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Driver personality and anthropomorphic attributions of vehicle personality relate to reported aggressive driving tendencies

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Abstract

Research in the area of driver anger and aggression has shown that several personality factors contribute to the growing problem. Pilot research indicated that drivers attribute human qualities such as a gender and name to their vehicles which suggested that this tendency to anthropomorphize the vehicle might predict aggressive driving tendencies. Two hundred four undergraduates completed personality inventories for both themselves and their vehicle along with several measures of driving anger and aggressive tendencies. Results suggest that driver and vehicle personalities were related but distinct, indicating that drivers were not just projecting their own personality onto the vehicle. Driver and vehicle personality scores were correlated with several indexes of aggressive driving tendencies. In some cases, vehicle personality predicted aggressive driving better than driver personality. However, initial decision of drivers to anthropomorphize did not relate to differences in aggressive driving tendencies.

Keywords: Aggression; Personality; Anthropomorphism; Driving; Anger; Vehicle

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1. Introduction

During the past 18 years, roadway construction in America has increased by only 1%, with most additions focusing on additional lanes on existing roads; during this same time period the number of vehicles using the roads has increased by 35% (Taylor, 1997). This corresponds to increased incidents of road rage and aggressive driving, with an estimated 12,000 injuries and 200 deaths being attributed to road rage in 1995 (American Automobile Association, 1997). These numbers were also projected to increase by 7% per year which would put the number of injuries well over 20,000 by 2004 and the number of annual deaths around 370. As high as these numbers are climbing, they do not include the countless acts of aggressive driving that can potentially be just as dangerous. Some researchers have estimated that aggressive driving practices (speeding, rapid lane changes) are related to between one-third and two-thirds of all injury accidents in the US (Martinez, 1997; Snyder, 1997).

In studying this growing phenomenon researchers have examined many different aspects of the aggressive driving experience. Some have focused on situational factors such as heat, provocation, and crowding, while others have examined vehicle characteristics such as engine size or vehicle status, and still other researchers have looked at personality attributes. Among researchers examining personality it has been found that some people seem to have higher trait anger specifically related to the context of driving (Deffenbacher, Oetting, & Lynch, 1994). Essentially, some people have a propensity to become angered frequently and intensely when driving. This disposition is fairly constant but still related to the specific situation (not all things are provoking). Follow-up research in the area of trait driving anger indicates that it is positively correlated with risky driving-related attitudes, the frequency and intensity of situation specific state anger, and the frequency of risky and aggressive driving behaviors such as tailgating, speeding, rapid lane changes, and running red lights (Deffenbacher, Lynch, Oetting, & Yingling, 2001).

Other research shows that the increased frequency of anger, aggressive driving, and risky behavior is not caused by more driving or longer commutes (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000). Based on Deffenbacher's findings, predictions can be made about driver anger (and subsequent aggressive driving) by administering a personality inventory focused on Driver Trait Anger. Additionally, interventions can be created that focus on driver coping skills or different ways of expressing driver anger. These interventions can be focused specifically towards those high in trait driving anger. In severe cases, extended periods of cognitive-behavioral therapy may be needed to alter the person's behaviors.

Other, more general personality variables such as impulsiveness, sensation seeking, and risk taking have also been related to aggressive and risk-related driving behaviors such as drunk driving and speeding (Arnett, Offer, & Fine, 1997; Donovan, Queisser, Salzberg, & Umlauf, 1985; Mayer & Treat, 1987; McMillen, Pang, Wells-Parker, & Anderson, 1992; Underwood, Chapman, Wright, & Crundall, 1999). Type-A personality patterns and macho personality have also been related to differences in aggressive driving behaviors, attitudes, and beliefs (Krahe & Fenske, 2002; Miles & Johnson, 2003). Research in these areas has also proposed interventions designed to change the driver of the vehicle and generally focuses on relaxation strategies, systematic desensitization, and anger control training (Lowenstein, 1997).

