Shifting Visual Attention to Reduce Bias in Legal Decision-Making

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Abstract

In the United States, eyewitness misidentification contributes to wrongful convictions which disproportionately impacts Black individuals. We review evidence to offer insights regarding what factors contribute to the misidentification of Black individuals, particularly by White witnesses. Additionally, we offer a facet that has received little previous attention: eye gaze. In summarizing eye-tracking research, we explain how people differentially orient visual attention to in-group and out-group faces and how these visual attention differences contribute to errors in facial recognition and facial learning, leading to misidentifications. We also explore the role of local and global processing in facial recognition, and we probe the consequences for recognition accuracy, depth of encoding, and cognitive effort. Moreover, we delve into two commonly espoused approaches to attenuating misidentification bias in the legal system. In reviewing empirical research, we offer explanations for why these approaches are generally ineffective at limiting bias in decision-making. Finally, we offer our own evidence-based intervention for such bias; we propose shifting overt attention through instructions prior to an eyewitness task. We believe that instructing participants to shift visual attention prior to a visual task will increase holistic attention to all people in a scene and increase cognitive effort while also limiting biased visual processing, such as vigilance-avoidance.

Keywords: Visual attention; Eye gaze; Eyewitness identification; Legal decision-making

Introduction

Eyewitness misidentification is the most prevalent contributing cause in wrongful conviction cases in the United States. Of those people exonerated by DNA evidence, 69% of cases included individuals who were incorrectly identified as the suspect, leading to their wrongful conviction [1]. Moreover, despite making up only 14% of the United States population, Black individuals account for 58% of wrongful conviction cases that the Innocence Project has assisted with overturning. This stark disproportion suggests that Black people are overrepresented in eyewitness misidentifications. While eyewitness identification is still admissible as a form of evidence in the legal system, the errors people exhibit in identifying perpetrators and wrongful conviction statistics undermine the veracity of this evidence.

People can be inaccurate identifiers of others' identities. Labeled the other race effect [2], individuals are especially at risk for misidentifying others when the possible suspect is a member of a different racial group. Why? Evidence suggests that people exert less effort in processing other-race faces and that unfamiliarity with other-race faces decreases abilities to differentiate features [3,4]. To these mechanisms, we add one facet that receives little consideration: visual attention. We summarize research demonstrating that people show differences in visual eye gaze patterns when attending to out-group rather than in-group members' faces. Moreover,

we argue that the attentional patterns individuals engage in when looking at out-group members' faces are suboptimal for accurate face recognition. We propose a potential solution to intervene on these attentional processes to improve the accuracy of identifications.

Group-Based Differences in Visual Processes

Global versus Local Strategies

People attend to out-group faces in different ways than they do in-group members' faces. When looking at other people, individuals can attend in global or local manners. When processing globally, individuals engage with visual information by integrating piecemeal information into a coherent whole by, more generally and in a big-picture type way, extracting the "gist" of the stimulus; in contrast, when processing locally, individuals focus attentional resources on specific details of a stimulus [5,6]. Importantly, global processing is not indexed by the number of fixations on specific elements of a visual stimulus, like the eyes or nose; perceivers can process a stimulus globally while still evincing attentional fixations on various elements of the stimulus [7,8]. Global processing, instead, reflects a process of engaging peripheral attention around points of fixation to simultaneously encode and stitch together multiple low-level pieces of information.

Differences in global and local processing styles predict differences in face recognition. Eye-tracking measures found evidence that some individuals focused attention on the center of a target's face and attended to peripheral visual information, demonstrating "global strategies," while other participants focused on specific regions of the face, demonstrating "local strategies" [9]. However, global processing improves and local processing impairs face recognition. When individuals are experimentally induced to assume a local processing style, the accuracy of face recognition decreases. Likewise, individuals who tend to experience difficulty recognizing faces tend to be individuals who evince weaker global rather than local processing tendencies [10].

