



# Age- and sex- related ability and readiness for sporting efforts of 20- to 64 years old runners

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## Purpose

Physical and sporting performance are subject to characteristic age-related change processes caused by biological ageing and, no less important, changes in training and lifestyle (1). Changes restricting physical resp. sporting performance often begin as early as young adulthood (2). Training parameters like volume and intensity play a decisive role for the adaptive outcome. The present large-scale survey of regularly trained runners examines the ability and willingness to train intensively, and to push themselves to the limits of their capabilities.

## Methods

Data from the nationwide survey of actively exercising subjects ([www.dshs-koeln.de/med-pace](http://www.dshs-koeln.de/med-pace)). A subsample of 13,627 runners was extracted from participants with complete datasets (>160,000).

The questionnaire (Fig. 1) includes items concerning:

- Sociodemographic and anthropometric parameters
- Sporting activity (e.g. training habits, sport experience)
- Health and medical risk factors (modified PAR-Q)
- Subjective data about how often subjects train close to the limits of their physical capacity ("exercise intensity")
- Degree of motivation to exercise

Sample selection criteria:

- Regular training for at least 2 years
- 2-5 sessions/week and running volume 11-60 km/week

Statistics:

- ANOVA, correlation, and regression analyses

The screenshot shows a questionnaire form with the following fields and options:

- Gender:**  male,  female
- Year of birth:** 1988 (yyyy)
- Weight:** 75 (kg)
- Height:** 181 (cm)
- What is your main activity/sports?:** Running/Walking/Hiking
- For how many years have you been exercising regularly?:**  since my youth
- Including all of your sports activities, on average, over the last 12 months:**
- How many times a week are you working out?:** 5-6
- On average: how long does a typical workout last (in minutes)?** 60
- How often do you push yourself to your limits while training?:** almost never, , , , , , , , almost always
- Please indicate to what degree you are motivated to exercise?:** very little, , , , , , , very much

Fig. 1: Screenshot of the online questionnaire

## Results

### Sample characteristics

- 13,627 subjects total: 8,592 men/5,035 women (age: 43.7±10.5/40.3±10.9 yrs; p<0.001)

### Running experience & Training volume

- Experience: 10.4±9.1 vs. 8.6±7.5 yrs (men vs. women); p<0.001
- Volume: 32.2±12.3 vs. 28.5±11.5 km (men vs. women; p<0.001)

### Exercise Intensity & Motivation

- Exercise intensity (Fig. 2) and relation intensity/motivation decrease with age (Fig. 4).
- Motivation remained almost constant (Fig.3).
- Women rarely train to performance limits, reported greater motivation and lower intensity/motivation (5.66±1.88 vs. 5.80±1.89, 8.45±1.44 vs. 8.31±1.37, 0.70±0.39 vs. 0.72±0.36, each p<0.001).
- Intensity is correlated with age, motivation, and running experience (r=-0.21,r=0.14, r=-0.12, all p<0.001).
- Age, motivation, and sex are strongest predictors for intensity (standard-beta -0.18, 0.14, -0.06, all p<0.001).
- Training volume and health status had no explanatory value.

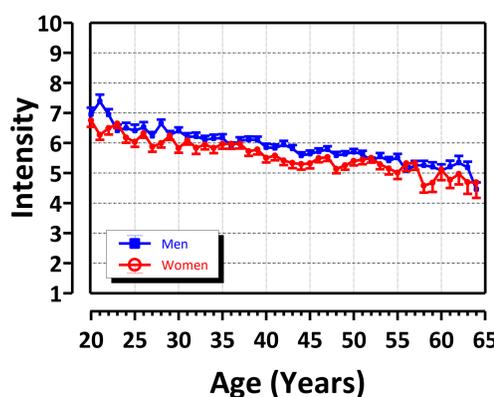


Fig. 2: Exercise-intensity of runners stratified by sex and age (mean±SE):  
- sex F(1, 13,537)=14.4, p<0.001  
- age F(44, 13,537)=55.6, p<0.001  
- sex x age F(44, 13,537)=0.9, p=0.603

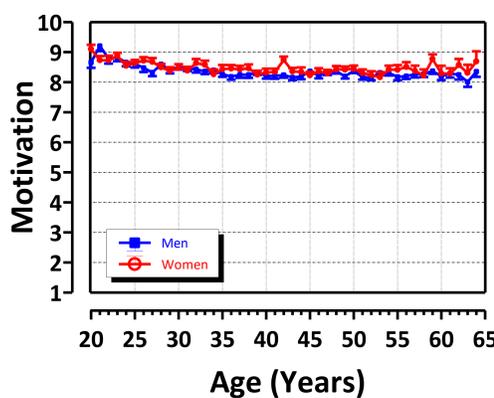


Fig. 3: Motivation for exercise of runners stratified by sex and age (mean±SE):  
- sex F(1, 13,537)=3.0, p<0.001  
- age F(44, 13,537)=14.1, p<0.001  
- sex x age F(44, 13,537)=0.9, p=0.606

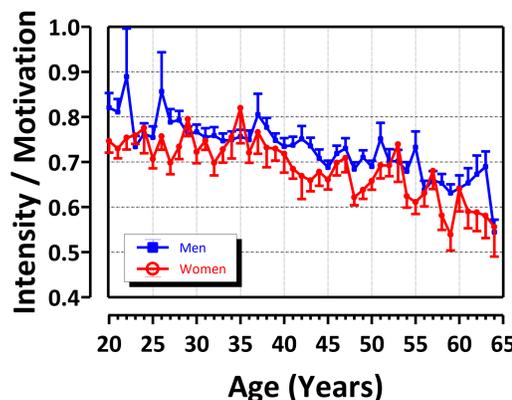


Fig. 4: Relation Intensity/Motivation of runners stratified by sex and age (mean±SE):  
- sex F(1, 13,537)=4.7, p<0.001  
- age F(44, 13,537)=26.9, p<0.001  
- sex x age F(44, 13,537)=0.8, p=0.804

## Conclusion and relevance

The frequency of training close to the individual physical limit is declining with age in running men and women. Despite consistently high motivation for exercise in all age groups, self reported exercise intensity is also decreasing with age. Both extensive endurance training and high intensity training loads are relevant aspects for the maintenance and improvement of overall physical fitness. To maintain the ability and readiness for intensive training efforts, the application of more varied and high intensity focused training like CrossFit or high-intensity interval training (HIIT) might be advisable even in advanced age groups.

## References

- 1) Leyk et al. (2010) Dtsch Arztebl Int 107(46): 809-816
- 2) Leyk et al. (2012) Dtsch Arztebl Int 109(44): 737-745

