systematically covary with religious disbelief (Zmigrod et al., 2018). Cultural differences can also be found on a larger scale, with young East Asian children often outperforming Western children on a range of executive function indices (Lan et al. 2011; Oh & Lewis 2008; Sabbagh et al. 2006).

Taken together, executive functions are not well-defined, which holds for both empirical bottom-up and theoretical top-down approaches, and there is increasing evidence that they show characteristics that are typical for culture-related associative processes: malleability, context-dependency, lack of transfer, and cultural dependency. Heyes' key argument for classifying executive functions as cognitive instincts rather than cognitive gadgets seems to be heritability: if executive functions were a product of culture rather than genes, why have they been shown to be heritable, observable in other animals, too, and to be enhanced in humans? Interestingly, a closer look reveals that these signs of heritability are not inconsistent with a cultural basis of executive functions either.

First, executive functions indeed seem to be heritable, at least to some degree (Friedman et al. 2016). Notably, however, more targeted studies on this genetic contribution suggest they rely on a complex interplay of different neurotransmitter functions (Logue & Gould 2014), with a particularly important role of dopamine (Cools & D'Esposito 2010). Given that the efficiency of the frontal and striatal dopaminergic pathways is heritable to some degree (Colzato et al. 2011), there are at least two ways that executive functions might be heritable even if they rely on associative processes. For one, various forms of associative learning rely on monoaminergic processes (Schultz 2013; Tully & Bolshakov 2010), so what looks like the heritability of executive functions might actually reflect the heritability of the domain-general associative learning mechanisms they rely on. For another, the online operations of executive functions have been shown to rely on dopaminergic efficiency (Cools & D'Esposito 2010), suggesting that frontal and striatal control pathways rely on the dopaminergic fuel provided by the ventral tegmental area and the substantia nigra. If so, what might be heritable might not be the engine being driven (i.e., executive functions proper) but the (amount, availability, and/or quality of the) fuel driving it. In any case, it is important to consider that signs of heritability do not determine whether it is the function of interest that is heritable, or just the infrastructural factors it needs to operate on. As an example, although the ability to acquire language is heritable (Byrne et al. 2007; Kovas et al. 2007), this is not in and of itself a reason to conclude that language itself must be genetically coded (Deacon 1997; Heyes 2018).

Second, Heyes (2018) further pointed towards observations that executive functions can also be observed in nonhuman animals, which would suggest they have a longer genetic history. Still, the fact that executive functions can be observed in animals does not invalidate executive functions as cognitive gadgets (as also argued for imitation processes, Heyes 2018). Instead, it merely suggests that in animals too, (rudimentary forms of) these processes can develop. Interestingly, in reviewing recent evidence comparing human and nonhuman primates, researchers have concluded that similarities in executive functions often reflect similarities in domain-general reinforcement learning mechanisms (e.g., as during reward learning), and that certain basic control processes may actually rely on different brain regions across species (Eisenreich et al. 2017; Heilbronner & Hayden 2016; Mansouri et al. 2017). Therefore, similar to how language might have latched itself onto the brain as a parasite to its host (cf. Deacon 1997), certain culture-specific executive functions could have developed onto partially different brain networks in different species.

Third, not only do executive functions seem to be heritable and observable in other animals, but also there are reasons to believe they have evolved into more superior or enhanced functions in humans. However, this enhancement could be culture-driven, or rely on other genetic benefits (e.g., enhanced associative learning or the ability to develop symbolic representations). This aside, the superior nature of these functions has also been questioned altogether. For example, Heyes (2018) cites evidence that self-control – the ability to inhibit one's impulses – might be enhanced in humans. However, others have argued that this ability is still rather poor in humans, and its seemingly enhanced nature could be partially due to procedural differences in measuring self-control across species (Hayden 2018). As for working memory capacity, some have argued this ability to be comparable (Carruthers 2013), or even inferior to some of our closest ancestors (Inoue & Matsuzawa 2007). In fact, Lotem et al. (2017) have suggested that while having a larger working-memory buffer in humans could be possible, having a smaller working-memory capacity might be more adaptive. Last, it is true that humans show a remarkably higher proficiency in switching between different tasks, and thus enhanced cognitive flexibility. However, this difference has been attributed to differences in language proficiency, rather than switching abilities per se (e.g., Hermer-Vazquez et al. 2001). In fact, a set of recent studies using a nonverbal computer task showed that baboons and children, as well as semi-nomadic adults from north Namibia, were better at switching away from a certain strategy to select more optimal strategies than were adults from North America (Pope et al. 2015; 2019).

Heyes (2018) emphasizes that no mental process is likely to be the product of nature, nurture, or culture alone, and she admits that "learning and cultural inheritance play major roles in the development of human executive function" (p. 74). We suggest taking these roles somewhat more seriously and consider executive functions not as cognitive instincts but as cognitive gadgets. Ultimately, this question will depend on one's exact definition of executive functions, one's level of analysis, and the specific executive function of interest, but we suggest that executive functions can be considered an emergent property arising from a complex interplay of different basic reinforcement learning processes, working at the level of more distributed or abstract representations (e.g., Abrahamse et al. 2016; Eisenreich et al. 2017). Such a perspective could further promote the study of how executive functions emerge through development, how they can be acquired and become conditioned and bound to context, and how this can lead to substantial inter-individual and cultural differences in the development of these particularly interesting "cognitive gadgets."

# Cognitive gadgets: A provocative but flawed manifesto

Marco Del Giudice

Department of Psychology, University of New Mexico, Albuquerque, NM 87131.
marcodg@unm.edu https://marcodg.net

doi:10.1017/S0140525X19001134, e174

**Abstract**

The argument against innatism at the heart of *Cognitive Gadgets* is provocative but premature, and is vitiated by dichotomous thinking, interpretive double standards, and evidence cherry-picking. I illustrate my criticism by addressing the heritability of imitation and mindreading, the relevance of twin studies, and the meaning of cross-cultural differences in theory of mind development. Reaching an integrative understanding of genetic inheritance, plasticity, and learning is a formidable task that demands a more nuanced evolutionary approach.

The provocative thesis of *Cognitive Gadgets* (Heyes 2018) is that human abilities such as imitation, mindreading, and language – the traits that allow our species' extensive cultural transmission – are not adaptations produced by biological evolution or, as repeated throughout the book, "in our genes." Instead, these abilities are themselves "gadgets" that have been created and refined by cultural group selection. Although they give the illusion of innateness, they are taught to children through social practices, and learned with the support of enhanced domain-general mechanisms such as attention, social motivation, working memory, and – most importantly – associative learning. Except for potentiating these general-purpose cognitive tools, genetic evolution has had virtually no role in shaping the distinctive traits that define human nature.

Why evolution should have followed this route in our species is a mystery, and Heyes does not offer any rationale or theoretical model to make sense of it. In fact, she stresses that genetic evolution *could* have played a role – the evidence from cognitive science just happens to say otherwise. The first question, then, is whether the book makes a compelling empirical case for its almost-blank-slate argument. *Cognitive Gadgets* presents a wealth of interesting findings and useful criticism of previous research; but as a refutation of innatism I found it surprisingly weak. Consider Heyes' treatment of genetic assimilation. In a nutshell, genetic assimilation occurs when traits that initially develop through learning (or other types of plasticity) get increasingly under genetic control, as selection favors variants that make the learning process faster and more reliable. In principle, assimilation can proceed so far that the trait develops entirely under genetic guidance, with no environmental input.

Heyes claims that she found no evidence of genetic assimilation for abilities like imitation and mindreading. Granting the premise for now, Heyes assumes that the heritability of a trait estimated from twin studies is an indicator of whether the trait develops with minimal environmental input ("poverty of the stimulus," high heritability) or with considerable input from the social environment ("wealth of the stimulus," low heritability). For imitation, the book cites one study of 2-year-olds by McEwen et al. (2007) as showing that "identical twins are no more alike in their imitative ability than fraternal twins" (p. 208). But this is not what the study found. The correlation was significantly higher in identical twins, and the authors estimated the heritability of imitation at 30%. This figure is well within expectations: The heritability of cognitive traits is small in infancy, but increases to about 30%–40% in childhood and reaches 50%–60% by late adolescence (Briley & Tucker-Drob 2017). Heyes fails to cite another study of imitation in 2-year-olds (Fenstermacher & Saudino 2007), which also found a higher correlation in identical twins and estimated heritability at 45%. For mindreading, Heyes cites one study by Hughes et al. (2005), which found the same correlation between identical and fraternal twins, indicating negligible genetic influences on individual differences in children's theory of mind. She omits to mention that, although the authors found no specific genetic contributions to theory of mind, there was a significant influence of nonspecific genetic factors shared with verbal ability (accounting for about 15% of variance). Other twin studies of theory of mind in children and adults have found heritabilities in the 15%–35% range (McEwen et al. 2007; Ronald et al. 2006; Warrier et al. 2018). Thus, contrary to Heyes' claim, both imitation and mindreading skills show a nontrivial proportion of genetic variance. Moreover, the apparent heritability of mindreading is most likely deflated by the rather noisy measures employed in these studies.

A deeper question is whether twin correlations and heritabilities are germane to the book's argument. In contrast with Heyes' assumptions, the proportion of genetic versus environmental variance says very little about the nature of environmental inputs and the trait's history of genetic assimilation. Consider a genetically assimilated trait that has become fixed in a population, and shows little or no genetic variation among individuals. By necessity, most of the variance of such a trait would be environmental. Or consider a hypothetical developmental process in which an environmental variable triggers the expression of alternative, genetically specified behaviors that are the same for all the individuals in a species. The resulting trait would show low heritability and high environmental variance; but the role of the "stimulus" would be limited to selecting from a menu of pre-specified alternatives. To further complicate things, nonshared environmental variance in a trait may reflect random events and insults (e.g., infections) rather than learning or organized plasticity; and genetic variance may capture the effects of deleterious mutations besides those of functional alleles. In general, the factors that drive the development of a trait may not be the same factors that produce individual differences in that trait. Moreover, a particular skill can be both evolutionarily novel and socially learned, but depend for its acquisition on traits that show substantial genetic variation. To illustrate: playing chess is a cultural "gadget" if there ever was one, and yet interest and aptitude for chess are about 40–50% heritable (de Moor et al. 2013; Olson et al. 2001; Vinkhuyzen et al. 2009). By Heyes' criteria, one should conclude that playing chess is more likely to be a "cognitive instinct" than imitation or mindreading. In sum, the book's argument for rejecting genetic assimilation is conceptually flawed and supported with cherry-picked data.

To remain on the topic of mindreading, Heyes cites interesting cross-cultural evidence that the stages of theory-of-mind acquisition differ between individualistic countries like the United States and Australia and collectivistic countries like China and Iran. But these findings are damning only if one holds an inflexible model in which the various components of mindreading (Schaafsma et al. 2015) can interact only in one pre-specified way, with no meaningful input from the social environment. Of note, the observed sequence changes typically involve two particular tasks out of five ("diverse beliefs" and "knowledge access"; see Duh et al. 2016; Kuntoro et al. 2017; Shahaeian et al. 2011; 2014; for a puzzling exception, see Dixson et al. 2018). The overall picture, then, is one of patterned variation on a background of stability. Heyes also cites evidence that theory of mind development is markedly delayed in Samoan children (Mayer & Träuble 2013). However, this literature contains several inconsistent findings that cannot be explained by cultural differences (see Liu et al. 2008; Mayer & Träuble 2015). Some apparent delays may reflect culture-specific issues with task demands, as Mayer and Träuble (2015) noted in their follow-up to the original Samoan study.

At the same time, theory-of-mind skills are not independent from other cognitive traits, and are significantly associated with IQ (e.g., Baker et al. 2014; Rajkumar et al. 2008). It may be impossible to fully make sense of the cross-cultural data on developmental trajectories without addressing the thorny issue of national differences in cognitive ability (e.g., Rindermann 2018).

These examples serve to illustrate a double standard that is applied throughout the book: whenever the data do not support a rigidly "preformist" view of development, they are implicitly or explicitly counted as positive evidence for an associative account. But in several of the examples discussed in *Cognitive Gadgets*, associative learning is little more than a hypothetical mechanism (or a plausible contributing factor), and it is unclear if the models proposed by Heyes are able to explain the totality of the evidence. Moreover, the apparent simplicity of associative accounts often hides a lot of complexity (and inefficiency), which is revealed only by careful unpacking (e.g., Dickinson 2012; Hanus 2016). For all these reasons, Heyes' rejection of innateness in favor of almost-blank-slate associationism seems highly premature.

I will not discuss the book's case for cultural group selection in any detail, except to note that the argument is fully – and admittedly – speculative. To be clear, I see nothing wrong with bold speculation; but there is some irony in the sudden shift away from the hard-nosed empiricism of the rest of the book, precisely at the point where Heyes needs to explain *how* all the distinctive content of human nature can be outsourced to culture-mediated learning. For example, it is unclear if the selection process envisioned in the book could provide enough robustness and reliability to enable adaptive evolution; if it could work on a realistic timescale, given the long "life cycle" of groups compared with that of individuals; how it would respond to conflicts of interests between different social actors, and between group and individual fitness; and how it would prevent genetic adaptation from catching up with cultural transmission.

Even though my review of *Cognitive Gadgets* is critical, I strongly recommend the book to other evolutionary-developmental psychologists. It will stimulate them, challenge them to think more deeply about their assumptions, and prompt the field to open the developmental "black box" and become more explicit about computational processes. I see a clear parallel with much recent work in artificial intelligence (including neural networks), which shares the book's empiricist attitude and faith in the power of domain-general learning (Marcus 2018; see also Lake et al. 2017). This new wave of research is a fantastic opportunity for evolutionary-developmental psychology. Understanding how learning is instantiated in the mind/brain, guided by evolved developmental programs, and integrated with innate information is a daunting task, which has been made even harder by a scarcity of explicit models (Frankenhuis & Tiokhin 2018). Computational tools like reinforcement learning can help understand what (and how much) preexisting information is needed to perform efficiently and reliably in the real world (Frankenhuis et al. 2018), and how evolved developmental programs may respond to novelties in the environment, from optical mirrors to online interactions.

These questions can be approached in a spirit of synergy and integration (e.g., Frankenhuis et al. 2018; Lake et al. 2017; Versace et al. 2018), or – less productively – as a zero-sum competition between genetic inheritance and learning. Back to *Cognitive Gadgets*, it is unfortunate that Heyes sets up her main argument as a dichotomy between two extremes. Psychological mechanisms are either genetically encoded, domain-specific "instincts" that develop with minimal environmental input; or culturally transmitted "gadgets" that are learned through domain-general processes, with minimal or no contribution from genetic factors. The only middle-ground option entertained in the book – and quickly dismissed – is genetic assimilation (see above). This black-and-white contrast leaves out a world of more plausible possibilities. For example, psychological mechanisms may reliably develop a basic level of functionality with minimal input, but depend on learning (often directed and canalized) in order to reach full competence. Although basic preferences for sweet versus bitter flavors are present at birth, food preferences are expanded and fine-tuned through years of intensive but nonrandom learning, which yields cultural similarities as well as differences (Rozin 1990a; 1990b). Furthermore, even established preferences for or against certain foods can be adaptively overturned by conditions such as pregnancy and nutrient deficiency (Berthoud 2011; Flaxman & Sherman 2000; Rozin 1990a).

By tuning their operating parameters, general processes such as associative sensory-motor learning can be canalized to reliably yield specific, adaptive outcomes.

My colleagues and I have proposed such a canalization hypothesis for the development of mirror neurons (Del Giudice et al. 2009). Also, distinct mechanisms specialized for different tasks may reuse some basic information-processing algorithms – for example, reinforcement learning – while adapting them to the particular nature of each task. Modularity, functional specialization, and the difficulty of distinguishing between domain-general and domain-specific processes have been addressed in considerable depth in the work by Clark Barrett et al. (e.g., Barrett 2012; 2015; 2017; Barrett et al. 2016), which reconciles the notion of specialized adaptations with a sophisticated view of learning and plasticity. A powerful idea stemming from this approach is that cognitive mechanisms may develop hierarchically, through "module spawning" and progressive specialization induced by different categories of inputs (Barrett 2012; 2015). Heyes never considers these possibilities, which have been discussed for years in mainstream evolutionary psychology (e.g., Buss 2015). It remains to be seen whether *Cognitive Gadgets* will herald a genuine paradigm change, or succeed mainly as a timely provocation.

# Language is not a gadget

Peter Ford Dominey

INSERM U1093 Cognition, Action and Sensorimotor Plasticity, Université de Bourgogne, UFR Staps, BP 27877, 21078 Dijon, France.
peter.dominey@inserm.fr

doi:10.1017/S0140525X19001092, e175

**Abstract**

Heyes does well to argue that some of the apparently innate human capabilities for cultural learning can be considered in terms of more general-purpose mechanisms. In the application of this to language, she overlooks some of its most interesting properties. I review three, and then illustrate how mindreading can come from general-purpose mechanism via language.

Although I agree with Heyes' main stance that emphasizes the power of general-purpose mechanisms in contributing to higher particularly for gestures, including the distinctive human realm of rituals (Whiten 2019a); Clay & Tennie (2018), for example, found that children tended to overimitate causally irrelevant hand gestures made while solving an object manipulation task, while bonobos ignored them. But I suggest that the majority of skills a child acquires through observational copying, such as how to make an unfamiliar tool do its job, do not rely on fidelity of bodily copying, which plays little part in the now more than 50 reports of "overimitation" (Hoehl et al. 2019). Is there any evidence to the contrary? More generally, what is the empirical evidence for the oft-repeated assertion that cumulative culture relies on high-fidelity copying – especially the bodily imitation on which Heyes' model focuses?

In that model, Heyes likewise seems overenthusiastic about the role that adults imitating a toddler can play in building a child's imitative capacity "from scratch" using domain-general associative learning. Caregivers may sometimes imitate infants' facial expressions in face-to-face interactions, but is there any evidence they routinely imitate toddlers' limb and other bodily movements? Is Heyes really suggesting that the boy copying "clasp hands behind back" developed the ability to imitate this because often in the past he did this or similar actions, and his parents copied him? And how could looking in mirrors, or synchronous activities, deliver this example? The same goes for chimpanzees and orangutans, able in "'do-as-I-do" tests to copy novel test items like "touch back of head" (Call 2001; Custance et al. 1995), that they surely have not learned because others copied them doing this? And what of avian imitation of bodily actions, like using foot versus beak (Heyes & Saggerson 2002; Zentall et al. 1996)? As I remarked in a critique following Heyes' initial promotion of the ASL model (Whiten 2005), there is a more general problem here too. Most of what a parent does cannot match what their infant is doing – they are attending to feeding, changing nappies, cooking, and so on – so for the infant to learn about matching, there would have to be some specific signal indicating "now, here is my rare perceptual match to what you just did." I think no such signals are known. Moreover, bodily imitation is not "correlated" in the sense of being synchronous anyway; imitation *follows* a model's acts.

So does the underlying process of imitation, from perception to matching action, remain a black box? Well yes; we remain ignorant of how the brain does it and how it comes to do so. Similarly, a humanoid robot that can achieve the whole process, globally, is yet to be created? It would be illuminating to see if such a robot could build the ability if programmed only with ASL.

# Author's Response

## Cognition blindness and cognitive gadgets

Cecilia Heyes

All Souls College and Department of Experimental Psychology, University of Oxford, Oxford OX1 4AL, United Kingdom.
cecilia.heyes@all-souls.ox.ac.uk users.ox.ac.uk/~ascch/

doi:10.1017/S0140525X19001158, e187

**Abstract**

Responding to commentaries from psychologists, neuroscientists, philosophers, and anthropologists, I clarify a central purpose of *Cognitive Gadgets* – to overcome "cognition blindness" in research on human evolution. I defend this purpose against Brunerian, extended mind, and niche construction critiques of computationalism – that is, views prioritising meaning over information, or asserting that behaviour and objects can be intrinsic parts of a thinking process. I argue that empirical evidence from cognitive science is needed to locate distinctively human cognitive mechanisms on the continuum between gadgets and instincts. Focussing on that requirement, I also address specific challenges, and applaud extensions and refinements, of the evidence surveyed in my book. It has been said that "a writer's idea of sound criticism is ten thousand words of closely reasoned adulation." I cannot disagree with this untraceable wag, but the 30 commentators on *Cognitive Gadgets* provided some 30,000 words of criticism that are of much greater scientific value than adulation. I am grateful to them all. The response that follows is V-shaped. It starts with the broadest conceptual and methodological issues and funnels down to matters arising from specific empirical studies.

### R1. Cognition blindness

One of the overarching aims of *Cognitive Gadgets* is to encourage people interested in human evolution to think not only about brains, bodies, behaviour, and beliefs, but also in a computational way about how our minds work. I was trying to overcome "cognition blindness," a tendency among evolutionists to look straight past an important resource – the kind of cognitive science, thriving in labs all over the world since the 1970s, that casts mental processes as software running on the brain (Block 1995). Some commentators revealed, inadvertently, just how tenacious cognition blindness can be. While making otherwise valuable points, these commentators looked straight past the software and wrote about cognitive gadgets as if they are parts of the brain, chunks of behaviour, or airy bridges between brain and behaviour built out of folk psychology and pure maths (e.g., **Badcock, Constant, & Ramstead** [**Badcock et al.**]; **Iannetti & Vallortigara**; **Jablonka, Ginsburg, & Dor** [**Jablonka et al.**]; **Smaldino & Spivey**; **Sperber**; **Tennie**; **Whiten**). The arcuate fasciculus is part of the brain, not of the mind. "Social organisation," "norm," "conformity," and (in frequent usage) "decision rule" refer to behavioural regularities rather than computational processes. And in many models, terms such as "inference" and "belief" are taken from folk psychological stock and applied so promiscuously that they lose all meaning, leaving maths to do the work.

