



# Career Performance Progressions of Junior and Senior Elite Track and Field Athletes

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## ABSTRACT

**Introduction:** National sport governing bodies invest considerable funds on Junior (under-20) athletes with the premise that it will translate to success at the Senior/Olympic level. This assumption may not hold true, as successful Senior athletes often do not have similar success at the Junior level.

**Purpose:** To examine best performances of elite Junior and Senior track and field athletes and compare career performance progressions using archival analysis.

**Methods:** The performance marks for the top 8 male and female finishers (e.g. finalists) in track and field events from the 2000 World Junior Championships and the 2000 Olympic Games were examined from published databases.

Annual performance bests of the finalists from select events, grouped as sprints (100m, 200m), distance (1500m, 5000m), jumps (long jump, high jump), and throws (discus, shot put), were tracked throughout their competitive careers. Each athlete's best lifetime performance and corresponding age were compared between groups, as well as the improvement from Junior-age best to lifetime best. The frequency with which athletes won Junior and Senior medals was also examined.

**Results:** Senior Olympic finalists achieved their lifetime best at a significantly later age than Junior finalists (25.6 ± 0.7 vs. 21.1 ± 0.6, p<0.05), and this difference extended across all four event groups. Senior finalists improved their under-20 best to lifetime best more than Junior finalists (6.8% ± 1.2 vs. 2.7% ± 0.7). A minority of Junior medalists later won Senior medals (23.6%), and a minority of Senior medalists previously won Junior medals (29.9%).

**Conclusion:** Successful Junior athletes may be early maturers, as they reach a performance peak much earlier than their Senior counterparts. Successful Junior athletes also improve significantly less than Senior athletes after their best Junior-age performance. Success at either the Junior or Senior level does not determine success in the other.

## INTRODUCTION

- Traditionally, athletes are expected to reach a lifetime best performance at a predictable age, systematic of the event in which they compete.<sup>1</sup>
- Top Junior (under-20) performers may reach lifetime best performance at a younger age than Senior Olympians, suggesting a possible difference in maturational pace.<sup>2</sup>
- The relationship between age of lifetime best performance and success at Junior and Senior championship events has not been analyzed.

## PURPOSE

- To retrospectively examine age of Junior best and lifetime best performances of elite Junior and Senior track and field athletes using published performance data to compare career performance progressions.
- To determine if the top Junior athletes are the same athletes who will eventually become the top Senior athletes.

## METHODS

- From published databases, annual best performances across competitive career from the top 8 male and female finishers (e.g. finalists) in track and field events from the 2000 World Junior Championships and the 2000 Olympic Games were examined.
- Annual bests of finalists from select events were grouped as distance (1500m, 5000m), sprints (100m, 200m), jumps (long jump, high jump), and throws (discus, shot put).
- Best lifetime performance age and improvement from Junior best to lifetime best were compared between groups.

### Age of Finalists (yrs. ± SD)

Junior Men (n=65)	17.5 ± 0.9
Junior Women (n=64)	17.0 ± 1.1
Senior Men (n=64)	25.2 ± 3.9
Senior Women (n=64)	27.3 ± 4.3

