

The Evolution of Insecurity

William von Hippel & John Merakovsky
Centre for Psychology and Evolution
School of Psychology
University of Queensland

Abstract:

To the best of our knowledge, *Homo sapiens* is the only species on the planet that can envision mutually contradictory futures, nested future scenarios, and unfelt needs. These capacities appear to have emerged more than 1.5 million years ago in our *Homo erectus* ancestors. These capacities played an outsized role in the human success story, as they enable us to simulate the future, thereby shaping our own destiny through the creation of complex plans. Nonetheless, these capacities have associated psychological costs, the most notable of which are anxiety and insecurity. An animal that cannot envision the future need not worry about it, but an animal that is aware of mutually contradictory future possibilities has a great deal to worry about. Nonetheless, the aversiveness of insecurity is highly adaptive, as it motivates people to shape the future in ways that enhance their security and safety. In this chapter we trace the evolution of insecurity, the nature of its experience among hunter gatherers, its role in the development of agriculture, and its manifestations in residents of modern nation states.

The evolution of foresight

To some degree the distinction between the immediate present and the immediate future is arbitrary, and particularly within the bounds of that arbitrariness it seems likely that all animals can envision the future. Indeed, animals tend to orient toward surprising events (McBride, 2012), providing clear evidence that they had expectations of the future based on their knowledge of the past (Suddendorf & Corballis, 1997). Thus, in a limited sense, all animals engage in prospection, envisioning a future that represents either a direct continuation of the present or a future that is shifted by the application of reliable rules that result in changes to the present (e.g., sunrise and sunset).

At least 1.7 million years ago, our *Homo erectus* ancestors evolved the capacity to simulate a more complex version of the future than can be achieved via associative learning alone. The clearest evidence for that capacity can be found in the Acheulean tools that our ancestors invented at that point in time. In contrast to the simpler Oldowan tools they had inherited from their ancestors, which are simply slightly sharpened stones, the Acheulean tools of *Homo erectus* required advanced planning to make. Not only does it take a fair bit of time to train people to create them, but when people who are trained to make them are asked what they would do next to finish a partially completed tool, fMRI reveals activation in frontal, planning regions of the brain and not just the motor cortex, which is activated when deciding how to finish Oldowan tools (Stout et al., 2015).

This capacity to simulate the future and use that simulation to make decisions would have given our ancestors an enormous advantage over the other animals on the planet. Once our ancestors gained the capacity to envision future events, they would have evolved the ability to represent mutually contradictory futures, which in turn would have enabled them to prepare for various contingencies (Redshaw & Suddendorf, 2016). Because mutually contradictory futures often entail desired versus undesired outcomes, our ancestors' preparations would have been designed to increase the odds of the former and decrease the odds of the latter. Perhaps the simplest example of this process involves creating carry bags to bring tools with you that you do not need now but might need later (Langley & Suddendorf, 2020). But deliberative practice would likely have evolved soon after we gained the capacity to envision alternative futures. Practicing a skill requires more foresight and self-control than simply bringing along one's favorite tools, but practice would have been a likely consequence of the ability to envision the future and the desire to be prepared for it (Suddendorf, Brinums, & Imuta, 2016).

Finally, once our ancestors had the ability to consider various futures and plan for them, they also gained the capacity to generate nested scenarios, envision how these scenarios might play out, and then make small (or large) tweaks to these simulations until they had developed a plan that seemed likely to succeed (Suddendorf, 2013). The power of these simulations becomes immediately apparent when we consider animals who cannot generate them. By way of example, consider an event that Jane Goodall (1986) witnessed when watching chimpanzees in the Gombe, Tanzania. The brief background to this story is that Melissa is a chimp who has just had a new baby, Passion is another chimp in Melissa's group, and Pom is Passion's adolescent daughter. Here is what Goodall wrote, in slightly abbreviated form:

