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Aggressive driving behaviors: are there psychological and attitudinal predictors?

Donald E. Miles ^{a,*}, Gregory L. Johnson ^b

^a *Institute of Human Performance, Decision Making, and Cybernetics, USA*

^b *605 Ole Plantation Drive, Brandon, FL 33511, USA*

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Abstract

Aggressive driving behaviors are extremely problematic in America, as well as in many other countries. This exploratory research study was designed to investigate whether researchers could identify personality characteristics as well as attitudes and beliefs of people who drive aggressively. Survey responses from a “known group” of drivers with multiple traffic citations were compared to a student sample. Underlying differences in driving behaviors, type-A behavior pattern, and attitudes and beliefs were supported in a series of *t*-test analyses. There were no significant differences regarding agreeableness, conscientiousness, and neuroticism. Areas of future research including investigations of trait anger, driving anger, and gender differences are suggested. We also argue that there may be a key distinction between aggressive driving and road rage, paralleling the distinction between instrumental and direct/hostile aggression.

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1. Introduction

Aggressive driving behaviors are considered major problems in America (American Automobile Association, 1998; James & Nahl, 2000; National Highway Traffic Safety Administration, 1999; Sleek, 1996). These problems have received considerable coverage in the media, and are currently being discussed by professionals in fields as diverse as insurance (Insurance Institute for Highway Safety), psychology (James & Nahl, 2000; Nerenberg, 1997), State and Federal Government

* Corresponding author. Address: Department of Psychology, College of Charleston, 66 George Street, Charleston, SC 29424, USA. Fax: +1-843-953-5851.

E-mail address: milesd@cofc.edu (D.E. Miles).

(National Highway Traffic Safety Administration (NHTSA); Federal Highway Administration (FHWA); Florida Department of Transportation), public policy organizations (Surface Transportation Policy Project), police agencies (Florida Highway Patrol, New York State Police), and clubs and organizations (American Automobile Association (AAA); Mothers Against Drunk Drivers; Citizens Against Speeding and Aggressive Driving). The general consensus is that aggressive driving behaviors cause major problems, and there are increasing demands on various authorities that action be taken in order to respond to these problems (NHTSA, 1999). Estimates of the number of aggressive driving incidents reach as high as 1.8 billion episodes per year in the United States (Nerenberg, 1997), with 25% of drivers surveyed admitting that they have driven aggressively at some time (American Auto Association, 1998). Even more troubling is the number of accidents resulting in injury and death that are a direct result of aggressive driving, with one estimate of 28,000 deaths in the United States in the years 1990–1996 (Martinez, 1997).

Aggressive driving behaviors are also considered major problems in many other parts of the world. Researchers such as Hennessy and Wiesenthal (2001), Parker, Lajunen, and Stradling (1998), Underwood, Chapman, Wright, and Crundall (1999), and West, Elander, and French (1993) among others have been studying related topics in the United Kingdom. Shinar (1998) and Yagil (2001) among others have been studying related issues in Israel. Any country with automobiles, roads, and drivers may be expected to have instances of aggressive driving behaviors.

As a result of this problem, approximately 20 state legislatures in the United States are reviewing bills that are directed at aggressive driving, and at aggressive drivers. For example, Florida House Bill (FHB) 373 was designed to create a traffic violation entitled “aggressive careless driving”. Additionally, the National Committee on Uniform Traffic Laws and Ordinances has been asked to develop a provisional model regarding aggressive driving that could be utilized by each state.

Strategies to address the problem have included hiring more police and using advanced technologies to “catch” more aggressive drivers, strengthening punitive guidelines, and developing awareness programs (NHTSA, 2001). In addition, surveys are being developed, studies are being conducted, videos are being created, classes are being taught, books are being written, and a copious amount of information is available on the Internet to help understand and alleviate this problem (James & Nahl, 2000, 2001).

This problem, which may be reaching epidemic proportions, has been researched from several perspectives including considerations of age, gender, and other demographic issues, types of vehicles owned, situations likely to increase the likelihood of aggressive driving behaviors, as well as geographic regions (James & Nahl, 2001). No definitive construct dealing with aggressive driving has been developed. Despite these limitations, there has been somewhat limited research regarding the underlying personality characteristics of people who are prone to emit aggressive driving behaviors as well as the underlying attitudes and beliefs held by chronically aggressive drivers.

