Culture and the Dance of Genes: A Bidirectional Journey

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ABSTRACT

Research in cultural psychology over the last three decades has revealed the profound influence of culture on cognitive, emotional, and motivational processes shaping individuals into active agents. This article first appeared in the *Annual Review of Psychology* (2024). It first reviews four notable cultural dimensions believed to underlie cultural variations: independent versus interdependent self, individualism versus collectivism, tightness versus looseness of social norms, and relational mobility. Then it examines how ecology and geography shape human activities and give rise to organised systems of cultural practices and meanings, called eco-cultural complexes. In turn, the eco-cultural complex of each zone is instrumental in shaping a wide range of psychological processes, revealing a psychological diversity that extends beyond the scope of the current East–West literature. Finally, it explores how some of the non-Western cultural zones of today, namely Arab, East Asian, Latin American, and South Asian zones, and discusses how they may have contributed, to varying degrees, to the formation of the contemporary Western cultural zone.

1. Introduction and Objectives

This article explores the intricate relationship between culture and genetics, showcasing how each partner shapes the other in a constant dance. Traditionally viewed as separate entities, culture and genetics are revealed to be in a bidirectional relationship, influencing each other in profound ways. One compelling example is the 7/2-R allele of the DRD4 gene, which potentially influences culturally shaped mental and neural characteristics. Individuals carrying this allele, depending on their cultural upbringing, are more likely to exhibit particular cognitive styles and neural responses to rewards and their contingencies. This highlights how cultural contexts can shape genetic expression, potentially influencing the prevalence of certain traits within populations.

2. Methodology

The two researchers, one of whom is an *Annual Review of Psychology* committee member, were invited to review the most recent academic scholarship on the relationship between culture and genes and synthesise how those findings impact our understanding of the nature-nurture debate. This article was created by the Atomic Academic AI.

3. Results

Research shows that cultural backgrounds can mould brain development and cognition. For instance, individuals from East Asian cultures, known for their holistic thinking, display distinct neural resource allocation compared to individuals from European American backgrounds, known for their analytic thinking. These differences extend to brain structure, with variations observed in brain volume between these two groups. This evidence emphasises the powerful influence of culture on neural mechanisms and cognitive functions.

Beyond brain development, the article delves into the impact of culture on behaviours and societal norms. Cultural contexts, shaped by historical, geographic, and economic factors, can influence an individual's tendency towards independence or interdependence. The research also emphasises the complexity of these cultural influences: individuals in collectivistic societies can exhibit seemingly individualistic behaviours at times.

The article further explores additional cultural dimensions like tightness/looseness of social norms and relational mobility, highlighting their influence on individuals and societies. It also introduces the concept of eco-cultural complexes, geographically defined systems of cultural practices and meanings shaped by the environment, contributing to diverse psychological processes across regions.

4. Discussion

1. **Genetic Mediation and Culture:** Culture serves as a significant context for genetic selection, whereby specific genetic elements favoured by cultural practices can support and reinforce the culture from which they emerge. This bidirectional relationship between culture and genetics suggests that genes play a mediating role in the intergenerational transmission of cultural traits. An example of this is the genetic mutation enabling lactose digestion in regions where milk consumption is crucial for survival.
2. **Genetic Determinism and Cultural Variations:** While genes can influence cultural differences in mentality, the concept of genetic determinism, which suggests that genes solely determine cultural traits, is contentious and problematic. Extensive evidence shows that learning and cultural

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transmission play crucial roles in shaping cultural practices. Therefore, it is essential to recognise that multiple cultural forms can emerge from the same genetic foundation because the shaping of human behaviour is complex.

3. **Genetic Moderation in Cultural Learning:** Certain genes may enhance the efficiency of cultural learning and acquisition processes. For instance, the dopamine D4 receptor gene (DRD4), specifically the 7/2-R allele, is associated with heightened sensitivity to rewards and their contingencies and likely facilitates adherence to cultural norms. This genetic moderation indicates that genes can augment cultural learning and contribute to the development of culturally typical mental and neural phenotypes, particularly in environments structured by cultural practices.
4. **Coevolution of Culture and Genes:** The concept of coevolution highlights how culture and genes influence each other over time. Culture provides a context for genetic selection, and selected genetic variations can, in turn, reinforce cultural practices. This coevolutionary process has been particularly intensive in the last 10,000 years, as humans formed increasingly large and complex social units and institutions to adapt to their environments. Understanding this dynamic interplay is crucial for comprehending the development and sustainability of diverse eco-cultural complexes.

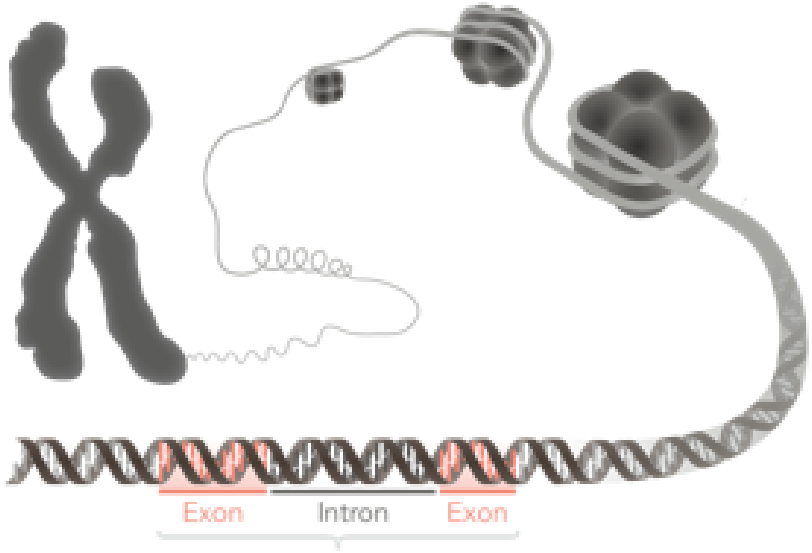

Figure 1 - Chromosomes, DNA, and Genes
Source: Thomas Splettstoesser (www.scistyle.com) CC BY-SA 4.0, via Wikimedia Commons

5. Conclusion

Recent scholarship by psychologists, geneticists, anthropologists, and other cultural studies fields reveal how culture influences genetic selection, brain development, and behaviour, while simultaneously being shaped by our genetic predispositions. Interactions between culture and genes underscore the need to move beyond simplistic categorisations and acknowledge the multifaceted nature of cultural influences on human behaviour. Interdisciplinary approaches are needed to unravel the complexities of human variation and behaviour. By recognising the intricate tango between these two forces, we gain a deeper appreciation for the multifaceted nature of human experience that embraces the rich diversity within and between cultures.

6. Original Publication

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