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THE INFLUENCE OF INNATE AND ACQUIRED FACTORS ON PERSONALITY DEVELOPMENT IN CONTEMPORARY PSYCHOLOGY

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Abstract. This article examines the relative contributions of innate factors, including biological and genetic predispositions, and acquired factors, including social, cultural, and environmental influences, to personality development from the perspective of contemporary psychological theories and empirical research. Moving beyond the traditional nature-nurture dichotomy, the article presents an integrative framework that emphasizes gene-environment interplay, epigenetic processes, and neuroplasticity. Particular attention is given to findings from twin and adoption studies, developmental changes in cognitive abilities and personality traits, and the implications of these findings for educational practice and child-rearing. The analysis suggests that personality development cannot be adequately explained by either heredity or environmental influences in isolation. Instead, it emerges through dynamic interactions among genetic predispositions, environmental conditions, individual experiences, and personal agency. The article concludes by highlighting the importance of developmentally appropriate education, supportive family environments, and further longitudinal research within diverse cultural contexts, including Uzbekistan.

Keywords: personality development, heredity, environment, gene-environment interplay, epigenetics, socialization, temperament, developmental psychology.

Introduction. The question of what determines personality development-innate biological predispositions or experiences acquired throughout life-has long been one of the central issues in psychology. The relationship between heredity and environment has been examined from various theoretical perspectives, reflecting broader debates concerning the origins of individual differences in human behaviour, cognition, and emotional functioning.

In the nineteenth century, Francis Galton helped establish the nature-nurture debate as a major scientific issue. During the twentieth century, the problem was interpreted differently within behaviourism, psychoanalysis, biological approaches to personality, and sociocultural theories of development. While some approaches emphasized the role of biological predispositions, others highlighted learning, social interaction, cultural practices, and the influence of the surrounding environment.

Advances in behavioural genetics, molecular genetics, neuroscience, and longitudinal developmental research have contributed to a more integrative understanding of this issue. Contemporary psychology increasingly recognizes that heredity and environment do not operate as independent or mutually exclusive forces. Rather, their effects are interdependent, developmentally dynamic, and influenced by the individual's experiences and actions.

The aim of this article is to examine the influence of innate and acquired factors on personality development through an analysis of major theoretical approaches and empirical findings in contemporary psychology. Particular attention is given to gene–environment interplay, epigenetic processes, neuroplasticity, developmental changes in individual differences, and the implications of these mechanisms for education and upbringing.

Literature Review and Methodology. This article employs a theoretical and analytical approach based on a review of established psychological theories and empirical research concerning personality development. The methodological framework includes theoretical analysis, comparative-historical analysis, conceptual synthesis, and the comparison of findings from twin, adoption, molecular-genetic, and longitudinal studies.

The literature review focuses on several major research traditions: biological and trait-based approaches to personality, sociocultural and activity-based theories of development, social-cognitive theory, ecological systems theory, attachment theory, and contemporary research on gene-environment interplay.

The purpose of this analysis is to identify the explanatory contributions and limitations of these approaches and to develop an integrated interpretation of the relationship between biological predispositions and environmental influences. As this article is a theoretical review rather than a systematic review or original empirical investigation, the findings are presented as a synthesis of existing research rather than as the results of newly collected data.

Biological and genetic approaches emphasize the contribution of inherited differences to individual variation in temperament, cognitive abilities, and personality traits. Among the influential scholars associated with these approaches are Hans J. Eysenck, Raymond B. Cattell, and Robert Plomin.

Eysenck linked major dimensions of personality to differences in physiological and neurobiological functioning. Cattell investigated the structure of personality through trait analysis, while Plomin contributed substantially to behavioural genetics and research on the genetic and environmental origins of individual differences.

Twin and adoption studies have provided important evidence that genetic differences contribute to variation in many psychological characteristics. However, heritability estimates should be interpreted with caution. They describe the proportion of observed variation within a particular population and environment that is statistically associated with genetic differences. They do not indicate the proportion of an individual's personality that is genetically determined, nor do they imply that a trait is unchangeable.

A major contribution to this field was the meta-analysis by Polderman et al. (2015), which synthesized evidence from decades of twin research. The study demonstrated that genetic influences contribute substantially to variation across a wide range of human traits, while environmental influences also account for meaningful differences. The findings support a multifactorial account of human development rather than a strictly genetic or environmental explanation.

In contrast to approaches that focus primarily on biological predispositions, sociocultural theories emphasize the role of social interaction, language, cultural practices, and participation in meaningful activities.

