



# Longitudinal Stability of Exercise Behavior Across Exercise Domains

van der Zee M.D.<sup>\*1</sup>, van der Mee, D.<sup>1</sup>, Bartels, M.<sup>1</sup> & de Geus, E.J.C.<sup>1</sup>

<sup>\*</sup>. Corresponding author: Matthijs D. van der Zee: m.d.vander.zee@vu.nl

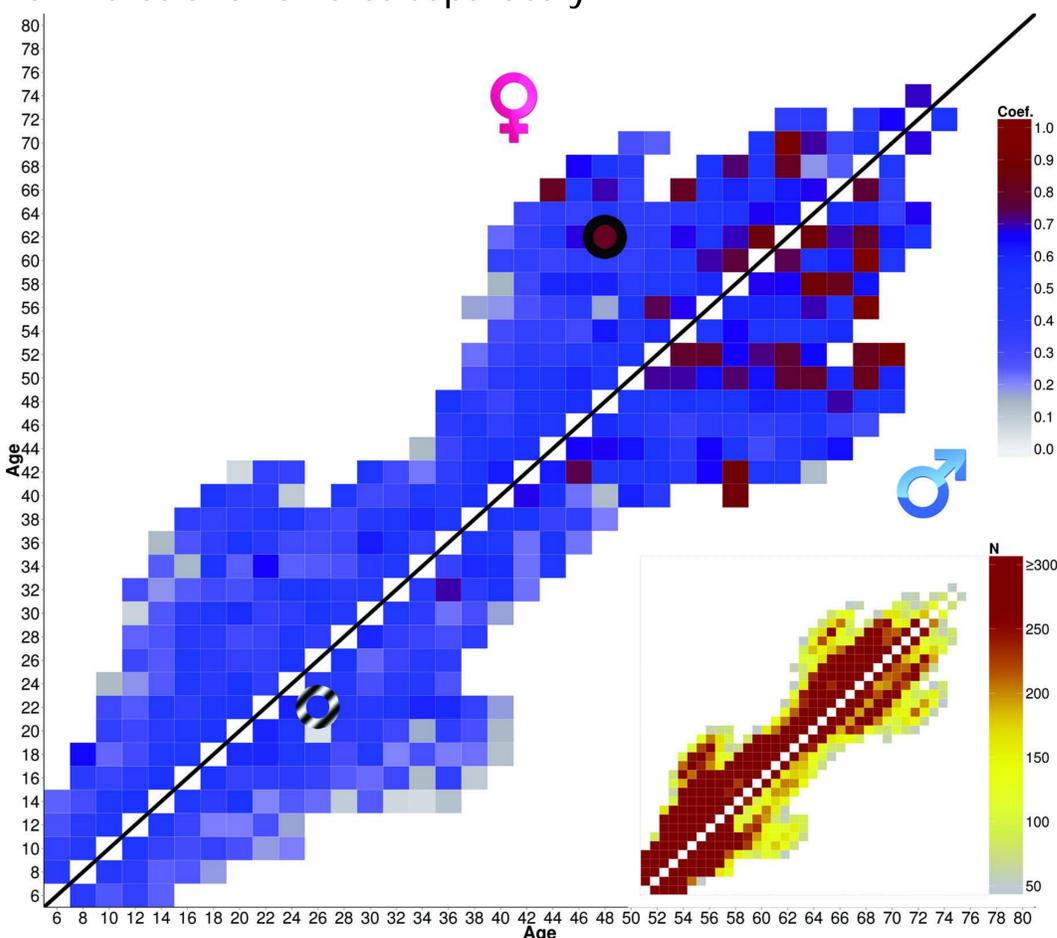
<sup>1</sup>. Department of Biological Psychology, Behavioral and Movement Sciences, Vrije Universiteit; Amsterdam Public Health research institute, Amsterdam University Medical Centers, the Netherlands

## Introduction

Many physical activity interventions seek to develop life-long habits of regular exercise and sports activities in leisure time. This study examined tracking of voluntary exercise activities in leisure time across a 2 to 22-year follow-up period. Total exercise activity was considered, as well as activities in six different domains: (1) team-based versus solitary activities, (2) competitive versus non-competitive activities, and (3) externally paced versus internally paced activities. We assessed which of these domains best predicted total exercise activity at follow-up.

