AMERICAN PSYCHOLOGICAL ASSOCIATION

Psychological Review

ISSN: 0033-295X

2024, Vol. 131, No. 6, 1411–1434
https://doi.org/10.1037/rev0000462

The Dual Role of Culture for Reconstructing Early Sapiens Cognition

Andrea Bender[1, 2], Larissa Mendoza Straffon[1, 2], John B. Gatewood[3], and Sieghard Beller[1, 2]
[1] Centre for Early Sapiens Behaviour (SapienCE), University of Bergen
[2] Department of Psychosocial Science, University of Bergen
[3] Department of Sociology and Anthropology, Lehigh University

Questions on early sapiens cognition, the cognitive abilities of our ancestors, are intriguing but notoriously hard to tackle. Leaving no hard traces in the archeological record, these abilities need to be inferred from indirect evidence, informed by our understanding of present-day cognition. Most of such attempts acknowledge the role that culture, as a faculty, has played for human evolution, but they underrate or even disregard the role of distinct cultural traditions and the ensuing diversity, both in present-day humans and as a dimension of past cognition. We argue that culture has exerted a profound impact on human cognition from the start in a dual manner: It scaffolds cognition through both development and evolution, and it thereby continually diversifies the form and content of human thinking. To unveil early sapiens cognition and retrace its evolutionary trajectories, this cognitive diversity must be considered. We present two strategies to achieve this: large-scale extrapolation and phylogenetic comparison. The former aims at filtering out diversity to determine what is basic and universal versus culturally shaped (illustrated for theory of mind abilities). The latter capitalizes on the diversity to reconstruct evolutionary trajectories (illustrated for religious beliefs). The two methods, in combination, advance our understanding of the cognitive abilities of our early sapiens ancestors and of how these abilities emerged and evolved. To conclude, we discuss the implications of this approach for our insights into early cognition itself and its scientific investigation.

Keywords: cognition, culture, early hominins, cognitive diversity, cognitive evolution

Over the past two decades, archeological discoveries of early symbolism and complex technologies in several caves along the southern coast of Africa—such as Blombos, Klasies River, or Sibudu (e.g., Henshilwood et al., 2002, 2018; Wadley, 2015; Wurz, 2013)—have forced us to rethink how we perceive the origins of the human mind. Until recently, the dominant view was that modern human cognition emerged about 40,000 years ago in the European Upper Paleolithic, likely driven by a genetic mutation that caused a dramatic change in cognitive abilities (e.g., Klein, 1995, 2019; Klein & Edgar, 2002). Now, we have to relocate the oldest evidence of art, symbolic thought, and complex technological innovation to the African continent and push it back at least some additional 40,000 years, into the period known as the Middle Stone Age (Henshilwood et al., 2002). In light of these recent findings, old questions need to be asked anew: When did modern human cognition emerge? Did it materialize as a new package or as a series of gradual modifications? Which factors triggered these changes? And what counts as evidence of modern human cognition in the first place?

That human cognitive achievements today are clearly different from those of any other species may be undeniable, but exactly when and how our ancestors began to "think" differently remains unresolved. Investigations of early sapiens cognition are hindered by the fact that cognition leaves no hard traces in the archeological record and can only be inferred from indirect evidence. Approaches in cognitive archeology (for overviews, see A. Currie & Killin, 2019; Overmann & Coolidge, 2019) and evolutionary psychology (Confer et al., 2010; Cosmides & Tooby, 2013) extrapolate from present-day cognition to the abilities of our ancestors, based on often thoughtful strategies and protocols such as reverse engineering of cognitive skills (Haidle, 2010; C. Liu & Stout, 2023; Sellet, 1993), more recently combined with neuroscientific studies (Mellet et al., 2019; Stout & Chaminade, 2007). In extrapolating, these approaches do acknowledge the role that culture, as a faculty, would have played

This article was published Online First December 14, 2023.
Andrea Bender https://orcid.org/0000-0001-9542-2975
Larissa Mendoza Straffon https://orcid.org/0000-0001-7352-1999
Sieghard Beller passed away before the article was complete.
This work was supported by the Research Council of Norway through its Centres of Excellence funding scheme for the Centre for Early Sapiens Behaviour (SapienCE), Project Number 262618, awarded to Andrea Bender. The authors do not have any conflicts of interest to disclose.

This study was not preregistered. All relevant content is reported in the article itself and is hence available to all readers. None of the ideas and data appearing in the article were disseminated previously. The authors are indebted to Sarah Mannion for both invaluable comments on earlier versions of this article and unfailingly meticulous proofreading.

Andrea Bender played a lead role in funding acquisition, project administration, and writing–original draft and an equal role in conceptualization, investigation, and writing–review and editing. Larissa Mendoza Straffon played a supporting role in investigation and writing–original draft and an equal role in writing–review and editing. John B. Gatewood played a supporting role in conceptualization, investigation, and writing–original draft and an equal role in writing–review and editing. Sieghard Beller played a lead role in methodology, a supporting role in writing–original draft, and an equal role in conceptualization and investigation.

Correspondence concerning this article should be addressed to Andrea Bender, Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, P.O. Box 7807, N-5020 Bergen, Norway. Email: andrea.bender@uib.no

in human evolution. However, they tend to underrate or even disregard the role of distinct cultural traditions and the ensuing degree of diversity in human cognition among present-day humans, and even more as a dimension of past cognition (Bender, 2020a).

Here, we argue that culture has exerted a profound impact on human cognition from the start in a dual manner, not only in scaffolding cognitive development and evolution but also as a means of continuous cognitive diversification. When attempting to reconstruct early sapiens cognition and to retrace its evolutionary trajectories, we therefore need to factor in the cultural variability of human cognition. To achieve this, the above-mentioned strategies need to be complemented by approaches that take greater account of the impacts of culture.

To begin, we flesh out our argument by highlighting the dual role that culture plays for human cognition. We then elaborate on two culturally informed approaches, which provide alternative and partly complementary avenues to the unveiling of early sapiens cognition, illustrated with exemplary studies and their findings. One of these approaches aims at reconstructing the basic and universal—as well as culturally shaped—components of human cognition, the other at reconstructing ancestral states and evolutionary trajectories of cognitive systems from present-day diversity. We will illustrate these approaches with two instances perceived as uniquely human—the ability to understand one another as intentional beings and the inclination to believe in supernatural entities—which will eventually advance our understanding of what kind of mind was at work when our early sapiens ancestors roamed the earth. To conclude, we discuss implications both for our insights into early cognition itself and for its scientific investigation.

The Dual Roles of Culture for Cognition

Culture impacts cognition in at least two distinct yet related ways: as a *scaffold* in cognitive development and evolution (Bender, 2020a; Colagè & d'Errico, 2020; Heyes, 2018) and as a *means of diversification* (Bender & Beller, 2019; Henrich, 2016; Levinson, 2003; Medin & Atran, 2004). The former arises from the fact that humans are a social species with evolved predispositions to seek and share information, establish joint intentions, and reinforce them through mutual coercion, which in turn results in specific patterning within the local group (Csibra & Gergely, 2009; de Munck & Bennardo, 2019; Tomasello et al., 2005). The latter is a natural consequence of the former: Unless heavily constrained by other factors, cultural scaffolding will inevitably lead to cognitive diversification (Boyd & Richerson, 1988; Mace & Holden, 2005).

Scaffolding Human Cognition

The last common ancestor with our closest contemporary relatives, chimpanzees and bonobos, lived about 6–7 million years ago. The earliest specimens of our own species, *Homo sapiens*, are now estimated to have roamed the earth around 300,000 years ago (Hublin et al., 2017), and only since the Neanderthals disappeared some 40,000 years ago have we been the sole species of the hominin line left on earth. In the past few decades, it has become clear that many sophisticated technologies and cultural practices that were once considered exclusive to the human populations of the European Upper Palaeolithic were actually present among both early *Homo sapiens* (Mcbrearty & Brooks, 2000; Scerri & Will, 2023) and *Homo neanderthalensis* (Hoffecker, 2018; Nielsen et al., 2020; Wynn & Coolidge, 2004). The record for the Neanderthals includes, for example, fire-making (Henry, 2017), woodworking (Vaquero et al., 2001), the production of glue for composite tools (Niekus et al., 2019), fiber processing (Hardy et al., 2020), the use of spaces in potentially ritual contexts (Baquedano et al., 2023; Jaubert et al., 2016), ochre processing (Pitarch Martí et al., 2021), and, possibly, mark-making for symbolic purposes (Hoffmann et al., 2018; Rodríguez-Vidal et al., 2014). In early *Homo sapiens* contexts, these technologies appear and reappear in a mosaic-like pattern throughout the African continent prior to 100,000 years ago (Colagè & d'Errico, 2020; Scerri & Will, 2023) but are occasionally found as a "package" in a few early key sites such as Blombos Cave in South Africa by 70,000 years ago (Henshilwood & Marean, 2003). All this suggests that our species shared a cognitive baseline with our closest extinct relatives, the Neanderthals. Nevertheless, over the past 50,000 years, *Homo sapiens* developed a level of cumulative culture unparalleled by any other members of our genus.

A key question is whether the mental capacities that underlie such development were acquired through changes in kind or only in degree from general hominin cognition, and by when. Although this issue is still hotly debated (Sterelny, 2020), comparative research in psychology has uncovered a range of predispositions that appear to enhance the cognitive skill set of present-day humans and thereby extend the perceived distance to other species.

One of these predispositions, linked to the human brand of sociality, is the ability and willingness to *align one's mental worlds*. Humans not only seek to understand the mental and motivational states that drive others' behavior but are also inclined to convey their own mental and motivational states in the service of cooperation (Enfield & Levinson, 2006; Tomasello et al., 2005). This willingness to share attention, interest, and information is a key building block in human culture, reinforced by an emerging sense of obligation and by nudges toward conformity (de Munck & Bennardo, 2019; Tomasello, 1999, 2020). This is why cognitive anthropologists have defined culture as "whatever it is one has to know or believe in order to operate in a manner acceptable to its members" (Goodenough, 1957, p. 167). A cultural world shared in this way provides the context in which individual cognition develops, distinct to the group and similar for its members, even though consensus regarding the details among these members is always a matter of degree (Gatewood, 2012; Romney et al., 1986).

Related to this ability of perspective taking is a second predisposition for cumulative culture, namely for *teaching and imitative learning* (Csibra & Gergely, 2009; d'Errico & Banks, 2015; Kline, 2015; Tomasello, 2016): the willingness on the part of those in possession of knowledge and skills to provide instruction and the preparedness on the part of the unskilled to recognize a teaching intention, pay attention, and copy the observed behavior. This imitative learning and copying is often done with high fidelity in human children (Horner & Whiten, 2005; Lyons et al., 2007; Nielsen, 2018; review in Hoehl et al., 2019) and with even higher fidelity in human adults (McGuigan et al., 2011). While teaching involves the transmission of beliefs, values, and practices, high-fidelity copying contributes to their establishment as normative and thereby to the strengthening of group cohesion (Legare & Nielsen, 2015). The inclination for teaching builds, in part, on the predisposition for joint intentionality and especially the ability to

take another's perspective, which helps to diagnose a lack of understanding and thereby renders teaching more effective.

Both the creation of a shared mental world and explicit teaching benefit from *language*, which is the most powerful tool for elaborating, storing, and sharing insights, interpretations, and ideas—so powerful indeed that language may be indispensable for achieving some of these goals. For instance, the ability to provide and receive information about mental states appears to be an essential precondition for comprehending both the existence and the content of mental states in other people (as will be discussed further down; and see C. A. Miller, 2006; Pyers & Senghas, 2009).

All of these factors—the willingness to align one's mental worlds, aided by a predisposition for teaching and learning, and facilitated by language—are key enablers of human culture. At the same time, they serve to enhance human cognition in multiple ways.

For a start, they foster the acquisition and accumulation of expertise. Explicit, language-based teaching and high-fidelity copying speed up the learning process tremendously, as the knowledge and skills already available in one's group need not be discovered and invented anew but can be rapidly adopted, thus saving time and cognitive resources for further elaboration and improvement. Paving the way to expand the amount of knowledge and skills that group members may acquire (Lyons et al., 2007), the key enablers also drive cultural evolution: Important achievements, once attained, can stabilize and serve as springboards for new achievements (Dean et al., 2014; Heyes, 1993; Richerson & Boyd, 2008; Tomasello, 1999), thereby "ratcheting up" human culture, including its cognitive tools and techniques (Tennie et al., 2009).

Importantly, knowledge is not merely accumulated; it is also organized and integrated into larger explanatory frameworks developed by previous generations, which afford and invite novel insights and inferences. This is how Micronesian seafarers attained their outstanding navigational skills, which enabled them to travel thousands of kilometers across the open ocean (Gladwin, 1970; Hutchins, 1983), or how Amerindian groups attained their expertise in ecological systems (Bang et al., 2007; Medin et al., 2013; Pierotti, 2011). It is how symbols gained meaning, from reading tracks in the sand to modern-day text messaging (Lupyan & Dale, 2016; Morin et al., 2018; Shaw-Williams, 2014), and how tool-making capitalized on increasingly more complex causal understanding, such as when taking the step from spears to bows and arrows (Haidle, 2014; Stuart-Fox, 2015). And it is how it was possible to achieve an ever deeper understanding of intricate matters, such as in mathematics or medicine (Erickson, 2007; Martzloff, 1997; K. F. Miller & Paredes, 1996).

By elevating us "onto the shoulders of giants," cultural evolution brings longed-for possibilities within reach and opens up prospects of which we were not even aware. When involving the recruitment of existing cultural traits for new purposes, this evolutionary driving force has been called *cultural exaptation* (Colagè & d'Errico, 2020; d'Errico & Colagè, 2018). A paradigmatic example is the presumed invention of numerical notation: from incidental cut marks on bones, through a series of transformative steps, to full number symbols, which gradually opened up a whole new world of mathematics (d'Errico et al., 2018).

Some cultural practices, finally, are even essential for unlocking the full potential of abilities with which all humans appear to be endowed. Mental state reasoning (or *theory of mind [ToM]*), for instance, is an ability that humans typically acquire long before adulthood. Still, its unfolding is likely contingent on growing up among other humans in any social context, and its developmental trajectories are shaped by the specifics of the cultural environment (as expounded below, on page 1416).

The scaffolding role of culture for cognition spans several levels, from the dynamics of individual social learning within populations (*microevolution*) to the historical dynamics of adaptations on the population level (*macroevolution*). On the microevolutionary level, cultural input entails cognitive changes in the course of an individual's lifetime by providing cognitive tools, supporting cognitive skills, and even boosting cognitive capacities. Some of these changes are so pervasive that they culminate in substantial neural rewiring, as when people learn to read and write (Dehaene & Cohen, 2007; Maguire et al., 2000). Yet, the relation between cultural environment and individual cognition is bidirectional, with innovations created by one individual also having the potential to change the cultural environment for all (Henrich, 2016; Morin, 2016; Sperber, 1996). On this macroevolutionary level, the most profound manifestations of cultural scaffolding are those that lead to gene–culture coevolution (Boyd & Richerson, 1988; Durham, 1991).

A factor operating on all of these levels of scaffolding is language. While the origins of the faculty of language are elusive, there is general consensus that it emerged as a product of gene–culture coevolution, presumably closely tied to human sociality (Buckley & Steele, 2002; Dor & Jablonka, 2010; Dunbar, 1998; Fitch, 2010; Tomasello, 2008). According to these scenarios, some hominin groups would have begun to use gestural communication, such as declarative pointing, to coordinate behavior and establish cooperation, which eventually selected for conventionalized vocal expressions that could transmit information beyond the "here and now" (Tomasello, 2008). Genetic mutations linked to the Forkhead box protein P2 gene may have further facilitated speech production, spreading rapidly due to their adaptive value (Fisher & Marcus, 2006; Fisher & Ridley, 2013). Through these complex feedback processes, spoken language became the ubiquitous communication mode of our lineage, perhaps as far back as half a million years ago (de Boer, 2017; Dediu & Levinson, 2013).

The uncertainties surrounding its origins aside, once in place, language served to boost not only human communication but also cognition (e.g., Lupyan et al., 2020): for instance, by providing classification systems for perceptions, metaphors for analogical reasoning, or recursive levels for cognitive representations, including those on (others') mental states (as explained in more detail further below). Sustained language use entails cortical remapping, targeting specific brain structures for different language modalities, such as when learning to read and write or when using a whistled language (Dehaene et al., 2015; Güntürkün et al., 2015). Finally, fixing language in script enabled the transmission of knowledge across space and time, raising cumulative culture to an entirely new level (Huettig & Mishra, 2014; Morin et al., 2018).

In short, human cognition is fundamentally shaped by the cultural environment in which it unfolds. For this very reason, however, we should expect distinct cultural environments to shape human cognition in distinct ways.

Sources of Diversification

Human cognition bears the stamp not only of culture in the abstract but also of concrete cultural traditions: How we perceive

and think about the world is shaped both by the fact that we are cultural beings and by the specifics of our distinct cultural background. Although systematic surveys are still largely lacking, evidence for cognitive diversity is accumulating, from low-level cognitive processes such as perception to higher order cognition involved in navigating or decision making (examples will be given below; for overviews, see Beller & Bender, 2015; Bender & Beller, 2016; Blasi et al., 2022; Henrich, Heine, & Norenzayan, 2010). Two major types of mechanisms are involved in creating this diversity. The first comprises the enablers of human culture, which themselves are shaped by cultural traditions and in turn serve to fine-tune cognitive processing on several levels. The second emerges from the interplay of these cognitive processes and the (culture-specific) content on which they are operating.

Enablers of Human Culture

As detailed above, the key enablers of human culture include the predispositions for aligning one's mental worlds, for teaching and learning, and for language use. These enhance the cognitive skill set in humans, but they are also subject to cultural molding (Bender & Beller, 2019).

First, while presumably a human universal, shared intentionality varies with respect to its implementation, with the focus being placed on mental states or the types of sociality valued (Duranti, 1993; Fiske, 1992; Markus & Kitayama, 1991; Robbins & Rumsey, 2008). Cultural traditions differ, for instance, in the relative degree to which they value relations, duties, and mutual obligations in a social group as compared to the properties, rights, and accomplishments of individuals (Markus & Kitayama, 1991; Nisbett et al., 2001; ojalehto et al., 2015, 2017a, 2017b). Implications of these cultural differences for cognition are manifold. They range from basic processes such as what to focus on during perception (Nisbett & Miyamoto, 2005), through preferences for holistic versus analytic reasoning styles (Nisbett et al., 2001), to various dimensions of social cognition, including causal attribution (J. G. Miller, 1984; Morris et al., 2001), assessments of guilt (Danziger, 2006; Throop, 2008), and concepts of fairness (Henrich, Ensminger, et al., 2010; Henrich et al., 2005). For instance, members of groups that emphasize a relational or holistic perspective tend to pay equal or more attention to the context than to focal objects (Masuda & Nisbett, 2006); they tend to spot relationships between objects or agents and changes in a situation more easily (Nisbett & Masuda, 2003), to consider a larger number of potential causes and consequences of observed events (Choi et al., 2003; Maddux & Yuki, 2006), and to ascribe responsibility also to social groups rather than exclusively to individuals (J. G. Miller, 1984; Morris et al., 2001). These differences in cognitive inclination have ramifications for everyday interactions; they affect how we respond emotionally to events (e.g., with anger when we blame somebody); and they ground our principles of justice, such as taking mitigating circumstances into consideration (Beller et al., 2009; Lillard, 1998).

Likewise, the willingness to teach and to learn from teaching is presumably widespread but varies across cultural groups with respect to teaching styles, including the degree of fidelity in copying (Berl & Hewlett, 2015; Hewlett & Roulette, 2016; Köster et al., 2022; Lancy & Grove, 2010; Rogoff, 2003). Repercussions of this variability involve how and what children learn, and also how eager they are to engage in explanation-seeking, exploration, and innovation (Gauvain et al., 2013; Legare & Nielsen, 2015).

