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Elite athletes also excel at some cognitive tasks

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New research suggests that elite athletes – Olympic medalists in volleyball, for example – perform better than the rest of us in yet another way. These athletes excel not only in their sport of choice but also in how fast their brains take in and respond to new information – cognitive abilities that are important on and off the court.

The study, of 87 top-ranked Brazilian volleyball players (some of them medalists in the Beijing and London Olympics) and 67 of their nonathletic contemporaries, also found that being an athlete minimizes the performance differences that normally occur between women and men. Female athletes, the researchers found, were more like their male peers in the speed of their mental calculations and reaction times, while nonathletic females performed the same tasks more slowly than their male counterparts.

The study appears in the journal *Frontiers in Psychology*.

"I think we have learned that athletes are different from us in some ways," said University of Illinois psychology professor and Beckman Institute Director Arthur Kramer, who led the study with graduate student Heloisa Alves.

"We found that athletes were generally able to inhibit behavior, to stop quickly when they had to, which is very important in sport and in daily life, " Kramer said. "They were also able to activate, to pick up information from a glance and to switch between tasks more quickly

than nonathletes. I would say these were modest differences, but they were interesting differences nonetheless."

Overall, the athletes were faster at memory tests and tasks that required them to switch between tasks. They were quicker to notice things in their peripheral vision and to detect subtle changes in a scene. And in general, they were better able to accomplish tasks while ignoring confusing or irrelevant information.

Perhaps the most interesting discovery was that female athletes had significant cognitive advantages over their nonathletic counterparts, Kramer said, advantages that minimized the subtle speed differences between them and the men. The female athletes were faster than their nonathletic peers at detecting changes in a scene and could more quickly pick out relevant details from a distracting background. Their performance on these and the other tasks was on par with the male athletes, whereas nonathletic males consistently outperformed their female peers.

Nonathletes excelled at only one of the cognitive tests the researchers administered. In this test, called the stopping task, participants were asked to type a "Z" or "/" key as soon as they saw it on a computer screen – unless they heard a tone shortly after the character appeared, in which case they were told to refrain from responding. Nonathletes tended to be faster in cases where the tone never sounded, while athletes were better at inhibiting their responses after hearing a tone.

The ability to inhibit a response is one marker of what brain researchers call "executive function," the capacity to control, plan and regulate one's behavior, Kramer said. While it has obvious advantages in sport, the ability to quickly inhibit an action also is useful in daily life, he said.

"One way to think about it is you're in your car and you're ready to start

off at a light and you catch in your side vision a car or a bicyclist that you didn't see a second ago," he said. Being able to stop after having decided to go can be a lifesaver in that situation.

"So both facilitating and inhibiting behavior is important," he said.

Kramer said the athletes' slower performance on this one task might be the result of a strategic decision they had made to wait and see if the tone sounded before they committed to pressing a key.

"My bet is that the athletes were just learning to read the task a little better," he said. "So if I'm a little slower in going, I'll be a little better at stopping if I need to."

All in all, the new findings add to the evidence that those who spend years training on specific physical tasks tend to also have enhanced cognitive abilities, Kramer said.

"Our understanding is imperfect because we don't know whether these abilities in the athletes were 'born' or 'made,' " he said. "Perhaps people gravitate to these sports because they're good at both. Or perhaps it's the training that enhances their cognitive abilities as well as their physical ones. My intuition is that it's a little bit of both."

More information: The paper, "Perceptual-cognitive expertise in elite volleyball players," is available online: www.frontiersin.org/Movement_S … .2013.00036/abstract

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