burke, E. E., Gillespie, B. W., Karafet, T. M., & Hammer, M. F. (2012) Religion as a means to assure paternity. *Proceedings of the National Academy of Sciences of the United States of America* 109:9781–5. doi:10.1073/pnas.1110442109
- Strathern, A., & Stewart, P. J. (2012) *Peace-making and the imagination: Papua New Guinea perspectives*. University of Queensland Press.
- Stroebe, W. (2022) The goal conflict model: a theory of the hedonic regulation of eating behavior. *Current Opinion in Behavioral Sciences* 48:101203. doi:10.1016/j.cobeha.2022.101203
- Sutton, R. S., & Barto, A. G. (1998) *Reinforcement learning: An introduction*. Bradford Books.
- Sznycer, D., & Patrick, C. (2020) The origins of criminal law. *Nature Human Behaviour* . doi:10.1038/s41562-020-0827-8
- Sznycer, D., Sell, A., & Williams, K. E. G. (2021) Justice-making institutions and the ancestral logic of conflict. *PsyArxiv Preprints* . <https://psyarxiv.com/dx3yv>

- Tamir, C., Connaughton, A., & Salazar, A. M. (2020) *The global God divide* Pew Research Center . <https://www.pewresearch.org/global/2020/07/20/the-global-god-divide/> (consultado: 27 de noviembre, 2020)
- Tarr, B., Launay, J., & Dunbar, R. I. M. (2014) Music and social bonding: “self-other” merging and neurohormonal mechanisms. *Frontiers in Psychology* 5:1–10. doi:10.3389/fpsyg.2014.01096
- Thaler, R., & Sunstein, C. (2004) Market efficiency and rationality: The peculiar case of baseball. *Michigan Law Review* 102:1390–1403. doi:10.2307/4141950
- Thomas, K. A., DeScioli, P., Haque, O. S., & Pinker, S. (2014) The psychology of coordination and common knowledge. *Journal of Personality and Social Psychology* 107:657–676. doi:10.1037/a0037037
- Thompson, S. (1946) *The folktale*. The Dryden Press. <https://catalog.hathitrust.org/Record/001276234>
- Thouzeau, V. (2023) Identification in Fiction as a Pseudo-Learning Device. In: *Fictional ingredients and recipes: From evolution to cognitive to fiction* .
- Tibble, L., & Carvalho, S. (2018) Rethinking the evolution of property and possession: A review and methodological proposition. *Evolutionary Anthropology* 27:285–296. doi:10.1002/evan.21748
- Tomasello, M. (2022) *The evolution of agency: Behavioral organization from lizards to humans*. The MIT Press.
- Tooby, J., & Cosmides, L. (1990) The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology* 11:375–424. doi:10.1016/0162-3095(90)90017-Z
- Tooby, J., & Cosmides, L. (2001) Does beauty build adapted minds? Toward an evolutionary theory of aesthetics, fiction and the arts. *SubStance* 30:6–27. doi:10.1353/sub.2001.0017
- Tooby, J., & Cosmides, L. (2016) Human cooperation shows the distinctive signatures of adaptations to small-scale social life. *Behavioral and Brain Sciences* 39:e54.
- Townsend, C., Aktipis, A., Balliet, D., & Cronk, L. (2020) Generosity among the Ik of Uganda. *Evolutionary Human Sciences* 2:e23. doi:10.1017/ehs.2020.22
- Trabasso, T., & Chung, J. (2004) Empathy: Tracking characters and monitoring their concerns in film. In: *Winter Text Conference, Jackson Hole, WY* .

