CARE IMPACT Study of Traffic Crashes Involving Aggressive Driving 2013-2017 Data

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Table of Contents

Table of Contents	0
Introduction and Summary of Findings Definition of Aggressive Driving Definition of Aggressive Operation Comparison of Findings AD vs AO Summary of Findings	3 6 7
Crash Characteristics	15
C015 Primary Contributing Circumstance – Ordered by Frequency	
C015 Primary Contributing Circumstance – Most Correlated	
C129 CU Vehicle Maneuvers	
C023 Manner of Crash	
C017 First Harmful Event – All Items with 300 or More Occurrences	19
C203 CU First Harmful Location	20
C051 Number of Vehicles	21
C056 Number of Pedestrians	22
Time Characteristics	23
C003 Year	
C004 Month	
C008 Time of Day	
C029 Lighting Conditions	
C006 Day of the Week	
Day of the Week by Time of Day	
Driver Characteristics (Demographics and Behavior)	30
C020 E Distracted Driving Opinion	30
C107 CU Driver Raw Age Frequency Distribution	31
C121 CU Driver Condition	

C122 CU Driver Officer Opinion Alcohol	33
C123 CU Driver Officer Opinion Drugs	
C213 CU Vehicle Usage	
C104 CU Left the Scene	
C109 CU Driver Gender	37
Driver Gender by Severity	38
Male vs Female Characteristics	
Severity Characteristics	41
C025 Crash Severity	
C224 CU Estimated Speed at Impact	
C224 CO Estimated Speed at impact.	
C060 Number Killed	
C058 Number Injured (Non-Fatal)	
C036 Adjusted EMS Arrival Delay	
C050 Aujusted Livis Airivai Delay	
Geographical Characteristics	
C010 Rural or Urban	
C031 Locale	
C011 Highway Classifications	
C110 CU Driver Residence Distance	
C001 County – Over-Represented	51
Tuscaloosa, Montgomery, Madison, Mobile, Cullman, Lauderdale and Morgan	
Counties	52
Vehicle Characteristics	54
C101 Causal Unit (CU) Type	
C208 CU Model Year	55
Roadway Environment and Pavement Characteristics	56
C412 CU Traffic Lanes	
C408 CU Vision Obscured By	
C030 Weather	
C403 CU Roadway Condition	
C022 E Type of Roadway Junction Feature	
C027 At Intersection	
C407 CU Roadway Curvature and Grade	
C409 CU Traffic Control	
C415 CU Workzone Related	64

Introduction and Summary of Findings

This introductory section consists of the following parts:

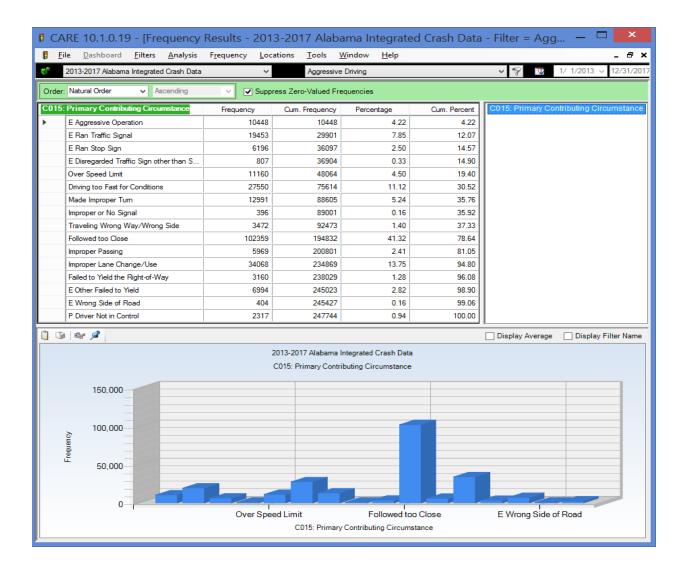
- A definition of the broad categorization of Aggressive Driving (AD), which was the primary focus of this study.
- A definition of the much narrower Aggressive Operation (AO), which meets the FMCSA specification for what is technically called aggressive operation. It is important that the distinction between these two classifications is understood.
- Discussion of findings comparing AD with AO.
- A summary of findings section, which essentially serves as an executive summary for the findings of this study.

Definition of Aggressive Driving

Filter Used for Aggressive Driving Analyses

		Filter Logic: Aggressive Driving — 🗖 🗖
Logic Tree	Logic Text	
One or more of t	-	
	of the following are	
	-	ated Crash Data: Primary Contributing Circumstance is equal to E Aggressive Operation
1 1	-	ated Crash Data: Primary Contributing Circumstance is equal to E Ran Traffic Signal
	-	ated Crash Data: Primary Contributing Circumstance is equal to E Ran Stop Sign
	-	ated Crash Data: Primary Contributing Circumstance is equal to E Disregarded Traffic Sign other than Stop Sign
	-	ated Crash Data: Primary Contributing Circumstance is equal to Over Speed Limit
	-	ated Crash Data: Primary Contributing Circumstance is equal to Driving too Fast for Conditions
	-	ated Crash Data: Primary Contributing Circumstance is equal to Made Improper Turn
		ated Crash Data: Primary Contributing Circumstance is equal to Improper or No Signal ated Crash Data: Primary Contributing Circumstance is equal to Traveling Wrong Way/Wrong Side
	-	ated Crash Data: Frimary Contributing Circumstance is equal to Followed too Close
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	-	ated Crash Data: Primary Contributing Circumstance is equal to Improper Lane Change/Use
	-	ated Crash Data: Frimary Contributing Circumstance is equal to Failed to Yield the Right-of-Way
	-	ated Crash Data: Primary Contributing Circumstance is equal to E Other Failed to Yield
	-	ated Crash Data: Primary Contributing Circumstance is equal to E Wrong Side of Road
	-	ated Crash Data: Primary Contributing Circumstance is equal to P Driver Not in Control
	of the following are	
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	-	ated Crash Data: CU Contributing Circumstance is equal to E Ran Traffic Signal
	-	ated Crash Data: CU Contributing Circumstance is equal to E Ran Stop Sign
	-	ated Crash Data: CU Contributing Circumstance is equal to E Disregarded Traffic Sign other than Stop Sign
	-	ated Crash Data: CU Contributing Circumstance is equal to Over Speed Limit
2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Driving too Fast for Conditions
2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Made Improper Turn
2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Improper or No Signal
- 2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Traveling Wrong Way/Wrong Side
2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Followed too Close
2013-20	17 Alabama Integra	ated Crash Data: CU Contributing Circumstance is equal to Improper Passing
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	-	ated Crash Data: CU Contributing Circumstance is equal to E Wrong Side of Road
	-	ated Crash Data: CU Contributing Circumstance is equal to P Driver Not in Control
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	-	ated Crash Data: V2 Contributing Circumstance is equal to E Ran Traffic Signal
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	-	ated Crash Data: V2 Contributing Circumstance is equal to E Disregarded Traffic Sign other than Stop Sign
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	_	ated Crash Data: V2 Contributing Circumstance is equal to Improper Lane Change/Use ated Crash Data: V2 Contributing Circumstance is equal to Failed to Yield the Right-of-Way
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The basis for the filter given above was proposed in the SHSP meetings of 2017. It was felt that each of these items would indicate Aggressive Driving (AD) if it showed up in any of the three contributing circumstance attributes (Primary, Contributing Unit, or Second Vehicle). There are 16 values listed within each of the attributes, one of which is Aggressive Operation (AO). Since any of these values could, by themselves, indicate driver aggressive behavior, for purposes of this analysis it was felt that the broadest possible definition should be used.



The subject came up that quite often a driver may transition into an aggessive attitude without even knowing it. We saw this as an additional reason to make the definition as broad as possible, since this factor should be considered in the development of countermeasures for AD. In considering the results, all of these factors should be borne in mind. The display above shows the Primary Contributing Circumstances (C015) for the 3-attribute filter above. This does not

count all cases since its values only accout for one of the three variables. Since this attribute (C015) would also include many values outside of the filter that occur in the other two attributes, these were pruned from the display. The purpose of this is to show the overall distribution of the various values as opposed to providing the numbers for each one of them. We will see in some of the summaries below that the total number of AD crashes over the five years of the data in the study (CY2013-2017) was 268,995 crashes. To further enable th relationship among the values, the display below places these same results in order from greatest to smallest frequency.

<u>File Dashboard Filters Analysis Frequency</u> 2013-2017 Alabama Integrated Crash Data	✓ Locations Tools Windo		v 💡 🔞	1/ 1/2013 y 12/31/2	2017 V 👔 Number Killed NC 🕨 🗊
		-	* 4	17 172013 @ 12/31/2	
	 Suppress Zero-Valued Frequence 	cies			
15: Primary Contributing Circumstance	Frequency 👻	Cum. Frequency	Percentage	Cum. Percent	C015: Primary Contributing Circumsta
Followed too Close	102359	102359	41.32	41.32	
Improper Lane Change/Use	34068	136427	13.75	55.07	
Driving too Fast for Conditions	27550	163977	11.12	66.19	
E Ran Traffic Signal	19453	183430	7.85	74.04	
Made Improper Turn	12991	196421	5.24	79.28	
Over Speed Limit	11160	207581	4.50	83.79	
E Aggressive Operation	10448	218029	4.22	88.01	
E Other Failed to Yield	6994	225023	2.82	90.83	
E Ran Stop Sign	6196	231219	2.50	93.33	
Improper Passing	5969	237188	2.41	95.74	
Traveling Wrong Way/Wrong Side	3472	240660	1.40	97.14	
Failed to Yield the Right-of-Way	3160	243820	1.28	98.42	
P Driver Not in Control	2317	246137	0.94	99.35	
E Disregarded Traffic Sign other than Stop Sign	807	246944	0.33	99.68	
E Wrong Side of Road	404	247348	0.16	99.84	
Improper or No Signal	396	247744	0.16	100.00	
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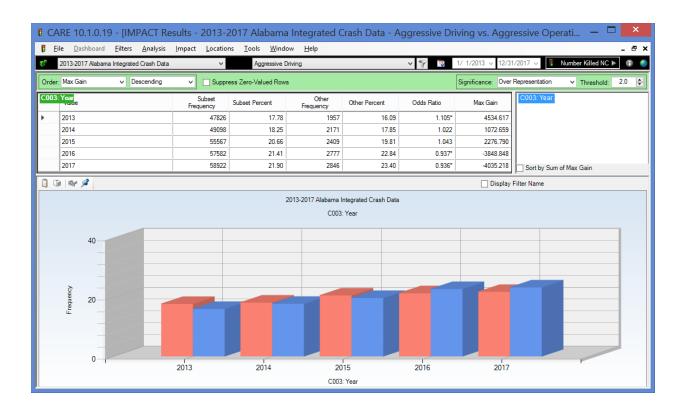
To summarize, the reason for using this very broad definition for this study is to assure that we get all of the cases in the target subset. The fact that some of these were not the result of aggressive driving will dilute the findings because the contrast between AD and non-AD will be smaller than its true difference. This will make the findings "conservative" in putting a higher burden of proof on the AD subset. That is, some being counted as AD will not arise from an aggressive driver. But, when significant differences are found, we can be sure that the statistical significance is valid, and that the odds ratio and the percent differences are at least the size that is being reported, and perhaps much greater.

Definition of Aggressive Operation

The distinction between Aggressive Driving (AD) and Aggressive Operation (AO) is quite important in that these two subsets of the crash data are very much different. Note, for example, that AO is a value for the three contributing circumstance attributes, and thus, AO is a subset of AD. AO is not determined by filtering of other variables (e.g., contributing circumstances) as was true with AD. It is determined as an opinion of the reporting officer, and the criteria for the officer specifying AO as the contributing circumstance is as follows:

In all cases for which there are <u>multiple contributing circumstances</u> (i.e., no one value can be entered to adequately describe what contributed to the crash), reporting officers are to select the Aggressive Operation (AO) code.

The rationale for this is that typically contributing circumstance indicate faults on the part of the causal driver. The decision-makers felt that if more than one contributing circumstance, then there would be a good chance that the driver was not just making a mistake, but was intentionally acting to break the rules. This would certainly correlate very highly with aggressive driving.



The IMPACT display above by year compares the AD with the AO results per year, where the proportions are indicated in the chart, and the actual values are indicated in the table. The total for the AD subset is 268,995 crashes, and the AO subset is 12,160 crashes. This is a very large difference, the AO crashes being only about 4.5% of the AD crashes, and only about 1.7% of all crashes. While the AO *might* give us close to zero false positives, it should also be clear that this is grossly under-reported estimate of the number of crashes caused by or involving aggression. Other issues with AO will be discussed in the next section, where the rationale for using AD as opposed to AO will be further justified.

The display above over the five years for the data is also beneficial for seeing the growth in AD as compared to AO reporting. The AD is represented by the red bars, while the AO bars are in blue. This indicates a potentially positive trend in more complete and accurate AO reporting as time has gone by and officers have gotten used to using the AO code.

For more comparisons over the five year period, see C003 below.

Comparison of Findings AD vs AO

While the comparison between AD and non-AD crashes formed the primary basis for this study, a second comparison of AO vs. non-AO was performed and the results were compared. In the summaries given in the net section, the AD comparison will be presented first, and then any major differences that were found in the AO part of the study will be presented and discussed.

Very few similarities were found in comparing AD with AO results. The reason for this has to do with how these two crash causes are defined. AD is defined from contributing circumstances and is almost independent of the reporting officer's opinion. AO, on the other hand, depends almost entirely on the reporting officer determining that more than one contributing circumstance was in effect, and therefore instead of indicating any of them, AO is selected.

The primary problem in this arises primarily in Impaired Driving (ID) caused crashes, either DUI Alcohol or DUI Drugs (or both). In a very large number of ID cases there will be more than one contributing circumstance, and thus the reporting officer will select AO. However, the cause of the problem is clearly not anything to do with aggression. In fact, the impaired driver might be the least aggressive on the road, not really knowing of caring about things one way or the other. We recognize that this is not always that case and there are exceptions in which ID drivers are quite aggressive. However, generally they are two different causes and for them to be correlated in such a strong way indicates that the AO attribute definition is not effective in surfacing aggression. There are many times that multiple contributing circumstance occur when aggression is not present, and ID served to highlight this flaw. This provided additional support for the focus of this study being upon AD as opposed to AO.

Summary of Findings

The comparisons in this document are between those crashes that were indicated by the filter defined above to be AD involved crashes against those that were not found to be such. Once this was accomplished, a second comparison of AO vs. non-AO crashes was performed to determine if major differences existed for each of the attributes.

The results of these analyses enable the characteristics for AD and AO crashes to surface so that traffic safety professionals can determine their magnitude and optimize aggressive driving safety programs so that emphasis is placed on the most important factors.

The following summary is a list of conclusions that were obtained from the major focus that was on the broadly defined Aggressive Driving (AD). These analyses were repeated for Aggressive Operation (AO), as defined above, but discussions were restricted to only where major contradictions between the two analyses were found.

- Crash Characteristics
 - C015-Primary Contributing Circumstance. Following Too Close is by far the greatest primary contributing factor in the AD involved subset of crashes, followed by Improper Lane Change/Use, Driving too fast for Conditions, and Ran Traffic Signal. When Over Speed Limit is combined with Driving Too Fast for Conditions, these combined speed related items become second place.
 - C129-CU Vehicle Maneuvers. The largest max gains are in Changing Lanes (odds ratio > 4), Overtaking/Passing (odds ration almost 9), and Negotiating a Curve.
 - C023-Manner of Crash. Manner of crash reflects the Following Too Close overrepresentation discussed above, and it is by far the highest frequency with about 46% of the AD crashes. Sideswipe-Same Direction has over twice the expected proportion.
 - C017-First Harmful Event. Collisions with vehicle in traffic (multi-vehicle crashes) are by far the greatest First Harmful Event, accounting for over 80% of the AD crashes, but only about 67% of the non-AD.
 - C203-CU First Harmful Event Location. Reflecting the large number of "vehicle in traffic" the vast majority of crashes occur on the roadway as opposed to running off the road. AO crashes were quite different with the largest number and over-representation being single-vehicle crashes, and rear-end crashes being the most under-represented. (Note: as you go through the various difference, observe how ID skews the AO findings. This will be discussed in detail when we get to the ID attributes, but will not be repeated over and over here.)
 - C051-Number of Vehicles. Single vehicle crashes are under-represented with an odds ratio of about 63%. Multiple vehicle crashes above two vehicles are generally all over-represented. AO crashes showed single vehicles to be over-represented and two-vehicle crashes to be under-represented.

- C056-Number of Pedestrians. AD crashes are under-represented in pedestrian involvement. AO crashes were over-represented for all numbers of pedestrians involved.
- Time Characteristics
 - C003-Year. Year is of interest because it shows that AD crashes are increasing at very close to their non-AD counterparts. This is expected since the AD filter covers a large proportion of crashes in general. AD has a fairly stable proportion compared to total crashes, which indicates that any changes are due to changes in overall crashes in general. AO, on the other hand, shows a consistent, although small growth rate, which may indicate that reporting officers are getting more used to employing this code.
 - C004-Month. Patterns of over-representation were found in the wet months of February, March and April, as well as the hot months of June, July and August, indicating that weather could be a factor. See C030 for weather. AO crashes were significantly over-represented in May, June and July.
 - C008-Time of Day. The clear pattern is for AD crashes to be over-represented in the afternoon building up to the afternoon rush hours. This is quite reasonable, including some over-representation in the morning rush hours as well. The indication of cause is the traffic density. AO crashes were quite different, showing over-representations in most of the night-time hours (7 PM until 5 AM).
 - C029-Lighting Conditions. The results here are consistent and tend to reinforce those for C008 immediately above. AO had all of the darkness categories overrepresented.
 - C006-Day of the Week. As would be suspected from the over-representations in the rush hours, weekdays tend to be over-represented (3 out of 5 significant), with Friday being the worst. The weekend days are expectedly under-represented in AD crashes. AO crashes were over-represented on Saturday and Sunday, and higher but slightly under-represented on Friday.
 - Day of the Week by Time of Day. No hasty conclusions should be drawn from the color coding of this cross-tabulation. Please see the discussion of this result after the cross-tabulation. AO crashes showed the classic over-representations on weekends that is found for alcohol and drugs.
- Driver Characteristics (Demographics and Behavior)
 - C020. Distracted Driving Officer's Opinion. Distracted driving is involved in only about 10.4% of aggressive driving crashes, as compared to 27.7% of all nonaggressive crashes. This is probably because the reporting officers in aggressive driving crashes consider other things of greater importance. Other distractions outside of the vehicle seem to be of greatest concern, and perhaps related to the presence of aggression.

