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Differences between self-described cyclists and car drivers**

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Do road user roles serve as social identities? Differences between self-described cyclists and car drivers

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ABSTRACT

Research in different domains has shown that people categorize oneself and others as ingroup (“us”) and outgroup (“them”) members, resulting in group-based stereotyping and attribution errors that may adversely affect social behaviour. To determine whether such patterns also exist in road traffic, we conducted an experimental web-based survey using scenarios of unregulated traffic settings in which the type of other road user was varied (cyclist vs. car driver). We investigated whether road users who described themselves predominantly as either a car driver (N = 330) or a cyclist (N = 315) would (1) report having more in common with members of their respective ingroups than outgroups, (2) be more negative about their respective outgroup than ingroup in terms of their expectations about other road users, (3) make more dispositional and less circumstantial attributions about an outgroup member who failed to yield right of way than about an ingroup member, and (4) show more willingness to raise traffic fines for the outgroup than for the ingroup. Results showed both self-described car drivers and cyclists reported having more in common with their ingroup than with their outgroup. Self-described car drivers were also least inclined to expect to be given right of way by cyclists as compared to car drivers, while self-described cyclists were less inclined than self-described car drivers to expect car drivers to yield right of way. Self-described car drivers were more inclined to make dispositional attributions about cyclists’ rule breaking behaviour and less inclined to attribute these to circumstances compared to rule breaking on the part of car drivers, and were most inclined to disadvantage their outgroup compared to their ingroup in terms of raising traffic fines. Since dispositional attributions are more likely to lead people to behave aggressively, our findings suggest that cyclists, who are arguably among those most dependent on the goodwill and forgiveness of drivers of motorised vehicles, may be less likely to receive it. This means that although both self-described cyclists and car drivers may distinguish between ingroups and outgroups in traffic, this distinction may have much more complicated implications than the simple terms “us” and “them” might imply.

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1. Introduction

While cycling is growing in popularity (British Cycling, 2015; De Groot-Mesken, Vissers, & Duivenvoorden, 2015; Pucher, Buehler, & Seinen, 2011; Stichting BOVAG-RAI, 2015), cycling safety has not shown the amount of decrease in fatalities as for other types of road users (OECD/ITF, 2015; Schepers, Stipdonk, Methorst, & Olivier, 2016). In a majority of the fatalities among vulnerable road users, as well as in a fair share of the number of serious injured vulnerable road users, motorised vehicles are involved (Department for Transport, 2017; Schepers et al., 2016; Toroyan, 2015). Although many countries choose to introduce policies and infrastructure dedicated to cycling safety (Department for Transport, 2017; Schepers, Twisk, Fishman, Fyhri, & Jensen, 2017), there are some policies for road design that argue *against* special facilities and provisions for vulnerable road users. Generally speaking, such policies are based on what may be described as a 'less regulation means more consideration'-philosophy, based on the premise that deformatizing priority rules will lead road users to be both more alert to and more considerate of other road users, for example by increased eye contact (cf. 'Shared Space', Monderman, Clarke, & Baillie, 2006). However, since deregulation is often combined with other infrastructural changes (Kaparias, Bell, Biagioli, Bellezza, & Mount, 2015; Methorst, Gerlach, Boenke, & Leven, 2007), these assumptions about the effects of deregulation on road user behaviour remain largely unsubstantiated (Gerlach, Methorst, Boenke, & Leven, 2009). This is especially true when it comes to behaviour towards vulnerable road users, because the aforementioned assumptions do not take into account that unregulated social behaviour and interactions can be strongly influenced by factors other than infrastructure alone, such as the group road users see themselves as belonging to: their social identity.

The social identity perspective (Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1999, 1987) contends that people's sense of self has both a personal and a social aspect. Personal identity consists of attributes that define someone as an individual, such as their compassion, sense of humor and generosity. Social identity refers to the part of an individual's self-concept that derives from the groups we feel we belong to. That is, people distinguish between "us" (ingroup) and "them" (outgroups) and by extension conceive of stereotypes: sets of attributes believed to be representative of in- and outgroup members (Hogg, Abrams, Otten, & Hinkle, 2004). These stereotypes are often automatically activated and can affect cognition and behaviour in implicit and involuntary ways (Baumeister, Masicampo, & Vohs, 2011; Dijksterhuis, Spears, & Lépinasse, 2001), even on the basis of arbitrary preferences or attributes like shirt colour preference, tendency to over- or underestimate the number of dots or camp group name (Hogg & Abrams, 2001; Stangor, 2000; Tajfel, 1970; Tajfel, Billig, Bundy, & Flament, 1971).

Previous research has found indications that social identity may play a role in traffic, such as Basford, Reid, Lester, Thomson, and Tolmie (2002) who noted that car drivers in group discussions and interviews described cyclists as an outgroup "with significantly different characteristics from other road users" (p.1). Some studies have been carried out to further explore the social identity angle, but so far this line of research has focused more on how road users describe themselves personally. That is, road users were asked to label themselves as a bicyclist, car driver or other type of road user and whether this was an important part of their identity (Gatersleben & Haddad, 2010; Heinen, 2016). What has been left unexplored is how strongly road users relate to others who share the same label, and those who do not. This is important, because social identities are not just about how people label themselves, but also on whether such labels serve to distinguish between in- and outgroups. The current study aims to expand upon previous research by examining whether road users consider themselves to be a part of either cyclists or car drivers as distinctive social groups. Given that outgroup stereotypes are generally less positive than ingroup stereotypes (Hewstone, Rubin, & Willis, 2002; Ratliff & Nosek, 2011), it is relevant for road safety to identify the presence and nature of social identity, especially in unregulated settings that are assumed by some to have positive effects on interactions between road users (e.g., Monderman et al., 2006).

In the present study we conducted an online experimental survey among Dutch road users to investigate how differences in social identity (self-described car drivers vs. cyclists) relate to expectations and attributions about the behaviour of other types of road users (car drivers vs. cyclists) in unregulated urban settings. The survey was carried out among road users who described themselves as either a car driver or a cyclist (self-described road user role) and sought to determine whether they differ in (1) their view of themselves and other types of road users (car drivers vs. cyclists) as distinctive categories of people with whom they have more or less in common and whether road users with different social identities differ in (2) their expectations about car drivers and cyclists, (3) their interpretations of situations where car drivers or cyclists do not follow the rules (attributions), and (4) their willingness to increase traffic fines towards both groups. Fig. 1 provides an overview of interrelationships of the hypotheses and variables in the study.

Our first hypothesis (H1) concerned social identification. In order for self-described role to be considered a social identity, road users should identify more strongly with road users of the same type than with those of another type. Therefore, self-described cyclists or car drivers were expected to report having more in common with members of their respective ingroups than outgroups (H1).