1.1. Current definitions of aggressive driving

Mizell (1997) used the following definition for aggressive driving:

an incident in which an angry or impatient motorist or passenger intentionally injures or kills another motorist, passenger, or pedestrian, or attempts to intentionally injure or kill another motorist, passenger, or pedestrian, in response to a traffic dispute, altercation,

or grievance. It is also considered aggressive driving when an angry or vengeful motorist intentionally drives his or her vehicle into a building or other structure or property (p. 3).

The New York penal law defines aggressive driving as:

the unsafe operation of a motor vehicle in a hostile manner, without regard for the safety of other users of the road. Aggressive driving includes frequent or unsafe lane changes, failing to signal, tailgating, failing to yield right of way, and disregarding traffic controls (Pataki, 1998, p. 1).

A more definitive definition of aggressive driving, one that includes clarifying statements, has been developed and proposed by NHTSA (2000) and includes: “the operation of a motor vehicle in a manner that endangers or is likely to endanger persons or property”. This basic definition is then followed by clarifying statements:

Some behaviors typically associated with aggressive driving include: exceeding the posted speed limit, following too closely, erratic or unsafe lane changes, improperly signaling lane changes, failure to obey traffic control devices (stop signs, yield signs, traffic signals, railroad grade cross signals, etc.). Law enforcement agencies should include red light running as part of their definition of aggressive driving. NHTSA calls the act of red light running as one of the most dangerous forms of aggressive driving. (NHTSA, 2000, p. 1).

The previous definitions vary greatly in their content and their coverage. The first definition focuses on intent and on responses to situations. The second definition includes behaviors and adds the concept of “in a hostile manner”. The third definition, when the clarifying statements are added, includes the concept of endangerment, and identifies several dangerous driving behaviors. Additionally, the above definitions have been developed from a legal perspective and have utility primarily for enforcement purposes. For psychological researchers, definitions that incorporate the underlying personality characteristics and attributes of people who are prone to commit aggressive driving behaviors are of greater interest, for purposes of understanding, predicting, and correcting or preventing such dangerous behaviors.

Therefore, one key element of the definition should include an attempt to identify personality characteristics of individuals more likely to emit direct/hostile aggressive behaviors. James and Nahl (2000) describe an “aggressive driver syndrome” consisting of 16 behaviors (including many behaviors from the Florida House bill). James and Nahl also added elements related to feelings of stress, competitiveness, rushing, anger, and hostility, as well as behaviors such as yelling, honking, and gesturing. They also included cognitions and emotions such as “more often indulging in violent fantasies” and “more often feeling the desire to drive dangerously”. This “aggressive driver syndrome” seems to confound aggressive driving behaviors, environmental stressors, personality and attitudinal issues, and expressive behaviors. Nerenberg’s (1997) “road rage disorder” may suffer from a similar imperfection.

1.2. Personality precursors

One psychological element that may be related to aggressive driving behaviors is type-A behavior pattern (Friedman & Rosenman, 1974). People who would be classified as type A’s are presumed to

be hard driving and competitive, possess underlying elements of hostility and aggressiveness, and feel a sense of impatience and time urgency. Each of these attributes may contribute to a person's likelihood of engaging in aggressive driving behaviors. West et al. (1993) incorporated type-A behavior pattern into their study, along with mild social deviance and driving style.

Three other personality attributes that may provide additional insights into aggressive driving behaviors are agreeableness, conscientiousness, and neuroticism. These attributes represent three of the five factors consistently identified within various conceptualizations of the five-factor model of personality (Costa & McCrae, 1988). Aggressive drivers seem to display a lack of concern for the safety and well being of other drivers, whether through carelessness or intent. People low in agreeableness would tend to be unfriendly, irritable, and rude. This factor has also been associated with a general tendency for compliance, or following of rules and laws. Low levels of agreeableness may indicate a general disregard for rules and laws. People low in conscientiousness would tend to be rash, irresponsible, and careless. People high on the factor labeled neuroticism would tend to be impatient, anxious, tense, and irritable (Carver & Scheier, 1999).

Additionally, there may be some prevalent attitudes and beliefs held by drivers that are likely to emit aggressive driving. Parker et al. (1998) looked at attitudes toward driving behaviors, subjective norms, and perceived behavioral control. Other attitudes and beliefs may be derived from topics such as personal space and territoriality.

