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Subjective well-being. Sex-specific effects of genetic and environmental factors

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Abstract

Genetic and environmental factors in subjective well-being were investigated. Special attention was paid to sex-specific effects. A classical twin design was applied, based upon data from 5140 young adult twins (same and opposite-sex). Structural equation modelling was used to estimate effects from additive genes, genetic interaction, common environment and non-shared environment. The best fitting model involved an additive genetic factor and non-shared environment. There were only marginal sex differences in mean levels of subjective well-being, and no differences in variance. Yet, there were sex differences in the degree of heritability (0.54 for women and 0.46 for men). Additionally, the correlation between the male and female genetic factors was 0.64, suggesting that, in part, different sets of genes may influence variation in subjective well-being for men and women. A dual mechanism process of genetic influence upon well-being is proposed, comprising the notion of interaction between genotypes and cultural value systems. © 2001 Elsevier Science Ltd. All rights reserved.

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What is happiness, and where does it originate? Such questions represent core issues in research on well-being, a field that has flourished in recent years (Diener, Suh, Lucas & Smith, 1999; Kahneman, Diener & Schwarz, 1999; Kwan, Bond & Singelis, 1997; Veenhoven, 1996). Under this general theme, several constructs have been studied, including quality of life, happiness, life satisfaction, subjective well-being, optimism and hope. Although not identical in content, these different constructs have in common a focus on positive characteristics and experiences, rather than the mere absence of psychological problems.

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Subjective well-being (SWB) is typically conceived of as comprising a cognitive component of life satisfaction and two affective components, namely the presence of positive affect and absence of negative affect (Diener & Suh, 1997; Diener, Suh, & Oishi, 1997; Pavot, Diener, Colvin & Sandvik, 1991). A number of correlates and potential causes of subjective well-being have been identified, for example friendship and social activity (Harlow & Cantor, 1996), marriage (Mastekaasa, 1993, 1994), perceived health (Brief, Butcher, George & Link, 1993; Harris, Pedersen, Stacey & McClearn, 1992), flow-experiences (Csikszentmihalyi & LeFevre, 1989), and goal accomplishments (Brunstein, 1993; Diener & Fujita, 1995). In contrast, factors such as material goods and income contribute very little to subjective well-being (Diener et al., 1999; Veenhoven, 1994). However, one common limitation of many studies so far is the regular cross-sectional design typically being applied. In a comprehensive state-of-the-art review, Diener et al. (1999) suggest causality to be one central topic for future research, and call for designs that apply more sophisticated methodologies in order to identify the causes and effects of SWB.

Recent studies have shown that SWB operates in both a top-down and a bottom-up fashion. That is, well-being partly results from a general tendency to hold positive life-views and partly the cumulative effect of specific events (e.g. Brief et al., 1993; Feist, Bodner, Jacobs & Miles, 1995; Headey, Veenhoven & Wearing, 1991; Mallard, Lance & Michalos, 1997; Vittersø, 1998). Moreover, Suh, Diener, and Fujita (1996) have shown that people tend to stabilise on a certain level of SWB, regardless of the daily events they face. Even after dramatic life events, such as winning a lottery or going through serious illness, within a few months people tend to return to their typical level of SWB.

The notion of a top-down process, and the finding of a return-to-the-baseline tendency, imply a general and stable disposition of holding a favourable, or not so favourable, life view.

To the extent that SWB operates as a relatively stable personality characteristic, it seems reasonable to hypothesise that genetic factors affect this characteristic. Given that genetic effects have been found for personality traits such as extraversion and neuroticism, and psychological problems such as anxiety and depression (Bergeman, Chipuer, Plomin & Pedersen 1993; Plomin, DeFries, McClearn & Rutter, 1997), it appears reasonable to expect a similar mechanism for SWB.

However, research on heritability and environmental effects for SWB is scarce. Based on correlations in twin data, Lykken and Tellegen (1996) have estimated that genes explain 40% of the variance in SWB, and when considering only the stable variance of SWB over time the heritability is estimated to be 80%. Moreover, they found a substantial correlation between monozygotic (MZ) twins, but the corresponding correlation between dizygotic (DZ) twins was negligible. This finding was interpreted to indicate that the genetic effect is non-additive rather than additive. That is, the genetic component of SWB seems not to be a simple summed effect of a set of specific genes, rather, interactions arising from a constellation of genes are the mechanisms of genetic expression. However, their interpretation that non-additive effects (genetic interaction) represents the major source of total genetic variance in SWB is somewhat at odds with findings of additive components as the primary genetic factors in personality traits, psychological problems and attitudes (e.g. Plomin et al., 1997).

The other published studies addressing heritability and SWB are typically based on samples of elderly people. Using data from the Swedish Adoption/Twin Study of Aging (SATSA) Harris et al. (1992) found that genes explains 48% of the variance in life satisfaction among people older than 65. Furthermore, Bergeman, Plomin, Pedersen and McClearn (1991) also analysed the