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Abstract

Most research on aggressive driving has focused on identifying aspects of driver personality which will exacerbate it (e.g., sensation seeking, impulsiveness, driving anger, etc.). The present study was designed to examine two theoretically relevant but previously unexplored personality factors predicted to reduce the risk of aggressive driving: trait forgiveness and consideration of future consequences. The utility of these variables in predicting aggressive driving and driving anger expression was evaluated among 316 college student volunteers. Hierarchical multiple regressions permitted an analysis of the incremental validity of these constructs beyond respondent gender, age, miles driven per week, and driving anger. Both forgiveness and consideration of future consequences contributed to the prediction of aggressive driving and driving anger expression, independent of driving anger. Research on aggressive driving may be enhanced by greater attention to adaptive, potentially risk-reducing traits. Moreover, forgiveness and consideration of future consequences may have implications for accident prevention.

Keywords

Aggressive driving; Driving anger; Forgiveness; Consideration future consequences

1. Introduction

The staggering cost of motor vehicle accidents in the United States, both as a leading cause of death and as the economic toll of roughly $230.6 billion per year, is well known (Kung, Hoyert, Xu, & Murphy, 2008; National Highway Traffic Safety Administration, 2007). With motor vehicle accidents remaining a critical public safety issue despite improvements in automobile safety, roadway engineering, and driver education, psychological research has increasingly focused on efforts to understand and prevent aggressive driving. As one indication, Dahlen & Ragan (2004) found only two citations on "aggressive driving" in PsychINFO from 1960–1990 compared with 29 from 2001–2003.

Demographic variables (e.g., driver age, gender, experience, etc.) are relevant, but the focus has been on identifying components of driver personality that predict aggressive driving (e.g., tailgating, honking one's horn in anger, yelling or making angry gestures at other drivers, etc.) and other unsafe driving behaviors (e.g., failing to wear safety belts, using a cellular phone

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while driving, driving under the influence of alcohol or drugs, etc.). Examples of personality factors which have been implicated in aggressive driving include sensation seeking, impulsiveness, and trait driving anger (Dahlen, Martin, Ragan, & Kuhlman, 2005; Jonah, 1997; Schwebel, Severson, Ball, & Rizzo, 2006).

Driving anger, assessed with Deffenbacher, Oetting, and Lynch's (1994) Driving Anger Scale (DAS), is a driving-specific form of trait anger (i.e., one's general propensity to experience angry feelings). That is, the DAS measures individual differences in one's likelihood of experiencing frequent and intense anger while driving a motor vehicle. It has been extensively validated as predictor of aggressive driving, driving anger expression, and a range of accident-related outcomes (Blanchard, Barton, & Malta, 2000; Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000; Deffenbacher, Lynch, Deffenbacher, Oetting, 2001; Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003; Lajuen, & Parker, 2001).

Noting that most predictors of aggressive driving had been studied separately, our research team conducted a series of studies examining other aspects of driver personality in conjunction with the DAS (e.g., Dahlen et al., 2005; Dahlen & White, 2006). As impressive as the DAS was, we reasoned that the combination of one's propensity to experience anger while driving and other personality variables would lead to improved prediction over driving anger alone. For example, Dahlen and colleagues (2005) found that sensation seeking, boredom proneness, and impulsiveness contributed to the prediction of many accident-related behaviors over and above the DAS. Similarly, Dahlen and White (2006) demonstrated that sensation seeking contributed to the prediction of aggressive driving, risky driving, losses of concentration, moving citations, and motor vehicle accidents beyond driving anger alone.

Somewhat surprisingly, the potential contribution of adaptive personality traits (i.e., positive, healthy attributes linked to adjustment) to aggressive driving remains largely unexplored. The extant research has focused on the identification of risk-enhancing factors (e.g., driving anger, sensation seeking, impulsiveness, etc.) rather than protective factors which might reduce one's tendency to engage in accident-related behaviors. Work with the Five Factor Model and driving behavior has been an exception, but aside from the negative effects of extraversion and neuroticism (e.g., Kirkcaldy & Furnham, 2000; Lajunen, 2001), findings have not been particularly clear. For example, some studies have found that conscientiousness is inversely related to motor vehicle accidents and moving violations (e.g., Arthur & Doverspike, 2001; Arthur & Graziano, 1996) while others have found no such relationships (Cellar, Nelson, & Yorke, 2000; Dahlen & White, 2006). The relative neglect of positive factors overlooks a number of potentially useful variables which could inform prevention or intervention programs.