Finally, there clearly are behaviors that are likely to lead to accidents and incidents of aggressive driving. The proposal for FHB 373 included behaviors such as speeding, improperly changing lanes, improperly passing, violating traffic control and signal devices, following a vehicle too closely, and failing to yield the right of way in the definition of "aggressive careless driving". The focus on this type of definition deals with the precursor behaviors that a driver may emit, and can lead to injury to others.

1.3. Current research project

The current research project has been designed as a preliminary attempt to clarify the concept of aggressive driving. Constructs such as type-A behavior pattern, especially the impatience and hostility components, as well as agreeableness, conscientiousness, and neuroticism have been proposed as important precursors in developing a profile of people most likely to commit aggressive driving behaviors. Additionally, identifying attitudes and beliefs held by people who are likely to emit aggressive driving behaviors can provide valuable information for developing an aggressive driver profile.

2. Method

2.1. Participants

Data for this study were gathered from two disparate groups of people from the United States. Sample one, hereafter referred to as the violator sample, was composed of individuals who were required to attend a "Defensive Driving Course" conducted by a local division of the National Safety Council. These individuals had received several citations for traffic violations, and would

have lost their driving privileges if they did not attend this type of course. Please note that the National Safety Council conducts separate classes for people receiving citations for DWI/DUI. There are also separate classes for people who have one or two less severe citations and need to take a class simply to prevent any insurance premium increases. Approximately 50% of attendees were willing to complete the questionnaires, with a total sample of 48 individuals. Most of the respondents were male (80%, $N = 38$), 65% were white, 21% were black, 8% were Hispanic, and the rest were of Asiatic ancestry or did not respond to this question. The mean age of this sample was 33.8, with ages ranging from 18 to 59 years.

Approximately 40% of the sample reported earning an annual income of \$25,000 or less, with 23% reporting income between \$25,001 and \$35,000, 16% reporting income between \$35,001 and \$45,000, with the rest reporting income greater than \$45,001. Slightly over one-third (39%) of the respondents in this sample reported attending college, or attaining a college degree.

Sample two, hereafter referred to as the student sample, was composed of students in several undergraduate psychology classes at a large southeastern university. Participation was voluntary; however respondents received extra credit points toward their psychology courses. There were 104 respondents in this sample. Eleven respondents in this sample, however, reported having had their licenses revoked or suspended. Survey data from these participants were excluded from further analysis, yielding an effective sample of 93 respondents. Please note that these 11 respondents were dropped due to our inability to ascertain whether license revocation or suspension was due to DWI/DUI citations or to the broader range of citations including aggressive driving behaviors.

A majority of the respondents were white (71%), with people of Hispanic ancestry representing 12% or respondents. People of color represented five percent, with people of Asiatic ancestry representing two percent. Three percent listed other or did not respond to this item. This sample had a majority of males (57%, with $N = 53$, females, $N = 39$, and one respondent who did not report gender). Approximately two-thirds (64%) were 25 years of age or less, with a mean age of 28.2 and with ages ranging from 18 to 62. Approximately three-fourths of the sample (76%) reported earning an annual income of \$25,000 or less. All members of this sample reported having attended college or graduating from college. Data were not available regarding whether the participants drove regularly, or regarding their driving habits. Based on the age distribution and the fact that the participants were licensed drivers and attended a commuter-oriented university located in a large urban area, it was assumed that driving was universal among the respondents. Comparison of the demographic characteristics of the disparate samples can be found in Table 1.

Table 1
Demographic characteristics of respondents in two samples

	Sample 1 (violators)	Sample 2 (students)
Gender	M = 38, F = 10	M = 53, F = 39 (1 NR)
Race/ethnicity	66% white	71% white
Age	Mean = 33.8	Mean = 28.2
Education	39% attended some college	100% attended some college
Personal income	64% between \$25,000 and \$45,000	76% < \$25,000

Note: $N = 48$ for violators, $N = 93$ for students.