Melissa, with her three-week-old female infant, climbed to a low branch of a tree. Passion and her daughter Pom cooperated in the attack; as Passion held Melissa to the ground, biting at her face and hands, Pom tried to pull away the infant. Passion then grabbed one of Melissa's hands and bit the fingers repeatedly, chewing on them. Simultaneously Pom,

reaching into Melissa's lap, managed to bite the head of the baby. Then, using one foot, Passion pushed at Melissa's chest while Pom pulled at her hands. Finally, Pom managed to run off with the infant and climb a tree. Melissa tried to climb also but fell back. She watched from the ground as Passion took the body and began to feed. Fifteen minutes after the loss of her infant, Melissa approached Passion. The two mothers stared at each other; then Melissa reached out and Passion touched her bleeding hand. An hour later Melissa again reached Passion, and the two females briefly held hands.

Hunter gatherer human groups have often faced similar problems of cannibalism, murder, or excessive bullying, but all human groups solve them by making plans to attack the perpetrators while they sleep or to unite the many against the few (Boehm, 2009). In contrast, due to chimpanzee's inability to make complex plans, Melissa appeared to have little choice but to reconcile with her daughter's killers. Furthermore, this wasn't an isolated incident. Passion and Pom continued to kill and eat infants in their group for years. One mother lost three babies in a row, and it was then that Goodall realized that only one infant had survived its first month in the group in the last three years. Despite the simplicity and predictability of Passion and Pom's attacks, none of the mothers devised a successful strategy for dealing with this pair of cannibals, and the mother-daughter team devastated the reproductive potential of their group.

Chimpanzees can and do form coalitions, but cooperation is not their preferred or default mode of problem solving (Bullinger et al., 2011; Mellis, Hare, & Tomasello, 2006). Chimps are also skilled manipulators, often using deception and other social strategies to gain status and avoid aggression (Byrne & Whiten, 1988). Nonetheless, their social capacities are severely limited by their inability to envision a future that contains unfelt needs and their inability to simulate nested scenarios. As a consequence, there is no evidence that chimps ever use their partial theory of mind skills to enhance cooperative success, even though they occasionally use these skills in service of conflict and competition (Tomasello et al., 2005). In contrast, humans have combined their theory of mind with an inherently cooperative nature and a capacity to envision the future, and in so doing have created groups that are much more than the sum of their parts. Only in humans does theory of mind provide the basis for enhanced social cooperation, communication, and teaching (Krupenye & Call, 2019). In contrast to other animals, who are locked in the present, the combination of these abilities gives us enormous power to shape our own future.

The psychological costs of foresight

Perhaps unsurprisingly, this capacity to envision the future and sometimes shape it comes with attendant costs. First, and perhaps most notably, because understanding the past helps us shape the future, humans are likely to spend a great deal of their mental lives reflecting on the past and envisioning possible futures (Suddendorf, Redshaw, & Bulley, in press). This proclivity to live in a time other than the present is not necessarily a problem in and of itself, but it does introduce problems, most notably anxiety and insecurity. In contrast to fear, which is an intense emotion that dissipates quickly once the threat disappears, anxiety and insecurity are concerns for possible threats that may emerge in the future. As a consequence, they are very difficult to ameliorate.

Anxiety and insecurity describe the subjective experience and emotional response to the mental construction of possible future threat scenarios (Miloyan et al., 2019). Anxiety manifests in different forms across the human lifespan, reflecting the specific vulnerabilities of each stage of life (Miloyan et al., 2019). During infancy, lack of proximity with the

protective adult attachment figure results in separation anxiety, and concomitant behavioral responses such as crying that draw the attention of caregivers (Bowlby, 1973). Once we enter childhood and adolescence we become much more independent, but even in adulthood we still rely heavily on our social relationships to ensure our productivity and survival. The ability to work toward group goals, engage in reciprocal relationships, and adhere to group norms and values, all contribute to an individual's social reputation, which was and is paramount for success in life (Romano et al., 2021). Indeed, the primary role of the self might be reputation maintenance (Baumeister, 2022).

