Human Self as Information Agent: Functioning in a Social Environment Based on Shared Meanings

Roy F. Baumeister
University of Queensland and Florida State University

Heather M. Maranges
Florida State University

Kathleen D. Vohs
University of Minnesota

A neglected aspect of human selfhood is that people are information agents. That is, much human social activity involves communicating and discussing information. This occurs in the context of incompletely shared information—but also a group's store of collective knowledge and shared understanding. This article elucidates a preliminary theory of self as information agent, proposing that human evolution instilled both abilities and motivations for the various requisite functions. These basic functions include (a) seeking and acquiring information, (b) communicating one's thoughts to others, (c) circulating information through the group, (d) operating on information to improve it, such as by correcting mistakes, and (e) constructing a shared understanding of reality. Sophisticated information agents exhibit additional features, such as sometimes selectively withholding information or disseminating false information for self-serving reasons, cultivating a reputation as a credible source of information, and cooperating with others to shape the shared worldview in a way that favors one's subgroup. Meaningful information is thus more than a resource for individual action: It also provides the context, medium, and content within which the individual self interacts with its social environment.

Keywords: self, information agent, communication, shared reality, culture

The human self is unprecedented in nature. Although scholars debate the degree of self-awareness and moral sensitivity in non-human animals (e.g., de Waal, 2001; Gallup, 1970; Tomasello, 2016), human selfhood has many features and processes that go far beyond those of other creatures. Some differences are linked to the human use of language, which enables features of self to be encoded with linguistic precision, processed and organized as meaningful information, and communicated to others in speech.

The purpose of this article is to outline and develop a theory of the human self as information agent. That is, a vital but easily overlooked feature of human selfhood is that it operates in a social world full of information, and much of its social and solitary activity is devoted to dealing with information—indeed, socially shared information, embedded in a fairly coherent body of shared assumptions, beliefs, and understandings. We speculate that the human self has evolved cognitive and motivational structures that go far beyond what other animals have, based on what enabled it to function effectively as an information agent within an information-based social system.

Nonhuman animals have social groups, but these do not generally construct a shared understanding of their world. Human selves thus face a largely unprecedented task of operating in a social environment based on a collective worldview, a joint mental construction. The construction and maintenance of this shared store of information constitute an important and pervasive human activity. Human groups are thus fundamentally different from other animal groups, because they use meaning to connect with each other, and being part of the group involves learning the group's shared reality and interacting with other group members on its basis of these shared meanings.

We therefore begin with the assumption that some features of human selfhood adapted in order to make this shared reality possible and to reap its benefits. These features include being motivated and equipped to seek information and communicate it to others. Relaying information obtained from others (e.g., via gossip, teaching, rumor transmission) is also vital to help spread information through the group. More advanced features of human information agency include selectively withholding information (e.g., keeping secrets), disseminating false or misleading information (e.g., lying), and even seeking to control the group's collective outlook (e.g., by stifling contrary information).

Meaning and Information

As presumably will be clear from the collection of papers for this special issue, defining meaning is difficult. One simple and useful pseudodefinition is that meaning is anything that can be expressed in language. Operationally, meaning can be defined as

possible associations (Heine, Proulx, & Vohs, 2006). Baumeister (1991) proposed that the most basic unit of meaning (and hence the simplest animal thought) is association, which is a nonphysical connection between two distinct entities, events, or other stimuli. That is, two things may be related symbolically or otherwise conceptually, which links them in ways other than physical contact. Those links constitute meaning.

Information associates concepts and stimuli and thus consists of meaning. Among humans, a collective store of information is almost always shared by language, which indicates symbolic (nonphysical) representation. Information is essentially mental representations of objective stimuli, including physical facts, people, events, and possibilities (e.g., opportunities and threats). Information is essentially mental representations of objective stimuli, including physical facts, other people, events, possibilities (e.g., opportunities and threats), and other circumstances. Indeed, in the history of cognitive psychology, many new thrusts have begun by grappling with the nature of meaning but soon shifted to focus instead on information (for review, see Beswick, 2017; also Bruner, 1990)—which somehow enables researchers to discuss the same matters with fewer conceptual and metaphysical stumbling blocks. Neither information nor meaning is itself a purely physical phenomenon, but psychologists seem to find it easier to assume the reality of information than the reality of meaning. Some information is mental representations of physical realities (e.g., it is raining), whereas other information is more purely social (e.g., stock share prices). It is conceptually challenging to explain how minds began to evolve the capacity to process meaning per se, but the adaptive advantages of processing specific information are readily apparent and uncontroversial. Nonetheless, information consists of meaning (it can and usually is expressed in language!), and so analyzing how human selves use information can offer useful insights into the meaning of meaning.

Language is a tool to facilitate use of meaning by representing it. It is however more than that: Language is inherently social. One does not have a language by oneself. Indeed, some philosophical perspectives understand language as essentially what two or more people have in common (Gadamer, 1975). The young human animal is socialized to become part of the group, and the socialization process includes learning to share understandings in common with other people in the group and to exchange information within that context. Thus, language enables the use of meaning to become interpersonal and collective, which greatly increases the interplay between behavior and information—thereby making the self into an agent of information.

Context: Nature, Culture, and Self

The roots of self as information agent extend back into evolutionary history. We assume that curiosity (the motivation to acquire new information about the physical environment) is found in very simple animals and would confer selection advantages quite early in evolution. More advanced (and more social) aspects of the information agent may however be distinctively human.

Evolution is driven by reproductive success, and of course survival is a key prerequisite for reproductive success. Humankind uses an unusual strategy for promoting these, namely culture: that is, the construction of organized social groups based on shared understandings (i.e., collective meaning; Baumeister, 2005; Boyd & Richerson, 2005). These capitalize on differences among individuals, such as in role specialization, division of labor, and economic exchange. A useful heuristic principle is therefore to regard all distinctively human traits as adaptations to enable culture.

The human self can be understood in the context of adaptations for culture. Even the extensive differentiation of human selves is probably such an adaptation. Baumeister, Ainsworth, and Vohs (2015) concluded that human groups function best on the basis of highly differentiated selves (as in division of labor), whereas, conversely, many of the failures, shortfalls, and pathologies of groups (e.g., social loafing, groupthink) occur when individual selfhood is submerged in the group. The implication is that the human self is fundamentally disposed to participate in social groups by performing unique roles or contributing in a distinctive fashion.

To understand the self as information agent, therefore, it is appropriate to begin with how groups use information (cf. De Dreu, Nijstad, & van Knippenberg, 2008; Hinsz, Tindale, & Vollrath, 1997). Early human groups competed against other groups for resources. Superior information would have conferred a competitive advantage. Indeed, that is presumably why human communicative motives and abilities evolved. Information could be about the physical environment (e.g., the availability of food and water; affordances for physical aggression, such as hiding places for ambush). It would also include having the group members have information about each other, so as to know their capabilities and limitations. Information can also be about what the group will be doing, as in a plan or blueprint for collective action.

What makes a group's collective stock of knowledge superior to another group's? The value of such a collective store can be measured on three dimensions. First, the overall *coherence* includes how complete the information is and whether it is free from contradictions (i.e., is internally consistent). Second, its general *accuracy* refers to how correctly the information matches objective reality. Third, *consensus* refers to how thoroughly the information is shared by all group members. Thus, to create a high quality collective store of information, the group must accumulate information and fill gaps (resolve uncertainty and contradictions), improve its resemblance to objective facts (resolve errors), and ensure that all group members share the same understanding (resolve disagreements and ignorance).