- C107-CU Driver Raw Age Frequency Distribution. Significant over-representations in ages 16-28; over-representations continue until age 34, although not significant. This is above this age group's normally high frequency when compared to all other ages.
- C121. CU Driver Condition. The "Emotional (Depressed/Angry/Disturbed)" value is significantly over-represented with about 50% higher proportion than what would be expected. However, it is less than half of a percent of the total crashes in the AD subset. It is out-numbered by Asleep/Fainted/Fatigued and Under the Influence of Alcohol/Drugs, even though these two values are very significantly under-represented. Contrasted with this, the over-representation of Emotional category was close to 15 times that expected for AO, yet with less than 4% of the total AO crashes.
- C122-CU Driver Officer's Opinion Alcohol. While the number of cases is fairly high (5498), the involvement of alcohol is significantly under-represented (48.5% of expected). Thus, it can be concluded that alcohol is not a major causative factor in AD involved crashes. Contrasted with this, AO cases had close to four times their expected number of positives for alcohol, which tends to explain most of the other differences. In other words, officers would tend to see multiple violations in the case of impaired driving and would then select the Aggressive Operation indicator, with possibly little or no actual evidence of the driver being aggressive.
- C123-CU Driver Officer's Opinion Drugs. Although the number of positives here is well under half of that of alcohol, the remaining information from this attribute is quite comparable to that for alcohol. For AO, drugs were indicated over 6 times what would be expected for non-AO. The reasons here are quite the same as given for alcohol in the previous item.
- C213. CU Vehicle Usage. Overwhelmingly personal, with the over-represented times indicating that the major personal usage is in commuting.
- C104-CU Left the Scene. An over-representation might be expected of AD drivers. While such was found, it was a very small (although significant) relative difference from the non-AD drivers. Thus, leaving the scene is not concluded to be a major factor with AD. It was with AO, where there was about 4 times the expected proportion of left-the-scene crashes.
- C109-CU Driver Gender. While males are significantly over-represented in their proportion of aggressive driving crashes, we would suspect most traffic safety professionals will be surprise at how very small the difference is between their AD vs. their non-AD proportions. For example, the over-representation in the proportion of AD to non-AD for males is less than 1% (0.7%, or 1.007 times that of non-AD). However, this picture changes dramatically when we just look at fatal crashes see the cross-tabulation discussed after this variable. AO crashes follow the ID pattern of the proportion of males being over-represented by over 30%.

- Driver Gender by Severity. Consistently with AO, this indicated a dramatic overrepresentation of male aggressive driving fatal crashes, which indicates that female aggressive driving is quite different from male aggressive driving. This is considered in more detail in the next item.
- Male vs. Female Characteristics (AD comparisons only). The following were the key items of difference between male driver AD crashes and the AD crashes where females were driving:
 - AD male drivers were dramatically over-represented driving pick-ups by an odds ratio of 4.5 times what would be expected. There seems to be a strong correlation between males driving pick-ups and AD.
 - In cars, males get more aggressive in two-door models (odds ratio 2.0) than their female counterparts.
 - Males tend to be driving older vehicles than female AD drivers.
 - Male AD drivers are over-represented in Speed & Driving Too Fast for Conditions, DUI, and Improper Passing. Speed at impact is dramatically higher.
 - Locale is over-represented in open country and rural areas; about 25-30% higher than female.
 - The male driver AD crash has a First Harmful Event over twice as likely to be a rollover than that of female AD drivers.
 - Most all of the differences listed above are heavily related to increased speed at impact.
 - Failure to use seatbelts for men is about twice that of women, which further explains the relatively higher number of fatal crashes.
- Severity Characteristics
 - C025-Crash Severity. There can be no doubt that both AD and AO crashes result in relatively more deaths and incapacitating injuries than do non-AD crashes. The fatality probability is 32.8% higher for AD crashes than for non-AD, resulting in an increase of 453 fatal crashes over the five year period. See the next item for speed at impact.
 - C224. Estimated Speed at Impact. This result confirms the speculation that impact speeds for AD (and AO) crashes are significantly higher, on average, than their non-AD (non-AO) counterparts. Especially high over-representations occur at most speeds above 71 MPH.
 - C227-CU Vehicle Towed. With the results given above, it would be expected that the proportion towed would be much higher. A quick cross-tabulation determined that the large number not towed were coming from the 102,359 following too close (rear end) crashes, of which 74% were not towed. For AO the over-representation because of disabled vehicle was about 40% higher, and it was close to three times being towed for other reasons (e.g., driver inebriated).
 - C060-Number Killed. Single fatality crashes were significantly under-represented, while all multiple fatality crashes were over-represented. This is highly correlated to the increased speed proportion. For AO, all of the fatal categories

were over-represented, with one and two fatalities being about 5 and 7 times their expectations, respectively,

- C058-Number Injured (Non-Fatal). Multiple injuries followed the same pattern as multiple fatalities; all but none of the multiple injury cases were significantly over-represented. AO were quite different with both single and multiple injury cases being significantly over-represented.
- C036-Adjusted EMS Arrival Delay. All times over 15 minutes are over-represented and of the six values, only two of them are not significant in their over-representations. This is probably due to the geographical distribution, which will be considered next.
- Geographical Characteristics
 - C010-Rural or Urban. AD crashes are significantly over-represented on rural roads, which probably explains the ambulance delay time findings. It also explains some of the higher speed conclusions.
 - C031-Locale. Shopping or Business is the overwhelming local in which AD crashes occur, followed by Open Country and Manufacturing or Industrial. All of the rest are under-represented. AO were over-represented in Residential and Open Country as opposed to Shopping or Business, which was under-represented.
 - C011-Highway Classification. AD crashes are over-represented on Interstate and Federal roads, but not on any of the others. While all of the differences are significant, the largest differences are in the Interstates, with about 38% higher proportion than expected, and Municipal with about 8% lower proportion than expected in comparison with the non-AD crashes. AO had their greatest over-representation on country roads, with municipal and Interstate roadways significantly overrepresented as well.
 - C110-Driver Residence Distance. It appears that drivers have more of a tendency toward AD when they are further away from home. The opposite is true with AO, which was significantly over-represented in Less than 25 Miles.
 - C001-County Over-Represented. It seems clear that there are certain counties that are over-represented in AD crashes. Further analyses was required to determine the common characteristics that would contribute to this tendency. The results of that analysis is given in the next item.
 - Seven Highest Max-Gain Counties (AD comparisons only). This special IMPACT runs were performed to begin to answer the question "What is it about these seven counties that distinguish them from the others?" The following is a summary of those differences:
 - AD crashes were highly over-represented on the municipal roadways in these counties.
 - Urban areas were over-represented as well as "less than 25 miles from home" in these counties.
 - Intersections and collisions with vehicles in traffic and other characteristics that correlate with urban driving, including shorter EMS arrival times.

- Typical urban primary contributing circumstances were found: following too close, improper lane changes, running traffic signals, and failure to yield.
- Age seemed to be the largest disparity in AD driver demographics. Ages 16-23 were significantly over-represented in the bad counties, reflecting the overall comparison given for C107. All other ages were either under-represented of not significantly over-represented.
- Females were over-represented in the bad county AD crashes by a very small but significant 1% (odds ratio: 1.022).
- More driving close to home was being done for the AD crashes in the bad counties (71.6%) as opposed to the comparison (67.1%) probably reflecting the gender differences.
- Unemployment of involved drivers was higher in the bad AD counties; it was 15.1% in the bad counties and 11.2% for the others, a significant difference.
- Alcohol impairment was significantly higher in the bad AD counties, at a proportion about 32% higher than in the comparison counties. It was effectively the same in the proportion comparison for drug impairment, although, as usual the numbers for drug impairments were considerably smaller. In the AD bad counties, AD drivers had about 5,512 cases of Alcohol impairment, while the number impaired by drugs was just 1928.
- Most of the other attributes that were over-represented in this comparison were also those over-represented in the AD vs. non-AD comparison.
- Vehicle Characteristics
 - C101. CU Vehicle Type. The most over-represented AD vehicles tend to be passenger cars and motorcycles. The most under-represented are pick-ups, SUVs, trucks and mini-vans.
 - C208-CU Model Year. The later model years are relatively under-represented in AD crashes.
- Roadway Environment/Pavement Characteristics
 - C412-Traffic Lanes. Generally, greater the number of lanes, the greater the relative inclination toward AD, while AO crashes were highly concentrated on two-lane roadways.
 - C408-CU Vision Obscured by. Vision obscurities that arise to the highest criticality seem to be items that might catch the AD driver by surprise, especially weather and the sun. See the next item for weather considerations.
 - C030-Weather. AD crashes are over-represented by almost 60% greater proportion than expected when in rain. The question remains as to whether the rain causes the aggressive driving or whether those who are driving aggressively fail to slow down for the rain. For AO, clear weather was over-represented and rain was significantly under-represented.

- C403-CU Roadway Condition. There is almost a 40% higher proportion than expected of wet-pavement crashes, which confirms the rain finding above for AD.
- C022-Type of Roadway Junction. Four-Way Intersection had the highest max gain, being over three times the second tier, which included Bridge Overpass/Underpass, and Entrance or Exit Ramp. Four-Way Intersections were significantly under-represented for AO.
- C027-At Intersection. While a significant over-representation was found at intersections, it was quite small. Intersections were under-represented for AO.
- C407-CU Roadway Curvature and Grade. Crashes on downgrades are expected when AD drivers are distracted by aggressiveness and do not realize that the braking distance may have increased by a factor of 2 or 3 compared to level roadway. Similarly, all of the curve categories were over-represented.
- C409-CU Traffic Control. Traffic Signals, Yield Signs and Lane Control Device were all significantly over-represented, with Traffic Signals having an order of magnitude greater max gain.
- C415-Workzone Related. AD crashes are under-represented in workzones, their having 92.5% of their crashes there as opposed to 93.0% for non-AD crashes. Large construction projects are clearly the greatest problem in both the absolute and the relative sense.

The following sections present the IMPACT displays from which the above summary conclusions were drawn. Traffic safety professionals who are involved with aggressive driving and/or aggressive operation countermeasures are urged to consider each of the IMPACT outputs carefully, and if there are any questions, please contact Dr. David Brown at <u>brown@cs.ua.edu</u>.

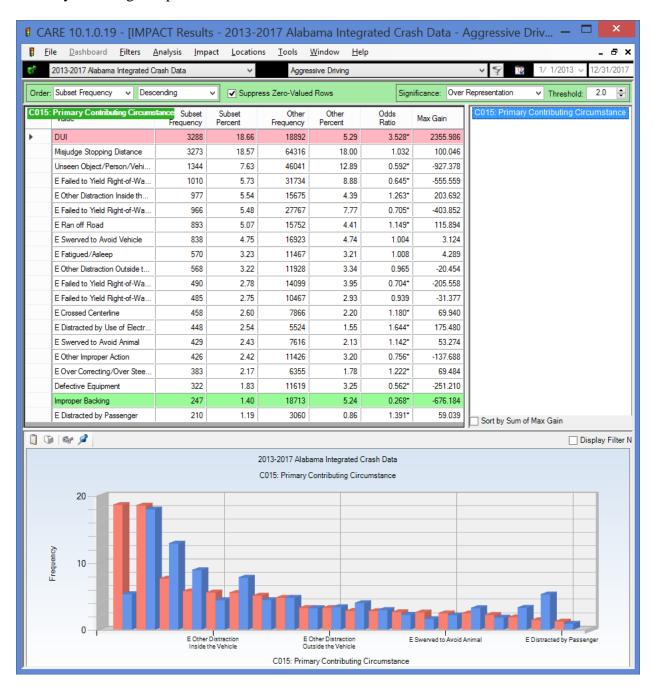
Crash Characteristics

C015 Primary Contributing Circumstance – Ordered by Frequency

CA	RE 10.1.0.19 - [Frequency Re	sults - 2013-3	2017 Alabam	na Integrated	l Crash Data ·	- Filter = Aggr	. – 🗆 🗙
<u>e</u> <u>E</u>	le <u>D</u> ashboard <u>F</u> ilters <u>A</u> nalysis F <u>r</u> e	equency <u>L</u> ocatio	ns <u>T</u> ools <u>W</u> in	dow <u>H</u> elp			_ & ×
6 2	2013-2017 Alabama Integrated Crash Data	~	Aggressive Dri	ving		▼ ♥ 1/	/ 1/2013 v 12/31/2017
Order	Frequency V Descending	V Suppress	Zero-Valued Freque	encies			
C015	Primary Contributing Circumstance	Frequency 👻	Cum. Frequency	Percentage	Cum. Percent	C015: Primary Con	tributing Circumstance
•	Followed too Close	102359	102359	41.32	41.32		
	Improper Lane Change/Use	34068	136427	13.75	55.07		
	Driving too Fast for Conditions	27550	163977	11.12	66.19		
	E Ran Traffic Signal	19453	183430	7.85	74.04		
	Made Improper Turn	12991	196421	5.24	79.28		
	Over Speed Limit	11160	207581	4.50	83.79		
	E Aggressive Operation	10448	218029	4.22	88.01		
	E Other Failed to Yield	6994	225023	2.82	90.83		
	E Ran Stop Sign	6196	231219	2.50	93.33		
	Improper Passing	5969	237188	2.41	95.74		
	Traveling Wrong Way/Wrong Side	3472	240660	1.40	97.14		
	Failed to Yield the Right-of-Way	3160	243820	1.28	98.42		
	P Driver Not in Control	2317	246137	0.94	99.35		
	E Disregarded Traffic Sign other than Stop	807	246944	0.33	99.68		
	E Wrong Side of Road	404	247348	0.16	99.84		
	Improper or No Signal	396	247744	0.16	100.00		
) 🞯 🖉					Display Average	Display Filter Name
			3-2017 Alabama Inte 15: Primary Contribu				
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	0	Made Imprope		Improper Pa	2	E Wrong Side of	Road

C015 Primary Contributing Circumstance – Most Correlated

The following are the PCCs that were not indicated as AD items for C015, but that came out anyway in C015 because AD was indicated in either C202 or C542. In other words, these would be C015 PCCs that are correlated with AD indicated by the other CC variables. In the display below they are being compared with the same values for non-AD.



Items with less than 200 occurrences have been pruned out of the output above. The resulting items give an indication of what other circumstances are commonly associated with AD in C015 when an AD value is chosen in one of the other contributing circumstance attributes (C202 or C542).

C129 CU Vehicle Maneuvers

-	RE 10.1.0.19 - [IMI ile Dashboard <u>Filter</u> s				-		sh Data - A	Aggressive	Driv — 🗆 💌
10 L	2013-2017 Alabama Integrated		v <u>r</u>	_	ssive Driving	٢		- v 💡 🔞	1/ 1/2013 v 12/31/2017
Order	: Max Gain 🗸 De	scending	V V Suppre	ess Zero-Value	d Rows	Sign	nificance: Over	Representation	✓ Threshold: 2.0 ÷
C129	CU Vehicle Maneuvers	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Batio	Max Gain 👻	C129: CU Vet	nicle Maneuvers
•	E Changing Lanes	27271	10.60	10346	2.48	4.279*	20898.258		
	Movement Essentially Straight	148226	57.61	224902	53.84	1.070*	9694.927		
	E Overtaking/Passing	6243	2.43	1164	0.28	8.707*	5526.020		
	E Negotiating a Curve	15815	6.15	17447	4.18	1.472*	5068.312		
	Slowing/Stopping	19067	7.41	27107	6.49	1.142*	2370.120		
	Turning Right	14304	5.56	20334	4.87	1.142*	1779.030		
	Making U-Tum	1671	0.65	1908	0.46	1.422*	495.745		
	E Leaving Main Road	721	0.28	1767	0.42	0.662*	-367.405		
	Stopped in Traffic	712	0.28	1986	0.48	0.582*	-511.300		
	E Stopped for Sign/Signal	647	0.25	2125	0.51	0.494*	-661.919		
	E Entering Main Road	3726	1.45	15350	3.67	0.394*	-5729.016		
	Backing	825	0.32	32610	7.81	0.041*	-19261.519		
	Tuming Left	18063	7.02	60660	14.52	0.483*	-19301.252	Sort by Sum	of Max Gain
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	0	Movement	E Negotiating	Turning	Right	E Leaving	E Stopped for	Backin	9
		Essentially Straight	a Curve	_		Main Road	Sign/Signal		
				C129	9: CU Vehicle Ma	aneuvers			

C023 Manner of Crash

	2013-2017 Alabama Integrated	Creak Data	~	Asses	sive Driving			v 😪 🦉	1/ 1/2013 y 12/31/2
	2013-2017 Alabama integrated		*	Aggres	sive Driving			3	1/ 1/2013 + 12/31/2
der	Max Gain 🗸 Des	cending	V Suppr	ess Zero-Valueo	l Rows	Sign	nificance: Over	Representation	✓ Threshold: 2.0
23	E Manner of Crash	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C023: E Mann	er of Crash
	Rear End (front to rear)	118498	45.93	140151	32.91	1.395*	33575.993		
	Sideswipe - Same Direction	33607	13.03	25194	5.92	2.201*	18341.144		
	Angle (front to side) Same Di	8071	3.13	10349	2.43	1.287*	1800.207		
	Head-On (front to front only)	4483	1.74	9825	2.31	0.753*	-1470.284		
	Sideswipe - Opposite Direction	3553	1.38	8635	2.03	0.679*	-1679.225		
	Causal Veh Backing: Reart	66	0.03	3958	0.93	0.028*	-2332.280		
	Angle Oncoming (frontal)	4572	1.77	11458	2.69	0.659*	-2370.771		
	Angle (front to side) Opposite	5985	2.32	14048	3.30	0.703*	-2527.136		
	Side Impact (angled)	19241	7.46	39740	9.33	0.799*	-4838.747		
	Side Impact (90 degrees)	20067	7.78	44109	10.36	0.751*	-6660.064		
	Causal Veh Backing: Reart	238	0.09	12868	3.02	0.031*	-7559.136		
	Single Vehicle Crash (all types)	39631	15.36	105475	24.77	0.620*	-24279.701	Sort by Sum o	f Max Gain
9) 🗞 🖉								🔄 Display Fi
				2013-2017 Alaba	ama Integrated C	rash Data			
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AD crashes are over-represented in Rear End (1.395 times expected), Sideswipe – Same Direction (2.201), and Angle (front to side) Same Direction (1.201).

