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From Social Darwinism to Sociobiology: The Developmental Trajectory of Biological Determinism in Social Sciences

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Abstract: Biological determinism, the theory that human behavior is primarily determined by genetic factors, has sparked extensive debate and controversy between social and biological sciences since the late 19th century with the introduction of Darwin's theory of evolution. By examining the origins, development, and impacts of these theories on modern scientific research and social policy from historical and theoretical perspectives, this article reveals the limitations and potential risks inherent in scientific research and social policymaking. The article emphasizes the complexity of using these theories to explain human behavior and social structures, as well as their importance in formulating inclusive social policies.

Keywords: Social Darwinism; Sociobiology; Evolutionary Psychology; Biological Determinism.

1. Introduction

Social Darwinism attempts to introduce the concepts of natural selection and survival of the fittest into the explanation of human society and behavior, profoundly impacting both scientific research and the shaping of social policies and public ideologies. With recent rapid advancements in genomics and neuroscience, our understanding of how genetic and environmental factors interact to shape human behavior has significantly deepened. This complex interaction not only highlights the limitations of biological determinism but also emphasizes its potential risks in shaping social policies. Thus, revisiting the historical development and theoretical foundations of biological determinism, particularly its role in shaping perceptions of gender, race, and social class, is crucial. This paper aims to comprehensively examine the theoretical foundations and historical evolution of biological determinism, critically analyzing its application in current scientific research and social policies. Structurally, the paper begins with the theoretical underpinnings of biological determinism, examines its development through a historical lens, and delves into its application and challenges in modern scientific research and social policy. Through specific case analyses, it reveals its role in fair and inclusive policies and its potential harms. This structural arrangement aims to establish a comprehensive, critical discussion framework that aids readers in fully understanding the complexity and multidimensional impacts of biological determinism.

2. The Historical and Theoretical Foundations of Social Darwinism

(1) Definition and Principles of Social Darwinism

Social Darwinism is an ideological framework that applies Charles Darwin's biological evolution theory to the social and political domain. It posits that social structures and individuals' statuses in society are determined through a "survival of the fittest" natural selection process, similar to species in nature. Social Darwinism was not proposed by Darwin himself but was popularized by his followers, particularly Herbert Spencer.

The core theory of Social Darwinism is based on the concept of natural selection—that in nature, the species best adapted to their environment are most likely to survive and reproduce. Spencer extended this theory to social science, arguing that individuals and groups in society also undergo similar evolutionary processes. For example, in economic and social competition, individuals and businesses best adapted to social and economic conditions are more likely to succeed and survive. Social Darwinism correlates the three major elements of biological evolution—competition, variation, and heredity—to social evolution: competition (e.g., market competition and the struggle for social status), social variation (innovation in culture and technology), and social inheritance (the transmission of culture and knowledge). This theory suggests that social evolution is driven by the interactions of individuals and groups within their environments, where successful social structures and behavioral patterns are retained and passed on. Social Darwinism emphasizes adaptability and capability within society; it proposes that individuals who can effectively adapt to socio-economic conditions, technological changes, and cultural shifts are more likely to achieve success [1]. This perspective has also sparked widespread debate about social equity and individual differences, with critics arguing that it could lead to the neglect and injustice towards vulnerable groups.

In summary, Social Darwinism is a theoretical framework that applies the principles of biological evolution to the analysis of social structures, offering a unique perspective on understanding social changes and individual differences. However, it also faces ethical and philosophical criticisms.

(2) The Development of Social Darwinism

Herbert Spencer's works, "Social Statics" (1851) and "Social Dynamics" (1852), provided an early theoretical foundation for Social Darwinism. In these works, Spencer applied biological evolutionary theory to human societies, advocating for the application of "survival of the fittest" within social realms.

By the late 19th century, as Britain's global influence

expanded, the ideas of Social Darwinism spread to the United States through books, lectures, and international conferences. For instance, Spencer's views were widely disseminated in the U.S. through his 1873 publication, "The Principles of Sociology," which significantly influenced American academics and policymakers. In the U.S., Social Darwinism resonated with Lester F. Ward's "Dynamic Sociology" (1883), affecting influential figures like Andrew Carnegie and John D. Rockefeller, who used the theory to justify their business practices and indifference towards the underprivileged.

By the early 20th century, Social Darwinism began facing criticism from various disciplines. For example, Thomas Huxley criticized Social Darwinism in his 1893 essay, arguing that it neglected the moral and ethical dimensions of human societies [1].