2.2. Measures

The original survey consisted of 42 items. Seventeen of these original items were developed to assess specific behaviors indicative of aggressive driving. Many of the behavioral items were based on careless aggressive driving behaviors described in FHB 373 as well as behaviors identified by James and Nahl (2000). Sample items included statements such as: “I have driven over the median if the line is too long to wait in at a light”; “I have driven on the shoulder of the road to avoid congested traffic”; and “I flash my lights and tailgate slower drivers in front of me in order to get them to change lanes or drive faster”. A behavior frequency scale was utilized for all items with five options ranging from “very frequently” (5) to “never” (1). Following a review of the items by Subject Matter Experts (two instructors from the local National Safety Council), review of inter-item correlations, as well as a comparison of responses between respondents from the two samples, only 10 of the items were used for subsequent analysis. The reliability coefficient (measured utilizing Cronbach’s Alpha) for this 10-item behavior frequency scale was .81. Table 2 includes the items, and the descriptive statistics for these ten items, compared across samples.

Fifteen items were originally developed to assess attitudes and beliefs that were presumed to be indicative of aggressive drivers. These items were based on the constructs of state and trait anger, (Spielberger & Sydeman, 1994), as well as personal space and territoriality. Items included: “There are too many road rules”; “Police officers should take into account the skill of drivers when issuing a ticket”; “The driver who has the most time should be the one who yields”, and “Driving empowers me”. Again, following a review of the items by Subject Matter Experts (two

Table 2
Aggressive driving behaviors

Item	Violators		Students	
	Mean	SD	Mean	SD
I flash my lights and tailgate slower drivers in front of me in order to get them to change lanes or drive faster	1.98	1.04	1.68	.88
Even though I do not have the right-of-way, I will go if the other drivers are too slow at a four-way stop	2.08	1.03	1.88	.86
I have driven over the median if the line is too long to wait in at a light	1.48	.88	1.27	.65
I have driven on the shoulder of the road to avoid congested traffic	1.77	.90	1.44	.80
I tend to clench my fist, use the horn frequently, or bang my fist when other drivers do not react the way I want them to	2.08	1.15	1.57	.71
I have made a turn from the wrong lane	2.00	.92	1.89	.79
I make insulting gestures to other drivers	1.90	1.10	1.85	.85
I yell at other drivers	1.96	1.05	1.89	.94
I will not let cars enter onto the highway, if it is going to slow me down	2.29	1.09	2.12	.81
I shout obscenities at other drivers	1.71	1.01	1.63	.87

Note: $N = 48$ for violators, $N = 93$ for students.

Table 3
Aggressive driving attitudes

Item	Violators		Students	
	Mean	SD	Mean	SD
There are too many road rules	2.75	1.25	2.01	.93
Police officers should take into account the skill of the drivers when issuing a ticket	2.58	1.11	2.00	1.05
Police officers should arrest drivers for going too slow	2.50	1.27	2.32	1.07
The driver who has the most time should be the one who yields	2.15	1.01	1.80	.80
I am the most important driver on the road	2.33	1.17	2.19	1.24
People who do not work should not be on the road during rush hour	2.38	1.25	2.15	1.03
Driving empowers me	2.60	1.33	2.49	1.18

Note: $N = 48$ for violators, $N = 93$ for students.

instructors from the local National Safety Council), review of inter-item correlations, as well as a comparison of responses between respondents from the two samples, only seven of these items were used for subsequent analysis. The reliability coefficient (Cronbach's Alpha) for this seven-item scale was .67. Table 3 includes the items and the descriptive statistics for these seven items, compared across samples.

Ten items were developed to assess type-A behavior pattern (Friedman & Rosenman, 1974). Items included: "I generally feel impatient with the pace of traffic", "It seems as if I am always in the slow lane", and "I become furious when the car in front of me drives at a pace I consider too slow". All items for the scales included five response choices ranging from "strongly disagree" (1) to "strongly agree" (5). Following a review of the items by Subject Matter Experts (two instructors from the local National Safety Council), review of inter-item correlations, as well as a comparison of responses between respondents from the two samples, only eight of these items were used for subsequent analysis. The reliability coefficient (Cronbach's Alpha) for this eight-item scale was .73 (see Table 4).