CA B	RE 10.1.0.19 - [IMPAG	CT Results -	2013-201	7 Alabama	Integrated	Crash Dat	a - Aggress	sive Driving Al	N — 🗖 🗙
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¢?	2013-2017 Alabama Integrated Cra	sh Data	~	Aggressive Dr	iving		- V 9	1/ 1/2013	✓ 12/31/2017 ∨ 🖪 🄮
Order	Subset Frequency V Descer	nding v	Suppress 2	Zero-Valued Rows		Sig	nificance: Over	Representation 💊	Threshold: 2.0 🛫
C017	First Harmful Event	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C017: First Harmf	ul Event
•	Collision with Vehicle in Traffic	213491	80.37	285905	67.38	1.193*	34511.393		
	Collision with Ditch	7581	2.85	12411	2.92	0.976	-188.420		
	Collision with Tree	5734	2.16	9936	2.34	0.922*	-486.043		
	E Ran Off Road Right	4975	1.87	17315	4.08	0.459*	-5864.376		
	E Collision with Vehicle in (or fro	4668	1.76	10677	2.52	0.698*	-2015.917		
	Overtum/Rollover	3113	1.17	5336	1.26	0.932*	-227.393		
	E Ran Off Road Left Collision with Parked Motor Veh	3058 2824	1.15	8934 29706	2.11	0.547*	-2534.780 -15772.276		
	E Evasive Action (Swerve/Brake)	2824	0.76	3516	0.83	0.152	-15/72.276		
	E Collision with Concrete Barrier	1914	0.70	2718	0.64	1.125*	212.503		
	Collision with Utility Pole	1821	0.69	4228	1.00	0.688*	-825.773		
	E Collision with Embankment	1699	0.64	2251	0.53	1.206*	289.850		
	E Collision with Guardrail Face	1533	0.58	2984	0.70	0.821*	-335.016		
	E Crossed Centerline	1473	0.55	3125	0.74	0.753*	-483.284		
	Collision with Sign Post	1401	0.53	2890	0.68	0.774*	-408.171		
	Collision with Fence	1183	0.45	2087	0.49	0.905*	-123.484		
	Collision with Other Fixed Object	1157	0.44	3877	0.91	0.477*	-1270.044		
	E Collision with Curb/Island/Rai	1016	0.38	2766	0.65	0.587*	-715.546		
	Collision with Mailbox	1001	0.38	2976	0.70	0.537*	-862.008		
	Collision with Culvert Headwall	934	0.35	2043	0.48	0.730*	-344.940		
	Collision with Bridge Abutment/	738	0.28	1310	0.31	0.900	-82.074		
	E Ran Off Road Straight	715	0.27	1337	0.32	0.854*	-121.976		
	E Other Non-Collision	481	0.18	1226	0.29	0.627*	-286.489		
	E Collision with Non-Motorist: P	442	0.17	2491	0.59	0.283*	-1117.393		
	E Collision with Guardrail End E Collision with Cable Barrier	326	0.12	1008 1256	0.24	0.517*	-305.019 -462.270		
n r		324	0.12	1230	0.30	0.412	-402.270	Sort by Sum of Ma	Display Filter Name
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		E Collision with Vehi in (or from) Other Roa	icle dway	E Collision with Concrete Barrier	Collision v	vith Sign Post	Collision v Culvert Hea	vith E Collisio dwall	on with Guardrail End
		,,			17: First Harmful	Event			

C017 First Harmful Event – All Items with 300 or More Occurrences

Ordered by AD frequency, notice that only three items are over-represented. The top one is Collision with Vehicle in Traffic, which would be most 2-vehicle crashes. The only single vehicle crashes that are over-represented are: Collision with a Concrete Barrier (e.g., a NJ lane divider) and Collision with Embankment. See C051 next.

Ēi	le <u>Dashboard</u> <u>Filters</u> <u>Anal</u> 2013-2017 Alabama Integrated Crash		Locations Lo	ols <u>W</u> indow Aggressive Driving			u 🔍 🍿	1/ 1/2013	→ 12/31/2017 → 1	. 8
	-						Y Y 1			
	Max Gain v Descend	ing Y	 Suppress Zero 			Sig	nificance: Over		✓ Threshold: 2.	
203:	CU First Harmful Event Location	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C203: CU Fit	rst Harmful Event Loca	tion
	On Roadway	217304	83.54	331595	76.75	1.089*	17675.444			
	E Shoulder	7457	2.87	19111	4.42	0.648*	-4048.304			
	Median	2261	0.87	5494	1.27	0.684*	-1046.527			
	E Roadside	19732	7.59	38061	8.81	0.861*	-3181.682			
	E Outside of Right-of-Way	1738	0.67	4574	1.06	0.631*	-1015.663			
	E Off Roadway - Location Unkno	1588	0.61	5118	1.18	0.515*	-1493.165			
	E In Parking Lane or Zone	1303	0.50	13527	3.13	0.160*	-6840.595			
	E Gore	40	0.02	74	0.02	0.898	-4.550			
	E Separator	50	0.02	118	0.03	0.704	-21.039			
	E Intersection with Crosswalk and	713	0.27	679	0.16	1.744*	304.225			
	E Intersection with Crosswalk no	469	0.18	638	0.15	1.221*	84.908			
	E At Intersection no Crosswalk	4078	1.57	6685	1.55	1.013	53.461			
	E Non-Intersection Crosswalk	29	0.01	73	0.02	0.660	-14.948			
	E Other Non-Intersection	41	0.02	107	0.02	0.636*	-23.417			
	E Driveway Access Crosswalk	14	0.01	69	0.02	0.337	-27.540			
	E Sidewalk	30	0.01	150	0.03	0.332*	-60.304			
	Off Roadway	3258	1.25	5977	1.38	0.905*	-340.305	Sort by Sum	of Max Gain	
G	i 🗞 🖉								Display Filter Name	
				2013-2017 Alabam	a Integrated Cras	h Data				
				C203: CU First H	larmful Event Loc	ation				
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C203 CU First Harmful Location

These results support the findings of the two attributes given above. Of new concern might be the potential problem with pedestrian not at crosswalks. However, see the next attribute.

_	-	IPACT Results - 2 <u>A</u> nalysis <u>I</u> mpact			tegrated Cra <u>H</u> elp	ash Data - A	Aggressive L	Driving vs. Not — 🗖 🗾 🎽
8	2013-2017 Alabama Integrate	ed Crash Data	~	Aggressive Driving	I		- v 💡 🔞	1/ 1/2013 ∨ 12/31/2017 ∨
Order	: Natural Order 🗸 🗸	escending 🗸 🗸	 Suppress Zero- 	Valued Rows		Sig	gnificance: Over F	Representation V Threshold: 2.0 🚖
C051	: Number of Vehicles	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C046: ALDOT Region / C047: ADECAAHSO Region
	1 Vehicle	43633	16.22	118128	25.93	0.626*	-26108.675	C048: Regional Planning Organization
•	2 Vehicles	206813	76.88	315839	69.32	1.109*	20344.586	C049: Has Coordinate
	3 Vehicles	15837	5.89	18661	4.10	1.437*	4819.719	C050: E MapClick Used C051: Number of Vehicles
	4 Vehicles	2230	0.83	2465	0.54	1.532*	774.687	C052: Number of Drivers Recorded
	5 Vehicles	346	0.13	404	0.09	1.451*	107.482	C053: Number of Persons Recorded
	6 Vehicles	97	0.04	83	0.02	1.979*	47.998	C054: Number of Motorists Recorded
	7 Vehicles	24	0.01	28	0.01	1.452	7.469	C055: Number of Non-Motorists Record
	8 Vehicles	10	0.00	6	0.00	2.823	6.458	C056: Number of Pedestrians C057: Number of Pedacvclists
	9 Vehicles	3	0.00	4	0.00	1.270	0.638	C058: Number Injured (Non-Fatal)
	10 Vehicles	1	0.00	3	0.00	0.565	-0.771	C059: Number Injured (Includes Fatalitie
	11 Vehicles	1	0.00	1	0.00	1.694	0.410	Sort by Sum of Max Gain
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	0	20 Vehicle	9	40 Vehicles		60 Vehicles		80 Vehicles
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C051 Number of Vehicles

This attribute explains many of the other attributes. It demonstrates that AD is dramatically under-represented in single-vehicle crashes (only 62.6% of the proportion expected. Multiple vehicle crashes are for the most part all over-represented. This indicates that aggressive drivers tend to have a negative impact on other drivers as opposed to just themselves. As a rough comparison, ID/DUI crashes tend to be highly over-represented in single vehicle crashes.

C056 Number of Pedestrians

₿ C.	ARE 10.1.0.19 - [IMPA	CT Results - 2	2013-2017 /	Alabama Int	tegrated Cra	ash Data - A	Aggressive l	Driving vs. Not 🗕 🗖 🗙			
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Orde	Order: Natural Order v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🜩										
C05	6: Number of Pedestrians	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C053: Number of Persons Recorded C054: Number of Motorists Recorded			
	No Pedestrians Involved	268250	99.72	452365	99.29	1.004*	1177.903	C055: Number of Non-Motorists Record			
	1 Pedestrian Involved	709	0.26	3133	0.69	0.383*	-1140.694	C056: Number of Pedestrians			
	2 Pedestrians Involved	28	0.01	105	0.02	0.452*	-33.991	C057: Number of Pedacyclists			
	3 Pedestrians Involved	6	0.00	15	0.00	0.678	-2.856	C058: Number Injured (Non-Fatal) C059: Number Injured (Includes Fatalitie			
	4 Pedestrians Involved	1	0.00	0	0.00	0.000	1.000	C060: Number Killed			
	11 Pedestrians Involved	1	0.00	0	0.00	0.000	1.000	Sort by Sum of Max Gain			
) er 🖉							Display Filter Name			
			:		na Integrated Cras oer of Pedestrians	h Data					
	Learners										
	0	No Pedestrians Involved	I 1 Pedestrian Involved	2 Pedestrians Invo	olved 3 Pedestrians	s Involved 4 Pedes	trians Involved	11 Pedestrians Involved			
				C056: Nu	mber of Pedestria	ns					

AD crashes are under-represented in pedestrian involvement.

Time Characteristics

C003 Year

CAF	RE 10.1.0.	19 - [IMP	ACT Resul	ts - 2013-	2017 Alak	oama Inte	grated Cra	ash Data -	Aggressive	e Dri 🗕 🗖	×
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6 2	2013-2017 Alaba	ma Integrated	Crash Data	~	Aggn	essive Driving			• 9	🦉 1/ 1/2013 ∨	12/31/2017
Order:	Natural Order	✓ Des	cending	V Supp	ress Zero-Value	ed Rows	Sign	ificance: Over	Representation	✓ Threshold:	2.0 🜲
C003: \	Year		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C003: Year		
	2013		47826	17.78	79936	17.54	1.013*	632.528			
	2014		49098	18.25	84562	18.56	0.983*	-826.620			
	2015		55567	20.66	94303	20.70	0.998	-108.616			
	2016		57582	21.41	98742	21.67	0.988*	-714.360			
	2017		58922	21.90	98079	21.53	1.018*	1017.069	Sort by Sum	of Max Gain	
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The growth of AD crashes over 5 years is a very significant 23.20%. However, this must be compared to the growth in nonAD crashes over 5 years, which was 22.70%. The following table gives the proportion of crashes that were AD and AO to total crashes, and this shows very little change from year to year, and thus we conclude that the grown in both AD and AO crashes is related to increased driving in general.

Year	% AD	%AO
2013	37.43%	1.53%
2014	36.73%	1.62%
2015	37.08%	1.61%
2016	36.84%	1.78%
2017	37.53%	1.81%
Average	37.12%	1.67%

C004 Month

₿ C	ARE 10.1.0.19 - [IMP	ACT Results -	2013-2017	7 Alabama	Integrated	Crash Data	ı - Aggressi	ve Driving	vs 🗕 🗖 🗙
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<u></u>	2013-2017 Alabama Integrated	Crash Data	~	Aggressive Dri	ving		▼ §	1/ 1/20	13 v 12/31/2017 v 🕞 🌔
Orde	er: Natural Order V Des	cending 🗸 🗸	Suppress Ze	ero-Valued Rows		Sig	nificance: Over l	Representation	✓ Threshold: 2.0
C00	4: Month	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C004: Month	
	January	21193	7.88	36344	7.98	0.988	-264.160		
	February	20597	7.66	34160	7.50	1.021*	429.253		
	March	22753	8.46	38310	8.41	1.006	135.132		
	April	22921	8.52	38603	8.47	1.006	130.147		
	May	22840	8.49	39201	8.60	0.987	-303.907		
	June	21817	8.11	35589	7.81	1.038*	805.585		
	July	21391	7.95	35662	7.83	1.016	336.486		
	August	22943	8.53	38541	8.46	1.008	188.751		
	September	21363	7.94	37321	8.19	0.970*	-670.972		
	October	23724	8.82	41321	9.07	0.972*	-671.535		
	November	22912	8.52	39368	8.64	0.986	-330.502		
	December	24541	9.12	41202	9.04	1.009	215.722	Sort by Sum of	of Max Gain
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	0	February	April	Ji	June	August	Octob	ber	December
		,			C004: Month		_ 0101		

The above shows the possibility of weather affecting aggressive attitudes. The three summer months of June, July and August are all over-represented, which could point to heat as the source. February, March and April are over-represented, which could point to the presence of rain as a cause. See C030 below for direct effects of weather.

C008 Time of Day

CARE 10.1.0.19 - [IMPA	ACT Results - 2	2013-2017	Alabama II	ntegrated (Crash Data	- Aggressiv	ve Driving vs. N	lot 🗕 🗖	×
<u>File D</u> ashboard <u>F</u> ilters <u>A</u>	nalysis <u>I</u> mpact	Locations To	ools <u>W</u> indow	<u>H</u> elp					- 8
2013-2017 Alabama Integrated C	rash Data	~	Aggressive Drivi	ng		- V 💡	1/ 1/2013 ∨	12/31/2017 🗸	
Order: Natural Order 🗸 Desc	ending 🗸 🗸	✓ Suppress Zero	p-Valued Rows			Significance:	Over Representation	✓ Threshold:	2.0 韋
C008: Time of Day	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C001: County C002: City		
1:00 AM to 1:59 AM	2105	0.78	5598	1.23	0.637*	-1200.007			
2:00 AM to 2:59 AM	1916	0.71	5279	1.16	0.615*	-1200.673	C004: Month		
3:00 AM to 3:59 AM	1588	0.59	4624	1.01	0.582*	-1141.967	C005: Day of M C006: Day of th		
4:00 AM to 4:59 AM	1740	0.65	4994	1.10	0.590*	-1208.411	C007: Week of		
5:00 AM to 5:59 AM	3242	1.21	7790	1.71	0.705*	-1357.144	C008: Time of		
6:00 AM to 6:59 AM	6166	2.29	11989	2.63	0.871*	-912.194	C009: Data So		
7:00 AM to 7:59 AM	17484	6.50	27553	6.05	1.075*	1216.965	C010: Rural or	Urban Classifications	
8:00 AM to 8:59 AM	12413	4.61	18868	4.14	1.114*	1273.508	C012: Controll		
9:00 AM to 9:59 AM	10575	3.93	17600	3.86	1.018	184.123	C013: E Highw		
10:00 AM to 10:59 AM	12141	4.51	20106	4.41	1.023	270.604		Contributing Circu	
11:00 AM to 11:59 AM	14944	5.56	24207	5.31	1.046*	652.412		Contributing Unit I	Numbe
12:00 Noon to 12:59 PM	18215	6.77	29382	6.45	1.050*	868.140	C017: First Ha	n First Harmful Eve	ent Rel
1:00 PM to 1:59 PM	18118	6.74	28513	6.26	1.076*	1284.189	C019: E Most H		
2:00 PM to 2:59 PM	20091	7.47	31338	6.88	1.086*	1589.336		cted Driving Opinio	on
3:00 PM to 3:59 PM	25748	9.57	39697	8.71	1.099*	2311.260		e to Fixed Object	
4:00 PM to 4:59 PM	24508	9.11	36536	8.02	1.136*	2937.485	C022: E Type o C023: E Manne	f Roadway Junctio	on/Feat
5:00 PM to 5:59 PM	26160	9.73	40081	8.80	1.106*	2496.550	C024: School E		
6:00 PM to 6:59 PM	15551	5.78	26758	5.87	0.984	-246.675	C025: Crash S	everity	
7:00 PM to 7:59 PM	9874	3.67	18946	4.16	0.883*	-1311.543	C026: Intersec		
8:00 PM to 8:59 PM	8057	3.00	16323	3.58	0.836*	-1579.948	C027: At Inters C028: Milepost		
9:00 PM to 9:59 PM	6764	2.51	13678	3.00	0.838*	-1311.364	C029: Lighting		
10:00 PM to 10:59 PM	5094	1.89	10393	2.28	0.830*	-1041.931	C030: Weather		
11:00 PM to 11:59 PM	3658	1.36	8057	1.77	0.769*	-1098.778	Sort by Sum of	f Max Gain	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							🗌 Di	splay Filter Name	
				ama Integrated Cr 8: Time of Day	ash Data				
10						-			-
è -		6		.11	đ	h	1		
Erequency	110						hh	11.	
0									
0	4:00 AM to 4:59	AM 9:0	0 AM to 9:59 AI	M 2:00	PM to 2:59 PM	7:00 P	M to 7:59 PM	Unknown	-

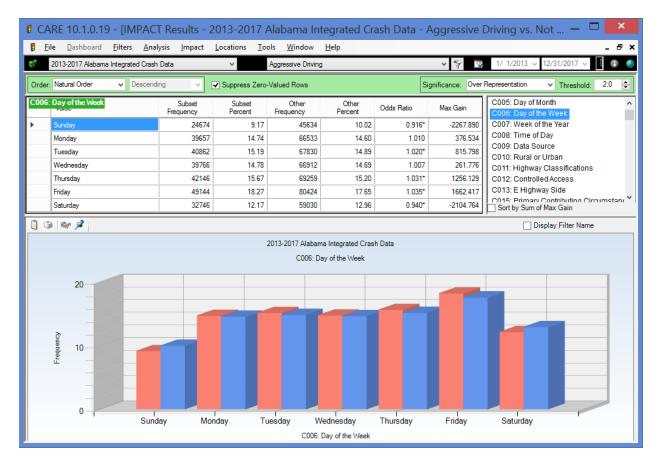
The clear pattern is for AD crashes to be over-represented in the afternoon building up to the afternoon rush hours. This is quite reasonable, including some over-representation in the morning rush hours as well.