Through this process of maturation from birth to adulthood, anxiety and insecurity shift from immediate survival concerns to broader concerns about reputation maintenance, threats to which lead to a form of insecurity known as social anxiety (Leary & Kowalski, 1997). Although social concerns might seem trivial in today's world, when physical survival is rarely a concern and hence coalition maintenance is no longer a matter of life and death, the processes that generate concern for these threats are the same today as they were in our ancestral past. For example, concerns with social reputation contribute to depression and suicidal ideation in adolescents (Wells et al., 2021).

Of course, thoughts of the future do not focus exclusively on factors that could go wrong, as people also spend a great deal of time thinking about how the future might pan out in desired ways and how to promote this possibility. This process evokes the emotion of hope, which is a uniquely human state that emerges from foresight and that motivates people to work optimistically toward a future goal. Hope represents an uncertain expectation of future goal achievement, often mediated through one's own agency. Given that humans traditionally achieved most of their goals through social cooperation (von Hippel, 2018), it is unsurprising that hope increases when people are in secure relationships (Moller et al., 2003).

Is Death Awareness an Inescapable Insecurity?

As should now be clear, once we evolved the capacity to envision the future we gained the capacity to shape it as well. This capacity comes at a notable psychological cost, in that humans spend a great deal of time worrying about unwanted future events. Nonetheless, from an evolutionary perspective, the aversiveness of worry is not a cost at all, as that aversiveness is what motivates and enables us to shape the future in ways that are beneficial to our survival and reproduction. Similarly, the more positive orientation toward the future – hope – also motivates and prepares us to be ready to capitalize on future opportunities. In combination, hope and worry lead us to form alliances, to practice, stockpile, and prepare, and more generally to engage in a wide variety of activities that might allow us to shape or at least exploit future events. Thus, from an evolutionary perspective, there seem to be no costs and only gains to the capacity to envision future events.

Unfortunately, there is an obvious exception to this rule. Our capacity to benefit by envisioning the future is limited to aspects of the future that can be exploited by our knowledge or shaped by our interventions. Knowledge of our eventual death is perhaps the most important aspect of the future that we cannot shape or easily exploit (beyond planning for its inevitability by leaving our assets to others). Although philosophers and eventually psychologists have studied how humans struggle with this knowledge for millennia, it is unclear why people respond to death as they do, and an evolutionarily informed theory remains elusive.

Building on Becker's *Denial of Death* (1973), Greenberg, Pyszczynski, and Solomon developed Terror Management Theory (1986), which outlines a variety of methods through which people attempt to cope with the inevitability of their own death. The proposed psychological processes that provide protection against fear of one's own death range from development of self-esteem (a sense of personal significance and value) through to the construction of worldviews like religion that are not constrained by the physical self.

There is substantial empirical support for various aspects of Terror Management Theory (e.g., Pyszczynski, Solomon, & Greenberg, 2015), but the possibility that religion is a cultural adaptation that circumvents death anxiety (through transcendence) is less clear. For example, as Boyer (2001) notes, the explanations provided by different religions to accommodate unseen or unknown causation of physical phenomena in our world (particularly those that threaten our existence), are often more complicated than the mysteries they attempt to explain. Similarly, if religion were a cultural response that serves to allay anxiety about our inevitable death, one would expect to encounter less terrifying religious world constructs than our material one, which is not the case (Boyer, 2001). Furthermore, although more recent and highly successful religions like Islam and Christianity often provide clear explanations of what happens after death and how to maximize one's chances of a happy afterlife, the religions common in small-scale societies typically do not have these features.

Finally, it is worth noting that from an evolutionary perspective, survival is important only insofar as it enables successful reproduction. We can only experience our own death once, but we can experience the highly costly deaths of those close to us, particularly our offspring, many times – and indeed our ancestors lost nearly half of their offspring before they reached adulthood (Gurven & Kaplan, 2007). Thus, if there is a hierarchy of anxieties, and if that hierarchy is rooted in factors that threatened us in our ancestral past, then death anxiety would not sit at the top (Boyer, 2001). Rather, the anxiety of losing offspring might have been paramount. Or perhaps insecurity in the ability to attract a mate in the first place might have been more important, as a mate is a necessary precursor to worrying about one's children. Extending this line of thinking, perhaps the more general concern about one's social reputation might have been the greatest evolutionary threat that our ancestors faced, as mating and survival both depend on our social reputation. Dealing with these insecurities required specific strategies, whereas a generalized death anxiety would have provided little to no value.