The historical development of Social Darwinism not only reflects the socio-economic transformations of the 19th century but also profoundly influenced subsequent discussions on social policy and ethics. The dissemination and application of this theory, particularly its spread from Europe to America and its impact on economic policies and social reforms, provide a critical perspective for understanding the history of modern social sciences.

(3) Key Figures and Their Impact

Herbert Spencer was a primary proponent of Social Darwinism, applying Darwin's theory of biological evolution to social sciences, suggesting that social structures and cultures evolve through a natural selection process of "survival of the fittest." His ideas were elaborated in his works "Social Statics" and "Social Dynamics," which had a profound impact on the socio-political thoughts of the 19th and 20th centuries. During the Industrial Revolution, his theories provided theoretical support for capitalist market competition, suggesting that the 'winners' in the market naturally deserved more resources. However, Spencer opposed excessive government intervention in social welfare, believing it hindered the natural process of social evolution. His theories were also used to support racial superiority and imperialism, positing that Western nations conquered others because they were more advanced in social evolution. Despite some of Spencer's views sparking ethical and moral controversies, his perspectives on education also promoted educational reforms advocating for more personalized educational methods.

Francis Galton, Spencer's cousin, contributed to Social Darwinism through his work in genetics and statistics. Influenced by Darwin's theories, especially natural selection, Galton founded the concept of eugenics, advocating for the improvement of human genetic qualities through selective breeding. Although his initial intention was to enhance public health, his theories were later misused to support racist ideologies and policies of racial superiority [2]. In the early 20th century, eugenics was misappropriated by certain groups and governments to promote racial cleansing and segregation policies, casting a negative light on the concept in modern society.

William Graham Sumner, an important American Social Darwinist, profoundly influenced U.S. economic policies and social structures. He believed that socio-economic disparities were a natural result of natural selection and "survival of the fittest." Sumner advocated for market freedom and personal responsibility, opposing government intervention in the economy and social welfare, arguing that social assistance could hinder natural competition and personal improvement. His views were fully expressed in his work "What Social Classes Owe to Each Other," suggesting that poverty was a reflection of personal character and habits rather than societal structures. His ideologies provided theoretical support for later American conservative policies, particularly emphasizing the importance of individual freedom and market economy. However, Sumner's theories also sparked widespread controversy and criticism, with detractors arguing that he oversimplified social issues and neglected the impact of social structures and inequality on individual opportunities. His perspectives stirred vigorous debates in social and political discussions, especially regarding the role of government in alleviating social inequalities.

3. The Decline of Social Darwinism and the Rise of Sociobiology

(1) Causes of the Decline of Social Darwinism

The decline of Social Darwinism was driven by multifaceted historical factors spanning social, scientific, ethical, and political realms. In the realm of science, the early 20th century witnessed advancements in genetics, psychology, and sociology that offered new insights into the complexities of human behavior. For instance, groundbreaking discoveries in genetics, such as the double helix structure of DNA, began to challenge the simplistic notions of biological determinism and the theoretical foundations of Social Darwinism, highlighting the interactions between genetics and environment and their influence on behavior.

Moreover, the extreme application of biological determinism by Nazi Germany during World War II, such as racial cleansing and eugenics practices, exposed the catastrophic consequences that these theories could entail [3]. A global reflection against such extremism, particularly ethical scrutiny of racism and social inequality, accelerated the decline of Social Darwinism. Post-war, the global spread of democratic and human rights ideals, along with the establishment of the United Nations and various international human rights organizations, promoted the values of equality and diversity worldwide. The political and social environment post-war, including the Cold War political dynamics, also influenced social theories. In Western countries, particularly in the United States and Europe, the consolidation of democratic regimes and their emphasis on individual freedom and social justice challenged the biological determinist views of Social Darwinism. Political leaders and policymakers began seeking more comprehensive social models to address complex domestic and international issues.

These scientific advancements, ethical awakenings, political and social environmental changes, and shifts in cultural perspectives collectively led to the marginalization of Social Darwinism. Emerging theories such as social constructivism and postmodernism, which emphasize the roles of language, culture, and social interactions in shaping individual identities and social structures, further pushed for the critique and transcendence of traditional biological determinism, marking a significant paradigm shift in social sciences [4]. This shift not only influenced theoretical developments in academia but also had profound impacts on public policies and social governance models.