In developing these ideas, we (presumably like most scientists) initially assumed that accuracy would be the paramount concern for the information agent. However, consensus may also be important and may often take precedence. Accurate information is beneficial in many ways, to be sure. But there are other considerations. Groups benefit from collective action, and so consensual agreement may be a high priority. Consensus may be needed in many situations when the means to verify information's accuracy are beyond reach. The group hunt was presumably one of the earliest group activities in human evolution and planning a group hunt probably required coordination first, with decisions needing to be made and collectively implemented without full knowledge (e.g., where to find the best prey). Likewise, military hierarchies require obedience to commands so that individuals fight together as a team. Even if dissenters turn out to have more accurate information, disobedience is punished. The diversity and incom-

patibility of many religions entails that most of them must have been false, but presumably they were useful at times for unifying and coordinating their respective societies.

When shared information coalesces into a collective worldview that includes values, it often has sociopolitical implications. Many groups are committed to particular ideologies or agenda, and information that impugns shared beliefs could be especially unwelcome. Political and religious ideologies have often sustained their power by asserting and enforcing views of questionable truthfulness. Hence individuals and groups may seek to exert control over the shared reality so as to benefit themselves. Thus many individuals will find it more important to get the group to agree with their favored view than to help it reach an objectively correct view.

One fascinating question about official falsehoods is whether the ruling elites who propagate such views believe them or not. We speculate that there are cases of both types. That is, some rulers may knowingly, even cynically, uphold a false worldview because it helps sustain them in power, whereas others sincerely believe their worldview. Probably many cases exist in the large gray area between those two, in which self-deceptive tactics are used to sustain preferred beliefs, and doubts are shrugged off as counterproductive. As an example close to home, psychology today is dominated by a political viewpoint that is progressively liberal, but it seems unlikely that many researchers knowingly assert falsehoods as scientific facts. They do however make publication of some findings much easier than others. The selective critique enables them to believe that the field's body of knowledge supports their political views more than it does, because contrary facts and findings are suppressed (e.g., Duarte et al., 2015). In general, we suspect that far more elites use biased informational strategies to convince themselves of the truth of their preferred views than cynically assert positions they know to be false—though the latter happens too. As examples, it seems doubtful that today's rulers of North Korea, Venezuela, or Zimbabwe sincerely believe the preposterous propaganda that keeps them in power.

Obviously it is an oversimplification to write as if all groups are the same. De Dreu et al. (2008) have provided a thoughtful analysis of how groups vary, including variability in both social and epistemic motivations. As commitment to the group grows weaker, there is less conformity pressure, for example. Dissenting minorities within groups create conflict but improve information processing, including less reliance on heuristics, reduction of groupthink, and open-minded information search. Group size also matters, not least insofar as large groups often consist of competing subgroups, which may vie for control over the larger group's collective understanding so as to steer it in ways that benefit their subgroup.

Overview of Information Agent Theory

The present article undertakes to develop a theory of informational agency as one aspect of selfhood. Information is composed of meaning, and so information agency is a central way in which the human self uses meaning. The term *agent* has multiple meanings, and we use it in the sense of one who takes action rather than in the sense of representing someone else. The self is, among other things, one who acts, and we elucidate that in the context of information and collective shared reality.

The human information agent is part of a group and operates in the context of a group stock of information that often extends to encompass a consensual worldview. Groups compete against groups, and some groups win. Undoubtedly it is better for individuals to be in the winning group rather than the losing group—including their prospects for survival versus immediate death. A group that builds up a collectively stored set of useful information can cooperate, plan, and execute more effectively than a group that lacks shared understandings.

Understanding the human self as having evolved so as to enable cultural groups to flourish provides a theoretical basis for deriving specific predictions about the self as information agent. The group's interest in building up a shared store of knowledge is best served by obtaining input from multiple individuals. Individuals should therefore first have some motivation to seek and obtain information. They may seek information to fill gaps in the group's collective knowledge (as opposed to merely satisfying their own curiosity).

The group's stock of information grows as people contribute different bits of information, but it is only a group resource insofar as the members share it. Hence resolving disputes and inconsistencies is helpful. There is thus some tension between adding diverse input and achieving agreement. A leader can encourage everyone to think the same thing, possibly at the expense of contrary and more accurate views. Leaders can also encourage diverse views and dissent, though that presumably makes it harder for the leader to lead.

Why might evolution have made people willing to sacrifice accuracy in favor of consensus, at least sometimes? Here we speculate that desire for consensus may derive from an innate social motive, whereas accuracy is an epistemic motive that would need to be acquired, and is therefore less deeply rooted and perhaps weaker. Accuracy requires meaningful evaluation, as it is essentially a match between two ideas—and perhaps meaning cannot be transmitted by purely physical processes, such as birth. To put this another way, consensus is about you and me having the same thoughts, and nature can program us to want sameness in general, as is seen in preference for genetic kin. In contrast, accuracy is about abstract relationships between statements and circumstances, and thus it is a meaningful rather than a physical thing. There may not be an innate motive to evaluate the truth-value of assertions or to appreciate the meaningful difference between truth and falsehood. Hence it may be necessary to learn from experience that accuracy is an informational virtue that confers benefits, whereas consensus may be more closely tied to innate motivations.

By way of analogy, there would be obvious advantages if all babies were born knowing and speaking the same language (or even just their parents' language), but that is apparently not possible, so nature settled for instilling innately prepared motivation and ability to learn whatever language is spoken in one's social environment. Thus, the meanings of words cannot be born into the person, but only the desire to learn the same meanings that others know. Similarly, given the usefulness of mathematics and the universality of its basic truths, these too would ideally be innate in the mind (at least to the extent of knowing all the correct answers to arithmetic calculations) rather than needing to be learned, but that also seems not to have been possible. Therefore, people have to learn mathematics via a time-consuming, arduous process that

remains incomplete and prone to error. If natural selection had instilled infallible knowledge of all arithmetic into every newborn mind, most thinkers would not be surprised: "Of course it is adaptive to know the right answers!" Yet it has not happened.

Language and mathematics are good examples of systems consisting purely of meaning. The need to learn them rather than have them innate is perhaps a vital hint about the broader nature of meaning: Meaning cannot be installed in the mind by purely physical means. As nonphysical connection, meaning is perhaps unable to be hard-wired in physical beings. Evolution is unable to instill meaningful thoughts in the brain—only the motivation and ability to get them.

The social but still innate desire to connect with others may be part of what motivates humans to master meaning, particularly including the acquisition of language, which is the ultimate tool for using meaning. Interest in shared reality emerges early in life, starting with joint attention tasks (e.g., Shteynberg, 2015; see below), presumably earlier than children learn that lying is bad and that hypotheses should be subject to reality testing. Anecdotal impressions suggest that to small children, reality testing often consists of asking their mother, which suggests that consensus operates as a surrogate for accuracy. The default assumption of parental omniscience may be fairly durable through childhood.[1]

Perhaps biological evolution cannot instill specific information and meanings in the nascent brain, but it can certainly instill motivations to connect with others, and the information agent benefits from these. The human mind discovers early in life that other minds have different information, which is something most other animals never discover (see Tomasello, 2014). The desire to share attention and thoughts with others could thus be innate (or innately prepared) whereas the desire to sort truth from fiction may only come along later.

In any case, it is clear that the human animal operates not just in a physical and social environment but also in an environment defined partly by shared information. Crucially, this shared body of knowledge is more than a simple collection of facts. Patterns can be found, conclusions and inferences made, and inconsistencies resolved, so that the body of knowledge is coherent and usable. Information agents can therefore operate on the information, alone and in conversation with each other, to accomplish these tasks.