- Tylor, E. B. (1920a) *Primitive culture: Researches into the development of mythology, philosophy, religion, language, art, and custom*, vol. 2 6th Ed. John Murray.
<https://archive.org/details/primitiveculture02tylouoft>
- Tylor, E. B. (1920b) *Primitive culture: Researches into the development of mythology, philosophy, religion, language, art and custom*, vol. 1 Sixth Ed. John Murray.
- Urponen, H., Vuori, I., Hasan, J., & Partinen, M. (1988) Self-evaluations of factors promoting and disturbing sleep: An epidemiological survey in Finland. *Social Science and Medicine* 26:443–450. doi:10.1016/0277-9536(88)90313-9
- Vaitl, D., Birbaumer, N., Gruzelier, J., Jamieson, G., Kotchoubey, B., Kubler, A., et al. (2005) Psychobiology of altered states of consciousness. *Psychological Bulletin* 131:98–127. doi:10.1037/0033-2909.131.1.98
- van der Watt, A. S. J., van de Water, T., Nortje, G., Oladeji, B. D., Seedat, S., Gureje, O., et al. (2018) The perceived effectiveness of traditional and faith healing in the treatment of mental illness: a systematic review of qualitative studies. *Social Psychiatry and Psychiatric Epidemiology* 53:555–566. doi:10.1007/s00127-018-1519-9
- VandenBos, G. R. (Ed.) (2007) *APA Dictionary of Psychology*. American Psychological Association. <https://dictionary.apa.org/goal>. Accessed 23 January 2025
- Vayda, A. P. (1974) Warfare in ecological perspective. *Annual Review of Ecology and Systematics* 5:183–193.
- Verhoef, T., & Ravignani, A. (2021) Melodic universals emerge or are sustained through cultural evolution. *Frontiers in Psychology* 12:1–13. doi:10.3389/fpsyg.2021.668300
- Vickers, J. (2013) That deep kind of discipline of spirit: Freedom, power, family, marriage, and sexuality in the story of John Humphrey Noyes and the oneida community. *American Nineteenth Century History* 14:1–26. doi:10.1080/14664658.2012.740168
- von Hahn, J. G. (1876) *Sagwissenschaftliche studien*. Friedrich Mauke.
- Vyse, S. (2014) *Believing in magic: The psychology of superstition*. Oxford University Press.
- Walker, R. S., Wichmann, S., Mailund, T., & Atkisson, C. J. (2012) Cultural phylogenetics of the Tupi language family in lowland South America. *PLoS ONE* 7:e35025. doi:10.1371/journal.pone.0035025
- Warner, W. L. (1958) *A black civilization: A social study of an Australian tribe*. Harper & Brothers.

- Watson-Jones, R. E., & Legare, C. (2018) The social functions of shamanism. *Behavioral and Brain Sciences* 41:e88.
- Wiessner, P. (2020) The role of third parties in norm enforcement in customary courts among the Enga of Papua. *Proceedings of the National Academy of Sciences* 117:32320–32328. doi:10.1073/pnas.2014759117
- Wilson, B. J., Jaworski, T., Schurter, K. E., & Smyth, A. (2012) The ecological and civil mainsprings of property: An experimental economic history of whalers' rules of capture. *The Journal of Law, Economics, and Organization* 28:617–656. doi:10.1093/jleo/ewr024
- Wilson, D. S. (2002) *Darwin's cathedral: evolution, religion, and the nature of society*. University of Chicago Press.
- Winkelman, M. (1984) *A cross-cultural study of magico-religious practitioners*. University of California, Irvine.
- Winkelman, M. (1986) Trance states: A theoretical model and cross-cultural analysis. *Ethos* 14:174–203.
- Winkelman, M. (2002) Shamanism and cognitive evolution. *Cambridge Archaeological Journal* 12:71–101. doi:10.1017/S00959774302000045
- Winkelman, M. (2004) Shamanism as the original neurotheology. *Zygon* 39:193–217. doi:10.1111/j.1467-9744.2004.00566.x
- Witek, M. A. G., Clarke, E. F., Wallentin, M., Kringelbach, M. L., & Vuust, P. (2014) Syncopation, body-movement and pleasure in groove music. *PLoS ONE* 9. doi:10.1371/journal.pone.0094446
- Witzel, M. (2012) *The origin of the world's mythologies*. Oxford University Press.
- Woodward, A. L. (2009) Infants' grasp of others' intentions. *Current Directions in Psychological Science* 18:53–57. doi:10.1111/j.1467-8721.2009.01605.x
- Yurdum, L., Singh, M., Glowacki, L., Vardy, T., Atkinson, Q. D., Hilton, C. B., et al. (2023) Universal interpretations of vocal music. *Proceedings of the National Academy of Sciences* 120:e2218593120. doi:10.1073/pnas
- Zillmann, D. (1995) Mechanisms of emotional involvement with drama. *Poetics* 23:33–51. doi:10.1016/0304-422X(94)00020-7
- Zillmann, D., & Cantor, J. R. (1977) Affective responses to the emotions of a protagonist. *Journal of Experimental Social Psychology* 13:155–165. doi:10.1016/S0022-1031(77)80008-5
- Zwirner, E., & Thornton, A. (2015) Cognitive requirements of cumulative culture: Teaching is useful but not essential. *Scientific Reports* 5:16781. doi:10.1038/srep16781