A likely candidate for just such a protective factor is the degree to which one considers the future consequences of one's behavior. The Consideration of Future Consequences (CFC) scale developed by Strathman, Gleicher, Boninger, and Edwards (1994) provides a means of evaluating one's ability to consider the future implications of one's current behavior. The CFC construct has been studied in contexts such as fiscal responsibility (Joireman, Sprott, & Spangenberg, 2005), health behavior (Orbell, Perugini, & Rakow, 2004; Sirois, 2004), environmental concern (Ebreo & Vining, 2001; Joireman, Van Lange, & Van Vugt, 2004), and anger (Joireman, Anderson, & Strathman, 2003). Although it has not yet been studied in the driving context, it has been shown to predict risky behavior in general (Appleby, Marks, Ayala, Miller, Murphy, & Mansergh, 2005) and has found to be inversely related to general aggression (Joireman et al., 2003), suggesting possible utility in the prediction of aggressive driving. A driver who tends to consider future behavioral consequences may drive less aggressively because the consequences of aggressive driving would be more salient.

Another variable which has been the subject of extensive research outside the driving context and which might reduce one's risk for engaging in aggressive driving is the tendency to forgive others. Definitions of forgiveness vary but tend to emphasize the interpersonal context within which conflict occurs, construing forgiveness as a process of change in one's attitude toward a perceived violator (Berry, Worthington, O'Connor, Parrott, & Wade, 2005; McCullough, Pargament, & Thoresen, 2000). Given that forgiveness is inversely related to vengeful attitudes (McCullough, Bellah, & Kilpatrick, 2001), anger (Berry et al., 2005; Huang & Enright, 2000; VanOyen-Witvliet, Ludwig, & Vander Lann, 2001), and general aggression (Fincham & Beach, 2002), it seems likely that individual differences in one's tendency to forgive others would predict aggressive driving. That is, a more forgiving person would be expected to be more tolerant of mistakes or even rude behavior on the part of other drivers, resulting in reduced anger and/or a diminished likelihood of expressing one's driving anger aggressively.

The present study was designed to evaluate the potential contribution of two theoretically relevant but previously unexamined variables to the prediction of aggressive driving and driving anger expression: consideration of future consequences and trait forgiveness. It was expected that both variables would emerge as significant predictors of aggressive driving and driving anger expression even after taking driving anger into account (i.e., both consideration of future consequences and forgiveness would demonstrate incremental validity beyond driving anger in the prediction of aggressive driving and driving anger expression).

2. Method

2.1. Participants

Undergraduate volunteers ($N = 316$) were recruited from psychology courses at the University of Southern Mississippi using the department's web-based research tracking system. Approximately 65% were female, and ages ranged from 18–38 ($Mdn = 20$). The majority identified themselves as African American (33%) or Caucasian (61%). Students received experimental credit for their participation.

2.2. Instruments

Driving Anger Scale (DAS)—The tendency to become angry while driving was measured with the 14-item short form of the DAS (Deffenbacher et al., 1994). Each item describes a potentially anger-provoking stimulus which could be encountered while driving (e.g., getting stuck in traffic, having another driver speed up when one tries to pass, etc.), and respondents rate the degree of anger they would experience from 1 ("not at all") to 5 ("very much"). DAS content reflects hostile gestures, illegal driving, police presence, slow driving, discourtesy, and traffic obstructions. The short form of the DAS is internally consistent ($\alpha = 0.80$), highly correlated with the full 33-item version ($r=0.95$), and has been well validated as a predictor of aggressive driving, risky but non-aggressive driving behavior, and accident-related outcomes such as near misses, moving violations, and minor accidents (Deffenbacher et al., 2000).

Driving Survey—The Driving Survey (Deffenbacher et al., 2000) contains 35 items measuring the frequency of aggressive and risky driving and other accident-related variables (e.g., losing concentration, drifting into another lane, etc.). Six items assessing crash-related conditions are analyzed individually, and there are two internally consistent subscales: 16 items assessing aggressive driving ($\alpha = .88$) and 16 items measuring risky driving ($\alpha = .86$) over the last three months (Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003; Deffenbacher et al., 2001). Aggressive driving items include behaviors such as making angry gestures at other drivers, tailgating, and honking out of anger; risky driving items include behaviors such as speeding, driving without a safety belt, and using a cell phone while driving. Items are rated

from 0 to 5+ based on the frequency with which the respondent has experienced the condition or engaged in the behavior.