Acquiring, communicating, and relaying information constitute the three basic aspects of the information agent. There are however more advanced aspects that deserve consideration. Certainly people operate on information so as to improve it and resolve contradictions. Some of this is done privately and individually, and some is done collectively, such as by arguing. Moreover, it is an idealized, simplistic model to assume that all information is shared throughout the group. Some individuals can gain advantage by selectively withholding some information from others. In economic trade, for example, sellers can get a higher price by withholding information about flaws in what they are selling.

Withholding information is a simple form of deception. A more ambitious version is communicating false information. Because evolutionary selection occurs at the individual level, individuals seek their own advantage, which may or may not coincide with sharing information accurately with the group.

Dealing in social information requires fairly advanced metacognition. One evolutionary innovation in the human information agent should thus be fairly extensive metacognitive capabilities (and perhaps motivations), such as in reflecting on what is known versus not known.

Evidence and Elaboration

We turn now to elucidate the predictions about information agents in relation to empirical evidence. Given page limitations, the review will be selective and incomplete. Our goal is to develop the theory. Empirical findings are presented to ground and elaborate the theory.

Acquiring Information: The Anti-Fysigunkus Imperative

The first and most obvious, and hence most trivial, aspect of informational agency is the acquisition of information. To conserve space, we have minimized our coverage of this aspect. We assume that the quest for information is not unique to humans and can be accepted without controversy. Human beings seek and acquire information.

Several theoretical points are worth noting, however. First, mere perception is not yet information. Sensory input becomes information when the input is endowed with meaning. This entails forming (nonphysical) linkages among perceptions and then, as information is built up, relating new information to existing knowledge. The most basic unit of thought is the association, which links two or more stimuli, which fairly simple minds can do. Discerning patterns is one important foundation of information agency: Patterns use meaning to link different stimuli or events together, forming the basis for expectancies.

The information agent is thus inherently an information seeker. The second point is that the information agent who belongs to a group may seek information in ways that differ from the information-seeking strategies of solitary information agents. The collective store of knowledge is increased by adding new information, which is best accomplished if group members contribute something different from what others contribute.

The so-called ratchet effect of cultural learning depends on this accumulation of diverse inputs. As Tomasello (2014) explained, nonhuman primates solve problems, but these do not end up producing lasting improvements in others' lives, because the solutions are not generally retained by the group. As a result, future generations must solve them again. Human culture is distinguished by the fact that a discovery by one member is shared, enabling other members and future generations to advance the collective store of knowledge. They build on previous discoveries by adding further information.

In any case, individuals and groups both benefit from seeking information, and this fact long precedes human evolution. A *fysigunkus* is defined as a person lacking curiosity. The term may be used as a reproach in specific cases, but we wonder how many true and thoroughgoing fysigunkuses exist. An individual who lacks curiosity and refuses to seek information in general would be at a disadvantage, although within a social group such individuals may

---

[1] Indeed often it is not until the teen years that youngsters come to realize that their parents are wrong about everything.

be able to survive as free riders on the group's acquisition of information.

An authoritative review of theory and research on curiosity was provided by Loewenstein (1994). He proposed that curiosity is stimulated by a subjective information gap—that is, one knows what one knows but recognizes something is missing (thus relying on metacognition). Curiosity is the desire to fill that gap (thus indicating a metacognitive motivation). Loewenstein's analysis was focused on the single individual but is also highly congenial to an information agent as group member. Scientists advance their careers by finding gaps in the collective store of knowledge and conducting research to fill those gaps.

Although it is probably fair to characterize people as seekers of information, sometimes they become information avoiders. The general assumption is that people seek to avoid unpleasant information. In a demonstration of the so-called "ostrich effect," Karlsson, Loewenstein, and Seppi (2009) showed that investors checked their financial portfolios less often when the market was declining than rising, presumably because they preferred to see their money increasing rather than decreasing. More broadly, Hertwig and Engel (2016) listed multiple motives for avoiding information. Most reflect the solitary thinker's wish to avoid information, such as to avoid regret, increasing suspense, and ward off distractions. People may avoid information because it is difficult to process (see Gilovich, Griffin, & Kahneman, 2002), because it challenges existing beliefs (see Harmon-Jones & Harmon-Jones, 2007), or because it reminds them of their impending death (Landau, Solomon, Pyszczynski, & Greenberg, 2007). Still, these indicate the intrusion of other motives to override the basic and presumably widespread motive to seek information.

Communicating Information

The second aspect of an information agent involves communicating its information to others. The central hypotheses are that humans as information agents have motivation and capabilities for communicating information to other group members.

To be sure, there are signs of limited communicative impulses in other animals, and these could be considered the predecessors of the human motivation to communicate. Many animals emit a loud noise when first noticing food or predators, and the sound can alert conspecifics to the opportunity or threat. But there is little evidence that the animals have any intention of alerting others or are aware that that is what they are doing. Monkeys, for example, give a specific alarm call when they spot a leopard or an eagle, but they do not modify the call to inform their group members of the number of predators, the distance from the predators, or the potential timing of the attack (Seyfarth, Cheney, & Marler, 1980). In other animals, alarm calls appear to be either conditioned or innately prepared responses to stimuli rather than deliberate attempts at communication.

A key hypothesis associated with the idea of human self as information agent is that people are fundamentally motivated to communicate the contents of their minds (i.e., thoughts and feelings) to others. Some relevant evidence was provided by Tamir and Mitchell (2012). They cited previous findings indicating that about 30–40% of human speech consists of simply describing people's subjective experiences to others. In their studies, participants performed trials on which they could choose which of three

questions to answer: about themselves, about then-President Obama, or trivia questions. Different (though quite small) cash rewards were offered in connection with the three response options. Participants showed a willingness to sacrifice money to answer questions about themselves. In further studies, Tamir and Mitchell (2012) showed that disclosing information about the self activated neural reward regions. Further work suggested that this positive value had two sources: it is rewarding both to think about oneself and to share information with others.

When information is materially useful to the recipient, people are particularly motivated to communicate what they know. A creative line of studies by Feinberg, Willer, Stellar, and Keltner (2012) had participants observe someone else playing economic games in a selfish, uncooperative manner. They then had the opportunity to inform another participant (a stranger) who was about to be the selfish person's opponent. Participants felt bad when observing the selfish play but felt better after warning the next person about the selfish player. They communicated this information without any apparent benefit to themselves and even spent on average about a dollar of their earnings to send the warning.

Again, the implication is people have a deeply rooted motivation to communicate information to others. Feinberg et al. (2012) interpreted their results in the context of Dunbar's (1996) theory of gossip. The gist is that in large groups it became impossible for people to monitor others for evidence of selfish, uncooperative behavior, so sharing information about the moral reputations of others became desirable to enable people to cope with life in the group and avoid being exploited. Telling others about the selfish person is a form of third-party punishment that benefits the group by establishing a bad reputation for someone who violates the group's values and best interests. People accept costs in the absence of direct gain to update the group's collective store of information about who is out for himself rather than helping the group.

A broader albeit more speculative argument is that increased communication was a central thrust of human evolution (see Baumeister & Masicampo, 2010). Contrary to early theories of human evolution that assumed the large brain was the first and key step, it is now agreed that upright posture preceded the expansion of brain size. One likely explanation is that the upright posture was linked to freeing the hands for gestural communication, which preceded vocal communication. Human evolution lowered the larynx in the throat, thereby increasing risk of choking but making vocal speech possible (Corballis, 2009). Apparently, the benefits of speech outweighed the increased risk of death by choking—at least after communication by gesturing had already begun to establish the pattern of sharing information to create a group's store of knowledge. The increase in brain size may have occurred then precisely because increased communication altered the selection environment by making much more information available, so that larger brains would indeed have enough to do to justify their increased metabolic cost. Baumeister and Masicampo (2010) even concluded that human conscious thought evolved for communicative purposes. As one sign, unconscious thoughts have been shown to be sufficient to produce many responses, but not for carrying on a conversation. Talking requires consciousness. Thus, these findings fit the view that human evolution improved the ability to communicate.

