The role of genetics in subjective well-being

To the Editor — *Nature Human Behaviour* has recently published three important papers on subjective well-being (SWB), focusing on social factors in SWB[1] and the association between income and SWB[2], and including a comprehensive review of this scientific field[3]. All three studies are impressive. However, they mainly address phenotypic associations and environmental influences, and have a limited focus on genetics. As recent years have witnessed exciting developments in our knowledge about the genetic influences on SWB[4], we want to add by elaborating briefly on these findings.

Genetic effects on well-being are replicable. Two meta-analyses of twin and family studies have shown average heritabilities of 0.36 (ref. [5]) and 0.40 (ref. [6]), providing solid evidence for genetic influences. These findings also testify to the important, and larger than genetic, causal effect of environmental factors. There is significant heterogeneity in the heritability estimates across studies, verifying that there is no fixed heritability. Rather, the heritability depends on the environmental variance, and may be moderated by characteristics of the population (for example, country, age, socioeconomic status) and the specific measures used[6]. Noteworthy, the cognitive evaluation of life satisfaction appears to be less influenced by genetic factors than other aspects such as positive emotions[5].

Multivariate studies show that genetic factors enhancing SWB are partly overlapping with those protecting against depression and other mental health problems[4], and also with genetic influences on personality traits such as extraversion and neuroticism[7]. In the populations studied so far, SWB is primarily related to mental health problems (negatively) and personality traits for genetic, not environmental, reasons. Note, however, that genetic factors may influence SWB through environmental pathways, involving social processes and relationships[1,3,4].

Whereas genetic factors are important for stability in SWB, environmental factors play an important role for change. People tend to return to their baseline level of SWB, subsequent to positive or negative life events[4]. This baseline is highly genetic but also changeable. Substantial differences in national mean levels of SWB also testify to the environmental and societal impact, and hence the potential for change[4].

Recent genome-wide complex trait analyses have shown that common genetic variants may account for up to 18% of the variance in SWB[8] and genome-wide association studies have begun to identify the specific genetic variants implicated. Thus far, 1–2% of the variance has been explained by polygenic scores based on identified genetic variants[9,10]. Importantly, despite the 'missing heritability' in molecular genetic studies, genome-wide association studies have confirmed the substantial genetic associations between SWB, neuroticism and depression, as previously documented in twin studies[4,7,10].

As the fields of molecular and behavioural genetics proceed rapidly, and the sample sizes of genome-wide association studies increase, we expect to see important discoveries in the coming years. Topics that need to be addressed include: (1) what are the specific genetic variants involved and the pathways of influence, (2) how do genetic and environmental factors interact and correlate in the pathways leading to SWB and (3) how can we use knowledge on optimal gene–environment matchmaking to develop tailored interventions to increase, nourish and sustain SWB in a changing world? ❐

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Competing interests

The authors declare no competing interests.