To date all of the personality-based research has focused exclusively on the owners and drivers of the vehicle. However, it may be possible that other personalities in the driving situation can

explain or predict these behaviors. In an unpublished study it was found that 55% of participants identified their vehicle by a gender and nearly 34% of participants had given their vehicle a name (Szlemko, Benfield, Bell, & Troup, 2004). In the same study it was found that participants could readily identify a personality associated with their vehicle. Other studies have found that horse owners and trainers can easily evaluate their animals' personalities on the Big Five dimensions (Morris, Gale, & Duffy, 2002), but the vehicle study was suggesting similar personality assessment for an inanimate object. These findings as a whole seem to indicate a high level of anthropomorphism towards the vehicle, and raise interesting research questions such as whether a driver with an allegedly extraverted vehicle is more prone to aggressive driving than the owner of an allegedly introverted vehicle. It could be the case that the vehicular personality would be a projective measure of the driver's own personality, or the driver/vehicle personalities could be different, further indicating anthropomorphism and the attribution of unique human qualities to the vehicle.

Because Szlemko et al. (2004) did not think the participants would answer such a quirky question about vehicle personality, they used only single items to assess the vehicle personality and the results were inconclusive. Essentially, the inspiration for the current project arose out of surprising behaviors by those participants: namely, attributing human qualities to a non-human object without a single objection or clarification question raised by the participant.

The purpose of the current research was to investigate similarities and differences between driver and vehicle personality by administering more thorough measures of personality for both driver and vehicle. The researchers also examined what role, if any, anthropomorphism might play in aggressive driving practices.

2. Method

2.1. Participants

Two hundred four students enrolled in an introductory psychology class and who owned a vehicle completed the study as part of a course research requirement. Participants were 84 males and 119 females, with one student not reporting gender. Ages ranged from 17 to 43 ($M = 18.71$; $SD = 1.97$). Participants were predominantly Caucasian (88.7%); other ethnicities included Native American/Alaska Native, African American, Asian, and Latino. All vehicles were manufactured between 1966 and 2005 (median 1996; mode 2002), and length of ownership ranged from two weeks to 15 years ($M = 26.76$ months; $SD = 22.04$ months).

2.2. Measures

The Driver Anger Expression Inventory (DAX) consists of 49 items on a 4-point Likert scale (Deffenbacher, Lynch, Oetting, & Swaim, 2002). Items reflect various ways people express anger when driving. Subscales are verbal aggressive expression (12 items, $\alpha = .88$; e.g., "I call the other driver names aloud"), personal physical aggressive expression (11 items, $\alpha = .81$; e.g., "I give the other driver the finger"), use of vehicle (11 items, $\alpha = .86$; e.g., "I purposely block the other driver from doing what he/she wants to do"), and adaptive/constructive expression (15 items, $\alpha = .90$; e.g., "I pay even closer attention to being a safe driver"). Scoring for this measure consists of

summing each item within the subscale, with higher scores indicating higher levels of that type of anger expression (i.e., a higher score for use of vehicle indicates that the driver is more likely to use the vehicle to express driving anger).

The Driver Angry Thoughts Questionnaire (DATQ) is a 65-item 5-point Likert measure intended to capture driving-related angry cognitions (Deffenbacher, Petrilli, Lynch, Oetting, & Swaim, 2003). Subscales are judgmental and disbelieving thinking (21 items, $\alpha = .94$), pejorative labeling and verbally aggressive thinking (13 items, $\alpha = .92$), revenge and retaliatory thinking (14 items, $\alpha = .93$), physically aggressive thinking (8 items, $\alpha = .93$), and coping self-instruction (9 items, $\alpha = .83$). Scoring for this measure uses summated ratings within each subscale; higher scores indicate more frequent occurrence of that type of cognition.

The Driving Anger Scale (DAS) consists of 14 items on a 5-point Likert scale ($\alpha = .85$) (Deffenbacher et al., 2002). It is intended to measure the ease with which a driver is able to be provoked into anger (e.g., "How angry would you be if someone honked at you about your driving?"). Responses range from "not at all" to "very much." Scoring consists of summing all items, with higher scores indicating greater ease of provocation to anger.