Fortunately, the attachment system provides some protection from these sources of insecurity. Attachment behaviors evolved to help human infants survive to adulthood (Simpson & Belsky, 2018) by obtaining proximity to their caregiver, which in turn provided them with food, safety, and the opportunity to learn the huge amount of information necessary to survive in ancestral environments. Unlike in other great apes, the attachment system does not become dormant in adolescence, as it appears to have been co-opted by natural selection in the form of pair-bonded romantic relationships that facilitate bi-parental care (Belsky, 2007; Fraley et al., 2005). But the attachment system goes well beyond romantic relationships, as humans rely on extensive friendship networks, ancestrally and today, to achieve their major life goals. Social and cultural learning, which lie at the foundation of human success, depend on attachment to other group members and to mentors who take a special interest in our success (Boyd, 2017; Laland, 2017).

Anxiety and Insecurity among Hunter Gatherers

Food insecurity negatively impacts physical, social, emotional, and cognitive development in humans, and our survival as species has always depended on obtaining a sufficient quantity and quality of food to serve the caloric demands of our large brains. The high nutritional density of meat, compared to plants, thus played a critical role in our survival on the savannah, but even the best hunters are more likely to fail than succeed on any one hunt. As a consequence, our ancestors learned the value of obligatory sharing of the proceeds of the hunt. Additionally, given the propensity of meat to spoil quickly in low latitudes, the cost of sharing the proceeds of the hunt was comparatively low and easily offset by the future gains of reciprocal sharing from others. Thus, one of the universal dimensions of hunter gatherer life in immediate return societies (those in which people have limited capacity to store food, and hence eat today what they killed today) is universal sharing of the proceeds of the hunt (Boehm, 2009). In this sense, cooperation became the primary behavioral strategy for offsetting the most important source of insecurity among hunter gatherers.

Obligatory food sharing is a great equalizer in hunter gatherer societies, but it does not completely level the playing field. Hunter gatherer groups are nomadic and they frequently split up and rejoin as they move from one location to another, following game and avoiding conflict with other groups. As a consequence of mandated sharing, the best hunters are not really better fed than other members of their group, but they do have the advantage that whatever group they are in will always have at least one good hunter. Thus, another universal strategy for avoiding insecurity about potential starvation is for humans to value hunters (particularly the best ones) in their group. Because hunting large game is also much easier for people who are not primary caregivers of small children, hunting is primarily a male activity and thus males are the ones who benefit from the esteem awarded to good hunters.

Perhaps the most notable evidence of the high esteem in which the best hunters are held is their greater reproductive success (Rueden & Jaeggi, 2016; Smith, 2004). Although widespread food sharing and the inability to accumulate material wealth are hallmarks of hunter gatherer lifestyles, less successful hunters still have less access to mates due to their lower status. The end result of this combination of biological and cultural evolution is that planning enabled highly effective forms of hunting, which was then enhanced by obligatory sharing of the proceeds of the hunt. This universal strategy combatted food insecurity among our ancestors, but the varying abilities of individual hunters resulted in unequal social status and a resultant rise in status insecurity due to the strong relationship between status and mating success.