Our second hypothesis (H2) concerned expectations about car driver and cyclist yielding behaviour. Previous research indicates that beliefs and expectations about cyclists and cycling form a rather negative stereotype. Especially car drivers hold rather negative views about cycling and associate cyclists with negative traits (Basford et al., 2002; Davies, Halliday, Mayes, & Pocock, 1997; Goddard, Dill, & Monsere, 2016; Johnson, Oxley, Newstead, & Charlton, 2014; Kaplan & Prato, 2016), and perceive cyclists as irresponsible road users (Gatersleben & Haddad, 2010). On the one hand, cyclists in the Netherlands are not the minority they are in other countries. Moreover, according to one of the central tenets of the 'safety

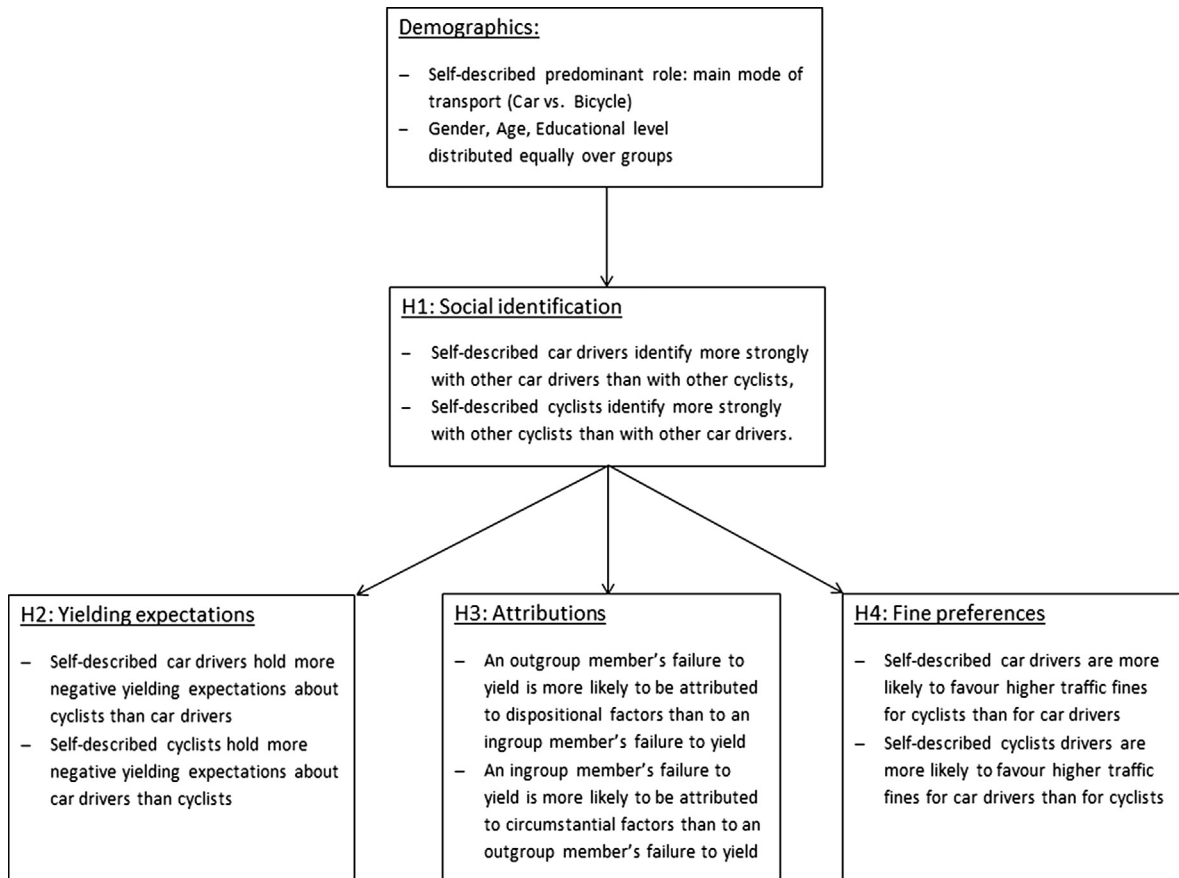


Fig. 1. Schematic representation of hypotheses in current study.

in numbers theory' (Jacobsen, 2003), more drivers will also be cyclists as the number of people cycling increases who “therefore will give greater consideration to cyclists when driving” (Johnson et al., 2014, p. 148). Based on these facts, one might expect Dutch car drivers to be less inclined to view cyclists as a distinct outgroup and to be more considerate of their needs. On the other hand, since previous research has shown that even trivially small attributes lead to in- and outgroups categorisation (Hogg & Abrams, 2001; Stangor, 2000; Tajfel, 1970; Tajfel et al., 1971) and that outgroup members are generally rated less positively than ingroup members (Hewstone et al., 2002; Ratliff & Nosek, 2011), we expected that compared to cyclists, car drivers in the Netherlands would hold more negative expectations about cyclists' adherence to priority regulations than about ‘fellow’ car drivers. For cyclists we expected the reverse (H2).

Our third hypothesis (H3) centred around the concept of attribution. Attribution refers to what people perceive as the cause(s) of behaviour (Kelley & Michela, 1980; Manusov & Spitzberg, 2008). This is of potential importance for driver behaviour: previous research found that people react less angrily and aggressively to negative driving events when that behaviour is attributed to external factors than to an actor's disposition or intent (Mesken, 2006; Mesken, Hagenzieker, Rothengatter, & de Waard, 2007; Wickens, Wiesenthal, Flora, & Flett, 2011). H3 (attribution) is in line with the long tradition of research on attribution in general (Hewstone, 1990; Jones & Harris, 1967; Kelley, 1967), the concept of the ultimate attribution error (Pettigrew, 1979), and on earlier research by Basford et al. (2002) in particular. The latter had previously found that car drivers attributed unsafe cyclist' behaviour to dispositional factors such as incompetence and had explicitly pointed to the ultimate attribution error as a possible explanation for their findings. This error refers to the systematic differences in the interpretation of negative and positive behaviours by ingroup and outgroup members by attributing favourable behaviours by ingroup members to dispositional factors, but attributing unfavourable behaviour by ingroup members to circumstantial factors. For behaviours of outgroup members these attributions are reversed. We expanded on this previous research by systematically verifying whether road users made the ultimate attribution error using situations where everything is kept constant except for the type of road user acting unsafely (car driver vs. cyclist). We expected that road users would be more likely to attribute a failure to yield to dispositional factors for outgroup members than for ingroup members, and vice versa (H3).