The Big Five Inventory-54-item (John & Srivastava, 1999) is a 5-point Likert measure of the big five personality variables of extraversion (9 items, $\alpha = .72$), agreeableness (9 items, $\alpha = .82$), conscientiousness (9 items, $\alpha = .76$), emotional stability (9 items, $\alpha = .81$), and openness (18 items, $\alpha = .85$). Scoring is done by summation of items in the subscale, with a higher score indicating a higher level of the trait for the subscale. A second version of the Big Five Inventory-54-item was adapted to participant vehicles by simply changing the instructions to include "imagine that your vehicle had a personality. Now rate the following items based on the vehicle's personality." Reliabilities for the adapted vehicle version of the BFI-54 were consistent with the original BFI-54 scales of extraversion ($\alpha = .77$), agreeableness ($\alpha = .82$), conscientiousness ($\alpha = .82$), emotional stability ($\alpha = .79$), and openness ($\alpha = .87$) with each item contributing to the internal consistency and none being dropped. Confirmatory factor analysis also indicated that the same five factor structure existed for the vehicle adapted version compared to the original driver inventory.

2.3. Procedure

Participants who signed up for the research reported to a designated room and were given an informed consent form. Participants were given a 16-page packet containing the research materials and were asked to complete the sections in order. The participant personality section and the vehicle personality sections were separated by the other 14 pages of material in order to reduce recall of previous responses. After completion of the packet, participants were given a debriefing slip and received 1 h of research credit. The entire procedure took 45–60 min.

3. Results

3.1. Human characteristics

Descriptive statistics were run on the participant data to assess what portion of the sample assigned human characteristics to their vehicles. This included questions about whether or not the

vehicle had a gender and/or a name that were asked before the personality measure for the vehicle. Some 47.3% of participants assigned a gender to their vehicle with the majority being female (27.9%) as opposed to male (19.4%). Also, 26.1% stated that their vehicle had a name. These included names such as Lolita, the Sweat-box of Death, Herbie, the Silver Bullet, Contessa, Mini-Pimp, and Jolly Green Giant.

Assignment of human characteristics of gender and name to vehicles did not show meaningful differences on the driving-related aggression scales. Drivers of named vehicles did not report higher levels of driving aggression for any of the 10 subscales of the DAX, DAS, or DATQ compared

Table 1
Correlations between personality scores and DAX and DAS subscales

	Driver extraversion	Vehicle extraversion
Verbal Aggression	−.01	−.04
Physical Aggression	.14*	.14*
Use of Vehicle	−.04	.05
Adaptive Constructive Behaviors	−.01	.03
DAS-Provocation	.03	.03
	Driver agreeableness	**Vehicle agreeableness**
Verbal Aggression	−.25**	−.22**
Physical Aggression	−.12	−.09
Use of Vehicle	−.23**	−.34**
Adaptive Constructive Behaviors	.34**	.25**
DAS-Provocation	−.26**	−.31**
	Driver conscientiousness	**Vehicle conscientiousness**
Verbal Aggression	−.31**	−.10
Physical Aggression	−.18	−.09
Use of Vehicle	−.05	−.15*
Adaptive Constructive Behaviors	.23**	.19**
DAS-Provocation	−.17*	−.06
	Driver emotional stability	**Vehicle emotional stability**
Verbal Aggression	−.14	−.08
Physical Aggression	.01	.01
Use of Vehicle	−.03	−.10
Adaptive Constructive Behaviors	.15*	.13
DAS-Provocation	−.12	−.12
	Driver openness	**Vehicle openness**
Verbal Aggression	−.04	−.01
Physical Aggression	−.05	−.02
Use of Vehicle	−.16*	−.01
Adaptive Constructive Behaviors	.25**	.09
DAS-Provocation	−.22**	−.06

* $p < .05$.
** $p < .01$.

to drivers of non-named vehicles. In addition, those who gave their vehicles more aggressive names (as determined by a panel of three independent raters) did not report significantly higher aggression on any of the 10 scales used although this could be an issue of sample size ($n = 18$).