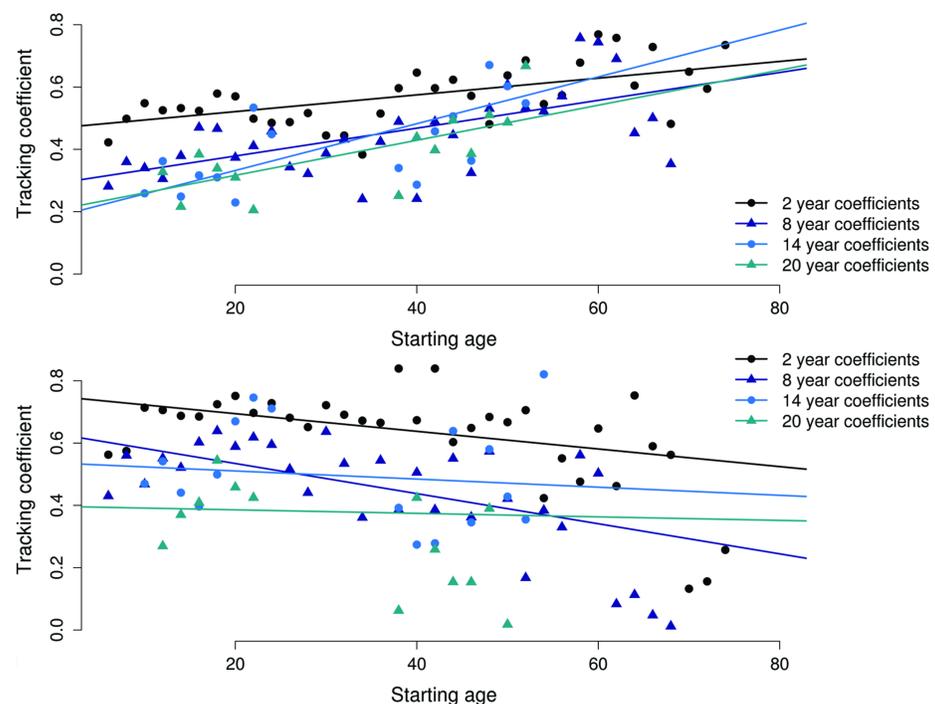
## Methods

A large dataset (N = 43,889) from the Netherlands Twin Register (NTR) was used to compute tracking coefficients for exercise behaviour as a function of baseline age (8 to 80 years) and tracking duration (2-year bins, e.g. 2, 4, 6, .. 22) for males and females separately.



**Figure 1:** Tracking coefficient heat map of the total volume of exercise activities across different time intervals. Inset represents sample size (N) in each cell.

**Annotated examples:** the cell in the black circle represents the tracking of total exercise activities ( $r=0.81$ ) from age 48 at baseline, to age 62 at follow-up in females; the cell in the striped circle represents tracking (0.57) from age 22 at baseline to age 26 at follow-up in males.



**Figure 2:** Tracking coefficients for total exercise activity (top panel), and team-based exercise activity (bottom panel) as a function of age at baseline.

## Results

The 2-year tracking coefficients are moderate to high for total exercise activity (Figure 1) ranging from .38 to .77 with a median of .57 across all possible ages at baseline. Tracking decreases as the distance to follow-up increases, down to a median of .38 for the 22-year follow-up. Tracking increases with age at baseline, such that when people get older their (absence of) exercise behavior becomes more and more stable. The patterns of tracking seen in total exercise activity were largely similar for the specific activities in the solitary, competitive, non-competitive, externally and internally paced exercise domains. Only for team-based activities tracking decreased as people get older (see Figure 2).

## Conclusion

We conclude that voluntary exercise behaviour is moderate to highly stable across the life span. In particular in adulthood, the tracking of exercise behavior mimics that of a classical behavioural trait like personality. This trait-like stability reinforces existing evidence that exercise habits are hard to change, but at the same time suggests that interventions that do succeed in the adoption of exercise habits tend to have lasting effects.