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Factors Influencing Implicit Bias: Social, Cognitive and Institutional Influence on Implicit Bias

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Abstract. Implicit bias refers to automatic associations that may influence people's daily judgment without fully conscious awareness. This article examines three major influencing factors of implicit bias: social and cultural environments, cognitive mechanisms and personal experience, and institutional and technological systems. The author reviews and compares studies in both English and Chinese to identify common findings and practical implications. This evidence shows that repeated cultural information and social atmosphere can contribute to the formation of implicit bias, while cognitive processes and personal experience affect how these biases are activated or changed. Lastly, institutional and technological systems may further influence bias in either positive or negative ways. Moreover, although implicit bias has the possibility to be changed, brief awareness training or information exposure is unlikely to produce long-lasting effects on changes in implicit bias. More effective solutions should combine meaningful intergroup experience with structural standards, such as standardized evaluation criteria and reduced personal discretion in decision-making. Overall, implicit bias results from the interaction of personal cognition, individual experience and social influence, so reducing its effects requires both personal and social structural change.

Keywords: Implicit bias, implicit social cognition, social stereotypes, artificial intelligence

1. Introduction

Implicit bias refers to automatic associations that can influence people's decisions or judgment without their full consciousness. Greenwald and Banaji first introduced the concept of implicit social cognition to explain how past experience may affect present responses without introspection [1]. Further research showed that attitudes and stereotypes can also shape social judgment and behavior in many areas, including education, medicine, business and law [2]. Since these biases are often subtle and unconscious, people may find it difficult to detect these biases before they gradually create problems.

Therefore, understanding implicit bias seems to be important because its effects are closely related to people's lives. Small differences in attention, evaluation and decision-making may accumulate over time and cause huge social issues such as inequity and prejudice in social interaction and daily life among different groups. However, implicit bias should not be viewed as a single fixed belief or prejudice in people's minds. Its formation has many complicated reasons and

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factors: childhood memories, surrounding atmosphere and cultural stereotypes may all contribute to it. Furthermore, there is the possibility to eliminate or weaken the implicit bias through reinterpretation and new information. Still, further research in this field is needed.

This paper examines three major factors influencing implicit bias in either positive or negative ways. First, the paper discusses how social and cultural environments create the foundation of stereotypes and group prejudice which may help the growth of implicit bias. Second, it discusses how cognitive mechanisms and personal experience affect how implicit associations are learned, formed and activated. Third, it considers how institutions and technological systems such as artificial intelligence (AI) tools may expand or further promote implicit bias and even cause issues in decision-making situations. By reviewing abundant materials discussing the formation and influencing factors of bias, people may have a deeper understanding of it.

2. Core concepts

Implicit bias refers to patterns of evaluation or association that are measured indirectly and may influence people's decision or judgment without notice. It belongs to the broader field of implicit social cognition. It is the influence of past experience on present responses when individuals cannot consciously identify its impact, as described by Greenwald and Banaji [1]. In their framework, an implicit attitude involves favorable or unfavorable responses toward an object, and an implicit stereotype involves automatically connecting members of certain social groups with particular characteristics.

For example, associating men with better science performance and women with better liberal arts performance reflects a typical stereotype, whereas responding positively or negatively toward certain groups is a kind of implicit bias.

The greatest differences between implicit and explicit bias are the ways in which they are expressed and measured. For explicit bias, these are evaluations and beliefs that someone usually holds in public and that can be easily recognized or distinguished, such as someone publicly expressing the idea that a certain group is better than others. Researchers have also shown that implicit and explicit bias can be related: a person who holds a conscious bias or idea may still have a completely different inner implicit idea that is not shown toward others. However, this difference does not mean individuals always secretly hold a prejudiced belief. Nosek et al. explained that implicit bias consists of several cognitive processes and should not be simply categorized as a single hidden attitude [3]. Therefore, the term "implicit" often refers to the indirect measurement method rather than confirming an attitude that is entirely unconscious.

Since implicit bias is different from explicit bias in both its effects and ways of expression, researchers need new indirect ways to detect and study it. They cannot simply ask participants to describe their current ideas. Wen and Zuo reviewed four common methods for assessing attitudes toward single objects: the Go/No-go Association Task, the Extrinsic Affective Simon Task, the Single-Category Implicit Association Test, and the Single-Target Implicit Association Test [4]. These methods were developed from the traditional psychological Implicit Association Test (IAT) and have been used by other researchers to examine implicit attitudes in more specific contexts.