For vehicle gender, drivers of gendered cars scored significantly higher than non-gender vehicle drivers on verbal aggression, physical aggression, use of vehicle, driving anger, and pejorative labeling/verbally aggressive thinking. However, drivers of female cars did not score significantly different from male vehicle drivers on any of the 10 subscales.

Table 2
Correlations between personality scores and DATQ subscales

	Driver extraversion	Vehicle extraversion
Judgmental and Disbelieving Thinking	.10	.15*
Pejorative Labeling and Verbally Aggressive Thinking	−.01	−.05
Revenge and Retaliatory Thinking	−.02	−.03
Physically Aggressive Thinking	−.03	−.02
Coping Self-Instruction	.02	.13
	Driver agreeableness	Vehicle agreeableness
Judgmental and Disbelieving Thinking	−.00	−.05
Pejorative Labeling and Verbally Aggressive Thinking	−.32**	−.30**
Revenge and Retaliatory Thinking	−.30**	−.35**
Physically Aggressive Thinking	−.33**	−.28**
Coping Self-Instruction	.17*	.23**
	Driver conscientiousness	Vehicle conscientiousness
Judgmental and Disbelieving Thinking	−.03	−.10
Pejorative Labeling and Verbally Aggressive Thinking	−.31**	−.11
Revenge and Retaliatory Thinking	−.04	.08
Physically Aggressive Thinking	−.06	−.03
Coping Self-Instruction	.18*	.25**
	Driver emotional stability	Vehicle emotional stability
Judgmental and Disbelieving Thinking	−.06	.07
Pejorative Labeling and Verbally Aggressive Thinking	−.21**	−.14*
Revenge and Retaliatory Thinking	−.04	−.05
Physically Aggressive Thinking	−.03	−.07
Coping Self-Instruction	.06	.19**
	Driver openness	Vehicle openness
Judgmental and Disbelieving Thinking	.11	.07
Pejorative Labeling and Verbally Aggressive Thinking	−.11	−.06
Revenge and Retaliatory Thinking	−.08	−.04
Physically Aggressive Thinking	.06	.00
Coping Self-Instruction	.19*	.14

* $p < .05$.
** $p < .01$.

3.2. Projection or anthropomorphism: correspondence between driver and vehicle personality

Analyses were conducted examining the relationship and similarities between each of the Big Five personality constructs for both the owner of the vehicle and the vehicle itself. Analyses indicated that all five personality traits were positively correlated between the driver and vehicle. Correlation coefficients ranged from .217 (Extraversion) to .514 (Agreeableness) with the other three constructs being in the .3–.4 range (Conscientiousness = .386, Openness = .356, and Emotional Stability = .352).

Table 3
DAX subscale changes in variance by adding vehicle personality (Model 2) to driver personality (Model 1)

	Model 1 R^2 (extraversion)	Model 2 R^2 (extraversion)	R^2 change	p-value (R^2 change)
Verbal Aggression	.000	.001	.001	.649
Physical Aggression	.020*	.034*	.014	.101
Use of Vehicle	.001	.004	.003	.392
Adaptive Constructive Behaviors	.000	.001	.001	.663
	Model 1 R^2 (agreeableness)	Model 2 R^2 (agreeableness)	R^2 change	p-value (R^2 change)
Verbal Aggression	.064**	.075**	.011	.132
Physical Aggression	.014	.015	.001	.548
Use of Vehicle	.052**	.122**	.070**	.000
Adaptive Constructive Behaviors	.113**	.122**	.009	.147
	Model 1 R^2 (conscientiousness)	Model 2 R^2 (conscientiousness)	R^2 change	p-value (R^2 change)
Verbal Aggression	.097**	.097**	.000	.826
Physical Aggression	.031*	.032*	.001	.748
Use of Vehicle	.002	.024	.022*	.041
Adaptive Constructive Behaviors	.052**	.064**	.012	.118
	Model 1 R^2 (emotional stability)	Model 2 R^2 (emotional stability)	R^2 change	p-value (R^2 change)
Verbal Aggression	.018	.020	.002	.587
Physical Aggression	.000	.000	.000	.960
Use of Vehicle	.001	.010	.009	.178
Adaptive Constructive Behaviors	.023*	.029	.006	.280
	Model 1 R^2 (openness)	Model 2 R^2 (openness)	R^2 change	p-value (R^2 change)
Verbal Aggression	.002	.002	.000	.936
Physical Aggression	.003	.003	.000	.988
Use of Vehicle	.024*	.026	.002	.528
Adaptive Constructive Behaviors	.062**	.062**	.000	.832