Finally, while all human groups use language, as a whole, we have generated close to 8,000 distinct languages documented as of today (Hammarström et al., 2022). And these individual languages vary on several dimensions from the modality in which they are implemented (e.g., as spoken or whistled languages, as simple signed or tactile signed, or in writing) to details of phonology, syntax, semantics, and pragmatics—again with substantial implications for cognition (overviews in Bender, 2019; Lucy, 2016; Wolff & Holmes, 2011; and see Cibelli et al., 2016; Lupyan & Clark, 2015) right down to the neural level (Dediu & Ladd, 2007; Güntürkün et al., 2015). One level at which different languages affect cognitive representation and processing in distinct ways is by providing different classification systems for domains such as color, odors, or biological taxa (Atran & Medin, 2008; Kay & Regier, 2006; Majid et al., 2018). For instance, English recruits one basic color term each for blue and green, whereas Tarahumara or Welsh use just one term for both (Kay & Kempton, 1984; Lazar-Meyn, 2004). By contrast, languages such as Russian (Davies & Corbett, 1994) and Italian (Paggetti et al., 2016) not only distinguish between green and blue but also separate the latter into two distinct categories: a lighter blue and a darker blue. To which extent these linguistic distinctions affect pure color perception as such remains contested (overviews in Cibelli et al., 2016; Regier & Kay, 2009). However, in all tasks not precluding language use, a range of cognitive processes—including recognition, rapid distinction, similarity judgments, and learning—are affected by where the language of use draws the categorical boundaries (e.g., Kay & Kempton, 1984; Mitterer et al., 2009; Roberson et al., 2005; Winawer et al., 2007).

Languages also differ in the metaphors they use for conceptualizing more abstract domains such as time, most frequently along one spatial dimension or another (Bender & Beller, 2014b; Boroditsky, 2001, 2018), or pitch, typically in terms of either height or thickness (Dolscheid et al., 2013). And different languages provide different tools for more complex activities such as spatial referencing or computing (Bender & Beller, 2014a; Majid et al., 2004).

Finally, language diversity also affects cognition in a more indirect manner. For instance, the mere fact of being bilingual affects executive function insofar as it increases an individual's ability to ignore distracting information and monitor task switching (Bialystok et al., 2012; Kroll et al., 2014); and the usage of a foreign language instead of one's native language has the potential to alter decision making and moral judgments because the emotional detachment in the foreign language facilitates utilitarian choices (Geipel et al., 2015; Hayakawa et al., 2016).

Against this background, the challenges involved in reconstructing early sapiens cognition are obvious and daunting. How the key enablers would have shaped pre- and early sapiens cognition essentially depends on their implementation. For example, evidence on whether sociality was characterized by a stronger focus on either independence of individuals or on their interdependence would be indicative of a prevalence of either analytic or holistic systems of thought. A considerable body of research on present-day hunter–gatherers suggests that these groups rely more strongly on independent decision making and less on conformity than do agriculturalists (Boyette & Hewlett, 2018) and correspondingly seem to pay more attention to focal objects as detached from the

surrounding field (Berry, 1966, 1967). At the same time, such groups are also known to exhibit relational epistemological orientations and a propensity for systems-level thinking (Bang et al., 2007; Medin et al., 2013; Ross et al., 2007), which precludes straightforward inferences on the sociality patterns among Pleistocene groups.

Teaching in present-day hunter–gatherer communities is not uniform either. While differing notably from traditions in WEIRD societies (Henrich, Heine, & Norenzayan, 2010), the spectrum of teaching strategies is wide, variable, and multifunctional (Hewlett & Roulette, 2016). Overall, hunter–gatherer communities place a greater emphasis on the child's self-reliance and independence than on compliance (Barry et al., 1959; Boyette & Hewlett, 2018), but evidence on the degree of high fidelity is mixed (Berl & Hewlett, 2015; Nielsen et al., 2014). Children are expected to learn predominantly from observation, and subtle teaching occurs more frequently than explicit, verbal instruction (Boyette & Hewlett, 2017; Burdett et al., 2018). With increasing age, most teaching is taken over by other children (Boyette & Hewlett, 2017; Gallois & Reyes-García, 2018; Lew-Levy et al., 2020). This social learning of general skill sets in childhood seems to lay the foundation on which individual training of more complex skills in adolescence then builds (Lew-Levy et al., 2017). If we assume that hunter–gatherer groups 100,000 years ago maintained similar practices, we may conjecture that knowledge and skills were actively shared, albeit often in implicit ways (MacDonald, 2019). If implicit teaching and learning from observation, imitation, and practice, rather than from instruction, were as prevalent then as they are today, this would have implications not only for cognition (Frensch & Rünger, 2003; Wilson & Golonka, 2013) but also for behavior, including elementary strategies such as explanation seeking (Gauvain et al., 2013; Legare et al., 2017). Specifically, such teaching practices, in combination with an emphasis on the child's autonomy, would likely have served to encourage active exploration rather than copying.

The specific forms that sociality and teaching would have taken depend crucially on the availability of language. Individualistic orientations are more likely in the absence of language, as the consideration of and emphasis on group values presupposes a powerful tool for communication. Likewise, while guided practicing is possible in the absence of language, both the diagnosis of misconceptions and explicit forms of teaching do largely depend on language. With respect to the latter, however, we lack strong evidence on how early languages were composed and even on when they came into existence in the first place.

Content and Organization of Knowledge

As described above, a major source of cognitive diversity is that the specifically human propensities and abilities linked to sociality, teaching, and language are themselves shaped by cultural traditions and, as such, shape cognitive processing in distinct ways. A second source of cognitive diversity is the (culture-specific) organization of people's knowledge, beliefs, and opinions—in short, the informational content on which the various cognitive processes are operating.

Unlike most nonhuman species, humans can gather information in two distinct ways: directly as individuals through their own experiences or indirectly from members of their group such as parents, teachers, or peers. In fact, most of what people come to accept as true in the course of their lives is socially learned, often incompletely and imperfectly, rather than arrived at through experience or empirical testing (Bender & Gatewood, 2021; Bender & Oterhals, in press; D'Andrade, 1995; Gatewood, 2011, 2012). Furthermore, we tend to take for granted what we learn from others (Legare & Nielsen, 2015; Sloman & Fernbach, 2017); even the mere belief that someone else understands a phenomenon increases our own sense of understanding (Sloman & Rabb, 2016), and oftentimes we could not be more wrong (e.g., Lawson, 2006; McCloskey et al., 1983; Rozenblit & Keil, 2002). The net effect of humans' proclivity to learn from others—along with learning who knows more about a topic than others—is societies with increasingly complex divisions of labor based on socially distributed knowledge. No individual knows everything that is held within and transmitted by the group. Rather, the accumulated knowledge is distributed among individuals bound together by ties of reciprocal ignorance and mutual dependence. In this way, the extrasomatic information storage capacity of human groups far exceeds the neurological information storage capacity of individuals per se (Gatewood, 1983, 2011; Sloman, 2022).

Many observations made by humans around the world are indeed valid and accurately reflect the unfolding of events. Such observations, however, do not remain in isolation; they give rise to more abstract concepts, are integrated into mental models on the topic, and tend to be organized by overarching theories of how things are related. To a substantial degree, this body of culturally accumulating knowledge is predicated on believing and on subjective interpretations rather than on personally verified understandings (Bender & Gatewood, 2021), such as which mushrooms are edible (Bender & Oterhals, in press), and is organized by explanatory frameworks that themselves represent culture-specific perspectives on the world (ojalehto et al., 2015, 2017a, 2017b). While this cognitive content is tested against and adjusted to reality over generations, and hence constrained in the extent of diversity, it continues to be permeated by culture-specific values, attitudes, and beliefs.

Let us illustrate this for the domain of folk biology (overview in Solomon & Zaitchik, 2012). Living in close interaction with one's natural environment provides ample opportunity to gather information on the properties of living beings and their relationships. Some of these observations are clearly guided by the biological world itself, as indicated by a large body of research on folk taxonomies according to which we tend to carve nature at its joints (e.g., Atran, 1998; Berlin, 1992; Berlin et al., 1973; Boster, 1988; Medin & Atran, 1999). Still, cultural framework theories shape how information is organized, stored, and interpreted in culture-specific ways; they invite some inferences to be drawn more easily than others; and they suggest distinct strategies for problem-solving and behavioral responses (Bang et al., 2007; Bang & Medin, 2010; ojalehto et al., 2013). Framework theories on the natural world differ, for instance, in the dimensions on which they focus and in how they position humans. While the Euro-American tradition highlights entities and their properties, such as species and their characteristics, many Amerindian traditions emphasize interconnectedness between entities or species. Consequently, the former suggests that one ascribes agency only to species with specific properties such as consciousness, whereas the latter also opens up the possibility to ascribe agency to species such as plants based on

their interactions (ojalehto et al., 2017a, 2017b). The two types also differ in that the former considers humans as *apart from* nature, the latter as *a part of* nature (Bang et al., 2007; Medin et al., 2006).

These premises of framework theories have multiple implications for cognition. For instance, framework theories highlighting interconnectedness between entities are more likely than Euro-American theories to foster an understanding of ecological relations such as deliberate cooperation across species (ojalehto et al., 2015) or social agency and kin-related cooperation even in plants (ojalehto et al., 2017a, 2017b). Having internalized the Euro-American view disposes people to base their generalizations on inductive principles and heuristics such as the typicality and diversity of the *categories* from which to generalize, whereas none of these strategies have been observed in Amerindian groups, who recruit *causal* reasoning strategies instead (Bailenson et al., 2002; López et al., 1997; Proffitt et al., 2000). In an example reported by Doug Medin (in Bender et al., 2017, p.722) these reasoning strategies warrant the inference that a substance contained by bees would also be found in bears (despite them belonging to wildly different categories), as this substance may be transferred when the bears prey on the bees' honey or are stung by the bees.

Even cornerstones of cognitive development are affected. Children raised in line with Euro-American theories are much more likely to draw both asymmetric and anthropocentric inferences when generalizing across biological species. That is, when asked whether an unknown property found in one species would also be found in another species, these children are more willing to generalize from humans to nonhuman animals than vice versa, and they are more willing to generalize from humans to nonhuman animals than from one animal to another, even if the two animal species are closely related (Ross et al., 2003). Finally, different notions of humans' role in nature also lead to different attitudes toward other species and to diverging strategies of resource management, including more or less sustainable agroforestry, hunting, and fishing practices (Medin et al., 2006; Ross et al., 2007).

In a nutshell, the culture-specific organization of knowledge and beliefs gives rise to diversity both in cognitive content and in cognitive processing. Research on present-day hunter–gatherers suggests that even with a set of cultural values emphasizing individual autonomy and independence, expert knowledge is frequently shared, even across group boundaries (Salali et al., 2016). Yet, the scope of this body of knowledge, the degree to which it is shared within a group, and its potential impact on cognitive processes are all clearly dependent on the availability of language. Explanatory frameworks can only emerge and proliferate with sophisticated tools for communication, and the same is true for expertise. In the absence of language, the social transmission of knowledge distributed among individuals in a group would have been pretty much limited to matters that are directly observable, such as how to make a particular stone tool or which mushrooms to eat and which to avoid. If, however, language was in place, then the group's distributed store of knowledge could become shared and shaped by collective winnowing—as cognition more generally would have been.

Bringing Culture to the Table

If we take the dual role that culture plays for human cognition seriously—not only as a scaffold in cognitive development and evolution but, importantly, also as a means of diversification—we cannot simply extrapolate from present-day cognition to past cognition, even if our ancestors a priori may have had the very same capabilities as we have today. For a start, there is no such thing as (one) present-day cognition (Beller & Bender, 2015; Henrich, Heine, & Norenzayan, 2010; Medin & Atran, 2004), despite its uniform depictions in most psychological textbooks. In fact, its diversity across cultures may be one of the hallmarks of human cognition compared to other species, just as the diversity of languages is one of the hallmarks of the principal human communication tool (Evans & Levinson, 2009). Furthermore, the paleoanthropological and genomic records indicate that our species originated from several small, isolated populations that dispersed and intermixed in and out of Africa on several occasions (Gunz et al., 2009; Hublin et al., 2017; Ragsdale et al., 2023). As a consequence, early *H. sapiens* would have been as culturally and cognitively diverse as they were genetically and anatomically heterogeneous (Mcbrearty & Brooks, 2000).

This need not prevent us from efforts to reconstruct past cognition, though. Here, we present two main approaches to this task: one aimed at filtering out diversity in an attempt to "distill" the universal aspects of human cognition, and the other aimed at capitalizing on this very diversity in an attempt to reconstruct the actual ancestral states. We illustrate these approaches for two textbook examples of human cognition, ToM abilities and religious beliefs, respectively, and we explore the prospects of combining these approaches.

Filtering Out Cultural Diversity

It may seem plausible that by conducting cross-cultural studies, one would be able to identify the universal core of human cognition, with the core being conceived as those aspects that do not vary across cultures. This popular assumption, however, is delusive, largely because cross-cultural differences are neither sufficient nor necessary to diagnose the impact of culture (Bender, 2020b). Moreover, an absence of cultural differences is impossible to prove, as this would presuppose a complete survey of all cultural traditions ever, both present and past. These issues render the current task even more challenging and any attempt to tackle it conjectural. Here, we outline what we consider the most promising strategy to deal with these challenges: a comparative approach that combines perspectives across a range of disciplines from the cognitive and social sciences (see also Liebal & Haun, 2018). Illustrated for ToM abilities, we show how a survey of research across species and on cognitive development allows us to identify those aspects that are distinct to and shared by humans. In order to fathom the extent of cultural scaffolding and diversification, we then sift through the research across cultures and languages. Together, the diverse sets of findings provide the basis for an informed guess on how these cognitive capacities may have looked in the Pleistocene, as presented in the final subsection on "ToM in Early Sapiens Cognition" (on page 1419).

ToM Abilities

What a person believes he or she knows about a particular situation at a particular moment in time is just one possible view of the world. Things can be different from how they look; a person's knowledge of things can change; and other people may generate

different beliefs based on their own point of view. Children usually come to grasp such insights when they learn to take perspective and to ascribe mental states such as perceptions, beliefs, desires, and intentions to other people (Apperly, 2012; Astington, 1993; Rakoczy, 2017). This set of abilities—often referred to as ToM but also called "folk psychology" and "belief–desire psychology" (Rakoczy, 2017), or "mind reading," "mentalizing," "mental-state attribution," and "perspective taking" (Krupenye & Call, 2019)—is a cornerstone of human sociality, enabling us to create the shared mental worlds so fundamental to both human culture and cognition (Call, 2009; Tomasello, 1999). ToM helps us to assess what our interlocutors may or may not know, thus rendering communication and teaching more efficient. Being able to read others' intentions also enables us to build on those intentions in order to either form common goals and facilitate cooperative problem solving or to undermine competitors' efforts.

Initially, several lines of research seemed to suggest that the underlying cognitive structure of ToM is an innate, encapsulated module that becomes activated in humans within the first years of life, is dedicated to a specific cognitive task, and operates largely automatically (Baron-Cohen, 1995; Fodor, 1992; Leslie, 1994). The *false belief* task, developed by Wimmer and Perner (1983) for use with children and later converted into a nonverbal task for nonhuman animals by Call and Tomasello (1999), was soon considered the litmus test for this ability. To pass it, the subject needs to be able to predict another individual's behavior as resulting from a belief that conflicts with the subject's own belief. Simultaneously entertaining two conflicting beliefs and correctly inferring the behavior of the other individual from this discrepancy is a formidable feat. Nonhuman species typically fail this test, while human children begin to pass it between 4 and 5 years of age. According to the modular view, ToM would therefore be a cognitive ability unique to and universal in humans.

Meanwhile, however, it has become increasingly clear that matters are more complex. Findings from various lines of research converge on an understanding of ToM as composed of a range of social–cognitive skills, from inhibitory control to perspective taking, rather than a single self-contained module (Apperly, 2012; Conway & Bird, 2018; Schaafsma et al., 2015; Slaughter & Perez-Zapata, 2014). As these skills turn out to be available separately and to develop asynchronously, they could also have emerged and evolved independently from one another. On this account, it seems more plausible to assume that they are distributed across species in distinct patterns, are more or less dependent on cultural scaffolding, and hence may vary across cultures in terms of both development and form.

ToM in Nonhuman Species

Research on ToM abilities in nonhuman species goes back almost half a century. In fact, the very investigation of ToM began with a study of whether chimpanzees possess the ability to impute mental states (Premack & Woodruff, 1978). Findings and conclusions in this field of research continue to be hotly debated (e.g., Burge, 2018; de Waal & Ferrari, 2010; Penn & Povinelli, 2007; van der Vaart & Hemelrijk, 2014), but a growing body of evidence indicates that several species, such as various primates, corvids, and perhaps dogs and dolphins, possess variable sets of some of those social–cognitive skills that are essential for ToM (Bugnyar, 2007; Dally et al., 2010; Hare & Tomasello, 2005; Krupenye & Call, 2019; Tschudin, 2006).

Chimpanzees, for instance, may not be able to understand what another individual *believes*, especially if this other's belief conflicts with what they themselves believe, but they understand what the other *sees* and hence *knows*. And while they appear to be unable to make behavioral predictions based on another's false belief, they succeed in making distinctive predictions depending on whether or not the other had access to relevant information (Bräuer et al., 2007; Hare et al., 2000, 2001; Kaminski et al., 2008; Tomasello et al., 2003). Based on these findings, Call and Tomasello (2008) therefore concluded that nonhuman primates are able to engage in a perception–goal psychology but not a full-fledged belief–desire psychology, as is characteristic of human mental-state reasoning. Recent studies now point to the possibility that chimpanzees may even share more foundational social–cognitive abilities with humans, including an *implicit* understanding of false belief (Buttelmann et al., 2017; Kano et al., 2019; Krupenye et al., 2016; reviewed in Krupenye & Call, 2019). If these findings prove to be robust and reliable, the claimed uniqueness of ToM abilities in humans would indeed have to be considered as a difference in degree rather than in kind (unless we allow for different evolutionary pathways leading to similar ToM abilities).

ToM in Human Development

One of the reasons for the widespread assumption that ToM abilities are a human universal is that they typically emerge in children in a given time window relatively early on, pretty much uniformly, and largely irrespective of potentially influencing factors (overview in Rakoczy, 2017; Träuble et al., 2013).

Developmental precursors of ToM abilities set in even earlier. As infants, humans begin to follow the eyes of their caregiver and create shared attention through so-called triadic interactions between this person, an object, and themselves. At this age, infants represent facts directly. At about 18 months of age, they begin to differentiate between real and fictional worlds and between their own and other people's feelings and desires, which enables them to build representations of what others might represent. They learn to understand that actions are driven by desires and become capable of *Level 1 perspective taking:* that another person may *not* see (and hence know) something that they themselves are able to see and know. *Level 2 perspective taking* requires the insight that the other person may see (and hence believe to be true) something that is *different* from what they themselves see and believe to be true. Whereas other primates are capable of perspective taking of Level 1, but arguably not of Level 2, human children begin to master Level 2 at around 4 years of age, when they realize that representations can be wrong, can be different for different people, and can change.

The task most frequently used to assess *Level 2 perspective taking* abilities is the false belief task. A meta-analysis of studies using this task revealed a largely robust pattern of findings across experimental conditions: Whereas almost all tested 3-year-olds failed, almost all 4.5-year-olds passed; the conceptual change typically took place between 41 and 48 months of age; and none of the investigated factors seemed to influence the development in any substantial manner (Wellman et al., 2001). Meanwhile, each of these three conclusions requires qualification. First, studies probing

spontaneous responses (e.g., through looking time) report *implicit* ToM abilities in much younger children, with even infants appearing to be sensitive to the beliefs of others (Scott & Baillargeon, 2017). However, both the replicability and interpretation of these findings remain controversial (Kulke et al., 2018; Schuwerk et al., 2018). Second, even when sticking to the traditional paradigms used to assess false belief representations in children, the age at which this ability begins to emerge has proven to be more variable than was previously assumed, differing by several years (Callaghan et al., 2005; De Gracia et al., 2016; D. Liu et al., 2008; Mayer & Träuble, 2013, 2015; Vinden, 1996). Finally, it emerged that its development is indeed sensitive to cognitive and social factors (Garfield et al., 2001).

