



FEATURE 18 December

2018

Toys are us: How childhood objects may have shaped human history

Tantalising evidence hints that key human innovations including the wheel and weaving were the outcome of, quite literally, child's play



Playing fosters imagination, a crucial ingredient in technological innovation

Kelly Davidson/Plainpicture

By David Robson

FEW origin stories are as perplexing as the invention of the wheel. Thomas Edison famously claimed that genius is 1 per cent inspiration and 99 per cent perspiration – for our ancestors, it was the 99 per cent that posed a problem. Even after they realised they could move objects with a rolling motion, they needed to refine their engineering skills enough to build a wheel that actually worked.

“Making a full-scale wheel takes a lot of physical resources, it takes a lot of time, it takes a lot of skill,” says Felix Riede, an archaeologist at Aarhus University in Denmark. But how could any prehistoric inventor have afforded to pour so much blood, sweat and tears into experimentation when there were mouths to feed?

Inspired by his young son, Riede has come up with a surprising solution. He thinks that the skills required for technological innovation were honed through play. While the adults went about the serious work of ensuring the group’s survival, youngsters naturally experimented with the objects around them. If Riede is right, some of humanity’s most important inventions – including the wheel, weaving and projectile weapons – have their roots in children’s toys.

“Some of humanity’s key inventions could have their roots in children’s toys”

The idea that toys shaped humanity builds on a growing understanding of just how important play has been to the evolution of our brains. Analyses of remains such as teeth from ancient hominins show that our species, *Homo sapiens*, enjoys an unusually long childhood. An extended infancy gives more time for imaginative play, which has been shown to train many important cognitive skills, including counterfactual thinking – the ability to ask “what

if...” – and the capacity to envisage different scenarios. According to [April Nowell at the University of Victoria in Canada](#), this might explain why we are the only species with such a rich symbolic and artistic culture.

Surprisingly, however, no one had examined toys in the archaeological record as objects that might have influenced the cognitive development of our ancestors – until Riede was inspired by the rising tide of plastic around his sons. “As soon as you have children, your home becomes flooded with playthings,” he says. This is not limited to the West: in almost every modern society, children play with miniature versions of adult objects.

A few psychological studies have shown that the characteristics of toys can have a direct influence on the cognitive development of children. In one experiment, kids playing with open-ended toys – building blocks that can be put together in many different ways, rather than ones forming a particular structure – tended to be better at solving so-called “divergent” problems. These require us to generate many solutions, such as finding new uses for a familiar object. Playthings can also help a child understand mechanical properties, such as the motion of a rolling ball, and practise social roles, such as parenting a doll. “Toys facilitate and also limit the kinds of cognitive activities and thinking that children engage in,” says Riede.

According to his hypothesis, prehistoric toys allowed children to explore new uses and adaptations of familiar objects while they played. This would have equipped them with greater technological understanding and the more-flexible outlook that underpins greater creativity. “It’s this cognitive priming that loads the dice in favour of an innovation that actually works,” says Riede. If he is right, you would expect to see some trace of this process in the archaeological record, with the presence of certain toys somehow pre-empting big cultural shifts in related technologies.

Inspired by play

It is early days for this idea, but Riede, Nowell and their colleagues recently published a paper outlining some intriguing case studies. For instance, examining the archaeological records of communities living in Greenland from around 4500 years ago, they found that the early colonisers lacked toys and also showed little innovation in their material culture, whereas the Thule, who migrated into Greenland around 800 years ago, had many miniature objects that appear to have been designed specifically for child's play, including toy kayaks, sledges, weapons and dolls. Their appearance seemed to coincide with an explosion of new adult technologies, such as advanced designs for harpoons, sophisticated boats and elaborate clothes. The chronology isn't refined enough to determine which emerged first, the toys or the advanced technology, but Riede thinks the two may have grown together, with the richer material culture inspiring new play objects, which in turn primed the young minds for further innovation.

The team also points to sites in Western Cape, South Africa, dating back 60,000 to 80,000 years ago. Analyses of rock fragments suggest that novices, presumably children, were mimicking the adults' stone knapping, producing crude and functionally useless copies of real tools. This "play-copying" again seems to coincide with sophisticated new technologies, including the first arrowheads, suggesting that the childhood games might have sparked greater cultural innovation.