Lower status males have limited options in dealing with this form of insecurity, which is based in an insecurity about their capacity to attract a mate. Fortunately, males can attract females through qualities other than their hunting prowess, as cooperativeness, kindness, and a willingness to care for others are nearly as important as hunting skills in ensuring the survival of one's family. Thus, an effective approach for attracting a partner among less skilled hunters is to increase the degree of provisioning and investment in biparental care (Kokko & Jennions, 2008). Due to the importance of such paternal care, females would have valued partners who would provision their young, thereby providing a mating strategy for lower status males (Gavrilets, 2012). Nevertheless, lower status men are less likely to marry and are at greater risk of cuckoldry. Given that conception is internal, and females are often motivated to seek additional partners for a host of reasons (Greiling & Buss, 2000), the risk of cuckoldry (and more broadly of relationship dissolution) introduces other forms of anxiety

and insecurity, particularly for low status individuals. The evolution of jealousy, mate guarding, and other strategies to minimize the loss of reproductive opportunities are a direct response to these forms of insecurity (Buss & Haselton, 2005).

In addition to these forms of insecurity, our hunter gatherer ancestors also had to contend with the risks of pathogens, parasites, and predation. Although the latter are visible, successful predators are capable of remaining undetected until it is too late to avoid them, with the result that the three P's would have killed many of our would-be ancestors before they even knew they were at risk. These invisible (and nearly invisible) health and safety concerns would have been a major and ongoing source of insecurity, given the impossibility of avoiding them completely.

Perhaps unsurprisingly, these threats to our existence were more pressing prior to adulthood, by which point our immune system was stronger and our ability to protect ourselves from predators was at its maximum. Survival curves of hunter gatherer societies show that humans were particularly likely to die in childhood, with an average of about 40% never making it to adulthood (Gurven & Kaplan, 2007). Thus, it comes as no surprise that anxiety and insecurity are a common response in children to the absence of their caregiver (Bowlby, 1973), as our ancestors were at the greatest risk when they were immature and relied on adult nurturance and support.

Insecurity and the Greatest Inflection Point in Human History

As discussed above, hunter gatherers felt many of the same insecurities that we experience today – status insecurity, anxiety about being left out of the mating game, and worries about sickness. The latter concern has been mitigated (although not eliminated) by modern medicine, but the former concerns remain common. Nonetheless, hunter gatherers' primary source of day-to-day insecurity, the worry about starvation, is no longer relevant for humans who have the good fortune to live in wealthy countries. The watershed event that eventually eliminated our worries about starvation was the development of agriculture, and indeed, people started planting seeds precisely to address the ever-present risk of starvation inherent in any immediate return society.

The invention of agriculture was clearly an idea whose time had come, given that societies in both the Middle East and China began agriculture at approximately the same time, twelve thousand years ago. Some data suggest that humans began planting food as soon as the climate was stable enough to enable farming (e.g., Feynman & Ruzmaikin, 2007), suggesting that it was the execution that was the primary challenge – not the idea itself. Although stuffing seeds into the ground so you know where the plants will grow may not be rocket science, the consequences were extraordinary. Agriculture had a far bigger impact on human lives than simply alleviating food insecurities, as it indirectly led to the development of cities, writing, science and technology, etc. Our ancestors who first started farming received none of these benefits, but the invention of agriculture is the single largest inflection point in the history of *Homo sapiens*.

As with other dramatic change in lifestyle, the invention of agriculture solved one problem (food insecurity) but introduced many others. Our hunter gatherer ancestors were probably largely indifferent to the weather (with the exception of long-term droughts and deadly floods), but the inevitable variability in rainfall in most temperate regions of the globe provided a new and important source of insecurity. Even when poor weather was not bad enough to cause everyone to starve, it could still easily be the ruin of any one family of

farmers. Similarly, pests like locusts and rats are of little concern to nomads, but they are deadly threats to farmers who store their food over the winter.

Animal husbandry, or the practice of farming animals rather than hunting them, was a similarly huge advance in stabilizing and expanding human food sources, but it too introduced a new set of problems. Most notably, living cheek by jowl with large numbers of domesticated animals introduced an apparently endless source of pandemics, as diseases that leap from animals to humans are often those against which we have limited or no immunities.

Despite these risks inherent in agriculture, the benefits clearly outweigh the costs, as the carrying capacity of the land (the number of humans who can live in a square kilometer) greatly increased with the advent of agriculture and the subsequent development of cities. Where once all humans were engaged in efforts to secure food for their livelihood, initially as hunter gatherers and then as farmers, the increased efficiency of agriculture eventually released most people from the direct production of food so they could focus their efforts elsewhere. As a consequence, the nature of our insecurities has shifted rather dramatically, as having enough to eat is no longer a source of concern for most people.

