Influences of biological factors on individual personality

Examine to what extend biological factors account for an individuals' personality?

The term ' personality' is used in general conversation in many ways. When psychologists discuss personality they are concerned primarily with individual differences – the characteristics that distinguish one individual from another. This essay discusses personality in terms of the biological approaches that view characteristics as traits and considers the roles of genetics and environmental influences in the stability of individual characteristics.

A lot of evidence points to the conclusion that individual differences, mostly measured as psychological traits are substantially influenced by genetic factors (Carver & Scheier, 2000). This conclusion raises questions about research and theory in Psychology in terms of the variation of these traits in the population and the existence of psychopathology (Bouchard, 2004). Trait psychology has a clear set of assumptions including the heritability of traits and a causal model attributing individual differences in brain function into behavioural and learning differences (Gale & Eysenck, 1992). The behaviour and molecular genetic evidence confirm that biology has its role in personality traits (Carey, 2002).

Since the 1950's Eysenck claimed that most of the differences we observe between people's personalities can be accounted for by just three factors, expressed as bi-polar dimensions: (1) introversion-extraversion; (2) neuroticism-stability and (3) psychoticism. Eysenck (1994) also gave his typology a biological basis, linking it not with body fluids but with the central

nervous system (introversion-extraversion) and the autonomous nervous system (neuroticism-stability). He proposed that individual differences in introversion-extraversion are explained by inherited differences in the excitatory potential of central nervous systems (CNS). Individuals whose excitatory potential is low are predisposed towards extraversion since the bias in their CNS is towards cells being inactive (inhibition) rather than active (excitation). This means extraverts require more going on around them for their brains to function adequately, and to maintain a reasonable level of alertness, than introverts do. Extraverts are ‘ stimuli-hungry’ and not only have a CNS which switches off more readily, they take longer to dissipate the inhibition that has built up in their CNS while attending to a stimulus. Conversely, introverts, through their high excitatory potential, are already reasonably alert and thus less prone to switching their attention to other sources of stimuli; in other words, introverts are less easily distracted than extroverts. Introverts would also be less likely to have what is termed as ‘ micro sleeps’ (switching off for a few seconds), because they dissipate any inhibition much more rapidly than extraverts do.

Even before Eysenck’s theory was available, large individual differences had been observed in the ease with which individuals, in some occupational settings, doing jobs like radar and sonar operations, could cope with the low levels of signals on their screens or reported signals when none were present, while the performance of others seemed relatively unaffected by the low level of simulation (Eysenck & Eysenck, 1985). Eysenck’s theory seemed to offer an explanation of this and other similar differences of behaviour. Extraverts because of the low level of activation in their nervous

systems, find it difficult to cope with environments which provide low levels of unvarying stimulation. Introverts, on the other hand, with central nervous systems already reasonably activated find these environments ideal. Conversely they would be swamped by high levels of stimulation, which would cause a considerable reduction in their performance.

Much of the impact of these physiological differences on psychological differences between individuals was presumed to arise from its effect on an individual's conditionability (Eysenck, 1994). Introverts, since they build up inhibition slowly, are easier to condition than extraverts. This implies that introverts are constitutionally more likely to assimilate, through conditioning, the rules, obligations and attitudes of their social environment. Conversely, the impact of socialisation on extraverts is attenuated by their weaker conditionability. Extraverts are therefore less likely to acquire conforming and conscientious behaviour patterns than introverts.

Though Eysenck, for the most part, has focused on exploring the biological substructure of the introversion-extraversion dimension, he has suggested that an individual's position on the second dimension, neuroticism-stability, reflects the stability of the autonomic nervous system (ANS). The ANS is the part of the nervous system, not directly under the conscious control, that carries a number of reflex activities; it is also involved in certain emotional responses. Some people inherit a labile ANS, which responds vigorously to stress and also takes some time to return to baseline. In addition, they experience more spontaneous activity, that is, shifts in activation which are not clearly attributable to external events. Conversely, some individuals are born with stable ANS characterised by weaker responses to stress, a more

rapid return to baseline and spontaneous activity. This means individuals with a labile ANS are constitutionally more prone to worry, anxiety, embarrassment and stress than those with a stabile ANS. Thus, individuals towards the neuroticism end of the dimension have greater ‘ free floating’ anxiety which, through conditioning, can become attached to events or people. This may mean that social interaction can, for some individuals, become ‘ loaded’ with a considerable amount of anxiety. However, an important implication of Eysenck’s theory is that neuroticism is normally distributed along a continuum. In other words, there is not a discontinuity between normal people and conditions such as agoraphobia (i. e. fear of open spaces), which are simply the result of somewhat higher levels of anxiety response. If the agoraphobics can learn a more neutral response he or she will be able to resume a normal life.