C029 Lighting Conditions

	ARE 10.1.0.19 - [IMPAC Eile <u>D</u> ashboard <u>F</u> ilters <u>A</u> na				egrated Cra Help	ash Data - A	Aggressive (Driving vs. N	lot 🗕 🗖	- 5
P	2013-2017 Alabama Integrated Crash	n Data	~	Aggressive Driving			▼	1/ 1/2013 v	12/31/2017 🗸	6
Orde	r: Natural Order V Descend	ling 🗸 [Suppress Zero- 	Valued Rows		Si	gnificance: Over	Representation	✓ Threshold:	2.0
:029	9: Lighting Conditions	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C022: E Type (C023: E Mann	of Roadway Junc er of Crash	tion/Feat
	Daylight	202589	75.32	318603	69.93	1.077*	14500.903	C024: School		
	Dusk	7551	2.81	12730	2.79	1.005	35.812	C025: Crash S		
	Dawn	2877	1.07	5882	1.29	0.829*	-595.454	C026: Intersed C027: At Inters		
	Dark - Roadway Lighted	1212	0.45	1575	0.35	1.303*	282.195	C028: Milepos		
	Dark - Roadway Not Lighted	21975	8.17	50455	11.07	0.738*	-7811.238	C029: Lighting	Conditions	
	E Dark - Unknown Roadway Ligh	574	0.21	1755	0.39	0.554*	-462.069	C030: Weathe	r	
	E Dark - Spot Illumination One Si	7277	2.71	16354	3.59	0.754*	-2377.626	C031: Locale	Present at Time	
	E Dark - Spot Illumination Both Si	15061	5.60	27536	6.04	0.926*	-1194.948		lotification Delay	
	E Dark - Continuous Lighting One	1109	0.41	2562	0.56	0.733*	-403.483	C034: Police A		
	E Dark - Continuous Lighting Bot	8299	3.09	14765	3.24	0.952*	-417.556	C035: EMS Arr	ival Delay	
	Other	81	0.03	415	0.09	0.331*	-163.996		EMS Arrival Delay	
	Unknown	175	0.07	2044	0.45	0.145*	-1031.681		nicular Property [Damage
	Not Applicable	174	0.06	906	0.20	0.325*	-360.859	C040: Agency		
Ç	3 8 1							,D	splay Filter Name	•
			:	2013-2017 Alabam C029: Ligł	a Integrated Cras ting Conditions	h Data				
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	Solution Sol									_
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	0	Dusk	Dark - Roadway Lighted	E Dark - Unkn Roadway Ligh	ting Illur	mination	l Dark - Continuous Lighting th Sides of Roadway	Unknown		
				C029	Lighting Condition	ons				

Reinforcing the conclusions above, the daylight times are over-represented.

C006 Day of the Week



As would be suspected from the over-representations in the rush hours, weekdays tend to be over-represented (3 out of 5 significant), with Friday being the worst. The weekend days are expectedly under-represented in AD crashes.

CARE 10.1	.0.19 - [Cros	stab Results	- 2013-2017	Alabama Int	egrated Cras	h Data - Filte	er = Aggressi	ve – 🗖	
🖡 <u>F</u> ile <u>D</u> ashb	oard <u>F</u> ilters <u>/</u>	<u>A</u> nalysis <u>C</u> rosstal	b <u>L</u> ocations <u>T</u>	ools <u>W</u> indow	<u>H</u> elp				-
2013-2017	Nabama Integrated C	irash Data	¥	Aggressive Driving		Ŷ	💡 🦉 1/ 1	/2013 y 12/31/20	17
Suppress Zero Va	lues: None	✓ Select	Cells: 🔳 🕶 %	9		С	olumn: Day of the W	eek ; Row: Time of D	ay
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL	
12:00 Midnight to 12:59 AM	714	258	226	253	265	316	695	2727	
1:00 AM to 1:59 AM	575	182	151	179	202	271	545	2105	
2:00 AM to 2:59 AM	550	153	137	142	162	250	522	1916	
3:00 AM to 3:59 AM	442	138	126	145	125	184	428	1588	
4:00 AM to 4:59 AM	337	198	204	202	203	231	365	1740	
5:00 AM to 5:59 AM	329	518	500	471	491	529	404	3242	
6:00 AM to 6:59 AM	357	1034	1113	1048	1029	1062	523	6166	
7:00 AM to 7:59 AM	458	3213	3448	3451	3267	2876	771	17484	
8:00 AM to 8:59 AM	536	2192	2311	2291	2099	2027	957	12413	
9:00 AM to 9:59 AM	816	1651	1739	1658	1693	1651	1367	10575	
10:00 AM to 10:59 AM	1127	1726	1855	1727	1834	2050	1822	12141	
11:00 AM to 11:59 AM	1337	2252	2162	2164	2285	2646	2098	14944	
12:00 Noon to 12:59 PM	1727	2642	2723	2625	2731	3377	2390	18215	
1:00 PM to 1:59 PM	2026	2569	2585	2463	2691	3335	2449	18118	
2:00 PM to 2:59 PM	2088	3058	2869	2746	2955	3779	2596	20091	
3:00 PM to 3:59 PM	1935	4090	3972	3853	4226	5371	2301	25748	
4:00 PM to 4:59 PM	1836	3673	3908	3700	4147	5018	2226	24508	
5:00 PM to 5:59 PM	1844	4187	4491	4337	4585	4574	2142	26160	
6:00 PM to 6:59 PM	1575	2049	2351	2258	2422	2968	1928	15551	
7:00 PM to 7:59 PM	1219	1242	1206	1270	1463	1898	1576	9874	
8:00 PM to 8:59 PM	1022	982	1032	1088	1139	1404	1390	8057	
9:00 PM to 9:59 PM	817	800	802	802	937	1363	1243	6764	
10:00 PM to 10:59 PM	595	490	587	536	731	1070	1085	5094	
11:00 PM to 11:59 PM	392	347	347	341	453	878	900	3658	
Unknown	20	13	17	16	11	16	23	116	
TOTAL	24674	39657	40862	39766	42146	49144	32746	268995	

Day of the Week by Time of Day

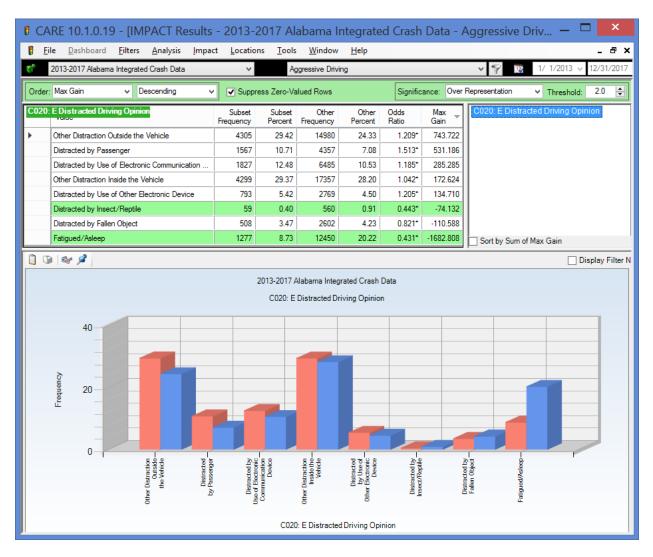
The largest hourly numbers are during the weekdays rush hours. They are generally not shown in red since no one of them is significantly higher than. Interesting symmetry not observed in any other such cross-tab. The 7 PM to 5 AM continuum on Saturday night going into Sunday

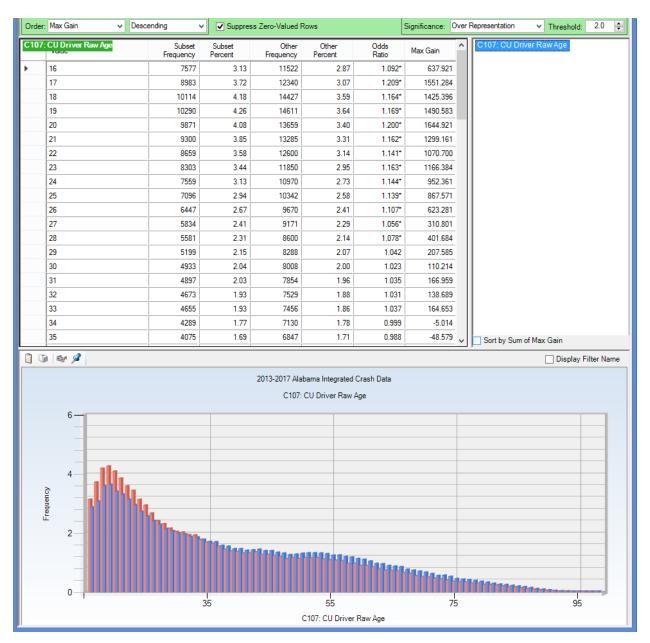
morning is significantly over-represented. There is a temptation to say that the same thing occurs Sunday night going into Monday, but Monday morning is not over-represented. The symmetrical over-representation in the upper right corner is Saturday morning, not Monday. What the colors do not reveal (and may even conceal) is the very high numbers on Friday night. The reason that these high numbers are not shown in red background is that the other numbers on Friday are so high, and thus, their percentages are low compared to Saturday and Sunday. We have to realize that Sunday night is red for the same reason – note that the numbers on Sunday night are relatively low in general, but the proportions for that day are well above the overall proportions for those hours. Summary: in interpreting this cross-tab, be sure to look at the actual numbers and recognize that the color background is relative, i.e., it is set by comparing the proportion for that time slot for that day against the overall proportion for that time slot for all days.

Driver Characteristics (Demographics and Behavior)

C020 E Distracted Driving Opinion

Distracted driving accounts for only about 10.4% of aggressive driving crashes, as compared to 27.7% of all non-aggressive crashes. This is probably because the reporting officers in aggressive driving crashes consider other things of greater importance. However, the possibility that aggressive drivers tend to be distracted by things other than their aggression should not be marginalized. The IMPACT below was run suppressing the cases where distracted driving was not a factor in both the aggressive and non-aggressive situations. Thus the comparisons are in the proportions where there was a report of distracted driving. Other distractions outside of the vehicle seem to be of greatest concern, and perhaps related to the presence of aggression.





C107 CU Driver Raw Age Frequency Distribution

Significant over-representations in ages 16-28; over-representations continue until age 34.

C121 CU Driver Condition

_	RE 10.1.0			sults - 201 Impact Loc			ntegrated Help	Crash Da	ta - Aggr	essive Drivi		× . ∂ ×
			ed Crash Data	inpact <u>F</u> or	_	Aggressive Drivi			Ŷ	? 1/	1/2013 y 12/31/201	
Order	Max Gain	~	Descending	~ ~ s	uppress Zero-'	Valued Rows		Signif	ficance: Over	Representation	✓ Threshold: 2	.0 📫
C121:	CU Driver C	ondition		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C121: CU Dri	ver Condition	
•	Apparently No	mal		227260	96.40	357209	91.01	1.059*	12702.885			
			igry/Disturbed)	980	0.42	1106	0.28	1.475*	315.683			
	P Fatigued*			37	0.02	27	0.01	2.281*	20.782			
	P Apparently	Asleep*		38	0.02	38	0.01	1.665	15.175			
	E Physical Im	paiment		398	0.17	1382	0.35	0.479*	-432.096			
	Illness			418	0.18	2487	0.63	0.280*	-1075.813			
	E Asleep/Fair	nted/Fatigued		1243	0.53	10276	2.62	0.201*	-4929.266			
	E Under the I	nfluence of Al	cohol/Drugs	5374	2.28	19964	5.09	0.448*	-6617.350	Sort by Sum	of Max Gain	
00) 🗞 🖉									-	Display Filter	Name
					2013-2	017 Alabama lı C121: CU Dri	ntegrated Crash ver Condition	Data				
	Frequency	100 50 0										
			Apparently Normal-	E Emoland (DepressettArgy/Disturbed)-	P Failurd	Р Адрынонију Асквор-	E Physical Impliment-	Intersec	E Askepff ainstfraignet-	E Under the Influence of AcoboVD regi-	F	
						C121: CU	Driver Conditio	n				

The "Emotional (Depressed/Angry/Disturbed)" value is significantly over-represented with about 50% higher proportion than what would be expected. However, it is less than half of a percent of the total crashes in the AD subset. It is out-numbered Asleep/Fainted/Fatigued and Under the Influence of Alcohol/Drugs, even though these two values are very significantly under-represented. It appears that alcohol/drugs could play a major part in AD – they will be considered next.

C122 CU Driver Officer Opinion Alcohol

	ARE 10.1.0.19 - [IMPACT Result					h Data - A	ggressive	e Driving Al		×
• <u>•</u>	Eile Dashboard Eilters Analysis Imp 2013-2017 Alabama Integrated Crash Data	act <u>L</u> ocations		<u>V</u> indow <u>H</u> e sive Driving	lp		• 9	1/ 1/2013	_	- 8 ×
Orde	er: Max Gain v Descending	V Suppres	ss Zero-Valued	Rows		Signif	icance: Over	Representation	✓ Threshold:	2.0 🜲
C122	2: CU Driver Officer Opinion Alcohol	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C122: CU Driv	ver Officer Opinion Al	cohol
<u> </u>	No - Driver Was Not Under Influence of Alcohol	229765	97.66	371567	95.17	1.026*	5843.561			
	P Both Alcohol and Drugs Yes - Driver Was Under Influence of Alcohol	14 5498	0.01	17 18826	0.00	1.367 0.485*	3.755 -5847.316			
		5450	2.34	10020	4.02	0.405	-3047.310	Sort by Sum		
	19 I av 🖉 -								Display Filter Name	
	Learner of the second s	Driver Was Not Und	C122:C		grated Crash Da	k	Was Under			
		fluence of Alcohol			-	Influence	of Alcohol			
			C122: Cl	J Driver Officer	Opinion Alcohol					

While the number of cases is fairly high (5498), the involvement of alcohol is significantly under-represented (48.5% of expected). Thus, it can be concluded that alcohol is not a major causative factor in AD involved crashes.

C123 CU Driver Officer Opinion Drugs

	RE 10.1.0.19 - [IMPACT Resul	ts - 2013-2 pact Location		ama Integ Window He		sh Data -	Aggressiv	e Driving AND — 🗖 🗙
** L	2013-2017 Alabama Integrated Crash Data	v	_	essive Driving	-14		• 9	1/ 1/2013 ∨ 12/31/2017 ∨ 👔 🌒
Order	: Max Gain V Descending	Y Suppr	ess Zero-Value	d Rows		Sigr	ificance: Over	Representation V Threshold: 2.0
C123	CU Driver Officer Opinion Drugs	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C123: CU Driver Officer Opinion Drugs
<u> </u>	No - Driver Was Not Under Influence of Drugs	231005	99.17	377140	98.46	1.007*	1660.487	
	P Both Alcohol and Drugs	14	0.01	17	0.00	1.354	3.662	
	Yes - Driver Was Under Influence of Drugs	1914	0.82	5884	1.54	0.535*	-1664.149	Sort by Sum of Max Gain
) 🛯 🖉							Display Filter Name
	100 50				egrated Crash Da			
		No - Driver Was Not Ider Influence of Drug		P Both Alcohol ar		1	s Under Influence o Drugs	f
			C123:	CU Driver Office	er Opinion Drugs			

Although the number of positives here is well under half of that of alcohol, given this understanding, the remaining information from this attribute is quite comparable to that for alcohol.

C213 CU Vehicle Usage

_	ile <u>D</u> ashboard <u>Filters A</u> nalysis		tions <u>T</u> ools		<u>H</u> elp			1/ 1/2013	_ _ ∨ 12/31/2017 ∨
	2013-2017 Alabama Integrated Crash Data			gressive Driving			• 7		
	: Max Gain	✓ Su	ppress Zero-Val	ued Rows		Sigr	nificance: Over		✓ Threshold: 2.0
213:	CU Vehicle Usage	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C213: CU Vehi	cle Usage
	Personal	232986	94.31	380265	92.97	1.014*	3318.119		
	Taxi	166	0.07	217	0.05	1.267	34.939		
	E Other Personal Use	511	0.21	854	0.21	0.991	-4.789		
	E Other Bus	59	0.02	108	0.03	0.905	-6.229		
	Bus/Passenger Transport	81	0.03	158	0.04	0.849	-14.427		
	E Construction/Maintenance of Privately	. 69	0.03	147	0.04	0.777	-19.783		
	E Motor Home/Recreational Vehicle	175	0.07	349	0.09	0.830	-35.785		
	E Rental Truck (Commercial Use)	136	0.06	298	0.07	0.756*	-43.982		
	Ambulance/Paramedic	94	0.04	263	0.06	0.592*	-64.844		
	E Transit/Commuter Bus	91	0.04	269	0.07	0.560*	-71.467		
	E Rental Truck (Personal Use)	341	0.14	685	0.17	0.824*	-72.718		
	Wrecker/Tow	248	0.10	536	0.13	0.766*	-75.727		
	Agriculture	265	0.11	602	0.15	0.729*	-98.589		
	Fire Fighting	70	0.03	290	0.07	0.400*	-105.151		
	E Vehicle Used As School Bus	226	0.09	571 1550	0.14	0.655*	-118.866		
	E Construction (Not Roadway) E Construction/Maintenance of Publicly	. 177	0.30	620	0.38	0.792	-195.150		
	Police	602	0.07	2063	0.15	0.473	-643.986		
	Other Business	3548	1.44	7134	1.74	0.465	-760.708		
	Transport Property	6452	2.61	12046	2.95	0.887*	-823.398	Carthy Const	Mar Caia
	j · · · ·	0432	2.01	12040	2.33	0.007	-023.330	Sort by Sum of	
9) 🕸 🖉								Display Filter Name
			2013-	-2017 Alabama Ir	ntegrated Crash D	ata			
				C213: CU Ve	hicle Usage				
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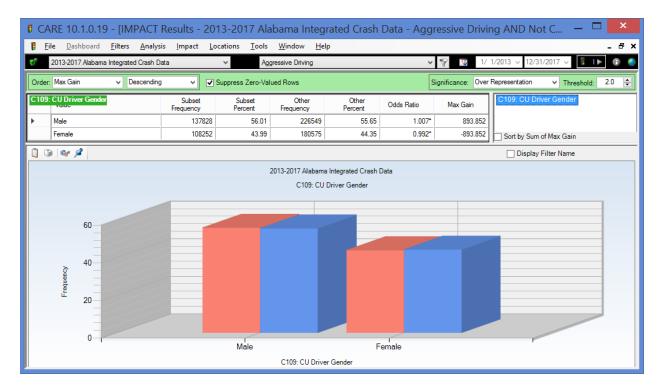
Overwhelmingly personal, with the over-represented times indicating that the major personal usage is in commuting.

C104 CU Left the Scene

C/	ARE 10.1.0.1	9 - [IMF	PACT R	esults -	2013-2017	Alabama Iı	ntegrated C	Crash Data -	Aggressiv	e Driving A	ND 🗕 🗖	×
I	<u>F</u> ile <u>D</u> ashboard	<u>F</u> ilters	<u>A</u> nalysis	<u>I</u> mpact	Locations <u>T</u> o	ools <u>W</u> indow	<u>H</u> elp					_ 8 %
¢°	2013-2017 Alabam	na Integrated	Crash Data	3	~	Aggressive Drivi	ng		- V 9	1/ 1/2013	✓ 12/31/2017 ∨	•
Orde	er: Max Gain	v De	scending	¥	Suppress Zero	-Valued Rows		Sig	gnificance: Over	Representation	✓ Threshold:	2.0 韋
C104	4: CU Left Scene		Fre	Subset equency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C104: CU Let	ft Scene	
•	Yes			24290	9.25	39564	9.04	1.023*	544.676			
	No			238418	90.75	398155	90.96	0.998*	-544.676	Sort by Sum	of Max Gain	
1	۵ 🗞 🕼										Display Filter Nan	ne
					:	2013-2017 Alabar	na Integrated Cras	sh Data				
						C104: (CU Left Scene					
	100			-								
	è			-								
	50 Ered											
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	0											
					Yes	0104 011		No				
						C104: CU	Left Scene					

The over-representation might be expected of AD drivers; its very small (although significant) relative difference with non-AD drivers is probably less than expected. Thus, leaving the scene is not seen to be a major factor with AD.

