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## Genome-wide association study of liking of physical activity in the UK Biobank

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### ABSTRACT:

A lack of physical activity (PA) is one of the most pressing current health issues. In addition to economic and social influences, one's propensity for PA is influenced by genetic factors. Here, in over 157,000 individuals from the UK Biobank, we sought to complement and extend previous findings on the genetics of PA behavior by performing genome-wide association studies of liking of several PA-related behaviors plus an additional derived overall PA-liking trait. We identified a total of 17 loci, along with an additional 8 for the overall trait, only some of which overlap with loci previously identified for PA behavior. Replication in over 7,000 adults from the Netherlands Twin Register (NTR) showed directional consistency in 13 out of 17 loci. The PA-liking traits were genetically correlated with self-report ( $r_g$ : 0.38 – 0.80) and accelerometry-derived ( $r_g$ : 0.26 – 0.49) PA measures, and with a wide range of health-related traits and dietary behaviors. Polygenic risk scores (PRS) for each PA-liking trait computed in NTR based on UKB significantly predicted the same liking trait in NTR. The PRS for overall PA-liking predicts PA behavior in NTR ( $r^2 = 0.0032$ ) nearly as well as one constructed based on PA behavior in UK Biobank ( $r^2 = 0.0042$ ). Combining the two PRS in a single model increased  $r^2$  to 0.0049, suggesting that although they broadly overlap, they are capturing different dimensions of PA behavior. In conclusion, we have identified some of the first loci associated with PA-liking and extend our understanding of the genetic basis of PA behavior.