

# Testes size correlates with men's involvement in toddler care

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Men with smaller testes than others are more likely to be involved in hands-on care of their toddlers, a new study conducted by anthropologists at Emory University finds. The *Proceedings of the National Academy of Sciences (PNAS)* published the results of the study Sept. 9.

Smaller testicular volumes also correlate with more nurturing-related [brain activity](#) in fathers as they are looking at photos of their own children, the study shows. "Our data suggest that the biology of human males reflects a trade-off between investments in mating versus parenting effort," says Emory [anthropologist](#) James Rilling, whose lab conducted the research.

The goal of the research is to determine why some fathers invest more energy in parenting than others. "It's an important question," Rilling says, "because previous studies have shown that children with more involved fathers have better social, psychological and [educational outcomes](#)."

Evolutionary Life History Theory posits that evolution optimizes the allocation of resources toward either mating or parenting so as to maximize fitness. "Our study is the first to investigate whether [human anatomy](#) and [brain function](#) explain this variance in parenting effort," says Jennifer Mascaro, who led the study as a post-doctoral fellow in the Rilling lab.

While many economic, social and cultural factors likely influence a

father's level of caregiving, the researchers wanted to investigate possible biological links.

They knew that lower levels of testosterone in men have been correlated with greater paternal involvement, and that higher levels of the hormone predict divorce as well as polygamy.

The testes, in addition to producing testosterone in males, also produce sperm. "Testes volume is more highly correlated with sperm count and quality than with [testosterone levels](#)," Mascaro says.

The study included 70 biological fathers who had a child between the ages of 1 and 2, and who were living with the child and its biological mother.

The mothers and fathers were interviewed separately about the father's involvement in hands-on childcare, including tasks such as changing diapers, feeding and bathing a child, staying home to care for a sick child or taking the child to doctor visits.

The men's testosterone levels were measured, and they underwent functional magnetic resonance imaging (fMRI) to measure brain activity as they viewed photos of their own child with happy, sad and neutral expressions, and similar photos of an unknown child and an unknown adult. Then, structural MRI was used to measure testicular volume.

The findings showed that both testosterone levels and testes size were inversely correlated with the amount of direct paternal caregiving reported by the parents in the study.

And the father's testes volume also correlated with activity in the ventral tegmental area (VTA), a part of the brain system associated with reward and parental motivation. "The men with smaller testes were activating

this brain region to a greater extent when looking at photos of their own child," Mascaro says.

While testosterone levels may be more related to pre-copulatory, intrasexual competition, testicular volume may reflect post-copulatory mating investment, the researchers theorize.

Although statistically significant, the correlation between testes size and caregiving was not perfect.

"The fact that we found this variance suggests personal choice," Rilling says. "Even though some men may be built differently, perhaps they are willing themselves to be more hands-on fathers. It might be more challenging for some men to do these kinds of caregiving activities, but that by no means excuses them."

A key question raised by the study findings is the direction of casualty. "We're assuming that testes size drives how involved the fathers are," Rilling says, "but it could also be that when men become more involved as caregivers, their testes shrink. Environmental influences can change biology. We know, for instance, that testosterone levels go down when men become involved fathers."

Another important question is whether childhood environment can affect testes size. "Some research has shown that boys who experience childhood stress shift their life strategies," Rilling says. "Or perhaps fatherless boys react to the absence of their father by adopting a strategy emphasizing mating effort at the expense of parenting effort."

The study focused only on direct paternal care, and not indirect forms of care, such as protecting children and earning a living to provide for them.

In the decades since the 1960s, the number of women raising children on their own in the United States has risen dramatically. "Although there are more households with no fathers, when the fathers are around, they tend to be much more involved than in previous decades," Mascaro says.

Much of the existing scientific literature on nurturing is focused on mothers, Rilling notes. "Mothers definitely have more of an impact on child development, but [fathers](#) are also important and their role is understudied."

**More information:** Testicular volume is inversely correlated with nurturing-related brain activity in human fathers, [www.pnas.org/cgi/doi/10.1073/pnas.1305579110](http://www.pnas.org/cgi/doi/10.1073/pnas.1305579110)

Provided by Emory University

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