The cognitive skill most strongly implicated in ToM performance is a cluster called executive function, which regulates the processes involving attention, working memory, task switching, or higher order activities such as planning. Executive function varies across individuals (Benson et al., 2013; Wang et al., 2016). Crucially for false belief representations, it also encompasses the inhibition of cognitive content or processes, which in turn helps coordinate the potentially conflicting representations that arise from taking different subjective perspectives (Apperly, 2012; Carlson et al., 2015; Rakoczy, 2010).

A second factor implicated in ToM performance is language, and this factor operates across several levels (Garfield et al., 2001; C. A. Miller, 2006). Timely and sufficient access to language is crucial in promoting ToM abilities, as attested to by studies with deaf children (Peterson & Siegal, 1999; Pyers & Senghas, 2009). Such studies have revealed, for instance, that late-signing children raised by nonsigning parents struggle more with ToM tasks compared both to hearing children and to native-signing children raised by signing parents (Woolfe et al., 2002). Moreover, if only a nascent form of sign language is available during childhood, this impairment can continue into adulthood (Pyers & Senghas, 2009). Obviously, being able to communicate through a full-fledged (sign or verbal) language opens up a unique window into the mental states of one's interlocutors, highlighting both the subjectivity of others' mental states and the need to consider them (Peterson & Slaughter, 2003). This is also reflected in findings of a correlation between individual language abilities and false-belief understanding in hearing children (Milligan et al., 2007). In addition, many languages contain explicit vocabulary for mental states, such as "want" or "believe," the usage of which raises awareness and helps direct attention to these states (Peterson & Slaughter, 2003; Ruffman et al., 2002). Finally, most languages also contain complement structures for recursive and nested expressions such as "Mum believes that dad knows that Timmy wants a puppy …," thereby providing the means for flexible embedding of mental-state content into mental-state activities (de Villiers & de Villiers, 2000; de Villiers & Pyers, 2002).

Languages differ, however, in the extent to which they emphasize mentalistic content. These differences are presumably the smallest with respect to the role of language for communication; they are greater in terms of syntactical structure, allowing for recursive and nested expressions; and they are greatest in terms of semantics, such as mental-state vocabulary. The scaffolding role of language for ToM abilities in humans is therefore also one door through which culture takes hold.

ToM Across Cultures

The ToM abilities emerging in childhood serve as the nucleus of a much more comprehensive, folk-psychological "ToM." The latter provides culturally accumulated, transmitted, and shared assumptions about what it is that drives people or why people respond to events in the way they do. These folk theories, including the foundational concept of mind itself, differ substantially across cultures (D'Andrade, 1987; Lillard, 1998; White & Kirkpatrick, 1985; Willard & McNamara, 2019). From the Western ethnopsychological point of view, mental states are triggered by other mental states and processes (e.g., knowledge arising from the perception of facts) and are decisive for people's behavior. Other ethnopsychologies accommodate the idea that mental states can also be triggered by, say, supernatural powers or rituals (e.g., Heelas & Lock, 1981; Luhrmann, 2012; Mageo & Howard, 1996) and provide additional or alternative accounts of behavior. Some of these accounts focus on social relationships and context rather than on mental states as the main driving forces of behavior and as an indicator of agency (e.g., Lutz, 1988; J. G. Miller, 1984; Norenzayan et al., 1999; ojalehto et al., 2017a, 2017b). The available research points to at least six distinct types of culture-specific theories of mind, including the one that informs conceptualization in cognitive science and psychology (Luhrmann, 2011). A crucial aspect in which these ethnotheories differ is the extent to which they presume a capacity for truly accessing other minds. For instance, whereas Western traditions emphasize the guest's privilege to choose, East Asian traditions expect the observant host to infer the guest's desires (Markus & Kitayama, 1991).

Importantly, these ethnotheories not only inform what people assume to be common ground and what to convey when communicating but also guide the way in which they raise their children. The culture-specific content of these theories therefore tends to reinforce the concepts that children acquire and the degree of attention they pay to them. Two types of ethnotheories in particular do not appear to be conducive to the early development of ToM abilities, one revolving around the opacity of other minds and the other emphasizing the transparency of language.

Ethnotheories grounded in the *opacity of other minds* prevail in Pacific societies (overview in Träuble et al., 2013). They consider mental states as ultimately private, deemphasize them as a topic of conversation, and discourage attempts to gain a first-person-like perspective on others (Robbins & Rumsey, 2008; Throop, 2008). In Samoa, for instance, adults are reluctant to draw and/or communicate inferences about the feelings, intentions, or thoughts of others. At the same time, children are expected to learn from observation rather than receiving explicit teaching (Gerber, 1985; Mageo, 1989, 1998; Ochs, 1988; Shore, 1982). While Samoan children learn to participate in rich and complex social interactions through social awareness and social responsiveness (Ochs & Izquierdo, 2009), this does not involve routine reflections on others' mental states (Mayer & Träuble, 2013, 2015).

Ethnotheories emphasizing the *transparency of language* are found in Central and South America. As they prioritize communication about objective observations over subjective views, mental-state vocabulary is limited and rarely resorted to (Danziger, 2006; Gaskins, 2013; Vinden, 1996). Junín Quechua, for instance, talk readily about the appearance of things—and even use grammatical markers to indicate the source of information as being direct

evidence, conjectural, or hearsay (Aikhenvald, 2004)—while mentalistic vocabulary is basically absent.

If mental states are not a regular topic of discourse, children have to discover by themselves what is going on in other people, or even that this might be important in the first place. Therefore, it would not be surprising if learning to read other minds were to take longer in the absence of mentalistic discourse than it does in a context in which other minds are discussed frequently and frankly. Correspondingly, both Samoan and Junín children tend to pass false belief tasks at a later age (Mayer & Träuble, 2013, 2015; Vinden, 1996). Alternatively, enculturation guided by an opacity theory may not necessarily impede children's emerging understanding of other minds but would at least interfere with it by providing conflicting signals. After all, these children are taught to ignore, and perhaps even distrust, their intuitions about others' mental states (Astuti, 2012; Keane, 2008). And if all the people around the child justify, evaluate, and sanction a person's behavior based on its consequences rather than on the mental states that motivated it, then drawing inferences on others' mental states from observable behavior should be not only more difficult but also less relevant (Bender & Beller, 2019; and see Astuti & Bloch, 2015).

The lack of large-scale surveys prevents us, for the time being, from drawing any conclusions about how widespread the cultural deemphasizing of mind reading might be. Still, the positive instances from broadly different populations do indicate the importance of cultural scaffolding for the development of ToM abilities, specifically for explicit mind reading (Heyes & Frith, 2014), and they point to the cultural diversity both in the content of folk theories of mind and their implications for mental-state reasoning (Lavelle, 2021). Interestingly enough, recent studies suggest that even in adults, the ability to distinguish between one's own and others' beliefs need not be routinely deployed when interpreting the actions of others (Conway et al., 2017; Heyes, 2014; Keysar et al., 2003; Phillips et al., 2015). Moreover, the degree of this dissociation, again, varies cross-culturally, with Western participants performing relatively poorly compared to participants from East Asian or Amerindian groups (Leung & Cohen, 2007; Unsworth, 2008; Wu & Keysar, 2007).

ToM in Early Sapiens Cognition

The first strategy for dealing with cultural diversity when reconstructing past cognition aims at filtering the diversity out in an attempt to identify which aspects of contemporary human cognition are widely shared, consequently allowing for a generalization back in time to core components of cognition in the Pleistocene. When trying to reconstruct the components of early sapiens cognition involved in mental-state reasoning, we therefore take as a starting point the set of abilities that humans share with their closest relatives, tentatively complemented by those that appear to be universal in cognitive development and shared across human populations. As detailed above, the abilities shared with nonhuman primates almost certainly include Level 1 perspective taking. Accordingly, our hominin ancestors would have been able to understand that another individual may or may not have access to the same information as they do, and hence may or may not know what they know. More tentatively, still, even an implicit understanding of false belief might have been part of pre- and early sapiens cognition, as has been reported for both human infants and nonhuman primates (albeit subject to debate).

At the same time, research across diverse human populations and specifically with home signers highlights the role of language for scaffolding the full set of ToM abilities. Our attempt to reconstruct early sapiens cognition would therefore crucially depend on whether or not our ancestors had a full-fledged language at their disposal. Although this has remained an unresolved and controversial issue, scientists seem increasingly prepared to predate the emergence at least of the use of symbols, if not of language itself, by an order of magnitude (Barham & Everett, 2021; Brooks et al., 2018; Dediu & Levinson, 2013; Fisher & Marcus, 2006; Henshilwood et al., 2018; Johansson, 2011; Lieberman, 2015), and hence well into the reach of the populations under scrutiny. Even if we take language use for granted, however, inferences about the scope of their ToM abilities would then depend on the extent to which these languages contained recursive structure and mental-state vocabulary. Under the hypothesis that these early languages were similar to present-day languages, it would be safe to infer that their users were capable of mind reading, including advanced false belief understanding. Still, the degree to which they practiced and routinely activated these abilities would have further depended on their ethnopsychological theories. Alternatively, one might hypothesize that, when languages developed, the absence of explicit guidance would have rendered it harder to comprehend the subjectivity of mental states (as described by Pyers & Senghas, 2009). On this account, mental-state vocabulary would have been a downstream development occurring later in time.

Unaided by firm evidence on the availability of language, we are then unable to infer when our ancestors became fully capable of Level 2 perspective taking: recognizing that another individual might both believe something that conflicts with one's own beliefs and then behave based on this diverging belief. However, it would be safe to assume that they were aware of other people's mental states and of the motivational force that such mental states may exert on behavior. Indeed, we might even conjecture that becoming able to communicate mental states in the interest of shared intentionality and cooperation would have been a potent driving force in the development of both more general language abilities and of mentalistic content. Note, though, that with the increasing ability to elaborate ethnopsychological theories against this backdrop, the cultural esteem for mind reading may have shifted, with some groups, throughout human history, emphasizing its value and setting incentives for practicing it and others discouraging its application.

Capitalizing on Cultural Diversity

The strategy described in the previous section is to *filter out* cultural diversity in order to identify the widely shared aspects of contemporary human cognition that would, in turn, afford the vantage ground from which to unlock core components of cognition in the Pleistocene. An alternative strategy *capitalizes* on precisely this cultural diversity and harnesses it to retrace the evolutionary trajectories that spawned it, all the way back to the ancestral states.

One means to achieve this ambitious goal is the phylogenetic comparative method, a cluster of Bayesian computational models borrowed from evolutionary biology (Harvey & Pagel, 1991; Mace & Pagel, 1997). The three major ingredients of this method are an initial estimate of group relatedness, one or several sets of

contemporary data related to the trait under scrutiny from as many groups as possible, and a concrete model of the evolutionary dynamics assumed (Cornwell & Nakagawa, 2017; Levinson & Gray, 2012). Evolutionary processes vary along several dimensions, including the rate of substitutions or changes, the extent to which cross-lineage borrowing (horizontal transmission) and hybridization take place, or whether traits are discrete versus continuous (Nascimento et al., 2017, p. 1447). For instance, when studying ethnolinguistic groups, "history" can take several forms: passive inheritance from an ancestral condition, diffusion, or local innovation (character replacement). While standard Bayesian models tailored for branching trees account well for inheritance and innovation, a high degree of borrowing requires network models that reflect the particular dynamics of many phenomena of cultural evolution (Greenhill et al., 2009; Nelson-Sathi et al., 2011).

For questions of cultural evolution, the world's languages serve as a proxy for the initial delineation of the phylogenetic structure. To reflect the uncertainty regarding single branching patterns and the amount of evolution along branches, models operate on a set of plausible trees rather than a single tree by applying Bayesian (Markov Chain Monte Carlo) algorithms (Levinson & Gray, 2012).

For the actual analysis, data points on the trait under scrutiny (say, information on how these groups trace descent) are mapped onto the tips of the language tree in order to rerun evolution and infer ancestral states of the trait (here: how the common ancestor of the groups was tracing descent). When adding a second set of data (say, whether or not each of these groups keeps large livestock), the approach can be used to determine the degree to which the two traits coevolve and even which of the two, if any, has driven the transformation of the other (for the example used here, the analysis showed that when Bantu-speaking groups acquired cattle, they changed from matrilineal to patrilineal or mixed descent; Holden & Mace, 2003).

Importantly, such a phylogenetic approach addresses two problems that afflict more traditional approaches: It controls for *Galton's problem* (i.e., that cultural groups may be related to varying degrees), and it establishes causal direction, whereas cross-cultural comparisons only generate correlational data at best. Each of its three components comes with a degree of uncertainty, though. First, tree-building methods are not perfect, especially when sampling (be it of genomes, terminal taxa, or ethnolinguistic groups) is limited, such that nodes can be misplaced and ancestral nodes wrongly inferred. Second, for most analyses based on a phylogenetic approach, the variable under scrutiny is described in terms of present/absent trait lists, thereby ignoring within-group variation. And third, the model chosen may not be adequate to capture the complex dynamics of trait evolution through space and time (Cornwell & Nakagawa, 2017).

Keeping these caveats in mind, phylogenetic comparative models can still be powerful tools. In fact, for the task at hand, they generate valuable insights by helping not only to detect whether, when, and how a trait changed but also whether such changes are the outcome of systematic transformations rather than random changes and under which conditions they are likely to occur (Levinson & Gray, 2012; Mace & Holden, 2005). In the last two decades, a phylogenetic approach has been used to address a diverse set of questions, ranging from migration history (Gray et al., 2009; Gray & Jordan, 2000) to the evolution of linguistic patterns (Dunn et al., 2011; Hua et al., 2019), sociocultural traits (T. E. Currie et al., 2010; Jordan et al., 2009), and even cognitive representations (Haun et al., 2006).

In the following, we illustrate the approach for one of the most ephemeral phenomena of human cognition—religious beliefs—in an attempt to trace the diversification of their content back into the prehistoric past.

Beliefs as Cornerstones of Religion

Religion is a complex, multidimensional, and largely ubiquitous part of human culture that evades consensual definitions (Willard, 2018). As the social and emotional dimensions of religion in particular tend to account for the attractiveness and proliferation of distinct religious traditions, these dimensions have also garnered a considerable amount of research in the social sciences, with a primary focus on their role in fostering group cohesion (e.g., Alcorta & Sosis, 2005), promoting trust and prosocial behavior (Norenzayan et al., 2016; Norenzayan & Shariff, 2008), and creating an experience of others' presence (Luhrmann, 2020), as well as an interest in the motivational power of rituals, their role in cultural transmission, and their grounding in the proclivity for high-fidelity copying (e.g., Atran & Henrich, 2010; Nielsen, 2018; Nielsen et al., 2020; Whitehouse, 2021). Our focus, by contrast, is on the *cognitive* content of religions, which is furnished by and large by the set of beliefs revolving around certain supernatural entities and/or forces. These beliefs are regarded as so pivotal to religious traditions that the latter are often categorized in terms of the former. Hazarding oversimplification, the remainder of this presentation will adopt a categorization into five fundamental types of beliefs, as used in recent attempts to reconstruct their evolutionary trajectories (Peoples et al., 2016):

- animistic beliefs in a vital force entailing intentionality, as permeating all living beings as well as major natural phenomena
- beliefs in an afterlife
- beliefs in the abilities of shamans (and presumably ritual specialists more generally) to communicate with the spirit world in the service of group cohesion and healing
- beliefs associated with ancestor worship, such as that the spirits of deceased kin continue to take an interest in their group's life (from inactive observers to active participants that can influence and be influenced by the living)
- beliefs in supreme beings, such as single creator deities or moralizing high gods (again from inactive to active observers, judges, and prosecutors)

To be regarded as religious rather than idiosyncratic, beliefs have to be culturally shared and transmitted. This does not imply that all members of a group subscribe to all the beliefs circulating within it, supernatural or otherwise (Gatewood, 2011, 2012). Interindividual variation is substantial also in this domain and has probably been so throughout human history (Caldwell-Harris, 2012; Luhrmann et al., 2021; Norenzayan & Gervais, 2013). Still, religious beliefs have been part of every known human society, permeating everyday life for the faithful and being intertwined, to different degrees, with a range of cultural domains, from social norms and values to political ideologies and organization.

As such, religious beliefs are a hallmark of human ways of thinking and the very epitome of diversification. In fact, few other domains so central to human culture are more strongly fragmented and separated by (occasionally subliminal) differences, with every new twist creating a new denomination and even the attempt to reconcile two closely related denominations likely culminating in the creation of a third denomination. Since religious beliefs are contingent on transmission and therefore subject to cultural evolution (including borrowing and hybridization), their present-day diversity provides a potent leverage to untangle past transformations and ancestral states of such beliefs.

Retracing the Evolution of Religious Beliefs

The origin of religious beliefs has been a topic of both armchair speculation and scientific study for centuries. Much of the effort in this regard has focused on identifying, through purely logical analysis, the most "elementary form of religious life" (for an excellent overview and discussion of such early theories of primitive religion, see Evans-Pritchard, 1965). For instance, Tylor (1871), the founder of British social anthropology and of the anthropological investigation of religion, regarded animism as the ancestral state of all religions. Marett (1914), who succeeded Tylor as Reader in Anthropology at Oxford, considered belief in *mana* (termed "animatism" by others) as a preanimistic religious belief. Scottish anthropologist Lang (1900), and especially the padres of the Vienna school of anthropology (e.g., Schmidt, 1912–1955), advocated a primeval belief in a supreme being. Much more recently, psychologists Rossano (2006) and Dunbar (1998, 2013) have joined those who favor shamanistic manifestations such as ecstatic states, social bonding, and healing rituals as foundational (see also Eliade, 1959; Lewis-Williams, 2010).

Despite this age-old history of conjecture about the earliest forms of religion and the driving forces in its evolution, researchers have only recently begun to systematically test the proposed hypotheses. Among these, a small handful of studies have sampled present-day diversity to explore the evolution of religious traits (e.g., Basava et al., 2021; Matthews, 2012; Peoples et al., 2016; Watts et al., 2016) or the conditions under which specific beliefs emerge and thrive, mostly with a focus on moralizing high gods (Botero et al., 2014; Peoples & Marlowe, 2012; Watts et al., 2015). Of specific interest to the goal of our article are those studies that attempt to reconstruct ancestral states closer to the origins of religion and the probable order(s) of transition.

The most pertinent of these studies (Peoples et al., 2016) analyzed data on religious traits for a global sample of 33 hunter–gatherer societies. Because contemporary hunter–gatherers do not belong to a single language family, the authors adopted a phylogenetic supertree method combining linguistic and genetic data (Duda & Zrzavý, 2016). Their variable of interest was the content of religious belief, categorized as one of the five types outlined above, two of them (ancestors and high gods) with two manifestations each, one passive and one active. Each society in the sample was coded for each of the seven types (present or absent); the codings were then mapped onto the supertree and subjected to phylogenetic analyses in order to reconstruct ancestral states and retrace their evolutionary trajectories, including the direction of change.

This approach not only revealed that animistic beliefs are present among all of the contemporary hunter–gatherer groups in the sample—an observation that does not hold for any of the other types of belief—but also indicated that these beliefs would have been the one major ingredient of the religious world of ancestral hunter–gatherer groups. The results were more equivocal regarding beliefs in an afterlife (present in 79% of contemporary groups), shamans (79%), and ancestor worship (45%), but all were more likely to have emerged in the presence of animistic beliefs. Moreover, they likely occurred in the order of mention, that is, afterlife beliefs tend to arise once animism is established, and shamanism once both animistic and afterlife beliefs are established. Ancestor worship, finally, appears to presuppose and depend upon afterlife beliefs and shamanism. Interestingly, none of these—not even the belief in an afterlife—has coevolved with a belief in high gods. The latter is not widespread in contemporary hunter–gatherer groups (39% for all forms of high gods, 15% for active gods), and given that the egalitarian ethos of mobile and self-sufficient hunter–gatherer groups runs counter to an acknowledgment of supremacy, such a belief, especially in a single and active supreme being, is unlikely to have been endorsed by ancestral groups (Peoples et al., 2016).