Model 1: Constant, driver personality.
Model 2: Constant, driver personality, vehicle personality.
* $p < .05$.
** $p < .01$.

3.3. Personalities related to driving anger

Based on the previous two sets of analyses, it seems apparent that driver and vehicle personalities are similar to each other, yet distinct. Because of this, both sets of personality ratings were analyzed as they relate to participant responses on the DAX, DATQ, and DAS. These correlations are intended to examine the potential role anthropomorphic thoughts could play in aggressive driving tendencies.

The first set of analyses examined correlations between each personality score and DAX ratings. Results indicated that each DAX subscale was correlated with at least one of the personality factors for either the drivers or their vehicles. For the most part, driver personality scores were more frequently significantly related to DAX scores and were negative in direction though of small magnitude (see Table 1). More aggressive driving was associated with high extraversion, low agreeableness, low conscientiousness, and lower openness.

Correlations were also run for the DAS subscale in relation to both driver and vehicle personality ratings. Once again, DAS scores were more frequently correlated with driver personality and were negative in direction (see Table 1); vehicle agreeableness was negatively correlated with driver anger.

DATQ subscale scores were also correlated with both driver and vehicle personality ratings (see Table 2). Less aggressive thinking was associated with more agreeableness, more conscientious-

Table 4
DAS subscale changes in variance by adding vehicle personality (Model 2) to driver personality (Model 1)

	Model 1 R^2 (extraversion)	Model 2 R^2 (extraversion)	R^2 change	p-value (R^2 change)
DAS-Provocation	.001	.001	.000	.760
	Model 1 R^2 (agreeableness)	Model 2 R^2 (agreeableness)	R^2 change	p-value (R^2 change)
DAS-Provocation	.069**	.109**	.040*	.004
	Model 1 R^2 (conscientiousness)	Model 2 R^2 (conscientiousness)	R^2 change	p-value (R^2 change)
DAS-Provocation	.027*	.027	.000	.980
	Model 1 R^2 (emotional stability)	Model 2 R^2 (emotional stability)	R^2 change	p-value (R^2 change)
DAS-Provocation	.015	.025	.010	.159
	Model 1 R^2 (openness)	Model 2 R^2 (openness)	R^2 change	p-value (R^2 change)
DAS-Provocation	.048*	.049*	.001	.750

Model 1: Constant, driver personality.
Model 2: Constant, driver personality, vehicle personality.
* $p < .05$.
** $p < .01$.

Table 5
DATQ subscale changes in variance by adding vehicle personality (Model 2) to driver personality (Model 1)

