Did standing up change our brains?

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Credit: Rice University

Although lots of animals are smart, humans are even smarter. How and

why do we think and act so differently from other species?

A young boy's efforts while learning to walk have suggested a new explanation, in a new journal paper jointly authored by his father and grandfather, both academics at the University of Sydney.

In the latest issue of the scientific journal, *Frontiers in Neuroscience*, the son-and-father team Mac and Rick Shine suggest that the big difference between humans and other species may lie in how we use our brains for routine tasks.

They advance the idea that the key to exploiting the awesome processing power of our brain's most distinctive feature - the cortex - may have been to liberate it from the drudgery of controlling routine activities.

And that's where young Tyler Shine, now two years old, comes into the story. When Tyler was first learning to walk, his doting father and grandfather noticed that every step took Tyler's full attention.

But before too long, walking became routine, and Tyler was able to start noticing other things around him. He was better at maintaining his balance, which freed up his attention to focus on more interesting tasks, like trying to get into mischief.

How did Tyler improve? His father and grandfather suggest that he did so by transferring the control of his balance to 'lower' parts of the brain, freeing up the powerful cortex to focus on unpredictable challenges, such as a bumpy floor covered in stray toys.

"Any complicated task - like driving a car or playing a musical instrument - starts out consuming all our attention, but eventually becomes routine," Mac Shine says.

"Studies of brain function suggest that we shift the control of these routine tasks down to 'lower' areas of the brain, such as the basal ganglia and the cerebellum.

"So, humans are smart because we have automated the routine tasks; and thus, can devote our most potent mental faculties to deal with new, unpredictable challenges.

"What event in the early history of humans made us change the way we use our brains?

Watching Tyler learn to walk suggested that it was the evolutionary shift from walking on all fours, to walking on two legs.

"Suddenly our brains were overwhelmed with the complicated challenge of keeping our balance - and the best kind of brain to have, was one that didn't waste its most powerful functions on controlling routine tasks."

So, the Shines believe, those first pre-humans who began to stand upright faced a new evolutionary pressure not just on their bodies, but on their brains as well.

"New technologies are allowing us to look inside the brain while it works, and we are learning an enormous amount," Mac Shine says.

"But in order to interpret those results, we need new ideas as well. I'm delighted that my son has played a role in suggesting one of those ideas.

"Hopefully, by the time he is watching his own son learn to walk, we will be much closer to truly understanding the greatest mystery of human existence: how our brains work."

More information: The article is available online: