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Racial bias in driver yielding behavior at crosswalks

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ABSTRACT

Psychological and social identity-related factors have been shown to influence drivers' behaviors toward pedestrians, but no previous studies have examined the potential for drivers' racial bias to impact yielding behavior with pedestrians. If drivers' yielding behavior results in differential behavior toward Black and White pedestrians, this may lead to disparate pedestrian crossing experiences based on race and potentially contribute to disproportionate safety outcomes for minorities. We tested the hypothesis that drivers' yielding behavior is influenced by pedestrians' race in a controlled field experiment at an unsignalized midblock marked crosswalk in downtown Portland, Oregon. Six trained male research team participants (3 White, 3 Black) simulated an individual pedestrian crossing, while trained observers cataloged the number of cars that passed and the time until a driver yielded. Results (88 pedestrian trials, 173 driver-subjects) revealed that Black pedestrians were passed by twice as many cars and experienced wait times that were 32% longer than White pedestrians. Results support the hypothesis that minority pedestrians experience discriminatory treatment by drivers at crosswalks.

1. Introduction

Of the potential points of conflict present in our transportation systems, driver–pedestrian interactions at crosswalks involve the highest degree of vulnerability for pedestrians (Shankar, 2003). In order to safely cross at unsignalized crosswalks on busy roadways, pedestrians must wait until drivers yield, creating a scenario in which pedestrians' experiences may depend in part on drivers' subtle biases and attitudes influencing their decision whether or not to stop. One such bias that is present in many forms of interpersonal interactions, but which has so far not been tested in the context of driver behavior at crosswalks, is racial bias.

Racial minorities are subjected to biased treatment and outcomes across a variety of societal domains, including education (Steele, 2010), employment (Pager, 2003; Schwartzman, 1997; Wilson, 1996), health care (Budrys, 2010; Dovidio et al., 2008), and criminal sentencing (Blair, Judd, & Chapleau, 2004; Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006). Racially-biased behaviors are reflected in interpersonal interracial interactions, as subtle stereotypes influence individuals' judgments and decisions (Dovidio, Kawakami, & Gaertner, 2002; Richeson & Shelton, 2007). There is ample evidence that racial minorities are treated differently and have different experiences within urban transportation systems. Racial disparities have been observed in hailing taxis (Ridley, Bayton, & Outtz, 1989), bargaining for new cars (Ayres & Siegelman, 1995), and being stopped by police for both drivers (Warren, Tomaskovic-Devey, Smith, Zingraff, & Mason, 2006) and pedestrians

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(Gelman, Fagan, & Kiss, 2007). There are also significant racial discrepancies in safety outcomes. From 2000 to 2010, the pedestrian fatality rates in the United States for Black and Hispanic men (3.93 and 3.73 per 100,000 population) were twice the rate for White men (1.78), even after controlling for increased exposure in urban areas, socioeconomic status, and alcohol use (CDC, 2013).

The social identity or physical characteristics of both drivers and pedestrians have been shown to influence yielding behavior at crosswalks. In one study in the United States, drivers yielded more frequently to research participants holding a "guide cane," the white cane used by the blind or vision-impaired, than to pedestrians holding only an umbrella (Harrell, 1992). In an Israeli study, drivers were more likely to yield to pedestrians in their own age group (Rosenbloom, Nemrodov, & Ben, 2006). In another study conducted in the United States, drivers in expensive or high status vehicles were the least likely to yield to a pedestrian (Piff, Stancato, Mendoza-Denton, Keltner, & Coteb, 2012). These results suggest that drivers discern between different types of pedestrians and rapid decisions about yielding may be influenced by subtle attitudes and biases.