Our final hypothesis (H4) dealt with road users' willingness to impose fines upon the in- or the outgroup. Previously, Leineweber and Lang (2011) had found that Dutch car drivers were more often in favour of harsher punishments for rule

breaking cyclists (57%) than for rule breaking car drivers (38%). In line with these findings, road users were expected to favour harsher sanctions for outgroup than for ingroup members.

2. Method

2.1. Participants

A total of 645 Dutch cyclists and car drivers (52% male; $M = 44.40$ years of age, $SD = 16.07$) were recruited through a sampling bureau and their participation was rewarded with donations to the charity of their choice. Using stratified sampling techniques, the sample was representative of the Dutch population for educational level and regional distribution. Participants were asked about their self-described role: what type of road user they saw themselves predominantly to be: pedestrian, cyclist, moped rider, motorcycle rider, car driver, car passenger, other. Participants were included in the study if they indicated their self-described role to be either 'cyclist' of any kind (cyclist: 87.6%, electric bicycle: 10.5%, touring bicycle: 1.9%) or 'car driver', provided they also held a driver's license.

2.2. Procedure

Participants completed an online experimental survey which was described as a survey measuring road users' expectations of different types of other road users. Our survey was a mixed-design testing for differences between two independent groups (self-described role, between-subjects factor) whilst gathering within measures from all participants for different types of road users (rated road user, within-subject factor). After indicating their self-described role as a road user, the following within measures were offered in order of appearance:

- Social identity: degree of identification with rated road user (car drivers, cyclists; filler item: motorcyclists);
- Expectations concerning the adherence to priority regulation by rated road user: car driver, cyclist (filler items: motorcyclist, SUV driver). Items were presented in random order to avoid order effects.
- Attributions concerning faulty yielding behaviour by rated road user: car driver, cyclist (filler items: motorcyclist, SUV driver). Items were presented in random order.
- Willingness to raise traffic fines for rated road user (car drivers, cyclists).

Additionally, the survey gathered participants' demographic information and the number and duration of trips among the participating car drivers and cyclists. The online survey took roughly 20 min to complete.

2.3. Measures

2.3.1. Social identity (2 items)

Social identification was measured using an adaptation of the Inclusion of Other in Self (IOS) scale (Aron, Aron, & Smollan, 1992; Schubert & Otten, 2002), a measure that is regularly used in research into social identity and categorization (Coats, Smith, Claypool, & Banner, 2000; Schubert & Otten, 2002; Tropp & Wright, 2001). Participants indicated their commonality with most other car drivers and cyclists on a 7 point Likert type scale (1 = nothing in common, 7 = much in common). The items were accompanied by an illustration depicting increasing levels of overlap between the participant (i.e., "me") and the relevant reference groups (i.e., "x") to signify other car drivers and cyclists, see Fig. 2).

2.3.2. Yielding expectations (2 items)

Participants were shown pictures of an unregulated traffic situation, such that there were no road signs or markings regulating or explicating right of way (see situation 1 in Fig. 3). The pictures were accompanied by the following statement: "Imagine that you as a [cyclist/car driver] are road user A. You want to continue on your current direction on this road. The oncoming road user (B) wants to make a left-hand turn. You (A) have the right of way, but will the other road user yield?". This way participants were explicitly informed on who had right of way. To discern whether participants differed in their expectations of different road users, this situation was presented with four different vehicle types. Two vehicles represented the experimental condition of rated road user (cyclist, car driver, see bottom row in Fig. 3), the other two were filler items (motorcyclist, SUV driver). All vehicles were depicted without driver and gender neutral language was used. Participants were asked to rate their agreement with the statement "I expect this road user (B) to yield the right of way to me" for

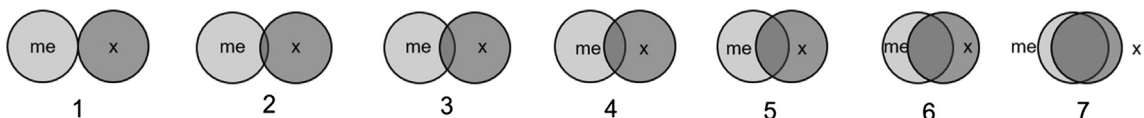


Fig. 2. Visual aid accompanying the social identification measure.

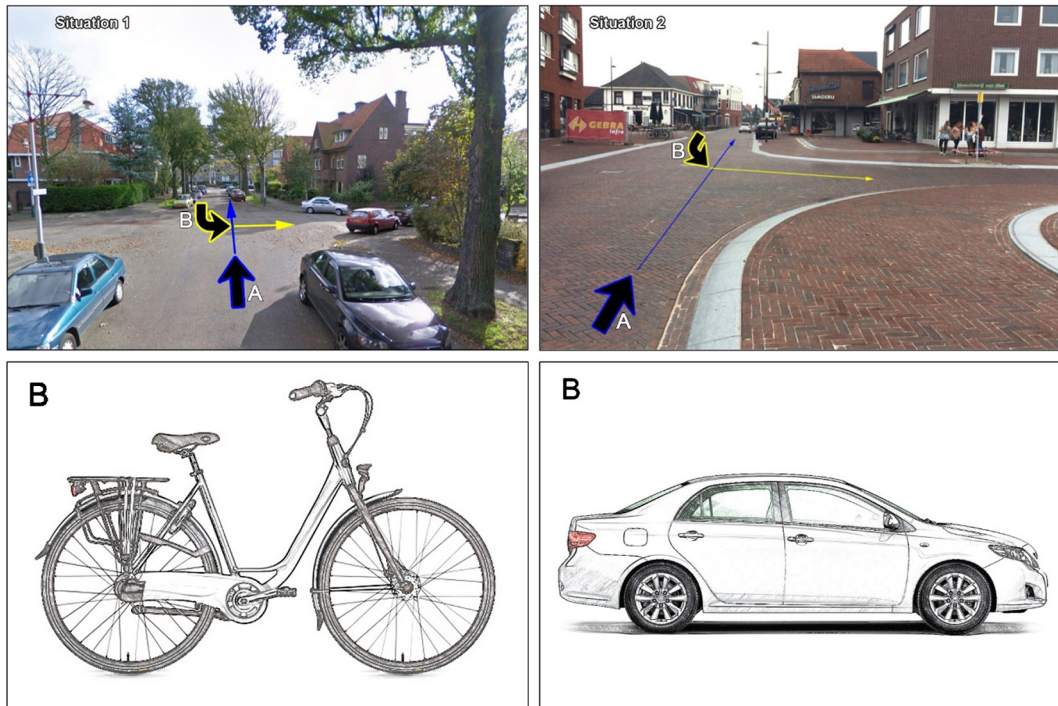


Fig. 3. Top row: Scenarios accompanying questions on yielding expectations (situation 1) and attributions (situation 2) of yielding behaviours; Bottom row: Pictures of a bicycle (left) and a sedan type passenger car (right) accompanying scenarios 1 and 2. See text for further explanation.

each type of vehicle. In order to prevent central tendency bias, we chose to omit the neutral option, making this a six point Likert type scale (1 = strongly disagree, 6 = strongly agree).

2.3.3. Attributions (11 items)

The same experimental scenario with a different task was applied as in the yield measure. Participants were again presented with pictures (see situation 2 in Fig. 3) and descriptions of a traffic situation in which only the type of other road user who failed to yield was varied: a cyclist, car driver, motorcyclist (filler) or SUV driver (filler). Participants were then asked to imagine the oncoming road user (thus car driver or cyclist) failed to yield, requiring the participant to brake to avert a crash. Participants were asked to rate their agreement on a six point Likert type scale (1 = strongly disagree, 6 = strongly agree) with statements about the possible causes of this violation. These statements concerned either dispositional causes suggesting the other road user was at fault or circumstantial causes suggesting the unsafe behaviour was beyond the control of the other road user. To confirm the distinction between these categories, two factor analyses using VARIMAX rotation were performed separately for attributions about car driver and cyclist yielding violations, including data from all participants, irrespective of self-described role. Results confirmed items to load on two consistent factors (see Table 1). The first factor reflected Dispositional attributions, while the second contained Circumstantial attributions. Both factors had an eigenvalue greater than 1, explaining 53.78% of variance for attributions about car drivers and 53.83% for attributions about cyclists. One item was omitted, because it inconsistently loaded on the first scale for car drivers and on the second for cyclists. Scores for each participant were obtained for these two attribution types, by averaging the item scores. This resulted in scores between 1 and 6 where, analogue to the original 6-point scale, higher scores indicated a higher degree of either Dispositional or Circumstantial attributions.

2.3.4. Willingness to raise traffic fines (2 items)

Participants rated their agreement with statements saying that traffic fines should be increased for car drivers, cyclists and motorcyclists (filler item) on a 6 point Likert type scale (1 = strongly disagree, 6 = strongly agree). In order to prevent this from being a simple measure of self-interest, this measure was formulated so that one was able, but under no obligation to impose a heavier fine.

2.4. Statistical analysis

First, we checked if the two groups (self-described cyclists vs. self-described car drivers) showed the intended differences in license possession and car/bicycle use, but not unintended differences in age, gender and education (see 3.1). Then, data

Table 1
Results of factor analyses for attributions of failure to yield by a cyclist or car driver.

		Factor loadings for:	
		Attributions about cyclist	Attributions about car driver
Factor 1: Dispositional attributions	The driver does not consider other road users	0.84	0.80
	The driver takes deliberate risks in traffic	0.78	0.82
	The driver is distracted by mobile devices	0.70	0.70
	The driver is under the influence of alcohol or drugs	0.54	0.60
	The driver does not know the rules of the road	0.48	0.39
	<i>Factor 1 alpha</i>	$\alpha = 0.84$	$\alpha = 0.81$
Factor 2: Circumstantial attributions	The driver is confused by my own behaviour	0.81	0.80
	The driver has poor visibility due to weather conditions	0.77	0.76
	The driver the road design is confusing/unclear	0.74	0.78
	The driver is in a hurry because of an emergency	0.72	0.63
	The driver accidentally overlooked me	0.67	0.64
	<i>Factor 2 alpha</i>	$\alpha = 0.84$	$\alpha = 0.83$
Inconsistent	The driver speeds regularly	F2: 0.52*	F1: 0.69*

* This item loads highest on factor 2 for cyclists (0.52), but highest for factor 1 for car drivers (0.69).

was analysed by means of mixed-design ANOVAs with 'self-described' traffic role - car-driver or cyclist - as the between factor, and rated road user (cyclist, car driver, and for 3 measures: self) as the within factor for social identification, yielding expectations and willingness to raise traffic fines. For attributions, two separate mixed-design ANOVAs for dispositional and circumstantial attributions were carried out, with self-described role as between and rated road user as within factor. These analyses were deemed appropriate because of the a priori basis of testing and the scale points being greater than 5. Under these conditions, the F-test is statistically robust to violations of the interval data assumption even at the item level (Carifio & Perla, 2007). ANOVA is also generally considered robust to violations of the homogeneity of variance assumption as long as group sizes are equal (Field, 2005; Glass, Peckham, & Sanders, 1972). Furthermore, the central limit theorem states that given our sample size we can assume normality regardless of the shape of our sample data (Lumley, Diehr, Emerson, & Chen, 2002; Norman, 2010). Other than the significance of the effects ($\alpha = 0.05$), the effect size (Partial eta squared, η_p^2) is reported. Effect sizes of $\eta_p^2 = 0.01$ are considered as small, $\eta_p^2 = 0.06$ as medium, and $\eta_p^2 \geq 0.14$ or higher as large (Cohen, 1988).

3. Results

3.1. Self-described role

Table 2 shows that both self-described road user groups were similar in age, gender and education, but differed in possession of licenses and in trip characteristics. All self-described car drivers held at least one license. The vast majority of self-described cyclists also held some type of driver's license (70%), with a license for passenger cars being the most common (67%). In terms of trips, self-described car drivers make more and longer trips by car than self-described cyclists, while self-described cyclists take more and longer trips by bicycle than self-described car drivers.

3.2. Social identification

There was a small main effect of rated road user (car drivers vs. cyclists) on social identification that showed that generally speaking, participants reported having more in common with cyclists ($M = 4.79$, $SD = 1.75$) than with car drivers ($M = 4.54$, $SD = 1.77$, $F(1,643) = 12.43$, $p < 0.001$, $\eta_p^2 = 0.02$).

The large interaction effect (see Table 3) between participants' self-described role and the degree to which participants felt they had something in common with other road users (car drivers vs. cyclists) was in line with H1. Participants who described themselves as either car drivers or cyclists (self-described road user role) reported having more in common with other road users using the same means of transportation, and less in common with road users using other means of transportation.

As shown in Fig. 4, self-described car drivers indicated having more in common with other car drivers than with cyclists, while self-described cyclists indicated they had more in common with other cyclists than with car drivers.

3.3. Expectations

A medium main effect of self-described role on expectations of receiving right of way showed that self-described car drivers were more inclined to expect other road users – irrespective of type – to yield ($M = 4.51$, $SD = 0.06$) than self-described cyclists were ($M = 3.97$, $SD = 0.06$, $F(1,643) = 45.67$, $p < 0.001$, $\eta_p^2 = 0.07$). The medium main effect of rated road user indicated

Table 2
Sample statistics by self-described role.

		Self-described role			
		Car driver (N = 330)		Cyclist (N = 315)	
Age	18–34	N = 97	29.4%	N = 99	31.4%
	35–54	N = 131	39.7%	N = 117	37.1%
	55–74	N = 102	30.9%	N = 99	31.4%
Gender	Male	N = 165	50%	N = 150	47.6%
	Female	N = 165	50%	N = 165	52.4%
Education	LO (elementary school)	N = 4	1.2%	N = 3	1%
	LBO (vocational training)	N = 21	6.4%	N = 17	5.4%
	MAO (high school, vocational oriented)	N = 31	9.4%	N = 24	7.6%
	HAO (high school, higher learning oriented)	N = 33	10.0%	N = 44	14.0%
	MBO (higher education, middle-level applied, vocational training)	N = 83	25.2%	N = 67	21.3%
	HBO (higher education, professional training)	N = 119	36.1%	N = 107	34.0%
License	WO (higher education, university, Doctoral)	N = 39	11.8%	N = 53	16.8%
	Motorcycle (A)	N = 45	13.6%	N = 31	9.8%
Number and duration of car and bicycle trips	Moped (AM)	N = 45	13.6%	N = 27	8.6%
	Car (B)	N = 330	100%	N = 210	66.7%
	None	N = 0	0%	N = 95	30.2%
	Possession of license B (years held)	M = 24.40	SD = 15.94	M = 23.91	SD = 16.67
	Car use (one way trips/week)	M = 9.84	SD = 7.05	M = 2.82	SD = 2.88
Car use (minutes/trips)	M = 53.51	SD = 63.17	M = 46.11	SD = 53.48	
Bicycle use (one way trips/week)	M = 5.27	SD = 9.66	M = 11.90	SD = 8.94	
Bicycle use (minutes/trips)	M = 33.90	SD = 48.03	M = 49.72	SD = 61.30	

Table 3

Results (interaction effects) from mixed-design ANOVA's pertaining to 4 main hypotheses as described in Fig. 1. Main effects are reported in running text. See text for further explanation.

			Self-described role				
			Cyclist		Car drivers		
			Rated road user		Rated road user		
			Cyclist(s)	Car driver(s)	Cyclist(s)	Car driver(s)	
H1	Self-described road users identify more strongly with ingroup than outgroup	Social identification (1 = nothing in common, 7 = much in common)	$F(1,643) = 292.39$, $p < 0.001$, $\eta_p^2 = 0.31$	$M = 5.50$, $SD = 1.44$	$M = 3.83$, $SD = 1.79$	$M = 4.12$, $SD = 1.77$	$M = 5.22$, $SD = 1.46$
H2	Self-described road users hold more negative beliefs about the outgroup than the ingroup	Yielding expectations (1 = strongly disagree, 6 = strongly agree)	$F(1,643) = 11.09$, $p < 0.001$, $\eta_p^2 = 0.02$	$M = 3.88$, $SD = 1.29$	$M = 4.07$, $SD = 1.28$	$M = 4.24$, $SD = 1.29$	$M = 4.78$, $SD = 0.96$
H3	Self-described road users make more dispositional attributions about outgroup members than ingroup member and more circumstantial attributions about ingroup members than outgroup members	Attribution Dispositional (1 = strongly disagree, 6 = strongly agree)	$F(1,643) = 4.37$, $p = 0.04$, $\eta_p^2 = 0.01$	$M = 3.65$, $SD = 0.90$	$M = 3.56$, $SD = 0.88$	$M = 3.82$, $SD = 0.90$	$M = 3.60$, $SD = 0.93$
		Circumstantial (1 = strongly disagree, 6 = strongly agree)	$F(1,643) = 5.16$, $p = 0.02$, $\eta_p^2 = 0.01$	$M = 2.42$, $SD = 0.84$	$M = 2.47$, $SD = 0.79$	$M = 2.41$, $SD = 1.00$	$M = 2.55$, $SD = 0.98$
H4	Self-described road users are more willing to raise traffic fines for outgroup than for ingroup members	Willingness to raise traffic fines (1 = strongly disagree, 6 = strongly agree)	$F(1,643) = 69.34$, $p < 0.001$, $\eta_p^2 = 0.10$	$M = 3.97$, $SD = 1.26$	$M = 3.70$, $SD = 1.26$	$M = 4.09$, $SD = 1.30$	$M = 3.55$, $SD = 1.30$

that both self-described groups expected car drivers ($M = 4.43$, $SD = 0.04$) to yield more than they expected cyclists to ($M = 4.06$, $SD = 0.05$, $F(1,643) = 48.93$, $p < 0.001$, $\eta_p^2 = 0.07$). The small statistically significant interaction effect between self-described role and rated road user (see Table 3) was partially in line with H2, as presented in Fig. 5. It shows that self-described car drivers were more inclined to expect a road user to yield when it was another car driver than when it was a cyclist, while self-described cyclists did not make that distinction. Furthermore, self-described cyclists were much less inclined than self-described car drivers to expect to be given right of way if the other road user was a car driver.

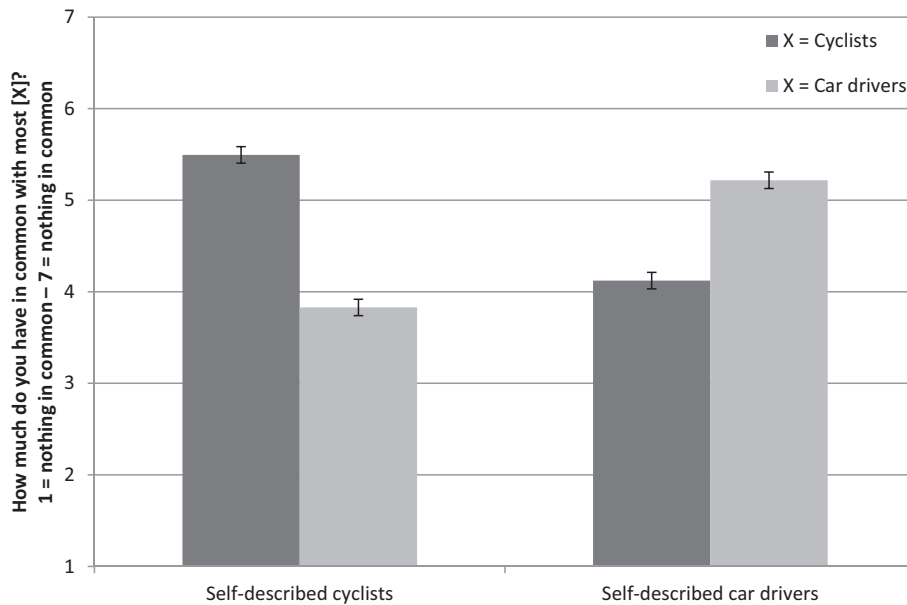


Fig. 4. Results of social identification measure.

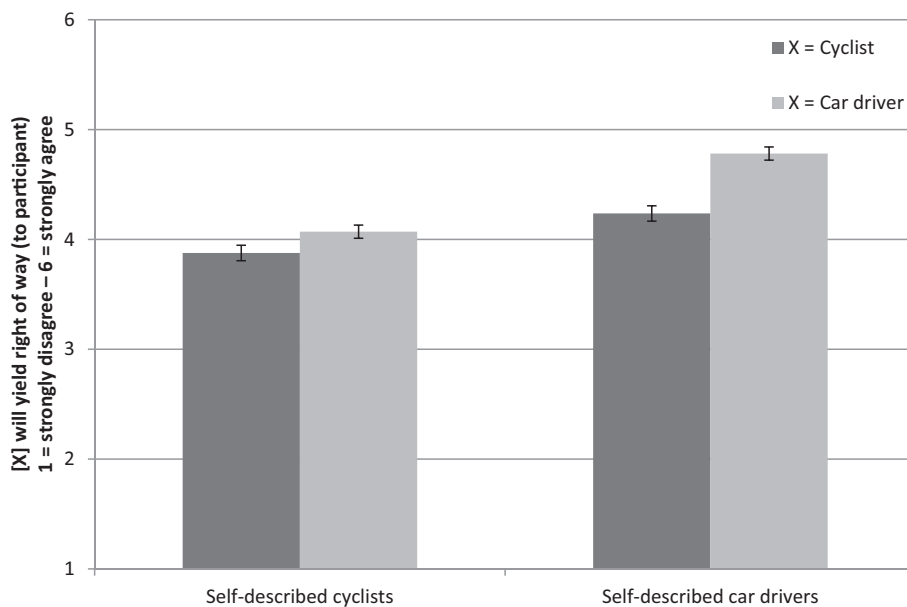


Fig. 5. Expectations concerning the yielding behaviour of other road users.

3.4. Attributions

There were small to medium main effects of rated road user for both dispositional ($F(1,643) = 65.11, p < 0.001, \eta_p^2 = 0.09$) and circumstantial attribution ($F(1,643) = 20.85, p < 0.001, \eta_p^2 = 0.03$) that went in opposite directions. Participants made more dispositional attributions if the other party was a cyclist ($M = 3.72, SD = 0.86$) than a car driver ($M = 3.49, SD = 0.86$). In contrast, circumstantial attributions were more often made for car drivers' failure to yield ($M = 2.51, SD = 0.89$) than for cyclists ($M = 2.42, SD = 0.92$). These results presented in Fig. 6 clearly show that overall participants were far more inclined to attribute failures to yield to disposition rather than to circumstantial factors.

Small yet statistically significant interaction effects of self-described role with rated road user were obtained for both dispositional and circumstantial attributions (see Table 3). However, only attributions by self-described car drivers followed the

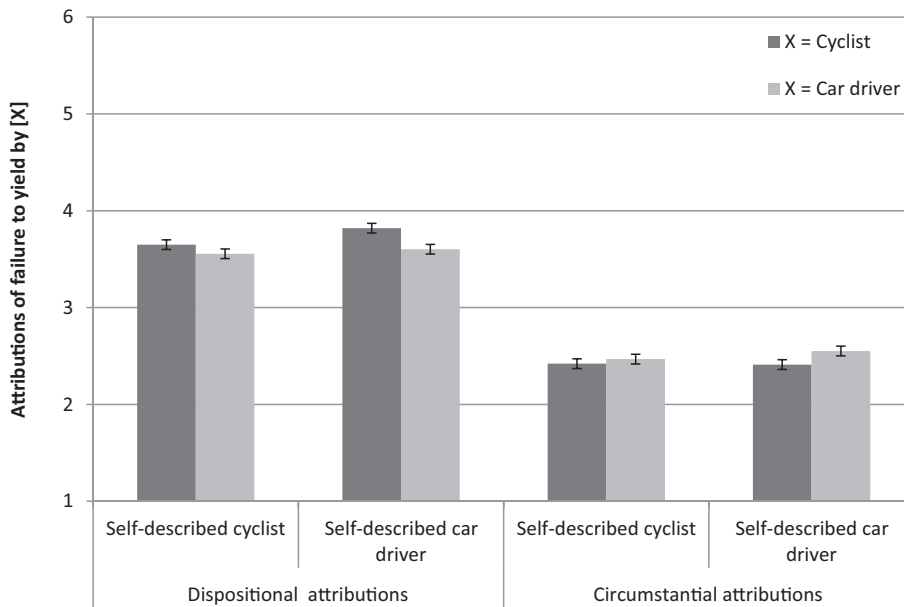


Fig. 6. Attributions concerning the behaviour of other road users (higher scores equal more agreement with dispositional/circumstantial attribution).

expected pattern of H3. With regard to dispositional attributions for failure to yield, self-described car drivers used those more frequently when the other road user was a cyclist than when it was another car driver. Cyclists, however, did not differ in the use of dispositional attributions whether it concerned another cyclist or a car driver. With regard to circumstantial attributions, it was again self-described car drivers who behaved in line with H3 by making more circumstantial attributions about another car driver's failure to yield than a cyclist's. In contrast, self-described cyclists did not differentiate in circumstantial attributions of a cyclist's or a car driver's failure to yield.

3.5. Willingness to raise traffic fines

There was a small but statistically significant main effect of rated road user. Participants were generally more in favour of raising fines for cyclists ($M = 3.91$, $SD = 1.30$) than for car drivers ($M = 3.76$, $SD = 1.30$, $F(1,643) = 9.99$, $p < 0.01$, $\eta_p^2 = 0.02$). In line with H4, there was also a statistically significant medium interaction effect between self-described role and rated road user (see Table 3). Fig. 7 shows self-described cyclists preferred higher fines for car drivers ($M = 3.97$, $SD = 1.26$) than for cyclists ($M = 3.70$, $SD = 1.26$), but that self-described car drivers were most in favour of higher fines for cyclists ($M = 4.09$, $SD = 1.30$) and least in favour for raised fines for car drivers ($M = 3.55$, $SD = 1.30$).

4. Discussion and conclusions

The current study investigated whether self-described cyclists and car drivers categorized themselves and others as either ingroup or outgroup members based on their means of transport. To determine that, we investigated whether self-described cyclists or car drivers reported having more in common with members of their respective ingroups than outgroups (H1), whether road users were more negative about their respective outgroup than ingroup in terms of their expectations (H2) and attributions (H3), and whether they showed more willingness to raise fines for the outgroup than for the ingroup (H4).

Results were in line with H1 (identification) and expand on previous findings. We indeed found that self-described cyclists and car drivers indicated they had more in common with their respective ingroups than with their respective outgroups, as was suggested by Basford et al. (2002). Our findings also expand on earlier findings on road user role and personal identity (Gatersleben & Haddad, 2010; Heinen, 2016) by showing that road user role is not just of importance to how road users describe themselves personally, but also how they view themselves in relation to other types of road users. Our results also show formal access in the form of possession of a driver's licence or a moderate degree of bicycle use alone are not enough for someone to *identify* as either a car driver or a cyclist. That is, while all self-described car drivers had a license, they also reported an average of 5 bicycle trips per week of an average of 30 min per trip, compared to 12 one way bicycle trips with an average 50 min duration on the part of self-described cyclists. Conversely, the vast majority of self-described cyclists also held some type of driver's license, with a license for passenger cars being by far the most common. These results suggest that social identification and categorisation have less to do with either possession or moderate use made out of either a driver's licence or bicycle, and more to do with the relative extent to which each transport mode is used. Indeed,

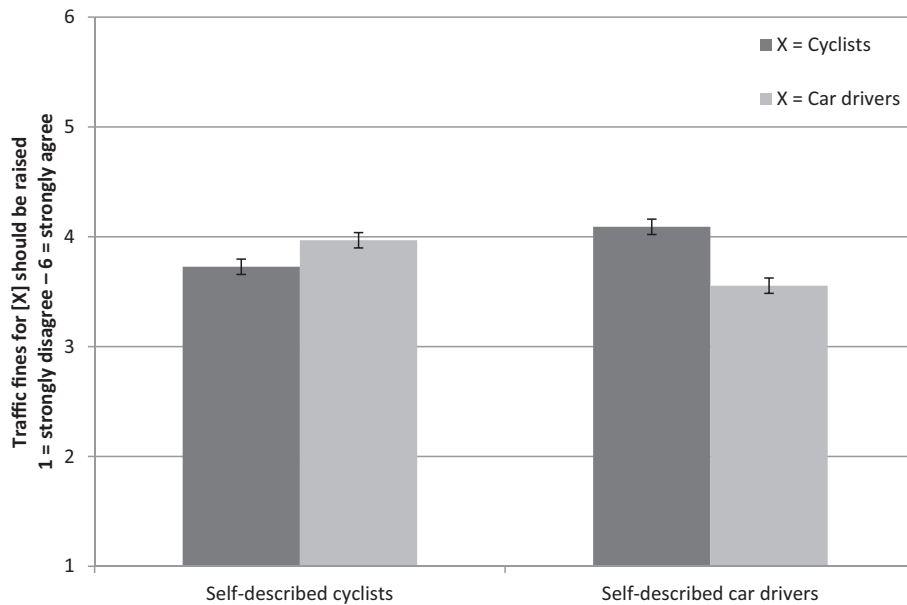


Fig. 7. Preferences regarding traffic fines.

we found that while self-described car drivers made a fair amount of bicycle trips each week, bicycle trips by self-described cyclists were both more frequent and of greater duration. It should further be noted that these results were obtained in a Dutch context where cycling is rather common: the vast majority, including car drivers, own and use a bicycle (Fietsplatform, 2013; Schepers et al., 2017). It is therefore especially striking that our sample of self-described car drivers and cyclists, who should know above any other that many car drivers are also cyclists, still categorizing others into in- or outgroups based on their means of transport. This speaks to the strength of our tendency to categorize and the impact this has on how we interpret behaviour: if this pattern occurs in the Netherlands, it is highly likely to occur in countries where cycling is less common. Finally, our findings on social identity may also have implications for the ‘safety in numbers’ hypothesis (Jacobsen, 2003). Although there is consensus on the non-linear relationship between the pedestrians or cyclists in an area and the accident rate among pedestrians or cyclists (Elvik, 2009; Geyer, Raford, Ragland, & Pham, 2006; Jacobsen, 2003), there is no real consensus on the safety in numbers hypothesis nor the conjectured mechanisms behind it (Bhatia & Wier, 2011). Our results may help shed some further light on this debate, specifically on the notion that “as the number of people cycling increases, more drivers will also be cyclists and therefore will give greater consideration to cyclists when driving” (Johnson et al., 2014, p. 148). Our results do not necessarily contradict this notion, but do give rise for tempered expectation, by showing that even car drivers who cycle regularly may still see themselves primarily as car drivers and still see cyclists as “other”, which, as further discussion of our results will show, may not lead to greater consideration at all.

Results concerning yielding expectations were in accordance with H2 (expectations) for self-described car drivers, but not for self-described cyclists. Self-described car drivers were less likely to expect another road user to yield when it was a cyclist than a car driver. Self-described cyclists did not make as much distinction between their expectations of cyclists’ and car drivers’ adherence to priority regulation. The lack of this pattern for self-described cyclists may be related to the fact that we also found cyclists were less inclined to expect car drivers to yield them right of way. These results suggest that while car drivers do hold negative out group perspectives towards cyclists, cyclists do not. Previous research conducted in other countries has also shown that car drivers see cyclists as having a disregard for the law and lacking concern for other road users and lacking in rule knowledge (Basford et al., 2002; Christmas, Helman, Buttress, Newman, & Hutchins, 2010; Davies et al., 1997; Goddard et al., 2016; Johnson et al., 2014; Kaplan & Prato, 2016). Taken together, the findings suggest there exists a stereotype of cyclists as rule breakers widely held by car drivers in different nations with vastly different cycling traditions. Conversely, one could also argue that this consensus between countries means that this is no mere stereotype of cyclist behaviour, but that cyclists are universally more likely to break rules than car drivers are. However, our findings suggest that the existence of the stereotype of cyclists as rule breakers and the absence of such a stereotype for car drivers in general may be due at least in part to cyclists being more egalitarian in their failure to yield, while car drivers may be more selective in when and to whom they grant right of way. That is, we found that although self-described cyclists were about equally likely to expect to be given way by either cyclists or car drivers, they were much less likely to expect to be given the right of way by car drivers than self-described car drivers were.