Moreover, reliance on global or local strategies may vary as a function of whether the faces depicted are of in or out-group members. Upon encountering members of a racial outgroup, individuals from the dominant group experience feelings of threat and fear towards members from the subordinate outgroup. Such shifts in affective responding hold implications for the style of attentional orienting [11,12]. Specifically, fear narrows attention's focus [13]. In contrast to positive emotional states, which increase attentional flexibility and global processing [14], negative emotions like anxiety have been linked with

increases in processing of local visual features [15] including those on others' faces [16]. If then, White people are more likely to experience threat, anxiety, and fear in response to Black individuals, it is likely that the increased reliance on local processing impairs face recognition.

Attending to Individuating Features

Independent of global and local processing style, attention to other's eyes increases individuation and improves later facial recognition. Using eye-tracking, researchers found that White participants, who in the control condition had no incentives other than to comply with instructions to view the faces presented, spent a significantly longer proportion of time (6% to be precise) attending to the eyes of White faces relative to the eyes of Black faces [17]. (See also Correll and Hudson [18] that reanalyzes Kawakami et al.'s 2014 data and finds support for this specific effect even after accounting for differences in base rates of attention to each face.) That is, White participants oriented more attention to in-group compared to out-group members' eyes. Participants that did not overtly attend to eyes demonstrate impaired facial learning and decreased recognition. Thus, attention to eyes improves recognition while attention to other regions impairs recognition, likely leading to less accurate identifications.

In order to individuate faces by attending to eyes, participants must attend to the face itself. However, White people look away from Black faces. Eye-tracking measures indicated that White participants, who were high in external motivation to respond without prejudice, demonstrated a vigilance-avoidance visual pattern [19]. When shown pairs of Black and White faces, White perceivers' eye gaze was initially drawn to but then subsequently moved away from Black faces and towards White faces. This vigilance-avoidance pattern indicates that White people hold a preference for in versus out-group faces, which could contribute to inaccurate identifications, as White people spend less time than they could encoding Black faces.

Cognitive Effort

People also need to exert more cognitive effort to identify out-group compared to in-group members' faces. Even in early visual processing, individuals more readily process in-group rather than out-group faces, as indexed by differences in neural encoding [20]. N170 amplitudes, a neural marker of attention, were larger when viewing an in-group face than out-group face, suggesting stronger encoding for in-group faces. In addition, when looking at out-group rather than in-group faces, perceivers' pupil size increased; this physiological change is a marker of increased cognitive effort

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when attending to faces from another race compared to their own race [21].

Additionally, people make their judgments more quickly suggesting an investment of less cognitive effort in the process of decision-making when identifying out-group versus in-group faces. In a first-person shooter task, eye gaze was measured when non-Black individuals decided whether to shoot or not shoot armed and unarmed Black and non-Black targets [22]. When the target was armed, participants made the decision to shoot a Black target at moments when their eye gaze was farther from the object; the implication is that they had lower visual resolution and clarity of the object when in the hand of a Black target. When deciding to shoot the White target, participants' eye gaze was closer to the object, suggesting they achieved more clarity before choosing to shoot the White armed target.

In sum, eye gaze research on visual attention to in-group and out-group faces suggests several explanations for why Black individuals are inaccurately identified in eyewitness scenarios. The use of local, compared to global, processing strategies impairs facial recognition and varies as a function of who is depicted. When the target depicted is an out-group member, people demonstrate increased emotional responses, such as threat, anxiety, and fear, leading to increased local processing and impairment for facial recognition. Further, facial recognition can be improved by attending to individuating features such as eyes, but White individuals demonstrate a preference for in-group eyes rather than eyes of Black individuals. Moreover, identifying out-group faces requires more cognitive effort since they are less readily processed relative to in-group faces, but Whites demonstrate less effort for decisions about out-group, versus in-group members. However, less is known about how to reduce these biased visual processes.