Driving Anger Expression Inventory (DAX)—Participants' mode of expressing anger while driving was assessed with the 49-item DAX (Deffenbacher, Lynch, Oetting, & Swaim, 2002). The frequencies with which respondents engage in various behaviors when angry while driving are rated from 1 ("almost never") to 4 ("almost always"). The DAX yields four subscales (αs = .80 to .90): Physically Aggressive Expression (e.g., shaking a fist at another driver), Verbally Aggressive Expression (e.g., yelling or swearing out loud at another driver), Use of the Vehicle to Express Anger (e.g., cutting in front of another driver), and Adaptive/ Constructive Expression (e.g., thinking the situation through before responding). The DAX has been validated through comparisons with trait anger, aggression, and aggressive or risky driving (Deffenbacher et al. 2001, 2002).

Consideration of Future Consequences Scale (CFC)—Individual differences in how respondents view the consequences of their behavior were measured by the 12-item CFC Scale (Strathman et al., 1994). Items provide respondents with concise statements meant to determine the degree to which they consider the consequences of their behavior. Respondents rate each item from 1 = "extremely uncharacteristic" to 5 = "extremely characteristic". The CFC Scale displays sufficient internal consistency (αs = .80 to .86; Joireman et al., 2003; Strathman et al. 1994) and has been used successfully to predict a variety of risky decisions and behavior (Appleby et al., 2005; Joireman et al., 2005; Orbell et al., 2004).

Trait Forgivingness Scale (TFS)—Participants' general willingness to forgive others was assessed with the 10-item TFS (Berry & Worthington, 2001). Self-statements are rated from 1 = "strongly disagree" to 5 = "strongly agree". The TFS demonstrates adequate internal consistency (αs = .74 to .80), and evidence of validity has been obtained through correlations with other measures of forgiveness (Berry et al., 2005).

2.3. Procedure

Participants were provided with a brief overview of the study and signed up to participate on the Department of Psychology's research website. Those who opted to participate were then directed to an online consent form. The consent form explained that participants were being asked to participate in a research project investigating the role of personality traits in driving behavior. After providing an electronic signature on the consent form, they were transferred to an online survey containing the instruments described above.

3. Results

Descriptive statistics and alpha coefficients were calculated for all study variables (see Table 1). Bivariate correlations among all variables were calculated to assess interrelationships and facilitate interpretation of subsequent regression analyses (see Table 2). The DAS was positively correlated with aggressive and risky driving and with each of the three maladaptive expression subscales of the DAX. CFC was inversely related to aggressive driving, risky driving, physically aggressive driving anger expression, and use of the vehicle to express driving anger. In addition, CFC was positively related to the adaptive/constructive expression of driving anger. The TFS was inversely related to the DAS, aggressive driving, risky driving, and each of the three DAX subscales assessing maladaptive forms of driving anger expression. In addition, the TFS was positively correlated with adaptive/constructive driving anger expression.

A series of hierarchical multiple regressions were conducted on the aggressive behavior subscale of the Driving Survey and each of the four DAX subscales (see Table 3). Respondent gender, age, and weekly miles driven were entered on Step 1 to control for their potential effects. The DAS was entered on Step 2 based on the wealth of previous findings supporting its utility in the prediction of aggressive driving and driving anger expression. By entering the well-established predictor early in the regressions, a more stringent analysis of subsequent variables is set up. The TFS and CFC were entered simultaneously on Step 3 to provide a test of their incremental validity beyond the DAS.

As expected, the combination of CFC and TFS contributed to the prediction of aggressive driving and driving anger expression beyond the DAS. The TFS predicted aggressive driving and each of the three DAX subscales assessing maladaptive driving anger expression. CFC predicted aggressive driving, physically aggressive driving anger expression, use of the vehicle to express driving anger, and adaptive/constructive driving anger expression.