(2) Origins of Sociobiology

The origins of sociobiology can be traced back to the 1970s, particularly through the pioneering work of E.O. Wilson, which systematically articulated and promoted this field. In

the 1970s, Wilson, an entomologist and biologist, used his research on insects, especially ants, to propose the concept of sociobiology. His findings that complex behavioral patterns in ant societies were largely genetic prompted him to consider the biological bases of human social behavior. In 1975, Wilson published "Sociobiology: The New Synthesis," marking the formal establishment of sociobiology as a discipline. In this book, Wilson argued that many social behaviors, including cooperation, competition, territoriality, and social hierarchies, could be explained through evolutionary principles. He suggested that these behaviors were not merely products of culture or environment but were significantly influenced by genetic and evolutionary pressures.

Wilson's theory, originating from his studies on insect social behavior, particularly ants, showed that many social behavior patterns have a genetic basis. He then hypothesized that these biological principles could also apply to human societies[5]. Wilson believed that many human social behaviors, such as kinship, group competition, sexual selection, and social hierarchy, could be understood from an evolutionary perspective. His theory aimed to bridge traditional disciplinary boundaries, integrating biology, psychology, anthropology, and sociology into a cohesive framework to analyze social behavior. By doing so, Wilson reintroduced biological determinism—the significance of genetic factors in determining social behavior and structures.

This approach sparked considerable controversy in the academic world, facing criticism from social scientists and philosophers, particularly concerning its biological determinist leanings. Many social scientists and philosophers criticized Wilson's views as overly simplistic, arguing that he excessively emphasized genetic factors while neglecting the roles of culture, environment, and individual choice. Despite the support or opposition, Wilson's sociobiology undoubtedly provided a new perspective on how biological factors influence social structures and behavior, greatly facilitating interdisciplinary dialogue and research.

(3) Core Theories of Sociobiology

The core theories of sociobiology are based on applying biological evolutionary principles to explain social behavior, arguing that individual and group social behaviors are largely driven by genetic factors. This theory was systematically articulated by E.O. Wilson in his 1975 work "Sociobiology: The New Synthesis," marking a significant turning point in the application of biological principles to social science research. Wilson proposed that social behaviors, including kin selection, sexual selection, and cooperative and competitive behaviors within groups, could be explained from an evolutionary perspective. He emphasized that biological factors, such as genetics, reproductive success, and predation pressures, profoundly influence social structures and behavior patterns.

Kin selection theory: This theory, proposed by W.D. Hamilton, explains how animals tend to support individuals closely related to them to ensure the better propagation of their genes. For example, parents are inclined to protect their offspring because the offspring carry their genetic information.

Sexual selection theory: Charles Darwin's sexual selection theory suggests that certain traits evolved to enhance individual reproductive success rather than survival. Sexual selection can explain complex mating behaviors and secondary sexual characteristics in many animals, including humans.

Group selection theory: Group selection theory explores natural selection at the group level. Although controversial, some biologists believe that behaviors beneficial to group survival, such as self-sacrifice, can be preserved through natural selection.

Behavioral ecology: Behavioral ecology, a branch of sociobiology, uses evolutionary principles to explain animal (including human) behavior strategies. For instance, human social strategies, reproductive strategies, and food acquisition strategies can be interpreted from an evolutionary perspective.

Gene-centered view: Richard Dawkins' "The Selfish Gene" reinforced the idea that natural selection acts on genes rather than individuals or populations. This suggests that behavior evolves guided by its impact on gene propagation success.

These theories of sociobiology provide a new lens for analyzing and understanding social structures and individual behaviors, emphasizing the role of biological factors in shaping social and cultural traits. This approach has sparked broad discussions and has had profound impacts on anthropology, psychology, sociology, and other fields.

Sociobiology's acceptance varies widely in academia and among the public. In the academic world, the theory has received attention and application from multiple fields like genetics, ecology, and behavioral science, particularly in the study of animal behavior, where sociobiology provides robust theoretical support. However, in social science disciplines, especially those focusing on human culture and social constructs, sociobiology's biological determinist views have faced strong criticism. Critics argue that it overemphasizes genetic factors in determining behavior, overlooking the importance of culture, environment, and individual choice. On the public level, sociobiology's theories have also sparked ethical and moral controversies, particularly regarding its biological explanations for social inequalities. Some argue that attributing complex social behaviors to biological factors could provide a flawed scientific basis for racism, sexism, and other social issues. Nonetheless, as a bridge between biological and social sciences, sociobiology has promoted dialogue and provided new insights into human and other social animals' behaviors.