Insecurity in Modern Nation States

The creation of cities, and subsequently nation states, played a central role in the development of writing, the arts and sciences, and almost all other modern human pleasures, but cities come with their own unique costs as well. Prior to the advent of cities, everyone spent their lives surrounded by people they knew well. With the move to cities, for the first time in human history we began to spend our lives surrounded by strangers. Not only did this shift require a dramatic change in our psychology and cultural rules to accommodate our new existence (Henrich, 2020), but it also led to an important source of insecurity. People who are well known to us are understood risks and opportunities, but people who are unknown to us represent risks that are very difficult to calculate. Most are harmless, but assuredly all are not.

In response to this situation, humans invented a wide variety of new social mores as well as new laws and new enforcers of those laws. Hunter gatherers had no police or formal government, in part because they spent their lives negotiating solutions to their problems directly with one another. Once we began to live in a world full of strangers, the development of impartial rules became much more important for the effective functioning of society, in large part because people are tempted to treat each other poorly if they are not known to each other and may never meet again. But trust is the basis of every well-functioning society, so a wide variety of rules and enforcers became necessary to enable sufficient trust for a functioning market economy. Thus, to a large degree, the insecurities introduced by the ubiquity of strangers led to the creation of governance and law enforcement. The presence of laws and police might not eliminate the insecurities that humans feel, but they have made the world much safer than it used to be when we were all hunter gatherers (Pinker, 2011), suggesting that felt insecurities and actual risks do not always track each other accurately.

Our increased safety is a very modern phenomenon; the immediate (and unfortunate) consequence of the development of cities was that humans began dominating one another in their efforts to be sure they benefitted from governance and law enforcement. Hunter gatherers are fiercely egalitarian, and their nomadic way of life made it very difficult for any one person to enforce his will on anyone else. In contrast, once humans settled into farms and cities, our sedentary lifestyle and capacity to accumulate and store goods made it much easier for powerful people to exploit others. As a result, cities led to enormous inequality and

despotism. It might seem that both would be rare, as the many who are poor and individually powerless could always take from the few who are rich and powerful. In practice, however, that has proven difficult, largely due to the networks of kin and allies that powerful leaders are able to foster and maintain through bribery and threat (Chagnon, 2013). Furthermore, and importantly, because anarchy is often much worse for people's health and safety than despotic leaders, city dwellers eventually learned to trade their freedom and egalitarianism for inequality and despotism, even though no one wanted either (Hobbes, 1651).

The final source of insecurity that developed in modern nation states was again an unintended consequence of the benefits wrought by science. Our hunter gatherer ancestors worried every day about whether they would get enough to eat, but they never worried about their place in the universe. Their religions answered that question for them by linking them to family, to other life forms on earth, and most importantly, to their ancestors who were no longer living and their progeny who were not yet born. In this sense, their existence placed them in an unbroken chain from the past to the future, which connected them to a world that mattered. Scientific progress has broken that chain of meaningful connections and replaced it with a string of mindless processes that yielded our species and every other one via random chance, with our own particular existence being of negligible meaning or significance. In so doing, scientific advances also made religion less central in many of our lives, thereby replacing our previous understanding of our role in the universe and our importance and connection to a larger purpose with the uncomfortable reality that we are a trivial member of a trivial species living on one of many trillions of planets scattered among billions of galaxies.

Having indirectly demolished our understanding of our role in the universe via the creation of science, cities then began asking much more of us. People today are faced with an array of life choices never imagined by our ancestors, who never questioned what they would do for a living because everyone did much the same thing. Although our distant ancestors frequently faced uncertainty, they had little or no choice regarding their occupation, where they would live, the people with whom they would affiliate, etc. As a result, in our deep past, the struggle to find our place in society was limited to a few well-understood domains, such as whether a particular individual would try to be the best hunter, craftsman, or storyteller (keeping in mind that everyone engaged in all of these activities at least some of the time).