4. Discussion

The present study was conducted to determine whether individual differences in trait forgiveness and consideration of future consequences would contribute to the prediction of aggressive driving and driving anger expression. Trait forgiveness was inversely related to driving anger, aggressive and risky driving, maladaptive driving anger expression, and positively correlated with adaptive/constructive driving anger expression. Similarly, consideration of future consequences was inversely related to aggressive and risky driving, physically aggressive driving anger expression, use of the vehicle to express anger, and was positively related to adaptive driving anger expression. Hierarchical multiple regressions conducted to assess the incremental validity of trait forgiveness and consideration of future consequences beyond gender, age, miles driven, and trait driving anger in the prediction of aggressive driving and driving anger expression provided clear support for both variables. Scores on the Trait Forgiveness Scale (TFS) and Consideration of Future consequences (CFC) scale predicted aggressive driving and the expression of anger while driving. Findings support the utility of these adaptive traits in the study of aggressive driving.

4.1. Forgiveness

As expected, trait forgiveness appears to be relevant to the study of aggressive driving. More forgiving participants reported less anger across a variety of potentially provoking driving situations, were more likely to utilize constructive methods of coping with the anger they did experience while driving, were less likely to express driving anger through physical aggression, verbal aggression, or use of their vehicle, and reported engaging in fewer overtly aggressive or high-risk driving behaviors. Independent of their propensity to experience anger while driving, more forgiving persons engaged in fewer aggressive behaviors while driving and less dysfunctional driving anger expression.

These findings are consistent with prior work on forgiveness and general anger and general aggression, which also demonstrated inverse relationships (e.g., Berry et al., 2005; Fincham & Beach, 2002; Huang & Enright, 2000; Lin, Mack, Enright, Krahn, & Baskin, 2004; VanOyen-Witvliet et al, 2001). Worthington and Scherer (2004) suggested that forgiveness may act as an emotion-focused coping strategy, serving to reduce an individual's tendency to react to a stressful situation as a result of a perceived transgression. The present findings indicate that this effect may also apply in a driving-specific context.

4.2. Consideration of Future Consequences

Consideration of future consequences was also relevant to aggressive driving and driving anger expression. Scores on the CFC scale were inversely related to aggressive and risky driving behavior, physically aggressive driving anger expression, use of one's vehicle to express anger, and were positively related to constructive driving anger expression. Participants with a greater tendency to evaluate the future implications of their behavior reported engaging in fewer aggressive and risky driving behaviors and were more likely to express driving-related anger in an appropriate manner. Independent of respondents' tendency to experience anger while driving, those more likely to consider the future consequences of their behavior were less likely to drive in an aggressive manner and more likely to cope effectively with the anger they did experience while driving.

These findings were consistent with previous studies linking CFC to general anger, aggression and risky behavior in non-driving contexts (Appleby et al., 2005; Joireman, et al., 2003). Again, it appears that this construct is relevant to both general and driving-related aggression. However, additional research will be needed to determine the role of CFC in different sorts of consequences given Joireman and colleagues' (2003) findings that the relationship between CFC and aggression is likely to be mediated by the length of time occurring between aggressive behavior and its consequences. Specifically, they found that high CFC individuals (i.e., those who were more likely to consider future consequences of their behavior) displayed less aggression than low CFC individuals when the aggression was related to negative consequences occurring in the future. However, high CFC respondents actually reported more aggression than low CFC respondents when the aggression carried immediate consequences. Thus, the time frame over which individuals anticipate negative consequences may need to be considered.

4.3. Limitations

Noteworthy limitations of the present study include reliance on self-report data and the restricted age range and overrepresentation of women in the sample. While acknowledging that self-report data are subject to response styles, demand characteristics, and imperfect recall of retrospective events, we note that many problems have been identified with the use of official driving records (e.g., most behaviors under study would never appear in such records). Future research should consider the use of driving simulators and regular driving logs to minimize such potential problems. Given that age is known to be an important predictor of driving behavior and motor vehicle accidents (Hemenway & Solnick, 1993; Krahe & Fenske, 2002; NHTSA, 2004), the restricted age range of the present sample is a clear limitation. Now that we have obtained initial support for trait forgiveness and consideration of future consequences in a driving context, it will be necessary to explore these constructs using a sample with a larger age range. The same can be said for gender, as the degree to which the present findings from a predominately female college student sample will generalize to a more diverse population is yet to be determined.

4.4. Implications

The present study contributed to accident research by finding support for the utility of two adaptive personality traits in the prediction of aggressive driving and driving anger expression. Whereas most of the research conducted to date on aggressive driving seeks to identify factors which exacerbate risk, the present findings suggest that this research agenda may be enhanced by including risk-reducing factors. Drivers' tendency to forgive others and to consider the future consequences of their actions were not only associated with reduced risk but demonstrated incremental validity beyond driving anger in the prediction of aggressive driving and driving anger expression.