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3. Factors shaping implicit bias

3.1. Social and cultural factors influencing implicit bias

The first important factor influencing people's implicit bias is the social and cultural environment, since human beings develop connections and communications with others through continuous social interactions. Therefore, people may learn ideas about different groups from their peers, families and social media, and this repeated information gradually forms automatic associations inside people's minds. Unlike explicit prejudice, implicit bias does not always show an explicit stereotype toward a group, but gradually builds automatic associations in memory. Greenwald and Banaji explained that implicit bias can influence attitudes and thinking implicitly, meaning that it affects people's social judgment even when they are not fully aware of it [1]. Later, Greenwald and Lai reviewed previous research and reached a similar conclusion: attitudes and stereotypes can operate automatically and implicitly without conscious awareness [2]. These two findings suggest that when people are exposed to certain information, even though they may not notice it, it can still have an effect. When the same group or kind of message is repeatedly connected with certain roles, occupations, behaviors or groups, the association may be easier to activate and create further influence.

The development of these associations and bias can start in an early stage in life. Dunham et al. reported that implicit preferences for certain groups can appear in childhood and may remain relatively stable as people grow older [5]. This finding challenges the former idea that implicit bias develops only after many years of learning and influence from the surroundings [5]. It suggests that early childhood may be a crucial period for forming original implicit associations [5]. There are many factors that can influence kids in their life, for example, the conversations between family members, ideas from other same-age friends, and even misinformation on social media. Moreover, due to their still-developing values and minds, this kind of information is more likely to create a deeper bias in their memory and may be hard to change. Zhang and Song reviewed previous research on the origins and different forms of prejudice, including gender, racial and cultural prejudice [6]. Their discussion provided a broader view of prejudice: it is not only an individual personality problem, but is also connected to stereotypes and broader social conditions [6]. Although the former studies mentioned use many different kinds of study methods, they both agree that surrounding culture and environment provide important material from which implicit bias is formed and developed [5, 6].

However, the formation of bias under long-lasting social and cultural influence does not mean that implicit bias is permanent. Wen and Zuo argued that implicit impressions can be updated when new information is strong, credible and highly relevant to the receptor [7]. They also noted that reinterpretation, motivation and emotion can affect existing impressions [7]. Therefore, the same environment that creates stereotypes can also provide new relevant information that weakens or changes the former bias. This explains why social experience can both enhance and undermine the bias. Overall, the materials suggest that implicit bias is not simply produced inside individuals, but develops through interactions between society and the cultural environment. Social norms, group status and repeated information can all be factors determining the formation of implicit bias or actually weakening it.

3.2. Cognitive mechanisms and personal experience

Implicit bias is not simply produced in a single mental process. Instead, it develops in a more complicated way: the interaction of automatic associations, self-related processing and accumulated

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personal experience. Greenwald and Banaji, together with Nosek et al., noted that implicit cognition reflects the influence of past experience on responses to certain events or groups, and people often find it difficult to identify this influence on daily behavior [1, 3]. For example, people may sincerely support equality movements in an explicit way, while they may still contain prejudice reflected in biased associations. These studies also emphasized that implicit bias cannot be directly measured as a single hidden attitude because it is influenced by multiple psychological processes [1, 3]. Thus, the implicit bias should be understood as the result of automatic associations that probably began in childhood and automatic ideas formed under the social atmosphere.

Personal experience is one factor that should not be ignored when identifying the real origins of implicit bias. Dunham et al. reported that preferences for ingroups and certain people can appear in the early stage of childhood and may remain stable in the future [5]. They also noted that exposure during infancy and later development matters [5]. Infants who frequently encountered racial outgroup members did not show the same typical preferences as those with less exposure [5]. In adults, the high-quality intergroup contact has been proved to show weaker implicit biased association. These findings suggest that the surrounding relationships, family atmosphere and knowledge of status and education may all shape inner biases and influence how easily they are activated. But still, these associations do not mean that every daily experience may activate or weaken inner bias.

Interestingly, self-related processing may also contain implicit bias. Zhong et al. proposed that people tend to connect themselves with a more positive image [8]. For example, when people succeed, they will attribute it to their hard work or some other merits of themselves [8]. However, when they fail, they may blame it on external conditions and the environment [8]. Although this article only presents a research framework, it still provides an interesting and rational glimpse of implicit bias.

Furthermore, there is good news that implicit associations are not completely fixed in the mind and can be changed in certain ways. Wen and Zuo found that new information that is diagnostic, strong and relevant may lead people to reinterpret earlier associations and form a new idea [7]. Reinterpreting former ideas, whether attributed by personal experience or social environment, is a unique way to challenge fixed bias in memory and promote impression updating [7]. Overall, the implicit bias is also determined by cognitive mechanisms, while personal experience shapes it further whether in a positive or negative direction.

3.3. Institutional and technological factors

Implicit bias may affect society not only through personal attitudes toward others, but also through institutional procedures and technological systems that repeatedly influence and shape decision-making processes in people's minds. Greenwald and Lai noted that implicit-bias research was becoming increasingly relevant to broader fields such as education, medicine, business and law [2]. However, methods for guiding practical applications and reducing social bias remain incomplete and require further research [2]. This suggests that public organizations should be cautious when applying the concept of implicit bias and should ensure that their services and missions do not contain information that may trigger further bias or prejudice [2].

