Life is unfair, and so is speed skating

Some athletes can randomly benefit from alerting effects due to inconsistent starting procedures

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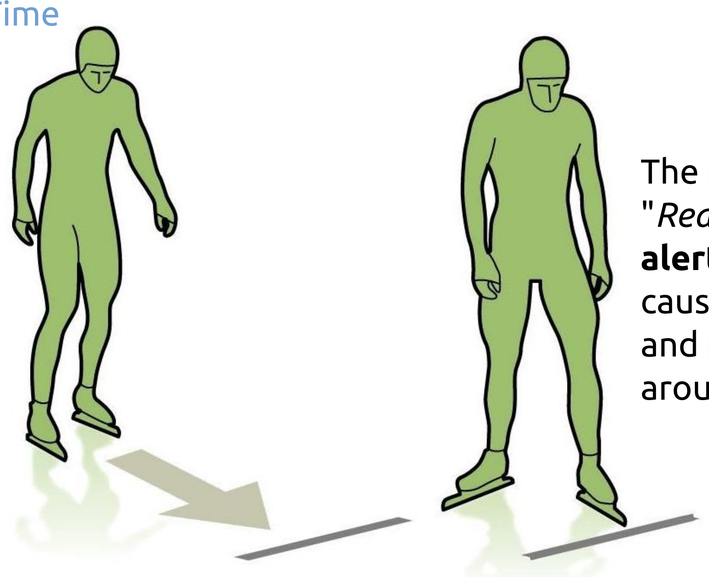
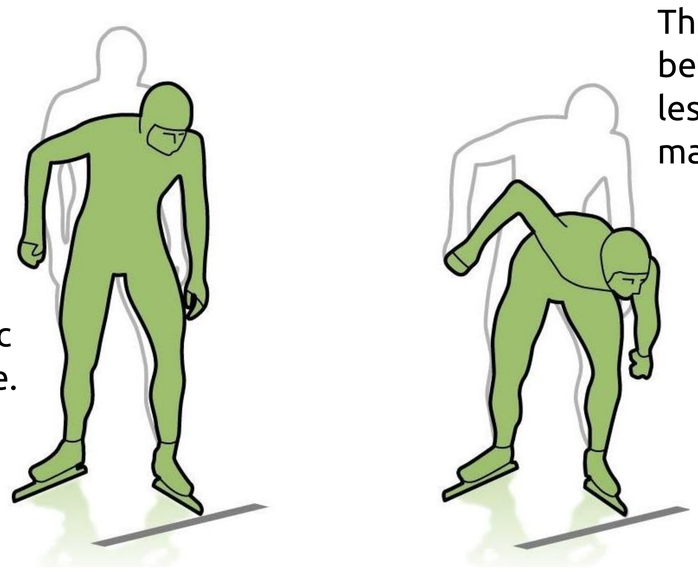
"*Go to the start...*" → "*Ready?*" → 3.5 - 5.5 seconds → "BANG!"

Time



The referee's "*Ready*" cue **alerts** athletes, causing a short and non-specific arousal increase.



The longer a referee waits between *ready* and *start*, the less aroused athletes will be, making them slower to start.