In addition to the 42 original items measuring behaviors, attitudes and beliefs, and type-A behavior pattern, 17 items were developed to assess demographic issues, vehicular descriptions, as well as additional questions about driving behavior. Items referring to driving behavior included the number of traffic citations, whether the driver had ever driven under the influence of alcohol and/or drugs, and the number of times the respondent had been cited for such behaviors. Items referring to the vehicle included whether the vehicle had been personalized in any way, whether the automobile was foreign or American, a description of the type of automobile, and the type of roof. There was an additional item designed to assess the respondents' self-rating of their driving skill (using a 10 point scale, with 1 = poor, 10 = great). There was also an item designed to assess each respondents' self-rating of their aggressiveness (using a 10 point scale, with 1 = not at all, 10 = extremely aggressive). Finally, there was a question asking respondents to indicate support for the proposed FHB 373 (regarding careless aggressive driving, with a yes-no response format). Respondents were also invited to explain their support (or lack thereof) with an open-ended item.

In order to assess personality characteristics, a 50-item scale derived from the International Personality Item Pool (hereafter referred to as IPIP, Goldberg, 1999), was used. This scale was

Table 4
Type A behavior pattern items

Item	Violators		Students	
	Mean	SD	Mean	SD
Driving is a good time to engage in business	2.17	1.02	1.80	.79
If you are not driving fast, you do not have an important place to go	1.90	.97	1.66	.67
Passengers feel the need to calm me down while I am driving	2.13	1.14	1.80	.90
I generally feel impatient with the pace of traffic	2.94	1.14	2.59	1.07
As a passenger, I often feel the need to tell the driver what to do	3.17	1.21	2.39	1.01
It seems as if I am always in the slow lane	2.46	1.05	2.31	1.00
The longer the driving time is for a single trip, the more aggressively I drive	2.13	1.02	1.97	.98
I become furious when a car in front of me drives at a pace I consider too slow	2.58	1.15	2.30	1.00

Note: $N = 48$ for violators, $N = 93$ for students.

developed to tap into the five superordinate personality factors often referred to as the “big five” (Costa & McCrae, 1988; Digman, 1990). Ten items were developed to assess each of the five constructs. Although data were gathered regarding all five dimensions, only three dimensions were of primary interest for this study. The first dimension of relevance has been labeled conscientiousness. People low on this factor are often viewed as rash, irresponsible, and careless. Sample statements include “I am always prepared” and “I leave my belongings around” (reverse coded). The reliability coefficient (Cronbach’s Alpha) for this 10-item scale was .81.

The second factor assessed via the IPIP was agreeableness. People low on this factor would tend to be unfriendly, irritable, and rude, as well as possessing a general lack of compliance, and a general disregard for rules and laws. Sample items for this dimension include “I feel little concern for others” (reverse coded) and “I am interested in people”. All items for the scales included five response choices ranging from “very inaccurate” (1) to “very accurate” (5). The reliability coefficient (Cronbach’s Alpha) for this 10-item scale was .85.

The third factor assessed via the IPIP was neuroticism. People high on this factor would tend to be anxious, tense, excitable, and impatient. Sample items for this dimension include “I get stressed out easily” and “I am easily disturbed”. All items for the scales included five response choices ranging from “very inaccurate” (1) to “very accurate” (5). The reliability coefficient (Cronbach’s Alpha) for this 10-item scale was .90.

Participants were informed that all of their responses would be kept in absolute confidence, because names would not be recorded. Further, participants were informed that they might refuse to respond to any item they found objectionable or discontinue their participation at any time.

3. Results

Data were gathered from two disparate samples, with data from violator sample compared to data from the student sample. Independent sample t -tests were conducted with a series of de-

pendent variables. The violators scored higher than the students on the driving behaviors scale with $t(139) = 2.14, p < .05$. The violators also scored higher than the students on the seven-item attitude scale, with $t(139) = 3.10, p < .01$. The violators scored higher on the summated type-A behavior pattern items, with $t(139) = 3.40, p < .01$.

Independent sample t -tests were also conducted on the summated scores for agreeableness, conscientiousness, and neuroticism. Although the mean responses for the violators were less than the mean responses for the students (indicating lower levels of both agreeableness and conscientiousness which was consistent with expectations), these differences were not statistically significant. Mean responses for neuroticism were higher for the violators than for the students, which was consistent with expectations, but this difference was not significant.

Independent sample t -tests were also conducted on the single items dealing with self-rated driving skill, and self-rated aggressiveness. For the item dealing with driving skill, there was no significant mean difference, although the violators did report less driving skill. There was no significant difference in self-ratings of aggressiveness. Means and standard deviations for all of the variables reported above, compared across samples, are found in Table 5.