A recent, comprehensive survey of human–animal differences concluded by emphasizing the drive to share one's thoughts and feelings with others as possibly the single most important difference (Suddendorf, 2013). Our review fits the conclusion that human evolution produced advances in both the motivation to share information and the ability to do so.

Relaying Information

Thus far we have proposed that the human agent is motivated to discover information and communicate it to someone else. For these processes to create a group store of information, it is vital for people to relay information obtained from others. Without that, each person's discovery would only enter the group's stock of knowledge insofar as the original discoverer managed to communicate it to every other member of the group. In contrast, if people relay information, it can spread through the group rapidly. The responsibility does not rest on each person who discovers information to make sure that everyone learns it, only that a few people learn it.

Rumor transmission processes are one well-studied form of relaying information. The classic studies by Allport and Postman (1947) found that as information was passed along, it was subjected to various refinements. Many details were lost. These omissions were not random. Details that were difficult and complex tended to be dropped, thereby simplifying the rumor toward easily remembered information and assimilated to expectancies, biases, and stereotypes. Their findings thus fit the idea that information agents help digest and share information. The changes in the information, which simplified the information to focus on key points, seemingly sacrifice accuracy to facilitate the construction of a shared worldview.

The motivation and ability to share information intentionally with other group members appear to form a human adaptive cognitive system based on wanting to fill the gap in the other person's knowledge (Csibra & Gergely, 2011). Literature on normally developing children, autistic children, and chimpanzees was reviewed by Tomasello, Kruger, and Ratner (1993). They concluded that cultural learning is a uniquely human form of social learning that facilitates high fidelity transmission of knowledge made possible by theory of mind and perspective taking abilities. (*Theory of mind* refers to understanding that other people have inner mental states that could differ from one's own, thereby raising the possibility of a community of minds that have similarities and differences.) Thus, one important innovation of human evolution was being able to mentally represent whether particular bits of information are differently known by different minds. This metacognitive ability would be a powerful enabler for information agency.

Evidence of intentional teaching is particularly relevant. Cultural intergenerational transmission can gradually augment the collective stock of knowledge. That requires that each generation teaches what it knows to the next generation, who then does the same for the subsequent generation. Teaching thus becomes a link in the chain: Teachers learn from older group members and relay information to the younger group members.

As far as we know, all countries in the world have schools where teachers pass along knowledge to the young. Even cultures who have not advanced to nation status typically include some teaching.

Thus, humans everywhere relay information to others and facilitate their learning. The contrast with nonhuman animals is stark. Almost nothing in animal behavior is solid evidence of intentional teaching (Hoppitt et al., 2008).

The uniqueness of human teaching (pedagogy) was carefully reviewed by Csibra and Gergely (2009). They concluded that nonhuman animals also manage to share information with each other in several ways. They may signal each other about what is currently happening, such as the presence of predators. They also imitate each other. They do not, however, intentionally communicate generalizable knowledge to each other, whereas all human societies do. That supports the conclusion that the pattern of communicating to share knowledge with other members of one's species is unique to humans and a potent adaptation of human evolution. This strongly supports the view that humans evolved in part to belong to social groups that maintain shared bodies of information.

Again, the difference in theory of mind is one key part of the explanation. Theory of mind is a metacognitive ability that presumably evolved to facilitate information agency. The most intelligent nonhuman primates can pass a few tests of theory of mind, but adult chimps do not perform as well on them as young human children (Povinelli, 2000; Povinelli & Eddy, 1996; Tomasello, 2014). There is no reason to want to share information with others unless you realize that you have some information they lack. Furthermore, being able to teach is not the same as wanting to teach. Humans seem motivated to communicate information to others, as would be optimal for an information agent. Thus, the human self surpasses the primate version in both the ability and the motivation to engage in deliberate teaching.

Gossip has lower prestige than teaching, partly because it is sometimes a form of malicious aggression (e.g., Baumeister, Reynolds, Winegard, & Vohs, in press). However, gossip also has positive value. It transmits accounts of misadventures by others, often revealing what norms are and how violators are treated. A study of gossip by Baumeister, Zhang, and Vohs (2004) found that people reported having learned useful lessons for their own lives in connection with about two thirds of gossip incidents. The power of emotion in motivating transmission was also evident in research on gossip. The vast majority (96%) of gossip reports evoked emotional reactions. These were mostly negative and correlated with reported learning from the gossip.

In sum, people have abilities and motivations to relay information that appear absent in other animals. This fits the view that human evolution facilitated information agency.

Operating on Information to Improve It

Building a store of information requires more than just collecting individual pieces of information. Indeed, as the quantity of information increases, the need to organize it also increases. If integrated and organized, discrete bits of information can be molded into a coherent worldview (by individuals, and then through a second process, by a society to build the shared reality). Organizing information includes attending to patterns, correcting errors, making inferences and deductions, resolving contradictions and inconsistencies, and building coherence. Human beings engage in all these activities, even as solitary minds.

An influential article by Mercier and Sperber (2011) concluded that many ostensible flaws in cognitive information processing,

especially logical reasoning, cease to be flaws when understood in an interpersonal context. That is, the extensive evidence that human thinking is pervasively flawed and biased is typically based on the assumption that the purpose of thinking is to discover the truth—which may be incorrect. Mercier and Sperber proposed that reasoning is for arguing. For example, the confirmation bias (searching for supportive evidence while overlooking contrary evidence) impairs dispassionate search for the truth, but it is very well geared toward making strong arguments for one's preferred side.

Individual thinkers do make multiple errors, and some scholars have come to pessimistic views about human thought because of these propensities for error. Gazzaniga (2008) noted that the "left brain interpreter," that is, the portion of the brain that integrates information and generates interpretations, is prone to bias and error. Yet people do not go about their daily activities blundering from one mistake to another. Part of the reason is social correction (Baumeister & Masicampo, 2010). If an information agent expresses a mistaken view, others can point out errors and missing facts. To take a broad view, one can conclude that the human mind did not evolve to find the truth in solitude so much as to find it via collective action and discussion (very much including argument and social correction).

Arguing also improves the thinking of disputants. Kuhn, Shaw, and Felton (1997) showed that people's thinking was significantly better after an argument as opposed to beforehand and in comparison with the thinking of people who did not debate anyone else. After engaging in a debate, people made better arguments for their position, including by using stronger reasoning, considering alternatives, and acknowledging multiple views. Mercier and Sperber (2011) noted that in contrast to using confirmation biases when building their own arguments, people exhibit a disconfirmation bias when listening to others'. That is, while listening to what others say, people are alert to errors or flaws and think of contrary evidence.

The broader implication is that people do not simply, uncritically pass along all information. Rather, information agents are active consumers who scrutinize and evaluate what others tell them, ultimately accepting some and rejecting other information. Moreover, the arguing process may facilitate the group's quest for accuracy even at the expense of the individual's quest. That is, arguing one side of a debate may cause an individual to develop a biased view that is farther from the truth than he or she would get by open-minded consideration of all perspectives. But perhaps the most effective strategy for the group to end up with accurate information is to have different people take opposing sides and each make the best case it can for its side. For example, this is presumably the principle underlying the adversarial system of courtroom trials, in which society's goal is justice based on the truth but is pursued by having the opposing attorneys make the strongest cases for their respective sides, to the extent of biasing the facts they use.