Lev S. Vygotsky conceptualized psychological development as a cultural-historical process in which higher mental functions initially emerge through social interaction and are subsequently internalized by the individual. His concept of the *zone of proximal development* highlights the difference between what a learner can accomplish independently and what can be achieved with appropriate guidance from adults or more capable peers.

Vygotsky's theoretical framework was further developed in activity-oriented approaches associated with scholars such as A. N. Leontiev, D. B. Elkonin, and P. Ya. Galperin. These approaches emphasize the developmental significance of purposeful activity, learning, and the gradual transformation of externally guided actions into internal psychological processes.

From this perspective, personality development is inseparable from the social and cultural contexts in which individuals participate. Language, educational practices, family relationships, and culturally established forms of activity contribute to the development of self-regulation, motivation, values, and social competence.

Albert Bandura's social-cognitive theory provides another important explanation of the relationship between the individual and the environment. The theory emphasizes observational learning, self-efficacy, and reciprocal determinism, according to which personal factors, behaviour, and environmental conditions influence one another.

Urie Bronfenbrenner's ecological systems theory situates development within interconnected environmental systems. These include the microsystem of direct relationships and settings, the mesosystem of interactions between those settings, the exosystem of indirectly influential social structures, and the macrosystem of broader cultural values and institutions. Later developments of the ecological approach also emphasized the role of time and changing person-context relationships.

John Bowlby's attachment theory highlights the importance of early relationships with caregivers for the development of emotional security and later social functioning. However, attachment outcomes cannot be attributed exclusively to either the child's temperament or the caregiver's behaviour. Individual characteristics may influence patterns of interaction, while the quality and consistency of caregiving can, in turn, shape the expression of behavioural and emotional tendencies.

Taken together, these perspectives suggest that personality development is best understood as a process involving reciprocal relationships among individual characteristics, social interactions, cultural practices, and broader environmental conditions.

Contemporary developmental psychology increasingly replaces the question of whether heredity or environment is more important with an examination of how these factors interact over time. This approach is sometimes described as the principle of “nature via nurture,” emphasizing that genetic predispositions are expressed and modified within particular environmental contexts.

One important mechanism is gene-environment correlation, which refers to the association between genetic differences and the environments individuals experience. Three commonly distinguished forms are passive, evocative, and active gene-environment correlation.

Passive gene-environment correlation occurs when parents provide both genetic material and an environment associated with their own characteristics. For example, parents with a strong interest in music may transmit genetic predispositions relevant to certain abilities while also providing musical instruments, lessons, and opportunities for musical engagement.

Evocative gene-environment correlation occurs when an individual's characteristics elicit particular responses from other people. A child who demonstrates curiosity, sociability, or strong emotional reactivity may receive different forms of attention and feedback from parents, teachers, and peers.

Active gene-environment correlation occurs when individuals increasingly select, modify, or create environments that correspond to their interests and dispositions. For example, an adolescent with a strong interest in scientific activities may seek out specialized courses, competitions, or peer groups that reinforce that interest.

Scarr and McCartney (1983) argued that the forms of gene–environment correlation change over the course of development. As individuals gain greater autonomy, their opportunities to select and shape their environments generally expand. Nevertheless, the extent of this autonomy depends on age, family circumstances, socioeconomic conditions, cultural expectations, and access to resources.

It is important to distinguish gene-environment correlation from gene-environment interaction. Correlation concerns the association between genetic differences and environmental exposure, whereas interaction refers to situations in which the relationship between genetic differences and an outcome varies across environmental conditions, or the effects of an environment differ according to genetic differences.

Gene-environment interaction provides a framework for examining why individuals exposed to similar circumstances may experience different developmental outcomes. Genetic differences may be associated with varying levels of sensitivity to particular environmental conditions, while environmental experiences may influence the extent to which predispositions are expressed.

Caspi et al. (2003) reported findings suggesting that the relationship between variation in the serotonin transporter gene and depressive outcomes differed according to exposure to stressful life events. The interpretation and replicability of this specific finding have subsequently been debated, and it should not be treated as definitive evidence that a single genetic variant determines vulnerability to depression.

Nevertheless, the broader research question remains important: how do genetic differences and environmental experiences jointly contribute to psychological outcomes? Current approaches emphasize the need for replication, adequately powered studies, careful measurement of environmental exposure, and the consideration of multiple genetic and environmental influences.