C109 CU Driver Gender



While males are significantly over-represented in their proportion of aggressive driving crashes, we would suspect most traffic safety professionals will be surprise at how very small the difference is between their AD vs. their non-AD proportions. For example, the over-representation in the proportion of AD to non-AD for males is less than 1% (0.7%, or 1.007 times that of non-AD). However, this picture changes dramatically when we just look at fatal crashes – see the cross-tabulation discussed on the next page.

Driver Gender by Severity

2013-2017 A	Nabama Integrated C	irash Data	~	Aggressive Driving		~	Sec. 1/ 1	/2013									
Suppress Zero Values: None 🗸 Select Cells: 🖬 🗸 😵 😵 Column: Crash Severity ; Row: CU Driver Gender 👰																	
	Fatal Injury	Incapacitating Injury	Non- Incapacitating Inju	Possible Injury	Property Damage Only	Unknown	TOTAL										
Male	1326	7087	10572	12823	103107	2913	137828	1									
Male	72.38%	59.65%	55.50%	49.53%	50.53%	46.39%	51.24%										
Female	410	4276	7402	11366	82507	2291	108252	1									
remale	22.38%	35.99%	38.86%	43.90%	40.43%	36.49%	40.24%										
Unknown	9	166	435	758	13499	830	15697	1									
Unknown	0.49%	1.40%	2.28%	2.93%	6.62%	6.62% 13.22%		1									
Not Applicable	0	4	8	8	8	8	8	8	8	-	-		12	164	27	215	1
Not Applicable	0.00%	0.03%	0.04%	0.05%	0.08%	0.43%	0.08%										
CU is Not a	78	189	237	97	99	19	719	1									
Vehicle	4.26%	1.59%	1.24%	0.37%	0.05%	0.30%	0.27%	1									
CU is Unknown	9	159	393	834	4690	199	6284	1									
CO IS UNKNOWN	0.49%	1.34%	2.06%	3.22%	2.30%	3.17%	2.34%	1									
TOTAL	1832	11881	19047	25890	204066	6279	268995	1									
TUTAL	0.68%	4.42%	7.08%	9.62%	75.86%	2.33%	100.00%	1									

This indicates a dramatic over-representation of male aggressive driving fatal crashes, which indicates that female aggressive driving is quite different from male aggressive driving. This will be considered in more detail in a separate section below.

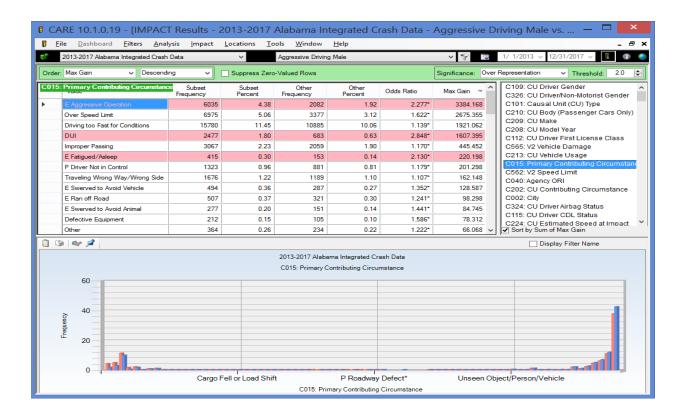
Male vs Female Characteristics

Because there were such dramatic differences in the frequencies and proportions of male and female AD drivers, it was felt that additional study along these lines was warranted.

Notable over-representations found:

- AD male drivers were dramatically over-represented driving pick-ups by an odds ratio of 4.5 times what would be expected. Seems that there is a strong correlation between driving a pick-up and aggressive driving.
- In cars, males get more aggressive in two-door models (odds ratio 2.0).
- Males tend to be driving older vehicles. See display below.
- Male AD drivers are over-represented in Speed & Driving Too Fast for Conditions, DUI and Improper Passing. Speed at impact is dramatically higher. See display below.
- Locale is over-represented in open country and rural areas; about 25-30% higher than female.
- The male driver AD crash has a First Harmful Event over twice as likely to be a rollover.
- Most all of the differences listed above are heavily related up to speed increased speed at impact. See display below.
- Failure to use seatbelts is about twice that of women, which further explains the relatively higher number of fatal crashes.

Ele Dathoard Filters Anaysis Impact Locations Tools Window Help Impact Impact Content C	CARE 10.1.0.19 - [IMPACT	۲ Results - 2	2013-2017	Alabama In	tegrated Cr	ash Data -	Aggressive D	Driving Male vs 🗕 🗖 🗙		
Order Natural Order Descending Subset Other Other Other Odds Ralio Max Gan 1984 189 0.03 6.776 20.764 318.860 C209: CU Model Year C109: CU Driver Gender C326: CU DriverNon-Motorisit Gender C326: CU DriverNon-Motorisit Gender C326: CU DriverNon-Motorisit Gender C320: CU Driver Gender C32			<u>L</u> ocations <u>T</u> o	_				& ×		
COURCE Subset Frequency Subset Percent Other Percent Other Percent Other Percent Other Percent Odds Ratio Max Gain () 1985 259 0.19 30 0.02 7.849 157.067 1985 259 0.19 30 0.03 6.776' 220.78 1985 366 0.27 37 0.03 7.764' 318.80 () C109: CU Driver Gender C101: Cu Dedy (Passenger Cars Only) C209: CU Marcel C101: Cu Driver Montholisi G ender C101: Cu Driver Montholisi	2013-2017 Alabama Integrated Crash	Data	~	Aggressive Drivin	g Male		✓	1/ 1/2013 🗸 12/31/2017 🧹 👔 🕚		
Nate Prequency Percent Odd Ratio Max Gain 1984 180 0.13 18 0.02 7.849 1576 1984 250 0.19 30 0.03 6.776 220.78 1987 337 0.03 7.764 318.860 CUB dot (Passenger Cars Only) 1987 337 0.03 7.764 318.860 COM Set (Model Year) 1987 337 0.03 7.764 318.860 CSE (V Driver Noneshorts) Cards (Var) 1987 337 0.03 7.764 318.860 CSE (V Driver Viet) Carages (Cars Only) 1987 643 0.47 119 0.11 4.241 491388 1990 677 0.49 181 0.17 2.365 Vehicle Damage 1991 0.81 0.82 3.61 0.33 2.476' 679.067 1992 1139 0.82 0.68 2.332' 121.94 C015 Pirmary Contributing Circumstance 1995 2.281 1.11	Order: Natural Order V Descendir	ng 🗸 [Suppress Zero	-Valued Rows			Significance: Over	r Representation V Threshold: 2.0		
1985 228 0.19 30 0.03 6.776* 220.778 (210: CU Body (Passenger Cars Only)) 1986 366 0.27 37 0.03 7.76* 318.860 1987 337 0.25 58 0.05 4.56* 263.105 1988 485 0.66 73 0.07 5.256* 395.94 1990 677 0.49 181 0.17 2.336* 544.637 1991 851 0.62 224 2.530* 514.650* C202. CU Hidde Usage 1992 1138 0.83 361 0.33 2.476* 679.077 1993 1526 1.11 508 2.300* 121.10* C00 eV Hide Usage 1995 2881 2.10 999 0.93 2.264* 1608.221 1995 3021 2.20 1334 1.24 1.777* 1321.414 IS1* CU Driver Airbag Status C115: CU Driver CDL Status C208: CU Model Year C115: CU Driver CDL Status C115: CU Driver CDL Status C115: CU Driver CDL Status 1996 3021 2.20 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>Odds Ratio</td> <td>Max Gain</td> <td></td>						Odds Ratio	Max Gain			
1865 265 0.77 3.03 7.764 318.860 1987 337 0.25 5.8 0.05 4.561* 263.105 1988 4.89 0.26 7.3 0.07 5.256* 395.944 1989 6.43 0.47 119 0.11 4.241* 491.3886 1990 6.77 0.49 181 0.17 2.936* 446.397 1991 851 0.62 2.64 0.24 2.530* 514.650 1992 1138 0.83 3.61 0.33 2.476* 679.067 1992 1138 0.83 3.61 0.33 2.476* 679.067 1994 2.142 1.56 7.30 0.68 2.303* 1211.942 1995 2.881 2.10 9.99 0.53 2.264* 1060.222 1996 3.021 2.20 1334 1.24 1.777* 1321.414 VII* Sum of Max Gain C2013-2017 Alabama Integrated Crash Data C203- 2013-2017 Alabama Integrated Crash Data C2013	1984	180	0.13	18	0.02	7.849	157.067			
1986 366 0.27 37 0.03 7.764* 318.860 1987 337 0.25 58 0.05 4.561* 263.105 1988 489 0.36 73 0.07 5.258* 395.94 1989 643 0.47 119 0.11 4.241* 491.388 1990 677 0.49 181 0.17 2.936* 446.397 1991 851 0.62 224 0.235* 516.65 22 Vehicle Damage 1992 1139 0.83 361 0.33 2.476* 679.067 1993 1526 1.11 508 0.47 2.338* 878.782 1995 2881 2.10 999 0.93 2.264* 1608.222 1996 3021 2.20 1334 1.24 1.777* 1321.41* V V Sert JS Sert JS 10 119.22 10 Sert JS 10 10 10 10 10 10 10 10 10 10 10 10 10	1985	259	0.19	30	0.03	6.776*	220.778			
1987 337 0.25 58 0.06 4.561* 223.105 112: CU Driver FlistLicense Class 1988 489 0.36 73 0.07 5.258* 395.994 1990 677 0.49 118 0.17 2.936* 446.397 1991 851 0.62 264 0.24 2.530* 514.656 1992 1139 0.83 361 0.33 2.476* 679.067 1993 1526 1.11 508 0.47 2.38* 878.782 1995 2881 2.10 999 0.33 2.264* 1608.224 1995 3021 2.20 1334 1.24 1.77* 132.1414 Image: Class C	1986	366	0.27	37	0.03	7.764*	318.860			
1989 643 0.47 119 0.11 4.24* 491388 1990 677 0.49 181 0.17 2.93* 446.397 1991 851 0.62 2.24 0.24 2.530* 514.650 1992 1139 0.83 361 0.33 2.47* 679.07 1993 1526 1.11 508 0.47 2.358* 878.782 1995 2831 2.10 999 0.33 2.26* 1608.222 1996 3021 2.20 1334 1.24 1.777* 1321.414 24* 1018* C115* CD Inview Airbag Status C115 CUD Invier Airbag Status C115* C100* C115* CUD Stitute Status C122* CU Estimated Status C116* C103* 2.20 1334 1.24 1.777* 1321.414 V Status C115* CUD Estimated Status C208* C118* C118* <td>1987</td> <td>337</td> <td>0.25</td> <td>58</td> <td>0.05</td> <td>4.561*</td> <td>263.105</td> <td></td>	1987	337	0.25	58	0.05	4.561*	263.105			
1990 0.00 0.01 1.01 0.236 446.397 1991 851 0.62 264 0.24 2.530 514.650 1992 1139 0.83 361 0.33 2.476 679.067 1993 1526 1.11 508 0.47 2.356 878.782 1994 2142 1.55 730 0.68 2.303 121.142 1995 2881 2.10 999 0.93 2.264* 1608.222 1996 3021 2.20 1334 1.24 1.777 1321.414 Iff: CU Driver CDL Status C208: CU Model Year 2013-2017 Alabama Integrated Crash Data Status Status Status Status Status 1996 3021 2.20 1334 1.24 1.777 1321.414 Status Status<	1988	489	0.36	73	0.07	5.258*	395.994			
1990 677 0.49 181 0.17 2336 446.37 1991 851 0.62 264 0.24 2530* 514.650 1992 1139 0.83 361 0.33 2476* 679.067 1993 1526 1.11 508 0.47 2358* 878.782 1994 2142 1.56 730 0.66 2303* 1211.942 1995 288 2.10 999 0.33 2264* 1608.222 1996 3021 2.20 1334 1.24 1.77* 1321.414 Image: Color throw CDL Status 1996 3021 2.20 1334 1.24 1.77* 1321.414 Image: Color throw CDL Status 1996 3021 2.20 1334 1.24 1.77* 1321.414 Image: Color throw CDL Status 1996 3021 2.20 1334 1.24 1.77* 1321.414 Image: Color throw CDL Status 1996 3021 2.00 134 1.24 1.77* 1321.414 Image: Color throw CDL Status 19	1989	643	0.47	119	0.11	4.241*	491.388			
1991 851 0.62 264 0.24 250° 514 650 Codo: Agency ORI 1992 1139 0.83 361 0.33 2476* 679.067 1993 1526 1.11 508 0.47 2.356* 878.782 1994 2142 1.56 730 0.68 2.303* 1211.942 1995 2881 2.10 999 0.93 2.264* 1608.222 1996 3021 2.20 1134 1.24 1.777* 1321.414 Image: Codo: Agency ORI 1996 3021 2.20 1334 1.24 1.777* 1321.414 Image: Codo: Agency ORI 1996 3021 2.20 1334 1.24 1.777* 1321.414 Image: Codo: Agency ORI 1996 3021 2.20 1334 1.24 1.777* 1321.414 Image: Codo: Agency ORI 1996 3021 2.20 1334 1.24 1.777* 1321.414 Image: Codo: Agency ORI 1996 3021 2.20 1334 1.24 1.777* 132.414 Image	1990	677	0.49	181	0.17	2.936*	446.397			
1993 1526 1.11 508 0.47 2.388 878.782 1994 2142 1.56 730 0.68 2.303 1211.942 1995 2881 2.10 999 0.93 2.264 1608.222 1996 3021 2.20 1334 1.24 1.777° 1321.414 1355 Image: Second Secon	1991	851	0.62	264	0.24	2.530*	514.650			
1994 2142 1.56 730 0.68 2.303* 1211.942 1995 2881 2.10 999 0.93 2.264* 1608.222 1996 3021 2.20 1334 1.24 1.777* 1321.414 Image: 100 model of the second of the secon	1992	1139	0.83	361	0.33	2.476*	679.067			
IOUN I/M	1993	1526	1.11	508	0.47	2.358*	878.782			
1995 2881 2.10 999 0.33 2.264* 1608.222 16224: CU Estimated Speed at Impact C224: CU Estimated Speed at Impact C 1996 3021 2.20 1334 1.24 1.77* 1321.414 C234: CU Estimated Speed at Impact C C Soft by Sum of Max Gain Image: Comparison of the comparison of th	1994	2142	1.56	730	0.68	2.303*	1211.942			
1996 3021 2.20 1334 1.24 1.777 1321.414 Source of Max Gain Display Filter Name 2013-2017 Alabama Integrated Crash Data C208: CU Model Year 10 5 5 5 5 5 5 5 5 5 5 5 5 5	1995	2881	2.10	999	0.93	2.264*	1608.222			
2013-2017 Alabama Integrated Crash Data C208: CU Model Year	1996	3021	2.20	1334	1.24	1.777*	1321.414 🗸			
C208: CU Model Year	📋 🕼 🞯 🖋							Display Filter Name		
				2013-2017 Alaba	ama Integrated Cra	ish Data				
Leoner				C208:	CU Model Year					
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				attili				line h		
	0-1	1986		1996	5 2006 2016					
C209: CU Model Year					C208: CU Model Y	'ear				



C/	ARE 10.1.0.19 - [IMPAC	T Results - 2	2013-2017	Alabama In	tegrated Cr	ash Data -	Aggressive D	riving Male AN	_ 🗆 🗙
	<u>Eile D</u> ashboard <u>F</u> ilters <u>A</u> na	ysis <u>I</u> mpact	Locations <u>T</u> o	ols <u>W</u> indow	<u>H</u> elp				_ 8 ×
*	2013-2017 Alabama Integrated Crash	Data	~	Aggressive Drivin	g Male			1/ 1/2013 y 12/31/20	D17 🗸 🔋 🚯 🌒
Orde	r: Max Gain 🗸 Descend	ing 🗸	 Suppress Zero 	-Valued Rows			Significance: Over	Representation V	Threshold: 2.0 🚖
C224	I: CU Estimated Speed at Impact	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C224: CU Estimated	Speed at Impact
	36 to 40 MPH	5922	7.04	4356	7.01	1.005	30.620		
	41 to 45 MPH	7854	9.34	5396	8.68	1.076*	556.046		
	46 to 50 MPH	4788	5.69	2936	4.72	1.206*	817.134		
	51 to 55 MPH	6228	7.41	3670	5.90	1.255*	1264.418		
	56 to 60 MPH	4301	5.12	2156	3.47	1.475*	1385.065		
	61 to 65 MPH	4046	4.81	1970	3.17	1.519*	1381.625		
	66 to 70 MPH	3824	4.55	1893	3.04	1.494*	1263.765		
	71 to 75 MPH	1203	1.43	509	0.82	1.748*	514.590		
	76 to 80 MPH	946	1.13	332	0.53	2.107*	496.978		
	81 to 85 MPH	365	0.43	121	0.19	2.230*	201.351		
	86 to 90 MPH	314	0.37	62	0.10	3.745*	230.147		
	91 to 95 MPH	75	0.09	13	0.02	4.266	57.418		
	96 to 100 MPH	203	0.24	33	0.05	4.548*	158.368		
	Over 100 MPH	133	0.16	28	0.05	3.512*	95.131 🗸	Sort by Sum of Max C	iain
	D 🛯 🖉							Display Filt	er Name
				2013-2017 Alaba	ama Integrated Cra	ash Data			
				C224: CU Est	imated Speed at Ir	npact			
	15 10 5 0	h			hn	66			
		16 to 20 M	MPH	41 to 45			0 MPH	91 to 95 MPH	
				C224- C	U Estimated Sneed	d at Impact			

Severity Characteristics

C025 Crash Severity

CA	ARE 10.1.0.19 - [IMP	ACT Results	s - 2013-2	2017 Alab	ama Integ	rated Cra	sh Data - A	Aggressive	Driv – 🗖	×
🖡 E	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> mpa	act <u>L</u> ocation	ns <u>T</u> ools	<u>W</u> indow <u>H</u> e	lp				- 8 ×
6	2013-2017 Alabama Integrated	Crash Data	~	Aggree	ssive Driving			- v 💡 🦉	1/ 1/2013 v	12/31/2017
Order	: Max Gain 🗸 Des	cending	Suppre	ess Zero-Value	d Rows	Sign	nificance: Over	Representation	✓ Threshold:	2.0 🜲
C025	Crash Severity	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C025: Crash	Severity	
•	Fatal Injury	1832	0.70	2321	0.52	1.328*	452.771			
	Incapacitating Injury	11881	4.52	18767	4.24	1.065*	728.918			
	Non-Incapacitating Injury	19047	7.25	35109	7.94	0.913*	-1816.134			
	Possible Injury	25890	9.85	40678	9.20	1.071*	1717.549			
	Property Damage Only	204066	77.68	345230	78.09	0.995*	-1083.104	Sort by Sum	of Max Gain	
00	a 🗞 🖉								🗌 Dis	play Filter N
			:	2013-2017 Alab	ama Integrated (Crash Data				
				C025	: Crash Severity					
	100									
	100									
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	Street St									
	L		_							
	0	Fatal Injury	Incapacitati	ing Injury Non	-Incapacitating Inju	ry Possible	e Injury Pro	perty Damage Only		
					25: Crash Severi					
P										

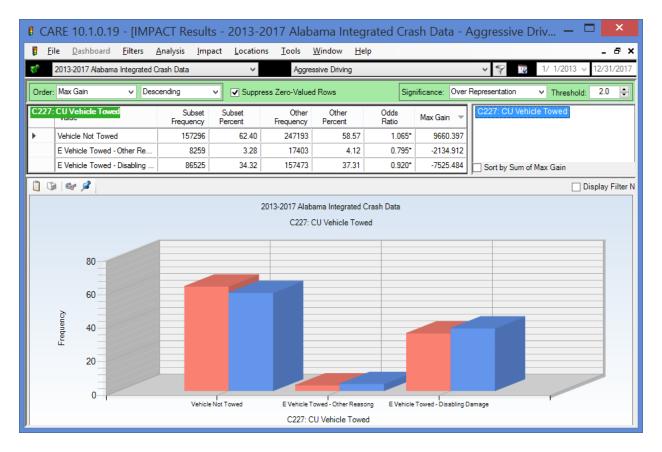
There can be no doubt that AD crashes result in relatively more deaths and incapacitating injuries than do non-AD crashes. The fatality probability is 32.8% higher for AD crashes than for non-AD, resulting in an increase of 453 fatal crashes over the five year period.