Evidence indicates that people have highly developed abilities for critically appraising information obtained from others. Even relatively young children show multiple patterns of evaluating the quality of information obtained from others. They focus on cues of reliability, success, and certainty when deciding from whom to seek information. Starting around 4 years old, children prefer potential information sharers who consistently answer questions correctly about events children also have seen (Koenig, Clement, & Harris, 2004; Koenig & Harris, 2005). Although small children prefer to get information from their mothers than from strangers, they switch and prefer information from credible strangers when the mother is known to be inaccurate (Corriveau et al., 2009). Four-year-old children keep track of who has provided accurate versus inaccurate information and subsequently seek information preferentially from the accurate and knowledgeable sources (Koenig et al., 2004; Koenig & Harris, 2005). After establishing that someone has provided inaccurate information, they will accept information from that source if the person shows signs of having gained accurate knowledge (Nurmsoo & Robinson, 2009).

Additional evidence indicates that group participation improves people's ability to vet information and evaluate its quality, which places the information agent as functioning optimally in a group context. For example, groups are better at detecting lies than are individual members of those groups (Klein & Epley, 2015). Lies can be separated from truths through the process of group discussion, which likely provide helpful information that individuals may lack otherwise.

As noted in the previous section, rumor transmission often degrades the quality of information and makes it less accurate. There are exceptions, however. DiFonzo and Bordia (2007) concluded from multiple studies that organizational rumors (e.g., about changes in management or general career prospects) often become more accurate as they spread, unlike rumors about disasters and catastrophes elsewhere, which tend to become less accurate. The reason is that organizational rumors are highly important to organizations' members, and therefore rumored information is subjected to scrutiny, critique, and improvement.

Thus, rumor transmission moves either toward greater accuracy or greater extremity. Both seem well designed to facilitate a collective response to danger. The widespread psychological pattern of emphasizing dangers and other negative impacts is presumably adaptive (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

In sum, information agents are not simply passive transmitters of information, though we assume that that does happen sometimes. Often, however, information agents are critical, skeptical, and argumentative. People relay information along to the others and thereby increase the group's store of knowledge, while evaluating and refining what they hear and relaying what they think is most accurate.

The Community of Minds and Shared Reality

A communal store of information could in principle be built up by information agents who were unaware that they were doing it. However, it seems likely that deliberate and self-conscious participation in such a community would improve the group's ability to form such a stock of knowledge. This section briefly reviews evidence that humans have both conscious and automatic responses to indicate that they know they are part of a community of minds.

Lacking theory of mind, most nonhuman animals presumably operate on the assumption that what they experience is objective reality. Therefore, they cannot imagine that other minds have different views, perspectives, or values. In contrast, people are aware of different perspectives. They can thus be aware of both

similarities and differences among minds, which would be helpful in enabling information agents to build a common store of knowledge. Understanding that disagreement can happen, humans seek to resolve disagreement so that they can establish a shared outlook.

Shared reality is the perception that, at that moment, others have the same inner experience as oneself, and that one is connected to them through common experience. One central finding of research on shared reality is the saying-is-believing effect (Higgins, Rholes, & Jones, 1977). When people express their opinions to others, they adjust what they say based on what they understand the listener favors or believes—and subsequently their own beliefs shift in the direction of what they said. Thus, private cognition is altered to conform to what the person believes the emerging consensus is. Crucially, this sacrifices accuracy: The person abandons his or her original view to shift toward what the other person would prefer to hear.

A similar conclusion emerged from the research on anticipatory attitude change. Many studies had shown that attitudes changed after group discussion or exposure to persuasive messages, but then researchers discovered that attitude change begins prior to discussion. Baseline attitudes shift toward more moderate positions or positions that impending discussion partners were believed to hold (Cialdini, Levy, Herman, & Evenbeck, 1973).

Further studies have confirmed that the construction of a shared mental reality is the motivating factor. Echterhoff, Higgins, and Groll (2005) showed this by testing various moderators. The saying-is-believing effect was mainly found when communication was successful. In one study, participants described a person to an audience, and the audience was expected to use this information to pick the person out of a lineup. The saying-is-believing effect was eliminated when participants later learned that the audience had failed on the lineup selection, indicating that the participant had not created the shared reality. In other studies, saying-is-believing was mainly found with communication to ingroups, and not to outgroups. All these support the view that information agents mainly seek to construct shared reality.

Further studies by Boothby, Clark, and Bargh (2014) confirmed that shared reality intensifies both good and bad reactions. In their first study, people who tasted chocolate liked it better when someone else they had recently met (a confederate) was supposedly also simultaneously tasting it than when the other person was doing something different. In a second study, they used bad-tasting chocolates, and participants disliked them more when the confederate was also tasting them than otherwise. Obviously, the chocolate's taste was identical regardless of the (false) belief that someone else was also tasting it. But merely believing that the experience was shared changed the subjective taste, for better and for worse.

Shared reality begins with shared attention. Knowing that other people have different minds with different perspectives adds value to knowing that other minds are focusing on the same stimulus. An authoritative review of this research by Shteynberg (2015) indicated that from early childhood and throughout life, people are highly sensitive to whether the focus of their attention matches that of important others. Babies are extra interested in things they notice that others are also attending to. Coattended stimuli are recalled better than other stimuli. Goals that are the focus of joint attention are pursued more earnestly and effectively than solitary goals. Both good and bad emotions are intensified simply by believing that a relationship partner is attending to the same stimulus, regardless of it whether the partner is physically present. These effects are mediated by devoting more attention and cognitive processing to the stimulus. That is, the fact that someone close to you is supposedly looking at or thinking about the same thing makes you process it more and thereby intensifies your reactions to it.

A remarkable extension of shared reality theory was contributed by Sloman and Rabb (2016). Their studies show that despite objectively lacking requisite information, people rate their own understanding higher when other group members understand something. Thus, people respond as if having the information in the group's store of knowledge is almost as good as actually knowing it oneself.

Summing up the literature on shared reality, Echterhoff, Higgins, and Levine (2009) posited four components. First, shared reality is not just about observable behavior but encompasses a commonality of inner, subjective states. Second, shared reality is about something, that is, the shared inner states refer to some other facts. Third, the sharedness of inner states is not accidental or coincidental but is strongly motivated. Fourth, it depends on a successful connection of each person's inner states with other people's inner states. The information agent's task is thus to establish connection so that its inner states of knowledge and feeling match those of others in creating a mutually similar understanding of the world.

The shared reality perspective also helps explain one of the classic paradoxes in groups research. This pattern emerged from the hidden profile research by Stasser and colleagues (e.g., Stasser & Titus, 1985). Prior to discussion, group members were given assorted information, most of which favored one candidate while some favored the other. Crucially, the limited amount of information favoring the poorer candidate was given in full to all group members, while the bits favoring the better candidate were dispersed among the various individual members. This is of course the classic rationale for having committees: Group members can contribute their diverse knowledge and viewpoints so as to bolster the collective wisdom. Unfortunately, the findings generally failed to fulfill that ideal, and in fact group discussions tended to emphasize what all knew in common rather than the uniquely held information, resulting in groups often choosing the worse option.

The implication is that groups value consensus and shared reality, and so members are often reluctant to bring up information that goes against the emerging consensus. Although critique and argument would best serve the group's epistemic goals, the goal of harmony tends to suppress those processes. If anything, group members like to validate each other's views and perspectives (and to have their own statements similarly validated). Indeed, research using the hidden profile task showed that group members who talked about shared information (favoring the lesser candidate) were perceived more favorably and had more influence on the group than those who brought up different bits of information (Wittenbaum, Hubbell, & Zuckerman, 1999).