Modern living has introduced massive changes from one generation to the next, which in turn has put a much greater premium on individual life choices. For many people, the most important of those choices is finding and then pursuing their passion. The chance to pursue your passion in almost any direction is an enormous opportunity, but it is also a significant threat. People are expected to discover their calling among a seemingly endless array of opportunities – a process that can be both daunting and confusing. At the same time, our increased wealth, education, and urban living have reduced the depth of our connections to other members of our group.

As a result, modern humans experience a form of insecurity that our ancestors never encountered and that probably would make no sense to them. This insecurity is experienced as an almost overwhelming sense of choice in who we will become, which is then exacerbated by the fact that our diminished connections have left us bereft of the guidance that our ancestors could have sought had they been faced by these choices. For those of us who are lucky enough to discover our passion early in life, the freedom to go in any direction is an incredible gift. But for many of us, this freedom is a major source of insecurity, as every choice to pursue one possibility simultaneously represents the loss of countless others.

References

- Baumeister, R. F. (2022). *The self explained: Why and how we become who we are*. Guilford Publications.
- Becker, E. (1973). *The Denial of Death*. Simon and Schuster.
- Belsky, J. (2007). Childhood experiences and reproductive strategies. In R. Dunbar & L. Barrett (Eds.), *Oxford handbook of evolutionary psychology* (pp. 237–254). Oxford, UK: Oxford University Press.
- Boehm, C. (2009). *Hierarchy in the Forest: The Evolution of Egalitarian Behavior*. Cambridge, MA: Harvard University Press.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. New York: Basic Books.
- Boyd, R. (2017). *A different kind of animal: How culture transformed our species*. Princeton, NJ: Princeton University Press.
- Boyer, P. (2001). *Religion explained: the evolutionary origins of religious thought*. Basic Books.
- Bullinger, A.F., Melis, A. P., & Tomasello, M. (2011). Chimpanzees, Pan troglodytes, prefer individual over collaborative strategies towards goals. *Animal Behaviour*, 82(5), 1135–1141.
- Buss, D. M., & Haselton, M. (2005). The evolution of jealousy. *Trends in Cognitive Sciences*, 9(11), 506-506.
- Chagnon, N. A. (2013). *Noble savages: my life among two dangerous tribes--the Yanomamo and the anthropologists*. Simon and Schuster.
- Feynman, J., & Ruzmaikin, A. (2007). Climate stability and the development of agricultural societies. *Climatic Change*, 84(3), 295-311.
- Fraley, R.C., Brumbaugh, C. C., & Marks, M. J. (2005). The Evolution and Function of Adult Attachment. *Journal of Personality and Social Psychology*, 89(5), 731–746.
- Gavrilets, S. (2012). Human origins and the transition from promiscuity to pair-bonding. *Proceedings of the National Academy of Sciences*, 109(25), 9923–9928.
- Goodall, J. (1986). *The Chimpanzees of Gombe: Patterns of Behavior*. Cambridge, MA: Harvard University Press.
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. In *Public self and private self* (pp. 189-212). Springer, New York, NY.
- Greiling, H., & Buss, D. M. (2000). Women's sexual strategies: The hidden dimension of extra-pair mating. *Personality and Individual Differences*, 28(5), 929-963.

Gurven, M., & Kaplan, H. (2007). Longevity Among Hunter- Gatherers: A Cross-Cultural Examination. *Population and Development Review*, 33(2), 321–365.

Henrich, J. (2020). *The WEIRDest people in the world: How the West became psychologically peculiar and particularly prosperous*. Penguin UK.

Hobbes, T. (1651). *Leviathan or The Matter, Forme and Power of a Commonwealth Ecclesiasticall and Civill*. London: Andrew Crooke.

Kokko, H., & Jennions, M. D. (2008). Parental investment, sexual selection and sex ratios. *Journal of Evolutionary Biology*, 21(4), 919–948.

