

The tortoise and the hare: A sex difference in marathon pacing

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Men are more likely than women to slow their pace in the marathon, according to a new study led by a Grand Valley State University researcher. The findings were published in *Medicine & Science in Sports & Exercise*.

The study, led by Robert Deaner, associate professor of psychology at Grand Valley State, was based on 14 marathons that occurred in the U.S. in 2011, and it included almost 92,000 performances. On average, [men](#) ran the second half of the marathon 15.6 percent slower than the first half, whereas [women](#) slowed by an average of 11.7 percent. Although the extent of slowing varied at different races, the sex difference in pacing occurred at all 14 marathons. The sex difference was especially clear when considering runners who slowed by 30 percent or more—men were about three times as likely as women to experience such dramatic slowing.

The researchers decided to conduct the study because they hypothesized that marathon pacing might reflect [decision making](#), and previous studies show that men generally make riskier decisions in many other situations.

"Sports scientists have long been interested in pacing, but they have focused on elite athletes and haven't considered the role of decision making," said Deaner. "We reasoned that decision making could be important for recreational runners—some have little knowledge about the demands of the [marathon](#) or their own capabilities, so it can be very

easy to begin the early miles with an aggressive, unsustainable pace. We anticipated that men would be more likely to do this and, consequently, they'd be more likely to crash in the second half of the race."

While decision making could play a role, physiological factors might also be a primary factor explaining the greater slowing of men relative to women. Sandra Hunter, a co-author and professor of exercise science at Marquette University, said: "Women typically use more fat and less carbohydrate during endurance exercise. This should make them less likely to 'bonk' or 'hit the wall' because they are less likely to have their muscles depleted of glycogen."

The authors hope their results will spur future studies of pacing among non-elites. "We'd like to think we're putting pacing in non-elite athletes on scientists' radar," said Hunter. "It would be fantastic to complement our study—based only on halfway times and finishing times—with other kinds of data. This might include runners' training, self-knowledge, targeted pace, subjective feelings, and physiological measures. These kinds of studies might go a long way in helping runners achieve better performances and enjoy racing more."

Outstanding endurance performances almost involve even pacing, so the new findings suggest that women are superior to men in their race pacing. "Yeah, you can certainly look at this as a 'tortoise and hare' type of situation," said Deaner. "Men are crashing more frequently and that certainly isn't desirable. But I think it's premature to conclude that women are superior pacers. This is because an evenly paced race does not automatically indicate a well-paced one. Someone might be too conservative given his or her training and ability. So this question won't be truly answered until a future study investigates runners' training and their goals, along with their pacing."

Other key results were that pace slowing was generally far greater among

slower runners and that the sex difference in pacing widened among slower marathoners. For example, among those who finished in about three hours, men slowed by 6.9 percent whereas women slowed by 5.5 percent, a 25 percent sex difference. By comparison, among those who finished in about five hours, men slowed by 18.8 percent whereas women slowed by 14.5 percent, a 30 percent sex difference.

The researchers also investigated whether racing experience was related to pacing and whether it might contribute to the sex difference. For more than 2,900 runners, they acquired information on racing experience by looking up runners on the athlinks website, which aggregates performances from many races. More years of racing experience and more previous marathons were both associated with more even pacing. Nevertheless, these experience effects were similar for men and women, so that controlling for experience did not eliminate the sex difference in pacing.

The researchers also showed that the sex difference in pacing held across age groups. It also held when adjusting women's performances by 12 percent to address men's greater maximal oxygen uptake and their typically faster performances.

Provided by Grand Valley State University

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