	Model 1 R^2 (extraversion)	Model 2 R^2 (extraversion)	R^2 change	p-value (R^2 change)
Judgmental/Disbelieving Thinking	.009	.029	.020	.073
Pejorative Labeling and Verbally Aggressive Thinking	.000	.002	.002	.508
Revenge and Retaliatory Thinking	.001	.002	.001	.573
Physically Aggressive Thinking	.001	.001	.000	.820
Coping Self-Instruction	.000	.017	.017	.070
	Model 1 R^2 (agreeableness)	Model 2 R^2 (agreeableness)	R^2 change	p-value (R^2 change)
Judgmental/Disbelieving Thinking	.000	.003	.003	.449
Pejorative Labeling and Verbally Aggressive Thinking	.103**	.127**	.024*	.021
Revenge and Retaliatory Thinking	.090**	.144**	.054**	.001
Physically Aggressive Thinking	.106**	.122**	.016	.057
Coping Self-Instruction	.029*	.055*	.026*	.021
	Model 1 R^2 (conscientiousness)	Model 2 R^2 (conscientiousness)	R^2 change	p-value (R^2 change)
Judgmental/Disbelieving Thinking	.001	.014	.013	.107
Pejorative Labeling and Verbally Aggressive Thinking	.098**	.098**	.000	.836
Revenge and Retaliatory Thinking	.001	.007	.006	.305
Physically Aggressive Thinking	.003	.004	.001	.877
Coping Self-Instruction	.032**	.070**	.038**	.006
	Model 1 R^2 (emotional stability)	Model 2 R^2 (emotional stability)	R^2 change	p-value (R^2 change)
Judgmental/Disbelieving Thinking	.004	.013	.009	.178
Pejorative Labeling and Verbally Aggressive Thinking	.045**	.050**	.005	.345
Revenge and Retaliatory Thinking	.001	.003	.002	.543
Physically Aggressive Thinking	.001	.006	.005	.346
Coping Self-Instruction	.003	.036*	.033**	.010
	Model 1 R^2 (openness)	Model 2 R^2 (openness)	R^2 change	p-value (R^2 change)
Judgmental/Disbelieving Thinking	.011	.012	.001	.599
Pejorative Labeling and Verbally Aggressive Thinking	.012	.012	.000	.795
Revenge and Retaliatory Thinking	.005	.005	.000	.808
Physically Aggressive Thinking	.003	.004	.001	.729
Coping Self-Instruction	.035**	.041*	.006	.277

Model 1: Constant, driver personality.
Model 2: Constant, driver personality, vehicle personality.
* $p < .05$.
** $p < .01$.

ness, and more emotional stability. Differences between correlations for driver and vehicle personality were mostly moderate.

A separate set of analyses was run utilizing hierarchical regression to examine whether vehicle personality contributed unique explanations of variance for any of the DAX, DAS, and DATQ subscales after driver personality had been tested (see Tables 3–5). Results were similar to the correlation analyses with only specific subscales and specific personality measures having substantial effects. In this case, the DAX subscale for use of vehicle was explained significantly better with the addition of vehicle agreeableness and conscientiousness. The DATQ subscale of coping/self-instructive thinking was better explained with the addition of scores for vehicle agreeableness, conscientiousness, and emotional stability. Interestingly, vehicle agreeableness also added significantly more explained variance for driving anger as well as two other DATQ subscales (pejorative labeling/verbally aggressive thinking and revenge/retaliatory thinking) meaning that its inclusion added to the explanation of scores for half of the subscales used in this project.

4. Discussion

Results from the unpublished study that inspired this project indicated that roughly half of all people gave their vehicle a gender and one-third chose to name it (Szlemko et al., 2004). The current project mirrored those results quite closely with almost half the participants attributing gender and more than one-quarter giving their vehicle a name. Given the agreement between these two studies, it seems reasonable to conclude that some form of vehicle-centered anthropomorphism exists within a large proportion of drivers. One of these anthropomorphic acts (engendering the vehicle) was related to higher scores on several of the aggressive driving subscales indicating that vehicle anthropomorphism does influence reported behavioral and cognitive driving anger tendencies.

Additionally, anthropomorphizing the vehicle was not an outlandish idea. Out of more than 200 participants, not a single objection or inquiry was raised concerning the seemingly ridiculous request to rate their vehicle's personality. While this could be largely explained by participant conformity to the research environment, it does not explain significant differences between vehicle personality and driver personality ratings. Anthropomorphism does: Drivers are not just projecting their own personalities onto their vehicles, but are attributing anthropomorphic qualities to the vehicles.