Other work has shown that if and when group members do bring up unshared information, they do so only later in the group discussion (Larson, Foster-Fishman, & Keys, 1994), suggesting that the group first builds consensus and only after that is done seeks novel, idiosyncratic input that might increase accuracy. In an important sense, information shared by the group is valued more

and perceived as more accurate than unshared information (De Dreu et al., 2008). The group would presumably function best if all diverse information were shared, but reaching consensual agreement is apparently valued even more. This suggests that the group's worldview is not primarily about accuracy of information. Consensus comes first, accuracy second, at least in this context.

One would assume that as children grow up, they become generally better at managing and sharing information. A remarkable and relevant exception was identified by Gummerum, Leman, and Hollins (2014). Using a hidden profile task, they found that groups of 7-year-old children were more likely to reach the correct decision than groups of 9-year-olds. The implication is that social and cognitive development increases the tendency to emphasize building the group consensus rather than contributing their own unique knowledge to the group. The older children are more prone to see group discussion as a collaborative process and hence to inhibit each other's bringing up information that deviates from the emerging consensus. Thus, the developmental trend gives priority to group consensus and shared reality rather than increasing accuracy by individuals contributing information that they alone have.

In sum, information agents understand they are operating in the context of an ever-emerging collective worldview. Sharing a worldview involves both consensus and accurate information. Some evidence suggests that consensus is if anything the more powerful motivation.

Additional Factors and Processes

Given the page limits for the special issue, we cannot develop all aspects or dimensions of the theory of human self as information agent. This section is intended as an overview of some additional dimensions that further work may elaborate.

Selectively withholding information. Information agents can manipulate what others know not just by telling them things but also by not telling them things, selectively. Information can be directed to some people and withheld from others, creating subgroups that differ as to knowledge and beliefs. The very phenomenon of keeping secrets is a sign of information agency, as it involves withholding information selectively based on promise or strategy. For example, captured soldiers, spies, and crime syndicate members recognize an obligation to protect their organization's secrets from the enemy. The metacognitive basis of secrets resembles that of teaching, insofar as it includes knowing that one has information that others lack. But instead of sharing it, one is careful to avoid letting the other know. Even apart from keeping specific secrets, people may believe they gain power or other advantage by withholding some information from coworkers, negotiation opponents, intimate relationship partners, organizational rivals, and various others (e.g., Webster et al., 2015).

Disseminating false information. Although scattered instances of deception have been observed in nature (e.g., Wheeler, 2009), there is general agreement that outright lying is beyond the capabilities of almost all animals except humans. That is because full-fledged deception requires the deceiver to be capable of mentally representing multiple mental states. In other words, theory of mind is once again centrally relevant in information agency. The liar knows X to be true while persuading one or more others that not-X is true.

Lying to outgroup members has obvious advantages, but with respect to the ingroup, lying is generally detrimental to the collective enterprise of building up a stock of shared accurate knowledge. It introduces false information into the group's stock. Lying is nonetheless to the advantage of the individual agent operating within a group context (e.g., von Hippel & Trivers, 2011).

Reputation concerns. People are fundamentally concerned with how they are evaluated by others, not least because human survival and reproduction depend on working together with others and so people know that they need to be perceived positively (Baumeister, 1982; Tomasello, 2016). Information agency adds several considerations. One needs to appeal to others as a useful source of information, and so credibility becomes an important aspect of reputation. It is advantageous to an information agent to have other group members perceive him or her as a reliable source of accurate information. This would entail that the agent is seen as not giving out wrong information, knowingly or unknowingly. Knowingly doing so would be lying, and so information agents wish to be seen as honest. Unknowing dissemination of falsehoods would indicate ignorance and overconfidence, and so information agents wish to be seen as knowledgeable.

Knowing what one does not know (and frankly admitting this to others) would be a key interpersonal aspect of the metacognitive skills required by information agency. However, people may also be reluctant to admit not knowing something so they can maintain a reputation of being highly knowledgeable. People pretend to understand esoteric or erudite concepts (Paulhus, Harms, Bruce, & Lysy, 2003), which may be one strategy of protecting one's reputation as a well-informed person.

Although we have emphasized accuracy, the other two dimensions of the stock of knowledge can also have reputational implications. First, people may find it useful to be seen as someone who agrees with the consensus of the group, especially with regard to unverifiable beliefs (e.g., religious doctrines) and values (e.g., moral and political preferences). Hence information agents may wish to be seen as among the right-thinking persons, that is, members of the group who share the group's consensual worldview. Second, the coherence of one's knowledge may be valuable above and beyond accuracy. Someone who knows only three things perfectly well (and nothing else) may have a high score on accuracy but not be of much use, as compared to someone who has a vast stock of information, even if some of that information is less than fully accurate.

The reputational concern adds another dimension to arguing, which we have already discussed at several points. In an argument about X, more is at stake then X. People may feel that to lose an argument will damage their credibility in general, thereby undermining their ability to share information or argue about topics that have nothing to do with X. This concern may also be related to why people are reluctant to admit they have changed their minds, even though having altered one's views so may move the group closer to the truth.

More broadly, the information agent may often be doing two things at once: sharing information and burnishing reputation for informational prowess. We noted above that gossip transmits useful information about social norms and the consequences of violating them (Baumeister et al., 2004). In that sense, by telling gossip, one shows oneself to be knowledgeable not only about the incident but about the relevant norms and contingencies. In a

similar vein, children's teasing is often a way of showing off one's superior knowledge of norms: The teaser recognizes someone else's norm violation and calls attention to it in a humorous fashion, thus showing that the teaser knows the norms better than the person being teased and perhaps better than other group members who have not pointed out the violation (Shapiro, Baumeister, & Kessler, 1987).

Role of boredom. Presumably simple animals can experience boredom, but that subjective feeling state may have evolved and adapted to facilitate information agency among humankind. Boredom is commonly understood as lack of stimulation, which for information agents could mean the absence of new, incoming information. The information agent view would offer the additional hypothesis that giving information to others also averts boredom. That is, people would not be bored when telling stories or otherwise relaying information to other people.

The sense of boredom may also have adapted to help evaluate incoming information. If people tell each other much of what happens in their minds, including what they see and hear and learn, some of this information will be far more useful than others to the recipients. The spectrum of subjective responses to information someone conveys can range from "very interesting" to "quite boring." Such judgments may be an early, initial step toward acting on new information, so that agents can dismiss that which was boring and instead focus on elaborating and verifying the interesting stuff.

Boredom can even become a factor in the reputational strategies of information agents. Presumably they would prefer to be known as sources of highly interesting information than of boring information. A reputation for being boring could cause others to avoid interacting with that person, which would be detrimental to the boring person's status in the group.

Controlling the collective store of knowledge. The last plank in our theory posits that information agents can gain advantage within the group by manipulating or otherwise controlling the collective stock of knowledge. Political and religious groups may engage in this, by advocating their preferred worldview and suppressing expression of alternative, dissenting views. This is an ambitious extension of the influential benefit of lying to one person. Group action is based on the group's shared store of beliefs. Therefore, if one can get the group to view things in a way suitable to one's own interests, the individual can benefit. At its worst, it consists of a kind of group lying. Presumably this will be most effective if multiple information agents work together to manipulate the collective worldview.

Discussion

Human selfhood is a rich, complex organization of psychological and biological processes. Being an information agent is one of them. Psychological theories of self have not devoted much attention to this aspect of selfhood. Our goal is not to replace or dispute other contributions to the psychology of self but to augment them by elucidating this hitherto neglected aspect.

Agency, as the capacity to initiate and control action, emerged early in evolution. Its original function was presumably to help the animal deal with the environment. For human beings, however, the environment includes culture, much of which is composed of meaningful information. The human agent therefore acts with, on, and immersed in information.