In a nutshell, the findings obtained by Peoples et al. (2016) support Tylor's (1871) account according to which animism is the core of all religions and their most probable origin—an account that also stands to reason from a theoretical perspective: Assuming a vital force (or "soul") inherent in all living beings would be the conceptual foundation for further elaboration, such as that it may persist after the death of the body or that ritual specialists like shamans are capable of having it embark on a spiritual journey. Such findings are not incompatible with Rossano's (2006) proposal, in which notions of the supernatural are preceded by ecstatic states and rituals for social bonding—at least insofar as these do not rely on a shamanistic worldview—but they do refute the supposition of a primeval belief in an active supreme being, as advocated by Lang (1900) or Schmidt (1912–1955).

The latter conclusion that the belief in high gods was not a prevalent part of ancestral religion is further supported by a second phylogenetic study based on data from 96 Austronesian ethno-linguistic groups, which tested the relationship between creed and political complexity. The authors found moralizing high gods to be a distinctly downstream phenomenon that follows from political complexity (Watts et al., 2015).

As engaging as the approach described here may be, it depends on a careful selection of evolutionary model, phylogenetic tree, and coding strategies (e.g., Slingerland et al., 2023). Moreover, it is constrained by the established time depth of available language phylogenies (in the case of typical phylogenetic analyses) or written sources (e.g., when using the global history databank *Seshat*; Turchin et al., 2015). Extrapolating evolutionary trajectories further into the past therefore requires triangulation with additional data sets, such as the genetic data informing the supertree method proposed by Duda and Zrzavý (2016), or with complementary approaches such as that outlined earlier for filtering out cultural diversity.

Triangulation Across Diversity-Based Approaches

In the previous sections, we presented two strategies for dealing with cultural diversity when reconstructing past cognition—one that attempts to filter it out and the other that tries to capitalize on it—and we illustrated them for ToM abilities and religious beliefs,

respectively. These two examples not only represent key cognitive abilities but are also tightly linked to one another, with beliefs in and about nonphysical and nonvisible conditions featuring centrally in both ToM reasoning and religion (Luhrmann & Weisman, 2022). This allows us to combine what we know about each of them in order to triangulate our inferences.

In marked distinction to the prevailing tendency in mainstream cognitive science, the cognitive science of religion (J. L. Barrett, 2011; Pyysiäinen, 2013) considered the diversity of its subject from the outset. The establishment that—despite variation in content—religious beliefs do share some fundamental characteristics was thus a major achievement rather than the unquestioned starting point. In search for the psychological mechanisms that would account for these systematic patterns, this line of research recognizes the continuity of regular and religious cognition and also explores the extent to which the latter may be beneficial and adaptive (e.g., Atran & Norenzayan, 2004; J. L. Barrett & Lanman, 2008; Boyer, 1994, 2003; Guthrie, 1993), thereby offering a rational explanation for apparently irrational beliefs. Combining the two diversity-based approaches can therefore advance our understanding of how religious beliefs evolved by addressing key questions such as: Which mechanisms generate and perpetuate the human propensity for beliefs in counterintuitive claims? Which factors have caused or constrained changes in such beliefs? And when in the history of our genus did these come within reach?

Cognitive Underpinnings of Religious Beliefs

A commonality of most religious beliefs is the combination of characteristics that bolster their credibility and persistence. Typically revolving around supernatural entities or incidents, such beliefs appear strongly counterfactual to all but the faithful. At the same time, they tend to be only minimally counterintuitive. Supernatural agents, for instance, combine a few implausible physical features with largely plausible psychological features, thus remaining so similar to natural agents that social relationships can be entertained. This combination of features renders religious beliefs both interesting and comprehensible, which makes them intuitively compelling and easier to remember—hence facilitating cultural sharing, retention, and transmission (Atran & Norenzayan, 2004; J. L. Barrett, 2000; Boyer & Ramble, 2001; Kelly & Keil, 1985; White et al., 2021; for a critical assessment, see Purzycki & Willard, 2016).

Due to their largely counterfactual nature, religious beliefs are still harder to buy into, though (Luhrmann, 2020; Willard et al., 2016). Often, they refer to incidents for which more "natural" explanations are also available, without necessarily replacing them. Religious beliefs can coexist with other (say, magical or technical) beliefs held by the same person on the same subject and even with conflicting beliefs, for instance, about whether life ends with death. To a certain extent, religious beliefs thus provide a complementary account for the same situation but from a different, culturally revered perspective (Astuti & Harris, 2008; Legare et al., 2012; Luhrmann & Weisman, 2022). This important role of cultural transmission and embedding for the stabilization of such supernatural beliefs is also attested to by the observation that they appear to be relatively weak in children and grow stronger with age (Astuti & Harris, 2008; H. C. Barrett & Behne, 2005; Bering et al., 2005; Lane & Harris, 2014).

In terms of content, most religious beliefs share the presupposition of a vital force inherent in living beings, endowing them with life, will, and occasionally communicative capacities, all of which are cues of agency. Like the vital force on which it is predicated, agency may be distinctively conceived, assigned to a variable range of species and major natural phenomena, and/or extended to inanimate, invisible, if not nonexistent entities. Since Tylor (1871), scholars have proposed that such beliefs might be triggered and reinforced by experiencing the presence of others in dreams or that images and ideas simply "cross one's mind" out of the blue, suggesting a porous boundary between mind and world (Luhrmann & Weisman, 2022).

Importantly, while vitalistic concepts and assignment of agency appear to be foundational to all beliefs in the supernatural, they do not necessarily engender them, as they may also be implicated in "purely" folk-biological reasoning (Inagaki & Hatano, 2002; Solomon & Zaitchik, 2012), even if stretched beyond the range of species generally deemed appropriate (ojalehto et al., 2017a, 2017b). It is precisely because of its relevance for identifying biological entities that the ability to detect agency in one's natural environment may have leveraged the emergence of supernatural beliefs. So central is this ability in regular everyday cognition, and so early does it manifest in ontogenetic development, that many researchers propose a cognitive system specifically dedicated to this task (Leslie, 1994; Saxe et al., 2005; Spelke & Kinzler, 2007). And as it would clearly be more advantageous to err on the side of false positives, the prevailing theory in the field attributes the emergence of religious beliefs, and especially of animistic beliefs, to this system being hypersensitive and hence overreacting (e.g., Guthrie, 1993; and see Atran & Norenzayan, 2004; J. L. Barrett & Lanman, 2008; Boyer, 2008). Combined with a strong tendency for anthropomorphization, this overreaction paves the way to more easily, say, "see" faces in some features of landscape, "hear" voices in the rustle of leaves, or "perceive" will and intention in the movements of clouds, in the activities of thunderstorms and fires, or the obstinacy of traffic lights and computers.

Taken together, the characteristics outlined above could account for both the early emergence, the wide distribution, and the persistence of such beliefs: While a hypersensitive system for agency detection would have induced some individuals to believe in supernatural agency, the "minimally counterintuitive" nature of some such beliefs would have rendered them ideal tokens of cultural sharing and transmission, further supported by their service for group cohesion (Boudry, 2019; Dissanayake, 1979; Van Leeuwen & van Elk, 2019). So, how might such an account help us narrow down the time period in which religious beliefs would have emerged in the history of our species?

Religious Beliefs Within Early Sapiens Cognition

In the last three decades, a number of authors have proposed explicit accounts of the origin of religion, specific religious beliefs (including disbelief), and their social functions (e.g., Atran & Henrich, 2010; Boyer, 1994, 2003; Dunbar, 2013; Luhrmann, 2020; Murray & Moore, 2009; Nielsen et al., 2020; Norenzayan & Gervais, 2013; Norenzayan & Shariff, 2008; Peoples & Marlowe, 2012; Sterelny, 2018). Two accounts that explicitly address early sapiens cognition and either focus on religious beliefs more generally or include them as the key component are the phylogenetic study of religious beliefs described earlier (Peoples et al., 2016) and a theoretical account of the evolution of religion in terms of the

"religious mind" (Rossano, 2006). Each takes a hyperactive agency detection system as the starting point but also involves ToM abilities as crucial for religious beliefs.

As noted earlier, the phylogenetic analyses conducted by Peoples et al. (2016) supported the hypothesis that animism was the earliest trait of religion. The authors consider this way of thinking to be a natural byproduct both of those processes devoted to agency detection and of a more general ToM mechanism. As this ToM mechanism is also claimed to have predated language, Peoples et al. conjecture that such animistic beliefs "would have been present in early hominins" (2016, p. 274), that is, prior to *H. erectus* broadly defined (i.e., *H. erectus sensu lato*, according to Antón, 2013).

Linking insights into the religious mind with data from anthropology and archeology, Rossano (2006) proposes a three-stage model of how religion evolved: from "prereligion" (arising at 300,000 years ago [300 kya]) via "transitional religion" (150 kya) to "Upper Paleolithic religion" (35 kya). In this sequence, shamanistic manifestations such as ecstatic states and rituals for social bonding are considered foundational, whereas supernatural beliefs would have emerged relatively late, evoked by some rudimentary overassignment of agency in the transitional stage. In Rossano's view, however, this would have spawned a conception of the supernatural not before the Upper Paleolithic, when modern human brains were believed to have emerged. Only then would our ancestors have achieved the capacities for remembering and interpreting altered states of consciousness, which, together with language, allowed them to generate overarching supernatural frameworks. Like Peoples et al. (2016), Rossano (2006, p. 356) links agency detection to ToM abilities, but he goes further by asserting that supernatural agency even presupposes several levels of metarepresentation attainable only in higher order ToM reasoning.

In claiming ToM to be a precondition for the emergence of even the most basic religious beliefs, both Peoples and colleagues and Rossano follow Dunbar (2003; and see Dunbar, 2013), who, however, focuses on the social dimension of religion and hence foregrounds concepts and rituals that he takes to serve social cohesion and compliance with rules and norms. Our approach deviates from this group of suppositions on two crucial points.

First, based on the insights compiled so far, we concede that ToM abilities might have been conducive to integrating larger social groups, but we dispute the asserted indispensability of ToM abilities for ancestral religious beliefs. If Peoples et al. (2016) are correct that animistic beliefs are ancestral for and foundational to subsequent types of religious beliefs, and if such beliefs result from an overassignment of agency (Guthrie, 1993), then advanced ToM abilities would neither be required for explaining the emergence of religious beliefs nor would they have had to predate them.

If the account of a hyperactive agency detection system described in the previous section holds any water, then individual sensations of supernatural agency would have become possible as soon as that system was in place (or turned hyperactive). For all we know, this might not be confined to the human species or even the hominin line. Detecting agency in its simplest forms—that is, *animate agency* and *intentional agency* (as opposed to *mentalistic agency*; Gonçalves & Carvalho, 2019)—gets by with attention to basic cues for life (such as self-propelled motion) and intentional behavior (such as goal-directed activities), respectively (e.g., Carey, 2009; Csibra et al., 1999; Heider & Simmel, 1944). Neither of these abilities is reliant on an elaborate concept of mental states or perspective taking. What is more, sensitivity to these agency cues is also observed in nonhuman species (Gonçalves & Carvalho, 2019; Taylor et al., 2012), and if hypersensitivity to such cues is adaptive in humans, there is no reason to assume that this would be any different in our closest nonhuman relatives. They, too, would benefit from overascribing life and potentially harmful intentions to hidden sources of unaccounted perceptions. On this view, animistic thinking (as the most ancestral state of religious beliefs) might actually be phylogenetically old enough to be within reach for several presapiens species (one caveat is discussed below), but in either case substantially older than the Upper Paleolithic.

Accordingly, whether the source of agency is regarded simply as an abstract vital force or conceptualized as a distinct entity to which, for lack of a better generic term, we might tentatively refer as "soul" (i.e., the very essence of animistic beliefs), holding such a belief would not require any advanced ToM abilities. Even if this vital force or "soul" is believed to linger on after the death of the body, mentalistic notions need not be implicated. It is only when such souls or spirits are conceived of as interfering with one's affairs and communication with them is sought (as in shamanism, ancestor worship, or sacrifices and prayers to gods) that these beliefs involve an awareness of mental states that may differ from, or conflict with, one's own mental state, such as knowledge diverging from one's own knowledge. Put differently, to the extent that more ToM abilities come within reach, those already holding animistic beliefs might be increasingly prepared to incorporate mental agency: by adding a notion of "spirit" to that of vital force or "soul," ascribing more mental states to their supernatural agents, coming up with novel features such as that this soul/spirit can temporarily leave (e.g., in trance) or outlive the body (afterlife), and even designing novel agents (such as ancestral spirits and gods). Moreover, to the extent that more advanced ToM abilities are recruited for incorporating mentalistic concepts into religious beliefs, the latter would—and increasingly so—become subject to impacts of cultural traditions and practices that are as similarly diversifying as ToM itself.

The second aspect in which our approach deviates significantly from the proposals discussed earlier is its emphasis on language. Even though individuals (human as much as nonhuman) in the same situation may experience similar apparitions based on similar interpretations of the same perception, the emerging beliefs would remain isolated, idiosyncratic mental representations that may be revised by new experiences or consolidated via superstitious behavior. To qualify as *religious* beliefs, such individual representations would have to become communal. Sharing them with others not only results in greater distribution of their content but may also lead to them being incorporated into an explanatory framework, having meaning assigned to them, and being culturally reinforced and transmitted. In turn, this may even calibrate the cognitive processes that generated those beliefs so that, over time, perceiving the respective entities or activities becomes easier once a belief in them has gained a foothold. To the extent, however, that assignment of meaning to, and sharing of, mental representations presupposes a tool for communication powerful enough to capture and denote ephemeral notions and counterfactual states, it would be contingent on language. On this view, religious beliefs were indeed confined to hominins as the only line known to have developed such a powerful communication tool.

To sum up, combining the two methodological approaches described in the previous sections yields new insights that constitute a critical step forward for our understanding of the cognitive abilities of our early sapiens ancestors and of how these abilities emerged and evolved: Compared to previous proposals, such as those of Dunbar (2003) or Rossano (2006), it allows us to substantially predate the origins of religious beliefs, conjecturing animistic thinking and its extension to entities beyond the biological domain as a part of early sapiens cognition from the outset. And although sympathetic to the overassignment of (animate and intentional) agency as the causal mechanism for the emergence of such beliefs, it shifts the focus from ToM abilities to the language faculty as the major enabling precondition for the formation of religious beliefs.

Conclusion

The impact of culture on human cognition, as a scaffold in both development and evolution and as a source of variation, is profound. And yet, most approaches in human evolution studies underestimate or neglect the extent of cognitive diversity in the past as in the present. Human culture rests on the predisposition for shared intentionality, instructional teaching, and language. Jointly, these enable knowledge, practices, and behaviors to be transmitted and accumulated but also diversified, the latter via mechanisms such as innovation, borrowing, and cultural exaptation. As one case in point, language in particular appears to be fundamental in both unlocking and shaping characteristic human cognitive traits such as mental-state reasoning. By allowing humans to express and communicate mental states in distinct ways, the linguistic repertoires for mind reading also engender cultural differences in the developmental trajectories of such abilities. This becomes palpable, for instance, in the order of steps in which mentalizing unfolds in English- versus Samoan- and Quechua-speaking children.

The main argument developed here is that culture plays a dual role for cognition—both as a scaffold and as a means of diversification—and that for any attempt to reconstruct early sapiens cognition, this cognitive diversity must be taken seriously, regardless of the challenges it poses. Yet, we also propose how to remedy the challenges. Specifically, we suggest harnessing, and ideally combining, two complementary strategies: one that aims at filtering out diversity and the other at capitalizing on it.

The former strategy builds on cross-cultural and interspecies comparisons, alongside studies on cognitive development, to aid in inferring the presence or absence of certain key aspects of cognition among pre- and early sapiens populations. We illustrate the strategy for ToM abilities, building on current views of ToM as composed of different sociocognitive skills. Some of these skills are present in several nonhuman animals (including Level 1 perspective taking being found in great apes) and must therefore have been widespread among hominins. Level 2 perspective taking, by contrast, does seem to be uniquely human, subject to cultural variation, and closely linked to linguistic communication. Our comparative approach thus indicates that this latter ability would only have arisen with, or soon after, the acquisition of language abilities.

The second strategy capitalizes on cognitive diversity to trace the cultural evolution that produced it, illustrated for the classic anthropological question on the origin of religious beliefs. Analyzing massive data sets with phylogenetic comparative methods supports the hypothesis that animistic thinking lays the foundation for human religious beliefs.

Combining the two strategies, finally, points to Level 1 perspective taking as one of the psychological mechanisms underpinning religious cognition, as it triggers the attribution of agency, intentionality, and social motivation to other living and even nonliving entities. Because Level 1 perspective taking is thought to have been available to pre- and early sapiens populations, we consider it likely that animistic thinking, too, may have emerged early in the history of our genus. Turning such individual sensations into religious beliefs, though, depends on communication and cultural sharing. On this view, the emergence of religious beliefs would have been predicated on language rather than on higher order ToM abilities, as has often been claimed (for debates on potential interdependences between the two, see, e.g., Dunbar, 1998; Stade, 2020; Sterelny, 2012).

By now, it will have become clear that a great deal of our ability to reconstruct early sapiens cognition hinges on estimates of when, exactly, humans began to develop and use full-fledged languages. While still hotly debated, this timing is increasingly ascribed to a deep chronology, predating our species. The implications of, hence, not early language but early languages, are vast and involve substantial cultural and cognitive diversity of both early and possibly even presapiens groups. For instance, we should consider the possibility that different populations of Neanderthals and early *Homo sapiens*, each with their own language(s), would have had different cognitive approaches and arrived at different solutions to similar problems. This could partly explain the disparity of the archeological record despite the comparable brain size and cognitive power of these groups.

As Lewontin (1983) suggested, one of Darwin's greatest contributions was to show that variation should be the object of study for the natural sciences. We argue that, similarly, culturally induced diversity should receive more attention in cognitive research, as it is the locus of continuous selection and thus the driver of cognitive and behavioral evolution. Focusing on diversity further opens the door to multi- and interdisciplinary collaborations and to a plurality of methods and theories, with the potential to help us better understand the kind of mind that was at work in those famous South African caves—and ultimately how we became what we are today.

References

Aikhenvald, A. (2004). *Evidentiality*. Oxford University Press.

Alcorta, C. S., & Sosis, R. (2005). Ritual, emotion, and sacred symbols: The evolution of religion as an adaptive complex. *Human Nature*, *16*(4), 323–359. https://doi.org/10.1007/s12110-005-1014-3

Antón, S. C. (2013). Homo erectus and related taxa. In D. R. Begun (Ed.), *A companion to paleoanthropology* (pp. 497–516). Wiley-Blackwell. https://doi.org/10.1002/9781118332344.ch26

Apperly, I. A. (2012). What is "theory of mind"? Concepts, cognitive processes and individual differences. *Quarterly Journal of Experimental Psychology*, *65*(5), 825–839. https://doi.org/10.1080/17470218.2012.676055

Astington, J. W. (1993). *The child's discovery of the mind*. Harvard University Press.