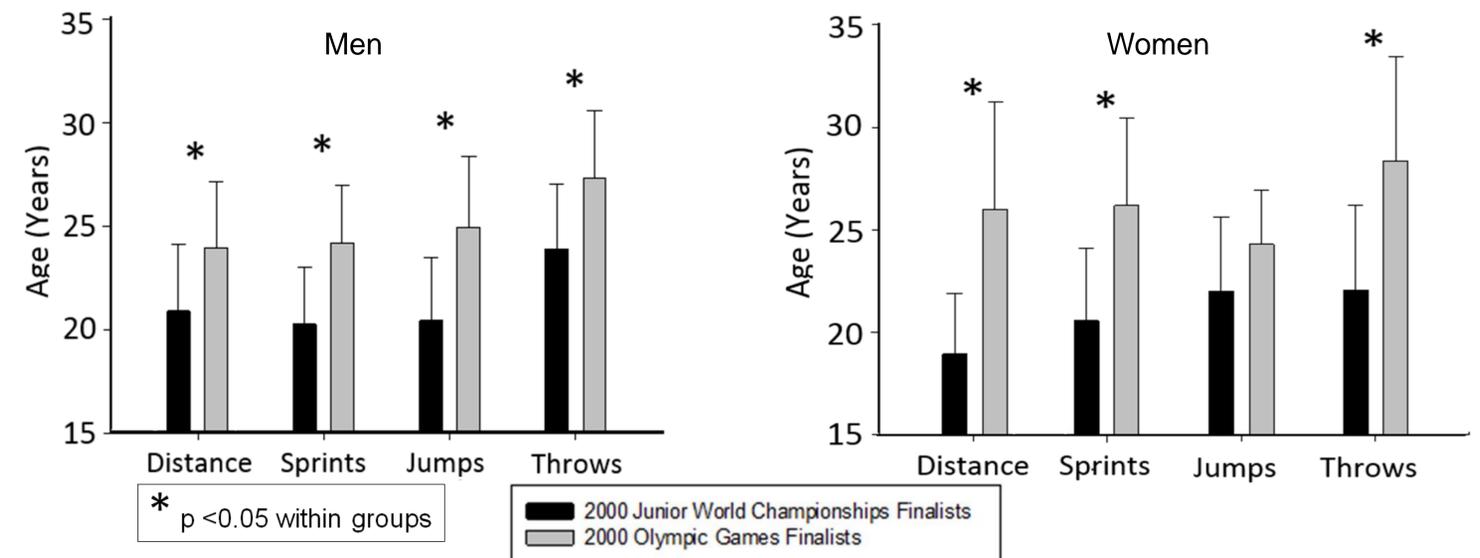
## RESULTS

- Senior athletes achieved a lifetime best performance at a significantly later age than their Junior counterparts in all four men's event groups and 3 of 4 women's event groups.
- Significant increases in percent improvement from best Junior performance to lifetime best performance were observed in six of the eight groups.

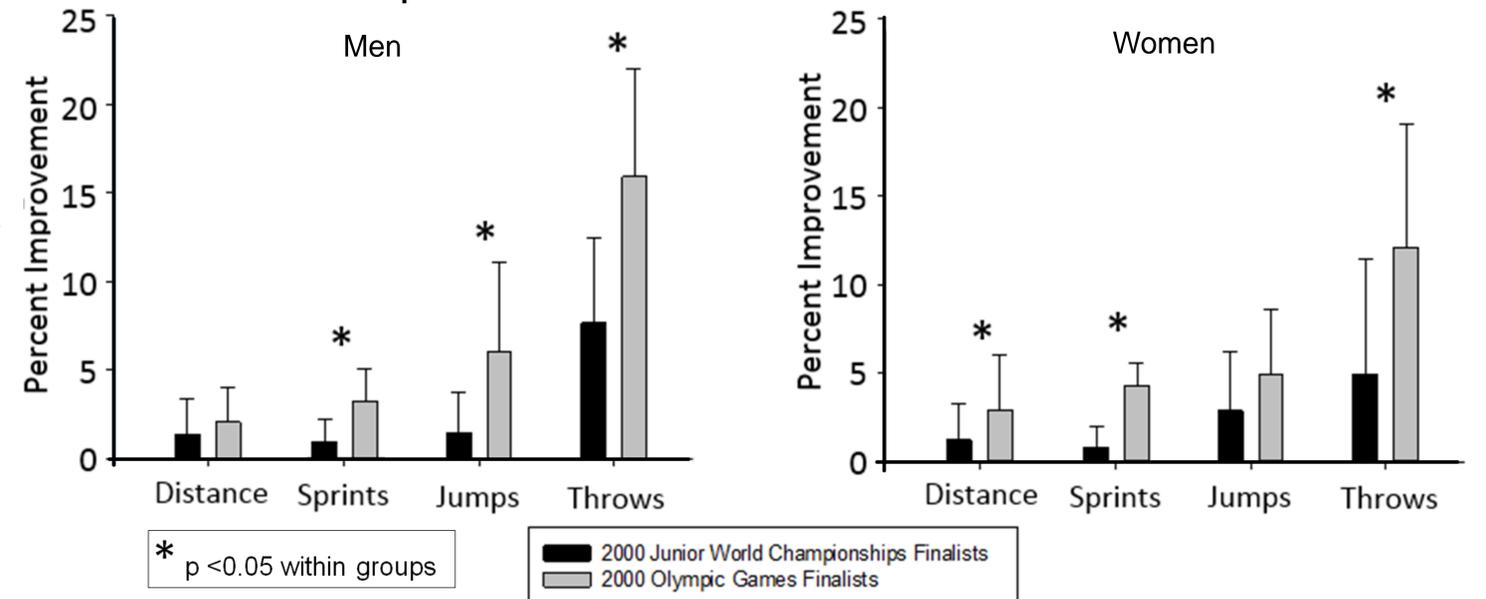
## CONCLUSIONS

- Top Junior athletes reach lifetime best performance at a significantly younger age than top Senior athletes, with most failing to improve to a level required for success at the Senior level.
- One potential reason for this difference could be a difference in maturational pace.

### Age of Lifetime Best Performance



### % Improvement from Junior Best to Lifetime Best



## REFERENCES

1. Ericsson, K., "Peak performance and age: An examination of peak performance in sports." *Successful aging: Perspectives from the behavioral sciences*. 164-195, 1990.
2. Malina, R.M., et al., "Age at menarche and selected menstrual characteristics in athletes at different competitive levels and in different sports." *Med Sci Sports*, 10(3): 218-22, 1978.

- Successful Junior athletes may be earlier maturers than top Senior athletes, which may be advantageous for competitive success as a Junior athlete.
- Successful Senior athletes may be later maturers than top Junior athletes, which may be advantageous for competitive success at the Senior level.