Of course, it is vital to study the brain and behaviour, often with the help of mathematical models and folkweave characterisations of the mind, but *Cognitive Gadgets* recommends a major addition to the evolutionist's armoury. It suggests that we can better understand human evolution if we recognise that the brain interacts with behaviour via cognitive mechanisms; these mechanisms are among the targets of genetic and cultural selection; and folk psychology seldom provides the most precise and empirically grounded descriptions of how these mechanisms work. In many cases – such as the mechanisms involved in object recognition, speech production, and reading – folk psychology is simply silent.

Mathematical models can help fill the silence, but without more abstract, software characterisations of what the mind is doing, these models struggle to make testable predictions (Coltheart 2002; 2012).

**Dominey** and **Fenici & Garofoli** certainly do not suffer from cognition blindness. They see the computationalism of *Cognitive Gadgets* clearly and challenge it head-on. At the heart of their challenge are a lament and an historical claim. They lament that computationalist cognitive science makes little contact with lived experience and, therefore, with the humanities. It sides with the natural sciences, offering "explanation" rather than "understanding," in the language of "information" rather than of "meaning." The historical claim is that this could easily have been otherwise. If computer technology had not been advancing so rapidly when behaviourism ran out of steam, the cognitive revolution would have produced a more humane, meaning-based cognitive science (Bruner 1990).

I am sympathetic to the lament and I find the historical claim fully plausible. It is deeply regrettable that we are still a long way from knowing how to integrate explanation and understanding, information and meaning, science and the humanities. However, I doubt that the direction of cognitive science can be changed from on high by the kind of metaphysical arguments advanced by critics of computationalism (e.g., **Baggs, Raja, & Anderson (Baggs et al.)**; Clark & Chalmers 1998; Hutto & Myin 2017; Malafouris 2016), and, even if such inorganic change were possible, I am not sure there would be a net gain from switching sides. A cognitive science that jettisoned computationalism for "meaning" would lose most of the insights accumulated over the last 50 years and, although closer to the humanities, would be alienated from the natural sciences. As long as a meaning-based approach continues to dominate social and developmental psychology (e.g., Tomasello 1999; 2014; 2019; **Whiten**), I see no danger that it will be abandoned completely by those who study the mind. Furthermore – and this may be where I differ most from **Dominey** and **Fenici & Garofoli** – I am not disturbed by the historically contingent origins of computationalism. I see both computationalism and folk or "belief-desire" psychology – the "meaning" framework – as products of cultural evolution. They each have strengths and weaknesses, and are eminently revisable. For now, as highlighted by **van Bergen & Sutton**, there are advantages to be gained from using both folk psychology and computationalism to understand the evolution of the human mind.

## R2. Grist and mills

In one of my efforts to overcome cognition blindness, to point at what is missing from cultural evolutionary studies, I borrowed an 800-year-old metaphor of the mind from St. Thomas Aquinas. I said that cultural evolution operates not only on the grist of the mind (e.g., beliefs, ideas, behaviours, skills, artefacts) but also on the mills (cognitive mechanisms). Like most metaphors, this one is far from perfect. Mills work on grist and cognitive mechanisms work on beliefs, ideas, behaviours, skills, and artefacts (BIBSA); cognitive mechanisms take these particulars as input and transform them. So far, so good. But whereas mills turn grist into flour, cognitive mechanisms turn BIBSA into more BIBSA. Beliefs, ideas, behaviours, skills, and artefacts – the usual targets of cultural evolutionary analysis – are both inputs and outputs of cognitive processing.

As **Smaldino & Spivey** noticed, the grist-and-mills metaphor would have been even more imperfect if I had used it to capture not the synchronic relationship between cognitive processes and their contents, but the diachronic relationship between social interactions and neural mechanisms. I agree with them that "the social mechanisms of language use and the neural mechanisms of language processing may not be well treated as 'a grist' and 'a mill', respectively." Fortunately, although the mutually formative relationship between social interactions and cognitive (rather than neural) mechanisms was a central theme of *Cognitive Gadgets*, I did not try to capture that relationship with a metaphor of any kind. Instead I characterised it as a relationship in which cognitive mechanisms undergo cultural evolution.

I am pleased to find that I have much in common with **Baggs et al.**, but they are also unhappy about the grist-and-mills metaphor. At first blush it seems that, in their view, this metaphor misled me into thinking that "the things we do and make" are mere products of cognitive processes. On this reading, to cast behaviour and artefacts as grist is to overlook the vital role of the agent's own behaviour in determining the information to which s/he has access, and to underestimate the importance of both artefacts and the behaviour of other agents as carriers of information in their own right. But when the first blush has subsided, this is an implausible reading of the concern expressed by Baggs et al. *Cognitive Gadgets* does not say a lot about artefacts because it focusses on social cognition (language, mindreading, imitation) rather than instrumental cognition (e.g., causal understanding, spatial navigation), but it dwells at great length on the importance of social interaction – what we do with others – in informing and shaping the human mind. Given this emphasis, it is more likely that Baggs et al. are objecting to the metaphysics of the grist-and-mills metaphor. They are challenging the assumption – enshrined in both computationalism and contemporary Western folk psychology – that thinking, acting, and artefacts are three fundamentally different kinds of things. They see value in the idea of "the extended mind" (Clark & Chalmers 1998), the view that behaviour and objects can be intrinsic parts of a thinking process.

There is something exhilarating about philosophical work on the extended mind. Consistent with the cultural evolution of mindreading, it shows that our thinking about thinking could easily have been both coherent and radically different from the way it is now. However (call me old-fashioned), I cannot see what would be gained, in everyday life or in cognitive science, by switching from the view that the mind is "in the head" to the view that the mind is (partly) in the world. The capacity of a puddle to constrain dance movements and inspire mischief can be captured not only by casting the puddle as "a component in our action control" (**Baggs et al.**), but also in the conventional way by casting the puddle as an environmental input to action control – grist to a mill. Similarly, in the diachronic case, when I say that the childhood development of imitation draws on experience with optical mirrors, and of being imitated by others, I struggle to see what would be gained by casting the mirrors and the actions of other agents as component parts of the child's developing mind. It is kind of cool to think of it that way, but would the extended mind perspective suggest different empirical questions, or make existing questions more empirically tractable?

**Baggs et al.** also chide me (gently) for neglecting niche construction, "the idea that animals reshape their environments through their actions, and this in turn structures the selection pressures exerted on current and future generations." It is not clear whether niche construction is a bold new concept, like the extended mind, or a catchy new term for an important and pervasive phenomenon that has long been recognised by evolutionists (Feldman et al. 2017; Gupta et al. 2017). Without attempting to resolve that issue, which is way above my pay grade, I can only say that I am puzzled when people suggest that niche construction – a ubiquitous phenomenon throughout the animal kingdom – is not just important in humans, but a key to understanding distinctively human characteristics. It is a bit like the problem posed by research on social learning strategies in nonhuman animals (Heyes 2018, ch. 5). If nearly all animals have social learning strategies, we need to find out what it is about human social learning strategies that makes us different. Similarly, if nearly all animals engage in niche construction, we need to find out what it is about human niche construction that makes us different. Most of the explanatory work is done by the difference-maker rather than the base concept – in the case of social learning strategies, by the recognition that, in humans, some social learning strategies are explicitly metacognitive.

## R3. Gadgets and instincts

In the movies, Frankenstein screams maniacally "It's alive! It's alive!" as his monster begins to twitch. We have no trouble understanding what Dr. F. is asserting (and denying) even though he is drawing on a distinction, between life and death, that affords many intermediates and ambiguous cases. A creature can be more or less alive, closer or further away from death; there are entities – viruses, zombies, Frankenstein's monster – that resist classification; and, as it says in *The Book of Common Prayer* (2007/1549), "In the midst of life we are in death." The distinction between cognitive gadgets and cognitive instincts, although less profound, is similarly sinuous.

The first thing I should emphasise is that a cognitive gadget is *not* an entity "created by cultural evolution alone" (**Whiten**). As highlighted by **Sperber**, I am convinced that "The rich interactive complexity of developmental processes makes it absolutely clear that, in cognition as in other biological systems, there are no pure cases of nature or of nurture; no biological characteristic is caused only by 'the genes' or only by 'the environment'" (Heyes 2018, p. 24). Rather, a cognitive gadget is a cognitive mechanism with distinctively human characteristics that have been shaped predominantly by selection operating on cultural variants. In contrast, a cognitive instinct is a cognitive mechanism with distinctively human characteristics that have been shaped predominantly by selection operating on genetic variants. The terms cognitive gadget and cognitive instinct mark the ends of a continuum of cases (Sperber), with, I argued in *Cognitive Gadgets*, imitation and mindreading close to the gadget end, and things like associative learning and the inborn face bias (**Iannetti & Vallortigara**) close to the instinct end of the continuum.

There are many evolutionary processes that could, in principle, send a cognitive process from one end of the continuum into a "messy middle ground" (**Rathkopf & Dennett**) between gadgetry and instinctiveness. For example, in principle, genetic assimilation (**Del Giudice**) could increase the role of genetically inherited information in shaping development, and genetic accommodation could amplify the roles of nature, nurture, and/or culture (**Jablonka et al.**). As Del Giudice underlined, this is not a "zero-sum competition." All of these in-principle possibilities I happily embrace. What puzzles me is that those commentators who were critical of the gadget-instinct distinction seem to share my interest in examining how different factors (genetic, cultural, "plasticity," etc.) combine to produce cognitive development, but do not seem to believe that, in order to do this, one must be able to get an empirical handle on what and how each factor is contributing in any given case. It is as if they want to know how different ingredients and oven settings contribute to the texture and flavour of a cake but do not believe that, to find out, one must be able to distinguish their contributions through intervention – for example, by adding more flour – and by examining patterns of covariance – for example, by comparing cakes baked at 180, 190, and $200^0$C.

**Badcock et al., Jablonka et al.**, and **Sperber** say very little about empirical matters. They distinguish types of interaction between genetic and experiential influences – or genetic and specifically cultural influences – without considering how the types could be distinguished in practice. For example, they do not explain how we would know whether genetic accommodation had or had not occurred (Jablonka et al.), or how we can tell apart cases in which "A biological function [has been] fulfilled through the cultural evolution of an appropriate trait" and in which "cultural evolution [has taken] advantage of biologically evolved dispositions" (Sperber). On the other hand, **Del Giudice,** revisiting our disagreement about mirror neurons (Cook et al. 2014; Del Giudice et al. 2009), concerns himself with empirical matters but offers a counsel of despair. He doubts that twin studies can provide positive evidence of genetically inherited contributions to development, and remarks ominously that "It may be impossible to fully make sense of the cross-cultural data on developmental trajectories without addressing the thorny issue of national differences in cognitive ability." However, Del Giudice does not direct us to empirical methods that are, in his view, better able to trace the contributions of nature, nurture, and culture to cognitive development. It seems that he wants to consign cognitive mechanisms to the middle ground between gadgetry and instinctiveness because he despairs of our ever being able to find positive evidence of genetic, learning, and cultural contributions.

As I acknowledge repeatedly in *Cognitive Gadgets*, both explicitly and by poring over data, it is very difficult indeed to get an empirical handle on the contributions of nature, nurture, and culture to cognitive development. For example, after discussing a range of methods, I note:

> "each of the methods outlined above is highly fallible. When learning opportunity A (for example, talking with a parent about mental states) correlates with cognitive ability B (mindreading), it could be because a hidden factor C (linguistic skill), is influencing both A and B, not because A is causing B. Likewise, twin studies may indicate a relatively large genetic contribution to development simply because the people included in the study happen to have grown up in very similar environments, and, in cross-species comparisons, convergent evolution can be mistaken for a strong influence of learning on development. Given these risks, in this area of science, as in most others, we have to place more trust in research that includes effective control procedures, and to look for convergent evidence – for signs that studies using different samples and methods are pointing to the same conclusion." (Heyes 2018, p. 50)

In my view, it is neither legitimate nor helpful to respond to these challenges with a "messy middle default," – that is, by assuming that all three sources of information contribute about equally in all cases, or by assuming out of tribal loyalty (e.g., to behaviourism or High Church evolutionary psychology) that one of them is dominant. *Cognitive Gadgets* offers and uses a methodological template for parsing cognitive development, based on the distinction between poverty and wealth of the stimulus. I would be flabbergasted if this template were exactly right. It certainly needs refinement and to be augmented by modelling, especially nonlinear modelling (**Smaldino & Spivey**). But I shall stick to my guns on what the current evidence suggests – that many distinctively human cognitive mechanisms lie at the gadget end of the continuum (see below) – and, more generally, on the necessity for empirical evidence from cognitive science to back up claims about the roles of nature, nurture, and culture in cognitive development. I will be content if *Cognitive Gadgets* proves to be "a timely provocation" (**Del Giudice**) in this respect; if it encourages those interested in human evolution to recognise that claims about the innateness and genetic assimilation of cognitive processes are not helpful unless they are backed by specific, discriminative empirical evidence. We should not allow nativism to be a matter of taste.

## R4. More about gadgets

Before turning to the evidence surveyed in *Cognitive Gadgets*, I would like to say a little more about what I had in mind when I coined the term "cognitive gadgets." (Gadgets are out in the world now, so people can make of them what they will, but I still feel a bit proprietary.)

First, I have been convinced by Buskell (2018) that "minority" cognitive processes – such as those specialised for chess (**Del Giudice**), lace making, or abacus calculation – are cognitive gadgets in good standing, and that they could prove to be a valuable resource in empirical research on the cultural evolution of typically human cognition. However, following High Church evolutionary psychology, I am especially interested in the types of cognitive mechanisms – such as mindreading, episodic memory, language, imitation – that are present in most people alive today. These human-nature–defining cognitive gadgets are, for me, the paradigmatic cases. Note, with **Badcock et al.**, that many people who now identify as "evolutionary psychologists" are not High Church. I may even be one of them. But, of course, insofar as the departure from orthodoxy involves rejection of computationalism, I regard it as heresy.

Second, **Del Giudice** and **Sperber** take me to be yet more devout about associative learning than I really am. I see associative learning as a powerful engine, but not the only engine, in the construction of cognitive gadgets. As I tried to make clear in my discussions of metacognitive social learning strategies and mindreading (Heyes 2018, chapters 5 and 7), like **Dominey**, I regard language as another major generator.

Finally, I want to put my hands up and acknowledge that, although it suggests that cognitive gadgets are shaped by cultural group selection, the book says relatively little about evolutionary dynamics (**Del Giudice**; **Smaldino & Spivey**). It is the work of a cognitive scientist interested in evolution, not of an evolutionist interested in cognitive science. I hope researchers with complementary expertise will take up the challenge, using modelling and historical-anthropological data to assess the plausibility of the hypothesis that distinctively human cognitive mechanisms (along with grist – social organisation, norms, beliefs, etc.) have been shaped by cultural selection. In the meantime, let me reiterate baldly an argument in favour of cultural selection that did not make it from the book to the precis: We know of three sources of adaptive fit between a species-typical trait and its environment – intelligent design, genetic selection, and cultural selection (Dennett 2017). Intelligent design now contributes to the development of some distinctively human cognitive mechanisms (e.g., there are education programmes designed to promote literacy), but it is not a plausible candidate for most of these mechanisms (e.g., mindreading, imitation). Genetic selection is the option backed by High Church evolutionary psychology, but, I argue in *Cognitive Gadgets*, contemporary evidence from cognitive science is not consistent with the idea that genetic selection is the principal architect of the human mind. Therefore, to the extent that distinctively human cognitive mechanisms are adaptive – do their jobs well – it must be because they have been shaped by the third designer, cultural selection.

## R5. Evidence

### R5.1. Starter kit

#### R5.1.1. Face preference

**Iannetti & Vallortigara** draw attention to a very interesting, recently published electroencephalographic study showing a stronger neural response to upright than inverted face-like stimuli in newborns (Buiatti et al. 2019). At first I could not work out why Iannetti & Vallortigara regard this study as contrary to my suggestion that an inborn face bias is part of the genetically inherited starter kit for distinctively human cognition. The results are entirely consistent with the behavioural evidence on which I based this claim, showing that newborns have an attentional bias in favour of face-like stimuli. Having read Iannetti & Vallortigara's commentary more carefully, I think there has been a misunderstanding due to their focus on the brain (hardware) and my focus on cognition (software). They identify the inborn face bias with a particular neural response. For them, the inborn face bias *is* a neural response. Therefore, by definition, as this neural response declines the inborn face preference goes away; it is a transitory phenomenon rather than something that persists to become part of mature face processing. In contrast, for me the inborn face bias is a functional entity observed at a particular stage in development; it is whatever makes newborns attend more to face-like stimuli. On this cognitive view, the decline of a particular neural response in the first few days post-partum is entirely consistent with the inborn face bias being a foundation for growth, via domain-general learning, of more specific face-related attentional biases.

#### R5.1.2. Executive functions

In their commentary based on careful reading of *Cognitive Gadgets* and packed with interesting data, **Braem & Hommel** challenge my suggestion that enhanced executive functions are part of the genetic starter kit for distinctively human cognition. Instead, they (and now I) find it plausible that, insofar as inhibitory control, working memory and cognitive flexibility are more advanced in humans than other animals, it is due to genetically based changes in associative learning plus sociocultural input during development. I found myself wondering, if this is correct, how free-living nonhuman animals could get enough of the right kind of social interaction to support the development of their executive functions. But that is my only immediate reservation. I hope Braem, Hommel, and others pursue the hypothesis that executive functions are cognitive gadgets, and, whatever the answer, that this line of enquiry has the benefits identified in their final paragraph. Stimulating research of this kind is exactly what I hoped *Cognitive Gadgets* would do.

### R5.2. Case studies

#### R5.2.1. Selective social learning

**Rathkopf & Dennett** encourage me – in a charmingly collegial way, but also with force – to reflect on the "benefits of embracing the messy middle," especially in relation to selective social learning. They argue that there are likely to be many varieties of social learning rule between those I describe as planetary and the explicitly metacognitive rules I describe as cook-like. There are likely to be many intermediate rules that involve increasing degrees of comprehension along with the competence. It is possible that Rathkopf & Dennett overestimate the amount of comprehension I'm packing into cook-like social learning rules. Just as a cook does not need to know the chemistry that makes it wise to bake a cake at 180°, a user of *copy digital natives* does not need to know the epistemology that makes it wise to learn IT skills from people born after 1985. But Rathkopf & Dennett's main point is well-taken: evolution is typically gradual, and therefore we should be on the lookout for intermediate forms.

The question is: Where should we look? It is easy to take any distinction between types of cognitive process and dream up a third (or fourth, or fifth …) type that shares characteristics with both. It is much harder to formulate new testable hypotheses; to conceptualise an intermediate type of cognitive process in a way that is both rooted in existing evidence and makes it possible to distinguish empirically between the new type and the types we already knew about. It is hard but, unless intermediates are conceptualised in this way, theorising about the evolution of mind will continue to float free of empirical science. I want research on the evolution of cognition to be messy in another sense – to get down and dirty with the data. With this kind of engagement as a cherished goal, I would look for intermediates between planetary and cook-like social learning rules in the cognitive science of implicit metacognition (Shea et al. 2014), not, like **Rathkopf & Dennett**, in research on "rational imitation." Experiments by Beisert et al. (2012) suggest that, in both human infants and chimpanzees (Buttelmann et al. 2007), rational imitation effects are due to distraction. For example, a head movement is less likely to be copied when the model's hands are wrapped than when they're free, not because the subject understands wrapped hands to indicate lack of free choice, but because distraction by the wrapping procedure makes it less likely that the subject will attend to the head movement. If this is correct, if rational imitation effects are due to distraction, they are produced by wholesomely planetary social learning biases (Heyes 2016b).

Like many others (e.g., **Tennie**), but in contrast with **Whiten**, I see the inheritance of behaviour via social learning in animals as importantly different from human culture because it is not cumulative; it does not afford cultural selection. However, in previous work my colleagues and I have given a straightforward answer to Whiten's question about how to test for explicit metacognition in non-linguistic creatures:

> If, contrary to our hypothesis, non-human animals have system 2 metacognition, they should be able to learn that reward-seeking behaviour is successful after making decisions that are unlikely to be correct (low confidence) and unsuccessful after making decisions that are likely to be correct (high confidence). This could be tested by, for example, using a reverse transfer test after training in a wagering task (Shea et al. 2014, p. 191).

#### R5.2.2. Imitation

**Del Giudice** is right to point out that twin studies have limited value in parsing the contributions of nature, nurture, and culture to cognitive development (e.g., Feldman & Ramachandran 2018), and that, away from my home turf of experimental psychology and cognitive neuroscience, I misreported the results of a twin study of imitation. It was Hughes et al. (2005), not McEwen et al. (2007), who found the same correlation between identical and fraternal twins. McEwen et al. found a .3 difference between the within-pair correlations, and concluded: "individual differences in imitation at age 2 years could be attributed to modest heritability, but mainly environmental influences" (p. 485). Echoing a crucial point made by **Braem & Hommel** about endophenotypes, McEwen et al. also noted: "The fact that 30% of the variance can be attributed to genetic factors could mean that genes directly influence individual differences in imitation mechanisms, although it is entirely possible that the impact is on more basic perceptual, attentional or motivational factors" (p. 485). Fortunately, the case for imitation as a cognitive gadget rests not on twin studies – which were not even mentioned in the chapter of *Cognitive Gadgets* devoted to imitation – but on experimental data confirming predictions of the associative sequence learning (ASL) model, and indicating wealth of the stimulus.

