From: Dunbar, R., Barrett, L., & Lycett, J. (2005). *Evolutionary psychology: A beginner's guide*. Oneworld.

~~Interestingly, altruism is one of the few areas that has been given equal attention by evolutionary biologists and social psychologists. Psychologists have been interested in identifying the factors that cause individuals to act co-operatively and help one another altruistically. The in-group effect we described above, whereby people show a strong tendency to identify with and help others whom they perceive as belonging to the same group, is an extremely robust phenomenon, and has been studied by social psychologists for more than half a century. It can be produced even when groups are designated on the basis of quite arbitrary criteria (being allocated one geometric shape versus another or on the basis of preferences for paintings by Picasso over those by Matisse).~~

~~These psychological traits are the kinds of things that might be selected for at the level of the group and could help give one group a competitive advantage over another by increasing the cohesiveness of the group and making individual members more willing to defend and protect their group mates. Such traits can also help increase group harmony overall, so that the stresses and tensions of group living are reduced, which in turn can increase the relative reproductive success of a cohesive group over a fragmented one.~~

Niche construction theory

One last evolutionary theory that we need to mention before we start reviewing human psychology and behaviour in earnest is Niche Construction Theory (NCT). Like multi-level selection, NCT is particularly pertinent to issues of human evolution, both anatomical and psychological. John Odling-Smee, who has been working on the ideas behind this theory for many years, coined the phrase 'niche construction' to get across the central point that animals do not passively occupy ecological niches but actively modify them.

Active modification of an ecological niche by an organism changes the selection pressures that act on the organism itself: in effect, individual organisms may become the engineers of their own evolution. Spider's webs, for example, modify the selective environments of the spiders that spin them, creating new opportunities for selection to act. Other forms of niche construction modify the selective environment of the constructing organism's descendants. For example, there are many insects that provide their eggs with food. They may lay their eggs on a leaf, or even, in the case of parasitoids, in the body of another organism. In such cases, the modified niche is an example of what Odling-Smee and his colleagues, Kevin Laland and Marcus Feldman, call 'ecological inheritance'. Ecological inheritance can have a profound effect on the evolutionary process since it represents a second form of inheritance that differs from standard genetic inheritance. Inheritance of land, chattels, money and status play an especially important role in human societies and may thus represent a particularly dramatic example of this process.

In other words, ancestral organisms can also transmit phenotypically modified habitats to their descendants, as well as their genes. If these ecologically inherited niches remain stable over time (that is, the process of ecological inheritance persists across generations) then they will result in new selection pressures being applied to organisms and new forms of adaptation arising, which may then lead to further modification of the niche by the organism. This, in turn, implies that environments can evolve as well as organisms.

Niche construction, then, is essentially a feedback process, and it is this feedback which gives it its evolutionary significance. Theoretical analyses using population genetic models have shown that traits whose fitness is affected by niche construction (so-called recipient traits) co-evolve with the niche-constructing traits themselves. In our own history, for example, the evolution of stone tools (a niche constructing trait) expanded the range of foods that early humans were able to eat (to include meat and bone marrow), thus selecting for changes in our digestive morphology and relieving a constraint on the evolution of brain size. Tool use, dietary changes and brain size continued to co-evolve and feed back on each other in evolutionarily significant ways.

Niche construction means that adaptation is no longer a one way process, whereby organisms respond exclusively to environmentally imposed problems but becomes two way, with populations of organisms setting problems for themselves, as well as solving problems set by the environment.

This has important implications for how we view evolution, since it enables experiences that an animal undergoes during its life to have an effect on the evolutionary process. When organisms niche construct, they become more than just 'vehicles for genes' because they are now able to modify the sources of natural selection that are present in the environment and so have some responsibility for selecting their own genes. Moreover, there is no need for niche-constructing activities to be genetically specified. Learning, and other forms of experience, may lead to animal niche construction; in humans, it may also depend on culture.

It should now be clear why niche construction is so relevant to an explanation of human evolutionary ecology and behaviour. We show a more diverse and sophisticated form of culture than any other species on the planet, and we have been constructing our own niche for hundreds of millennia – since, at the very least, the time we first invented tools, around two million years ago. The philosopher Matteo Mameli has argued that other humans may also have played a powerful niche constructing role during the course of human evolution, shaping our psychology and in particular our mind-reading abilities – our ability to attribute thoughts, feelings, beliefs and desires to others – so that today, human psychological development is utterly dependent on the presence of other human minds for its normal expression: we are 'mind-shapers', as well as mind-readers (we will deal with this idea in more detail in Chapter 5).

However, as the philosopher Kim Sterelny points out, the fact that we have been constructing our niche for so long does raise some problems for understanding the evolution of human cognition, because it means that humans have, to some extent, freed themselves from the constraints imposed by the environment. Thus, while we might attempt to reconstruct the ecology of a species from a knowledge of habitat, weather conditions, predator densities and the like, this may be much more difficult when trying to understand patterns of human evolution, because much of our evolutionary history has been spent constructing our own niche, rather than being shaped by independent features of the natural environment. The selective environment of humans may therefore have been very changeable, even during periods when the physical environment remained entirely stable. For example, once hominids invented a means of carrying water with them, they were freed from the selection pressures imposed by increasing aridity in the physical environment. If this happened on a small local scale, it would leave few traces in the fossil record and make it difficult to determine the exact evolutionary course that humans had taken at this point.

Sterelny therefore suggests that we need to use a diversity of methods to probe the evolution of human cognition, including experimentation, modelling and computation, comparative studies of other species, archaeology and task analysis (where the cognitive demands of particular tasks are identified). It is also important to understand the adaptiveness of current behaviour, since this helps to reveal how our niche-constructing abilities influence the behavioural strategies that people follow, the cues people use to guide these strategies and the plasticity that people can display in the face of environmental constraints. Combining behavioural studies of humans with experimental psychology, along with the historical sciences of palaeoanthropology and archaeology, allows us to constrain the degrees of freedom we have in constructing a plausible scenario and moves us from 'Just-so' story-telling to hypothesis formation and testing. This is by no means an easy task and we are still very far from having achieved it. Conversely, the fact that the situation is more complex than we might originally have imagined does not, of itself, make the task impossible.

~~The human revolution~~

~~This brings us to one final issue – the history of human evolution. This is important to our discussion for two reasons. One is that, building on Tinbergen's *Four Whys*, understanding the historical origins of our behaviour and psychology may help us appreciate their functional (or adaptive) significance. The other is that a particular view of human evolutionary history has come to occupy a more prominent position in evolutionary psychology than it really deserves.~~

~~Our lineage, the hominid (or in some terminologies, hominin) lineage, is a member of the African Great Ape clade (or family). Indeed, we share a more recent common ancestor with the chimpanzees than either of us shares with the other two Great Apes (the gorilla and orang-utan). According to the genetic evidence, the human and chimpanzee lineages separated some time around 5–7 million years ago (MYA). Since there is little fossil material from that period and what little there is is controversial, we are not able to say very much about this period of our history other than that we come from a fairly typical Great Ape line. The earliest known members of the hominid lineage for which there is plentiful fossil evidence (the australopiths of the genera *Australopithecus* and *Paranthropus*) are in many ways (but especially in terms of brain size) fairly standard apes. They differed from our Great Ape cousins only in that they walked bipedally, whereas apes normally walk quadrupedally (on four legs).~~

~~The big change came around 2.5 MYA, with the emergence of the genus *Homo*, to which modern humans belong. This was~~