Astuti, R. (2012). Some after dinner thoughts on theory of mind. *Anthropology of This Century*, *3*. http://eprints.lse.ac.uk/41536/

Astuti, R., & Bloch, M. (2015). The causal cognition of wrong doing: Incest, intentionality, and morality. *Frontiers in Psychology*, *6*, Article 136. https://doi.org/10.3389/fpsyg.2015.00136

Astuti, R., & Harris, P. L. (2008). Understanding mortality and the life of the ancestors in rural madagascar. *Cognitive Science*, *32*(4), 713–740. https://doi.org/10.1080/03640210802066907

Atran, S. (1998). Folk biology and the anthropology of science: Cognitive universals and cultural particulars. *Behavioral and Brain Sciences*, *21*(4), 547–569. https://doi.org/10.1017/S0140525X98001277

Atran, S., & Henrich, J. (2010). The evolution of religion: How cognitive by-products, adaptive learning heuristics, ritual displays, and group competition generate deep commitments to prosocial religions. *Biological Theory*, *5*(1), 18–30. https://doi.org/10.1162/BIOT_a_00018

Atran, S., & Medin, D. L. (2008). *The native mind and the cultural construction of nature*. MIT Press. https://doi.org/10.7551/mitpress/7683.001.0001

Atran, S., & Norenzayan, A. (2004). Religion's evolutionary landscape: Counterintuition, commitment, compassion, communion. *Behavioral and Brain Sciences*, *27*(6), 713–730. https://doi.org/10.1017/S0140525X04000172

Bailenson, J. N., Shum, M. S., Atran, S., Medin, D. L., & Coley, J. D. (2002). A bird's eye view: Biological categorization and reasoning within and across cultures. *Cognition*, *84*(1), 1–53. https://doi.org/10.1016/S0010-0277(02)00011-2

Bang, M., & Medin, D. (2010). Cultural processes in science education: Supporting the navigation of multiple epistemologies. *Science Education*, *94*(6), 1008–1026. https://doi.org/10.1002/sce.20392

Bang, M., Medin, D. L., & Atran, S. (2007). Cultural mosaics and mental models of nature. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(35), 13868–13874. https://doi.org/10.1073/pnas.0706627104

Baquedano, E., Arsuaga, J. L., Pérez-González, A., Laplana, C., Márquez, B., Huguet, R., Gómez-Soler, S., Villaescusa, L., Galindo-Pellicena, M. A., Rodríguez, L., García-González, R., Ortega, M. C., Martín-Perea, D. M., Ortega, A. I., Hernández-Vivanco, L., Ruiz-Liso, G., Gómez-Hernanz, J., Alonso-Martín, J. I., Abrunhosa, A., … Higham, T. (2023). A symbolic Neanderthal accumulation of large herbivore crania. *Nature Human Behaviour*, *7*(3), 342–352. https://doi.org/10.1038/s41562-022-01503-7

Barham, L., & Everett, D. (2021). Semiotics and the origin of language in the Lower Palaeolithic. *Journal of Archaeological Method and Theory*, *28*(2), 535–579. https://doi.org/10.1007/s10816-020-09480-9

Baron-Cohen, S. (1995). *Mindblindness*. MIT Press. https://doi.org/10.7551/mitpress/4635.001.0001

Barrett, H. C., & Behne, T. (2005). Children's understanding of death as the cessation of agency: A test using sleep versus death. *Cognition*, *96*(2), 93–108. https://doi.org/10.1016/j.cognition.2004.05.004

Barrett, J. L. (2000). Exploring the natural foundations of religion. *Trends in Cognitive Sciences*, *4*(1), 29–34. https://doi.org/10.1016/S1364-6613(99)01419-9

Barrett, J. L. (2011). Cognitive science of religion: Looking back, looking forward. *Journal for the Scientific Study of Religion*, *50*(2), 229–239. https://doi.org/10.1111/j.1468-5906.2011.01564.x

Barrett, J. L., & Lanman, J. A. (2008). The science of religious beliefs. *Religion*, *38*(2), 109–124. https://doi.org/10.1016/j.religion.2008.01.007

Barry, H., Child, I. L., & Bacon, M. K. (1959). Relation of child training to subsistence economy. *American Anthropologist*, *61*(1), 51–63. https://doi.org/10.1525/aa.1959.61.1.02a00080

Basava, K., Zhang, H., & Mace, R. (2021). A phylogenetic analysis of revolution and afterlife beliefs. *Nature Human Behaviour*, *5*(5), 604–611. https://doi.org/10.1038/s41562-020-01013-4

Beller, S., & Bender, A. (Eds.). (2015). Exploring cognitive diversity: Anthropological perspectives on cognition. *Topics in Cognitive Science*, *7*(4), 547–688. https://doi.org/10.1111/tops.12160

Beller, S., Bender, A., & Song, J. (2009). Conditional promises and threats in Germany, China, and Tonga: Cognition and emotion. *Journal of Cognition and Culture*, *9*(1–2), 115–139. https://doi.org/10.1163/156853709X414674

Bender, A. (2019). Language and thought. In R. J. Sternberg & J. Funke (Eds.), *The psychology of human thought: An introduction* (pp. 213–233). Heidelberg University Publishing. https://doi.org/10.17885/heiup.470.c6675

Bender, A. (2020a). The role of culture and evolution for human cognition. *Topics in Cognitive Science*, *12*(4), 1403–1420. https://doi.org/10.1111/tops.12449

Bender, A. (2020b). What early sapience cognition can teach us: Untangling cultural influences on human cognition across time. *Frontiers in Psychology*, *11*, Article 99. https://doi.org/10.3389/fpsyg.2020.00099

Bender, A., & Beller, S. (2014a). Mangarevan invention of binary steps for easier calculation. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(4), 1322–1327. https://doi.org/10.1073/pnas.1309160110

Bender, A., & Beller, S. (2014b). Mapping spatial frames of reference onto time: A review of theoretical accounts and empirical findings. *Cognition*, *132*(3), 342–382. https://doi.org/10.1016/j.cognition.2014.03.016

Bender, A., & Beller, S. (2016). Current perspectives on cognitive diversity. *Frontiers in Psychology*, *7*, Article 509. https://doi.org/10.3389/fpsyg.2016.00509

Bender, A., & Beller, S. (2019). The cultural fabric of human causal cognition. *Perspectives on Psychological Science*, *14*(6), 922–940. https://doi.org/10.1177/1745691619863055

Bender, A., Beller, S., & Medin, D. L. (2017). Causal cognition and culture. In M. R. Waldmann (Ed.), *The Oxford handbook of causal reasoning* (pp. 717–738). Oxford University Press.

Bender, A., & Gatewood, J. B. (2021). Knowledge *is* belief—and shaped by culture. *Behavioral and Brain Sciences*, *44*, Article e143. https://doi.org/10.1017/S0140525X20001582

Bender, A., & Oterhals, Å. (in press). Relying on grandma's mushrooms: How cultural models affect appraisals of edibility. In G. Bennardo, V. C. de Munck, & S. Chrisomalis (Eds.), *Culture in and out of the mind: Cultural model theory*. Palgrave-McMillan.

Benson, J. E., Sabbagh, M. A., Carlson, S. M., & Zelazo, P. D. (2013). Individual differences in executive functioning predict preschoolers' improvement from theory-of-mind training. *Developmental Psychology*, *49*(9), 1615–1627. https://doi.org/10.1037/a0031056

Bering, J. M., Hernández-Blasi, C., & Bjorklund, D. F. (2005). The development of "afterlife" beliefs in secularly and religiously schooled children. *British Journal of Developmental Psychology*, *23*(4), 587–607. https://doi.org/10.1348/026151005X36498

Berl, R. E., & Hewlett, B. S. (2015). Cultural variation in the use of overimitation by the Aka and Ngandu of the Congo Basin. *PLOS ONE*, *10*(3), Article e0120180. https://doi.org/10.1371/journal.pone.0120180

Berlin, B. (1992). *Ethnobiological classification: Principles of categorization of plants and animals in traditional societies* (2nd ed.). Princeton University Press. https://doi.org/10.1515/9781400862597

Berlin, B., Breedlove, D. E., & Raven, P. H. (1973). General principles of classification and nomenclature in folk biology. *American Anthropologist*, *75*(1), 214–242. https://doi.org/10.1525/aa.1973.75.1.02a00140

Berry, J. W. (1966). Temne and Eskimo perceptual skills. *International Journal of Psychology*, *1*(3), 207–229. https://doi.org/10.1080/00207596608247156

Berry, J. W. (1967). Independance and conformity in subsistence-level societies. *Journal of Personality and Social Psychology*, *7*(4), 415–418. https://doi.org/10.1037/h0025231

Bialystok, E., Craik, F. I. M., & Luk, G. (2012). Bilingualism: Consequences for mind and brain. *Trends in Cognitive Sciences*, *16*(4), 240–250. https://doi.org/10.1016/j.tics.2012.03.001

Blasi, D. E., Henrich, J., Adamou, E., Kemmerer, D., & Majid, A. (2022). Over-reliance on English hinders cognitive science. *Trends in Cognitive Sciences*, *26*(12), 1153–1170. https://doi.org/10.1016/j.tics.2022.09.015

Boroditsky, L. (2001). Does language shape thought? Mandarin and English speakers' conceptions of time. *Cognitive Psychology*, *43*(1), 1–22. https://doi.org/10.1006/cogp.2001.0748

Boroditsky, L. (2018). Language and the construction of time through space. *Trends in Neurosciences*, *41*(10), 651–653. https://doi.org/10.1016/j.tins.2018.08.004

Boster, J. S. (1988). Natural sources of internal category structure: Typicality, familiarity, and similarity of birds. *Memory & Cognition*, *16*(3), 258–270. https://doi.org/10.3758/BF03197759

Botero, C. A., Gardner, B., Kirby, K. R., Bulbulia, J., Gavin, M. C., & Gray, R. D. (2014). The ecology of religious beliefs. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(47), 16784–16789. https://doi.org/10.1073/pnas.1408701111

Boudry, M. (2019). The cultural buck stops somewhere: The origin of supernatural belief and the role of agency detection. *Religion, Brain & Behavior*, *9*(3), 253–255. https://doi.org/10.1080/2153599X.2018.1453532

Boyd, R., & Richerson, P. J. (1988). *Culture and the evolutionary process*. University of Chicago Press.

Boyer, P. (1994). *The naturalness of religious ideas: A cognitive theory of religion*. University of California Press. https://doi.org/10.1525/9780520911628

Boyer, P. (2003). Religious thought and behaviour as by-products of brain function. *Trends in Cognitive Sciences*, *7*(3), 119–124. https://doi.org/10.1016/S1364-6613(03)00031-7

Boyer, P. (2008). Being human: Religion: Bound to believe? *Nature*, *455*(7216), 1038–1039. https://doi.org/10.1038/4551038a

Boyer, P., & Ramble, C. (2001). Cognitive templates for religious concepts: Cross-cultural evidence for recall of counter-intuitive representations. *Cognitive Science*, *25*(4), 535–564. https://doi.org/10.1207/s15516709cog2504_2

Boyette, A. H., & Hewlett, B. S. (2017). Autonomy, equality, and teaching among Aka foragers and Ngandu farmers of the Congo Basin. *Human Nature*, *28*(3), 289–322. https://doi.org/10.1007/s12110-017-9294-y

Boyette, A. H., & Hewlett, B. S. (2018). Teaching in hunter–gatherers. *Review of Philosophy and Psychology*, *9*(4), 771–797. https://doi.org/10.1007/s13164-017-0347-2

Bräuer, J., Call, J., & Tomasello, M. (2007). Chimpanzees really know what others can see in a competitive situation. *Animal Cognition*, *10*(4), 439–448. https://doi.org/10.1007/s10071-007-0088-1

Brooks, A. S., Yellen, J. E., Potts, R., Behrensmeyer, A. K., Deino, A. L., Leslie, D. E., Ambrose, S. H., Ferguson, J. R., d'Errico, F., Zipkin, A. M., Whittaker, S., Post, J., Veatch, E. G., Foecke, K., & Clark, J. B. (2018). Long-distance stone transport and pigment use in the earliest Middle Stone Age. *Science*, *360*(6384), 90–94. https://doi.org/10.1126/science.aao2646

Buckley, C., & Steele, J. (2002). Evolutionary ecology of spoken language: Co-evolutionary hypotheses are testable. *World Archaeology*, *34*(1), 26–46. https://doi.org/10.1080/00438240220134241

Bugnyar, T. (2007). An integrative approach to the study of 'theory-of-mind'-like abilities in ravens. *Japanese Journal of Animal Psychology*, *57*(1), 15–27. https://doi.org/10.2502/janip.57.1.2

Burdett, E. R. R., Dean, L. G., & Ronfard, S. (2018). A diverse and flexible teaching toolkit facilitates the human capacity for cumulative culture. *Review of Philosophy and Psychology*, *9*(4), 807–818. https://doi.org/10.1007/s13164-017-0345-4

Burge, T. (2018). Do infants and nonhuman animals attribute mental states? *Psychological Review*, *125*(3), 409–434. https://doi.org/10.1037/rev0000091

Buttelmann, D., Buttelmann, F., Carpenter, M., Call, J., & Tomasello, M. (2017). Great apes distinguish true from false beliefs in an interactive helping task. *PLOS ONE*, *12*(4), Article e0173793. https://doi.org/10.1371/journal.pone.0173793

Caldwell-Harris, C. L. (2012). Understanding atheism/non-belief as an expected individual-differences variable. *Religion, Brain & Behavior*, *2*(1), 4–23. https://doi.org/10.1080/2153599X.2012.668395

Call, J. (2009). Contrasting the social cognition of humans and nonhuman apes: The shared intentionality hypothesis. *Topics in Cognitive Science*, *1*(2), 368–379. https://doi.org/10.1111/j.1756-8765.2009.01025.x

Call, J., & Tomasello, M. (1999). A nonverbal false belief task: The performance of children and great apes. *Child Development*, *70*(2), 381–395. https://doi.org/10.1111/1467-8624.00028

Call, J., & Tomasello, M. (2008). Does the chimpanzee have a theory of mind? 30 years later. *Trends in Cognitive Sciences*, *12*(5), 187–192. https://doi.org/10.1016/j.tics.2008.02.010

Callaghan, T., Rochat, P., Lillard, A., Claux, M. L., Odden, H., Itakura, S., Tapanya, S., & Singh, S. (2005). Synchrony in the onset of mental-state reasoning: Evidence from five cultures. *Psychological Science*, *16*(5), 378–384. https://doi.org/10.1111/j.0956-7976.2005.01544.x

Carey, S. (2009). *The origin of concepts*. Oxford University Press.

Carlson, S. M., Claxton, L. J., & Moses, L. J. (2015). The relation between executive function and theory of mind is more than skin deep. *Journal of Cognition and Development*, *16*(1), 186–197. https://doi.org/10.1080/15248372.2013.824883

Choi, I., Dalal, R., Kim-Prieto, C., & Park, H. (2003). Culture and judgment of causal relevance. *Journal of Personality and Social Psychology*, *84*(1), 46–59. https://doi.org/10.1037/0022-3514.84.1.46

Cibelli, E., Xu, Y., Austerweil, J. L., Griffiths, T. L., & Regier, T. (2016). The Sapir-Whorf Hypothesis and probabilistic inference: Evidence from the domain of color. *PLOS ONE*, *11*(7), Article e0158725. https://doi.org/10.1371/journal.pone.0158725

Colagè, I., & d'Errico, F. (2020). Culture: The driving force of human cognition. *Topics in Cognitive Science*, *12*(2), 654–672. https://doi.org/10.1111/tops.12372

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

Conway, J. R., & Bird, G. (2018). Conceptualizing degrees of theory of mind. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(7), 1408–1410. https://doi.org/10.1073/pnas.1722396115

Conway, J. R., Lee, D., Ojaghi, M., Catmur, C., & Bird, G. (2017). Submentalizing or mentalizing in a Level 1 perspective-taking task: A cloak and goggles test. *Journal of Experimental Psychology: Human Perception and Performance*, *43*(3), 454–465. https://doi.org/10.1037/xhp0000319

Cornwell, W., & Nakagawa, S. (2017). Phylogenetic comparative methods. *Current Biology*, *27*(9), R333–R336. https://doi.org/10.1016/j.cub.2017.03.049

Cosmides, L., & Tooby, J. (2013). Evolutionary psychology: New perspectives on cognition and motivation. *Annual Review of Psychology*, *64*(1), 201–229. https://doi.org/10.1146/annurev.psych.121208.131628

Csibra, G., & Gergely, G. (2009). Natural pedagogy. *Trends in Cognitive Sciences*, *13*(4), 148–153. https://doi.org/10.1016/j.tics.2009.01.005

Csibra, G., Gergely, G., Bíró, S., Koós, O., & Brockbank, M. (1999). Goal attribution without agency cues: The perception of 'pure reason' in infancy. *Cognition*, *72*(3), 237–267. https://doi.org/10.1016/S0010-0277(99)00039-6

Currie, A., & Killin, A. (2019). From things to thinking: Cognitive archaeology. *Mind & Language*, *34*(2), 263–279. https://doi.org/10.1111/mila.12230

Currie, T. E., Greenhill, S. J., Gray, R. D., Hasegawa, T., & Mace, R. (2010). Rise and fall of political complexity in island South-East Asia and the Pacific. *Nature*, *467*(7317), 801–804. https://doi.org/10.1038/nature09461

D'Andrade, R. G. (1987). A folk model of the mind. In D. Holland & N. Quinn (Eds.), *Cultural models in language and thought* (pp. 112–148).

Cambridge University Press. https://doi.org/10.1017/CBO9780511607660.006

D'Andrade, R. G. (1995). *The development of cognitive anthropology*. Cambridge University Press. https://doi.org/10.1017/CBO9781139166645

d'Errico, F., & Banks, W. E. (2015). The archaeology of teaching: A conceptual framework. *Cambridge Archaeological Journal*, *25*(4), 859–866. https://doi.org/10.1017/S0959774315000384

d'Errico, F., & Colagè, I. (2018). Cultural exaptation and cultural neural reuse: A mechanism for the emergence of modern culture and behavior. *Biological Theory*, *13*(4), 213–227. https://doi.org/10.1007/s13752-018-0306-x

d'Errico, F., Doyon, L., Colagé, I., Queffelec, A., Le Vraux, E., Giacobini, G., Vandermeersch, B., & Maureille, B. (2018). From number sense to number symbols. An archaeological perspective. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *373*, Article 20160518. https://doi.org/10.1098/rstb.2016.0518

Dally, J. M., Emery, N. J., & Clayton, N. S. (2010). Avian theory of mind and counter espionage by food-caching western scrub-jays (*Aphelocoma californica*). *European Journal of Developmental Psychology*, *7*(1), 17–37. https://doi.org/10.1080/17405620802571711

Danziger, E. (2006). The thought that counts: Interactional consequences of variation in cultural theories of meaning. In N. J. Enfield & S. C. Levinson (Eds.), *Roots of human sociality* (pp. 259–278). Berg.