The information agent operates within context of the accumulation of a group stock of knowledge. Individual and group interests generally coincide with building up a useful, efficacious (hence reasonably accurate) stock of shared knowledge. People seek information, communicate it to others, relay information obtained from the social group, and operate on information to improve it by means of critique and argument. They may also seek to abuse the collective store of information by selectively withholding information, communicating false information (lying), and working together with selected others to sway the collective store of information so as to serve the subgroup's advantage.

Information is inherently meaningful. Moreover, meaning largely exists in a web of relationships and distinctions, rather than as isolated facts. The group's shared reality is not a list or collection of bits of information so much as it is a body of interconnected beliefs, values, assumptions, and understandings. The meaningful interconnectedness of the group's store of information entails that new discoveries and events can be related to the existing store of knowledge. The information agent thus operates in relation to other people and in relation to this evolving but already extensive network of information.

Our review suggests that human evolution contributed both the motivation and the ability to accomplish these tasks as information agent. Compared to other primates, humans are more eager to communicate and more capable of constructing shared understandings of reality. The motivations extend far beyond animal curiosity to encompass desiring to share, construct, and maintain interpersonally shared reality, plus perhaps also consistency and verification motivations. The abilities include the greater capacity for language as well as metacognitive awareness. The last (metacognition) was abundantly in evidence, including being able to represent what different individuals know about the same issue, in some cases knowing enough to know that one does not want to find out particular information.

Although we started with the simple assumption that the group would seek accurate information, abundant evidence indicated that accuracy is only one among several criteria. We repeatedly found that people would sacrifice accuracy to enhance group harmony and consensus. We speculate that the basic and original motivation behind human information agency is to share understandings and outlook with other group members. The wish for accuracy may not even be innate but rather the result of discovering that accurate information often is more powerful, effective, and useful than inaccurate information. Even so, various motives can still drive people to conceal information, mislead others, and seek to bias the group's collective worldview in ways that are advantageous to individuals or subgroups. Many powerful people have sustained political and religious views, despite or even because of inaccuracies. Dissenters who questioned these false collective worldviews, often with accurate information, have been subject to harsh penalties.

To be sure, accuracy remains important. Ample evidence indicated that people do refine collective information so as to improve its accuracy. They question each other's stories, test hypotheses, argue back and forth, and catch and punish liars.

Directions for Future Research

More work on all aspects of information agency is warranted. A systematic account of the competition between accuracy and consensus motives would be helpful, but it will require more evidence about what circumstances cause one or the other view to prevail. The final plank in our theory, exerting control over the collective worldview, was almost wholly speculative and invites research attention.

We propose this as a theory of self, and so further work could elaborate that connection. How key self-based traits (e.g., self-esteem, self-control, self-consciousness) predict informationally agentic behavior would be revealing. Cognitive approaches to self have thus far emphasized building the stock of knowledge and using that self-knowledge to guide decisions. (Indeed many of the self's tasks start and end with information.) The human self as information agent goes beyond merely thinking just for the purpose of thinking and instead pursues its goals, extending even to the biologically basic goals of survival and reproduction, by strategically communicating and sometimes withholding information.

Concluding Remarks

Our project was to elaborate a new way that the self involves meaning. The self is not just the repository of self-knowledge but also an agent whose actions use information in a social world in which interactions are based on shared meanings and often consist of sharing and refining information. Performing one's roles in society often depends on the self not only having information but understanding the distribution of information among other minds, and operating so as to confirm or alter other people's versions of the collective understanding. The activities of the self essentially involve participating in shared worldviews, which are meaningful structures of information and evaluation. What sets humans apart from other primates may well be a new set of motivations and capabilities centering on how to build a shared stock of information, a collective worldview.

References

Allport, G. W., & Postman, L. (1947). *The psychology of rumor*. Oxford, UK: Holt.

Baumeister, R. F. (1982). A self-presentational view of social phenomena. *Psychological Bulletin, 91,* 3–26. http://dx.doi.org/10.1037/0033-2909.91.1.3

Baumeister, R. F. (1991). *Meanings of life*. New York, NY: Guilford Press.

Baumeister, R. F. (2005). *The cultural animal: Human nature, meaning, and social life*. Oxford, UK: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780195167030.001.0001

Baumeister, R. F., Ainsworth, S. E., & Vohs, K. D. (2015). Are groups more or less than the sum of their members? The moderating role of individual identification. *Behavioral and Brain Sciences, 39,* e137. http://dx.doi.org/10.1017/S0140525X15000618

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5,* 323–370. http://dx.doi.org/10.1037/1089-2680.5.4.323

Baumeister, R. F., & Masicampo, E. J. (2010). Conscious thought is for facilitating social and cultural interactions: How mental simulations serve the animal-culture interface. *Psychological Review, 117,* 945–971. http://dx.doi.org/10.1037/a0019393

Baumeister, R. F., Reynolds, T., Winegard, B., & Vohs, K. D. (in press). Competing for love: Applying sexual economics theory to mating contests. *Journal of Economic Psychology*.

Baumeister, R. F., Zhang, L., & Vohs, K. D. (2004). Gossip as cultural learning. *Review of General Psychology, 8,* 111–121. http://dx.doi.org/10.1037/1089-2680.8.2.111

Beswick, D. (2017). *Cognitive motivation: From curiosity to identity, purpose and meaning*. New York, NY: Cambridge University Press.

Boothby, E. J., Clark, M. S., & Bargh, J. A. (2014). Shared experiences are amplified. *Psychological Science, 25,* 2209–2216. http://dx.doi.org/10.1177/0956797614551162

Boyd, R., & Richerson, P. J. (2005). *The origin and evolution of cultures*. Oxford, UK: Oxford University Press.

Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard.

Cialdini, R. B., Levy, A., Herman, C. P., & Evenbeck, S. (1973). Attitudinal politics: The strategy of moderation. *Journal of Personality and Social Psychology, 25,* 100–108. http://dx.doi.org/10.1037/h0034265

Corballis, M. C. (2009). The evolution of language. *Annals of the New York Academy of Sciences, 1156,* 19–43. http://dx.doi.org/10.1111/j.1749-6632.2009.04423.x

Corriveau, K. H., Harris, P. L., Meins, E., Fernyhough, C., Arnott, B., Elliott, L., . . . de Rosnay, M. (2009). Young children's trust in their mother's claims: Longitudinal links with attachment security in infancy. *Child Development, 80,* 750–761. http://dx.doi.org/10.1111/j.1467-8624.2009.01295.x

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

Csibra, G., & Gergely, G. (2011). Natural pedagogy as evolutionary adaptation. *Philosophical Transactions of the Royal Society of London Series B, Biological Sciences, 366,* 1149–1157. http://dx.doi.org/10.1098/rstb.2010.0319

De Dreu, C. K. W., Nijstad, B. A., & van Knippenberg, D. (2008). Motivated information processing in group judgment and decision making. *Personality and Social Psychology Review, 12,* 22–49. http://dx.doi.org/10.1177/1088868307304092

de Waal, F. (2001). *The ape and the sushi master: Cultural reflections of a primatologist*. New York, NY: Basic Books.

DiFonzo, N., & Bordia, P. (2007). *Rumor psychology: Social and organizational approaches*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11503-000

Duarte, J., Crawford, J. T., Stern, C., Haidt, J., Jussim, L., & Tetlock, P. E. (2015). Political diversity will improve social psychological science. *Behavioral and Brain Sciences, 38,* 130, 1–13.

Dunbar, R. I. (1996). Groups, gossip, and the evolution of language. In A. Schmitt, K. Atzwanger, K. Grammer, & K. Schäfer (Eds.), *New aspects of human ethology* (pp. 77–89). New York, NY: Springer.