Chi-square tests of independence were conducted to compare additional driving-related characteristics. As expected, respondents from sample one reported a greater number of traffic citations $\chi^2(5, N = 141) = 24.36, p < .01$. There were no significant differences between respondents from the two samples regarding arrests for DWI or DUIs, self-reports of driving after consuming alcohol or utilizing a controlled substance, or self-reports of driving after taking a prescribed medication. There were no significant differences regarding the types of vehicles driven, or the amount of personalization of those vehicles. There were also no differences in responses regarding their support for passage of FHB 373.

3.1. Additional results

Males and females responded differently regarding their support for passage of FHB 373, $\chi^2(1, N = 141) = 7.93, p < .01$, with males tending to report no support, while females tended to support the measure. Then investigating within samples, females within the student sample reported significantly lower driving skill than did males, with $t(90) = 3.38, p < .01$ and a mean difference of

Table 5
Descriptive statistics comparing two samples

Variables	Sample 1 (violators)		Sample 2 (students)	
	Mean	SD	Mean	SD
Driving behaviors (10 items)	19.25	6.15	17.21	4.87
Driving attitudes (7 items)	17.29	4.71	14.96	3.98
Type A behavior pattern (8 items)	19.46	4.71	16.81	4.21
Agreeableness (10 items)	37.81	7.5	39.77	6.78
Conscientiousness (10 items)	36.88	6.78	37.86	6.73
Neuroticism (10 items)	27.60	9.83	26.67	8.81
Driving skill (1 item)	7.52	1.92	7.98	1.45
Aggressive driving (1 item)	4.69	2.16	4.48	2.22

Note: $N = 48$ for violators, $N = 93$ for students.

one point on the 10-point scale. This difference was not found in the violators' sample. Additionally, again within the student sample, females reported significantly lower numbers of aggressive driving behaviors, with $t(90) = 2.52$, $p < .05$, and a mean difference of two units across the ten item composite. Again, this finding was not replicated in the violators' sample.

4. Discussion

This study represents an attempt to use a "known groups" approach to identify important characteristics of people who are prone to commit aggressive driving acts. These characteristics included personality "traits" (agreeableness, conscientiousness, neuroticism) as well as type-A behavior pattern, and specific attitudes and beliefs.

There were significant differences in self-reported driving behaviors, self-reported attitudes and beliefs, and in type-A behavior pattern. There were no significant differences in the personality characteristics of agreeableness, conscientiousness, and neuroticism, although the mean differences for these characteristics trended in the anticipated direction. There were no significant differences in vehicle type or personalization of vehicles, which were added to the study as proxy variables for territoriality. There were also no differences in support for FHB 373, which was included in the study as an additional indicator of driving attitudes.

A particularly interesting finding was that respondents in the violators' sample did not report significantly lower driving skill, despite having significantly more driving citations. Nor did the respondents in the violators' sample rate themselves as particularly aggressive drivers, despite the greater number of driving citations received. Aggressive drivers may perceive themselves as skillful drivers, and may not perceive their driving behaviors as being particularly aggressive.

Additionally, respondents from both groups of drivers rated themselves as above average in skill (for the violators' sample the mean equals 7.5, for the student sample the mean equals 8.0, with 5.5 representing the midpoint of the scale). Finally, respondents from both groups of drivers also rated themselves as below average in aggressiveness (for the violators' sample, the mean equals 4.7; for the student sample the mean equals 4.5; with 5.5 representing the midpoint of the scale).

4.1. *Limitations of the study*

There are several limitations of the current study. One issue deals with use of the of individuals who were required to attend a "Defensive Driving Course" conducted by a local division of the National Safety Council acting as a "known group" of aggressive drivers. Unfortunately, FHB 373 had not been passed prior to this data collection effort. Therefore, there was no appropriate designation on Florida citations for aggressive driving citations. Brief anecdotal interviews following administration and collection of the surveys, however, did tend to support the notion that many of the respondents from sample one had received citations for driving behaviors falling within the purview of FHB 373. As more states and countries implement legislation specifically designating aggressive driving behaviors (as Florida did in 2001), future researchers will have greater ability to identify known groups of aggressive drivers.