The following is highly speculative pending replication and additional research to determine the degree to which present findings may generalize to a broader driver population, but we are encouraged that this study may help to inform accident prevention efforts. Driver education programs may benefit from supplementing defensive driving curricula with strategies to control anger and promote forgiveness. Forgiveness-based treatments have received some support for general anger reduction (Fizgibbons, 1986; Lin et al., 2004) and may be useful for driving-specific anger as well. Moreover, it appears that training drivers to more deliberately consider the potential consequences of their behavior while driving may be useful. Such training could include material to increase the accuracy of drivers' appraisal of consequences and offer rapid decision-making models for use while driving.

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Table 1

Alphas, Means, and Standard Deviations for all Variables (N=316)

Variables	α	Male			Female	
		M	SD		M	SD
Trait Forgiveness Scale	.78	35.79	7.00		35.44	6.69
CFC	.79	39.33	7.78		41.60	6.48
Driving Survey						
Aggressive Driving	.88	12.21	12.49		13.55	10.71
Risky Driving	.87	31.67	15.71		25.52	13.63
Driving Anger Scale	.91	100.29	24.19		105.41	23.94
Driving Anger Expression						
Physically Aggressive	.91	13.27	4.35		13.05	4.52
Use of the Vehicle	.86	17.79	5.43		17.24	5.14
Adaptive/Constructive	.91	34.97	9.22		35.14	9.10
Verbally Aggressive	.91	24.21	8.14		24.88	9.10

Note. CFC = Consideration of Future Consequences.

Table 2

Intercorrelations Among all Variables (N=316)

Variables	1	2	3	4	5	6	7	8
1) TFS	—							
2) CFC	.23**	—						
3) AB	-.25**	-.14*	—					
4) RD	-.12*	-.15**	.50**	—				
5) DAS	-.12*	.02	.41**	.28**	—			
6) DAX-PA	-.25**	-.24**	.59**	.33**	.23**	—		
7) DAX-UV	-.25**	-.21**	.62**	.50**	.40**	.66**	—	
8) DAX-AC	-.13*	.21**	-.08	-.12*	-.12*	.04	-.03	—
9) DAX-VA	-.27**	-.08	.65**	.35**	.44**	.44**	.58**	-.04

*
$p < .05$.

**
$p < .01$

Note. TFS = Trait Forgiveness Scale; CFC = Consideration of Future Consequences; AB = Aggressive Behavior; RD = Risky Driving; DAS = Driving Anger Scale; DAX-PA = Physically Aggressive Expression; DAX-UV = Use of the Vehicle to Express Anger; DAX-AC = Adaptive/Constructive Expression; DAX-VA = Verbally Aggressive Expression.

Table 3

Summary of Hierarchical Multiple Regressions (N=316)

Aggressive Driving Behavior			
Variable	R^2	ΔR^2	β
Step 1	.01		
Miles			.01
Gender			.03
Age			−.02
Step 2	.17	.16**	
DAS			.39**
Step 3	.22	.05**	
TFS			−.18**
CFC			−.11*

Physically Aggressive Expression			
Variable	R^2	ΔR^2	β
Step 1	.00		
Miles			.03
Gender			−.02
Age			.01
Step 2	.05	.05**	
DAS			.21**
Step 3	.14	.09**	
TFS			−.18**
CFC			−.20**

Using the Vehicle for Aggressive Expression			
Variable	R^2	ΔR^2	β
Step 1	.00		
Miles			.04
Gender			−.06
Age			−.09
Step 2	.18	.16**	
DAS			.38**
Step 3	.25	.07**	
TFS			−.17**
CFC			−.17**

Adaptive/Constructive Expression			
Variable	R^2	ΔR^2	β
Step 1	.01		
Miles			−.06
Gender			−.04
Age			.08
Step 2	.04	.03**	
DAS			.18**
Step 3	.09	.05**	
TFS			.10
CFC			.19**

Verbally Aggressive Expression			
Variable	R^2	ΔR^2	β
Step 1	.01		
Miles			.01
Gender			−.01
Age			.09
Step 2	.21	.20**	
DAS			.42**
Step 3	.26	.05**	
TFS			−.21**
CFC			−.05

*
$p < .05$

**
$p < .01$

Note. TFS = Trait Forgiveness Scale; CFC = Consideration of Future Consequences; DAS = Driving Anger Scale.