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Summary of research

Key words: Cognitive function, depression, gene-environment interaction

Application lay Summary:

1a: We, the Social Science Genetic Association Consortium (SSGAC), aim to bring together the expertise of medical geneticists and social scientists to study how a range of health-relevant outcomes are influenced by specific genetic variants, the environment (including lifestyle), and their interaction. In accessing the U.K. Biobank data, we are specifically interested in the following health-relevant outcomes: cognitive function, dementia, depression, smoking, and alcohol drinking.

1b: Our research will contribute to quantifying how several risk factors (e.g. lifestyle, environment, genes), both separately and in combination, influence public health and well-being. Incorporating insights from the social sciences and investigating social scientific outcomes helps to achieve this objective. For example, a genome wide association study (GWAS) on subjective well-being in a very large sample could identify genetic factors associated with (absence of) depression that would not be possible to identify by studying depression directly

in a much smaller sample. Furthermore, accurate polygenic risk scores can be used to study how lifestyle and environmental factors mediate genetic effects on health.

1c: We will use several methods, e.g.:

- GWAS that aim to identify individual genetic variants associated with a particular outcome.
- GWAS of a “proxy phenotype”—a biologically-distal phenotype available in larger samples—to identify candidate genetic variants for association with a health-relevant outcome available in smaller samples.
- Estimation of economic and statistical models of health-relevant outcomes as a function of genetic variants, environmental factors, and their interaction.

1d: We will typically use all available observations in the UKB that (i) are of European descent, (ii) have been successfully genotyped, and (iii) have measures of the phenotype(s) under investigation.