In her deep and well-informed commentary, **Powell** argues that, even if the ASL model is right about the development of imitation, the resulting cognitive mechanism may be not a cognitive gadget but a "cultural starting point"; not a mechanism favoured by cultural selection because it promotes cultural inheritance but a mechanism, made possible by social elements of the genetic starter kit and dependent on social learning for its development, that acts as a platform for the evolution of true cognitive gadgets. I find this proposal very interesting indeed, and not only because it converges with work that Jonathan Birch (2017) and I are doing on "the cultural evolution of cultural evolution." Powell is acutely aware of the challenges inherent in explaining not only how cognitive gadgets get off the ground, in evolutionary and developmental time, but also on the subtle interplay between social practices and cognitive mechanisms as targets of cultural selection (see also **McNamara & Neha**; **Smaldino & Spivey**). I am not entirely convinced by Powell's evidence that parents' imitation of infants, and social partners' positive responses to being imitated, are sustained only by "incremental increases in the human genetic predisposition for social motivation and attention." For example, many of the studies she cites, which claim to show that infants and adults respond positively to being imitated, did not include adequate controls for contingency, and there is evidence that, when imitation and contingency are dissociated, it is the latter that makes us feel warm towards others (Catmur & Heyes 2013). But these reservations aside, Powell's subtle analysis has given me much to think about. I am grateful to her.

**Tennie**'s planet-of-the-apes reflections on imitation were also enlightening. I love the idea that "ape imitation is a gadget lent to apes by humans," and I am intrigued by his evidence that imitation evolved only about 500,000 years ago.

**Whiten** and I have a long, and usually friendly, history of disagreement about imitation. Instead of repeating answers to some of his "twenty questions" that I have offered in the past (e.g., Heyes 2016c), I would like to highlight a point of solid agreement between us: imitation of the topography of body movements (what Whiten calls "high fidelity copying") is important primarily for the inheritance of social, rather than instrumental, behaviour (Heyes 2013). Also, I am glad he drew attention to a key feature of the ASL model: it implies that imitation is compositional. Through social interaction (being imitated, synchronous action, mirror experience, etc.), the child builds up a repertoire, or vocabulary, of action units that can subsequently be imitated when they are encountered in novel sequences and configurations. Just as language users can understand sentences they have never heard before, imitators can copy compound body movements they have never seen before. Finally, Whiten is surely right that it would be valuable to have more information about the sources of imitogenic experience available to children in their everyday lives. However, evidence that children learn to imitate, in the manner proposed by the ASL model, is accumulating fast (e.g., de Klerk et al. 2018).

#### *R5.2.3. Mindreading*

I particularly enjoyed the commentaries that focussed on mindreading (**Apperly**; **Dominey**; **McNamara & Neha**). Although open to the idea that mindreading is culturally inherited, they identified patches where my treatment of the subject is "thin" (McNamara & Neha) and added valuable thickness.

My reading of the evidence to date suggests that much of what is culturally inherited, at least in WEIRD societies, amounts to mental state concepts. However, I would not contest **Apperly**'s proposal that, "in a long social apprenticeship," learning from others to identify relevant information is yet more important in the development of mindreading. Similarly, although I live on the information side of the information-understanding divide (see sect. R1 above), and do not embrace the extended mind for day-to-day scientific use (see sect. R2), I find great value in the ideas that mindreading is culturally inherited via narrative practice and analogical mapping (**Dominey**; **Fenici & Garofoli**; Hutto 2007). Furthermore, I was educated by **McNamara & Neha**'s evidence of how "teaching and learning environments vary across cultures to provide children with context-specific opportunities to develop the cognitive abilities needed to thrive as adults." Their reference to "culture itself" implies that the domain of culture is exhausted by what I call grist – behaviour, beliefs, artefacts, etc. – whereas a primary aim of *Cognitive Gadgets* is to show that distinctively human cognitive mechanisms are also cultural. However, that quibble did not dampen my enthusiasm as McNamara & Neha directed us to rich seams of data from cultural psychology.

#### *R5.2.4. Language*

I need to think further about the many subtle and interesting points made by **Dominey**, but I am sympathetic to his view that language is a very special cognitive gadget. I do not believe that language is necessary for all gadget construction – for example, the ASL model implies that imitation can get going without it – and I take seriously the idea that language itself is rooted in associative learning. However, once language is in place, even with a toehold, it enables the evolution and development of a wide array of other gadgets. If Dominey and I differ at all in the importance we assign to language, it is probably because he is preoccupied by sophisticated cultural grist – creation myths, mathematical concepts, the causal roles of mental states – whereas I am at least equally interested in the cultural inheritance of nonverbal social behaviour and motor skills. Verbal instruction is of more limited value in learning shibboleths – facial, postural, and vocal gestures that distinguish one social group from another – and the skills involved in making and using tools (Stout & Hecht 2017).

**Jablonka et al.** remind us that many peripheral mechanisms have been genetically specialised for language – "the innervation and musculature around the mouth, the larynx and the vocal cords; the unique function of the expanding muscles around the lungs" – and go on to say that "There is no reason to believe that the cognitive system, responsible for the activation and control of this physiology, somehow managed to remain unbiased towards it." Quite right, there is no reason to doubt that the mature cognitive system is biased for language. But the evidence surveyed in chapter 8 of *Cognitive Gadgets* provides many reasons to doubt that the biasing was done by selection operating on genetic variants. Research in cognitive science on the roles of domain-general sequence learning and social shaping in the development of language makes it fully plausible that, while genetic selection has done the lion's share on peripheral mechanisms, cultural selection has shaped the cognitive mechanisms responsible for language processing. If theorising about the evolution of human cognition is to be evidence-based, any claim that our minds are genetically specialised for language must, I believe, engage with that research.

#### *R5.2.5. Autobiographical memory*

Autobiographical memory was not one of my case studies but in their fascinating commentaries, **McNamara & Neha** and **van Bergen & Sutton** showed that it deserves a central place in "an expanded cognitive science of gadgets." The combination of cross-cultural and intervention studies, clinical relevance, and hypotheses linking different gadget-generating social practices with ecological conditions, makes autobiographical memory rich territory for cultural evolutionary psychology. I hope future work will examine further how elaborative and repetitive reminiscing change not only what is remembered and when, but also the computational processes of remembering. Autobiographical memory also presents an excellent opportunity to develop the idea of a compound gadget (van Bergen & Sutton; **Dominey**). All gadgets are compounds in that, like any complex cognitive mechanism, they incorporate many subroutines. But are some gadgets compounds in a deeper sense – combinations of other gadgets, such as episodic memory and mindreading, that can function alone or, in different contexts, as a single system? Like all questions about the individuation or "unitisation" of cognitive mechanisms, the answer is far from obvious and cannot be solved by intuition. The beauty of computational cognitive science is that it uses, not intuition or folk psychology, but empirical methods to find out about the structure and functions of the mind (Shallice & Cooper 2011). That is why, in *Cognitive Gadgets*, I recommend cognitive science as a valuable resource to anyone interested in human evolution.

## R6. Concluding remark

Although a part of me would have preferred 30,000 words "of closely reasoned adulation," what the commentators have provided is much more invigorating and instructive. I am grateful to them all for reading the book, and offering critiques that will help evolutionary psychology to identify more and better cognitive gadgets.

**Acknowledgments.** I am grateful to Martin Eimer, Noel Malcolm, and Nick Shea for their help in preparing this response to commentaries.

## References

**[The letters "a" and "r" before author's initials stand for target article and response references, respectively]**

Abrahamse E., Braem S., Notebaert W. & Verguts T. (2016) Grounding cognitive control in associative learning. *Psychological Bulletin* **142**:693–728. [SB]

Ach N. (1910) *Über den willensakt und das temperament*. Quelle & Meyer. [SB]

Agnetta B. & Rochat P. (2004) Imitative games by 9-, 14-, and 18-month-old infants. *Infancy* **6**(1):1–36. [LJP]

Anderson M. L. (2008) Circuit sharing and the implementation of intelligent systems. *Connection Science* **20**(4):239–51. [aCH]

Anderson M. L. (2014) *After phrenology: Neural reuse and the interactive brain*. MIT Press. [MF]

Anderson M. L. & Finlay B. L. (2014) Allocating structure to function: The strong links between neuroplasticity and natural selection. *Frontiers in Human Neuroscience* **7**:918. [aCH]

Andrews R., Van Bergen P. & Wyver S. (submitted) Children's, educators', and mothers' use of mental state language during conversations about the past and future. [PVB]

Anisfeld M. (1979) Interpreting "imitative" responses in early infancy. *Science* **205**:214–15. [aCH]

Anisfeld M. (2005) No compelling evidence to dispute Piaget's timetable of the development of representational imitation in infancy. In: *Perspectives on imitation: From cognitive neuroscience to social science, vol. 2*, ed. S. Hurley & N. Chater, pp. 107–31. MIT Press. [aCH]

Apperly I. A. (2010) *Mindreaders: The cognitive basis of "theory of mind."* Psychology Press/Taylor & Francis Group. [aCH, IAA]

Apperly I. A. (2012) What is "theory of mind"? Concepts, cognitive processes and individual differences. *Quarterly Journal of Experimental Psychology* **65**(5):825–839. [IAA]

Apps M. A., Lesage E. & Ramnani N. (2015) Vicarious reinforcement learning signals when instructing others. *Journal of Neuroscience* **35**(7):2904–13. [aCH]

Aquinas T. (1272/2015) *Summa theologica*. (Originally published 1272.) Xist. [aCH]

Arendash G. W., Garcia M. F., Costa D. A., Cracchiolo J. R., Wefes I. M. & Potter H. (2004) Environmental enrichment improves cognition in aged Alzheimer's transgenic mice despite stable β–amyloid deposition. *Neuroreport* **15**(11):1751–54. [EB]

Ariew A. (1996) Innateness and canalization. *Philosophy of Science* **63**(3[Suppl]):S19–S27. [DS]

Arrington C. M. & Logan G. D. (2004) The cost of a voluntary task switch. *Psychological Science* **15**(9):610–15. [SB]

Aston A. (2019) Metaplasticity and the boundaries of social cognition: Exploring scalar transformations in social interaction and intersubjectivity. *Phenomenology and the Cognitive Sciences* **18**(1):65–89. [MF]

Avital E. and Jablonka E. (2000) *Animal traditions. Behavioural inheritance in evolution*. Cambridge University Press. [EJ]

Badcock P. B. (2012) Evolutionary systems theory: A unifying meta-theory of psychological science. *Review of General Psychology* **16**(1):10–23. doi: 10.1037/a0026381. [PBB]

Badcock P. B., Davey C., Whittle S., Allen N. B. & Friston K. J. (2017) The depressed brain: An evolutionary systems theory. *Trends in Cognitive Sciences* **21**(3):182–94. doi: 10.1016/j.tics.2017.01.005. [PBB]

Badcock P. B., Friston K. J. & Ramstead M. J. D. (2019a) The hierarchically mechanistic mind: A free-energy formulation of the human psyche. *Physics of Life Reviews*. Advance online publication. doi: 10.1016/j.plrev.2018.10.002. [PBB]

Badcock P. B., Friston K. J., Ramstead M. J., Ploeger A. & Hohwy J. (2019b) The hierarchically mechanistic mind: An evolutionary systems theory of the human brain, cognition, and behavior. *Cognitive, Affective, & Behavioral Neuroscience*. Advance online publication. doi: 10.3758/s13415-019-00721-3. [PBB]

Baer D. M. & Sherman J. A. (1964) Reinforcement control of generalized imitation in young children. *Journal of Experimental Child Psychology* **1**(1):37–49. [aCH]

Bahrami B., Olsen K., Bang D., Roepstorff A., Rees G. & Frith C. (2012) Together, slowly but surely: The role of social interaction and feedback on the build-up of benefit in collective decision-making. *Journal of Experimental Psychology: Human Perception and Performance* **38**(1):3–8. [aCH]

Baillargeon R., Scott R. M. & He Z. (2010) False-belief understanding in infants. *Trends in Cognitive Sciences* **14**(3):110–18. [aCH]

Baker C. A., Peterson E., Pulos S. & Kirkland R. A. (2014) Eyes and IQ: A meta-analysis of the relationship between intelligence and "Reading the Mind in the Eyes". *Intelligence* **44**:78–92. [MDG]

Bardi L., Regolin L. & Simion F. (2011) Biological motion preference in humans at birth: Role of dynamic and configural properties. *Developmental Science* **14**(2):353–59. [aCH]

Bardi L., Regolin L. & Simion F. (2014) The first time ever I saw your feet: Inversion effect in newborns' sensitivity to biological motion. *Developmental Psychology* **50**(4):986–93. [aCH]

Barkow J. H., Cosmides L. & Tooby J., ed. (1992) *The adapted mind: Evolutionary psychology and the generation of culture*. Oxford University Press. [aCH, MF]

Barrett H. C. (2012) A hierarchical model of the evolution of human brain specializations. *Proceedings of the National Academy of Sciences USA* **109**(Suppl 1):10733–40. [MDG]

Barrett H. C. (2015) *The shape of thought: How mental adaptations evolve*. Oxford University Press. [MDG]

Barrett H. C. (2017) Diversity and hierarchy in the evolution of mental mechanisms. In: *On human nature: Biology, psychology, ethics, politics, and religion*, ed. M. Tibayrenc & F. J. Ayala, pp. 467–474. Elsevier. [MDG]

Barrett H. C., Bolyanatz A., Crittenden A. N., Fessler D. M. T., Fitzpatrick S., Gurven M., Henrich J., Kanovsky M., Kushnick G., Pisor A., Scelza B. A., Stich S., von Rueden C., Zhao W. & Laurence S. (2016) Small-scale societies exhibit fundamental variation in the role of intentions in moral judgment. *Proceedings of the National Academy of Sciences USA* **113**(17):4688–93. Available at: http://doi.org/10.1073/pnas.1522070113. [RAM]

Barrett H. C., Broesch T., Scott R. M., He Z., Baillargeon R., Di Wu, *et al.* (2013) Early false-belief understanding in traditional non-Western societies. Proceedings of the Royal Society B: Biological Sciences 280(1755):20122654. Available at: Available at: https://doi.org/10.1098/rspb.2012.2654. [RAM]

Barrett H. C., Peterson C. D. & Frankenhuis W. E. (2016) Mapping the cultural learnability landscape of danger. *Child Development* **87**:770–81. [MDG]

Barrett L. F. (2017) *How emotions are made: The secret life of the brain*. Houghton Mifflin Harcourt. [aCH]

Barth C. M. & Funke J. (2010) Negative affective environments improve complex solving performance. *Cognition and Emotion*, **24**(7), 1259–1268. [EB]

Bates E. & MacWhinney B. (1987) Competition, variation, and language learning. In: *Mechanisms of language acquisition*, ed. B. MacWhinney & E. Bates, pp. 157–93. Erlbaum. [PFD]

Bates E., Wulfeck B. & MacWhinney B. (1991) Cross-linguistic research in aphasia: An overview. *Brain and Language* **41**:123–48. [PFD]

Bauer P. (1996) What do infants recall of their lives? Memory for specific events by 1- and 2-year-olds. *American Psychologist* **51**(1):29–41. [PVB]

Bauer P. (2015) A complementary processes account of the development of childhood amnesia and a personal past. *Psychological Review* **122**(2):204–31. [PVB]

Bavelas J. B., Black A., Lemery C. R. & Mullett J. (1986) "I show how you feel": Motor mimicry as a communicative act. *Journal of Personality and Social Psychology* **50**(2):322. [LJP]

Bednarik R. G. (2013) *Creating the human past: An epistemology of Pleistocene archaeology*. Archaeopress. [MF]

Behrens T. E., Hunt L. T., Woolrich M. W. & Rushworth M. F. (2008) Associative learning of social value. *Nature* **456**(7219):245–49. [aCH]

Beisert M., Zmyj N., Liepelt R., Jung F., Prinz W. & Daum M. M. (2012) Rethinking 'rational imitation' in 14-month-old infants: A perceptual distraction approach. *PLoS One* **7**(3):e32563. [rCH]

Belland B. R., Kim C. & Hannafin M. J. (2013) A framework for designing scaffolds that improve motivation and cognition. *Educational Psychologist* **48**(4):243–70. [EB]

Berthoud H. R. (2011) Metabolic and hedonic drives in the neural control of appetite: Who is the boss? *Current Opinion in Neurobiology* **21**(6):888–96. [MDG]

Berto S. and Nowick K. (2018) Species-specific changes in a primate transcription factor network provide insights into the molecular evolution of the primate prefrontal cortex. *Genome Biology and Evolution* **10**(8):2023–36. [EJ]

Berwick R. C. & Chomsky N. (2015) *Why only us: Language and evolution*. MIT Press. [aCH]

Bicchieri C. (2006) *The grammar of society*. Cambridge University Press. [PES]

Birch J. (2017) *The philosophy of social evolution*. Oxford University Press. [rCH]

Bird G. & Heyes C. (2005) Effector-dependent learning by observation of a finger movement sequence. *Journal of Experimental Psychology: Human Perception and Performance* **31**(2):262–75. [aCH]

Birdsong D. & Molis M. (2001) On the evidence for maturational constraints in second-language acquisition. *Journal of Memory and Language* **44**(2):235–49. [aCH]

Blakemore S. J. & Choudhury S. (2006) Development of the adolescent brain: Implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry* **47**(3–4):296–312. [SB]

Bloch M. & Sperber D. (2002) Kinship and evolved psychological dispositions: The mothers brother controversy reconsidered. *Current Anthropology* **43**(5):723–48. [DS]

Block N. (1995) The mind as the software of the brain. In: *Thinking*, ed. E. E. Smith & D. N. Osherson, pp. 377–425. MIT Press. [rCH]

Bloom P. (2000) *How children learn the meanings of words*. MIT Press. [aCH]

Boeckx C. (2006) *Linguistic minimalism: Origins, concepts, methods, and aims*. Oxford University Press. [aCH]

Bohannon J. N., MacWhinney B. & Snow C. (1990) No negative evidence revisited: Beyond learnability or who has to prove what to whom. *Developmental Psychology* **26**(2):221–26. [aCH]

Bono A. E. J., Whiten A., van Schaik C., Krutzen M., Eichenberger F., Schnider A. & van de Waal E. (2018) Payoff- and sex-biased social learning interact in a wild primate population. *Current Biology* **28**(17):2800–05. [AW]

Boogert N. J., Giraldeau L.-A. & Lefebvre L. (2008) Song complexity correlates with learning ability in zebra finch males. *Animal Behaviour* **76**:1735–41. [aCH]

Bornkessel-Schlesewsky I., Schlesewsky M., Small S. L. & Rauschecker J. P. (2015) Neurobiological roots of language in primate audition: Common computational properties. *Trends in Cognitive Sciences* **19**(3):142–50. [aCH]

Bouchard J., Goodyer W. & Lefebvre L. (2007) Social learning and innovation are positively correlated in pigeons. *Animal Cognition* **10**:259–66. [aCH]

Bouchard T. J. & Loehlin J. C. (2001) Genes, evolution, and personality. *Behavior Genetics* **31**(3):243–73. doi: 10.1023/A:1012294324713. [PBB]

Boyd R. & Richerson P. J. (1985) *Culture and the evolutionary process*. University of Chicago Press. [aCH]

Boyd R. & Richerson P. J. (2002) Group beneficial norms can spread rapidly in a structured population. *Journal of Theoretical Biology* **215**:287–96. [PES]

Braem S. (2017) Conditioning task switching behavior. *Cognition* **166**:272–276. [SB]

Braem S. & Egner E. (2018) Getting a grip on cognitive flexibility. *Current Directions in Psychological Science* **27**:470–476. [SB]

Braem S., Verguts T. & Notebaert W. (2011) Conflict adaptation by means of associative learning. *Journal of Experimental Psychology: Human Perception and Performance* **37**:1662–66. [SB]

Braitenberg V. (1984) *Vehicles: Experiments in synthetic psychology*. Bradford Books. [GI]

Brewer M. B. (2007) The importance of being we: Human nature and intergroup relations. *American Psychologist* **62**(8):728–38. doi: 10.1037/0003-066x.62.8.728. [PBB]

Briley D. A. & Tucker-Drob E. M. (2017) Comparing the developmental genetics of cognition and personality over the life span. *Journal of Personality* **85**(1):51–64. [MDG]

Bruner J. (1991) The narrative construction of reality. *Critical Inquiry* **18**(1):1–21. [PFD]

Bruner J. S. (1990) *Acts of meaning*. Harvard University Press. [rCH, PFD]

Bruner J. S. (2009) *Actual minds, possible worlds*. Harvard University Press. [PFD]

Brusse C. (2017) Making do without selection – review essay of "Cultural evolution: Conceptual challenges" by Tim Lewens. *Biology & Philosophy* **32**(2):307–19. [aCH]

Buchel C., Morris J., Dolan R. J. & Friston K. J. (1998) Brain systems mediating aversive conditioning: an event-related fMRI study. *Neuron* **20**(5):947–57. [GI]

Buiatti M., Di Giorgio E., Piazza M., Polloni C., Menna G., Taddei F., Baldo E., and Vallortigara G. (2019). Cortical route for facelike pattern processing in human newborns. *Proceedings of the National Academy of Sciences USA* **116**(10):4625–30. Available at: https://www.ncbi.nlm.nih.gov/pubmed/?term=buiatti+vallortigara. [rCH, GI]

Bull R., Phillips L. H. & Conway C. A. (2008) The role of control functions in mentalizing: Dual-task studies of theory of mind and executive function. *Cognition* **107**(2):663–72. [aCH]

Buskell A. (2018) Causes of cultural disparity: Switches, tuners, and the cognitive science of religion. *Philosophical Psychology* **31**(8):1239–64. [rCH]

Buss D. (2012) *Evolutionary psychology: The new science of the mind*. Allyn & Bacon. [MF]

Buss D. M. (2015) *The handbook of evolutionary psychology*. Wiley. [MDG]

Butterfill S. A. & Apperly I. A. (2013) How to construct a minimal theory of mind. *Mind & Language* **28**(5):606–37. [aCH]