Davies, I., & Corbett, G. (1994). The basic color terms of Russian. *Linguistics*, *32*(1), 65–90. https://doi.org/10.1515/ling.1994.32.1.65

de Boer, B. (2017). Evolution of speech and evolution of language. *Psychonomic Bulletin & Review*, *24*(1), 158–162. https://doi.org/10.3758/s13423-016-1130-6

De Gracia, M. R. L., Peterson, C. C., & de Rosnay, M. (2016). A cultural conundrum: Delayed false-belief understanding in Filipino children. *Journal of Cross-Cultural Psychology*, *47*(7), 929–940. https://doi.org/10.1177/0022022116655790

de Munck, V. C., & Bennardo, G. (2019). Disciplining culture. *Current Anthropology*, *60*(2), 174–193. https://doi.org/10.1086/702470

de Villiers, J. G., & de Villiers, P. A. (2000). Linguistic determinism and the understanding of false beliefs. In P. Mitchell & K. J. Riggs (Eds.), *Children's reasoning and the mind* (pp. 191–228). Psychology Press. https://scholarworks.umass.edu/aae_groundwork/15

de Villiers, J. G., & Pyers, J. E. (2002). Complements to cognition: A longitudinal study of the relationship between complex syntax and false-belief-understanding. *Cognitive Development*, *17*(1), 1037–1060. https://doi.org/10.1016/S0885-2014(02)00073-4

de Waal, F. B., & Ferrari, P. F. (2010). Towards a bottom-up perspective on animal and human cognition. *Trends in Cognitive Sciences*, *14*(5), 201–207. https://doi.org/10.1016/j.tics.2010.03.003

Dean, L. G., Vale, G. L., Laland, K. N., Flynn, E., & Kendal, R. L. (2014). Human cumulative culture: A comparative perspective. *Biological Reviews of the Cambridge Philosophical Society*, *89*(2), 284–301. https://doi.org/10.1111/brv.12053

Dediu, D., & Ladd, D. R. (2007). Linguistic tone is related to the population frequency of the adaptive haplogroups of two brain size genes, ASPM and Microcephalin. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(26), 10944–10949. https://doi.org/10.1073/pnas.0610848104

Dediu, D., & Levinson, S. C. (2013). On the antiquity of language: The reinterpretation of Neandertal linguistic capacities and its consequences. *Frontiers in Psychology*, *4*, Article 397. https://doi.org/10.3389/fpsyg.2013.00397

Dehaene, S., & Cohen, L. (2007). Cultural recycling of cortical maps. *Neuron*, *56*(2), 384–398. https://doi.org/10.1016/j.neuron.2007.10.004

Dehaene, S., Cohen, L., Morais, J., & Kolinsky, R. (2015). Illiterate to literate: Behavioural and cerebral changes induced by reading acquisition. *Nature Reviews Neuroscience*, *16*(4), 234–244. https://doi.org/10.1038/nrn3924

Dissanayake, E. (1979). An ethological view of ritual and art in human evolutionary history. *Leonardo*, *12*(1), 27–31. https://doi.org/10.2307/1574079

Dolscheid, S., Shayan, S., Majid, A., & Casasanto, D. (2013). The thickness of musical pitch: Psychophysical evidence for linguistic relativity. *Psychological Science*, *24*(5), 613–621. https://doi.org/10.1177/0956797612457374

Dor, D., & Jablonka, E. (2010). Plasticity and canalization in the evolution of linguistic communication: An evolutionary developmental approach. In R. K. Larson, V. Déprez, & H. Yamakido (Eds.), *The evolution of human language: Biolinguistic perspectives* (pp. 135–147). Cambridge University Press. https://doi.org/10.1017/CBO9780511817755.010

Duda, P., & Zrzavý, J. (2016). Human population history revealed by a supertree approach. *Scientific Reports*, *6*(1), Article 29890. https://doi.org/10.1038/srep29890

Dunbar, R. I. M. (1998). The social brain hypothesis. *Evolutionary Anthropology*, *6*(5), 178–190. https://doi.org/10.1002/(SICI)1520-6505(1998)6:5<178::AID-EVAN5>3.0.CO;2-8

Dunbar, R. I. M. (2003). The social brain: Mind, language, and society in evolutionary perspective. *Annual Review of Anthropology*, *32*(1), 163–181. https://doi.org/10.1146/annurev.anthro.32.061002.093158

Dunbar, R. I. M. (2013). The origin of religion as a small-scale phenomenon. In S. Clarke, R. Powell, & J. Savulescu (Eds.), *Religion, intolerance, and conflict: A scientific and conceptual investigation* (pp. 48–66). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199640911.003.0003

Dunn, M., Greenhill, S. J., Levinson, S. C., & Gray, R. D. (2011). Evolved structure of language shows lineage-specific trends in word-order universals. *Nature*, *473*(7345), 79–82. https://doi.org/10.1038/nature09923

Duranti, A. (1993). Truth and intentionality: An ethnographic critique. *Cultural Anthropology*, *8*(2), 214–245. https://doi.org/10.1525/can.1993.8.2.02a00050

Durham, W. H. (1991). *Coevolution: Genes, culture, and human diversity*. Stanford University Press. https://doi.org/10.1515/9781503621534

Eliade, M. (1959). *The sacred and the profane: The nature of religion*. Houghton Mifflin Harcourt.

Enfield, N. J., & Levinson, S. C. (Eds.). (2006). *Roots of human sociality*. Berg.

Erickson, P. I. (2007). *Ethnomedicine*. Waveland Press.

Evans, N., & Levinson, S. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences*, *32*(5), 429–448. https://doi.org/10.1017/S0140525X0999094X

Evans-Pritchard, E. E. (1965). *Theories of primitive religion*. Clarendon Press.

Fisher, S. E., & Marcus, G. F. (2006). The eloquent ape: Genes, brains and the evolution of language. *Nature Reviews. Genetics*, *7*(1), 9–20. https://doi.org/10.1038/nrg1747

Fisher, S. E., & Ridley, M. (2013). Evolution: Culture, genes, and the human revolution. *Science*, *340*(6135), 929–930. https://doi.org/10.1126/science.1236171

Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99*(4), 689–723. https://doi.org/10.1037/0033-295X.99.4.689

Fitch, W. T. (2010). *The evolution of language*. Cambridge University Press. https://doi.org/10.1017/CBO9780511817779

Fodor, J. A. (1992). A theory of the child's theory of mind. *Cognition*, *44*(3), 283–296. https://doi.org/10.1016/0010-0277(92)90004-2

Frensch, P. A., & Rünger, D. (2003). Implicit learning. *Current Directions in Psychological Science*, *12*(1), 13–18. https://doi.org/10.1111/1467-8721.01213

Gallois, S., & Reyes-García, V. (2018). Children and ethnobiology. *Journal of Ethnobiology*, *38*(2), 155–169. https://doi.org/10.2993/0278-0771-38.2.155

Garfield, J. L., Peterson, C. C., & Perry, T. (2001). Social cognition, language acquisition and the development of the theory of mind. *Mind & Language*, *16*(5), 494–541. https://doi.org/10.1111/1468-0017.00180

Gaskins, S. (2013). Pretend play as culturally constructed activity. In M. Taylor (Ed.), *The Oxford handbook of the development of imagination* (pp. 224–247). Oxford University Press.

Gatewood, J. B. (1983). Loose talk: Linguistic competence and recognition ability. *American Anthropologist*, *85*(2), 378–387. https://doi.org/10.1525/aa.1983.85.2.02a00100

Gatewood, J. B. (2011). Personal knowledge and collective representations. In D. B. Kronenfeld, G. Bennardo, V. C. de Munck, & M. D. Fischer (Eds.), *A companion to cognitive anthropology* (pp. 102–114). Wiley-Blackwell. https://doi.org/10.1002/9781444394931.ch6

Gatewood, J. B. (2012). Cultural models, consensus analysis, and the social organization of knowledge. *Topics in Cognitive Science*, *4*(3), 362–371. https://doi.org/10.1111/j.1756-8765.2012.01197.x

Gauvain, M., Munroe, R. L., & Beebe, H. (2013). Children's questions in cross-cultural perspective: A four-culture study. *Journal of Cross-Cultural Psychology*, *44*(7), 1148–1165. https://doi.org/10.1177/0022022113485430

Geipel, J., Hadjichristidis, C., & Surian, L. (2015). The foreign language effect on moral judgment: The role of emotions and norms. *PLOS ONE*, *10*(7), Article e0131529. https://doi.org/10.1371/journal.pone.0131529

Gerber, E. R. (1985). Rage and obligation: Samoan emotion in conflict. In G. M. White & J. Kirkpatrick (Eds.), *Person, self and experience: Exploring Pacific ethnopsychologies* (pp. 121–167). University of California Press.

Gladwin, T. (1970). *East is a big bird: Navigation and logic on Puluwat Atoll*. Harvard University Press. https://doi.org/10.4159/9780674037625

Gonçalves, A., & Carvalho, S. (2019). Death among primates: A critical review of non-human primate interactions towards their dead and dying. *Biological Reviews of the Cambridge Philosophical Society*, *94*(4), 1502–1529. https://doi.org/10.1111/brv.12512

Goodenough, W. (1957). Cultural anthropology and linguistics. In Paul L. Garvin (Ed.), *Report of the seventh annual round table meeting on linguistics and language study* (pp. 167–173). Georgetown University.

Gray, R. D., Drummond, A. J., & Greenhill, S. J. (2009). Language phylogenies reveal expansion pulses and pauses in Pacific settlement. *Science*, *323*(5913), 479–483. https://doi.org/10.1126/science.1166858

Gray, R. D., & Jordan, F. M. (2000). Language trees support the express-train sequence of Austronesian expansion. *Nature*, *405*(6790), 1052–1055. https://doi.org/10.1038/35016575

Greenhill, S. J., Currie, T. E., & Gray, R. D. (2009). Does horizontal transmission invalidate cultural phylogenies? *Proceedings of the Royal Society B. Biological Sciences*, *276*(1665), 2299–2306. https://doi.org/10.1098/rspb.2008.1944

Güntürkün, O., Güntürkün, M., & Hahn, C. (2015). Whistled Turkish alters language asymmetries. *Current Biology*, *25*(16), R706–R708. https://doi.org/10.1016/j.cub.2015.06.067

Gunz, P., Bookstein, F. L., Mitteroecker, P., Stadlmayr, A., Seidler, H., & Weber, G. W. (2009). Early modern human diversity suggests subdivided population structure and a complex out-of-Africa scenario. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(15), 6094–6098. https://doi.org/10.1073/pnas.0808160106

Guthrie, S. (1993). *Faces in the clouds: A New theory of religion*. Oxford University Press.

Haidle, M. N. (2010). Working-memory capacity and the evolution of modern cognitive potential: Implications from animal and early human tool use. *Current Anthropology*, *51*(Suppl. 1), S149–S166. https://doi.org/10.1086/650295

Haidle, M. N. (2014). Building a bridge-an archeologist's perspective on the evolution of causal cognition. *Frontiers in Psychology*, *5*, Article 1472. https://doi.org/10.3389/fpsyg.2014.01472

Hammarström, H., Forkel, R., Haspelmath, M., & Bank, S. (2022). *Glottolog 4.7*. Max Planck Institute for Evolutionary Anthropology. Retrieved June 21, 2023, from http://glottolog.org

Hardy, B. L., Moncel, M. H., Kerfant, C., Lebon, M., Bellot-Gurlet, L., & Mélard, N. (2020). Direct evidence of Neanderthal fibre technology and its cognitive and behavioral implications. *Scientific Reports*, *10*(1), Article 4889. https://doi.org/10.1038/s41598-020-61839-w

Hare, B., Call, J., Agnetta, B., & Tomasello, M. (2000). Chimpanzees know what conspecifics do and do not see. *Animal Behaviour*, *59*(4), 771–785. https://doi.org/10.1006/anbe.1999.1377

Hare, B., Call, J., & Tomasello, M. (2001). Do chimpanzees know what conspecifics know? *Animal Behaviour*, *61*(1), 139–151. https://doi.org/10.1006/anbe.2000.1518

Hare, B., & Tomasello, M. (2005). Human-like social skills in dogs? *Trends in Cognitive Sciences*, *9*(9), 439–444. https://doi.org/10.1016/j.tics.2005.07.003

Harvey, P. H., & Pagel, M. D. (1991). *The comparative method in evolutionary biology*. Oxford University Press.

Haun, D. B., Rapold, C. J., Call, J., Janzen, G., & Levinson, S. C. (2006). Cognitive cladistics and cultural override in Hominid spatial cognition. *Proceedings of the National Academy of Sciences of the United States of America*, *103*(46), 17568–17573. https://doi.org/10.1073/pnas.0607999103

Hayakawa, S., Costa, A., Foucart, A., & Keysar, B. (2016). Using a foreign language changes our choices. *Trends in Cognitive Sciences*, *20*(11), 791–793. https://doi.org/10.1016/j.tics.2016.08.004

Heelas, P., & Lock, A. (Eds.). (1981). *Indigenous psychologies*. Academic Press.

Heider, F., & Simmel, M. (1944). An experimental study of apparent behavior. *The American Journal of Psychology*, *57*(2), 243–259. https://doi.org/10.2307/1416950

Henrich, J. (2016). *The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter*. Princeton University Press. https://doi.org/10.1515/9781400873296

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N. S., Hill, K., Gil-White, F., Gurven, M., Marlowe, F. W., Patton, J. Q., & Tracer, D. (2005). "Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, *28*(6), 795–815. https://doi.org/10.1017/S0140525X05000142

Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., Cardenas, J. C., Gurven, M., Gwako, E., Henrich, N., Lesorogol, C., Marlowe, F., Tracer, D., & Ziker, J. (2010). Markets, religion, community size, and the evolution of fairness and punishment. *Science*, *327*(5972), 1480–1484. https://doi.org/10.1126/science.1182238

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*(2–3), 61–83. https://doi.org/10.1017/S0140525X0999152X

Henry, A. G. (2017). Neanderthal cooking and the costs of fire. *Current Anthropology*, *58*(Suppl. 16), S329–S336. https://doi.org/10.1086/692095

Henshilwood, C. S., d'Errico, F., van Niekerk, K. L., Dayet, L., Queffelec, A., & Pollarolo, L. (2018). An abstract drawing from the 73,000-year-old levels at Blombos Cave, South Africa. *Nature*, *562*(7725), 115–118. https://doi.org/10.1038/s41586-018-0514-3

Henshilwood, C. S., d'Errico, F., Yates, R., Jacobs, Z., Tribolo, C., Duller, G. A., Mercier, N., Sealy, J. C., Valladas, H., Watts, I., & Wintle, A. G. (2002). Emergence of modern human behavior: Middle stone age engravings from South Africa. *Science*, *295*(5558), 1278–1280. https://doi.org/10.1126/science.1067575

Henshilwood, C. S., & Marean, C. W. (2003). The origin of modern human behavior. *Current Anthropology*, *44*(5), 627–651. https://doi.org/10.1086/377665

Hewlett, B. S., & Roulette, C. J. (2016). Teaching in hunter–gatherer infancy. *Royal Society Open Science*, *3*(1), Article 150403. https://doi.org/10.1098/rsos.150403

Heyes, C. M. (1993). Imitation, culture and cognition. *Animal Behaviour*, *46*(5), 999–1010. https://doi.org/10.1006/anbe.1993.1281

Heyes, C. M. (2014). Submentalizing: I am not really reading your mind. *Perspectives on Psychological Science*, *9*(2), 131–143. https://doi.org/10.1177/1745691613518076

Heyes, C. M. (2018). *Cognitive gadgets: The cultural evolution of thinking*. Harvard University Press.

Heyes, C. M., & Frith, C. D. (2014). The cultural evolution of mind reading. *Science*, *344*(6190), Article 1243091. https://doi.org/10.1126/science.1243091

Hoehl, S., Keupp, S., Schleihauf, H., McGuigan, N., Buttelmann, D., & Whiten, A. (2019). 'Over-imitation': A review and appraisal of a decade of research. *Developmental Review*, *51*, 90–108. https://doi.org/10.1016/j.dr.2018.12.002

Hoffecker, J. F. (2018). The complexity of Neanderthal technology. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(9), 1959–1961. https://doi.org/10.1073/pnas.1800461115

Hoffmann, D. L., Standish, C. D., García-Diez, M., Pettitt, P. B., Milton, J. A., Zilhão, J., Alcolea-González, J. J., Cantalejo-Duarte, P., Collado, H., de Balbín, R., Lorblanchet, M., Ramos-Muñoz, J., Weniger, G. C., & Pike, A. W. G. (2018). U-Th dating of carbonate crusts reveals Neandertal origin of Iberian cave art. *Science*, *359*(6378), 912–915. https://doi.org/10.1126/science.aap7778

Holden, C. J., & Mace, R. (2003). Spread of cattle led to the loss of matrilineal descent in Africa: A coevolutionary analysis. *Proceedings of the Royal Society B: Biological Sciences*, *270*(1532), 2425–2433. https://doi.org/10.1098/rspb.2003.2535

Horner, V., & Whiten, A. (2005). Causal knowledge and imitation/emulation switching in chimpanzees (*Pan troglodytes*) and children (*Homo sapiens*). *Animal Cognition*, *8*(3), 164–181. https://doi.org/10.1007/s10071-004-0239-6

Hua, X., Greenhill, S. J., Cardillo, M., Schneemann, H., & Bromham, L. (2019). The ecological drivers of variation in global language diversity. *Nature Communications*, *10*(1), Article 2047. https://doi.org/10.1038/s41467-019-09842-2

Hublin, J.-J., Ben-Ncer, A., Bailey, S. E., Freidline, S. E., Neubauer, S., Skinner, M. M., Bergmann, I., Le Cabec, A., Benazzi, S., Harvati, K., & Gunz, P. (2017). New fossils from Jebel Irhoud, Morocco and the pan-African origin of Homo sapiens. *Nature*, *546*(7657), 289–292. https://doi.org/10.1038/nature22336

Huettig, F., & Mishra, R. K. (2014). How literacy acquisition affects the illiterate mind: A critical examination of theories and evidence. *Language and Linguistics Compass*, *8*(10), 401–427. https://doi.org/10.1111/lnc3.12092

Hutchins, E. (1983). Understanding Micronesian navigation. In D. Gentner & A. L. Stevens (Eds.), *Mental models* (pp. 191–225). Lawrence Erlbaum.

Inagaki, K., & Hatano, G. (2002). *Young children's naive thinking about the biological world*. Psychology Press.

Jaubert, J., Verheyden, S., Genty, D., Soulier, M., Cheng, H., Blamart, D., Burlet, C., Camus, H., Delaby, S., Deldicque, D., Edwards, R. L., Ferrier, C., Lacrampe-Cuyaubère, F., Lévêque, F., Maksud, F., Mora, P., Muth, X., Régnier, É., Rouzaud, J. N., … Santos, F. (2016). Early Neanderthal constructions deep in Bruniquel Cave in Southwestern France. *Nature*, *534*(7605), 111–114. https://doi.org/10.1038/nature18291

Johansson, S. (2011). Constraining the time when language evolved. *Linguistic and Philosophical Investigations*, *10*, 45–59. https://www.proquest.com/scholarly-journals/constraining-time-when-language-evolved/docview/880289523/se-2

Jordan, F. M., Gray, R. D., Greenhill, S. J., & Mace, R. (2009). Matrilocal residence is ancestral in Austronesian societies. *Proceedings of the Royal Society B. Biological Sciences*, *276*(1664), 1957–1964. https://doi.org/10.1098/rspb.2009.0088

Kaminski, J., Call, J., & Tomasello, M. (2008). Chimpanzees know what others know, but not what they believe. *Cognition*, *109*(2), 224–234. https://doi.org/10.1016/j.cognition.2008.08.010

Kano, F., Krupenye, C., Hirata, S., Tomonaga, M., & Call, J. (2019). Great apes use self-experience to anticipate an agent's action in a false-belief test. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(42), 20904–20909. https://doi.org/10.1073/pnas.1910095116

Kay, P., & Kempton, W. (1984). What is the Sapir-Whorf hypothesis? *American Anthropologist*, *86*(1), 65–79. https://doi.org/10.1525/aa.1984.86.1.02a00050

Kay, P., & Regier, T. (2006). Language, thought and color: Recent developments. *Trends in Cognitive Sciences*, *10*(2), 51–54. https://doi.org/10.1016/j.tics.2005.12.007

Keane, W. (2008). Others, other minds, and others' theories of other minds: An afterword on the psychology and politics of opacity claims. *Anthropological Quarterly*, *81*(2), 473–482. https://doi.org/10.1353/anq.0.0000

Kelly, M. H., & Keil, F. C. (1985). The more things change …: Metamorphoses and conceptual structure. *Cognitive Science*, *9*(4), 403–416. https://doi.org/10.1207/s15516709cog0904_2

Keysar, B., Lin, S., & Barr, D. J. (2003). Limits on theory of mind use in adults. *Cognition*, *89*(1), 25–41. https://doi.org/10.1016/S0010-0277(03)00064-7

Klein, R. G. (1995). Anatomy, behavior, and modern human origins. *Journal of World Prehistory*, *9*(2), 167–198. https://doi.org/10.1007/BF02221838

Klein, R. G. (2019). Population structure and the evolution of *Homo sapiens* in Africa. *Evolutionary Anthropology*, *28*(4), 179–188. https://doi.org/10.1002/evan.21788

Klein, R. G., & Edgar, B. (2002). *The dawn of human culture*. Wiley.