From a developmental perspective, these findings reinforce the principle that genetic predispositions should not be interpreted as fixed psychological destinies. Their implications depend on the broader pattern of developmental experiences and the conditions under which individuals grow and function.

Epigenetics provides an additional perspective on the relationship between biological predispositions and environmental experience. Epigenetic mechanisms involve changes in gene regulation that do not require alterations to the underlying DNA sequence. These mechanisms include DNA methylation, histone modifications, and other processes that influence gene expression.

Research suggests that environmental conditions, including stress, nutrition, and aspects of caregiving, may be associated with epigenetic changes. Some of these processes have been investigated in relation to stress regulation, brain development, and behavioural outcomes.

However, the interpretation of epigenetic findings requires caution. The existence of an association between an environmental exposure and an epigenetic marker does not, by itself, establish causation. Effects may vary by tissue, developmental stage, and exposure, and findings in animal models cannot automatically be generalized to humans.

Epigenetics therefore does not eliminate the distinction between inherited predispositions and acquired experiences. Rather, it helps explain some of the biological processes through which environmental conditions may influence development and gene regulation.

Neuroplasticity refers to the capacity of the nervous system to change its structure and functioning in response to experience, learning, and environmental conditions. This capacity contributes to the development of cognitive abilities, emotional regulation, behavioural patterns, and adaptive skills.

During early childhood, certain neural systems demonstrate heightened sensitivity to particular forms of stimulation. These developmental windows are commonly discussed in terms of sensitive periods, during which specific experiences may have especially strong effects on the acquisition of particular skills.

For example, early exposure to language-rich interactions can support language development, while stable and responsive caregiving can contribute to emotional regulation and the development of social expectations. Conversely, severe deprivation or prolonged adversity may create developmental challenges.

However, the effects of adverse experiences are not uniform, and later development is not predetermined by early circumstances. The nervous system retains a capacity for change throughout life, although the extent and nature of that plasticity differ across functions and developmental stages.

The concepts of neuroplasticity and sensitive periods therefore support the importance of early developmental support while also emphasizing the continuing potential for learning, adaptation, and psychological change.

The relative contributions of genetic and environmental influences may vary across developmental stages and psychological characteristics. These variations reflect not only biological maturation but also changes in social roles, educational opportunities, personal autonomy, and exposure to different experiences.

Behavioural-genetic research has frequently found that estimates of the heritability of general cognitive ability are higher in many adult samples than in childhood samples. One possible explanation involves gene-environment correlation: as individuals gain greater control over their educational, occupational, and recreational choices, they may increasingly select environments that correspond to their interests and abilities.

This pattern is sometimes referred to as the Wilson effect. However, it should not be interpreted as a universal developmental law. Changes in heritability estimates may vary across populations and historical periods and may be influenced by socioeconomic conditions, educational access, and other environmental factors.

Moreover, higher heritability does not mean that cognitive abilities become immune to environmental influences. Education, nutrition, health, social support, and opportunities for learning remain important for cognitive development and the realization of individual potential.

Personality traits demonstrate both continuity and change throughout life. Research on the development of the Big Five personality dimensions indicates that average levels of certain traits change systematically across adulthood, although the direction and magnitude of change differ by trait and individual.

Personality traits often become more stable with age, but stability does not imply immutability. Major life transitions, including entering employment, forming long-term relationships, becoming a parent, or experiencing significant adversity, may be associated with changes in personality-related patterns of behaviour and emotional functioning.

The developmental trajectory of an individual is therefore shaped by the interaction of biological predispositions, accumulated experience, social expectations, and personal choices.

Adolescence is an important developmental period characterized by changes in self-awareness, social relationships, emotional regulation, and identity formation. Erik Erikson's theory of psychosocial development identifies identity formation as a central developmental task during this stage.

Peer relationships, family expectations, educational experiences, and cultural norms may become particularly influential during adolescence. Young people increasingly evaluate their values, aspirations, and social identities while negotiating expectations from parents, teachers, and peers.

Nevertheless, adolescence should not be understood as a period in which social influences entirely override individual predispositions. Temperament, prior experiences, cognitive development, and family relationships continue to shape how young people interpret and respond to their social environments.

The interaction of these influences underscores the importance of supportive relationships, opportunities for independent decision-making, and educational environments that encourage reflection, responsibility, and constructive social participation.

The integration of biological, psychological, and environmental perspectives has important implications for educational practice and child-rearing. If personality and individual differences develop through the interaction of predispositions and experience, educational approaches should recognize individual variation while avoiding deterministic assumptions.