Krupenye, C., & Call, J. (2019). Theory of mind in animals: Current and future directions. *Wiley Interdisciplinary Reviews. Cognitive Science*, 10(6), e1503–n/a.

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

Langley, M. C., & Suddendorf, T. (2020). Mobile containers in human cognitive evolution studies: Understudied and underrepresented. *Evolutionary Anthropology: Issues, News, and Reviews*, 29(6), 299-309.

Leary, M. R., & Kowalski, R. M. (1997). *Social anxiety*. Guilford Press.

McBride, G. (2012). Ethology, Evolution, Mind & Consciousness. *Journal of Consciousness Exploration & Research*, 3(7), 830-840.

Melis, A. P., Hare, B., & Tomasello, M. (2006). Engineering cooperation in chimpanzees: tolerance constraints on cooperation. *Animal Behaviour*, 72(2), 275-286.

Miloyan, B., Bulley, A., & Suddendorf, T. (2019). Anxiety: Here and Beyond. *Emotion Review*, 11(1), 39–49.

Moller, N.P., Fouladi, R. T., McCarthy, C. J., & Hatch, K. D. (2003). Relationship of Attachment and Social Support to College Students' Adjustment Following a Relationship Breakup. *Journal of Counseling and Development*, 81(3), 354–369.

Pinker, S. (2011). *The Better Angels of Our Nature: The Decline of Violence in History and Its Causes*. London: Penguin UK.

Pyszczynski, T., Solomon, S., & Greenberg, J. (2015). Thirty years of terror management theory: From genesis to revelation. In *Advances in experimental social psychology* (Vol. 52, pp. 1-70). Academic Press.

Redshaw, J., & Suddendorf, T. (2016). Children's and apes' preparatory responses to two mutually exclusive possibilities. *Current Biology*, 26(13), 1758-1762.

Romano, A., Giardini, F., Columbus, S., de Kwaadsteniet, E. W., Kisfalusi, D., Triki, Z., ... & Hagel, K. (2021). Reputation and socio-ecology in humans. *Philosophical Transactions of the Royal Society B*, 376(1838), 20200295.

Simpson, J.A., and Belsky, J. (2016). Attachment theory within a modern evolutionary framework. In *Handbook of Attachment, Third Edition: Theory, Research, and Clinical Applications*, edited by Jude Cassidy, and Phillip R. Shaver, Guilford Publications, 2016.

Smith. (2004). Why do good hunters have higher reproductive success? *Human Nature* (Hawthorne, N.Y.), 15(4), 343–364.

Stout, D., Hecht, E., Khreisheh, N., Bradley, B., & Chaminade, T. (2015). Cognitive Demands of Lower Paleolithic Toolmaking. *PLoS One* 10, no. 4: e0121804.

Suddendorf, T. (2013). *The gap: The science of what separates us from other animals*. Constellation.

Suddendorf, T., Brinums, M., & Imuta, K. (2016). *Shaping one's future self: The development of deliberate practice*. Oxford University Press.

Suddendorf, T., & Corballis, M. C. (1997). Mental Time Travel and the Evolution of the Human Mind. *Genetic, Social, and General Psychology Monographs*, 123(2), 133-167.

Suddendorf, T., Redshaw, J., & Bulley, A. (in press). *The Invention of Tomorrow: Foresight and the Human Quest to Control the Future*. NY: Basic Books.

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

von Hippel., W. (2018). *The Social Leap*. NY: HarperCollins.

Von Rueden, C.R., & Jaeggi, A. V. (2016). Men's status and reproductive success in 33 nonindustrial societies. *Proceedings of the National Academy of Sciences*, 113(39), 10824–10829.

Welch, R.D., & Houser, M. E. (2010). Extending the four-category model of adult attachment: An interpersonal model of friendship attachment. *Journal of Social and Personal Relationships*, 27(3), 351–366.

Wells, G., Horwitz J., Seetharaman D. The Facebook Files. *Wall Street Journal*. Sep 14, 2021.