Results concerning attribution provide a clear indication that car drivers may be more likely to be angered by errors made by cyclists than by errors made by other car drivers. Previous research into attribution showed that road users who attrib-

uted a negative driving event to the actor's disposition or intent responded more angrily and with less sympathy (Wickens et al., 2011). Similarly, Mesken (2006) found that traffic scenarios where the blame for an event in traffic could be attributed to a person, elicited more anger than situations where the event was due to situational factors. Research outside the realm of road user behaviour has likewise shown that people react less aggressively to provocation when they are explicitly alerted to external factors that behaviour might be attributed to Barlett (2013), Barlett and Anderson (2011), Boon and Sulsky (1997), Krieglmeyer, Wittstadt, and Strack (2009). Our own results concerning attributions by self-described car drivers followed the same pattern: self-described car drivers made more dispositional attributions for failure to yield by a cyclist than by a car driver, and conversely made more circumstantial attributions for failure to yield by a car driver than by a cyclist. Although these findings for self-described car drivers were in line with H3 (attributions), results for self-described cyclists did not follow the same pattern: unlike self-described car drivers, self-described cyclists did not differentiate between cyclists and car drivers in terms of either dispositional or circumstantial attributions. This unexpected pattern did however correspond to aforementioned results on yielding expectations by self-described cyclists: since cyclists do not expect different outcomes when dealing with either car drivers and cyclists, they may therefore also not distinguish between them in the reasons behind these outcomes. In short, while self-described cyclists did not distinguish between road type users in terms of attributions, the pattern of attributions on the part of self-described car drivers suggests they may respond more angrily and less sympathetically to errors or violations by cyclists than by other car drivers.

With regard to willingness to raise traffic fines (H4), we found that both car drivers and cyclists showed a stronger preference for raising fines for members of their respective outgroup than for their ingroup. Although these findings were largely in accordance with H4 (fines) both self-described road user groups, the pattern did deviate from our previously discussed results on yielding expectations and attributions where the expected pattern was only found for self-described car drivers. Perhaps the difference in the pattern of results for these measures is due to the fact that while attribution and yielding measures were strictly about other road users, raising traffic fines in general affects not just others but the self as well. Although steps were taken to prevent this from being a measure of simple self-interest by giving participants opportunity but no obligation to impose heavier fines, results may have been more similar to the other dependent measures if participants had been asked how high fines should be for particular offences committed by particular road users. Nevertheless, the expected pattern was most pronounced for self-described car drivers: even compared to self-described cyclists, they were most in favour of raising fines for their outgroup and least in favour of raising fines for their ingroup.

Taken together, our findings raise something of a red flag. Road users' roles do indeed appear to lead road users to see other road users as belonging to either "us" or "them" categories, with all the consequences that may entail. Indeed, our results show that self-described car drivers appear to be more inclined to make dispositional attributions about cyclists' rule breaking behaviour and less inclined to attribute these to circumstances compared to rule breaking on the part of car drivers. The fact that there seems to exist a widely held stereotype of cyclists as rule breakers based on both this and previous research (Basford et al., 2002; Christmas et al., 2010; Davies et al., 1997; Goddard et al., 2016; Johnson et al., 2014; Kaplan & Prato, 2016) is also troubling in this context, because previous research into road user aggression suggested that reactions to road users might be influenced even more strongly by impressions about other road users that develop over time than by situational attributions (Yagil, 2001). The current study provided some preliminary self-reported indications of the distinctions car drivers seem to make to the disadvantage of cyclists, because (1) car drivers in general were deemed less likely to yield right of way by self-described cyclists than by self-described car drivers; and (2) self-described car drivers were most inclined to disadvantage their outgroup compared to their ingroup in terms of raising traffic fines. These findings are particularly relevant for road safety policies advocating the deregulation of infrastructure, because all traffic situations used in this survey were unregulated by road signs, markings or dedicated cycling infrastructure. Although policies like 'Shared Space' (Monderman et al., 2006) assume that deregulation may give road users more opportunity to be careful and mindful of others, our results suggest that when given the opportunity car drivers may instead be prone to interpret cyclists' behaviour in ways that may lead car drivers to be less forgiving of cyclists' eventual errors or violations.

5. Limitations and future research

Our results were obtained with an online survey which respondents could complete at their leisure, and focussed on behavioural precursors like expectations and attributions, rather than on actual behaviour. Although there is reason to suppose that actual road user behaviour may be more rather than less impacted by such stereotyping and attribution errors because high cognitive load and time pressure increases stereotypical responses (Correll, Park, Judd, & Wittenbrink, 2002; Van Knippenberg, Dijksterhuis, & Vermeulen, 1999), future research should nevertheless look at actual driver behaviours in real traffic or in a simulated environment to ascertain how such precursors affect actual behaviour. Future research may also benefit from garnering further insight into reasons people may have for identifying as either a cyclist or car driver, given that possession of a license alone does not seem to be enough. Furthermore, road user role was not determined experimentally, but rather based on participants' self-described road user role, meaning caution must be exercised in inferring causality. Future research may address causality by priming group identification rather than selecting for it, for example by having participants complete a circuit as a cyclist or car driver before participating in future studies. Finally, an important question that remains is how the expectations and attributions of Dutch cyclists and car drivers compare to road users in different countries. Our hypothesis that the pattern of in- and outgroup categorisation based on means of transport found

in the current study will be even more pronounced in countries where cycling is less common, would ideally be tested in a cross-cultural study. Additionally, this type of study could be employed to examine whether car drivers who cycle themselves and are used to cyclists are more forgiving towards car drivers who have far less experience with either cyclists or cycling.

6. Conclusion

Our study shows that road users who described themselves as either car drivers or cyclists categorize road users driving the same vehicle as an ingroup with whom they have more in common (“us”), and road users driving another vehicle as an outgroup with whom they have less in common (“them”), even though our sample of Dutch road users should know better than anyone that in the Netherlands car drivers are often also cyclists. Furthermore, our results showed that “us” cyclists differed from “us” car drivers in terms of how they thought about the “them” in their respective outgroup. Although self-described car drivers believed cyclists were less likely to yield right of way than car drivers, self-described cyclists were less expectant of being given way by a car than self-described car drivers were. Self-described car drivers also distinguished between cyclists and car drivers in terms of attributions, while cyclists made no such distinction. The fact that car drivers make more dispositional and less circumstantial attributions about cyclists’ failure to yield, suggests that vulnerable road users like cyclists, who are most dependent on the goodwill and forgiveness of others, may be less likely to receive it from self-described car drivers whose vehicles render them capable of inflicting bodily harm. Caution should therefore be exercised in implementing road safety policies that rely on goodwill and forgiveness.

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