Butterfill S., Apperly I., Rakoczy H., Spaulding S. & Zawidzki T. (2013) Symposium on Butterfill and Apperly's "How to construct a minimal theory of mind" (*Mind and Language* 28, 606–637). Available at: philosophyofbrains.com/2013/11/11/symposium-on-butterfill-and-apperlys-how-to-construct-a-minimal-theory-of-mind-mind-language-28-5-606-63.aspx. [aCH]

Buttelmann D., Carpenter M., Call J. & Tomasello M. (2007) Enculturated chimpanzees imitate rationally. *Developmental Science* **10**(4):31–38. [rCH, CR]

Byrne B., Samuelsson S., Wadsworth S., Hulslander J., Corley R., DeFries J. C., Quain P., Willcutt E. G. & Olson R. K. (2007) Longitudinal twin study of early literacy development: Preschool through Grade 1. *Reading and Writing* **20**(1–2):77–102. [SB]

Byrne R. W. (2016) *Evolving insight*. Oxford University Press. [CT]

Call J. (2001) Body imitation in an enculturated orangutan (*Pongo pygmaeus*). *Cybernetics and Systems* **32**(1–2):97–119. [AW]

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):378–84. Available at: http://doi.org/10.1111/j.0956-7976.2005.01544.x. [RAM]

Calvo-Merino B., Grèzes J., Glaser D. E., Passingham R. E. & Haggard P. (2006) Seeing or doing? Influence of visual and motor familiarity in action observation. *Current Biology* **16**(19):1905–10. [aCH]

Campbell D. T. (1965) Variation and selective retention in socio-cultural evolution. *Social Change in Developing Areas* **19**:26–27. [aCH]

Campbell D. T. (1974) Evolutionary epistemology. In: *The philosophy of Karl Popper*, ed. P. A. Schlipp, pp. 413–63. Open Court. [aCH]

Caporael L. (2003) Repeated assembly. In: *Evolutionary psychology: Alternative approaches*, ed. S. J. Scher & F. Rauscher, pp. 71–89. Kluwer Academic. [PES]

Caporael L. R. (2001) Evolutionary psychology: Toward a unifying theory and a hybrid science. *Annual Review of Psychology* **52**:607–28. doi: 10.1146/annurev.-psych.52.1.607. [PBB]

Caporael L. R., Griesemer J. R. & Wimsatt W. C. (2013) *Developing scaffolds in evolution, culture, and cognition*. MIT Press. [PES]

Carpenter M. & Call J. (2013) How joint is the joint attention of apes and human infants? In: *Agency and joint attention*, ed. J. Metcalf & H. S. Terrace, pp. 49–61. Oxford University Press. [aCH]

Carpenter M., Uebel J. & Tomasello M. (2013) Being mimicked increases prosocial behavior in 18-month-old infants. *Child Development* **84**(5):1511–18. [LJP]

Carr A., Slade L., Yuill N., Sullivan S. & Ruffman T. (2018) Minding the children: A longitudinal study of mental state talk, theory of mind, and behavioural adjustment from the age of 3 to 10. *Social Development* **27**(4):826–40. Available at: http://doi.org/10.1111/sode.12315. [RAM]

Carruthers P. (2013) Evolution of working memory. *Proceedings of the National Academy of Sciences USA* **110**(Suppl 2):10371–78. [SB]

Catmur C. & Heyes C. M. (2013) Is it what you do, or when you do it? The roles of contingency and similarity in pro-social effects of imitation. *Cognitive Science* **37**(8):1541–52. [rCH]

Catmur C., Press C. & Heyes C. M. (2016) Mirror neurons from associative learning. In: *The Wiley handbook on the cognitive neuroscience of learning*, ed. R. A. Murphy & R. C. Honey, pp. 515–37. Wiley Blackwell. [aCH]

Catmur C., Walsh V. & Heyes C. M. (2009) Associative sequence learning: The role of experience in the development of imitation and the mirror system. *Philosophical Transactions of the Royal Society B: Biological Sciences* **364**(1528):2369–80. [aCH]

Cavalli-Sforza L. L. & Feldman M. W. (1981) *Cultural transmission and evolution, vol. 16: A quantitative approach. (Monographs in population biology)*. Princeton University Press. [aCH]

Centola D. (2018) *How behavior spreads: The science of complex contagions*. Princeton University Press. [PES]

Changizi M. A., Zhang Q., Ye H. & Shimojo S. (2006) The structures of letters and symbols throughout human history are selected to match those found in objects in natural scenes. *The American Naturalist* **167**(5):E117–39. [aCH]

Chartrand T. L. & Bargh J. A. (1999) The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology* **76**(6):893–910. [LJP]

Chartrand T. L. & Lakin J. L. (2013) The antecedents and consequences of human behavioral mimicry. *Annual Review of Psychology* **64**:285–308. [LJP]

Choi I., Nisbett R. E. & Norenzayan A. (1999) Causal attribution across cultures: Variation and universality. *Psychological Bulletin* **125**(1):47–63. Available at: http://doi.org/10.1037//0033-2909.125.1.47. [RAM]

Chomsky N. (1965) *Aspects of the theory of syntax*. MIT Press. [aCH, PBB]

Christiansen M. H. & Chater N. (2016) *Creating language: Integrating evolution, acquisition, and processing*. MIT Press. [aCH]

Christiansen M. H. & MacDonald M. C. (2009) A usage-based approach to recursion in sentence processing. *Language Learning* **59**(s1):126–61. [aCH]

Cieri R.L., Churchill S.E., Franciscus R.G., Tan J., Hare B., Athreya S., Holliday T.W., Nowell A., Steele T.E., Weaver T.D. & Wrangham R. (2014) Craniofacial feminization, social tolerance, and the origins of behavioral modernity. *Current Anthropology* **55**(4):419–43. [aCH]

Clark A. (1998) *Being there: Putting brain, body, and world together again*. MIT Press. [EB]

Clark A. (2008) *Supersizing the mind: Embodiment, action, and cognitive extension*. Oxford University Press. [PES]

Clark A. (2013) Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behavioral and Brain Sciences* **36**(3):181–204. doi: 10.1017/S0140525X12000477. [PBB]

Clark A. & Chalmers D. (1998) The extended mind. *Analysis* **58**(1):7–19. [EB, rCH]

Clay Z. & Tennie C. (2018) Is overimitation a uniquely human phenomenon? Insights from human children as compared to bonobos. *Child Development* **89**(5):1535–44. doi: 10.1111/cdev.12857. [AW, CT]

Clegg J. M. & Legare C. H. (2016) A cross-cultural comparison of children's imitative flexibility. *Developmental Psychology* **52**(9):1435–44. Available at: http://doi.org/10.1037/dev0000131. [RAM]

Coltheart M. (2002) Cognitive neuropsychology. In: *Stevens' handbook of experimental psychology*, ed. J. Wixted, pp. 139–174. Wiley. [rCH]

Coltheart M. (2012) The cognitive level of explanation. *Australian Journal of Psychology* **64**(1):11–18. [rCH]

Coltheart M., Rastle K., Perry C., Langdon R. & Ziegler J. (2001) DRC: A dual route cascaded model of visual word recognition and reading aloud. *Psychological Review* **108**(1):204. [aCH]

Colzato L. S., Hommel B. & Shapiro K. (2010) Religion and the attentional blink: Depth of faith predicts depth of the blink. *Frontiers in Psychology* **1**:147. [SB]

Colzato L. S., Slagter H., de Rover M. & Hommel B. (2011) Dopamine and the management of attentional resources: Genetic markers of striatal D2 dopamine predict individual differences in the attentional blink. *Journal of Cognitive Neuroscience* **23**(11):3576–85. [SB]

Constant A., Ramstead M. J., Veissiere S. P., Campbell J. O. & Friston K. J. (2018) A variational approach to niche construction. *Journal of The Royal Society Interface* **15**(141):20170685. doi: 10.1098/rsif.2017.0685. [PBB]

Constant A., Ramstead M. J., Veissiere S. P., Campbell J. O. & Friston K. J. (2019) Regimes of expectations: An active inference model of social conformity and decision making. *Frontiers in Psychology* **10**:679. doi: 10.3389/fpsyg.2019.00679. [PBB]

Cook R., Bird G., Catmur C., Press C. & Heyes C. (2014) Mirror neurons: From origin to function. *Behavioral and Brain Sciences* **37**(2):177–92. [arCH]

Cook R. G., Brown M. F. & Riley D. A. (1985) Flexible memory processing by rats: Use of prospective and retrospective information in the radial maze. *Journal of Experimental Psychology: Animal Behavior Processes* **11**(3):453–69. [aCH]

Cools R. & D'Esposito M. (2010) Dopaminergic modulation of flexible cognitive control in humans. In: *Dopamine handbook*, ed. A. Björklund, S. Dunnett, L. Iversen & S. Iversen, pp. 249–60. Oxford University Press. [SB]

Cosmides L. & Tooby J. (1996) Are humans good intuitive statisticians after all? Rethinking some conclusions from the literature on judgment under uncertainty. *Cognition* **58**(1):1–73. [RAM]

Cosmides L. & Tooby J. (2013) Evolutionary psychology: New perspectives on cognition and motivation. *Annual Review of Psychology* **64**(1):201–29. [MF]

Cowie F. (2016) Innateness and language. In: *The Stanford encyclopedia of philosophy* (winter 2016 edition), ed. E. N. Zalta. Available at: plato.stanford.edu/archives/win2016/entries/innateness–language. [aCH]

Crain S., Goro T. & Thornton R. (2006) Language acquisition is language change. *Journal of Psycholinguistic Research* **35**(1):31–49. [aCH]

Crozier W. (2006) *Blushing and the social emotions. The self unmasked*. Palgrave Macmillan. [EJ]

Crump M. J., Gong Z. & Milliken B. (2006) The context-specific proportion congruent Stroop effect: Location as a contextual cue. *Psychonomic Bulletin & Review* **13** (2):316–321. [SB]

Culicover P. W. & Jackendoff R. (2005) *Simpler syntax*. Oxford University Press. [aCH]

Custance D. M., Whiten A. & Bard K. A. (1995) Can young chimpanzees (*Pan troglodytes*) imitate arbitrary actions? Hayes and Hayes (1952) revisited. *Behaviour* **132** (11): 837–59. [AW, CT]

Dąbrowska E. (2012) Different speakers, different grammars: Individual differences in native language attainment. *Linguistic Approaches to Bilingualism* **2**(3):219–53. [aCH]

Damuth J. & Heisler I. L. (1988) Alternative formulations of multilevel selection. *Biology and Philosophy* **3**(4):407–30. [aCH]

Danziger E. & Rumsey A. (2013) Introduction: From Opacity to intersubjectivity across languages and cultures. *Language and Communication* **33**(3):247–50. Available at: http://doi.org/10.1016/j.langcom.2013.07.004. [RAM]

Darwin C. (1868) *The variation in animals and plants under domestication*. John Murray. [aCH]

Darwin C. (1872) *The expression of the emotions in man and animals*, 1st edition. John Murray. [EJ]

Davidson D. (1990) The structure and content of truth. *Journal of Philosophy* **87**(6):279–328. [IAA].

Davies M. & Stone T., eds. (1995) *Folk psychology: The theory of mind debate*. Blackwell. [IAA]

Dawson E. H., Avarguès-Weber A., Chittka L. & Leadbeater E. (2013) Learning by observation emerges from simple associations in an insect model. *Current Biology* **23** (8):727–30. [aCH].

Deacon T. W. (1997) *The symbolic species*. Norton. [SB]

Dehaene S. & Cohen L. (2011) The unique role of the visual word form area in reading. *Trends in Cognitive Sciences* **15**(6):254–62. [aCH, DS]

Dehaene S., Pegado F., Braga L. W., Ventura P., Nunes Filho G., Jobert A., Dehaene-Lambertz G., Kolinsky R., Morais J. & Cohen L. (2010) How learning to read changes the cortical networks for vision and language. *Science* **330** (6009):1359–64. doi: 10.1126/science.1194140. [GI]

de Klerk C. C., Johnson M. H., Heyes C. M. & Southgate V. (2015) Baby steps: Investigating the development of perceptual-motor couplings in infancy. *Developmental Science* **18**(2):270–80. [aCH]

de Klerk C. C., Lamy-Yang I., & Southgate V. (2018) The role of sensorimotor experience in the development of mimicry in infancy. *Developmental Science*, e12771. Available at: DOI: 10.1111/desc.12771. [rCH]

Del Giudice M., Manera V. & Keysers C. (2009) Programmed to learn? The ontogeny of mirror neurons. *Developmental Science* **12**(2):350–63. [rCH, MDG]

Demetras M. J., Post K. N. & Snow C. E. (1986) Feedback to first language learners: The role of repetitions and clarification questions. *Journal of Child Language* **13** (2):275–92. [aCH]

de Moor M. H., Roeling M. P. & Boomsma D. I. (2013) Creativity and talent: Etiology of familial clustering. In: *Neuroscience of creativity*, ed. O. Vartanian, A. S. Bristol, & J. C. Kaufman, pp. 95–112. MIT Press. [MDG]

Dennett D. (1978) *Brainstorms: Philosophical essays on mind and psychology*. MIT Press. [SB]

Dennett D. C. (1983) Intentional systems in cognitive ethology: The "Panglossian paradigm" defended. *Behavioral and Brain Sciences* **6**(3):343–55. [CR]

Dennett D. C. (1990) Memes and the exploitation of imagination. *The Journal of Aesthetics and Art Criticism* **48**(2):127–35. [aCH]

Dennett D. C. (1991) *Consciousness explained*. Little Brown. [aCH]

Dennett D. C. (2013) *Intuition pumps and other tools for thinking*. W.W. Norton. [CR]

Dennett D. C. (2017) *From bacteria to Bach and back: The evolution of minds*. W.W. Norton. [rCH, CR]

De Villiers P. A. & de Villiers J. G. (2012) Deception dissociates from false belief reasoning in deaf children: Implications for the implicit versus explicit theory of mind distinction. *British Journal of Developmental Psychology* **30**(1):188–209. [aCH]

De Waal F. B. & Ferrari P. F. (2010) Towards a bottom-up perspective on animal and human cognition. *Trends in Cognitive Sciences* **14**(5):201–07. [aCH]

Diaconescu A. O., Mathys C., Weber L. A. E., Daunizeau J., Kasper L., Lomakina E. I., Fehr E. & Stephan K. E. (2014) Inferring on the intentions of others by hierarchical Bayesian learning. *PLoS Computational Biology* **10**(9):e1003810. [aCH]

Diamond A. (2013) Executive functions. *Annual Review of Psychology* **64**:135–68. Available at: http://dx.doi.org/10.1146/annurev-psych-113011-143750. [aCH]

Dickinson A. (2012) Associative learning and animal cognition. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1603):2733–42. [aCH, MDG]

Dixson H. G., Komugabe-Dixson A. F., Dixson B. J. & Low J. (2018) Scaling theory of mind in a small-scale society: A case study from Vanuatu. *Child Development* **89** (6):2157–75. [MDG]

Dolan R. J. & Dayan P. (2013) Goals and habits in the brain. *Neuron* **80**(2):312–25. [SB]

Dominey P. F. (1995) Complex sensory-motor sequence learning based on recurrent state representation and reinforcement learning. *Biological Cybernetics* **73**(3):265–74. [PFD]

Dominey P. F. (2013) Recurrent temporal networks and language acquisition – from corticostriatal neurophysiology to reservoir computing. *Frontiers in Psychology* **4**:1–14. [PFD]

Dominey P. F., Hoen M., Blanc J. M. & Lelekov-Boissard T. (2003) Neurological basis of language and sequential cognition: Evidence from simulation, aphasia, and ERP studies. *Brain and Language* **86**(2):207–25. [PFD]

Dominey P. F., Inui T. & Hoen M. (2009) Neural network processing of natural language: II. Towards a unified model of corticostriatal function in learning sentence comprehension and non-linguistic sequencing. *Brain and Language* **109**(2–3):80–92. [PFD]

Dor D. (2015) *The instruction of imagination: Language as a social communication technology*. Oxford University Press. [EJ]

Dor D. and Jablonka E. (2010) Canalization and plasticity in the evolution of linguistic communication. In: *The evolution of human language*, ed. R.K. Larson, V. Deprez and H. Yamakido, pp. 135–147. Cambridge University Press. [EJ]

Duh S., Paik J. H., Miller P. H., Gluck S. C., Li H. & Himelfarb I. (2016) Theory of mind and executive function in Chinese preschool children. *Developmental Psychology* **52** (4):582–91. [MDG]

Dupierrix E., de Boisferon A. H., Méary D., Lee K., Quinn P. C., Di Giorgio E., Simion F., Tomonaga M. & Pascalis O. (2014) Preference for human eyes in human infants. *Journal of Experimental Child Psychology* **123**:138–46. [aCH]

Duranti A. (2015) *The anthropology of intentions: Language in a world of others*. Cambridge University Press. [RAM]

Eerkens J. W. & Lipo C. P. (2005) Cultural transmission, copying errors, and the generation of variation in material culture and the archaeological record. *Journal of Anthropological Archaeology* **24**(4)316–34. [CT]

Efferson C., Richerson P. J., McElreath R., Lubell M., Edsten E., Waring T. M., Paciotti B. & Baum W. (2007) Learning, productivity, and noise: An experimental study of cultural transmission on the Bolivian Altiplano. *Evolution and Human Behavior* **28** (1):11–17. [aCH]

Egner T. (2014) Creatures of habit (and control): A multi-level learning perspective on the modulation of congruency effects. *Frontiers in Psychology* **5**:Article ID 1247. [SB]

Eisenreich B. R., Akaishi R. & Hayden B. Y. (2017) Control without controllers: Toward a distributed neuroscience of executive control. *Journal of Cognitive Neuroscience* **29** (10):1684–98. [SB]

Elman J. L., Bates E. A., Johnson M. H., Karmiloff-Smith A., Parisi D. & Plunkett K. (1996) *Rethinking innateness: A connectionist perspective on development*. MIT Press. [PES]

Eriksson K. (2012) The nonsense math effect. *Judgment and Decision Making* **7**(6):746–49. [aCH]

Evans J. S. B. & Stanovich K. E. (2013) Dual-process theories of higher cognition: Advancing the debate. *Perspectives on Psychological Science* **8**(3):223–41. [SB]

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):429–48. [aCH]

Everett D. L. (2005) Cultural constraints on grammar and cognition in Pirahã: Another look at the design features of human language. *Current Anthropology* **46**(4):621–46. [aCH]

Everett D. L. (2012) *Language: The cultural tool*. Pantheon Books. [MF]

Fagot J. & Cook R. G. (2006) Evidence for large long-term memory capacities in baboons and pigeons and its implications for learning and the evolution of cognition. *Proceedings of the National Academy of Sciences* **103**(46):17564–67. [aCH]

Fawcett T. W., Hamblin S. & Giraldeau L. A. (2012) Exposing the behavioral gambit: The evolution of learning and decision rules. *Behavioral Ecology* **24**(1):2–11. [aCH]

Feldman M. W., Odling-Smee J. & Laland K. N. (2017) Why Gupta et al.'s critique of niche construction theory is off target. *Journal of Genetics* **96**(3):505–08. [rCH]

Feldman M. W. & Ramachandran S. (2018) Missing compared to what? Revisiting heritability, genes and culture. *Philosophical Transactions of the Royal Society B: Biological Sciences* **373**(1743):20170064. [rCH]

Fenici M. (2017) What is the role of experience in children's success in the false belief test: Maturation, facilitation, attunement or induction? *Mind & Language* **32**(3):308–37. [MF]

Fenici M. & Garofoli D. (2017) The biocultural emergence of mindreading: Integrating cognitive archaeology and human development. *Journal of Cultural Cognitive Science* **1**(2):89–117. [MF]

Fenstermacher S. K. & Saudino K. J. (2007) Toddler see, toddler do? Genetic and environmental influences on laboratory-assessed elicited imitation. *Behavior Genetics* **37** (5):639–47. [MDG]

Fincher C. L. & Thornhill R. (2012) Parasite-stress promotes in-group assortative sociality: The cases of strong family ties and heightened religiosity. *Behavioral and Brain Sciences* **39**(2–3):155–160. Retrieved from https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/parasitestress-promotes-ingroup-assortative-sociality-the-cases-of-strong-family-ties-and-heightened-religiosity/0331C3331E16F6C15BB9A5AF1AA07108. [RAM]

Fivush R. (2001) Owning experience: The development of subjective perspective in autobiographical memory. In: *The self in time: Developmental perspectives*, ed. C. Moore & K. Lemmon, pp. 35–52. Erlbaum. Available at: https://doi-org.helicon.vuw.ac.nz/10.4324/9781410600684. [RAM]

Fivush R., Haden C. A. & Reese E. (2006) Elaborating on elaborations: Role of maternal reminiscing style in cognitive and socioemotional development. *Child Development* **77** (6):1568–88. Available at: http://www.jstor.org/stable/4139261. [PVB, RAM]

Fivush R. & Nelson K. (2004) Culture and language in the emergence of autobiographical memory. *Psychological Science* **15**(9):573–577. doi: 10.1111/j.0956-7976.2004.00722.x. [RAM]

Flaxman S. M. & Sherman P. W. (2000) Morning sickness: A mechanism for protecting mother and embryo. *Quarterly Review of Biology* **75**(2):113–148. [MDG]

Flege J. E., Yeni-Komshian G. H. & Liu S. (1999) Age constraints on second-language acquisition. *Journal of Memory and Language* **41**(1):78–104. [aCH]

Fleming S. M., Dolan R. J. & Frith C. D. (2012) Metacognition: Computation, biology and function. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1594):1280–86. [aCH]

Flick L. B. (2000) Cognitive scaffolding that fosters scientific inquiry in middle level science. *Journal of Science Teacher Education* **11**(2):109–129. [EB]