However, despite clear connections between an individual’s biological status and neuroticism, there are clearly very significant environmental considerations. Tong et al., (2000) found that levels of neuroticism (N) were causally related to environmental factors and, in particular, to the failure of affect ional bonds provided by a social network of friends and acquaintances. Similarly, Bouchard (2004) found that women with children at home under 15 years old and men and women who are unemployed are more likely to have neurotic problems. Thus, 25. 4% of unemployed women and 13. 6% of unemployed men had neurotic illness as compared with 8. 9% of employed women and 5. 5% of full or part-time employed men. The employed status of the subject’s spouse also plays a part in the prevalence of neurotic symptoms. Men with a wife at home are less at risk than those who have a

wife at work. In women, those with an unemployed husband at home are more at risk than their peers with a husband at work. Thus neuroticism, though having a large genetic component, seems to be also partly environmental, although the direction of cause-and-effect in such studies should not be presumed.

Children in maturation process value immensely consistent parental, familial and peer encouragement and emotional support (Bouchard, 2004). Inadequate or culturally atypical child rearing practices, parental illness, marital disharmony and family disturbance are all associated with personality disorder. Nevertheless, the role of learning cannot be over-estimated. Many personality disorders, for example, can be described in terms of inappropriate thresholds to incoming stimuli (Krueger & Markon, 2006). Low thresholds to frustration or tolerance lead to impulsive behaviour or loss of temper. A high threshold in relation to emotional sensitivity leads to over defensiveness and emotional coldness. Thus, a child with little innate tendency to loss of temper but, in a family where tempers are regularly lost and are socially effective and valued, will model this behaviour and lower her threshold. Impulsive behaviour may be more likely in children where impulsive behaviour flourishes in the family and subculture.

In terms of genes and cognitive abilities, several researchers have estimated the separate effects of genes and environment in the expression of intelligence by comparing monozygotic and dizygotic twins raised in the same environment with those raised in different environments (Bouchard et al., 1990). These can be viewed as experiments of nature (monozygotic and dizygotic twins) and experiments of nurture (raised in birth or adoptive

families). Genes and environment are both correlated in birth families because the same parents provide both genes and environment. In adoptive families, the birth parents provide the genes and the adoptive families provide the environment. These studies have demonstrated that the correlation of the IQs of siblings raised in different environments is low, just over 0. 20 (Bouchard & McGue, 1981). Monozygotic twins of course share 100 percent of their genes, whereas dizygotic twins and other siblings share 50 percent. Clearly genes have stronger effect on IQ. However, the outcomes of twins studies do not refer to individual members of the populations under investigation. In other words, conclusions about the relationship between genes and IQ do not apply to individuals regarding the research evidence available. Nevertheless, the decreasing role of the environment in IQ seems to be counter-intuitive because research by Petrill et al., (1998) has shown that the longer twins experience different environments the more dissimilar should become. In other words, the effect of the environment on IQ is important in childhood but becomes increasingly unimportant in adulthood (Petrill et al., 1998).

Nowadays, trait psychology has been challenged in terms of whether or not should we maintain individual differences in the functioning of broad neural systems as the principal explanations of personality? Cognitive and social-cognitive models may provide viable alternatives considering the impact of moderating factors. Further, both Eysenck and Gray assume that each trait relates to a single, key underlying system, but there might not be any simple one-to-one mappings between brain functions and traits (Zuckerman, 1991). These challenges presented by cognitive theorists and multiple-systems

models of traits may be met in various ways. For example, improvements in the methodology for assessing brain functions may reveal that Eysenck and Gray are correct. Another approach maintains the centrality of neurophysiological explanations and seeks to develop more complex physiological models (e. g. Zuckerman, 1991). Furthermore, an alternative is to consider cognitive variables as mediating constructs so that they facilitate neural processes.

In conclusion, some personality characteristics (such as general mood and energy level) are influenced by inherited biological factors. Eysenck (1985; 1994) thought that personality was determined more by genes than by environmental factors. Various personality attributes seem to be identifiable within weeks of birth and remain relatively stable in each child during the first three years. Although this clearly attests to the large genetic influence on early personality development, these biological factors cannot be viewed in a vacuum. Experiences that are common to the culture and the subculture group (such as gender roles) and experiences that are unique to the individual interact with inborn predispositions to shape personality. Personality develops in a constant interactive process between biological potential, environmental circumstances and social opportunity.

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