Another issue deals with the use of "known group" comparisons. There were similarities between the demographic compositions of the samples. Additionally, the student sample was

gathered from a large metropolitan “commuter” university, with many non-traditional students. There were, however, differences between the demographic compositions of the samples (ratio of male/female; ratios of racial/ethnicity; education level, income level). The use of “known groups” rests on the key assumption that differences between the groups are limited to the independent variable(s) of interest. All respondents were drivers (either currently or previously licensed) using the streets, roads, highways, and thoroughfares in Florida. Investigating driving differences between drivers of various demographic groups other than gender was beyond the scope of this study, but could be a viable area of future investigation.

Additionally, there may be specific characteristics of the respondents endemic to these specific groups of people. The response rate for sample one (approximately 50%) may be reflective of some underlying personality or attitudinal characteristics; i.e. those who responded may have been higher on characteristics such as conscientiousness or agreeableness than those who were unwilling or unable, due to prior commitments, to participate. Due to the voluntary nature of data gathering from a student population, respondents from the student sample may also have possessed higher levels of these characteristics.

The timing of the administration of the surveys may also have created some unintended variability of the responses. The surveys were administered at the approximate 2/3rd point of the duration of each class (class was structured for four hours on Friday evening, then eight additional hours on the immediately following Saturday, with surveys being administered during the luncheon break on Saturday). The respondents had been exposed to several key safety topics, had received several admonitions to respect traffic laws, and had received strong encouragement to respond in different manners to various traffic situations. This may have subtly affected their responses to several items. For example, respondents from the student sample reported higher mean responses for driving behaviors such as “I have driven through a light just after it has turned red”, “I tailgate slow drivers in order to get them to speed up or move out of the way”, and “I drive at least 25 miles over the speed limit” than did people in the violator sample. These are specific behaviors that are addressed in the defensive driving course.

Another issue deals with the use of data derived from self-report using paper-and-pencil surveys. Despite guarantees of anonymity, there were some items dealing with potentially sensitive information. However, respondents would be expected to under-report dangerous or illegal activities, and this tendency was expected to be consistent across both groups.

Finally, this is a correlational study. There has been no attempt (and should be no attempt) to infer any statements of causality based on the results and interpretations of this study.

4.2. Suggestions for future research

We are proposing that there should be further research regarding aggressive driving behaviors and the construct labeled road rage. Mizell (1997) conceptualized road rage as an act of aggressive driving in which an angry driver or passenger injured or killed another motorist or pedestrian. Nerenberg (1997) differentiated between aggressive driving and road rage. A “road rager” may drive safely but make an obscene gesture, while aggressive driving was defined in terms of actual driving behavior. He also proposed a “road rage disorder,” which includes two or more aggressive driving episodes annually (clearing expressing anger at another driver).

NHTSA (2000) has added the following distinction to differentiate road rage from aggressive driving:

To avoid conflict with the term road rage, departments should clearly identify that issue and train their officers to use the correct terminology during the program as well as during traffic stops and public information opportunities. Road rage differs from aggressive driving. It is a criminal offense and is an assault with a motor vehicle or other dangerous weapon by the operator or passenger(s) of one motor vehicle on the operator or passenger(s) of another motor vehicle or is caused by an incident that occurred on a roadway (p. 2).

Road rage, which we are defining as a series of aggressive driving behaviors with direct and/or hostile intent to harm others, involves a persistent and consistent response to driving stressors. Building on definitions of aggression drawn from Social Psychology literature, a standard definition of aggression is “behavior intended to injure another” (Kenrick, Neuberg, & Cialdini, 1999, p. 353). These authors then draw distinctions between instrumental aggression and direct aggression. Instrumental aggression involves behaviors designed to hurt another person to accomplish some other goal while direct aggression involves behavior aimed at hurting someone to his or her face (Kenrick et al., 1999).

This distinction between instrumental and direct/hostile aggressive behaviors may be crucial. Identical behaviors may be emitted as a reaction to another person’s behaviors, and then directed at those specific individuals, or may simply be part of a pattern of behavior designed to get a person to their destination more quickly. Hennessy (2000) actually differentiates between driver aggression and driver vengeance (“the infliction of harm in response to perceived injustice from other drivers”, p. 11). This is consistent with Shinar (1998) who argued that “aggressive driving is a syndrome of frustration-driven behaviors, enabled by the driver’s environment. These behaviors can either take the form of instrumental aggression . . . or hostile aggression which is directed at the object of frustration.” (p. 137). This distinction may parallel a legalistic distinction between a civil offense (careless aggressive driving) and a criminal offense (road rage).