Floccia C., Christophe A. & Bertoncini J. (1997) High-amplitude sucking and newborns: The quest for underlying mechanisms. *Journal of Experimental Child Psychology* **64** (2):175–98. [aCH]

Florio M., Albert M., Tverna E., Namba T., Brand H., Lewitus E., Haffner C., Sykes A., Kuan Wong F., Peters J., Guhr E., Klemroth S., Prüfer K., Kelso J., Naumann R., Nüsslein I., Dahl A., Lachmann R., Pääbo S., Wieland B. and Huttner W.B. (2015) Human-specific gene ARHGAP11B promotes basal progenitor amplification and neocortex expansion. *Science* **347**(6229):1465–70. [EJ]

Fodor J. (2000) *The mind doesn't work that way: The scope and limits of computational psychology*. MIT Press. [IAA]

Fodor J. A. (1983) *The modularity of mind*. MIT Press. [aCH]

Fouts R. S., Fouts D. H. & Van Cantfort T. E. (1989) The infant Loulis learns signs from cross-fostered chimpanzees. In: *Teaching sign language to chimpanzees*, ed. R. A. Gardner, B. T. Gardner & T. E. Van Cantfort, pp. 280–92. State University of New York Press. [CT]

Frankenhuis W. E. & Fraley R. C. (2017) What do evolutionary models teach us about sensitive periods in psychological development? *European Psychologist* **22**:141–150. doi: 10.1027/1016–9040/a000265. [PBB]

Frankenhuis W. E., Panchanathan K. & Barto A. G. (2018) Enriching behavioral ecology with reinforcement learning methods. *Behavioural Processes* **161**:94–100. [MDG]

Frankenhuis W. E. & Tiokhin L. (2018) Bridging evolutionary biology and developmental psychology: Toward an enduring theoretical infrastructure. *Child Development* **89** (6):2303–06. [MDG]

Freeman H. D. & Ross S. R. (2014) The impact of atypical early histories on pet or performer chimpanzees. *PeerJ*, **2**:e579. [CT]

Friedman N. P. & Miyake A. (2017) Unity and diversity of executive functions: Individual differences as a window on cognitive structure. *Cortex* **86**:186–204. [SB]

Friedman N. P., Miyake A., Altamirano L. J., Corley R. P., Young S. E., Rhea S. A. & Hewitt J. K. (2016) Stability and change in executive function abilities from late adolescence to early adulthood: A longitudinal twin study. *Developmental Psychology* **52**(2):326. [SB]

Friston K. (2010) The free-energy principle: A unified brain theory? *Nature Reviews: Neuroscience* **11**:127–48. doi: 10.1038/nrn2787. [PBB]

Friston K. (2013) Life as we know it. *Journal of the Royal Society Interface* **10** (86):20130475. doi: 10.1098/rsif.2013.0475. [PBB]

Friston K.J., Daunizeau J. & Kiebel S.J. (2009). Reinforcement learning or active inference? *PloS One* **4**(7):e6421. doi: 10.1371/journal.pone.0006421. [PBB]

Frith U. (2001) Mind blindness and the brain in autism. *Neuron* **32**(6):969–79. [aCH]

Fröber K. & Dreisbach G. (2017) Keep flexible – keep switching! The influence of forced task switching on voluntary task switching. *Cognition* **162**:48–53. [SB]

Frost R. (1914) *North of Boston*. David Nutt. [CR]

Gallagher S. & Hutto D. (2008) Understanding others through primary interaction and narrative practice. In: *The shared mind: Perspectives on intersubjectivity*, ed. J. Zlatev, T. P. Racine, C. Sinha, & E. Itkonen, pp. 17–38. John Benjamins. [MF, PFD]

Garcia E., Baer D. M. & Firestone I. (1971) The development of generalized imitation within topographically determined boundaries. *Journal of Applied Behavior Analysis* **4**(2):101–12. [aCH]

Gardner B. T. & Gardner R. A. (1971) Chapter 3 – Two-way communication with an infant chimpanzee. In: *Behavior of nonhuman primates, vol. 4*, ed. A. M. Schrier & F. Stollnitz, pp. 117–184. Elsevier. [CT]

Gardner R. A. & Gardner B. T. (1989) A cross-fostering laboratory. In: *Teaching sign language to chimpanzees*, ed. R. A. Gardner, B. T. Gardner & T. E. Van Cantfort, pp. 1–28. State University of New York Press. [CT]

Garofoli D. (2019) Embodied cognition and the archaeology of mind: A radical reassessment. In: *Handbook of evolutionary research in archaeology*, ed. A. M. Prentiss, pp. 379–405. Springer. [MF]

Garvert M. M., Moutoussis M., Kurth-Nelson Z., Behrens T. E. & Dolan R. J. (2015) Learning-induced plasticity in medial prefrontal cortex predicts preference malleability. *Neuron* **85**(2):418–28. [aCH]

Geary D. C. & Bjorklund D. F. (2000) Evolutionary developmental psychology. *Child Development* **71**(1): 57–65. doi: 10.1111/1467-8624.00118. [PBB]

Gelfand M. J., Raver J. L., Nishii L., Leslie L. M., Lun J., Lim B. C., Duan L., Almaliach A., Ang S., Arnadottir J., Aycan Z., Boehnke K., Boski P., Cabecinhas R., Chan D., Chhokar J., D'Amato A., Ferrer M., Fischlmayr I. C., Fischer R., Fülöp M., Georgas J., Kashima E. S., Kashima Y., Kim K., Lempereur A., Marquez P., Othman R., Overlaet B., Panagiotopoulou P., Peltzer K., Perez-Florizno L. R., Ponomarenko L., Realo A., Schei V., Schmitt M., Smith P. B., Soomro N., Szabo E., Taveesin N., Toyama M., Van de Vliert E., Vohra N., Ward C. & Tamaguchi S. (2011) Differences between tight and loose cultures: A 33-nation study. *Science* **332** (6033):1100–04. Available at: http://doi.org/10.1126/science.1197754. [RAM]

Gibson J. J. (1966) *The senses considered as perceptual systems*. Houghton Mifflin. [MF]

Godfrey-Smith P. (2009) *Darwinian populations and natural selection*. Oxford University Press. [aCH, CR]

Godfrey-Smith P. (2012) Darwinism and cultural change. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1599):2160–70. Available at: http://doi.org/10.1098/rstb.2012.0118. [aCH, RAM]

Goldberg A. (1995) *Constructions: A construction grammar approach to argument structure*. University of Chicago Press. [PFD]

Goldin-Meadow S. (2005) *Hearing gesture: How our hands help us think*. Harvard University Press. [EB]

Gómez-Roblesa A., Hopkins W. D., Schapiro S. J. & Sherwood C. C. (2015) Relaxed genetic control of cortical organization in human brains compared with chimpanzees. *Proceedings of the National Academy of Sciences USA*, **112**(48):14799–804. [EJ]

Goucha T., Zaccarella E. & Friederici A. D. (2017) A revival of the *Homo loquens* as a builder of labeled structures: Neurocognitive considerations. *Neuroscience & Biobehavioral Reviews* **81**(Part B):213–24. [PFD]

Gray J. A. (1994) Personality dimensions and emotion systems. In: *The nature of emotion: Fundamental questions*, ed. P. Ekman & R. J. Davidson, pp. 329–31. Oxford University Press. [PBB]

Gruber T., Muller M. N., Strimling P., Wrangham R. & Zuberbuhler K. (2009) Wild chimpanzees rely on cultural knowledge to solve an experimental honey acquisition task. *Current Biology* **19**(21):1806–10. [AW]

Grusec J. E. & Abramovitch R. (1982) Imitation of peers and adults in a natural setting: A functional analysis. *Child Development* **53**(3):636–42. [aCH]

Gupta M., Prasad N. G., Dey S., Joshi A. & Vidya T. N. C. (2017). Niche construction in evolutionary theory: The construction of an academic niche? *Journal of Genetics* **96** (3):491–504. [rCH]

Güss C. D. & Wiley B. (2007) Metacognition of problem-solving strategies in Brazil, India, and the United States. *Journal of Cognition and Culture* **7**(1):1–25. [aCH]

Hakuta K., Bialystok E. & Wiley E. (2003) Critical evidence: A test of the critical-period hypothesis for second-language acquisition. *Psychological Science* **14**(1):31–38. [aCH]

Han J. J., Leichtman M. D. & Wang Q. (1998) Autobiographical memory in Korean, Chinese, and American children. *Developmental Psychology* **34**(4):701–13. [PVB]

Hanus D. (2016) Causal reasoning versus associative learning: A useful dichotomy or a strawman battle in comparative psychology? *Journal of Comparative Psychology* **130** (3):241–48. [MDG]

Haun D. B. M., Rapold C. J., Cal J., Janzen G. & Levinson S. C. (2006) Cognitive cladistics and cultural override in Hominid spatial cognition. *Proceedings of the National Academy of Sciences USA* **103**(46):17568–73. [aCH]

Hayden B. Y. (2018) Why has evolution not selected for perfect self-control? *Philosophical Transactions of the Royal Society B: Biological Sciences* **374** (1766):2018.0139. Available at: https://doi.org/10.1098/rstb.2018.0139. [SB]

Hayne H. (2004) Infant memory development: Implications for childhood amnesia. *Developmental Review* **24**(1):33–73. [PVB]

Heilbronner S. R. & Hayden B. Y. (2016) Dorsal anterior cingulate cortex: A bottom-up view. *Annual Review of Neuroscience* **39**:149–70. [SB]

Heine S.J., Kitayama S., Lehman D. R., Takata T., Ide E., Leung C. & Matsumoto H. (2001) Divergent consequences of success and failure in Japan and North America: An investigation of self-improving motivations and malleable selves. *Journal of Personality and Social Psychology* **81**(4):599–615. [aCH]

Hendriks-Jansen H. (1996) *Catching ourselves in the act*. MIT Press. [PBB]

Henrich J. (2004a) Cultural group selection, coevolutionary processes and large-scale cooperation. *Journal of Economic Behavior & Organization* **53**(1):3–35. [PES]

Henrich J. (2004b) Demography and cultural evolution: How adaptive cultural processes can produce maladaptive losses: The Tasmanian case. *American Antiquity* **69**(2):197–214. [aCH]

Henrich J. (2015) *The secret of our success: How culture is driving human evolution, domesticating our species and making us smarter*. Princeton University Press. [aCH, PBB, EB, RAM, DS, AW]

Henrich J. & Broesch J. (2011) On the nature of cultural transmission networks: Evidence from Fijian villages for adaptive learning biases. *Philosophical Transactions of the Royal Society B: Biological Sciences* **366**(1567):1139–48. [aCH]

Henrich J., Heine S. J., & Norenzayan A. (2010) The weirdest people in the world? *Behavioral and Brain Sciences*, **33**(2–3), 61–135. Available at: http://doi.org/10.1017/S0140525X0999152X. [PES, RAM]

Hermer-Vazquez L., Moffet A. & Munkholm P. (2001) Language, space, and the development of cognitive flexibility in humans: The case of two spatial memory tasks. *Cognition* **79**(3):263–99. [SB]

Hewlett B. S. (2016) Teaching in hunter-gatherer infancy. *Royal Society Open Science* **3**(1):150403. Available at: http://doi.org/10.1098/rsos.150403. [RAM]

Heyes C. (2012a) Grist and mills: On the cultural origins of cultural learning. *Philosophical Transactions of the Royal Societ y B: Biological Sciences* **367**(1599):2181–91. [aCH, EB]

Heyes C. (2018) *Cognitive gadgets: The cultural evolution of thinking*. Harvard University Press. [arCH, IAA, EB, PBB, SB, MDG, PFD, MF, GI, EJ, RAM, LJP, CR, DS, PES, CT, PVB, AW]

Heyes C. & Saggerson A. (2002) Testing for imitative and non-imitative social learning in the budgerigar using a two-object/two-action test. *Animal Behaviour* **64**(6):851–59. [AW]

Heyes C. M. (1994) Social learning in animals: Categories and mechanisms. *Biological Reviews* **69**(2):207–31. [aCH]

Heyes C. M. (2003) Four routes of cognitive evolution. *Psychological Review* **110**(4):713–27. [aCH]

Heyes C. M. (2011) Automatic imitation. *Psychological Bulletin* **137**(3):463–83. [aCH]

Heyes C. M. (2012b) Simple minds: A qualified defence of associative learning. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1603):2695–703. [aCH]

Heyes C. M. (2012c) What's social about social learning? *Journal of Comparative Psychology* **126**(2):193. [aCH]

Heyes C. M. (2013) What can imitation do for cooperation? In: *Cooperation and its evolution*, ed. K. Sterelny, R. Joyce, B. Calcott & B. Fraser, pp. 313–31. MIT Press. [arCH]

Heyes C. M. (2014a) Submentalizing: I am not really reading your mind. *Perspectives on Psychological Science* **9**(2):131–43. [aCH]

Heyes C. M. (2014b) False belief in infancy: A fresh look. *Developmental Science* **17**(5):647–59. [aCH]

Heyes C. M. (2015) Animal mindreading: What's the problem? *Psychonomic Bulletin and Review* **22**(2):313–27. [aCH]

Heyes C. M. (2016a) Blackboxing: Social learning strategies and cultural evolution. *Philosophical Transactions of the Royal Society B* **371**:20150369. [aCH]

Heyes C. M. (2016b) Born pupils? Natural pedagogy and cultural pedagogy. *Perspectives on Psychological Science*, **11**(2), 280–295. [rCH]

Heyes C. M. (2016c) Homo imitans? Seven reasons why imitation couldn't possibly be associative. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **371**(1636),20150069. [rCH]

Heyes C. M. (2016d) Who knows? Metacognitive social learning strategies. *Trends in Cognitive Sciences* **20**:204–13. [aCH]

Heyes C. M. (2017a) Enquire within: Cultural evolution and cognitive science. *Philosophical Transactions of the Royal Society B: Biological Sciences* **373**(1743):20170051. [aCH]

Heyes C. M. (2017b) Apes submentalise. *Trends in Cognitive Sciences* **21**(1):1–2. [aCH]

Heyes C. M. & Frith C. D. (2014) The cultural evolution of mind reading. *Science* **344**(6190):1243091. [aCH]

Heyes C. M. & Pearce J. M. (2015) Not-so-social learning strategies. *Proceedings of the Royal Society B: Biological Sciences* **282**(1802):20141709. [aCH]

Heyes C. M. & Ray E. D. (2000) What is the significance of imitation in animals? *Advances in the Study of Behavior* **29**:215–45. [aCH]

Hill M. R., Boorman E. D. & Fried I. (2016) Observational learning computations in neurons of the human anterior cingulate cortex. *Nature Communications* **7**:12722. doi: 10.1038/ncomms12722. [aCH]

Hinaut X. & Dominey P. F. (2013) Real-time parallel processing of grammatical structure in the fronto-striatal system: A recurrent network simulation study using reservoir computing. *PloS One* **8**(2):e52946. [PFD]

Hinde R. A. (1970) *Animal behaviour: A synthesis of ethology and comparative psychology*. McGraw Hill. [AW]

Hodder I. & Hutson S. (2003) *Reading the past: Current approaches to interpretation in archaeology*. Cambridge University Press. [MF]

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. [AW]

Hofstede G. (1986) Cultural differences in teaching and learning. *International Journal of Intercultural Relations* **10**(3):301–20. Available at: http://doi.org/10.1016/0147-1767(86)90015-5. [RAM]

Holland P. C. (1992) Occasion setting in Pavlovian conditioning. *Psychology of Learning and Motivation* **28**:69–125. [aCH]

Hommel B. & Colzato L.S. (2017) The social transmission of metacontrol policies: Mechanisms underlying the interpersonal transfer of persistence and flexibility. *Neuroscience and Biobehavioral Reviews* **81**(Part A):43–58. [SB]

Hommel B., Colzato L. S., Scorolli C., Borghi A. M. & van den Wildenberg W. P. M. (2011) Religion and action control: Faith-specific modulation of the Simon effect but not stop-signal performance. *Cognition* **120**(2):177–85. [SB]

Hood B. M., Willen J. D. & Driver J. (1998) Adult's eyes trigger shifts of visual attention in human infants. *Psychological Science* **9**(2):131–34. [aCH]

Hrdy S. B. (2009) *Mothers and others*. Harvard University Press. [PBB]

Hruschka D. J., Efferson C., Jiang T., Falletta-Cowden A., Sigurdsson S., McNamara R., Sands M., Munira S., Slingerland E. & Henrich J. (2014) Impartial institutions, pathogen stress and the expanding social network. *Human Nature* **25**(4):567–79. Available at: http://doi.org/10.1007/s12110-014-9217-0. [RAM]

Hsu H. J. & Bishop D. V. (2014) Sequence-specific procedural learning deficits in children with specific language impairment. *Developmental Science* **17**(3):352–65. [aCH]

Hsu H. J., Tomblin J. B. & Christiansen M. H. (2014) Impaired statistical learning of non-adjacent dependencies in adolescents with specific language impairment. *Frontiers in Psychology* **5**: Article ID 175. [aCH]

Hughes C., Devine R. T. & Wang Z. (2017) Does parental mind-mindedness account for cross-cultural differences in preschoolers' theory of mind? *Child Development* **89**(4):1296–1310. Available at: http://doi.org/10.1111/cdev.12746. [RAM]

Hughes C., Jaffee S. R., Happé F., Taylor A., Caspi A. & Moffitt T. E. (2005) Origins of individual differences in theory of mind: From nature to nurture? *Child Development* **76**(2):356–70. [arCH, MDG]

Hughes C. H. & Ensor R. A. (2009) How do families help or hinder the emergence of early executive function? *New Directions for Child and Adolescent Development* **2009**(123):35–50. [SB]

Hurks P. P. M. (2012) Does instruction in semantic clustering and switching enhance verbal fluency in children? *Clinical Neuropsychology* **26**(6):1019–37. [aCH]

Hutto D. D. (2007) The narrative practice hypothesis: Origins and applications of folk psychology. *Royal Institute of Philosophy Supplement* **60**:43–68. doi: 10.1017/S1358246107000033. [PFD, rCH]

Hutto D. D. (2008) *Folk psychological narratives: The sociocultural basis of understanding reasons*. MIT Press. [MF]

Hutto D. D. & Myin E. (2013) *Radicalizing enactivism: Basic minds without content*. MIT Press. [MF]

Hutto D. D. & Myin E. (2017) *Evolving enactivism: Basic minds meet content*. MIT Press. [MF, rCH]

Iannetti G. D., Salomons T. V., Moayedi M., Mouraux A. & Davis K. D. (2013) Beyond metaphor: Contrasting mechanisms of social and physical pain. *Trends in Cognitive Sciences* **17**(8):371–378. doi: 10.1016/j.tics.2013.06.002. [GI]

Ihde D. (1990) *Technology and the lifeworld: From garden to earth*. Indiana University Press. [MF]

Ihde D. (2009) *Postphenomenology and technoscience: The Peking University lectures*. State University of New York Press. [MF]

Ihde D. & Malafouris L. (2018) *Homo faber* revisited: Postphenomenology and material engagement theory. *Philosophy & Technology* 1–20. Available at: https://doi.org/10.1007/s13347-018-0321-7. [MF]

Iliopoulos A. & Garofoli D. (2016) The material dimensions of cognition: Reexamining the nature and emergence of the human mind. *Quaternary International* **405**(Part A, The material dimensions of cognition):1–7. [MF]

Inglehart R. (1997) Modernization, postmodernization and changing perceptions of risk. *International Review of Sociology* **7**(3):449–59. Available at: http://doi.org/10.1080/03906701.1997.9971250. [RAM]

Ingold T. (2004) Beyond biology and culture. The meaning of evolution in a relational world. *Social anthropology* **12**(2):209–21. [MF]

Ingold T. (2007) The trouble with 'evolutionary biology'. *Anthropology Today* **23**(2):13–17. [MF]

Ingold T. & Palsson G., ed. (2013) *Biosocial becomings: Integrating social and biological anthropology*. Cambridge University Press. [MF]

Inoue S. & Matsuzawa T. (2007) Working memory of numerals in chimpanzees. *Current Biology* **17**(23):R1004–R1005. [SB]

Ivanova M. V., Isaev D. Y., Dragoy O. V., Akinina Y. S., Petrushevskiy A. G., Fedina O. N., Shklovsky V.M. & Dronkers N. F. (2016) Diffusion-tensor imaging of major white matter tracts and their role in language processing in aphasia. *Cortex* **85**:165–81. [aCH]

Jablonka E., Ginsburg S. and Dor D. (2012) The co-evolution of language and emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1599):2152–59. [EJ]

Jablonka E. and Lamb M. J. (2005) *Evolution in four dimensions*. MIT Press. [EJ]

Jablonka E. and Rechav G. (1996) The evolution of language in the light of the evolution of literacy. In: *The major origins of language*, ed. J. Trabant, pp. 70–88. Collegium Budapest. [EJ]

Jacobson S. W. & Kagan J. (1979) Interpreting "imitative" responses in early infancy. *Science* **205**(4402):215–17. [aCH]

Janczyk M. & Leuthold H. (2018) Effector system-specific sequential modulations of congruency effects. *Psychonomic Bulletin & Review* **25**(3):1066–72. [SB]

Jara-Ettinger J., Gweon H., Schulz L. E. & Tenenbaum J. B. (2016) The naïve utility calculus: Computational principles underlying commonsense psychology. *Trends in Cognitive Sciences* **20**(8)589–604. [IAA]

Jelbert S. A., Miller R., Schiestl M., Boeckle M., Cheke L. G., Gray R. D., Taylor A. H. & Clayton N. S. (2019) New Caledonian crows infer the weight of objects from observing their movements in a breeze. *Proceedings of the Royal Society B: Biological Sciences* **286** (1894):20182332. doi: http://dx.doi.org/10.1098/rspb.2018.2332. [GI]