C/	ARE 10.1.0.19 - [IMP	ACT Results	- 2013-2	017 Alab	ama Integi	rated Cra	sh Data - A	Aggressive	Driv — 🗆 🗙
<u>e</u> E	ile <u>D</u> ashboard <mark>Filters</mark>	<u>A</u> nalysis <u>I</u> mpa	ct <u>L</u> ocation	is <u>T</u> ools <u>I</u>	<u>W</u> indow <u>H</u> el	р			- 8
¢?	2013-2017 Alabama Integrated	Crash Data	~	Aggres	sive Driving			- ¥ 💡 🏆	1/ 1/2013 y 12/31/20
Orde	∵ Max Gain 🗸 Des	cending v	Suppre	ess Zero-Valueo	l Rows	Sign	ificance: Over F	Representation	✓ Threshold: 2.0
C224	: CU Estimated Speed at Impa	ect Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C224: CU Est	imated Speed at Impact
•	1 to 5 MPH	18143	12.19	51724	21.17	0.576*	-13366.904		
	6 to 10 MPH	14357	9.65	31239	12.79	0.754*	-4673.583		
	11 to 15 MPH	10707	7.19	19597	8.02	0.897*	-1231.357		
	16 to 20 MPH	9843	6.61	13256	5.43	1.219*	1767.536		
	21 to 25 MPH	8672	5.83	11921	4.88	1.194*	1409.809		
	26 to 30 MPH	10272	6.90	12114	4.96	1.392*	2892.235		
	31 to 35 MPH	11118	7.47	14543	5.95	1.255*	2258.505		
	36 to 40 MPH	10396	6.99	13278	5.44	1.285*	2307.134		
	41 to 45 MPH	13532	9.09	22066	9.03	1.007	89.545		
	46 to 50 MPH	7949	5.34	9828	4.02	1.328*	1961.850		
	51 to 55 MPH	10217	6.87	18410	7.54	0.911*	-998.245		
	56 to 60 MPH	6703	4.50	5997	2.45	1.835*	3049.669		
	61 to 65 MPH	6312	4.24	8069	3.30	1.284*	1396.421		
	66 to 70 MPH	6006	4.04	9945	4.07	0.991	-52.425		
	71 to 75 MPH	1818	1.22	1329	0.54	2.246*	1008.382		
	76 to 80 MPH	1352	0.91	594	0.24	3.736*	990.139		
	81 to 85 MPH	507	0.34	157	0.06	5.301*	411.357		
	86 to 90 MPH	408	0.27	91	0.04	7.360*	352.563		
	91 to 95 MPH	95	0.06	13	0.01	11.996	87.080		
	96 to 100 MPH	250	0.17	101	0.04	4.063*	188.471		
	Over 100 MPH	164	0.11	20	0.01	13.460*	151.816	Sort by Sum o	of Max Gain
] () 🛯 🖉								Display Filte
			2	2013-2017 Alaba	ama Integrated C	rash Data			
				C224: CU Est	imated Speed at	Impact			
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						Los			
	0							10000	
		21 to 25	MPH		o 50 MPH		71 to 75 MPH	9	6 to 100 MPH
				C224: C	U Estimated Spe	ed at Impact			

C224 CU Estimated Speed at Impact

This result confirms the speculation that impact speeds for AD crashes are significantly higher, on average, than their non-AD counterparts. Especially high over-representations occur at most speeds above 71 MPH.

C227 CU Vehicle Towed



Given the attributes before this one, which indicated higher speeds and greater injury per crash, this result would seem to be contradictory. We present it for this reason.

C060 Number Killed

The following is a comparison for those crashes that resulted in at least one fatality. This makes it clear that the AD is over-represented in multiple fatality crashes. We would suspect that both the increased fatal crashes and the increase in multiple fatalities must be caused by speed. See the next attribute.

lumber Killed		¥		<u>N</u> indow <u>H</u> elj sive Driving	þ			-	8 X
Max Gain V Desc		1	Aggres	sive Driving				1/ 1/2012 12/2	1 (2017
lumber Killed	cending 🗸 🗸			Sive Driving			¥ 💡 🔞	1/ 1/2013 v 12/3	31/2017
lumber Killed		Suppress Zero-Valued Rows			Sigr	nificance: Over	Representation	✓ Threshold: 2.0	D ≑
Valac		Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C060: Number	r Killed	
1 Fatality	1647	89.80	2197	93.89	0.956*	-74.922			
2 Fatalities	152	8.29	114	4.87	1.701*	62.651			
3 Fatalities	25	1.36	23	0.98	1.387	6.974			
4 Fatalities	8	0.44	4	0.17	2.552	4.865			
5 Fatalities	2	0.11	2	0.09	1.276	0.432	Sort by Sum o	f Max Gain	
× *		2		-	rash Data			Uisplay	r Filter N
100 50 0	1 Fatality	2 Fatali				alities	5 Fatalities		
	Fatalities Fatalities Fatalities Totalities	Fatalities 25 Fatalities 8 Fatalities 2 Fatalities 2 Fata	Fatalities 25 1.36 Fatalities 8 0.44 Fatalities 2 0.11	Fatalities 25 1.36 23 Fatalities 8 0.44 4 i Fatalities 2 0.11 2 Image: Construction of the second	Fatalities 25 1.36 23 0.98 Fatalities 8 0.44 4 0.17 Fatalities 2 0.11 2 0.09 Image: Statistic state 2 0.11 2 0.09 Image: Statistic state 2 0.11 2 0.09 Image: State 1 0.11 0.11 0.11 0.11 Image: State 1 0.11 0.11 0.11 0.11 0.11 <	Fatalities 25 1.36 23 0.98 1.387 Fatalities 8 0.44 4 0.17 2.552 Fatalities 2 0.11 2 0.09 1.276 2013-2017 Alabama Integrated Crash Data CO60: Number Killed 100 0 0 0 0 0	Fatalities 25 1.36 23 0.98 1.387 6.974 Fatalities 8 0.44 4 0.17 2.552 4.865 I Fatalities 2 0.11 2 0.09 1.276 0.432 Constrained of the second	Fatalities 25 1.36 23 0.98 1.387 6.974 Fatalities 8 0.44 4 0.17 2.552 4.865 I Fatalities 2 0.11 2 0.09 1.276 0.432 I Fatalities 2 0.11 2 0.09 1.276 0.432 Sort by Sum of the second	I Fatalities 25 1.36 23 0.98 1.387 6.974 I Fatalities 8 0.44 4 0.17 2.552 4.865 I Fatalities 2 0.11 2 0.09 1.276 0.432 I Fatalities 2 0.11 2 0.09 1.276 0.432 Sort by Sum of Max Gain

C058 Number Injured (Non-Fatal)

The following has pruned the non-injury case as well as those values that had less than ten instances. It shows that multiple injuries follow the same basic pattern as multiple fatalities.

CARE	10.1.0.19 - [Dashboard <u>F</u> ilte	IMPACT Resul ers <u>A</u> nalysis <u>I</u> m	lts - 2013-2 pact <u>L</u> ocation		ama Integ <u>W</u> indow <u>H</u> e		sh Data - A	Aggressive	Driv —	- a x
201	3-2017 Alabama Integ	rated Crash Data	~	Aggre	ssive Driving			- v 💡 1	2 1/ 1/2013	12/31/2017
Order: Ma	ax Gain 🗸 🗸	Descending	V Suppr	ess Zero-Value	d Rows	Sign	ificance: Over F	Representation	✓ Threshold	2.0 🜲
C058: Nu	mber Injured (Non-F	atal) Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C058: Numb	er Injured (Non-F	'atal)
▶ 1 In	njury	41997	72.42	71570	74.43	0.973*	-1165.767			
2 In	njuries	11130	19.19	17309	18.00	1.066*	691.208			
3 In	njuries	3184	5.49	4773	4.96	1.106*	305.477			
4 In	njuries	1047	1.81	1592	1.66	1.090	86.889			
5 In	njuries	402	0.69	570	0.59	1.169*	58.242			
6 In	njuries	133	0.23	229	0.24	0.963	-5.106			
7 In	njuries	64	0.11	<mark>6</mark> 9	0.07	1.538*	22.387			
8 In	njuries	21	0.04	27	0.03	1.290	4.717			
9 In	njuries	11	0.02	11	0.01	1.658	4.366	Sort by Sum	n of Max Gain	
Î 🗊 🕯	ay 🖉								I	Display Filter
					ama Integrated (ber Injured (Non-					
	100									
Frequency	50									
	0	I I 1 Injury 2 Injuri	es 3 Injuries		5 Injuries	6 Injuries	I 7 Injuries	8 Injuries S) Injuries	

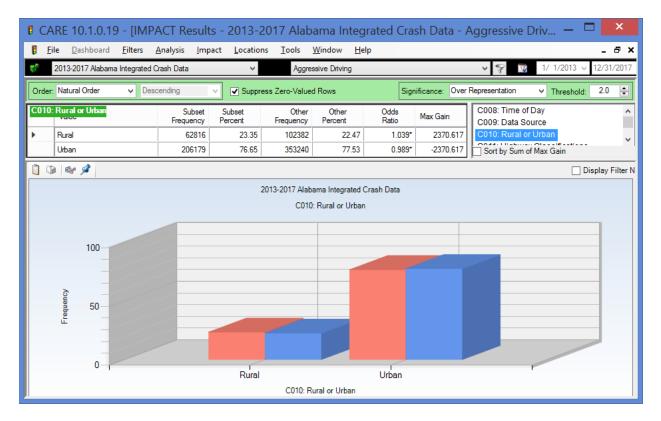
C036 Adjusted EMS Arrival Delay

CA	RE 10.1.0.19 - [IMF le <u>D</u> ashboard <u>F</u> ilters	ACT Result				egrated (Help	Crash Data	- Aggre	essive l	Driv — 🗖	_ æ >
F	2013-2017 Alabama Integrated		~	_	ressive Driving			~	9	1/ 1/2013 ∨	12/31/2017
Order:	Max Gain 🗸 De	scending	V V Supp	oress Zero-Valu	ued Rows		Significance:	Over Represe	ntation	✓ Threshold:	2.0 🜲
C036:	Adjusted EMS Arrival Delay	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	^ C030	6: Adjuste	d EMS Arrival Del:	ay
•	0 to 5 minutes	16605	26.22	30233	27.43	0.956	-766.816				
	6 to 10 minutes	19961	31.52	35437	32.15	0.980	-401.023				
	11 to 15 minutes	11352	17.93	19711	17.88	1.002	2 26.102				
	16 to 20 minutes	6341	10.01	10529	9.55	1.048	291.060				
	21 to 30 minutes	5691	8.99	9058	8.22	1.093	486.293				
	31 to 45 minutes	2260	3.57	3528	3.20	1.115	232.819	-			
	46 to 60 minutes	615	0.97	982	0.89	1.090) 50.745				
	61 to 90 minutes	364	0.57	540	0.49	1.173	• 53.717				
	91 to 120 minutes	69	0.11	110	0.10	1.092	2 5.794	v 🗆 Sor	t by Sum o	f Max Gain	
	&r ∮				abama Integrate justed EMS Arri						splay Filter
	40 Countral										
	0	6 to 10 minute	es 16	to 20 minutes C036	s 31 to- Adjusted EMS	l 45 minutes Arrival Delay		l minutes	121 to	180 minutes	

All times over 15 minutes are over-represented and of the six values, only two of them are not significant in their over-representations. This is probably due to the geographical distribution, which will be considered next.

Geographical Characteristics

C010 Rural or Urban



AD crashes are significantly over-represented on rural roads, which probably explains the ambulance delay time findings.

8	2013-2017 Alabama Integrated	Crash Data	~	Aggres	sive Driving			✓ ♥ 1/ 1/2013 ∨ 12/31/201
Orde	er: Max Gain 🗸 De	scending	Suppre	ess Zero-Valueo	l Rows	Sign	ificance: Over	Representation V Threshold: 2.0
203	1: Locale	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 📼	C026: Intersection Related C027: At Intersection
	Shopping or Business	135823	50.56	202575	44.50	1.136*	16297.254	C028: Mileposted Route
	Open Country	75323	28.04	126060	27.69	1.013*	943.557	C029: Lighting Conditions C030: Weather
	Manufacturing or Industrial	5086	1.89	8007	1.76	1.077*	361.613	C030: Weather C031: Locale
	Other	2470	0.92	4236	0.93	0.988	-29.376	C032: E Police Present at Time of Crash
	Playground	72	0.03	184	0.04	0.663*	-36.566	C033: Police Notification Delay
	School	3563	1.33	8251	1.81	0.732*	-1305.355	C034: Police Arrival Delay
	Residential	46281	17.23	105947	23.27	0.740*	-16231.128	Sort by Sum of Max Gain
] (G & A		2	013-2017 Alaba	ama Integrated Ci	ash Data		, 🗌 Display Filte
) (1) ar 9		2		ama Integrated Ci 031: Locale	ash Data		, Display Filte
] (2		-	ash Data		, Display Filte
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<u>)</u> (60	1	2		-	rash Data		, Display Filte
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	60 40				-	rash Data		Display Filte

Shopping or Business is the overwhelming local in which AD crashes occur, followed by Open Country and Manufacturing or Industrial. All of the rest are under-represented.

C011 Highway Classifications

			IPACT Results <u>Analysis</u> Impac			ama Integ <u>W</u> indow <u>H</u> el		sh Data - A	Aggressive	Driv 🗕 🗖	_ æ ×
··· ·	_	2017 Alabama Integrate		v		ssive Driving	'P'		- v 💡 🔞	1/ 1/2013 ∨	12/31/2017
Orde	r: Max (Gain v D)escending v	Suppre	ess Zero-Valueo	d Rows	Sign	nificance: Over	Representation	✓ Threshold:	2.0 🛓
C01	l: High	way Classifications	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C011: Highwa	ay Classifications	
•	Inters	tate	34323	12.85	40601	9.31	1.381*	9464.409			
	Feder	al	41510	15.54	61868	14.18	1.096*	3630.359			
	State		47092	17.63	80390	18.42	0.957*	-2128.022			
	Count	ty	38490	14.41	65977	15.12	0.953*	-1905.439			
	Munic	cipal	105725	39.58	187478	42.97	0.921*	-9061.307	Sort by Sum	of Max Gain	
	۵ 🕼	· 🖉		2	2013-2017 Alab	ama Integrated (Crash Data			Di:	splay Filter
					C011: Hig	hway Classifica	tions				
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		40 -									
	5	+0									
	Frequency										-
	Fre	20									
											_
		U-F	Interstate	Fede	ral	State	Cou	inty	Municipal		
					C011: Hi						

AD crashes are over-represented on Interstate and Federal roads, but not on any of the others. While all of the differences are significant, the largest differences are in the Interstates, with about 38% higher proportion than expected, and Municipal with about 8% lower proportion than expected in comparison with the non-AD crashes.

C110 CU Driver Residence Distance

1	CARE	10.1.0.19	9 - [IMP/	ACT Result	ts - 2013-3	2017 Alab	ama Integ	rated Cr	rash Data - /	Aggressive	Driv — 🗖	×
۵	<u>F</u> ile	<u>D</u> ashboard	<u>F</u> ilters	<u>A</u> nalysis <u>I</u> mp	oact <u>L</u> ocatio	ns <u>T</u> ools	<u>W</u> indow <u>H</u> e	lp				- 8 ×
6 2	2013-	2017 Alabama	a Integrated C	irash Data	<	Aggree	ssive Driving			- v 💡 🍱	1/ 1/2013 v 1	12/31/2017
Or	der: Max	Gain	✓ Desc	ending	V Suppr	ess Zero-Value	d Rows	s	ignificance: Over	Representation	✓ Threshold:	2.0
C1	10: CU [)river Reside	ence Distanc	e Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C110: CU Driv	ver Residence Dist	ance
	Grea	ter than 25 Mi	les	52985	22.09	80195	20.19	1.094	4* 4569.304			
	Less	than 25 Miles		186844	77.91	317054	79.81	0.976	5*	Sort by Sum of	of Max Gain	
0	Display Filter N											
	2013-2017 Alabama Integrated Crash Data											
						C110: CU Dri	iver Residence [Distance				
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		100										
	~	_		_								
	Frequency	50										
	Freq											
		-										
		0										
					Greater than 2	25 Miles	Le	ss than 25	Miles			
						C110: CU Driver	r Residence Dist	tance				

It appears that drivers have more of a tendency toward AD when they are further away from home.