Therefore, one potential research question deals with an operational definition of road rage. It may not simply be the total number of transgressions that differentiate “road ragers” from aggressive or ordinary drivers. Designation as a “road rager” should also be based on the severity of the aggressive behaviors, and the fact that the behaviors are directed at a specific individual. Further, a viable definition of road rage should help researchers as they attempt to identify those who are more frequent or chronic emitters of road rage behaviors. Identifying those who are most likely to engage in chronic or persistent road rage behavior would have practical implications for both prevention and intervention strategies. A NHTSA (1999) study found that aggressive drivers were more aware of a public safety campaign than general drivers and even approved of such a campaign. Campaigns that have been designed for and targeted at specific populations generally are more successful in affecting attitude and behavior change (Cialdini, 1993).

Trait anger (Spielberger & Sydeman, 1994) may well be one of the additional psychological components included within the construct of road rage. Deffenbacher (1992) found that individuals with higher trait anger scores reported greater intensity and frequency of daily anger

across a wider range of provocative situations than did persons low in trait anger. Most drivers would respond to someone cutting into their lane with resignation, or with brief anger, while “road ragers” would respond with more dysfunctional and more dangerous behavior. Deffenbacher, Lynch, and Oetting (1994) conceptualized a construct labeled “driving anger”, which is “a personality trait related to trait anger but a narrower, more situation or context bound anger than trait anger” (p. 84). Therefore use of a measure such as the Trait Anger Scale from the State-Trait Anger Expression Inventory-2 (Spielberger, 2000) or the driving anger scale by Deffenbacher et al. (1994) may provide additional information regarding road rage. Starkweather (2002), for example, found significant relationships between scores on the DAS and trait anger (as well as with various subscales of the trait portion of the State-Trait Anger Expression Inventory-2).

A second additional construct that could be utilized to differentiate road rage from aggressive driving would be territoriality. Altman (1975) described three types of territories (private, semi-public, and public), and they correspond to the centrality of the territory to one’s personal life: degree of ownership, perceived control of the area, and the relative permanence and/or duration of occupation. Primary territory has been defined as owned exclusively by the occupants for relatively permanent duration of time (e.g. a home). Primary territories are off-limits to outsiders, except by invitation of the owner. Primary territories are demarcated clearly and are extensions of one’s self. Self-identity and self-esteem are closely linked to a primary territory. Aggressive drivers (and “road ragers”) may have especially strong feelings of territoriality, redefining semi-public and public territories as private territory. The individual perceives himself or herself as “entitled” to the use of this space (the highway and the right of way surrounding their vehicle) and any unwanted or unwarranted intrusions are perceived as a threat. This construct could be perceived as a precursor to the attitude that “road ragers” are justified in or “entitled” to their aggressive behaviors.

Another issue related to self-entitlement is the construct of personal space. Personal space has been defined as the area surrounding a person’s body into which others may not intrude without arousing discomfort (Hayduk, 1983; Sommer, 1969). “Road ragers” may perceive their automobiles as personal space in which they are entitled to utilize public territories, such as roadways, as private territory. They would then act in an aggressive manner to defend incursions into their perceived space and/or territory.

Additional research regarding gender differences in aggressive driving behaviors and road rage would seem to be indicated. The findings from this study are consistent with those of Hennessy and Wiesenthal (2001), Lajunen, Parker, and Summala (1999), Parker et al. (1998), and Starkweather (2002), suggesting the need for continued research regarding gender differences in driving behaviors.

Finally, the problem of aggressive driving behaviors and road rage may be a worldwide problem. Cross-cultural research should be conducted to explore whether a profile of an aggressive driver (and/or a road rager) developed in one country or culture would be consistent with a profile of an aggressive driver developed in another country or culture. For example, Lajunen et al. (1999), found differences in driving behaviors when comparing drivers from Finland, The Netherlands, and The United Kingdom. The ultimate goal of such research would be in designing both prevention and intervention programs that effectively reduce the incidence of such dangerous behaviors.

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