Jelinek E. (1995) Quantification in Straits Salish. In: *Quantification in natural languages*, ed. E. Bach, E. Jelinek, A. Kratzer & B. Partee, pp. 487–540. Kluwer. [aCH]

Johnson M. H., Dziurawiec S., Ellis H. & Morton J. (1991) Newborns' preferential tracking of face-like stimuli and its subsequent decline. *Cognition* **40**(1):1–19. [aCH]

Jones S. S. (2006) Exploration or imitation? The effect of music on 4-week-old infants' tongue protrusions. *Infant Behavior and Development* **29**(1):126–30. [aCH]

Jones S. S. (2007) Imitation in infancy: The development of mimicry. *Psychological Science* **18**:593–99. [aCH]

Jones S. S. (2009) The development of imitation in infancy. *Philosophical Transactions of the Royal Society B: Biological Sciences* **364**(1528):2325–35. [aCH]

Jurado M. B. & Rosselli M. (2007) The elusive nature of executive functions: A review of our current understanding. *Neuropsychology Review* **17**(3):213–233. [SB]

Kahneman D. (2003) A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist* **58**(9):697–720. [SB]

Kameda T., Takezawa M. & Hastie R. (2005) Where do social norms come from? The example of communal sharing. *Current Directions in Psychological Science* **14** (6):331–334. doi: 10.1111/j.0963-7214.2005.00392.x. [PBB]

Karmiloff-Smith A. (1994) Précis of beyond modularity: A developmental perspective on cognitive science. *Behavioral and Brain Sciences* **17**(4):693–707. [PES]

Karmiloff-Smith A. (1995) *Beyond modularity: A developmental perspective on cognitive science*. MIT Press. [aCH]

Karr J. E., Areshenkoff C. N., Rast P., Hofer S. M., Iverson G. L. & Garcia-Barrera M. A. (2018) The unity and diversity of executive functions: A systematic review and re-analysis of latent variable studies. *Psychological Bulletin* **144**(11):1147. [SB]

Katz P. S. & Harris-Warrick R. M. (1999) The evolution of neuronal circuits underlying species-specific behavior. *Current Opinion in Neurobiology* **9**(5):628–33. doi: 10.1016/s0959-4388(99)00012-4. [PBB]

Kauffman S. A. (1993) *The origins of order: Self-organization and selection in evolution*. Oxford University Press. [PES]

Kendal J. R. (2011) Cultural niche construction and human learning environments: Investigating sociocultural perspectives. *Biological Theory* **6**(3):241–50. [PES]

Kendal R., Boogert N. J., Rendell L., Laland K. N., Webster M. & Jones L. (2018) Social learning strategies: Bridge-building between fields. *Trends in Cognitive Sciences* **22** (7):651–55. [AW]

Kenrick D. T. (2001) Evolutionary psychology, cognitive science, and dynamical systems: Building an integrative paradigm. *Current Directions in Psychological Science* **10** (1):13–17. doi: 10.1111/1467-8721.00104. [PBB]

Kenrick D. T., Li N. P. & Butner J. (2003) Dynamical evolutionary psychology: Individual decision rules and emergent social norms. *Psychological Review* **110**(1):3–28. doi: 10.1037/0033-295X.110.1.3. [PBB]

Kidd D. C. & Castano E. (2013) Reading literary fiction improves theory of mind. *Science* **342**(6156):377–80. [aCH]

Kidd E. (2012) Implicit statistical learning is directly associated with the acquisition of syntax. *Developmental Psychology* **48**(1):171–84. [aCH]

Kidd E. & Arciuli J. (2016) Individual differences in statistical learning predict children's comprehension of syntax. *Child Development* **87**(1):184–93. [aCH]

Kim U. & Park Y.-S. (2006) The scientific foundation of indigenous and cultural psychology – The transactional approach. In: *Indigenous and cultural psychology: Understanding people in context*, ed. U. Kim, K-S. Yang & K-K. Hwang, pp. 27–48. Springer. Available at: https://link.springer.com/content/pdf/10.1007/0-387-28662-4_2.pdf. [RAM]

Kirby S. (2017) Culture and biology in the origins of linguistic structure. *Psychonomic Bulletin & Review* **24**(1):118–37. [PES]

Kirby S., Cornish H. & Smith K. (2008) Cumulative cultural evolution in the laboratory: An experimental approach to the origins of structure in human language. *Proceedings of the National Academy of Sciences USA* **105**(31):10681–86. [PES]

Kirchhoff M., Parr T., Palacios E., Friston K. & Kiverstein J. (2018) The Markov blankets of life: Autonomy, active inference and the free energy principle. *Journal of The Royal Society Interface* **15**(138):20170792. doi: 10.1098/rsif.2017.0792. [PBB]

Kirmayer J. L. & Ramstead M. J. D. (2017) Embodiment and enactment in cultural psychiatry. In: *Embodiment, enaction, and culture: Investigating the constitution of the shared world*, ed. C. Durt, T. Fuchs, & C. Tewes, pp. 397–422. MIT Press. [PBB]

Kirsh D. (2005) Metacognition, distributed cognition and visual design. In: *Cognition, education, and communication technology*, ed. P. Gardenfors and P. Johansson, pp. 147–180. Routledge. [EB]

Kirsh D. & Maglio P. (1994) On distinguishing epistemic from pragmatic action. *Cognitive Science* **18**(4): 513–549. [EB]

Kline M. A. & Boyd R. (2010) Population size predicts technological complexity in Oceania. *Proceedings of the Royal Society B: Biological Sciences* **277**(1693):2559–64. [aCH]

Kline M. A., Boyd R. & Henrich J. (2013) Teaching and the life history of cultural transmission in Fijian villages. *Human Nature* **24**(4):351–74. Available at: http://doi.org/10.1007/s12110-013-9180-1. [RAM]

Kline M. A., Shamsudheen R. & Broesch T. (2018) Variation is the universal: Making cultural evolution work in developmental psychology. *Philosophical Transactions of the Royal Society B: Biological Sciences* **373**(1743):20170059. Available at: http://doi.org/10.1098/rstb.2017.0059. [RAM]

Knappett C. (2005) *Thinking through material culture*. University of Pennsylvania Press. [MF]

Koepke J. E., Hamm M., Legerstee M. & Russell M. (1983) Neonatal imitation: Two failures to replicate. *Infant Behavior and Development* **6**(1):97–102. [aCH]

Kokkinaki T. & Kugiumutzakis G. (2000) Basic aspects of vocal imitation in infant-parent interaction during the first 6 months. *Journal of Reproductive and Infant Psychology* **18** (3):173–87. [LJP]

Kovács Á. M., Téglás E. & Endress A. D. (2010) The social sense: Susceptibility to others' beliefs in human infants and adults. *Science* **330**(6012):1830–34. [aCH]

Kovas Y., Haworth C. M., Dale P. S., Plomin R., Weinberg R. A., Thomson J. M. & Fischer K. W. (2007) The genetic and environmental origins of learning abilities and disabilities in the early school years. *Monographs of the Society for Research in Child Development* **72**(3):i,iii–v,vii,1–156. Available at: https://www.jstor.org/stable/i30163176. [SB]

Krebs D. L. (2003) Fictions and facts about evolutionary approaches to human behaviour: Comment on Lickliter and Honeycutt (2003). *Psychological Bulletin* **129**(6):842–47. doi: 10.1037/0033-2909.129.6.842. [PBB]

Krebs D. L. (2008) Morality: An evolutionary account. *Perspectives on Psychological Science* **3**(3):149–72. doi: 10.1111/j.1745-6924.2008.00072.x. [PBB]

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):110–14. [aCH]

Kuntoro I. A., Peterson C. C. & Slaughter V. (2017) Culture, parenting, and children's theory of mind development in Indonesia. *Journal of Cross-Cultural Psychology* **48** (9):1389–1409. [MDG]

Kuo Z. Y. (1922) How are our instincts acquired? *Psychological Review* **29**(5):344–65. [aCH]

Labov W. (1972) *Language in the inner city: Studies in the black English vernacular*. University of Pennsylvania Press. [RAM]

Lake B. M., Ullman T. D., Tenenbaum J. B. & Gershman S. J. (2017) Building machines that learn and think like people. *Behavioral and Brain Sciences* **40**:e253. [aCH, DS, MDG]

Lakin J. L., Chartrand T. L. & Arkin R. M. (2008) I am too just like you: Nonconscious mimicry as an automatic behavioral response to social exclusion. *Psychological Science* **19**(8):816–22. [LJP]

Lakoff G. & Johnson M. (2008) *Metaphors we live by*. University of Chicago Press. [PFD]

Laland K. N. (2017) *Darwin's unfinished symphony: How culture made the human mind*. Princeton University Press. [PBB, AW]

Laland K. N. & O'Brien M. J. (2011) Cultural niche construction: An introduction. *Biological Theory* **6**(3):191–202. [PES]

Laland K. N., Odling-Smee J. & Feldman M. W. (2000) Niche construction, biological evolution, and cultural change. *Behavioral and Brain Sciences* **23**(1):131–146. [EB]

Laland K. N., Uller T., Feldman M. W., Sterelny K., Müller G. B., Moczek A., Jablonka E. & Odling-Smee J. (2015) The extended evolutionary synthesis: Its structure, assumptions and predictions. *Proceedings of the Royal Society B: Biological Sciences* **282** (1813):20151019. [aCH, EB]

Lan X., Legare C. H., Ponitz C. C., Li S. & Morrison F. J. (2011) Investigating the links between the subcomponents of executive function and academic achievement: A cross-cultural analysis of Chinese and American preschoolers. *Journal of Experimental Child Psychology* **108**(3):677–92. [SB]

Lancy D. F. & Grove M. A. (2010) The role of adults in children's learning. In: *The anthropology of learning in childhood*, ed. D. F. Lancy, J. C. Bock & S. Gaskins, pp. 145–180. AltaMira Press. [RAM]

Leadbeater E. (2015) What evolves in the evolution of social learning? *Journal of Zoology* **295**(1):4–11. [aCH]

Leavens D. A. & Hopkins W. D. (1999) The whole-hand point: The structure and function of pointing from a comparative perspective. *Journal of Comparative Psychology* **113**(4):417–25. [CT]

Legare C. H. & Nielsen M. (2015) Imitation and innovation: The dual engines of cultural learning. *Trends in Cognitive Sciences* **19**(11):688–99. [aCH]

Lehman D. R., Chiu C. Y. & Schaller M. (2004) Psychology and culture. *Annual Review of Psychology* **55**:689–714. doi: 10.1146/annurev.psych.55.090902.141927. [PBB]

Leichtman M. D., Wang Q. & Pillemer D. B. (2003) Cultural variations in interdependence and autobiographical memory: Lessons from Korea, China, India, and the United States. In: *Autobiographical memory and the construction of a narrative self*, ed. R. Fivush & C. A. Haden, pp. 73–97. Erlbaum. [PVB]

Leighton J. & Heyes C. M. (2010) Hand to mouth: Automatic imitation across effector systems. *Journal of Experimental Psychology: Human Perception and Performance* **36** (5):1174–83. [aCH]

Lenneberg E. H. (1967) *The biological foundations of language*. Wiley. [aCH]

Lepage J. F. & Théoret H. (2007) The mirror neuron system: Grasping others' actions from birth? *Developmental Science* **10**(5):513–23. [aCH]

Leroy F., Cai Q., Bogart S. L., Dubois J., Coulon O., Monzalvo K., Fischer C., Glasel H., Van der Haegen L., Bénézit A., Lin C. P., Kennedy D. N., Ihara A. S., Hertz-Pannier L., Moutard M. L., Poupon C., Brysbaert M., Roberts N., Hopkins W. D., Mangin J. F. and Dehaene-Lambertz G. (2015) New human-specific brain landmark: The depth asymmetry of superior temporal sulcus. *Proceedings of the National Academy of Sciences USA*, **112**(4):1208–13. [EJ]

Lewens T. (2015) *Cultural evolution: Conceptual challenges*. Oxford University Press. [aCH]

Lewis C., Freeman N. H., Kyriakidou C., Maridaki-Kassotaki K. & Berridge D. M. (1996) Social influences on false belief access: Specific sibling influences or general apprenticeship? *Child Development* **67**(6):2930–47. [aCH]

Lewis D. (1970) How to define theoretical terms. *Journal of Philosophy* **67**(13):427–46. [IAA]

Lewontin R. C. (1983) The organism as the subject and object of evolution. *Scientia* **118** (1–8):65–95. [EB]

Li J. (2003) US and Chinese cultural beliefs about learning. *Journal of Educational Psycholology* **95**(2):258–67. [aCH]

Li P. & Macwhinney B. (2013) Competition model. *The Encyclopedia of Applied Linguistics*. [PFD]

Lickliter R. & Honeycutt H. (2003) Developmental dynamics: Toward a biologically plausible evolutionary psychology. *Psychological Bulletin* **129**(6):819–35. doi: 10.1037/0033-2909.129.6.819. [PBB]

Lillard A. A. (1998) Ethnopsychologies: Cultural variations in theories of mind. *Psychological Bulletin* **123**(1):3–32. [RAM]

Lipton P. (2003) *Inference to the best explanation*. Routledge. [aCH]

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):523–31. [MDG]

Logue S. F. & Gould T. J. (2014) The neural and genetic basis of executive function: Attention, cognitive flexibility, and response inhibition. *Pharmacology Biochemistry and Behavior* **123**:45–54. [SB]

Lohmann H. & Tomasello M. (2003) The role of language in the development of false belief understanding: A training study. *Child Development* **74**(4):1130–44. [aCH]

Lorenz K. (1965) *Evolution and modification of behavior*. University of Chicago Press. [aCH]

Lorenz K. (1966) *Evolution and modification of behavior*. Methuen. [AW]

Lorenz K. (1969) Innate bases of learning. In: *On the biology of learning*, ed. K. H. Pribram, pp. 77–92. Harcourt, Brace & World. [aCH]

Lorenzi E., Mayer U., Rosa-Salva O. & Vallortigara G. (2017) Dynamic features of animate motion activate septal and preoptic areas in visually naive chicks (Gallus gallus). *Neuroscience* **354**:54–68. doi: 10.1016/j.neuroscience.2017.04.022. [GI]

Lotem A., Halpern J. Y., Edelman S. & Kolodny O. (2017) The evolution of cognitive mechanisms in response to cultural innovations. *Proceedings of the National Academy of Sciences USA* **114**(30):7915–22. [SB]

Luhrmann T. (2011) Toward an anthropological theory of mind. *Suomen Antropologi: Journal of the Finnish Anthropological Society* **36**(4):5–69. [RAM]

Lumsden C. J. & Wilson E. O. (2005) *Genes, mind, and culture: The coevolutionary process*. World Scientific. [aCH]

Lurz R. W. (2011) *Mindreading animals*. MIT Press. [GI]

Lyons D. E., Young A. G. & Keil F. C. (2007) The hidden structure of overimitation. *Proceedings of the National Academy of Sciences USA* **104**(50):19751–56. [aCH]

MacDonald S., Uesiliana K. & Hayne H. (2000) Cross-cultural and gender differences in childhood amnesia. *Memory* **8**(6):365–76. doi: 10.1080/09658210050156822. [PVB, RAM]

Machery E. (2008) A plea for human nature. *Philosophical Psychology* **21**(3):321–29. [aCH]

Machery E. (2018) A plea for human nature, redux. In: *Why we disagree about human nature*, ed. E. Hannon & T. Lewens, pp. 18–39. Oxford University Press. [aCH]

MacLean E. L., Hare B., Nunn C. L., Addessi E., Amici F., Anderson R. C., Aureli F., Baker J. M., Bania A. E., Barnard A. M., Boogert N. J., Brannon E. M., Bray E. E., Bray J., Brent L. J. N., Burkart J. M., Call J., Cantlon J. F., Cheke L. G., Clayton N. S., Delgado M. M., DiVincenti L. J., Fujita K., Herrmann E., Hiramatsu C., Jacobs L. F., Jordan K. E., Laude J. R., Leimgruber K. L., Messer E. J. E., Moura A. C. de A., Ostojić L., Picard A., Platt M. L., Plotnik J. M., Range F., Reader S. M., Reddy R. B., Sandel A. A., Santos L. R., Schumann K., Seed A. M., Sewall K. B., Shaw R. C., Slocombe K. E., Su Y., Takimoto A., Tan J., Tao R., van Schaik C. P., Virányi Z., Vesalberghi E., Wade J. C., Watanabe A., Widness J., Young J. K., Zentall T. R. & Zhao Y. (2014) The evolution of self-control. *Proceedings of the National Academy of Sciences USA* **111**(20):E2140–48. [aCH]

MacPhail E. M. (1982) *Brain and intelligence in vertebrates*, p. 423. Clarendon Press. [aCH]

Mahmoodi A., Bang D., Ahmadabadi M. N. & Bahrami B. (2013) Learning to make collective decisions: The impact of confidence escalation. *PLoS One* **8**:e81195. [aCH]

Malafouris L. (2010) Metaplasticity and the human becoming: Principles of neuroarchaeology. *Journal of Anthropological Sciences* **88**:49–72. [MF]

Malafouris L. (2013) *How things shape the mind: A theory of material engagement*. MIT Press. [MF]

Malafouris L. (2016) On human becoming and incompleteness: A material engagement approach to the study of embodiment in evolution and culture. In: *Embodiment in evolution and culture*, ed. G. Etzelmüller & C. Tewes, pp. 289–305. Mohr Siebeck. [MF, rCH]

Mansouri F. A., Egner T. & Buckley M. J. (2017) Monitoring demands for executive control: Shared functions between human and nonhuman primates. *Trends in Neurosciences* **40**(1):15–27. [SB]

Marcus G. (2018) Innateness, AlphaZero, and artificial intelligence. *arXiv* 1801.05667. [MDG]

Marler P. (1991) The instinct to learn. In: *The epigenesis of mind: Essays on biology and cognition*, ed. S. Carey and R. Gelman, pp. 591–617. Psychology Press. [DS]

Masters J. C. (1979) Interpreting "imitative" responses in early infancy. *Science* **205**:215. [aCH]

Matzel L. D. & Kolata S. (2010) Selective attention, working memory, and animal intelligence. *Neuroscience and Biobehavioral Reviews* **34**(1):23–30. [aCH]

Mayer A. & Träuble B. (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):650-65. [MDG]

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. Available at: http://doi.org/10.1177/0165025412454030. [aCH, MDG, RAM]

Mayer U., Rosa-Salva O., Morbioli F. & Vallortigara G. (2017) The motion of a living conspecific activates septal and preoptic areas in naive domestic chicks (Gallus gallus). *European Journal of Neuroscience* **45**(3):423–32. doi: 10.1111/ejn.13484. [GI]

Mayr U. & Bryck R. L. (2005) Sticky rules: Integration between abstract rules and specific actions. *Journal of Experimental Psychology: Learning, Memory, and Cognition* **31**(2):337–50. [SB]

McEwen F., Happé F., Bolton P., Rijsdijk F., Ronald A., Dworzynski K. & Plomin R. (2007) Origins of individual differences in imitation: Links with language, pretend play, and socially insightful behavior in two-year-old twins. *Child Development* **78** (2):474–92. [MDG, rCH]

McGeer V. (2007) The regulative dimension of folk psychology. In: *Folk psychology re-assessed*, ed. D. D. Hutto & M. Ratcliffe, pp. 137–56. Springer. [aCH]

McGlothlin J. W. & Ketterson E. D. (2008) Hormone-mediated suites as adaptations and evolutionary constraints. *Philosophical Transactions of the Royal Society B: Biological Sciences* **363**(1497):1611–20. doi: 10.1098/rstb.2007.0002. [PBB]

McGuigan N. (2013) The influence of model status on the tendency of young children to over-imitate. *Journal of experimental child psychology* **116**(4):962–69. [CR]

McKenzie B. & Over R. (1983) Young infants fail to imitate facial and manual gestures. *Infant Behavior and Development* **6**(1):85–95. [aCH]

McKoon G. & Ratcliff R. (1998) Memory-based language processing: Psycholinguistic research in the 1990s. *Annual Review of Psychology* **49**:25–42. [IAA]

McNamara R. A., Willard A. K., Norenzayan A. & Henrich J. (2019) Weighing outcome vs. intent across societies: How cultural models of mind shape moral reasoning. *Cognition* **182**:95–108. Available at: http://doi.org/10.1016/j.cognition.2018.09.008. [RAM]

Mealier A.-L., Pointeau G., Mirliaz S., Ogawa K., Finlayson M. & Dominey P. F. (2017) Narrative constructions for the organization of self experience: Proof of concept via embodied robotics. *Frontiers in Psychology: Language Sciences* **8**:1331. Available at: https://doi.org/10.3389/fpsyg.2017.01331. [PFD]

Meehl P. E. (1978) Theoretical risks and tabular asterisks: Sir Karl, Sir Ronald, and the slow progress of soft psychology. *Journal of Consulting and Clinical Psychology* **46** (4):806–34. doi: 10.1037/0022-006X.46.4.806. [GI]

Meins E. (2012) Social relationships and children's understanding of mind: Attachment, internal states, and mind-mindedness. In: *Access to language and cognitive development*, ed. M. Siegal & L. Surian, pp. 23–43. Oxford University Press. [aCH]

Melby-Lervåg M., Redick T. S. & Hulme C. (2016) Working memory training does not improve performance on measures of intelligence or other measures of "far transfer" evidence from a meta-analytic review. *Perspectives on Psychological Science* **11**(4):512–34. [SB]

Meltzoff A. N. (1990) Foundations for developing a concept of self: The role of imitation in relating self to other and the value of social mirroring, social modeling, and self practice in infancy. In: *The John D. and Catherine T. MacArthur foundation series on mental health and development. The self in transition: Infancy to childhood*, ed. D. Cicchetti & M. Beeghly, pp. 139–64. University of Chicago Press. [LJP]