Reducing the Influence of Biased Visual Processing

Shifting Visual Attention

We propose that shifting participants' attention through instructions to orient visual attention in ways that do not come naturally may be an effective moderator of biased visual processes. In so doing, attention-based interventions could help reduce influence of pre-existing prejudicial attitudes. We believe that instructions to shift overt attention to attend holistically to all elements of a scene will help reduce biased visual processes, including local processing tendencies that undermine the accuracy of out-group face identifications.

In addition to evidence that holistic processing increases facial recognition, previous research identifies the importance of visual attention for accurate judgments. Compared to individuals who assumed more holistic visual attention, individuals with more frequent fixations and narrowed attention on a police officer were less accurate in their interpretations of case facts regarding the actions the officer engaged. Although this finding regards accuracy in recall, we use this as a basis for suggesting similarities for facial processing and the ability of holistic attention to increase identification accuracy, relative to narrowed, local attention.

Approaches in Legal System to Reduce Bias

The legal system has called upon instructions before to reduce bias in decision-making. In particular, the legal system instructs people to make decisions solely on the evidence in a case and set aside their personal beliefs and prejudices. However, unsurprisingly, research suggests that, at least in domains like judicial instructions and judicial rehabilitation, such instructions are ineffective. A meta-analysis found that despite instructions to disregard it, participants' verdicts were affected by inadmissible evidence [23]. Moreover, the National Center for State Courts tested a specialized instruction intended to limit implicit bias; however, it found the instruction had no effect on jurors' verdicts, verdict confidence, or sentencing severity [24].

Additionally, when jurors recognize and voice their propensity for bias during the jury selection process, judges "rehabilitate" them by asking them to ignore their biases and act impartially anyway. Little empirical research exists for the effectiveness of rehabilitation, but no current evidence offers stable support for the efficacy of such instructions. Crocker & Kovera [25] tested an interaction between biased and unbiased jurors and rehabilitation, and found that rehabilitation did decrease impartiality, but unintentionally did so for both unbiased and biased jurors, resulting in mixed conclusions. In another study, judicial rehabilitation had no impact on reducing mock jurors' prejudicial pre-existing attitudes on their predicted case judgments, and rehabilitated participants falsely believed they were less biased in their decisions despite no evidence of bias reduction [26]. We propose an effective solution to reduce biased visual processes should come *before* prejudices take hold.

Though we also propose instructions to mitigate bias, we are confident that the format of our visual attention instructions hold the potential for greater impact than these other forms of instruction-based intervention. We maintain this position because attention-based instructions have three distinct advantages over other forms of instruction. First, we propose that giving instructions prior to engaging in a visual identification task which would allow us to intervene before biased visual processes undermine effective face

encoding. Second, we propose shifting endogenous attention through intentional mechanisms, an advantage over shifting exogenous attention. Shifting exogenous attention would involve a physical change, such as a flash of light, in order to direct attention to a specific location within the video [27]. Lastly, by shifting endogenous visual attention prior to a visual task, we can attempt to limit biases earlier and in a more effective manner than current legal system methods, which involve asking participants after the fact to disregard information acquired through biased means.

Conclusion

Differences in patterns of visual attention may contribute to errors in identifying suspects who engaged in criminal activity. Visual attention may be a contributing factor to the disproportionate degree of errors made when determining whether a Black person committed the crime someone witnessed. Though attention is part of the problem, it can also be part of the solution. Our proposal to shift visual attention prior to a visual task may help reduce eyewitness misidentifications. By shifting visual attention and encouraging holistic visual processing we posit that White individuals will attend more to out-group Black faces than they would naturally, allowing for increases in individuation and facial learning. This proposal seeks to provide an effective shift to reduce the errors for White people identifying Black out-group members that underscore eyewitness identification evidence in the legal system. Black individuals are overrepresented in the legal system as misidentified targets of eyewitness identification but by shifting visual attention and reducing natural inclinations to look differently at Black faces, this disproportion can be addressed and reduced.

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