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## Individual Differences in Daily Mobility Patterns in a Genetically Informed Youth Sample

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### ABSTRACT:

Daily mobility patterns (DMP) extracted from GPS location data offer a standardized objective tool for environmental measurement. Though these measures are increasingly prevalent in psychological research, key questions remain unanswered regarding sources of individual differences in DMP, including their developmental course and heritability. Using persistent smartphone location data collected from June 2016 through December 2019 (N = 13.2 million locations) from 709 Colorado-based adolescent twins, we investigated the development of and genetic and environmental contributions to DMP during adolescence and emerging adulthood. Additionally, we examined the extent to which individual differences were explained by personality, a core psychological construct with relationships to DMP. Mixed effects models found that, though there were large individual differences, mobility generally increased throughout adolescence before decreasing slightly from age 18-21. Multivariate ACE models identified moderate genetic and shared environmental components to locations visited per day and entropy of movement (A = 0.42;0.37, C = 0.32;0.35) while genetic factors largely accounted for daily distance travelled (A = 0.74). Finally, ACE Models applied to random age effects identified complex changes in DMP heritability patterns over time: heritability generally increased early in adolescence, flattened in late adolescence, and declined in emerging adulthood. Regarding personality, DMP were positively associated with extraversion and conscientiousness and negatively with openness. Genetic correlations revealed relationships between extraversion and DMP were partially explained by shared genetic effects ( $R_{GS} = 0.25-0.53$ ). Results suggest large individual differences in the developmental course of DMP, which are partially accounted for by genes, shared environments, and personality.

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