Meltzoff A. N. & Moore M. K. (1977) Imitation of facial and manual gestures by human neonates. *Science* **198**(4312):75–78. [aCH]

Meltzoff A.N. & Moore M. K. (1979) Interpreting "imitative" responses in early infancy. *Science* **205**(4402):217–19. [aCH]

Meltzoff A.N. & Moore M. K. (1997) Explaining facial imitation: A theoretical model. *Early Development and Parenting* **6**(3–4):179–92. [aCH]

Meltzoff A. N., Murray L., Simpson E., Heimann M., Nagy E., Nadel J., Pedersen E. J., Brooks R., Messinger D. S., De Pascalis L., Subiaul F., Paukner A. & Ferrari P. F. (2018) Re-examination of Oostenbroek et al. (2016): Evidence for neonatal imitation of tongue protrusion. *Developmental Science* **21**(4):e12609. doi: 10.1111/desc.12609. [GI, LJP]

Meristo M., Hjelmquist E. & Morgan G. (2012) How access to language affects theory of mind in deaf children. In: *Access to language and cognitive development*, pp. 44–62. Oxford University Press. [aCH]

Merleau-Ponty M. (2013) *Phenomenology of perception*. Routledge. [EB]

Mesoudi A. (2011) *Cultural evolution: How Darwinian theory can explain human culture and synthesize the social sciences*. University of Chicago Press. [MF]

Mesoudi A., Chang L., Murray K. & Lu H. J. (2015) Higher frequency of social learning in China than in the West shows cultural variation in the dynamics of cultural evolution. *Proceedings of the Royal Society B: Biological Sciences* **282**(1798):20142209. [aCH]

Mesoudi A., Whiten A. & Laland K. N. (2004) Is human cultural evolution Darwinian? Evidence reviewed from the perspective of The Origin of Species. *Evolution* **58**(1):1–11. [AW]

Middlebrooks P. G. & Sommer M. A. (2012) Neuronal correlates of metacognition in primate frontal cortex. *Neuron* **75**(3):517–30. [CR]

Millikan R.G. (1984) *Language, thought, and other biological categories: New foundations for realism*. MIT Press. [aCH]

Millikan R. G. (2004) *Varieties of meaning*. MIT Press. [MF]

Misyak J. B. & Christiansen M. H. (2012) Statistical learning and language: An individual differences study. *Language Learning* **62**(1):302–31. [aCH]

Moerk E. L. (1991) Positive evidence for negative evidence. *First Language* **11**(32):219–51. [aCH]

Moll H. & Tomasello M. (2007) Cooperation and human cognition: The Vygotskian intelligence hypothesis. *Philosophical Transactions of the Royal Society B: Biological Sciences* **362**(1480):639–48. [PES]

Molleman L., Van den Berg P. & Weissing F.J. (2014) Consistent individual differences in human social learning strategies. *Nature Communications* **5**:Article 3570. doi: 10.1038/ncomms4570. [PBB]

Moore C. & Corkum V. (1994) Social understanding at the end of the first year of life. *Developmental Review* **14**(4):349–72. [aCH]

Moore R. (2016) Gricean communication and cognitive development. *The Philosophical Quarterly* **67**(267):303–26. [aCH]

Moore R. (2017) Social cognition, stag hunts, and the evolution of language. *Biology and Philosophy* **32**(6):797–818. [aCH]

Morin O. (2015) *How traditions live and die*. Oxford University Press. [aCH]

Mullen M. K. & Yi S. (1995) The cultural context of talk about the past: Implications for the development of autobiographical memory. *Cognitive Development* **10**(3):407–19. [PVB]

Muthukrishna M. & Henrich J. (2016) Innovation in the collective brain. *Philosophical Transactions of the Royal Society B: Biological Sciences* **371**(1690):20150192. [aCH]

Nelson K. A. (1996) *Language in cognitive development: The emergence of the mediated mind*. Cambridge University Press. [IAA, PVB]

Nelson K. & Fivush R. (2004) The emergence of autobiographical memory: A social cultural developmental theory. *Psychological Review* **111**(2):486–511. [PVB, PFD]

Nettle D. (2006) The evolution of personality variation in humans and other animals. *American Psychologist* **61**(6):622–31. doi: 10.1037/0003-066X.61.6.622 [PBB]

Nettle D. & Bateson M. (2012) The evolutionary origins of mood and its disorders. *Current Biology* **22**(17):R712–R721. doi: 10.1016/j.cub.2012.06.020 [PBB]

Nettle D., Gibson M. A., Lawson D. W. & Sear R. (2013) Human behavioral ecology: Current research and future prospect. *Behavioral Ecology* **24**:1031–40. [aCH]

Nile E. & Van Bergen P. (2015) Not all semantics: Similarities and differences in reminiscing function and content between indigenous and non-indigenous Australians. *Memory* **23**(1):83–98. [aCH]

Nisbett R. (2010) *The geography of thought: How Asians and Westerners think differently … and why*. Simon & Schuster. [aCH]

Nisbett R. E. & Miyamoto Y. (2005) The influence of culture: Holistic versus analytic perception. *Trends in Cognitive Sciences* **9**(10):467–73. [PES]

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. [PES]

Norenzayan A., Choi I. & Nisbett R. E. (1999) Eastern and Western perceptions of causality for social behavior: Lay theories about personalities and situations. In: *Cultural divides: Understanding and overcoming group conflict*, ed. D. A. Prentice & D. T. Miller, pp. 239–72. Russell Sage Foundation. [RAM]

Norris P. & Inglehart R. (2004) *Sacred and secular: Religion and politics worldwide*. Cambridge University Press. [RAM]

O'Brien K., Slaughter V. & Peterson C. C. (2011) Sibling influences on theory of mind development for children with ASD. *Journal of Child Psychology and Psychiatry* **52**(6):713–19. [aCH]

Oh S. & Lewis C. (2008) Korean preschoolers' advanced inhibitory control and its relation to other executive skills and mental state understanding. *Child Development* **79**(1):80–99. [SB]

Okasha S. (2005) Multilevel selection and the major transitions in evolution. *Philosophy of Science* **72**(5):1013–25. [aCH]

Okasha S. (2009) *Evolution and the levels of selection*. Oxford University Press. [PES]

Okpewho I. (1992) *African oral literature: Backgrounds, character, and continuity*. Indiana University Press. [RAM]

Olson J. M., Vernon P. A., Harris J. A. & Jang K. L. (2001) The heritability of attitudes: a study of twins. *Journal of Personality and Social Psychology* **80**(6):845–60. [MDG]

Onishi K. H. & Baillargeon R. (2005) Do 15-month-old infants understand false beliefs? *Science* **308**(5719):255–58. [aCH]

Oostenbroek J., Suddendorf T., Nielsen M., Redshaw J., Kennedy-Costantini S., Davis J., Clark S. & Slaughter V. (2016) Comprehensive longitudinal study challenges the existence of neonatal imitation in humans. *Current Biology* **26**(10):1334–38. [aCH, LJP]

Over H. & Carpenter M. (2009) Priming third-party ostracism increases affiliative imitation in children. *Developmental Science* **12**(3):F1–F8. [LJP]

Paracchini S., Scerri T. & Monaco A. P. (2007) The genetic lexicon of dyslexia. *Annual Review of Genomics and Human Genetics* **8**:57–79. [aCH]

Passingham R. E. (2008) *What is special about the human brain?* Oxford University Press. [aCH]

Passingham R. E. & Smaers J. B. (2014) Is the prefrontal cortex especially enlarged in the human brain? Allometric relations and remapping factors. *Brain, Behavior and Evolution* **84**(2):156–66. [aCH]

Paukner A., Suomi S. J., Visalberghi E. & Ferrari P. F. (2009) Capuchin monkeys display affiliation toward humans who imitate them. *Science* **325**(5942):880–83. [LJP]

Paulus M., Hunnius S., Vissers M. & Bekkering H. (2011) Imitation in infancy: Rational or motor resonance? *Child Development* **82**(4):1047–57. [aCH]

Pawlby S. J. (1977) Imitative interaction. In: *Studies in mother-infant interaction*, ed. H. R. Schaeffer, pp. 203–224. Academic Press. [LJP]

Pearce J. M. (2013) *Animal learning and cognition: An introduction*. Taylor & Francis. [aCH]

Penny S. (2017) *Making sense: Cognition, computing, art, and embodiment*. MIT Press. [MF]

Pere R. R. (1982) *Ako: Concepts and learning in the Māori tradition*: University of Waikato, Department of Sociology. [RAM]

Perner J. (2010) Who took the cog out of cognitive science? In: *Cognition and neuropsychology: International perspectives on psychological science*, vol. 1, ed. P. A. Frensch & R. Schwarzer, pp. 241–61. Psychology Press. [aCH]

Petersen S. E. & Posner M. I. (2012) The attention system of the human brain: 20 Years after. *Annual Review of Neuroscience* **35**:73–89. [aCH]

Pinker S. (1994) *The language instinct: The new science of language and mind*, vol. 7529. Penguin Press. [aCH]

Pinker S. & Bloom P. (1990) Natural language and natural selection. *Behavioral and Brain Sciences* **13**(4):707–27. [aCH]

Pinker S. & Jackendoff R. (2005) The faculty of language: What's special about it? *Cognition* **95**(2):201–36. [aCH]

Pittendrigh C. S. (1958) Adaptation, natural selection, and behavior. In: *Behavior and evolution*, ed. A. Roe & G. G. Simpson, pp. 390–416. Yale University Press. [AW]

Ploeger A., van der Maas H. L. & Raijmakers M. E. (2008) Is evolutionary psychology a metatheory for psychology? A discussion of four major issues in psychology from an evolutionary developmental perspective. *Psychological Inquiry* **19**(1):1–18. doi: 10.1080/10478400701774006. [PBB]

Poldrack R. A. (2006) Can cognitive processes be inferred from neuroimaging data? *Trends in Cognitive Science* **10**(2):59–63. doi: 10.1016/j.tics.2005.12.004. [aCH, GI]

Polkinghorne D. E. (1988) *Narrative knowing and the human sciences*. State University of New York Press. [PFD]

Pope S. M., Fagot J., Meguerditchian A., Washburn D. A. & Hopkins W. D. (2019) Enhanced cognitive flexibility in the seminomadic Himba. *Journal of Cross-Cultural Psychology* **50**(1):47–62. [SB]

Pope S. M., Meguerditchian A., Hopkins W. D. & Fagot J. (2015) Baboons (Papio papio), but not humans, break cognitive set in a visuomotor task. *Animal Cognition* **18** (6):1339–46. [SB]

Pope S. M., Taglialatela J. P., Skiba S. A. & Hopkins W. D. (2018) Changes in frontoparietotemporal connectivity following do-as-I-do imitation training in chimpanzees (*Pan troglodytes*). *Journal of Cognitive Neuroscience* **30**(3):421–431. [CT]

Powell L. J. & Spelke E. S. (2018a) Human infants' understanding of social imitation: Inferences of affiliation from third party observations. *Cognition*, **170**, 31–48. [LJP]

Powell L. J. & Spelke E. S. (2018b) Third-party preferences for imitators in preverbal infants. *Open Mind* **1**(4):183–93. [LJP]

Press C., Bird G., Flach R. & Heyes C. (2005) Robotic movement elicits automatic imitation. *Cognitive Brain Research* **25**(3):632–40. [aCH]

Price C. J. & Devlin J. T. (2003) The myth of the visual word form area. *NeuroImage* **19** (3):473–81. [GI]

Price E. E., Wood L. A. & Whiten A. (2017) Adaptive cultural transmission biases in children and nonhuman primates. *Infant Behavior and Development* **48**(Part A):45–53. Available at: http://doi.org/10.1016/j.infbeh.2016.11.003. [AW]

Pyers J. E. & Senghas A. (2009) Language promotes false-belief understanding: Evidence from learners of a new sign language. *Psychological Science* **20**(7):805–12. Available at: https://doi.org/10.1111/j.1467-9280.2009.02377.x. [aCH, RAM]

Qureshi A. W., Apperly I. A. & Samson D. (2010) Executive function is necessary for perspective selection, not Level–1 visual perspective calculation: Evidence from a dual–task study of adults. *Cognition* **117**(2):230–36. [aCH]

Raja V. (2017) A theory of resonance: Towards an ecological cognitive architecture. *Minds and Machines* **28**(1):29–51. [MF]

Rajkumar A. P., Yovan S., Raveendran A. L. & Russell P. S. S. (2008) Can only intelligent children do mind reading: The relationship between intelligence and theory of mind in 8 to 11 years old. *Behavioral and Brain Functions* **4**:51. doi: 10.1186/1744-9081-4-51. [MDG]

Ramstead M. J. D., Veissière S. P. L. & Kirmayer L. J. (2016) Cultural affordances: Scaffolding local worlds through shared intentionality and regimes of attention. *Frontiers in Psychology: Cognitive Science* **7**:1090. Available at: http://doi:10.3389/fpsyg.2016.01090. [PBB]

Ramstead M. J. D., Badcock P. & Friston K. J. (2018) Answering Schrödinger's question: A free-energy formulation. *Physics of Life Reviews* **24**:1–16. doi: 10.1016/j.plrev.2017.09.001. [PBB]

Ramstead M. J. D., Constant A., Badcock P. B. & Friston K. J. (2019) Variational ecology and the physics of sentient systems. *Physics of Life Reviews*. Advance online publication. doi: 10.1016/j.plrev.2018.12.002. [PBB]

Ray E. & Heyes C. (2011) Imitation in infancy: The wealth of the stimulus. *Developmental Science* **14**(1):92–105. [aCH]

Reader S. M., Hager Y. & Laland K. N. (2011) The evolution of primate general and cultural intelligence. *Philosophical Transactions of the Royal Society B: Biological Sciences* **366**(1567):1017–27. [aCH]

Reese E. & Neha T (2015) Let's kōrero (talk): The practice and functions of reminiscing among mothers and children in Māori families. *Memory* **23**(1):99–110, doi: 10.1080/09658211.2014.929705. [RAM]

Reese E., Hayne H. & MacDonald S. (2008) Looking back to the future: Māori and Pakeha mother-child birth stories. *Child Development* **79**(1):114–25. [PVB]

Reese E. & Newcombe R. (2007) Training mothers in elaborative reminiscing enhances children's autobiographical memory and narrative. *Child Development* **78**(4):1153–70. [PVB]

Reese E., Taumoepeau M. & Neha T. (2014) Remember drawing on the cupboard? New Zealand Maori, European, and Pasifika parents' conversations about children's transgressions. In: *Talking about right and wrong parent-child conversations as contexts for moral development*, ed. C. Wainryb & H. E. Recchia, pp. 44–70. Cambridge University Press. [RAM]

Reid V. M., Dunn K., Young R. J., Amu J., Donovan T. & Reissland N. (2017) The human fetus preferentially engages with face-like visual stimuli. *Current Biology* **27**:1825–28. [aCH]

Reimers-Kipping S., Hevers W., Pääbo S. & Enard W. (2011) Humanized FOXP2 specifically affects cortico-basal ganglia circuits. *Neuroscience* **175**:75–84. [aCH]

Renfrew C. (2004) Towards a theory of material engagement. In: *Rethinking materiality: The engagement of mind with the material world*, ed. E. DeMarrais, C. Gosden & A. C. Renfrew, pp. 23–31. McDonald Institute for Archaeological Research. [MF]

Rescorla R. A. (1988) Pavlovian conditioning: It's not what you think it is. *American Psychologist* **43**(3):151. [aCH]

Rewi P. (2013) *Whaikōrero: The world of Māori oratory.* Auckland University Press. [RAM]

Richerson P., Baldini R., Bell A. V., Demps K., Frost K., Hillis V., Mathew S., Newton E. K., Naar N., Newson L., Ross C., Smaldino P. E., Waring T. M. & Zefferman M. (2016) Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence. *Behavioral and Brain Sciences* **39**:e30. [PES]

Richerson P. J. & Boyd R. (2005) *Not by genes alone: How culture transformed human evolution*. University of Chicago Press. [MF, RAM]

Richerson P. J. & Boyd R. (2013) Rethinking paleoanthropology: A world queerer than we supposed. In: *Evolution of mind, brain, and culture*, ed. G. Hatfield & H. Pittman, pp. 263–302. University of Pennsylvania Press. [aCH]

Ricoeur P. (1984) *Time and narrative*, vol. 1. University of Chicago Press. [PFD]

Ricoeur P. & Kearney R. (1978) Myth as the bearer of possible worlds. *The Crane Bag* **2**(1/2):112–18. [PFD]

Rietveld E., Denys D. & Van Westen M. (2018) Ecological-enactive cognition as engaging with a field of relevant affordances: The skilled intentionality framework (SIF). In: *Oxford handbook of 4E cognition*, ed. A. Newen, L. De Bruin & S. Gallagher, pp. 41–70. Oxford University Press. [MF]

Rietveld E. & Kiverstein J. (2014) A rich landscape of affordances. *Ecological Psychology* **26**(4):325–352. [MF]

Rilling J. K. (2014) Comparative primate neuroimaging: Insights into human brain evolution. *Trends in Cognitive Sciences* **18**(1):46–55. [aCH]

Rindermann H. (2018) *Cognitive capitalism: Human capital and the wellbeing of nations*. Cambridge University Press. [MDG]

Rivas E. (2003) Gimme Gimme Gimme. The recent signing behaviour of chimpanzees (*Pan troglodytes*) in interactions with longtime human companions. Doctoral dissertation, Radboud University Nijmegen. Available at: http://repository.ubn.ru.nl/handle/2066/76506. [CT]

Rivas E. (2005) Recent use of signs by chimpanzees (*Pan troglodytes*) in interactions with humans. *Journal of Comparative Psychology* **119**(4):404–17. [CT]

Robbins J. & Rumsey A. (2008) Introduction: Cultural and linguistic anthropology and the opacity of other minds. *Anthropological Quarterly* **81**(2):407–20. [RAM]

Robbins S. E. (2006) Bergson and the holographic theory of mind. *Phenomenology and the Cognitive Sciences* **5**(3–4):365–394. [MF]

Roberts P. (2016) 'We have never been behaviourally modern': The implications of material engagement theory and metaplasticity for understanding the late Pleistocene record of human behaviour. *Quaternary International* **405**:(Part A, The material dimensions of cognition):8–20. [MF]

Roepstorff A., Niewöhner J. & Beck S. (2010) Enculturing brains through patterned practices. *Neural Networks* **23**(8–9):1051–59. doi: 10.1016/j.neunet.2010.08.002. [PBB]

Ronald A., Viding E., Happé F. & Plomin R. (2006) Individual differences in theory of mind ability in middle childhood and links with verbal ability and autistic traits: A twin study. *Social Neuroscience* **1**:412–25. [MDG]

Roney J. J. (2016) Theoretical frameworks for human behavioral endocrinology. *Hormones and Behavior* **84**:97–110. [aCH]

Rossion B. & Jacques C. (2011) The N170: Understanding the time course of face perception in the human brain. In: *The Oxford handbook of event-related potential components*, ed. E. S. Kappenman & S. J. Luck, pp. 115–142. Oxford University Press. [GI]

Rozin P. (1990a) Acquisition of stable food preferences. *Nutrition Reviews* **48**:106–13. [MDG]

Rozin P. (1990b) Development in the food domain. *Developmental Psychology* **26**:555–62. [MDG]

Sabbagh M. A., Xu F., Carlson S. M., Moses L. J. & Lee K. (2006) The development of executive functioning and theory of mind: A comparison of Chinese and US preschoolers. *Psychological Science* **17**(1):74–81. [SB]

Salmon K., Dadds M. R., Allen J. & Hawes D. (2009) Can emotional language skills be taught during parent training for conduct problem children? *Child Psychiatry & Human Development* **40**(4):485–98. [PVB]

Salmon K. & Reese E. (2016) The benefits of reminiscing with young children. *Current Directions in Psychological Science* **25**(4):233–38. [aCH, PVB]

Samuels R. (2004) Innateness in cognitive science. *Trends in Cognitive Sciences* **8**(3):136–41. [aCH]

Samuels R. (2012) Science and human nature. *Royal Institute of Philosophy Supplement* **70**:1–28. doi: 10.1017/S1358246112000021. [aCH]

Sanford A. J. & Garrod S. C. (1998) The role of scenario mapping in text comprehension. *Discourse Processes* **26**(2-3):159–90. [IAA]

Schaafsma S. M., Pfaff D. W., Spunt R. P. & Adolphs R. (2015) Deconstructing and reconstructing theory of mind. *Trends in Cognitive Sciences* **19**:65–72. [MDG]

Schreiweis C., Bornschein U., Burguière E., Kerimoglu C., Schreiter S., Dannemann M., Goyal S., Rea E., French C. A., Puliyadi R. & Groszer M. (2014) Humanized FOXP2 accelerates learning by enhancing transitions from declarative to procedural performance. *Proceedings of the National Academy of Sciences* **111**(39):14253–58. [aCH]

Schultz W. (2013) Updating dopamine reward signals. *Current Opinion in Neurobiology* **23**(2):229–38. [SB]

Seidenberg M. (2017) *Language at the speed of sight: How we read, why so many can't, and what can be done about it*. Basic Books. [PES]

Senju A. & Csibra G. (2008) Gaze following in human infants depends on communicative signals. *Current Biology* **18**(9):668–71. [aCH]

Senju A., Southgate V., White S. & Frith U. (2009) Mindblind eyes: An absence of spontaneous theory of mind in Asperger syndrome. *Science* **325**(5942):883–85. [aCH]

Shahaeian A., Nielsen M., Peterson C. C. & Slaughter V. (2014) Cultural and family influences on children's theory of mind development: A comparison of Australian and Iranian school-age children. *Journal of Cross-Cultural Psychology* **45**:555–68. [MDG]