First, educational practices should take account of differences in temperament, interests, learning pace, and individual strengths. Children may respond differently to the same instructional approach because their prior experiences, motivational patterns, and developmental needs differ. Differentiated instruction and appropriate support can help create conditions in which diverse learners can participate and progress.

Second, genetic predispositions should not be interpreted as fixed limitations. A child who initially experiences difficulties in a particular area may benefit from structured instruction, supportive feedback, sustained practice, and access to appropriate learning resources. The concept of resilience highlights the role of protective factors, including stable relationships, supportive institutions, and opportunities for meaningful participation.

Third, the family and educational environments should provide emotional security, consistent guidance, and opportunities for autonomy. Warm and responsive relationships can support emotional regulation and social competence, while clear expectations and age-appropriate responsibility can promote self-regulation and independence.

Fourth, early childhood education deserves particular attention because early experiences can influence subsequent developmental pathways. Access to quality preschool education, language-rich interactions, adequate nutrition, and supportive caregiving may contribute to favourable developmental outcomes. At the same time, interventions should remain responsive to individual needs and should recognize that development continues beyond early childhood.

Finally, the individual should be regarded as an active participant in personal development. Through goal setting, reflection, learning, and self-regulation, individuals can influence their environments and modify established patterns of behaviour. Personal agency therefore constitutes an important dimension of development that cannot be reduced to biological inheritance or environmental exposure alone.

The theoretical approaches and empirical findings reviewed in this article converge on the view that personality development is a multidimensional and dynamic process. Biological and genetic factors contribute to individual differences in temperament, cognitive functioning, and personality-related characteristics. Environmental influences, including family relationships, education, peer interactions, cultural expectations, and socioeconomic circumstances, shape the contexts in which these predispositions are expressed.

Gene–environment correlation helps explain how individual characteristics become associated with particular developmental experiences, while gene-environment interaction provides a

framework for understanding why similar exposures may be associated with different outcomes across individuals. Epigenetic research and the study of neuroplasticity further demonstrate that biological development is responsive to environmental conditions, although the specific mechanisms and long-term implications require careful empirical investigation.

At the same time, the evidence does not support a simple conclusion that heredity and environment each contribute a fixed proportion to every aspect of personality. Heritability estimates are population-specific statistical measures, and environmental effects may differ in their nature and strength across contexts. Furthermore, some environmental influences are difficult to separate from genetic influences because family members share both genetic characteristics and aspects of their environment.

These considerations have important implications for research and practice. Explanations of personality development should avoid both biological determinism and the assumption that all individual differences can be attributed to upbringing. A more comprehensive approach considers the interaction of biological predispositions, environmental opportunities and constraints, developmental timing, and personal agency.

In the Uzbek cultural context, further research could examine how family socialization practices, educational expectations, community relationships, and cultural values interact with individual differences in temperament and personality. Longitudinal studies involving diverse social and regional groups would be particularly valuable for identifying developmental patterns and evaluating the applicability of established psychological models across cultural settings.

Conclusion. The analysis demonstrates that personality development cannot be adequately explained as the simple sum of innate and acquired factors. Rather, it is a dynamic process resulting from the continuous interaction of biological predispositions, environmental conditions, individual experiences, and personal agency.

Genetic differences contribute to variation in psychological characteristics, but they do not determine an individual's developmental trajectory in isolation. Family relationships, education, cultural practices, social support, and opportunities for learning influence how predispositions are expressed and how psychological characteristics develop over time.

Research on gene-environment interplay, epigenetic processes, and neuroplasticity provides a more comprehensive framework for understanding the interdependence of biological and environmental influences. At the same time, the interpretation of these findings requires methodological caution, particularly when drawing conclusions about causality, individual outcomes, or the universality of developmental patterns.

From an educational and practical perspective, the findings support the importance of individualized learning opportunities, supportive family relationships, early developmental interventions, and environments that foster resilience and personal agency. Recognizing individual differences should not lead to fixed classifications or deterministic expectations; instead, it should inform flexible and developmentally appropriate forms of support.

Future research should prioritize longitudinal investigations of personality development within the Uzbek cultural context, with particular attention to the interaction between family upbringing practices, educational environments, socioeconomic conditions, and individual psychological characteristics. Such research could contribute to a more culturally informed understanding of personality development and provide an empirical basis for improving educational and developmental practices.

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