Echterhoff, G., Higgins, E. T., & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology, 89,* 257–276. http://dx.doi.org/10.1037/0022-3514.89.3.257

Echterhoff, G., Higgins, E. T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science, 4,* 496–521. http://dx.doi.org/10.1111/j.1745-6924.2009.01161.x

Feinberg, M., Willer, R., Stellar, J., & Keltner, D. (2012). The virtues of gossip: Reputational information sharing as prosocial behavior. *Journal of Personality and Social Psychology, 102,* 1015–1030. http://dx.doi.org/10.1037/a0026650

Gadamer, H.-G. (1975). *Truth and method* (J. Weinsheimer & G. Marshall, Trans.). New York, NY: Continuum.

Gallup, G. G., Jr. (1970). Chimpanzees: Self-recognition. *Science, 167,* 86–87. http://dx.doi.org/10.1126/science.167.3914.86

Gazzaniga, M. S. (2008). *Human: The science behind what makes your brain unique*. New York, NY: HarperCollins.

Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. Cambridge, UK: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511808098

Gummerum, M., Leman, P. J., & Hollins, T. S. (2014). How do children share information in groups? *Developmental Psychology, 50,* 2105–2114. http://dx.doi.org/10.1037/a0037144

Harmon-Jones, E., & Harmon-Jones, C. (2007). Cognitive dissonance theory after 50 years of development. *Zeitschrift für Sozialpsychologie, 38,* 7–16. http://dx.doi.org/10.1024/0044-3514.38.1.7

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review, 10,* 88–110. http://dx.doi.org/10.1207/s15327957pspr1002_1

Hertwig, R., & Engel, C. (2016). Homo ignorans: Deliberately choosing not to know. *Perspectives on Psychological Science, 11,* 359–372. http://dx.doi.org/10.1177/1745691616635594

Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology, 13,* 141–154. http://dx.doi.org/10.1016/S0022-1031(77)80007-3

Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processors. *Psychological Bulletin, 121,* 43–64.

Hoppitt, W. J., Brown, G. R., Kendal, R., Rendell, L., Thornton, A., Webster, M. M., & Laland, K. N. (2008). Lessons from animal teaching. *Trends in Ecology & Evolution, 23,* 486–493. http://dx.doi.org/10.1016/j.tree.2008.05.008

Karlsson, N., Loewenstein, G., & Seppi, D. (2009). The ostrich effect: Selective attention to information. *Journal of Risk and Uncertainty, 38,* 95–115. http://dx.doi.org/10.1007/s11166-009-9060-6

Klein, N., & Epley, N. (2015). Group discussion improves lie detection. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 112,* 7460–7465. http://dx.doi.org/10.1073/pnas.1504048112

Koenig, M. A., Clément, F., & Harris, P. L. (2004). Trust in testimony: Children's use of true and false statements. *Psychological Science, 15,* 694–698. http://dx.doi.org/10.1111/j.0956-7976.2004.00742.x

Koenig, M. A., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development, 76,* 1261–1277. http://dx.doi.org/10.1111/j.1467-8624.2005.00849.x

Kuhn, D., Shaw, V., & Felton, M. (1997). Effects of dyadic interaction on argumentive reasoning. *Cognition and Instruction, 15,* 287–315. http://dx.doi.org/10.1207/s1532690xci1503_1

Landau, M. J., Solomon, S., Pyszczynski, T., & Greenberg, J. (2007). On the compatibility of terror management theory and perspectives on human evolution. *Evolutionary Psychology, 5,* 476–519. http://dx.doi.org/10.1177/147470490700500303

Larson, J. R., Foster-Fishman, P. G., & Keys, C. B. (1994). Discussion of shared and unshared information in decision-making groups. *Journal of Personality and Social Psychology, 67,* 446–461. http://dx.doi.org/10.1037/0022-3514.67.3.446

Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin, 116,* 75–98. http://dx.doi.org/10.1037/0033-2909.116.1.75

Mercier, H., & Sperber, D. (2011). Why do humans reason? Arguments for an argumentative theory. *Behavioral and Brain Sciences, 34,* 57–74. http://dx.doi.org/10.1017/S0140525X10000968

Nurmsoo, E., & Robinson, E. J. (2009). Children's trust in previously inaccurate informants who were well or poorly informed: When past errors can be excused. *Child Development, 80,* 23–27. http://dx.doi.org/10.1111/j.1467-8624.2008.01243.x

Paulhus, D. L., Harms, P. D., Bruce, M. N., & Lysy, D. C. (2003). The over-claiming technique: Measuring self-enhancement independent of

ability. *Journal of Personality and Social Psychology, 84,* 890–904. http://dx.doi.org/10.1037/0022-3514.84.4.890

Povinelli, D. J. (2000). *Folk physics for apes: The chimpanzee's theory of how the world works.* Oxford, UK: Oxford Univerisity Press.

Povinelli, D. J. & Eddy, T. J. (1996). What young chimpanzees know about seeing. Monographs of the Society for Research in Child Development (Vol. 61, No. 2, Serial No. 247).

Seyfarth, R. M., Cheney, D. L., & Marler, P. (1980). Vervet monkey alarm calls: Semantic communication in a free-ranging primate. *Animal Behaviour, 28,* 1070–1094. http://dx.doi.org/10.1016/S0003-3472(80)80097-2

Shapiro, J. P., Baumeister, R. F., & Kessler, J. W. (1987). Children's awareness of themselves as teasers and their value judgments of teasing. *Perceptual and Motor Skills, 64,* 1102. http://dx.doi.org/10.2466/pms.1987.64.3c.1102

Shteynberg, G. (2015). Shared attention. *Perspectives on Psychological Science, 10,* 579–590. http://dx.doi.org/10.1177/1745691615589104

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

Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology, 48,* 1467–1478. http://dx.doi.org/10.1037/0022-3514.48.6.1467

Suddendorf, T. (2013). *The gap: The science of what separates us from other animals.* New York, NY: Springer.

Tamir, D. I., & Mitchell, J. P. (2012). Disclosing information about the self is intrinsically rewarding. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 109,* 8038–8043. http://dx.doi.org/10.1073/pnas.1202129109

Tomasello, M. (2014). *A natural history of human thinking.* Cambridge, MA: Harvard University Press. http://dx.doi.org/10.4159/9780674726369

Tomasello, M. (2016). *A natural history of human morality.* Cambridge, MA: Harvard University Press. http://dx.doi.org/10.4159/9780674915855

Tomasello, M., Kruger, A. C., & Ratner, H. H. (1993). Cultural learning. *Behavioral and Brain Sciences, 16,* 495–511. http://dx.doi.org/10.1017/S0140525X0003123X

von Hippel, W., & Trivers, R. (2011). The evolution and psychology of self-deception. *Behavioral and Brain Sciences, 34,* 1–16. http://dx.doi.org/10.1017/S0140525X10001354

Webster, J., Brown, G., Zweig, D., Connelly, C. E., Brodt, S., & Sitkin, S. (2015). Beyond knowledge sharing: Withholding knowledge at work. *Research in Personnel and Human Resources Management, 27,* 1–37.

Wheeler, B. C. (2009). Monkeys crying wolf? Tufted capuchin monkeys use anti-predator calls to usurp resources from conspecifics. *Proceedings of the Royal Society of London, Series B: Biological Sciences, 276,* 3013–3018. http://dx.doi.org/10.1098/rspb.2009.0544

Wittenbaum, G. M., Hubbell, A. P., & Zuckerman, C. (1999). Mutual enhancement: Toward an understanding of the collective preference for shared information. *Journal of Personality and Social Psychology, 77,* 967–978. http://dx.doi.org/10.1037/0022-3514.77.5.967