Shahaeian A., Peterson C. C., Slaughter V. & Wellman H. M. (2011) Culture and the sequence of steps in theory of mind development. *Developmental Psychology* **47** (5):1239–47. [aCH, MDG]

Shallice T. & Cooper R. (2011) *The organisation of mind*. Oxford University Press. [rCH]

Shanks M. & Tilley C. Y. (1987) *Social theory and archaeology*. Polity Press. [MF]

Shea N. (2013) Inherited representations are read in development. *The British Journal for the Philosophy of Science* **64**(1):1–31. [aCH]

Shea N., Boldt A., Bang D., Yeung N., Heyes C. M. & Frith C. D. (2014) Supra-personal cognitive control and metacognition. *Trends in Cognitive Sciences*, **18**(4), 186–193. [rCH, CR]

Shettleworth S. J. (2010) *Cognition, evolution, and behavior*. Oxford University Press. [aCH]

Shiraev E. & Levy D. A. (2014) *Cross-cultural psychology*. Pearson Education Limited. [aCH]

Shweder R. A. & Sullivan M. A. (1993) Cultural psychology: Who needs it? *Annual Review of Psychology* **44**(1):497–523. doi: 10.1146/annurev.ps.44.020193.002433. [GI]

Simons D. J., Boot W. R., Charness N., Gathercole S. E., Chabris C. F., Hambrick D. Z. & Stine-Morrow E. A. (2016) Do "brain-training" programs work? *Psychological Science in the Public Interest* **17**(3):103–186. [SB]

Slaughter V. & Peterson C. C. (2012) How conversational input shapes theory of mind development in infancy and early childhood. In: *Access to language and cognitive development*, ed. M. Siegal & L. Surian, pp. 3–22. Oxford University Press. [aCH]

Slaughter V. & Zapata D. P. (2014) Cultural variations in the development of mind reading. *Child Development Perspectives* **8**(4):237–41. Available at: http://doi.org/10.1111/cdep.12091. [RAM]

Smaldino P. E. (2014) The cultural evolution of emergent group-level traits. *Behavioral and Brain Sciences* **37**:243–295. [PES]

Smith K. & Kirby S. (2008) Cultural evolution: Implications for understanding the human language faculty and its evolution. *Philosophical Transactions of the Royal Society B: Biological Sciences* **363**(1509):3591–3603. [PES]

Sousa A. M. M., Meyer K. A., Santpere G., Gulden F. O. and Sestan N. (2017) Evolution of the human nervous system function, structure, and development. *Cell* **170**(2):226–47. [EJ]

Spapé M. M. & Hommel B. (2008) He said, she said: Episodic retrieval induces conflict adaptation in an auditory Stroop task. *Psychonomic Bulletin & Review* **15**(6):1117–21. [SB]

Sperber D. (1996) *Explaining culture: A naturalistic approach*. Blackwell Publishers. [aCH, PES]

Sperber D. (2000) An objection to the memetic approach to culture. In: *Darwinizing culture: The status of memetics as a science*, ed. R. Aunger, pp. 163–74. Oxford University Press. [aCH]

Sperber D. & Hirschfeld L. A. (2004) The cognitive foundations of cultural stability and diversity. *Trends in Cognitive Sciences* **8**(1):40–46. [DS]

Sperber D. & Wilson D. (1995) *Relevance: Communication and cognition*, 2nd edition. Cambridge University Press. [aCH]

Spivey M. (2007) *The continuity of mind*. Oxford University Press. [MF]

Spivey M. & Richardson D. (2009) Language processing embodied and embedded. In: *The Cambridge handbook of situated cognition*, ed. P. Robbins and M. Aydede, pp. 382–400. Cambridge University Press. [PES]

Sterelny K. (2018) Culture and the extended phenotype: Cognition and material culture in deep time. In: *The Oxford handbook of cognition: Embodied, embedded, enactive and extended*, ed. A. Newen, L. de Bruin & S. Gallagher, pp. 96–106. Oxford University Press. [aCH]

Stout D. (2002) Skill and cognition in stone tool production: An ethnographic case study from Irian Jaya. *Current Anthropology* **43**(5):693–722. [EB]

Stout D. & Chaminade T. (2012) Stone tools, language and the brain in human evolution. *Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1585):75–87. [PFD]

Stout D., & Hecht E. E. (2017) Evolutionary neuroscience of cumulative culture. *Proceedings of the National Academy of Sciences* **114**(30)7861–68. [rCH]

Street J. A. & Dąbrowska E. (2010) More individual differences in language attainment: How much do adult native speakers of English know about passives and quantifiers? *Lingua* **120**(8):2080–94. [aCH]

Stuhlmüller A. & Goodman N. D. (2014) Reasoning about reasoning by nested conditioning: Modeling theory of mind with probabilistic programs. *Cognitive Systems Research* **28**:80–99. [IAA]

Subiaul F., Cantlon J. F., Holloway R. L. & Terrace H. S. (2004) Cognitive imitation in rhesus macaques. *Science* **305**(5682):407–10. [CR]

Sutton J. (2015) Scaffolding memory: Themes, taxonomies, puzzles. In: *Contextualizing human memory*, ed. L. Bietti & C. B. Stone, pp. 187–205. Routledge. [PVB]

Sutton J. (2019) Personal memory, the scaffolded mind, and cognitive change in the Neolithic. In: *Consciousness, creativity and self at the dawn of settled life*, ed. I. Hodder. Cambridge University Press. [PVB]

Tallis R. (2011) *Aping mankind: Neuromania, Darwinitis and the misrepresentation of humanity*. Acumen. [MF]

Tarr B., Launay J., Cohen E. & Dunbar R. (2015) Synchrony and exertion during dance independently raise pain threshold and encourage social bonding. *Biology Letters* **11** (10):20150767. [aCH]

Taumoepeau M. (2016) Maternal expansions of child language relate to growth in children's vocabulary. *Language Learning and Development* **12**(4):429–46. [aCH]

Taumoepeau M. & Ruffman T. (2006) Mother and infant talk about mental states relates to desire language and emotion understanding. *Child Development* **77**(2):465–81. [aCH]

Taumoepeau M. & Ruffman T. (2008) Stepping stones to others' minds: Maternal talk relates to child mental state language and emotion understanding at 15, 24, and 33 months. *Child Development* **79**(2):284–302. Available at: http://doi.org/10.1111/j.1467-8624.2007.01126.x. [aCH, RAM]

Taumoepeau M. & Ruffman T. (2016) Self-awareness moderates the relation between maternal mental state language about desires and children's mental state vocabulary. *Journal of Experimental Child Psychology* **144**:114–29. Available at: http://doi.org/10.1016/j.jecp.2015.11.012. [RAM]

Taylor T. J. (2012) Understanding others and understanding language: How do children do it? *Language Sciences* **34**(1):1–12. [MF]

Tennie C., Braun D. R., Premo L. S. & McPherron S. P. (2016) The Island test for cumulative culture in the Paleolithic. In: *The nature of culture*, pp. 121–133. Springer. [CT]

Tennie C., Call J. & Tomasello M. (2009) Ratcheting up the ratchet: On the evolution of cumulative culture. *Philosophical Transactions of the Royal Society B: Biological Sciences* **364**(1528):2405–15. [CT]

Tennie C., Call J. & Tomasello M. (2012) Untrained chimpanzees (*Pan troglodytes schweinfurthii*) fail to imitate novel actions. *PLoS One* **7**(8):e41548. Available at: https://doi.org/10.1371/journal.pone.0041548. [CT]

Tennie C., Premo L. S., Braun D. R. & McPherron S. P. (2017) Resetting the null hypothesis: Early stone tools and cultural transmission. *Current Anthropology* **58**(5):652–72. Available at: https://doi.org/10.1086/693846. [CT]

(2007/1549) *The book of common prayer*, p. 484. Church Publishing Incorporated. [rCH]

Thompson D. W. (1942) *On growth and form*. Cambridge University Press. [PES]

Tinbergen N. (1963). On aims and methods in ethology. *Zeitschrift für Tierpsychologie* **20**:410–33. doi: 10.1111/j.1439-0310.1963.tb01161.x. [PBB, aCH]

Toelch U., Bruce M., Newson L., Richerson P. J. & Reader S. M. (2014) Individual consistency and flexibility in human social information use. *Proceedings of the Royal Society B: Biological Sciences* **281**(1776):20132864. [aCH]

Tomasello M. (1999) *The cultural origins of human cognition*. Harvard University Press. [arCH, DS, AW]

Tomasello M. (2014) *A natural history of human thinking*. Harvard University Press. [PBB, rCH]

Tomasello M. (2019) *Becoming human: A theory of ontogeny*. Harvard University Press. [CT, rCH]

Tomasello M., Call J., Warren J., Frost G. T., Carpenter M. & Nagell K. (1997) The ontogeny of chimpanzee gestural signals: A comparison across groups and generations. *Evolution of Communication* **1**(2):223–59. [CT]

Tomasello M. & Gonzalez-Cabrera I. (2017) The role of ontogeny in the evolution of human cooperation. *Human Nature* **28**(3):274–288. [PES]

Tomasello M., Gust D. & Forst T. (1989) A longitudinal investigation of gestural communication in young chimpanzees. *Primates* **30**(1):35–50. [CT]

Tomasello M., Kruger A. C. & Ratner H. H. (1993a) Cultural learning. *Behavioral and Brain Sciences* **16**(3):495–511. [AW]

Tomasello M., Melis A. P., Tennie C., Wyman E. & Herrmann E. (2012) Two key steps in the evolution of human cooperation: The interdependence hypothesis. *Current Anthropology* **53**(6):673–92. [PES]

Tomasello M., Savage-Rumbaugh S. & Kruger A. C. (1993b) Imitative learning of actions on objects by children, chimpanzees, and enculturated chimpanzees. *Child Development* **64**(6):1688–705. [CT]

Tomblin J. B., Mainela-Arnold E. & Zhang X. (2007) Procedural learning in adolescents with and without specific language impairment. *Language Learning and Development* **3**(4):269–93. [aCH]

Tooby J. & Cosmides L. (1992) The psychological foundations of culture. In: *The adapted mind: Evolutionary psychology and the generation of culture*, pp. 19–136. Oxford University Press. [RAM]

Triesch J., Teuscher C., Deák G. O. & Carlson E. (2006) Gaze following: Why (not) learn it? *Developmental Science* **9**(2):125–47. [aCH]

Trigger B. G. (1998) Archaeology and epistemology: Dialoguing across the Darwinian chasm. *American Journal of Archaeology* **102**(1):1–34. [MF]

Tully K. & Bolshakov V. Y. (2010) Emotional enhancement of memory: how norepinephrine enables synaptic plasticity. *Molecular Brain* **3**(1):15. [SB]

Tunçgenç B. & Cohen E. (2016) Movement synchrony forges social bonds across group divides. *Frontiers in Psychology* **7**:782. [aCH, LJP]

Valentino K., Comas M., Nuttall A. K. & Thomas T. (2013) Training maltreating parents in elaborative and emotion-rich reminiscing with their preschool-aged children. *Child Abuse & Neglect* **37**(8):585–95. [PVB]

van Baaren R. B., Holland R. W., Kawakami K. & van Knippenberg A. (2004) Mimicry and prosocial behavior. *Psychological Science* **15**(1):71–74. [LJP]

Van Bergen P., Salmon K. & Dadds M. R. (2018) Coaching mothers of typical and conduct problem children in elaborative parent-child reminiscing: Implications of a randomised control trial on reminiscing behaviour and talk preferences. *Behaviour Research and Therapy* **111**:9–18. [PVB]

Van Bergen P., Salmon K., Dadds M. R. & Allen J. (2009) The effects of mother training in emotion-rich, elaborative reminiscing on children's shared recall and emotion knowledge. *Journal of Cognition and Development* **10**:162–87. [PVB]

Van de Vliert E. (2008) *Climate, affluence, and culture*. Cambridge University Press. [RAM]

Van de Vliert E. (2011) Climato-economic origins of variation in ingroup favoritism. *Journal of Cross-Cultural Psychology* **42**(3):494–515. http://doi.org/10.1177/0022022110381120. [RAM]

Van Overwalle F. (2009) Social cognition and the brain: A meta-analysis. *Human Brain Mapping* **30**(3):829–58. [aCH]

van Turennout M., Ellmore T. & Martin A. (2000) Long lasting cortical plasticity in the object naming system. *Nature Neuroscience* **3**(12):1329–34. [GI]

Varela F. J., Thompson E. & Rosch E. (2017) *The embodied mind: Cognitive science and human experience*. MIT Press. [MF]

Veissière S. P. L., Constant A., Ramstead M. J. D., Friston K. J. & Kirmayer L. J. (2019) Thinking through other minds: A variational approach to cognition and culture. *Behavioral and Brain Sciences*. Advance online publication. doi:10.1017/S0140525X19001213. [PBB]

Vecera S. P. & Johnson M. H. (1995) Gaze detection and the cortical processing of faces: Evidence from infants and adults. *Visual Cognition* **2**(1):59–87. [aCH]

Verbeek P.–P. (2005) *What things do: Philosophical reflections on technology, agency, and design*. University Park: Penn State Press. [MF]

Verbruggen F. & Logan G. D. (2008) Automatic and controlled response inhibition: associative learning in the go/no-go and stop-signal paradigms. *Journal of Experimental Psychology: General* **137**(4):649. [SB]

Versace E., Martinho-Truswell A., Kacelnik A. & Vallortigara G. (2018) Priors in animal and artificial intelligence: Where does learning begin? *Trends in Cognitive Sciences* **22**(11):963–65. doi: 10.1016/j.tics.2018.07.005. [GI, MDG]

Versace E. & Vallortigara G. (2015) Origins of knowledge: Insights from precocial species. *Frontiers in Behavioral Neuroscience* **9**:338. doi: 10.3389/fnbeh.2015.00338. [GI]

Vinden P. G. (2001) Parenting attitudes and children's understanding of mind: A comparison of Korean American and Anglo-American families. *Cognitive Development* **16**(3):793–809. http://doi.org/10.1016/S0885-2014(01)00059-4. [RAM]

Vinkhuyzen A. A., Van der Sluis S., Posthuma D. & Boomsma D. I. (2009) The heritability of aptitude and exceptional talent across different domains in adolescents and young adults. *Behavior Genetics* **39**:380–92. [MDG]

Vogd W. (2013) Constructivism in Buddhism. In: *Encyclopedia of Sciences and Religions*, ed. A. L. C. Runehov & L. Oviedo, pp. 489–495. Springer. [MF]

Vouloumanos A. & Werker J. F. (2007) Listening to language at birth: Evidence for a bias for speech in neonates. *Developmental Science* **10**(2):159–64. [aCH]

Waddington C. H. (1942) Canalization of development and the inheritance of acquired characters. *Nature* **150**:563–65. [DS]

Walls M. (2019) The bow and arrow and early human sociality: An enactive perspective on communities and technical practice in the Middle Stone Age. *Philosophy and Technology.* **32**(2):265–81. Available at: https://doi.org/10.1007/s13347-017-0300-4. [MF]

Wang Q. (2004) The emergence of cultural self-constructs: Autobiographical memory and self-description in European American and Chinese Children. *Developmental Psychology* **40**(1):3–15. [PVB]

Wang Q. (2013) *The autobiographical self in time and culture*. Oxford University Press. [PVB]

Wang Q. (2018) Culture in collaborative remembering. In: *Collaborative remembering: Theories, research and applications*, ed. M. Meade, C. Harris, P. Van Bergen, J. Sutton & A. Barnier, pp. 297–314. Oxford University Press. [PVB]

Wannenburgh A., Johnson P. & Bannister A. (1979) *The Bushmen*. Methuen. [AW]

Wareham P. & Salmon K. (2006) Mother-child reminiscing about everyday experiences: Implications for clinical interventions in the preschool years. *Clinical Psychology Review* **26**(5):535–54. [PVB]

Warrier V., Grasby K. L., Uzefovsky F., Toro R., Smith P., Chakrabarti B., Khadake J., Mawbey-Adamson E., Litterman N., Hottenga J.-J., Lubke G., Boomsma D. I., Martin N. G., Hatemi P. K., Medland S. E., Hinds D. A., Bourgeron T. & Baron-Cohen S. (2018) Genome-wide meta-analysis of cognitive empathy: Heritability, and correlates with sex, neuropsychiatric conditions and cognition. *Molecular Psychiatry* **23**:1402–09. [MDG]

Washburn M. F. (1908) *The animal mind*. Macmillan. [aCH]

Waszak F., Hommel B. & Allport A. (2003) Task-switching and long-term priming: Role of episodic stimulus-task bindings in task-shift costs. *Cognitive Psychology* **46**:361–413. [SB]

Watson J. B. (1930) *Behaviorism*. Phoenix. [aCH]

Werker J. F. & Hensch T. K. (2015) Critical periods in speech perception: New directions. *Annual Review of Psychology* **66**:173–96. [aCH]

West-Eberhard M. J. (2003) *Developmental plasticity and evolution*. Oxford University Press. [aCH, EJ]

West-Eberhard M. J. (2005) Developmental plasticity and the origin of species differences. *Proceedings of the National Academy of Sciences* **102**(1):6543–49. [aCH]

Whitehead H. & Rendell L. (2015) *The cultural lives of whales and dolphins*. Chicago University Press. [AW]

Whiten A. (2005) The imitative correspondence problem: Solved or sidestepped? In: *Perspectives on imitation: From neuroscience to social science,* vol. 1: *Mechanisms of imitation and imitation in animals*, ed. S. Hurley & N. Chater, pp. 220–222. MIT Press. [AW]

Whiten A. (2017a) A second inheritance system: The extension of biology through culture. *Royal Society Interface Focus* **7**:20160142. [AW]

Whiten A. (2017b) Culture extends the scope of evolutionary biology in the great apes. *Proceedings of the National Academy of Sciences USA* **114**(30):7790–97. [AW]

Whiten A. (2019a) Conformity and over-imitation: An integrative review of variant forms of hyper-reliance on social learning. *Advances in the Study of Behavior* **51**:31–75. [AW]

Whiten A. (2019b) Cultural evolution in animals. *Annual Review of Ecology, Evolution and Systematics*. Available at: https://doi.org/10.1146/annurev-ecolsys-110218-025040. [AW]

Whiten A. & Erdal D. (2012) The human socio-cognitive niche and its evolutionary origins. *Pan. Philosophical Transactions of the Royal Society B: Biological Sciences* **367**(1599): 2119–129. [AW]

Whiten A. & Ham R. (1992) On the nature and evolution of imitation in the animal kingdom: Reappraisal of a century of research. *Advances in the Study of Behavior* **21**:239. [aCH]

Whiten A., Hinde R. A., Stringer C. B. & Laland K. N. (2011) Culture evolves. *Philosophical Transactions of the Royal Society B: Biological Sciences* **366**(1567):938–948. [AW]

Whiten A. & van de Waal E. (2018) The pervasive role of social learning in primate lifetime development. *Behavioral Ecology and Sociobiology* **72**:UNSP 80. [AW]

Wilkins A.S., Wrangham R. W. & Fitch W. T. (2014) The "domestication syndrome" in mammals: A unified explanation based on neural crest cell behavior and genetics. *Genetics* **197**(3):795–808. [aCH]

Wilkinson A., Kuenstner K., Mueller J. & Huber L. (2010) Social learning in a non-social reptile. *Biology Letters* **6**:614–16. [aCH]

Wilson B., Slater H., Kikuchi Y., Milne A. E., Marslen-Wilson W. D., Smith K. & Petkov C. I. (2013) Auditory artificial grammar learning in macaque and marmoset monkeys. *Journal of Neuroscience* **33**(48):18825–35. [aCH]

Wilson D. S. (2002) *Darwin's cathedral: Evolution, religion, and the nature of society*. University of Chicago Press. [PES]

Wilson E. O. (1975) *Sociobiology: The new synthesis*. Harvard University Press. [aCH]

Wilson R. A. (1994) Wide computationalism. *Mind* **103**(411):351–72. [MF]

Wimsatt W. C. (1974) Complexity and organization. In: *PSA 1972*, ed. K. Schaffner & R. S. Cohen, pp. 67–86. Philosophy of Science Association. [PES]

Wischniewski J., Windmann S., Juckel G. & Brüne M. (2009) Rules of social exchange: Game theory, individual differences and psychopathology. *Neuroscience & Biobehavioral Reviews*, **33**(3), 305–313. doi: 10.1016/j.neubiorev.2008.09.008. [PBB]

Woodward M. (2019) Metaplasticity rendered visible in paint: How matter 'matters' in the lifeworld of human action. *Phenomenology and the Cognitive Sciences* **18**(1):113–32. [MF]

Young J. M., Krantz P. J., McClannahan L. E. & Poulson C. L. (1994) Generalized imitation and response-class formation in children with autism. *Journal of Applied Behavior Analysis* **27**(4):685–97. [aCH]

Zefferman M. R. & Mathew S. (2015) An evolutionary theory of large-scale human warfare: Group-structured cultural selection. *Evolutionary Anthropology* **24**(2):50–61. [PES]

Zentall T. R., Sutton J. E. & Sherburne L, M. (1996) True imitative learning in pigeons. *Psychological Science* **7**(6):343–46. [AW]

Zilles K. (2005) Evolution of the human brain and comparative cyto- and receptor architecture. In: *From monkey brain to human brain*, ed. S. Dehaene, J. R. Duhamel, M. D. Hauser & G. Rizzolatti, pp. 41–56. MIT Press. [aCH]

Zmigrod L., Rentfrow P. J., Zmigrod S. & Robbins T. W. (2018) Cognitive flexibility and religious disbelief. *Psychological Research*. Published online 11 June 2018. https://link.springer.com/content/pdf/10.1007%2Fs00426-018-1034-3.pdf [SB]

Zwaan R. A. & Radvansky G. A. (1998) Situation models in language comprehension and memory. *Psychological Bulletin*, **123**, 162–185. [IAA]