Furthermore, in a digital age, Bai et al. found that large language models (LLMs) may also produce biased information in their outputs [9]. They developed two prompt-based methods based on psychological association tests to examine subtle bias in AI tools [9]. Across eight value-aligned models, they identified stereotypical outputs involving race, gender, religion and health [9]. Moreover, the researchers tested more realistic decision situations and found that biased associations

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may affect model decisions [9]. Although these test methods could not completely prove that the models contain unconscious attitudes like humans, the findings still warn that repeated real-world use of such models may create significant problems [9].

Although some people may argue that institutions can easily eliminate the possibility of creating bias, Greenwald et al. found that individual bias-reduction interventions and group training programs have not been shown to produce durable reductions in established implicit bias [10]. Therefore, there should be other ways to solve the problem. The researchers recommended preventive and structural approaches; for example, blinding during decision-making can hide irrelevant demographic information from evaluators [10]. However, more effective solutions are not yet clear and need further evidence to prove.

Overall, institutions and technologies may not create every implicit bias in people's minds, but they may reproduce and expand its consequences to a greater extent. Therefore, reducing the harm of implicit bias requires more than just individuals' efforts. Organizations must also examine the rules, services, procedures and other situations that may create negative implicit associations, affecting certain outcomes.

4. Discussion and suggestions

The findings in this paper suggest that implicit bias is not caused by only one isolated factor, but develops through multiple interactions in people's lives. Social and cultural environments also provide repeated information about groups, while cognitive mechanisms and other factors determine how information is learned, cultivated, and can even affect the strength of implicit bias in the mind. Institutions and technological systems may also further influence these associations and determine whether the bias remains as small psychological tendencies or develops into bigger unequal social outcomes. These findings show that the factors influencing the formation of implicit bias should be understood as interacting rather than independent.

However, several limitations should be considered when interpreting this research. Although indirect measures such as the IAT, which originated from traditional psychological methods, may show correlational relationships, they cannot be used as precise diagnostic tools for determining whether someone really holds implicit bias, and can only provide some advice. Greenwald and Lai warned that changes in implicit-measure scores should not be automatically interpreted as changes in underlying implicit bias [2]. Similarly, biased-association tests of AI-generated information should not be treated as evidence that AI possesses human-like unconscious attitudes [9].

The articles also suggest that the reduction of discrimination requires approaches at more than one level. Education and meaningful intergroup experience may help people obtain more information that can challenge their former stereotypes, but brief approaches or training may not produce long-lasting changes. Greenwald et al. found that there is currently no established method with demonstrated long-term effects on decreasing implicit bias and discriminatory outcomes [10]. Therefore, organizations should use preventive procedures such as creating clear evaluation criteria, hiding irrelevant information and limiting personal discretion [10].

In future studies in the field of implicit bias, researchers should use longitudinal and real-world designs to examine whether changes in implicit-bias measurements lead to lasting changes in people's behaviors. Researchers should also compare differences across cultural settings and backgrounds to investigate how personal and social experiences influence implicit bias. For artificial intelligence, the evaluation should include both tests of AI output and subtle patterns across different social groups. Overall, the most realistic goal is not simply to eliminate implicit associations and bias, but to find ways to prevent them from producing unequal outcomes.

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5. Conclusion

Implicit bias is a complex psychological and social phenomenon that cannot be easily explained by a single factor. This article has reviewed three major influencing factors of implicit bias. First, social and cultural environments provide repeated information, stereotypes and prejudice toward certain groups. This information may push the formation of implicit associations and bias. Second, cognitive mechanisms and personal experience determine how the implicit associations are learned, activated, maintained or changed. Although some implicit bias may remain stable, meaningful new relevant information may lead to the reinterpretation and weakening of current implicit bias. Third, institutions and technological systems may reproduce and expand the consequences of implicit bias when repeated information is shown during decision-making and evaluation.

Another important point emphasized by the evidence is that implicit bias should not be understood as identical to deliberate prejudice. Indirect measures can reveal the presence of associations, but they cannot precisely prove whether the bias is conscious. Therefore, research findings should be explained in a more careful way.

Reducing the harmful effects of implicit bias requires action at both individual and structural levels. Education, meaningful intergroup contact, and exposure to reliable information may help people to weaken their implicit bias and reconsider existing associations. However, awareness training alone is not sufficient. Institutions and organizations should also use clearer evaluation standards, reduce unnecessary discretion and supervise outcomes to lower the effect of implicit bias. In conclusion, the most practical goal of society is not to eliminate everyone's automatic associations in a short time, but to prevent these associations from repeating and being reinforced.

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