Kline, M. A. (2015). How to learn about teaching: An evolutionary framework for the study of teaching behavior in humans and other animals. *Behavioral and Brain Sciences*, *38*, Article e31. https://doi.org/10.1017/S0140525X14000090

Köster, M., Torréns, M. G., Kärtner, J., Itakura, S., Cavalcante, L., & Kanngiesser, P. (2022). Parental teaching behavior in diverse cultural contexts. *Evolution and Human Behavior*, *43*(5), 432–441. https://doi.org/10.1016/j.evolhumbehav.2022.07.002

Kroll, J. F., Bobb, S. C., & Hoshino, N. (2014). Two languages in mind: Bilingualism as a tool to investigate language, cognition, and the brain. *Current Directions in Psychological Science*, *23*(3), 159–163. https://doi.org/10.1177/0963721414528511

Krupenye, C., & Call, J. (2019). Theory of mind in animals: Current and future directions. *Wiley Interdisciplinary Reviews: Cognitive Science*, *10*(6), Article e1503. https://doi.org/10.1002/wcs.1503

Krupenye, C., Kano, F., Hirata, S., Call, J., & Tomasello, M. (2016). Great apes anticipate that other individuals will act according to false beliefs. *Science*, *354*(6308), 110–114. https://doi.org/10.1126/science.aaf8110

Kulke, L., von Duhn, B., Schneider, D., & Rakoczy, H. (2018). Is implicit theory of mind a real and robust phenomenon? Results from a systematic replication study. *Psychological Science*, *29*(6), 888–900. https://doi.org/10.1177/0956797617747090

Lancy, D. F., & Grove, M. A. (2010). Learning guided by others. In D. F. Lancy, S. Gaskins, & J. Bock (Eds.), *The anthropology of learning in childhood* (pp. 145–179). Alta-Mira Press.

Lane, J. D., & Harris, P. L. (2014). Confronting, representing, and believing counterintuitive concepts: Navigating the natural and the supernatural. *Perspectives on Psychological Science*, *9*(2), 144–160. https://doi.org/10.1177/1745691613518078

Lang, A. (1900). *The making of religion*. Genesis Publishing.

Lavelle, J. S. (2021). The impact of culture on mindreading. *Synthese*, *198*(7), 6351–6374. https://doi.org/10.1007/s11229-019-02466-5

Lawson, R. (2006). The science of cycology: Failures to understand how everyday objects work. *Memory & Cognition*, *34*(8), 1667–1675. https://doi.org/10.3758/BF03195929

Lazar-Meyn, H. A. (2004). Color naming: "grue" in the Celtic languages of British Isles. *Psychological Science*, *15*(4), 288. https://doi.org/10.1111/j.0956-7976.2004.00669.x

Legare, C. H., Evans, E. M., Rosengren, K. S., & Harris, P. L. (2012). The coexistence of natural and supernatural explanations across cultures and development. *Child Development*, *83*(3), 779–793. https://doi.org/10.1111/j.1467-8624.2012.01743.x

Legare, C. H., & Nielsen, M. (2015). Imitation and innovation: The dual engines of cultural learning. *Trends in Cognitive Sciences*, *19*(11), 688–699. https://doi.org/10.1016/j.tics.2015.08.005

Legare, C. H., Sobel, D. M., & Callanan, M. (2017). Causal learning is collaborative: Examining explanation and exploration in social contexts. *Psychonomic Bulletin & Review*, *24*(5), 1548–1554. https://doi.org/10.3758/s13423-017-1351-3

Leslie, A. M. (1994). ToMM, ToBy, and agency: Core architecture and domain specificity in cognition and culture. In L. A. Hirschfeld & S. A. Gelman (Eds.), *Mapping the mind* (pp. 119–148). Cambridge University Press. https://doi.org/10.1017/CBO9780511752902.006

Leung, A. K.-Y., & Cohen, D. (2007). The soft embodiment of culture: Camera angles and motion through time and space. *Psychological Science*, *18*(9), 824–830. https://doi.org/10.1111/j.1467-9280.2007.01986.x

Levinson, S. C. (2003). *Space in language and cognition: Explorations in cognitive diversity*. Cambridge University Press. https://doi.org/10.1017/CBO9780511613609

Levinson, S. C., & Gray, R. D. (2012). Tools from evolutionary biology shed new light on the diversification of languages. *Trends in Cognitive Sciences*, *16*(3), 167–173. https://doi.org/10.1016/j.tics.2012.01.007

Lew-Levy, S., Kissler, S. M., Boyette, A. H., Crittenden, A. N., Mabulla, I. A., & Hewlett, B. S. (2020). Who teaches children to forage? Exploring the primacy of child-to-child teaching among Hadza and BaYaka hunter–gatherers of Tanzania and Congo. *Evolution and Human Behavior*, *41*(1), 12–22. https://doi.org/10.1016/j.evolhumbehav.2019.07.003

Lew-Levy, S., Reckin, R., Lavi, N., Cristóbal-Azkarate, J., & Ellis-Davies, K. (2017). How do hunter–gatherer children learn subsistence skills? *Human Nature*, *28*(4), 367–394. https://doi.org/10.1007/s12110-017-9302-2

Lewis-Williams, D. (2010). *Conceiving God: The cognitive origin and evolution of religion*. Thames & Hudson.

Lewontin, R. (1983). Darwin's revolution. *The New York Review of Books*, *30*(10), 34–37. https://www.nybooks.com/articles/1983/06/16/darwins-revolution/

Liebal, K., & Haun, D. B. M. (2018). Why cross-cultural psychology is incomplete without comparative and developmental perspectives. *Journal of Cross-Cultural Psychology*, *49*(5), 751–763. https://doi.org/10.1177/0022022117738085

Lieberman, P. (2015). Language did not spring forth 100,000 years ago. *PLOS Biology*, *13*(2), Article e1002064. https://doi.org/10.1371/journal.pbio.1002064

Lillard, A. (1998). Ethnopsychologies: Cultural variations in theories of mind. *Psychological Bulletin*, *123*(1), 3–32. https://doi.org/10.1037/0033-2909.123.1.3

Liu, C., & Stout, D. (2023). Inferring cultural reproduction from lithic data: A critical review. *Evolutionary Anthropology*, *32*(2), 83–99. https://doi.org/10.1002/evan.21964

Liu, D., Wellman, H. M., Tardif, T., & Sabbagh, M. A. (2008). Theory of mind development in Chinese children: A meta-analysis of false-belief understanding across cultures and languages. *Developmental Psychology*, *44*(2), 523–531. https://doi.org/10.1037/0012-1649.44.2.523

López, A., Atran, S., Coley, J. D., Medin, D. L., & Smith, E. E. (1997). The tree of life: Universal and cultural features of folkbiological taxonomies and inductions. *Cognitive Psychology*, *32*(3), 251–295. https://doi.org/10.1006/cogp.1997.0651

Lucy, J. A. (2016). Recent advances in the study of linguistic relativity in historical context: A critical assessment. *Language Learning*, *66*(3), 487–515. https://doi.org/10.1111/lang.12195

Luhrmann, T. M. (2011). Toward an anthropological theory of mind [overview]. *Suomen Antropologi: Journal of the Finnish Anthropological Society*, *36*(4), 5–69. https://groups.psych.northwestern.edu/gentner/papers/gentner_2012.pdf

Luhrmann, T. M. (2012). A hyperreal God and modern belief: Toward an anthropological theory of mind. *Current Anthropology*, *53*(4), 371–395. https://doi.org/10.1086/666529

Luhrmann, T. M. (2020). *How God becomes real: Kindling the presence of invisible others*. Princeton University Press.

Luhrmann, T. M., & Weisman, K. (2022). Porosity is the heart of religion. *Current Directions in Psychological Science*, *31*(3), 247–253. https://doi.org/10.1177/09637214221075285

Luhrmann, T. M., Weisman, K., Aulino, F., Brahinsky, J. D., Dulin, J. C., Dzokoto, V. A., Legare, C. H., Lifshitz, M., Ng, E., Ross-Zehnder, N., & Smith, R. E. (2021). Sensing the presence of gods and spirits across cultures and faiths. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(5), Article e2016649118. https://doi.org/10.1073/pnas.2016649118

Lupyan, G., Abdel Rahman, R., Boroditsky, L., & Clark, A. (2020). Effects of language on visual perception. *Trends in Cognitive Sciences*, *24*(11), 930–944. https://doi.org/10.1016/j.tics.2020.08.005

Lupyan, G., & Clark, A. (2015). Words and the world: Predictive coding and the language-perception-cognition interface. *Current Directions in Psychological Science*, *24*(4), 279–284. https://doi.org/10.1177/0963721415570732

Lupyan, G., & Dale, R. (2016). Why are there different languages? The role of adaptation in linguistic diversity. *Trends in Cognitive Sciences*, *20*(9), 649–660. https://doi.org/10.1016/j.tics.2016.07.005

Lutz, C. A. (1988). *Unnatural emotions: Everyday sentiments on a Micronesian atoll and their challenge to Western theory*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226219783.001.0001

Lyons, D. E., Young, A. G., & Keil, F. C. (2007). The hidden structure of overimitation. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(50), 19751–19756. https://doi.org/10.1073/pnas.0704452104

MacDonald, K. (2019). Strong differences between Neanderthals and AMHs cannot be inferred from ethnographic evidence for skill and learning in hunting. In Y. Nishiaki & O. Jöris (Eds.), *Learning among Neanderthals and Palaeolithic modern humans* (pp. 149–158). Springer. https://doi.org/10.1007/978-981-13-8980-1_10

Mace, R., & Holden, C. J. (2005). A phylogenetic approach to cultural evolution. *Trends in Ecology & Evolution*, *20*(3), 116–121. https://doi.org/10.1016/j.tree.2004.12.002

Mace, R., & Pagel, M. (1997). Phylogenies and cultural evolution. *Evolution and Human Behavior*, *18*(5), 349–351. https://doi.org/10.1016/S1090-5138(97)00047-0

Maddux, W. W., & Yuki, M. (2006). The "ripple effect": Cultural differences in perceptions of the consequences of events. *Personality and Social Psychology Bulletin*, *32*(5), 669–683. https://doi.org/10.1177/0146167205283840

Mageo, J. M. (1989). Aga, amio and loto: Perspectives on the structure of the self in Samoa. *Oceania*, *59*(3), 181–199. https://doi.org/10.1002/j.1834-4461.1989.tb02321.x

Mageo, J. M. (1998). *Theorizing self in Samoa*. University of Michigan Press. https://psycnet.apa.org/record/2000-07100-000

Mageo, J. M., & Howard, A. (Eds.). (1996). *Spirits in culture, history, and mind*. Routledge.

Maguire, E. A., Gadian, D. G., Johnsrude, I. S., Good, C. D., Ashburner, J., Frackowiak, R. S., & Frith, C. D. (2000). Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National*

Academy of Sciences of the United States of America, *97*(8), 4398–4403. https://doi.org/10.1073/pnas.070039597

Majid, A., Bowerman, M., Kita, S., Haun, D. B., & Levinson, S. C. (2004). Can language restructure cognition? The case for space. *Trends in Cognitive Sciences*, *8*(3), 108–114. https://doi.org/10.1016/j.tics.2004.01.003

Majid, A., Burenhult, N., Stensmyr, M., De Valk, J., & Hansson, B. S. (2018). Olfactory language and abstraction across cultures. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *373*(1752), Article 20170139. https://doi.org/10.1098/rstb.2017.0139

Marett, R. R. (1914). *The threshold of religion* (2nd rev. & enlarged ed.; 1st ed.: 1909). Methuen.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Martzloff, J. C. (1997). *A history of Chinese mathematics*. Springer. https://doi.org/10.1007/978-3-540-33783-6

Masuda, T., & Nisbett, R. E. (2006). Culture and change blindness. *Cognitive Science*, *30*(2), 381–399. https://doi.org/10.1207/s15516709cog0000_63

Matthews, L. J. (2012). The recognition signal hypothesis for the adaptive evolution of religion: A phylogenetic test with Christian denominations. *Human Nature*, *23*(2), 218–249. https://doi.org/10.1007/s12110-012-9138-8

Mayer, A., & Träuble, B. E. (2013). Synchrony in the onset of mental state understanding across cultures? A study among children in Samoa. *International Journal of Behavioral Development*, *37*(1), 21–28. https://doi.org/10.1177/0165025412454030

Mayer, A., & Träuble, B. E. (2015). The weird world of cross-cultural false-belief research: A true-and false-belief study among Samoan children based on commands. *Journal of Cognition and Development*, *16*(4), 650–665. https://doi.org/10.1080/15248372.2014.926273

Mcbrearty, S., & Brooks, A. S. (2000). The revolution that wasn't: A new interpretation of the origin of modern human behavior. *Journal of Human Evolution*, *39*(5), 453–563. https://doi.org/10.1006/jhev.2000.0435

McCloskey, M., Washburn, A., & Felch, L. (1983). Intuitive physics: The straight-down belief and its origin. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *9*(4), 636–649. https://doi.org/10.1037/0278-7393.9.4.636

McGuigan, N., Makinson, J., & Whiten, A. (2011). From over-imitation to super-copying: Adults imitate causally irrelevant aspects of tool use with higher fidelity than young children. *British Journal of Psychology*, *102*(1), 1–18. https://doi.org/10.1348/000712610X493115

Medin, D. L., & Atran, S. (2004). The native mind: Biological categorization and reasoning in development and across cultures. *Psychological Review*, *111*(4), 960–983. https://doi.org/10.1037/0033-295X.111.4.960

Medin, D. L., & Atran, S. (Eds.). (1999). *Folkbiology*. MIT Press. https://doi.org/10.7551/mitpress/3042.001.0001

Medin, D. L., ojalehto, B., Marin, A., & Bang, M. (2013). Culture and epistemologies: Putting culture back into the ecosystem. In M. J. Gelfand, C.-Y. Chiu, & Y.-Y. Hong (Eds.), *Advances in culture and psychology* (pp. 177–217). Oxford University Press. https://doi.org/10.1093/acprof:osobl/9780199336715.003.0004

Medin, D. L., Ross, N. O., Atran, S., Cox, D., Coley, J., Proffitt, J. B., & Blok, S. (2006). Folkbiology of freshwater fish. *Cognition*, *99*(3), 237–273. https://doi.org/10.1016/j.cognition.2003.12.005

Mellet, E., Salagnon, M., Majkić, A., Cremona, S., Joliot, M., Jobard, G., Mazoyer, B., Tzourio Mazoyer, N., & d'Errico, F. (2019). Neuroimaging supports the representational nature of the earliest human engravings. *Royal Society Open Science*, *6*(7), Article 190086. https://doi.org/10.1098/rsos.190086

Miller, C. A. (2006). Developmental relationships between language and theory of mind. *American Journal of Speech-Language Pathology*, *15*(2), 142–154. https://doi.org/10.1044/1058-0360(2006/014)

Miller, J. G. (1984). Culture and development of everyday social explanation. *Journal of Personality and Social Psychology*, *46*(5), 961–978. https://doi.org/10.1037/0022-3514.46.5.961

Miller, K. F., & Paredes, D. (1996). On the shoulders of giants: Cultural tools and mathematical development. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 83–117). Erlbaum.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development*, *78*(2), 622–646. https://doi.org/10.1111/j.1467-8624.2007.01018.x

Mitterer, H., Horschig, J. M., Müsseler, J., & Majid, A. (2009). The influence of memory on perception: It's not what things look like, it's what you call them. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *35*(6), 1557–1562. https://doi.org/10.1037/a0017019

Morin, O. (2016). *How traditions live and die*. Oxford University Press.

Morin, O., Kelly, P., & Winters, J. (2018). Writing, graphic codes, and asynchronous communication. *Topics in Cognitive Science*. Advance online publication. https://doi.org/10.1111/tops.12386

Morris, M. W., Menon, T., & Ames, D. R. (2001). Culturally conferred conceptions of agency: A key to social perception of persons, groups, and other actors. *Personality and Social Psychology Review*, *5*(2), 169–182. https://doi.org/10.1207/S15327957PSPR0502_7

Murray, M., & Moore, L. (2009). Costly signaling and the origin of religion. *Journal of Cognition and Culture*, *9*(3–4), 225–245. https://doi.org/10.1163/156770909X12489459066264

Nascimento, F. F., Reis, M. D., & Yang, Z. (2017). A biologist's guide to Bayesian phylogenetic analysis. *Nature Ecology & Evolution*, *1*(10), 1446–1454. https://doi.org/10.1038/s41559-017-0280-x

Nelson-Sathi, S., List, J. M., Geisler, H., Fangerau, H., Gray, R. D., Martin, W., & Dagan, T. (2011). Networks uncover hidden lexical borrowing in Indo-European language evolution. *Proceedings of the Royal Society B. Biological Sciences*, *278*(1713), 1794–1803. https://doi.org/10.1098/rspb.2010.1917

Niekus, M. J. L. T., Kozowyk, P. R. B., Langejans, G. H. J., Ngan-Tillard, D., van Keulen, H., van der Plicht, J., Cohen, K. M., van Wingerden, W., van Os, B., Smit, B. I., Amkreutz, L. W. S. W., Johansen, L., Verbaas, A., & Dusseldorp, G. L. (2019). Middle Paleolithic complex technology and a Neandertal tar-backed tool from the Dutch North Sea. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(44), 22081–22087. https://doi.org/10.1073/pnas.1907828116

Nielsen, M. (2018). The social glue of cumulative culture and ritual behavior. *Child Development Perspectives*, *12*(4), 264–268. https://doi.org/10.1111/cdep.12297

Nielsen, M., Langley, M. C., Shipton, C., & Kapitány, R. (2020). *Homo neanderthalensis* and the evolutionary origins of ritual in *Homo sapiens*. *Philosophical Transactions of the Royal Society B*, *375*(1805), Article 20190424. https://doi.org/10.1098/rstb.2019.0424

Nielsen, M., Mushin, I., Tomaselli, K., & Whiten, A. (2014). Where culture takes hold: "overimitation" and its flexible deployment in Western, Aboriginal, and Bushmen children. *Child Development*, *85*(6), 2169–2184. https://doi.org/10.1111/cdev.12265

Nisbett, R. E., & Masuda, T. (2003). Culture and point of view. *Proceedings of the National Academy of Sciences of the United States of America*, *100*(19), 11163–11170. https://doi.org/10.1073/pnas.1934527100

Nisbett, R. E., & Miyamoto, Y. (2005). The influence of culture: Holistic versus analytic perception. *Trends in Cognitive Sciences*, *9*(10), 467–473. https://doi.org/10.1016/j.tics.2005.08.004

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*(2), 291–310. https://doi.org/10.1037/0033-295X.108.2.291

Norenzayan, A., Choi, I., & Nisbett, R. E. (1999). Eastern and Western perceptions of causality for social behavior: Lay theories about

personalities and situations. In D. A. Prentice & D. T. Miller (Eds.), *Cultural divides* (pp. 239–272). SAGE Publications.

Norenzayan, A., & Gervais, W. M. (2013). The origins of religious disbelief. *Trends in Cognitive Sciences*, *17*(1), 20–25. https://doi.org/10.1016/j.tics.2012.11.006

Norenzayan, A., & Shariff, A. F. (2008). The origin and evolution of religious prosociality. *Science*, *322*(5898), 58–62. https://doi.org/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*, Article e1. https://doi.org/10.1017/S0140525X14001356

Ochs, E. (1988). *Culture and language development*. Cambridge University Press.