The final purpose of this project aimed at examining the relationship that both types of personality have with driving anger and aggressive tendencies. Results indicated that for specific types of driver anger—driver angry thoughts and provocation—both types of personality ratings were significantly correlated. What's more interesting about these results is that for some subscales, a model including vehicle personality was a better predictor than one only utilizing driver personality. While 8 out of 50 analyses may not appear to be overwhelming support for the position that vehicle personality is a valuable predictor, some important factors were consistently enhanced in predictability by the addition of vehicle personality indicating that it can contribute meaningfully. This seemed especially true for the DATQ subscale of coping/self-instruction and the vehicle personality measure of Agreeableness.

For example, vehicle Agreeableness and Conscientiousness both had correlation coefficients at least 50% higher than driver personality correlations for the Use of Vehicle subscale of the DAX. Regression models including these vehicle personality measures also explained significantly more variance related to Use of Vehicle which is one of the most dangerous aggressive driving behaviors. Vehicle Emotional Stability had a much larger (≈300%) correlation coefficient than driver Emotional Stability relating to Coping Self-Instruction on the DATQ and was a useful addition to the regression model. In fact, additional unique variance was explained by vehicle personality for 3 of the 5 factors when related to Coping/Self-Instructive behaviors. Considering these types of behaviors are a core element in preventing or reducing road rage, vehicle personality and its unique contribution is valuable.

These findings potentially raise serious issues in the field of personality and driver aggression. How can personality measures for an inanimate object be more predictive than personality measures for the person performing the behaviors being predicted? This question seems most pertinent for the >25% of the sample that both named and engendered their vehicle before participating in the study. Future research needs to explore what role level of anthropomorphism (high vs. low) plays in shaping these scale correlations as well as examining what role anthropomorphism plays in actual behaviors and driver justifications for those behaviors.

For instance, will driving behaviors change for an agreeable person if they believe that the car they use is either not agreeable or unconscientious? It can be reasoned that a disagreeable person in an AMC Gremlin might behave as aggressive as an agreeable person in a BMW 735. What happens if they are driving someone else's vehicle? The interactions between driver personality, driver anthropomorphic tendency, and vehicle anthropomorphized "personality" need to be examined in order to further establish the role that anthropomorphism plays in aggressive driving situations and behaviors.

Of course it would be absurd to conclude that driver personality is not valuable in relation to aggressive driving and anger expression. After all, previous research has demonstrated that relationship several times over. In fact, this project found that driver personality was related to DAX, DATQ, and DAS ratings more frequently than vehicle personality was. Additionally, for the most part, driver personality was at least as good a predictor as vehicle personality.

However, vehicle anthropomorphism does exist within at least some portion of the driving population ($\geqslant 25\%$) and seems to be related to some forms of driving anger, aggression, and coping. That aspect of the driving situation (vehicle anthropomorphic attributes) could be just as important to some drivers as the driver personality aspect is to others (e.g., low self-monitors). Because of this, it is a reasonable area of future study and may serve a purpose in both prediction and treatment of some aggressive drivers.

For example, driver centered aspects such as driving trait anger are useful in predicting specific aggressive driving behaviors and in designing treatments that focus more on perceptual changes rather than situational avoidance. Similarly, by knowing an individual's tendency to anthropomorphize their vehicle, and even more importantly, the types of traits he or she is giving to the vehicle, clinicians and researchers alike may be able to not only better predict types of aggressive driving behaviors but may also be able to design treatments that either aim at reducing the anthropomorphic tendency or at altering the perceived "disposition" of the vehicle. Just as clinicians can isolate high trait anger individuals for specific treatment, they could also isolate high anthropomorphizing individuals for specific treatment. Future research needs to better parcel

out the differences between anthropomorphizing drivers and non-anthropomorphizing drivers. However, given the demographic make-up of the sample, it will also be important to explore the generalizability of these findings to other populations such as older samples or those with greater ethnic diversity.

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