4. The Transition from Sociobiology to Evolutionary Psychology

(1) The evolution of the theory

Social biology to the transition of the evolutionary psychology marked the further development of biological determinism in the field of psychology. This transformation process involves several key steps, including the theory of reinterpretation, subject intersection, and the new theory of academic acceptance and promotion.

Theory to explain. Sociobiology, especially the work of E.O. Wilson, emphasizes the importance of genetic factors in social behavior. This view challenges the concepts of the psychological educational world mainstream, the behavior is mainly decided by the environment and learning [5]. Social biology theory and Darwin's theory of natural selection and sexual selection is closely related, provides a new perspective for the psychology: psychological and behavioral characteristics can also be the result of the adaptive [6].

Interdisciplinary integration. The formation of evolutionary psychology is a combination of social concept of biology and psychology research methods. Psychologists

began to explore how to apply theory of evolution to the understanding of human psychological characteristics, such as fear, mate choice, and social behavior. In the process, theorists have tried to construct a framework to explain how these psychological traits helped our ancestors adapt to prehistoric environments, thereby improving the likelihood of survival and reproduction.

Academic acceptance and promotion of new theory. Evolutionary psychology as a new discipline in academia of receiving process is complex and controversial. On the one hand, it provides a new way to explain human behavior, was welcomed by some psychologists and behavioral scientists. On the other hand, it also suffered from cultural anthropology, and social science in areas such as criticism, the criticism mainly focused on its biological determinism orientation and the neglect of cultural factors. Despite the controversy, evolutionary psychology through its application in the study of human behavior and psychological characteristics, gradually occupied a place in academia.

This transition not only marks the theory development and deepening, also reflects the scientific nature of human behavior and psychological understanding of constant pursuit and correction [7]. The application of the concept of biological determinism to psychology, evolutionary psychology to understand the complex human behavior provided a new biology and psychology point of view.

(2) Major arguments in evolutionary psychology

Evolutionary psychology is a kind of evolution theory to explain the application of psychological characteristics and behavior of the subjects. The basic argument in this field is based on several core theories and approaches that aim to explain how human psychological traits helped our ancestors adapt to their environment and thereby improve their chances of survival and reproduction.

Adaptive psychological mechanism; Evolutionary psychology, many human psychological characteristics, such as fear, love, language ability, etc., are the result of adaptability, that is, these characteristics is formed in the long evolution process, because they had on our ancestors help [6] on the survival and reproduction. Modular idea; The human brain is considered by many special modules, each module processing certain types of information. For example, language, social interaction, food choices, and other functions may be governed by different modules of the brain. Universality and difference; Evolutionary psychologists to explore the psychological characteristics of the universal (that is common to all human characteristics) and the relationship between cultural differences, emphasize while some psychological mechanism is common, but their forms may be affected by the cultural environment [6].

The methodology of evolutionary psychology is a core component of the field and covers a variety of research strategies and techniques with the aim of exploring and validating the evolutionary roots of human psychological traits. The following several kinds of research methods are commonly used in evolutionary psychology:

Experimental design: Evolutionary psychologists use controlled experiments to test the performance of specific psychological mechanisms under given conditions, such as in the context of social interaction, partner choice, or risky decision making. In addition, scenario simulation is used to observe people's reactions and decision patterns by constructing virtual environments or scenarios that simulate possible evolutionary environments.

Comparative study: this approach include interspecific and intraspecific comparison. Interspecies comparison involving (especially other primates) to humans and other animals behavior, to find common evolutionary model or psychological mechanism. Intra-species comparison studies the behavioral differences of different human groups (such as different cultures and different genders) to explore the universality and variability of evolutionary psychology theory [8].

Computational models and mathematical simulations: Evolutionary psychologists use evolutionary game theory and agency models to study how specific behaviors evolve in social interactions. Evolutionary game theory uses mathematical models to simulate the evolution of behaviors such as cooperation versus competition and social punishment. Agent models create virtual "agents" through computer simulations that simulate their decisions and behaviors in specific contexts to predict possible psychological adaptations in evolution.

Psychological adaptability research: ecological validity test and cross-cultural validation are the two main forms of such research. Ecological validity tests to explore whether individual behavior or psychological response to the specific environment adaptive advantage [9]. Cross-cultural validation is to verify the universality of a psychological trait in different cultural backgrounds to confirm whether it is the product of evolution.

Anthropology and history research: ethnographic research and historical analysis to help researchers understand how culture and social structure affect psychological adaptation. Ethnographic research involves long-term observation of specific cultures and data collection to explore the influence of cultural factors, while historical behavior analysis analyzes changes in human behavior and social structure through historical records [10].