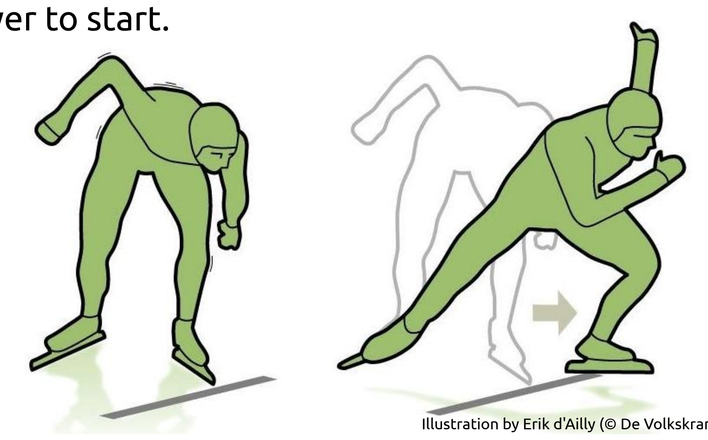
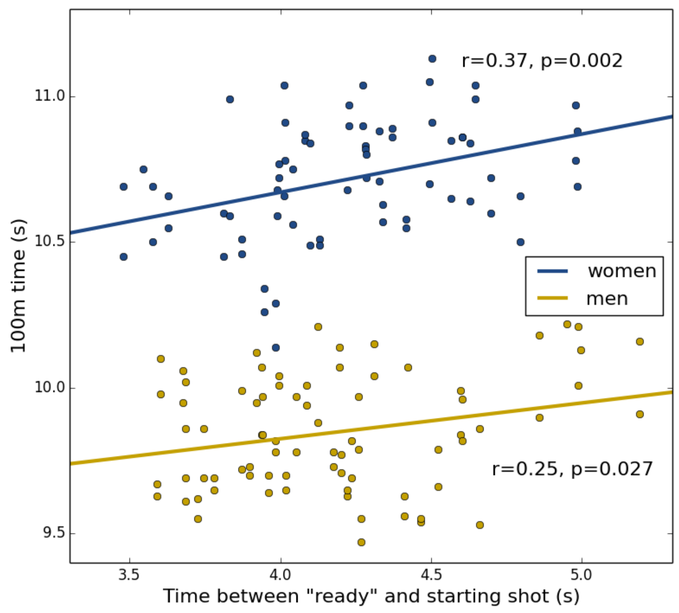
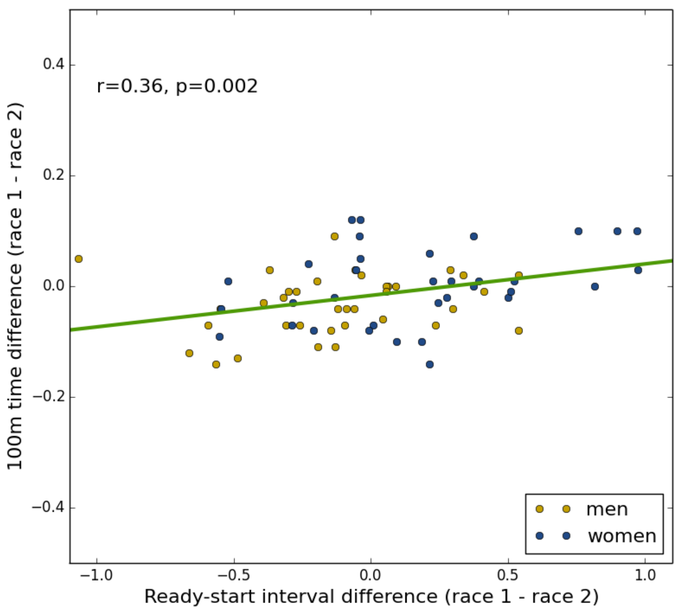


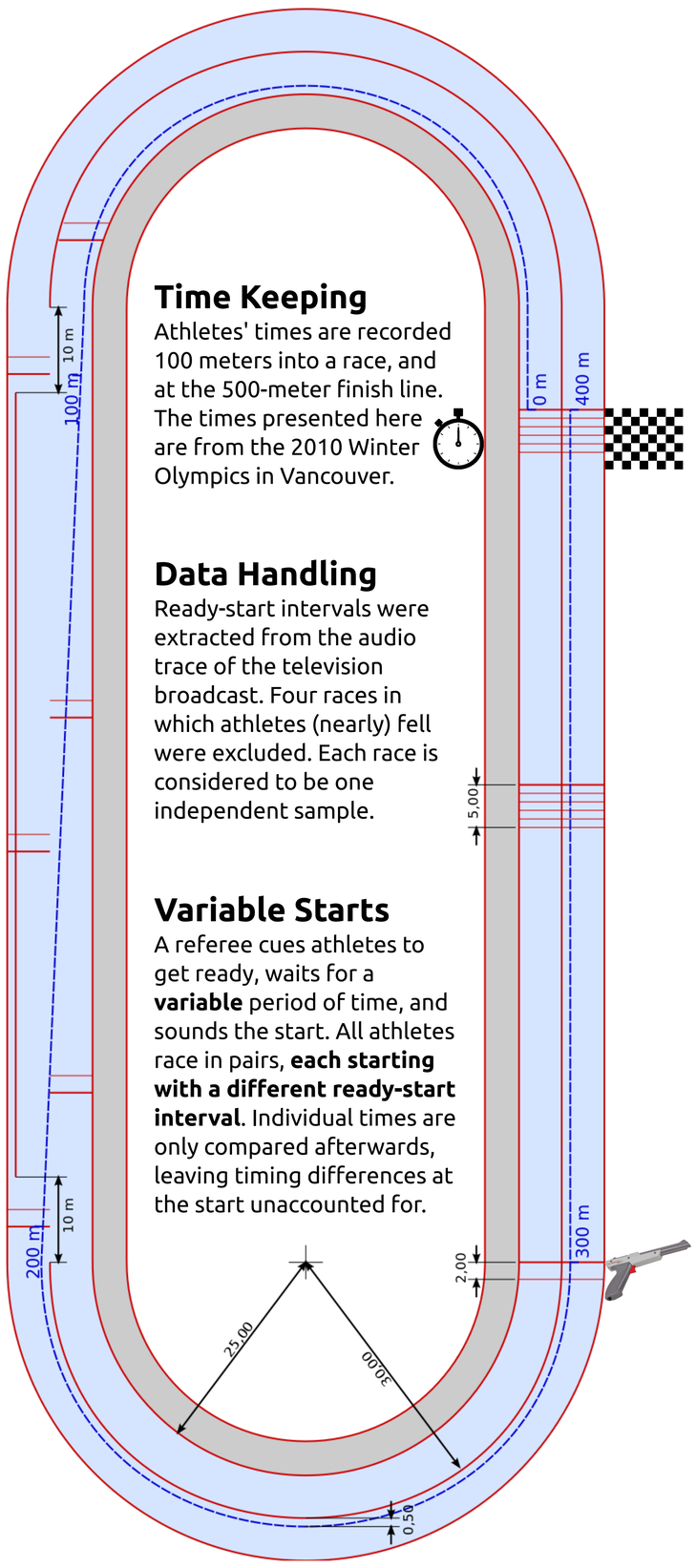
Illustration by Erik d'Ailly (© De Volkskrant)