Ochs, E., & Izquierdo, C. (2009). Responsibility in childhood: Three developmental trajectories. *Ethos*, *37*(4), 391–413. https://doi.org/10.1111/j.1548-1352.2009.01066.x

ojalehto, B., Medin, D. L., & García, S. G. (2017a). Conceptualizing agency: Folkpsychological and folkcommunicative perspectives on plants. *Cognition*, *162*, 103–123. https://doi.org/10.1016/j.cognition.2017.01.023

ojalehto, B., Medin, D. L., & García, S. G. (2017b). Grounding principles for inferring agency: Two cultural perspectives. *Cognitive Psychology*, *95*, 50–78. https://doi.org/10.1016/j.cogpsych.2017.04.001

ojalehto, B., Medin, D. L., Horton, W. S., García, S., & Kays, E. (2015). Seeing cooperation or competition: Ecological interactions in cultural perspectives. *Topics in Cognitive Science*, *7*(4), 624–645. https://doi.org/10.1111/tops.12156

ojalehto, B., Waxman, S. R., & Medin, D. L. (2013). Teleological reasoning about nature: Intentional design or relational perspectives? *Trends in Cognitive Sciences*, *17*(4), 166–171. https://doi.org/10.1016/j.tics.2013.02.006

Overmann, K. A., & Coolidge, F. L. (Eds.). (2019). *Squeezing minds from stones: Cognitive archaeology and the evolution of the human mind*. Oxford University Press. https://doi.org/10.1093/oso/9780190854614.001.0001

Paggetti, G., Menegaz, G., & Paramei, G. V. (2016). Color naming in Italian language. *Color Research and Application*, *41*(4), 402–415. https://doi.org/10.1002/col.21953

Penn, D. C., & Povinelli, D. J. (2007). On the lack of evidence that non-human animals possess anything remotely resembling a 'theory of mind'. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *362*(1480), 731–744. https://doi.org/10.1098/rstb.2006.2023

Peoples, H. C., Duda, P., & Marlowe, F. W. (2016). Hunter–gatherers and the origins of religion. *Human Nature*, *27*(3), 261–282. https://doi.org/10.1007/s12110-016-9260-0

Peoples, H. C., & Marlowe, F. W. (2012). Subsistence and the evolution of religion. *Human Nature*, *23*(3), 253–269. https://doi.org/10.1007/s12110-012-9148-6

Peterson, C. C., & Siegal, M. (1999). Representing inner worlds: Theory of mind in autistic, deaf, and normal hearing children. *Psychological Science*, *10*(2), 126–129. https://doi.org/10.1111/1467-9280.00119

Peterson, C. C., & Slaughter, V. (2003). Opening windows into the mind: Mothers' preferences for mental states explanations and children's theory of mind. *Cognitive Development*, *18*(3), 399–429. https://doi.org/10.1016/S0885-2014(03)00041-8

Phillips, J., Ong, D. C., Surtees, A. D., Xin, Y., Williams, S., Saxe, R., & Frank, M. C. (2015). A second look at automatic theory of mind: Reconsidering Kovács, Téglás, and Endress (2010). *Psychological Science*, *26*(9), 1353–1367. https://doi.org/10.1177/0956797614558717

Pierotti, R. (2011). *Indigenous knowledge, ecology, and evolutionary biology*. Routledge. https://doi.org/10.4324/9780203847114

Pitarch Martí, A., Zilhão, J., d'Errico, F., Cantalejo-Duarte, P., Domínguez-Bella, S., Fullola, J. M., Weniger, G. C., & Ramos-Muñoz, J. (2021). The symbolic role of the underground world among Middle Paleolithic Neanderthals. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(33), Article e2021495118. https://doi.org/10.1073/pnas.2021495118

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, *1*(4), 515–526. https://doi.org/10.1017/S0140525X00076512

Proffitt, J. B., Coley, J. D., & Medin, D. L. (2000). Expertise and category-based induction. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *26*(4), 811–828. https://doi.org/10.1037/0278-7393.26.4.811

Purzycki, B. G., & Willard, A. K. (2016). MCI theory: A critical discussion. *Religion, Brain & Behavior*, *6*(3), 207–248. https://doi.org/10.1080/2153599X.2015.1024915

Pyers, J. E., & Senghas, A. (2009). Language promotes false-belief understanding: Evidence from learners of a new sign language. *Psychological Science*, *20*(7), 805–812. https://doi.org/10.1111/j.1467-9280.2009.02377.x

Pyysiäinen, I. (2013). Cognitive science of religion: State-of-the-art. *Journal for the Cognitive Science of Religion*, *1*(1), 5–28. https://doi.org/10.1558/jcsr.v1i1.5

Ragsdale, A. P., Weaver, T. D., Atkinson, E. G., Hoal, E. G., Möller, M., Henn, B. M., & Gravel, S. (2023). A weakly structured stem for human origins in Africa. *Nature*, *617*(7962), 755–763. https://doi.org/10.1038/s41586-023-06055-y

Rakoczy, H. (2010). Executive function and the development of belief-desire psychology. *Developmental Science*, *13*(4), 648–661. https://doi.org/10.1111/j.1467-7687.2009.00922.x

Rakoczy, H. (2017). Theory of mind. In B. Hopkins, E. Geangu, & S. Linkenauger (Eds.), *Cambridge encyclopedia of child development* (pp. 507–514). Cambridge University Press. https://doi.org/10.1017/9781316216491.081

Regier, T., & Kay, P. (2009). Language, thought, and color: Whorf was half right. *Trends in Cognitive Sciences*, *13*(10), 439–446. https://doi.org/10.1016/j.tics.2009.07.001

Richerson, P. J., & Boyd, R. (2008). *Not by genes alone: How culture transformed human evolution*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226712130.001.0001

Robbins, J., & Rumsey, A. (2008). Introduction: Cultural and linguistic anthropology and the opacity of other minds. *Anthropological Quarterly*, *81*(2), 407–420. https://doi.org/10.1353/anq.0.0005

Roberson, D., Davidoff, J., Davies, I. R. L., & Shapiro, L. R. (2005). Color categories: Evidence for the cultural relativity hypothesis. *Cognitive Psychology*, *50*(4), 378–411. https://doi.org/10.1016/j.cogpsych.2004.10.001

Rodríguez-Vidal, J., d'Errico, F., Giles Pacheco, F., Blasco, R., Rosell, J., Jennings, R. P., Queffelec, A., Finlayson, G., Fa, D. A., Gutiérrez López, J. M., Carrión, J. S., Negro, J. J., Finlayson, S., Cáceres, L. M., Bernal, M. A., Fernández Jiménez, S., & Finlayson, C. (2014). A rock engraving made by Neanderthals in Gibraltar. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(37), 13301–13306. https://doi.org/10.1073/pnas.1411529111

Rogoff, B. (2003). *The cultural nature of human development*. Oxford University Press. https://doi.org/10.1037/e612832007-002

Romney, A. K., Weller, S. C., & Batchelder, W. H. (1986). Culture as consensus: A theory of culture and informant accuracy. *American Anthropologist*, *88*(2), 313–338. https://doi.org/10.1525/aa.1986.88.2.02a00020

Ross, N., Medin, D., Coley, J. D., & Atran, S. (2003). Cultural and experiential differences in the development of folkbiological induction. *Cognitive Development*, *18*(1), 25–47. https://doi.org/10.1016/S0885-2014(02)00142-9

Ross, N., Medin, D., & Cox, D. (2007). Epistemological models and culture conflict: Menominee and Euro-American hunters in Wisconsin. *Ethos*, *35*(4), 478–515. https://doi.org/10.1525/eth.2007.35.4.478

Rossano, M. J. (2006). The religious mind and the evolution of religion. *Review of General Psychology*, *10*(4), 346–364. https://doi.org/10.1037/1089-2680.10.4.346

Rozenblit, L., & Keil, F. (2002). The misunderstood limits of folk science: An illusion of explanatory depth. *Cognitive Science*, *26*(5), 521–562. https://doi.org/10.1207/s15516709cog2605_1

Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers' mental state language and theory-of-mind understanding. *Child Development*, *73*(3), 734–751. https://doi.org/10.1111/1467-8624.00435

Salali, G. D., Chaudhary, N., Thompson, J., Grace, O. M., van der Burgt, X. M., Dyble, M., Page, A. E., Smith, D., Lewis, J., Mace, R., Vinicius, L., & Migliano, A. B. (2016). Knowledge-sharing networks in hunter–gatherers and the evolution of cumulative culture. *Current Biology*, *26*(18), 2516–2521. https://doi.org/10.1016/j.cub.2016.07.015

Saxe, R., Tenenbaum, J. B., & Carey, S. (2005). Secret agents: Inferences about hidden causes by 10- and 12-month-old infants. *Psychological Science*, *16*(12), 995–1001. https://doi.org/10.1111/j.1467-9280.2005.01649.x

Scerri, E. M. L., & Will, M. (2023). The revolution that still isn't: The origins of behavioral complexity in Homo sapiens. *Journal of Human Evolution*, *179*, Article 103358. https://doi.org/10.1016/j.jhevol.2023.103358

Schaafsma, S. M., Pfaff, D. W., Spunt, R. P., & Adolphs, R. (2015). Deconstructing and reconstructing theory of mind. *Trends in Cognitive Sciences*, *19*(2), 65–72. https://doi.org/10.1016/j.tics.2014.11.007

Schmidt, W. (1912–1955). *Der Ursprung der Gottesidee* [The origin of the idea of God] (Vol. 12). Aschendorff.

Schuwerk, T., Priewasser, B., Sodian, B., & Perner, J. (2018). The robustness and generalizability of findings on spontaneous false belief sensitivity: A replication attempt. *Royal Society Open Science*, *5*(5), Article 172273. https://doi.org/10.1098/rsos.172273

Scott, R. M., & Baillargeon, R. (2017). Early false-belief understanding. *Trends in Cognitive Sciences*, *21*(4), 237–249. https://doi.org/10.1016/j.tics.2017.01.012

Sellet, F. (1993). Chaîne opératoire; the concept and its applications. *Lithic Technology*, *18*(1–2), 106–112. https://doi.org/10.1080/01977261.1993.11720900

Shaw-Williams, K. (2014). The social trackways theory of the evolution of human cognition. *Biological Theory*, *9*(1), 16–26. https://doi.org/10.1007/s13752-013-0144-9

Shore, B. (1982). *Sala'ilua: A Samoan mystery*. Columbia University Press. https://doi.org/10.7312/shor92710

Slaughter, V., & Perez-Zapata, D. (2014). Cultural variations in the development of mind reading. *Child Development Perspectives*, *8*(4), 237–241. https://doi.org/10.1111/cdep.12091

Slingerland, E., Monroe, M. W., & Muthukrishna, M. (2023). The Database of Religious History (DRH): Ontology, coding strategies and the future of cultural evolutionary analyses. *Religion, Brain & Behavior*. Advance online publication. https://doi.org/10.1080/2153599X.2023.2200825

Sloman, S. A., & Fernbach, P. (2017). *The knowledge illusion: Why we neverthink alone*. Riverhead Books.

Sloman, S. A. (2022). How do we believe? *Topics in Cognitive Science*, *14*(1), 31–44. https://doi.org/10.1111/tops.12580

Sloman, S. A., & Rabb, N. (2016). Your understanding is my understanding: Evidence for a community of knowledge. *Psychological Science*, *27*(11), 1451–1460. https://doi.org/10.1177/0956797616662271

Solomon, G. E. A., & Zaitchik, D. (2012). Folkbiology. *Wiley Interdisciplinary Reviews: Cognitive Science*, *3*(1), 105–115. https://doi.org/10.1002/wcs.150

Spelke, E. S., & Kinzler, K. D. (2007). Core knowledge. *Developmental Science*, *10*(1), 89–96. https://doi.org/10.1111/j.1467-7687.2007.00569.x

Sperber, D. (1996). *Explaining culture: A naturalistic approach*. Cambridge University Press.

Stade, C. M. (2020). Theory of mind as a proxy for Palaeolithic language ability: An alternative to the search for the earliest symbolic material culture. *Language Dynamics and Change*, *10*(1), 59–85. https://doi.org/10.1163/22105832-20201000

Sterelny, K. (2012). Language, gesture, skill: The co-evolutionary foundations of language. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *367*(1599), 2141–2151. https://doi.org/10.1098/rstb.2012.0116

Sterelny, K. (2018). Religion re-explained. *Religion, Brain & Behavior*, *8*(4), 406–425. https://doi.org/10.1080/2153599X.2017.1323779

Sterelny, K. (2020). Afterword: Tough questions; hard problems; incremental progress. *Topics in Cognitive Science*, *12*(2), 766–783. https://doi.org/10.1111/tops.12427

Stout, D., & Chaminade, T. (2007). The evolutionary neuroscience of tool making. *Neuropsychologia*, *45*(5), 1091–1100. https://doi.org/10.1016/j.neuropsychologia.2006.09.014

Stuart-Fox, M. (2015). The origins of causal cognition in early hominins. *Biology & Philosophy*, *30*(2), 247–266. https://doi.org/10.1007/s10539-014-9462-y

Taylor, A. H., Miller, R., & Gray, R. D. (2012). New Caledonian crows reason about hidden causal agents. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(40), 16389–16391. https://doi.org/10.1073/pnas.1208724109

Tennie, C., Call, J., & Tomasello, M. (2009). Ratcheting up the ratchet: On the evolution of cumulative culture. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *364*(1528), 2405–2415. https://doi.org/10.1098/rstb.2009.0052

Throop, C. J. (2008). On the problem of empathy: The case of Yap, Federated States of Micronesia. *Ethos*, *36*(4), 402–426. https://doi.org/10.1111/j.1548-1352.2008.00024.x

Tomasello, M. (1999). *The cultural origins of human cognition*. Harvard University Press. https://doi.org/10.2307/j.ctvjsf4jc

Tomasello, M. (2008). *Origins of human communication*. MIT Press. https://doi.org/10.7551/mitpress/7551.001.0001

Tomasello, M. (2016). Cultural learning redux. *Child Development*, *87*(3), 643–653. https://doi.org/10.1111/cdev.12499

Tomasello, M. (2020). The moral psychology of obligation. *Behavioral and Brain Sciences*, *43*, Article e56. https://doi.org/10.1017/S0140525X19001742

Tomasello, M., Call, J., & Hare, B. (2003). Chimpanzees understand psychological states—The question is which ones and to what extent. *Trends in Cognitive Sciences*, *7*(4), 153–156. https://doi.org/10.1016/S1364-6613(03)00035-4

Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences*, *28*(5), 675–691. https://doi.org/10.1017/S0140525X05000129

Träuble, B. E., Bender, A., & Konieczny, C. (2013). Human social cognition—The theory of mind research. In J. Wassmann, B. Träuble, & J. Funke (Eds.), *Theory of mind in the Pacific* (pp. 13–37). Universitätsverlag Winter.

Tschudin, A. J.-P. C. (2006). Belief attribution tasks with dolphins: What social minds can reveal about animal rationality. In S. Hurley & M. Nudds (Eds.), *Rational animals?* (pp. 413–436). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198528272.003.0019

Turchin, P., Brennan, R., Currie, T. E., Feeney, K. C., Francois, P., Hoyer, D., Manning, J. G., Marciniak, A., Mullins, D. A., Palmisano, A., Peregrine, P., Turner, E. A. L., & Whitehouse, H. (2015). Seshat: The global history databank. *Cliodynamics. The Journal of Quantitative History and Cultural Evolution*, *6*(1), 77–107. https://doi.org/10.21237/C7CLIO8135421

Tylor, E. B. (1871). *Primitive culture: Research into the development of mythology, philosophy, religion, art, and custom*. J. P. Putnam's Sons.

Unsworth, S. J. (2008). *The influence of culturally varying discourse practices on cognitive orientations toward nature* (Publication No. 3331165) [Doctoral Dissertation]. Northwestern University.

van der Vaart, E., & Hemelrijk, C. K. (2014). 'Theory of mind' in animals: Ways to make progress. *Synthese*, *191*(3), 335–354. https://doi.org/10.1007/s11229-012-0170-3

Van Leeuwen, N., & van Elk, M. (2019). Seeking the supernatural: The interactive religious experience model. *Religion, Brain & Behavior*, *9*(3), 221–251. https://doi.org/10.1080/2153599X.2018.1453529

Vaquero, M., Vallverdú, J., Rosell, J., Pastó, I., & Allué, E. (2001). Neandertal behavior at the middle Palaeolithic site of Abric Romani, Capellades, Spain. *Journal of Field Archaeology*, *28*(1–2), 93–114. https://doi.org/10.1179/jfa.2001.28.1-2.93

Vinden, P. G. (1996). Junin Quechua children's understanding of mind. *Child Development*, *67*(4), 1707–1716. https://doi.org/10.2307/1131726

Wadley, L. (2015). Those marvellous millennia: The Middle Stone Age of Southern Africa. *Azania*, *50*(2), 155–226. https://doi.org/10.1080/0067270X.2015.1039236

Wang, Z., Devine, R. T., Wong, K. K., & Hughes, C. (2016). Theory of mind and executive function during middle childhood across cultures. *Journal of Experimental Child Psychology*, *149*, 6–22. https://doi.org/10.1016/j.jecp.2015.09.028

Watts, J., Greenhill, S. J., Atkinson, Q. D., Currie, T. E., Bulbulia, J., & Gray, R. D. (2015). Broad supernatural punishment but not moralizing high gods precede the evolution of political complexity in Austronesia. *Proceedings of the Royal Society B: Biological Sciences*, *282*(1804), Article 20142556. https://doi.org/10.1098/rspb.2014.2556

Watts, J., Sheehan, O., Atkinson, Q. D., Bulbulia, J., & Gray, R. D. (2016). Ritual human sacrifice promoted and sustained the evolution of stratified societies. *Nature*, *532*(7598), 228–231. https://doi.org/10.1038/nature17159

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, *72*(3), 655–684. https://doi.org/10.1111/1467-8624.00304

White, C. J. M., Willard, A. K., Baimel, A., & Norenzayan, A. (2021). Cognitive pathways to belief in karma and belief in God. *Cognitive Science*, *45*(1), Article e12935. https://doi.org/10.1111/cogs.12935

White, G. M., & Kirkpatrick, J. (Eds.). (1985). *Person, self and experience: Exploring Pacific ethnopsychologies*. University of California Press.

Whitehouse, H. (2021). *The ritual animal: Imitation and cohesion in the evolution of social complexity*. Oxford University Press. https://doi.org/10.1093/oso/9780199646364.001.0001

Willard, A. K. (2018). Defining religion. *Religion, Brain & Behavior*, *8*(4), 449–451. https://doi.org/10.1080/2153599X.2017.1323785

Willard, A. K., Henrich, J., & Norenzayan, A. (2016). Memory and belief in the transmission of counterintuitive content. *Human Nature*, *27*(3), 221–243. https://doi.org/10.1007/s12110-016-9259-6

Willard, A. K., & McNamara, R. A. (2019). The minds of God(s) and humans: Differences in mind perception in Fiji and North America. *Cognitive Science*, *43*(1), Article e12703. https://doi.org/10.1111/cogs.12703

Wilson, A. D., & Golonka, S. (2013). Embodied cognition is not what you think it is. *Frontiers in Psychology*, *4*, Article 58. https://doi.org/10.3389/fpsyg.2013.00058

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, *13*(1), 103–128. https://doi.org/10.1016/0010-0277(83)90004-5

Winawer, J., Witthoft, N., Frank, M. C., Wu, L., Wade, A. R., & Boroditsky, L. (2007). Russian blues reveal effects of language on color discrimination. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(19), 7780–7785. https://doi.org/10.1073/pnas.0701644104

Wolff, P., & Holmes, K. J. (2011). Linguistic relativity. *Wiley Interdisciplinary Reviews: Cognitive Science*, *2*(3), 253–265. https://doi.org/10.1002/wcs.104

Woolfe, T., Want, S. C., & Siegal, M. (2002). Signposts to development: Theory of mind in deaf children. *Child Development*, *73*(3), 768–778. https://doi.org/10.1111/1467-8624.00437

Wu, S., & Keysar, B. (2007). The effect of culture on perspective taking. *Psychological Science*, *18*(7), 600–606. https://doi.org/10.1111/j.1467-9280.2007.01946.x

Wurz, S. (2013). Technological trends in the Middle Stone Age of South Africa between MIS 7 and MIS 3. *Current Anthropology*, *54*(Suppl. 8), S305–S319. https://doi.org/10.1086/673283

Wynn, T., & Coolidge, F. L. (2004). The expert Neandertal mind. *Journal of Human Evolution*, *46*(4), 467–487. https://doi.org/10.1016/j.jhevol.2004.01.005

Received January 12, 2023
Revision received October 9, 2023
Accepted October 16, 2023 ■