These approaches not only help researchers understand the evolutionary roots of human behavior, but also provide a rich experimental and empirical foundation for theories of psychological adaptation, thus establishing a comprehensive and exhaustive framework of understanding that accounts for complex human psychological and behavioral patterns.

(3) Contemporary criticism and evaluation

Evolutionary psychology as a discipline has had a profound impact in both academia and the public. It provides a new framework for psychology and related fields, postulates that psychological traits are products of adaptation, and drives in-depth research into the evolutionary forces behind human behavior. The application of this methodology spans multiple disciplines such as social sciences, anthropology, and biology, facilitating interdisciplinary research collaboration. At the same time, the evolutionary psychological theory and found that has been incorporated into the university curriculum and teaching material, become an important part of education. In addition, the findings have potential implications for public policy making in areas such as health promotion and education reform. The concept of evolutionary psychology is widely spread in the popular media and public discussion, especially about the topic of gender differences and relationship, although sometimes with misunderstanding and controversy, but also stimulate the public's interest in science. However, this field is faced with criticism from different disciplines, especially for the rationality of its methodology and ethical consequences of some hypothesis, these criticisms, in turn, contributed to the theory of self-examination and

improvement. Overall, evolutionary psychology not only enrich the scientific research, and deeply influenced the social culture and the formation of public policy, showed how a subject from the academic field is expanded to a wider range of social practice.

As a theoretical framework, evolutionary psychology faces a variety of criticisms and challenges in contemporary times. First of all, it has been criticized as too simplify complex human behavior and psychological characteristics, sometimes tend to think of complicated social phenomenon is due to genetic and evolutionary factors, and ignore the influence of culture, environment and individual differences. In addition, some assumptions and inferences in evolutionary psychology also faces the challenge of scientific evidence, such as its how to explain the modern social behavior and the relationship between the ancient environment. Critics argue that these theories sometimes lack an adaptive analysis of modern environmental changes. In addition, some application of evolutionary psychology is considered may have a gender and racial prejudice, sometimes because they tend to use biological determinism explain gender roles and racial differences, which may exacerbate social inequality[11]. In the ethical level, evolutionary psychology's point of view if misused or simplify the interpretation of social policy may support a problem or unfair stereotypes.

Despite the criticism, evolutionary psychology is still an active area of research, many researchers working on through experimental design more accurate and more comprehensive theoretical explanation in response to criticism, and promote the field to develop in the direction of more comprehensive and diversified. Such criticism and reflection not only contribute to the advancement of science, but also contribute to broader social and academic dialogue, with important implications for understanding the complexity of human behavior and psychology.

5. Modern Influence and Ethical Considerations of Biological Determinism

(1) Modern scientific research and biological determinism

In recent years, the forefront of genetics and neuroscience advances have greatly changed our view of biological determinism. In the field of genetics, scientists studying the connection between the genes and behavior, found the genes in a potential role of influence human behavior and personality traits [8]. For example, some gene mutation and impulse control disorders, mental health problems and even differences in social interaction ability. This discovery prompted the scientific community to reassess the role of biological factors in the formation of social behavior. At the same time, the rapid development of neuroscience reveals the brain structure and function how to influence the behaviour of the individual. Study how to specific areas of the brain activity and the decision-making process, emotional response, and the formation of social behavior. For example, dysfunction in the prefrontal cortex has been directly linked to impaired social behavior and decision-making.

However, despite the biological factors in understanding human behavior has important value, a single biological determinism perspectives to explain complex human behavior mode is ragged. Scientific community increasingly recognize that environmental factors and individual life experience also play a decisive role in the formation of behavior. For example, individuals with the same genetic background may exhibit completely different behavioral characteristics under different environmental conditions.

Thus, modern scientific research has highlighted the need for a more holistic perspective in interpreting human behavior, taking into account the interplay of biology, psychology, environmental factors, and sociocultural context. This integrated approach helps us to gain a deeper understanding of the diversity and complexity of human behavior and avoid falling into the trap of simple biological determinism. Such research will allow for more precise identification and interpretation of the multifactorial drivers of behavior, leading to more informed choices about social policy and treatment strategies.

(2) Social policies and influence

The concept of biological determinism think human social and cultural phenomenon can be explained by biology. This theory in the field of social policy, education, law and so on influence is extensive and profound.

In terms of social policy, biological determinism may lead policy makers to base policies on genetic traits of biological traits such as race or gender, which may exacerbate social division and inequality. For example, some social policies may tend to discriminate against groups that are considered to be biologically less "fit" or "capable", and such classification based on biological determinism may lead to limited opportunities for some groups in education or vocational training [8].