Racially biased attitudes are present in individuals at both the explicit and implicit level. Explicit attitudes refer to attitudes that are consciously accessed and freely expressed (Smith & DeCoster, 2000). While explicit racial attitudes may contribute to racial disparities in treatment at crosswalks, explicit forms of racial bias have decreased over the last 50 years (Bobo, 2001). Contemporary forms of racial bias are often demonstrated on a covert or implicit level (Dovidio, 2001; Greenwald & Banaji, 1995; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Olson & Fazio, 2003). Implicit racial attitudes are subtle beliefs that individuals hold beneath their conscious awareness, but that can lead to discriminatory behavior and outcomes (Fazio & Olson, 2003). Pro-White, Anti-Black implicit attitudes are commonly held by a large percentage of Americans and have been shown to be a cause of discriminatory behaviors (Banaji & Greenwald, 2013; Baron & Banaji, 2006; Greenwald & Banaji, 1995; Joy-Gaba & Nosek, 2010; Nosek et al., 2007; Schmidt & Nosek, 2010). Implicit bias influences decisions that are difficult to monitor and control, and are particularly influential in fast-paced situations (Devine & Monteith, 1999; Greenwald & Banaji, 1995; Greenwald et al., 2009). In particular, implicit bias has been shown to affect split-second decisions regarding safety-related behavior, exposing racial minorities to more dangerous outcomes than racial majority group members (Kahn & Davies, 2011). The current study hypothesized that drivers' yielding behavior would differ based on the race of the pedestrian. Although the study does not provide a direct test of whether drivers' implicit or explicit attitudes are the cause of this behavior, many driving behaviors, including yielding, are representative of behaviors in which implicit attitudes are influential. Future research should directly explore the concept that drivers' racial attitudes may affect their stopping behavior. Driving involves making fast-paced decisions, often rife with distractions, and includes behaviors that may be perceived as discretionary, all of which are conditions where implicit attitudes are better predictors of behavior than explicit attitudes (Greenwald et al., 2009).

Differences in drivers' yielding behavior at crosswalks for Black pedestrians would be an example of a daily microaggression that minorities consistently face. Microaggressions are small and commonplace verbal, behavioral, or environmental experiences that indicate negative racial treatment (Hebl, Foster, Mannix, & Dovidio, 2002; Singletary & Hebl, 2009; Sue, Capodilupo, & Holder, 2008). Microaggressions increase psychological and physiological signs of stress, and can negatively impact both physical and emotional well-being (Sue et al., 2008). Similar to other forms of microaggressions, the additive effect of small but repeated discriminatory treatment, and routine inconvenience such as additional delay at a crosswalk, can add up to significant burdens for racial minorities.

In this paper, we present the findings of an experiment testing whether drivers' stopping behavior varies depending on the race of the pedestrian attempting to cross the street. We hypothesize that, similar to other types of intergroup interactions, roadway interactions between drivers and pedestrians are likely influenced by drivers' subtle racial attitudes and biases. To test this hypothesis, we conducted a controlled field experiment in which we observed how drivers' stopping behavior differed depending on whether a White or Black pedestrian (trained members of the research team) was attempting to cross at a marked crosswalk. Results are based on analyses of whether the first approaching car stopped, how many cars passed before the participant could cross, and the total time a pedestrian had to wait before crossing. We hypothesized that drivers are less likely to stop for Black pedestrians than for White pedestrians crossing and that Black pedestrians have longer wait times before they can safely cross. Disparities in the pedestrian experiences of racial minorities at crosswalks may lead to more delay, increased risk, and lower quality pedestrian experiences, all of which could reduce utilization of active transportation modes. These findings have implications for crosswalk design and may help inform efforts to promote equitable access to active transportation.

2. Methods

2.1. Subjects and design

The field experiment was a one-way between-subjects design, with pedestrian race (Black versus White) as the independent variable. Data were collected on 90 individual pedestrian crossing trials involving three White and three Black research participants. Pedestrians crossed the street using a marked crosswalk on a busy two-lane, one-way street in downtown Portland, Oregon. Each research participant pedestrian completed 15 crossing trials. These trials resulted in 173 driver subjects, including the drivers who stopped.