Meanwhile, spinning whorls essential for the production of fabrics may have been inspired by "rondelles", threaded discs engraved with pictures of animals. Archaeologists believe that these discs, found in Europe during the Late Stone Age, would have spun around the thread to alternate between the images on either side, a bit like a prehistoric flick-book. "There is cognitive overlap between the idea of these spinning discs and the idea that you can use rotation for a purpose – to make fibres,"

says Riede.



Jason Raish

It is the invention of the wheel, however, that offers the most compelling support for Riede's idea. The oldest evidence of wheeled vehicles suggests that the technology emerged around 5500 years ago, across western Eurasia – in the northern Caucasus, Mesopotamia and central and northern Europe. But some two centuries beforehand, we see small models of animals with holes drilled through their feet for an axle, and ceramic discs that functioned as wheels. The tops of the animals were hollowed, leading to the suggestion that they were ornate drinking vessels, perhaps used during rituals. But given their size and the fact that miniature animals are playthings in many modern cultures, Riede believes that they were toys. “You could easily call them quite cute,” he says.

If so, like any toddler with a train set today, children playing with those toys would have been getting to grips with the mechanics of rotary motion. They might have used their toys to carry various objects, and practised different ways of propelling them – from the front or the back, or letting them roll down a slope. They might even have experimented with wheels of different sizes, or made from different materials. As the children grew up, those same skills would have helped them make the cognitive leap necessary to imagine a wagon, whereas a society that lacked those toys would have struggled to

envisage a workable design.

“A society that lacked toys with wheels would have struggled to envisage a workable wagon”

Perhaps the early inventors even used toys to produce prototypes. “You could easily make 100 of these miniature figures, all different, play around with them – quite literally – and then see what sort of design works best,” says Riede.

Archaeologist Michelle Langley at Griffith University in South East Queensland, Australia, agrees that the idea is worth further study. “You don’t just wake up one day as an adult, able to do all these things. You need to practise and to get familiar with the raw materials and how they work,” she says. “There’s this big learning process and you need to start young.”

Like Riede, Langley has been inspired by her own child’s behaviour. She recently published an article arguing that various archaeological objects, including rondelles and clay figurines often seen as ritual objects, should be reinterpreted as playthings. Animal figures, for instance, might have been important to teach children about hunting. “It’s easier when you have these little props.”

Langley is currently designing a study that will involve giving replicas of prehistoric objects to small children to help determine the characteristic patterns of wear and tear that come with play – whether they become smooth and polished, or cracked and chipped, for instance. This should then allow archaeologists to better identify which artefacts really were toys, perhaps providing further evidence for Riede’s hypothesis.

Riede, Langley and Nowell are now planning to

organise a conference in Australia that will draw together scientists from diverse disciplines to explore exactly how children, so long overlooked by archaeologists, drove cultural change. Riede is excited about what they might find. “We need to look at the stuff we already have with new eyes and from a different angle because the children’s material culture is really important for understanding long-term trajectories of innovation and creativity,” he says.

If they are right, our greatest advances might truly have been child’s play.

Fight clubs

Team sports have long been known to bring out our tribal instincts. But did they first emerge to train us for warfare? That’s the hypothesis of Michelle Scalise Sugiyama at the University of Oregon.

She scoured the ethnographic record for information about the physical strategies used by traditional societies during their typical battles, such as when they raid another camp. Her final list of eight items included moves such as kicking, striking and blocking blows to the body, throwing and dodging objects, and group coordination. “They have to track the behaviours and infer the intentions of multiple individuals,” says Scalise Sugiyama. She then compared this list with ethnographic accounts of team games, many of which resembled Western sports such as rugby.

Sure enough, 36 per cent of the societies played a game incorporating at least half of the strategies that are crucial for battle. Scalise Sugiyama thinks this is probably an underestimate because anthropologists sometimes see such games as trivial activities. “If you’re lucky, you get a couple of pages of information,” she says. But if team sports do serve an important evolutionary function, we should take play more seriously.

This article appeared in print under the headline “R toys us?”

David Robson believes
this is an idea worth toying
with

Magazine issue 3209,
published 22 December
2018

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