In the field of education, biological determinism could lead to a school on the course design and student distributary decision-making overemphasize the genetic traits of students. This view may lead schools to pigeonbox students into fixed learning trajectories too early, thereby limiting their developmental potential and freedom of choice, especially for students who are deemed genetically incapable of certain abilities.

In law, the application of biological determinism may affect the determination of criminal responsibility and the setting of penalty. For example, if someone is thought to have a higher propensity to commit a crime because of genetic factors, this may affect their trial and sentence, possibly leading to harsher or more lenient legal treatment[12]. This not only raises ethical and moral controversies, but also challenges individual free will and legal justice.

In conclusion, the application of biological determinism, while providing a perspective, also brings with it a complex set of ethical, social, and legal issues that require us to carefully consider and balance different interests and values in practical applications.

(3) Ethical and philosophical perspectives

The profound ethical and philosophical challenges of biological determinism are multifaceted and involve the conflict between scientific understanding and social values, the boundaries between human free will and biological determination, and how scientific findings affect social policies and moral standards.

Biological determinism could lead to a "naturalistic fallacy", namely the mistake is derived from "yes" to "should be". For example, biological differences in the distribution of certain traits such as aggression or intelligence are considered natural, but using these differences as a justification for social inequality ignores ethical requirements for equality and justice [13]. This view challenges the basic principle of the traditional ethics, everyone should enjoy the equal dignity and

rights.

Biological determinism may weaken the recognition of individual responsibility. If the behavior is regarded as determined by the genetic completely, this may lead to the denial of personal free will, cause of legal responsibility and moral responsibility to rethink[9]. Crime if, for example, is thought to be caused by genetic, this may affect the cognizance of criminal responsibility and penal justice.

Biological determinism is also likely to reinforce the social label and discrimination, by transforming the social and individual psychological characteristics attributed to biological factors that they cannot change, such as genes and brain structure. This kind of attribution can easily lead to fixed views and identity of specific groups, which can deepen social division and estrangement between groups. When social attributes such as intelligence, personality or behavior is seen as a biological predisposition and cannot be changed, this not only limits the growth potential of the individual, may also hinder the social mobility, because social opportunities tend to be allocated to those who are considered "fit" or "superior" group. This view of biological decisions may make social policy and public interventions to ignore individual and group of plasticity, thus ignore the change through education, environment and social support can bring positive change [14].

Therefore, criticism of the biological determinism and ethical considerations are necessary, it requires us to review and evaluate how to deal with more just and inclusive biological and environmental factors impact on individual behavior. From the perspective of philosophy, biological determinism challenge the traditional idea about human nature and freedom. This theory raises a fundamental question: how is human behavior and social structure defined and interpreted between biological determinism and environmental shaping? This philosophical inquiry not only concerns the interpretation and application of scientific theories, but also profoundly affects our understanding of the human condition and social justice.

In the face of ethics and philosophy of the problems of biological determinism, we need a more comprehensive and balanced perspective. This requires us in for a reasonable balance between scientific research and social ethics, to ensure that the development of science is both accurate and reliable, and can be sensitive to the challenge of social ethics. The realization of this balance helps to promote the healthy development of science, so that it can better serve the promotion of human well-being and social justice. This needs to be scientists, policy makers, broad dialogue and cooperation between the educators and the public, to discuss and solve these complex problems.

6. Conclusion

In this paper, we delve into social Darwinism and its subsequent theoretical evolution, from sociobiology to evolutionary psychology to the challenges and implications of modern scientific research on biological determinism. We find that although biological determinism has historically provided a framework for social policy and scientific research, its accompanying ethical issues and scientific limitations have gradually emerged, which has promoted the continuous evolution and deepening of the theory.

This study not only enhances our understanding of the history and development of biological determinism and its related theories such as sociobiology and evolutionary psychology, but also highlights the importance of theoretical examination at the intersection of science and social ethics. By revealing how these theories affect areas such as social policy, education, and law, this paper highlights the need for scientific theories to be applied with careful consideration of their social implications and ethical consequences.

For future research, we recommend focusing on the adaptation and challenges of biological determinism under new scientific and technological advances, such as how developments in fields such as gene editing and artificial intelligence affect our understanding of the interaction between biological and social factors. At the same time, future research should further explore the applicability and impact of these theories in different cultural and social structures to promote the development of scientific ethics and social policies from a global perspective.

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