100 meters

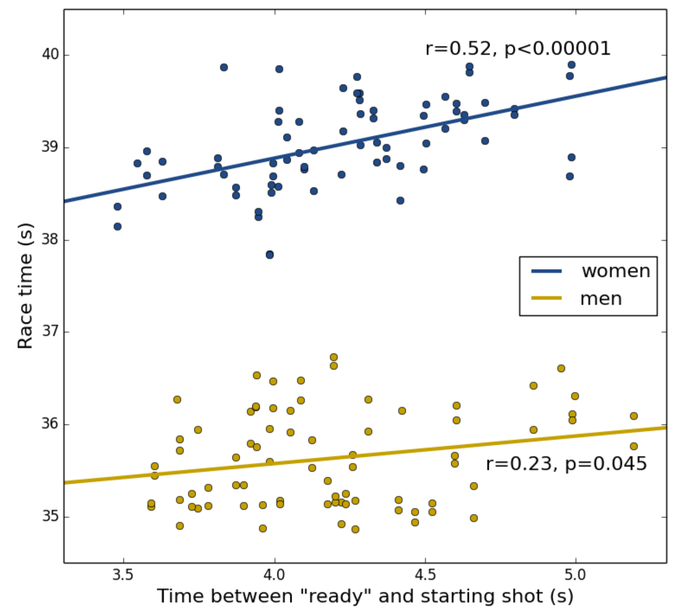


Ready-start intervals positively correlate with 100-meter times (above). To investigate the direction of causality, we looked at the differences between each individual's two races. We found that **differences in ready-start intervals are a significant predictor of 100-meter times** (below), explaining 13% of the variance. In this sample, one extra second of ready-start interval increased the 100-meter time difference by 59 ms. These results suggest that **longer ready-start intervals increase athletes' response times to the starting gun**.

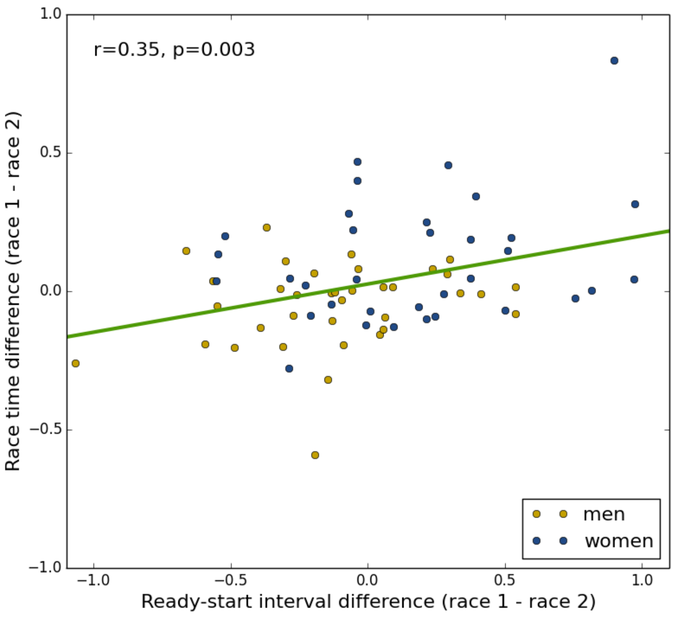




500 meters



Ready-start intervals positively correlate with finish times (above), which could mean that longer starts decrease skaters' performance. We found that **differences in ready-start intervals are a significant predictor of finish times** (below), explaining 12% of the variance. In this sample, one extra second of ready-start interval increased the race time difference by 174 ms. These results suggest that **longer ready-start intervals decrease athletes' performance at Olympic competitions.**



Alerting

Race starts closely resemble **alerting** experiments, in which participants receive a non-spatial cue that precedes a target signal. Reaction times are lowest after an optimal cue-target interval of 500 ms (Posner & Boies, 1971, *Psychological Review*), and progressively slower as the interval increases up to several seconds (Sanders, 1975, *Quarterly Journal of Experimental Psychology*). We think that part of our results can be attributed to differences in alerting: **Skaters who start after longer ready-start intervals are less quick to respond to the starting shot**.

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A solution?

The effect of ready-start interval on performance scales from 100 to 500 meters, indicating that alerting could only be part of the story. Perhaps there are knock-on effects on motivation, and perhaps longer ready-start intervals allow more muscle fatigue to build up. Although the precise underlying mechanisms should be investigated, sports unions would be wise to exercise caution with the current starting procedures. **An unbiased starting procedure would not allow for timing variability**, therefore eliminating alerting and other effects.

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