2013-2017 Alabama Integrated Crass Order: Max Gain Descent Tuscaloosa Montgomery Madison Mobile Cullman Lauderdale Morgan Calhoun Limestone 20	Subset Subset Frequency Percent 18481 6.1 20556 7.1 23278 8.1 29926 11.1 4603 1.1 4511 1.1 6143 2.2 6784 2.1	Other Frequency 87 21525 54 27003 55 32499 13 45081 71 6884 68 6730 28 9618	ressive Driving Ued Rows Other Percent 4.72 5.93 7.13 9.89 1.51 1.48 2.11 2.44 1.12	Odds Ratio 1.454* 1.289* 1.213* 1.124* 1.135* 1.082* 1.034 1.052	gnificance: Over R Max Gain 5772.840 4613.679 4090.892 3310.596 538.750 537.670 464.622 224.169 157.875	Image: Weight of the second
C001: County Value Montgomery Madison Mobile Culiman Lauderdale Morgan Calhoun Limestone	Subset Frequency Subset Percent 18481 6.3 20556 7.4 23278 8.4 29926 11.1 4603 1.1 4511 1.1 6143 22.2 6784 2.3	Other Frequency 87 21525 64 27003 65 32499 13 45081 71 6884 68 6730 28 9618 52 11111	Other Percent 4.72 5.93 7.13 9.89 1.51 1.48 2.11 2.44	Odds Ratio 1.454* 1.289* 1.213* 1.124* 1.133* 1.135* 1.082* 1.034	Max Gain 5772.840 4613.679 4090.892 3310.596 538.750 537.670 464.622 224.169	C001: County C002: City C003: Year C004: Month C005: Day of Month C006: Day of the Week C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Tusceloosa Montgomery Madison Mobile Culiman Lauderdale Morgan Calhoun Limestone	Frequency Percent 18481 6.1 20556 7.1 23278 8.8 29926 11. 4603 1.1 4511 1.1 6143 2.2 6784 2.1	Frequency 87 21525 64 27003 55 32499 13 45081 71 6884 68 6730 28 9618 52 11111	Percent 4.72 5.93 7.13 9.89 1.51 1.48 2.11 2.44	Ratio 1.454* 1.289* 1.213* 1.124* 1.133* 1.135* 1.082* 1.034	Gain 5772.840 4613.679 4090.892 3310.596 538.750 537.670 464.622 224.169	C002: City C003: Year C004: Month C005: Day of Month C006: Day of the Week C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Montgomery Image: Cullman Cullman Image: Cullman Lauderdale Image: Cullman Calhoun Image: Cullman Limestone Image: Cullman	20556 7.1 23278 8.1 29926 11.1 4603 1.1 4511 1.1 6143 2.2 6784 2.3	64 27003 65 32499 13 45081 71 6884 68 6730 28 9618 52 11111	5.93 7.13 9.89 1.51 1.48 2.11 2.44	1.289* 1.213* 1.124* 1.133* 1.135* 1.082* 1.034	4613.679 4090.892 3310.596 538.750 537.670 464.622 224.169	C004: Month C005: Day of Month C006: Day of the Week C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Madison Mobile Cullman Lauderdale Morgan Calhoun Limestone	23278 8.1 29926 11.1 4603 1.1 4511 1.1 6143 2.2 6784 2.3	65 32499 13 45081 71 6884 68 6730 28 9618 52 11111	7.13 9.89 1.51 1.48 2.11 2.44	1.213* 1.124* 1.133* 1.135* 1.082* 1.034	4090.892 3310.596 538.750 537.670 464.622 224.169	C005: Day of Month C006: Day of the Week C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Mobile Cullman Lauderdale Morgan Calhoun Limestone	29926 11. 4603 1. 4511 1. 6143 2. 6784 2.	13 45081 71 6884 68 6730 28 9618 52 11111	9.89 1.51 1.48 2.11 2.44	1.124* 1.133* 1.135* 1.082* 1.034	3310.596 538.750 537.670 464.622 224.169	C006: Day of the Week C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Culman Lauderdale Morgan Calhoun Limestone	4603 1. 4511 1. 6143 2. 6784 2.	71 6884 68 6730 28 9618 52 11111	1.51 1.48 2.11 2.44	1.133* 1.135* 1.082* 1.034	538.750 537.670 464.622 224.169	C007: Week of the Year C008: Time of Day C009: Data Source C010: Rural or Urban C011: Highway Classifications
Lauderdale Morgan Calhoun Limestone	4511 1.1 6143 2.1 6784 2.1	68 6730 28 9618 52 11111	1.48 2.11 2.44	1.135* 1.082* 1.034	537.670 464.622 224.169	C009: Data Source C010: Rural or Urban C011: Highway Classifications
Morgan Calhoun Limestone	6143 2. 6784 2.	28 9618 52 11111	2.11 2.44	1.082* 1.034	464.622 224.169	C010: Rural or Urban C011: Highway Classifications
Calhoun Limestone	6784 2.	52 11111	2.44	1.034	224.169	C011: Highway Classifications
Limestone						
	3173 1.	18 5107	1.12	1.052	157.875	OUTZ. OUTHIONEGACCESS
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			C001: County	Barbou	r. La La La	Pike

C001 County – Over-Represented

It seems clear that there are certain counties that are over-represented in AD crashes. Further analyses was required to determine the common characteristics that would contribute to this tendency. This is done in a separate section below.

Tuscaloosa, Montgomery, Madison, Mobile, Cullman, Lauderdale and Morgan Counties

These seven counties were significantly over-represented (see the C001, County attribute above). The goal here was to attempt to determine why this might be the case. The following differences were found between these counties and the rest of the state, strictly for AD crashes:

- AD crashes were highly over-represented on the municipal roadways in these counties.
- Urban areas were over-represented as well as "less than 25 miles from home" in these counties.
- Intersections and collisions with vehicles in traffic and other characteristics that correlate with urban driving, including shorter EMS arrival times.
- Typical urban primary contributing circumstances were found: following too close, improper lane changes, running traffic signals, and failure to yield.

So while in general, rural areas are over-represented, they tend to have a greater over-representation in moderately urbanized counties. Urbanized counties that are under-represented include Etowah, Baldwin, Jefferson, and Shelby (referenced below as the good counties).

To buffer out the urban/rural effect, a comparison was made between the 7 over-represented (bad) counties and these four under-represented (good) counties, both subsets urbanized. The major over-represented contributing circumstance in the bad countries. Although not as pronounced, the other over-represented contributing circumstances included Improper Lane Change, Speed (over speed limit and too fast for conditions), and failure to yield (several categories). Why these values would be different in the difference county subsets is unclear, but it is not due to the good counties being rural; in fact, the bad counties were over-represented in urban crashes having 84.3% as opposed to 81.3%, a difference that is not large enough to account for the disparity in the AD crashes. However, AD crashes in the bad counties on municipal roads were over-represented by a proportion 44% higher than expected, and all other roadway classifications were under-Orepresented.

Looking at driver demographics between these two county AD subsets:

- Age seemed to be the largest disparity in AD driver demographics. Ages 16-23 were significantly over-represented in the bad counties, reflecting the overall comparison given for C107. All other ages were either under-represented of not significantly over-represented.
- Females were over-represented in the bad county AD crashes by a very small but significant 1% (odds ratio: 1.022).
- More driving close to home was being done for the AD crashes in the bad counties (71.6%) as opposed to the comparison (67.1%) probably reflecting the gender differences.
- Unemployment of involved drivers was higher in the bad AD counties; it was 15.1% in the bad counties and 11.2% for the others, a significant difference.

- Alcohol impairment was significantly higher in the bad AD counties, at a proportion about 32% higher than in the comparison counties. It was effectively the same in the proportion comparison for drug impairment, although, as usual the numbers for drugs were considerably smaller. In the AD bad counties, AD drivers had about 5,512 cases of Alcohol impairment, while the number impaired by drugs was just 1928.
- Most of the other attributes that were over-represented in this comparison were also those over-represented in the AD vs. non-AD comparison.

Vehicle Characteristics

C101 Causal Unit (CU) Type

The following were for causal units that had 400 or more crashes.

Ei	le <u>D</u> ashboard <u>F</u> ilters <u>A</u>	nalysis <u>I</u> mpa	act <u>L</u> ocatior	ns <u>T</u> ools	<u>W</u> indow <u>H</u> el	р			_ 8
	2013-2017 Alabama Integrated Ci	ash Data	~	Aggree	ssive Driving			- ¥ 💡 🏆	1/ 1/2013 v 12/31/20
)rder:	Max Gain 🗸 Desc	ending	V V Suppre	ess Zero-Value	d Rows	Sign	ificance: Over F	Representation	✓ Threshold: 2.0
:101:	Causal Unit (CU) Type	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C101: Causal	I Unit (CU) Type
	Passenger Car	140906	54.36	221033	51.94	1.047*	6292.683		
	Motorcycle	2306	0.89	3283	0.77	1.153*	306.590		
	Station Wagon	885	0.34	1392	0.33	1.044	37.245		
	E Van or Mini-Van	936	0.36	1648	0.39	0.933	-67.663		
	E Truck (6 or 7) with Trailer	599	0.23	1131	0.27	0.870*	-89.801		
	E Passenger Van	802	0.31	1550	0.36	0.850*	-141.980		
	E Tractor/Semi-Trailer	4768	1.84	8208	1.93	0.954*	-230.829		
	E Cargo Van (10000 lbs or L	1479	0.57	2812	0.66	0.864*	-233.562		
	E Single-Unit Truck (3 Axles	827	0.32	1861	0.44	0.730*	-306.385		
	E Mini-van	5801	2.24	10200	2.40	0.934*	-410.995		
	E Single-Unit Truck (2-Axle/	1735	0.67	4100	0.96	0.695*	-761.978		
	E Sport Utility Vehicle (SUV)	51629	19.92	87212	20.49	0.972*	-1484.773		
	Pick-Up (Four-Tire Light Truck)	46517	17.95	81152	19.07	0.941*	-2906.117	Sort by Sum of	of Max Gain
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			2	2013-2017 Alab	ama Integrated C	rash Data			
				C101: Ca	usal Unit (CU) T	уре			
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Much can be learned from the above just by considering the extremes. The most over-represented AD vehicles tend to be passenger cars and motorcycles. The most under-represented are pick-ups, SUVs, trucks and mini-vans.

C208 CU Model Year

8 (CARE 10.1.0.19	9 - [IMP	ACT Result	s - 2013-2	2017 Alab	ama Integi	ated Cra	sh Data - <i>I</i>	Aggressive	Driv — 🗖	x
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5 6	2013-2017 Alabama	a Integrated	Crash Data	~	Aggre	essive Driving			- ¥ 💡 🔞	1/ 1/2013 v 12/3	1/2017
Or	der: Max Gain	✓ Des	cending	V Suppre	ess Zero-Value	d Rows	Sigr	nificance: Over	Representation	✓ Threshold: 2.0	-
C2	08: CU Model Year		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C208: CU Mo	del Year	
	1991		1152	0.48	1880	0.47	1.019	21.420			
	1992		1539	0.64	2591	0.64	0.988	-19.156			
	1993		2099	0.87	3462	0.86	1.008	17.049			
	1994		2961	1.22	4838	1.20	1.018	51.561			
	1995		3994	1.65	6370	1.58	1.043	163.258			
	1996		4483	1.85	7151	1.78	1.042	182.587			
	1997		6090	2.51	9841	2.44	1.029	171.895			
	1998		7208	2.98	11410	2.83	1.050*	346.342			
	1999		9142	3.78	14849	3.69	1.024	212.223			
	2000		11334	4.68	18375	4.56	1.026	283.784			
	2001		11540	4.77	18880	4.69	1.016	186.091			
	2002		13491	5.57	21443	5.33	1.046*	595.774			
	2003		14602	6.03	23889	5.93	1.016	235.817			
	2004		15282	6.31	25298	6.28	1.005	68.483			
	2005		16541	6.83	26982	6.70	1.019	314.772			
	2006		16775	6.93	27363	6.80 7.02	1.019	319.650			
	2007		16937 13817	6.99 5.71	28258 23091	5.73	0.997	-56.579 -69.288			
	2009		8828	3.65	14652	3.64	1.002	16.693			
	2010		9741	4.02	14652	4.11	0.979	-213.516			
	2010		10257	4.02	17827	4.43	0.957*	-463.664			
	2012		11107	4.59	19711	4.43	0.937*	-746.650			
	2013		10859	4.48	19110	4.75	0.945*	-633.225			
	2014		8965	3.70	15446	3.84	0.965*	-323.797			
	2015		7037	2.91	12427	3.09	0.942*	-436.254			
	2016		4467	1.84	7709	1.91	0.964	-168.979			
	2017		1803	0.74	3101	0.77	0.967	-61.856			
	2018		109	0.05	172	0.04	1.054	5.564	Sort by Sum	of Max Gain	
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				2	2013-2017 Alat	ama Integrated C	rash Data				
					C208	CU Model Year					
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						C208: CU Model 1	Year				

The later model years are relatively under-represented in AD crashes.

Roadway Environment and Pavement Characteristics

C412 CU Traffic Lanes

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Eil	e <u>D</u> ashboard <u>F</u> ilte	ers <u>A</u> nalysis <u>I</u> mp	act <u>L</u> ocation		<u>W</u> indow <u>H</u> el ssive Driving	p		v 😌 🔞	1/ 1/2013 ∨ 1	_ & ×
	2013-2017 Alabama Integ	rated Crash Data		Aggres	ssive Driving			Y Y 😗	1/ 1/2013 🤍	2/31/2017
Order:	Max Gain 🗸 🗸	Descending	V V Suppre	ess Zero-Valueo	d Rows	Sign	nificance: Over	Representation	✓ Threshold:	2.0 🜩
C412:	CU Trafficway Lanes	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C412: CU Tra	fficway Lanes	
▶	Six Lanes or More	35681	13.73	33842	8.14	1.686*	14512.059			
	Four Lanes	88206	33.93	122274	29.42	1.153*	11720.831			
	Three Lanes	14892	5.73	18681	4.50	1.274*	3206.609			
	Five Lanes	10059	3.87	14406	3.47	1.116*	1047.719			
	One Lane	4787	1.84	9725	2.34	0.787*	-1296.209			
	Two Lanes	106336	40.90	216662	52.13	0.785*	-29191.010	Sort by Sum o	of Max Gain	
			:		ama Integrated C U Trafficway Lar					_
	60 40 20 0	Six Lanes or More	Four Lanes	Three La	nes Five	Lanes	One Lane	Two Lanes		
				C412:	CU Trafficway L	anes				

Generally, greater the number of lanes, the greater the relative inclination toward AD.

C408 CU Vision Obscured By

Vision obscurity seems not to be a major problem in AD crashes, with 93.7% falling into the Not Obscured category, as opposed to 85.8% for the non-AD crashes. However, there are some significant differences that occur that might shed some light on AD. In the following the not-obscured value was suppressed, meaning that the comparison is between situations where vision was obscured are being compared between AD and non-AD crashes. Things that arise to the highest criticality seem to be items that might catch the AD driver by surprise, especially weather and the sun. See the next item for weather considerations.

CA	ARE 10.1.0.19 - [IMPACT	Results - 20	013-2017 A	labama Inte	grated Cra	sh Data - Ag	ggressive Di	riving AND Not — 🗖 🗙
🖳 E	ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> naly	rsis <u>I</u> mpact <u>I</u>	ocations <u>T</u> oo	ls <u>W</u> indow <u>I</u>	<u>H</u> elp			_ @ ×
۴	2013-2017 Alabama Integrated Crash I	Data	- V /	Aggressive Driving			▼	1/ 1/2013 🗸 12/31/2017 🧹 👔 🚳
Order	: Max Gain 🗸 Descendin	ng 🗸 🗸	Suppress Zero-\	/alued Rows		Si	gnificance: Over	Representation V Threshold: 2.0 文
C408	CU Vision Obscured By	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C408: CU Vision Obscured By
▶	E Weather Conditions	1165	19.26	1981	9.49	2.031*	591.303	
	Curve in Road	496	8.20	786	3.76	2.179*	268.375	
	Hillcrest	723	11.95	1774	8.49	1.407*	209.250	
	Driver Blinded by Sun	1032	17.06	2922	13.99	1.220*	185.790	
	Buildings	65	1.07	111	0.53	2.022*	32.854	1
	E Lights/Glare (Roadside)	107	1.77	292	1.40	1.265	22.437	1
	E Splash or Spray from Wheels	21	0.35	34	0.16	2.133*	11.154	1
	Dust	18	0.30	40	0.19	1.554	6.416	
	Embankment	33	0.55	98	0.47	1.163	4.619	
	E Cargo from Other Vehicle	6	0.10	17	0.08	1.219	1.077	
	Fire/Smoke	7	0.12	27	0.13	0.895	-0.819	
	Sign/Billboard	17	0.28	105	0.50	0.559	-13.408	
	Trees/Crops	338	5.59	1228	5.88	0.950	-17.628	
	E Frosted Windows/Windshield	88	1.46	423	2.03	0.718*	-34.501	
	Driver Blinded by Headlights	50	0.83	296	1.42	0.583*	-35.722	
	E Other Object in Roadway	58	0.96	324	1.55	0.618*	-35.830	
	E Person/Object in or on Vehicle	86	1.42	434	2.08	0.684*	-39.686	
	Parked Vehicles	273	4.51	2135	10.22	0.442*	-345.295	
	Moving Vehicles	1465	24.22	7857	37.62	0.644*	-810.385	Sort by Sum of Max Gain
0) 🗞 🖉							Display Filter Name
			:	2013-2017 Alabam	a Integrated Crash	Data		
				C408: CU Vi	sion Obscured By			
	40							
	>							
	20 20 10 10 10 10 10 10 10 10 10 10 10 10 10							
	Fee	_ 6						
	0	Buik	dings	E Caro	o from Other Ve	nicle Dri	iver Blinded by H	leadlights
		Dui		2	U Vision Obscure			·····
				0.00.0		•		

C030 Weather

	ARE 10.1.0.19 - [IMPAC <u>F</u> ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> na				egrated Cras Help	sh Data - Ag	ggressive Di	riving AND N	Not — 🗖 🗾 🗙 - 🗗
¢?	2013-2017 Alabama Integrated Crash	Data	- V /	Aggressive Driving			¥ 💡 🏆	1/ 1/2013 v 12	2/31/2017 🗸 👔 🕞
Orde	er: Max Gain 🗸 Descend	ing 🗸 🗸] Suppress Zero-\	/alued Rows		Si	gnificance: Over	Representation	✓ Threshold: 2.0
C03	0: Weather	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 📼	C030: Weather	
•	Rain	37585	13.99	40768	8.99	1.557*	13448.546		
	E Mist	6897	2.57	9669	2.13	1.205*	1172.526		
	Snow	1023	0.38	880	0.19	1.964*	502.001		
	Sleet/Hail/Freezing Rain	821	0.31	639	0.14	2.170*	442.684		
	Severe Winds	33	0.01	220	0.05	0.253*	-97.250		
	Fog	1301	0.48	2517	0.55	0.873*	-189.175		
	Cloudy	50785	18.91	87858	19.36	0.976*	-1230.810		
	Clear	170166	63.35	311150	68.58	0.924*	-14048.522	Sort by Sum of	Max Gain
1	1) er 🖉							🗌 Displ	ay Filter Name
				2013-2017 Alabam	a Integrated Crash	Data			
				C030	: Weather				
	80								
	60								
	Au 40								
	Lea								
	20								
	20								
	0								
	U I Rain	E Mist	Snow	Sleet/Hail/Free Rain	zing Severe Win	ds Fog	Cloudy	Clear	
				CO	30: Weather				

AD drivers do not seem to be deterred by bad weather, at least not nearly as much as non-AD drivers. The question remains as to whether the rain causes the aggressive driving or whether those who are driving aggressively fail to slow down in the rain.

B CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Aggressive Driving AND Not... 📴 Eile Dashboard Eilters Analysis Impact Locations Tools Window Help _ 8 × 2013-2017 Alabama Integrated Crash Data ✓ ♥ 1/ 1/2013 ∨ 12/31/2017 ∨ 1 6 Aggressive Driving × 2.0 🜲 Over Representation Order: Max Gain ✓ Descending ¥ ✓ Suppress Zero-Valued Rows Significance: Market C403: CU Roadway Condition Subset Frequency Subset Percent Other Percent Other Odds Ratio Max Gain Frequency Wet 56340 21.63 64891 15.53 1.393* 15889.032 2.613* 1298.232 lce 2103 0.81 1291 0.31 E Snow 491 0.19 369 0.09 2.135* 260.977 E Slush 224 146 0.03 2.461* 132.988 0.09 E Water Buildup 293 0.11 307 0.07 1.531* 101.626 Muddy Sand/Dirt/Gravel 208 0.08 205 0.05 1.628* 80.210 P Snow or Slush* 37 0.01 14 4.240 28.273 0.00 Dry 200792 77.08 350649 83.91 0.919* -17791.338 Sort by Sum of Max Gain 📋 🕼 🚳 🖉 Display Filter Name 2013-2017 Alabama Integrated Crash Data C403: CU Roadway Condition 100 Frequency 50 0-E Snow E Slush P Snow or Slush* Dry E Water Buildur Muddy Sand/Dirt/Gravel C403: CU Roadway Condition

C403 CU Roadway Condition

This further confirms the weather findings above. There seems to be a dramatic disregard for extreme slippery conditions, which may be characteristic of the emotional response to aggression and its related abandonment of logical thinking.

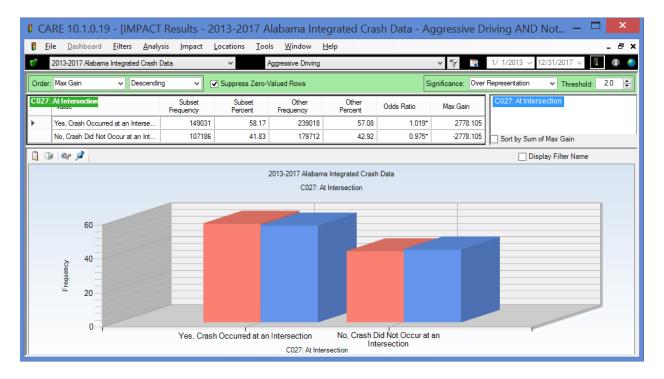
C022 E Type of Roadway Junction Feature

The following suppressed all items with less than 500 AD crashes. Four-way Intersections and the others at the top of the list give the AD drivers particular problems.

2013/2017 Alabama Hragitate Crash Data Aggressive Diwring Image: Construction of the		ARE 10.1.0.19 - [IMPACT R ile Dashboard Filters Analysis			-		h Data - Ag	ggressive D	riving AND No	ut — 🗖 🗾 🗙
Unter: Mex Gan V Descending V Suppress 20-Valued Rows Suppress 20-Valued Rows Suppress 20-Valued Rows Mex Gan V Threshold 2.0 272 = Lyged Boskway Auction/Ender Enderson Subset Peccent Octor Peccent Odds Ratio Mex Gan V Threshold 2.0 Bridge/Ovepass/Undepass 6146 2.38 7077 1.60 1.214* 6934.135 1.014* 6934.135 1.014* 6934.135 1.015* 6944.135 1.015* 1.014* 6934.135 1.015* 1.014* 6934.135 1.015* 1.014* 6934.135 1.015* 1.014* 6934.135 1.015* 1.014* 6934.135 1.015* 1.014* 6934.135 1.015* 1.014* 1.015* 1.014* 1.015* 1.014* 1.015* 1.014* 1.015* 1.014* 1.015* 1.014* 1.015* 1.014* 1.012* 1.014* 1.013* 1.014* 1.013* 1.014* 1.015* 1.014* 1.014* 1.014* 1.015* 1.014* 1.015*	88 E					eip		v 😌 🔞	1/ 1/2013 y 12/3	
Four-Way Intersection Prequency Percent Code Hato Max Can Four-Way Intersection 37455 14.50 52394 11.95 1.144 6594.136 Endige-Overpass/Underpass 6146 2.23 707 1.60 1.448 2019.528 Entrance or Ext Ramp 4.337 1.68 5007 1.10 1.448 2019.528 Of Ramp 0.3730 0.65 1.557 0.55 1.506 442.141 Intersection with Ramp 1175 0.45 1.331 0.30 1.514 339.818 On Ramp Marge Acea 748 0.22 650 0.16 1.855 345.573 On Ramp Marge Acea 748 0.22 1.931 4.83.456 4.1442 0.32 1.722 397.96 Offert FourWay Intersection 1038 0.40 1.777 0.40 1.002 1.832 1.43.456 At Intersection 1038 0.40 1.777 0.40 1.002 1.832 1.146.419 Desorevin Medan	Order						Sig	gnificance: Over		
Bridge/Overpase/Undepase 6146 2.38 7077 1.66 1.439 2019.528 Enternoe or Ext Ramp 4.337 1.68 5007 1.13 1.466 1417.508 On Segment but Intersection Related 3161 1.22 4495 1.01 1.206 540.046 Off Ramp 0.1370 0.63 1.557 0.33 1.509 462.141 Under Intersection with Ramp 1.175 0.45 1.331 0.30 1.514' 338.918 On Ramp Merge Area 748 0.29 690 0.16 1.857 445.833 On Ramp Merge Area 748 0.22 690 0.16 1.857 445.833 Off Earon-Nerge Area 1.786 0.21 449 0.11 1.947 299.873 Vintersection 1.038 0.40 1.777 0.40 1.002 1.883 Differ Four-Wery Intersection 1.038 0.42 2.913 448.933 1.993 -145.419 Dreserver in Median 823 0.32 2.111 0.938 -145.419 .9019 Intersection .9019/1418/1	C022	E Type of Roadway Junction/Feature					Odds Ratio	Max Gain 🔻	C022: E Type of R	oadway Junction/Featu
Errance or Ext Ramp 4337 1.68 5007 1.13 1.446 1417.508 On Segment but Interaction Related 3161 1.22 4495 1.01 1.206 540.046 Off Ramp 1370 0.53 1557 0.35 1509 462.141 Other Interaction with Ramp 1175 0.45 1331 0.33 1.544 398.918 Other Interaction 1238 0.48 1442 0.33 1.472 397.196 On Ramp Marga Area 748 0.29 690 0.16 1.889 343.673 On Ramp 655 0.21 449 0.21 0.913 48.345 At Interaction 505 0.20 349 0.21 0.913 48.345 At Interaction Interaction Related 983 0.38 1.821 0.41 0.525 7.07.792 Buiness Drive 1314 0.51 3180 0.66 0.507 439.803.053 1.92.007 T+teraction 172.07 6.67 314.92 7.11 0.938 -1403.374 Diversey Access Interaction	•	Four-Way Intersection	37459	14.50	52934	11.95	1.214*	6594.136		
On Segment but Intersection Related 3161 1.22 4445 1.01 1.206 540.466 Of Ramp 1370 0.633 1557 0.35 1.509 442.141 Intersection with Ramp 1175 0.44 1331 0.30 1.514' 338.918 On Ramp Marge Area 748 0.22 6590 0.16 1.859' 345.673 On Ramp Marge Area 748 0.22 6590 0.16 1.859' 345.673 On Ramp Marge Area 748 0.22 0.91 4.8345 4.845 1.01 1.947' 259.873 Offset FourWay Intersection 1036 0.40 1777' 0.40 1.002 1.863 Offset FourWay Intersection 1035 0.21 4.94 0.11 0.926' 7.8732 Crossover in Median 823 0.32 1.821 0.41 0.926' 7.8732 Dreversy Access Intersection 11206 6.67 3142 7.11 0.938' -1146.419 Dreversy Access Intersection 1596 0.62 5144 1.16 0.532' -1403.374 <td></td> <td>Bridge/Overpass/Underpass</td> <td>6146</td> <td>2.38</td> <td>7077</td> <td>1.60</td> <td>1.489*</td> <td>2019.528</td> <td></td> <td></td>		Bridge/Overpass/Underpass	6146	2.38	7077	1.60	1.489*	2019.528		
Off Ramp 1370 0.63 1557 0.35 1.509 442.141 Heresection 1238 0.45 1331 0.30 1.514 398.918 Off Ramp Mege Area 748 0.29 690 0.16 1.859 335.767 On Ramp 655 0.21 449 0.11 1.947 268.973 Off For-Way Intersection 1038 0.40 1777 0.40 1.002 1.863 Off Set Four-Way Intersection 1038 0.32 2.217 0.50 0.637 449.963 Business Drive 1314 0.51 3.818 0.86 0.590° -912.207 Tritesection 17217 6.67 3.1492 7.11 0.532 -1403.374 Driveway Access Intraction 1596 0.52 5144 1.16 0.532° -1403.374 No Special Feature 17862 0.516 2.0780 7.241 0.532° -1403.374 No Special Feature 170852 0.516 2.0720		Entrance or Exit Ramp	4337	1.68	5007	1.13	1.486*	1417.508		
Intersection with Ramp 1175 0.4s 133 0.30 1.514 338.918 Oher Intersection 1238 0.4s 1442 0.33 1.472 397.196 On Ramp Merge Area 748 0.29 630 0.11 1.947 269.873 Y-Intersection 1038 0.4d 1777 0.4d 1.002 1.883 Offset FourWay Intersection 505 0.20 949 0.21 0.913 48.345 A Intersection, Intersection Related 983 0.32 2217 0.60 505 -78.792 Cossover in Median 283 0.32 2217 0.01 0.937 46.803 Business Drive 1314 0.51 3818 0.86 0.5907 -912207 Thiersection 17265 0.62 5144 1.16 0.532 -148.313 No Special Feature 17865 0.62 5144 1.16 0.532 -148.313 Mo 1708000 120207 1.955 0.9380.053 Sorte Sum of Max Gain Or Oue Oue 1032017 Alabama Integrated Crash Data		On Segment but Intersection Related	3161	1.22	4495	1.01	1.206*	540.046		
Other Intersection 1238 0.48 1442 0.33 1.472 397.196 On Ramp Merge Area 748 0.29 690 0.16 1.859 345.673 On Ramp 655 0.21 449 0.11 1.947 269.873 Y-Hzersection 1038 0.40 1777 0.40 1.002 1.863 Offset FourWay Intersection 1036 0.20 949 0.21 0.0137 4463.653 Octosover in Median 823 0.32 2.217 0.50 0.637 4463.633 Bainess Drive 1314 0.51 3818 0.86 0.5392 -912.207 Thritersection 1556 0.62 5144 1.16 0.532 1440.314 Driveway Access Intersection 1556 0.62 5144 1.16 0.532 1.939 Sort by Sum of Max Gain Driveway Access Intersection 1556 0.62 5144 1.16 0.532 1.939 Diversection Diversection Diversection D		Off Ramp	1370	0.53	1557	0.35	1.509*	462.141		
On Ramp Merge Area 748 0.22 659 0.16 1.889 345.673 On Ramp 555 0.21 489 0.11 1.947 269.873 Y Intersection 1038 0.40 1777 0.40 1.002 1.863 Offset Four-Way Intersection 508 0.20 949 0.21 0.913 48.845 Crossover in Median 623 0.32 2217 0.50 0.637 459.833 Business Drive 1314 0.51 3818 0.86 0.590 912.207 Trintersection 17277 6.67 31492 7.11 0.933 -1145.419 Driveway Access Intersection 1556 0.62 5144 1.16 0.532* -1493.374 Dispecial Feature 178652 69.16 320790 72.41 0.955* 389.053 Sort by Sum of Max Gain Or of the area 178652 0.217 Alshama Integrated Crash Data Cozz: E Type of Roadway Junction/Feature		Intersection with Ramp	1175	0.45	1331	0.30	1.514*	398.918		
On Ramp 555 0.21 489 0.11 1.947 269.873 Y-Intersection 1038 0.40 1777 0.40 1.002 1.863 Offset Four-Way Intersection 505 0.20 949 0.21 0.913 48.345 At Intersection. Intersection Related 983 0.32 2.217 0.50 0.637 -469.693 Business Drive 1314 0.51 3818 0.86 0.590 -912.207 T-Intersection 17217 6.67 31492 7.11 0.938 -1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532 -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955 838.9053 Sort by Sum of Max Gain C022: E Type of Roadway Junction/Feature		Other Intersection	1238	0.48	1442	0.33	1.472*	397.196		
Y-Intersection 1038 0.40 1777 0.40 1.002 1.863 Offset Four-Way Intersection 505 0.20 949 0.21 0.913 448.445 At Intersection, Intersection 605 0.20 949 0.21 0.913 448.445 Crossover in Median 823 0.32 2217 0.50 0.637 449.5983 Business Drive 1314 0.51 3818 0.86 0.590° 912.207 Ti-tressection 17217 6.67 31492 7.11 0.935° 1454.519 Driveway Access Intersection 1596 0.62 5144 1.16 0.532° 1403.374 No Special Feature 178652 63.16 320780 72.41 0.955° 6389.053 Sort by Sum of Max Gain		On Ramp Merge Area	748	0.29	690	0.16	1.859*	345.673		
Offset Four-Way Intersection 505 0.20 949 0.21 0.913 448.445 At Intersection, Intersection Related 983 0.38 1821 0.41 0.926 -78.792 Crossover in Median 823 0.32 2217 0.50 0.637 -469.693 Business Drive 1314 0.51 3818 0.86 0.590*//related -912.207 T-Intersection 17217 6.67 31492 7.11 0.933*//related -1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532*//related -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955*//related -Sott by Sum of Max Gain Image: Comparison of the compa		On Ramp	555	0.21	489	0.11	1.947*	269.873		
At Intersection, Intersection Peaked 983 0.38 1821 0.41 0.926 -78.792 Crossover in Median 823 0.32 2217 0.50 0.637 469.693 Business Drive 1314 0.51 3818 0.86 0.590 -912.207 T-intersection 17217 6.67 31492 7.11 0.938 -1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532 -140.3374 No Special Feature 178652 69.16 320780 72.41 0.955* 8389.053) Sort by Sum of Max Gain		Y-Intersection	1038	0.40	1777	0.40	1.002	1.863		
Crossover in Median 823 0.32 2217 0.50 0.637 469.693 Business Drive 1314 0.51 3818 0.86 0.590* -912.207 T-Intersection 17217 6.67 31492 7.11 0.938* -1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532* -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955* -3389.051 - Origony Access Intersection 1596 0.62 5144 1.16 0.532* -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955* -3389.051 - Lotation of Max Gain Core for adway Junction/Feature Core for adway Junction/Feature Core for adway Junction/Feature Off Ramp Y-Intersection Off Ramp Y-Intersection		Offset Four-Way Intersection	505	0.20	949	0.21	0.913	-48.345		
Business Drive in 1314 0.51 318 0.86 0.590 9912.207 T-Intersection 17217 6.67 31492 7.11 0.938 -1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532 -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955 8389.053 Sort by Sum of Max Gain Cost by Sum o		At Intersection, Intersection Related	983	0.38	1821	0.41	0.926	-78.792		
T-Intersection 17217 6.67 31492 7.11 0.938* 1145.419 Driveway Access Intersection 1596 0.62 5144 1.16 0.532* 1403.374 No Special Feature 178652 69.16 320780 72.41 0.955* 8389.053 Cost by Sum of Max Gain Image: Cost of the state of the st		Crossover in Median	823	0.32	2217	0.50	0.637*	-469.693		
Driveway Access Intersection 1596 0.62 5144 1.16 0.532* -1403.374 No Special Feature 178652 69.16 320780 72.41 0.955* -8389.050		Business Drive	1314	0.51	3818	0.86	0.590*	-912.207		
No Special Feature 178652 69.16 320780 72.41 0.955* -8389.053 Sort by Sum of Max Gain Image: Contract of the system of the sys		T-Intersection	17217	6.67	31492	7.11	0.938*	-1145.419		
Display Filter Name 2013-2017 Alabama Integrated Crash Data C022: E Type of Roadway Junction/Feature		Driveway Access Intersection	1596	0.62	5144	1.16	0.532*	-1403.374		
2013-2017 Alabama Integrated Crash Data C022: E Type of Roadway Junction/Feature		No Special Feature	178652	69.16	320780	72.41	0.955*	-8389.053	Sort by Sum of Ma	x Gain
C022: E Type of Roadway Junction/Feature] [) 🕼 🖉							Display	Filter Name
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				20	13-2017 Alabama I	Integrated Crash I	Data			
Gramp V-Intersection T-Intersection				CO	22: E Type of Road	dway Junction/Fe	ature			
Gramp V-Intersection T-Intersection										
Off Ramp Y-Intersection T-Intersection		80								
Off Ramp Y-Intersection T-Intersection										
20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		60								
20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		ČE								
20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		aba 40								
Off Ramp Y-Intersection T-Intersection		<u>د</u>								
		20								
		0	0#	Ramp		Y-Interso	ction	- <u></u>	T-Intersection	
C022: E Type of Roadway Junction/Feature			UII	namp	C022: E Turo of				r-mtersection	

Four-Way Intersection had the highest max gain, being over three times the sec-ond tier, which included Bridge Overpass/Underpass, and Entrance or Exit Ramp.

C027 At Intersection



The over-representation at intersections for AD crashes is significant, but it is not a large overrepresentation.

C407 CU Roadway Curvature and Grade

2013	-2017 Alabama Inte	grated Crash Da	ata	✓ //	Aggressive Driving			v 💡 🔞	1/ 1/2013 y 12/31	/2017 🗸 🚺 🕞
der: Max	(Gain 🗸	Descending	~ •] Suppress Zero-\	/alued Rows		Si	gnificance: Over F	Representation 🗸	Threshold: 2.0
07: CU I	Roadway Curvatu	re and Grade	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C407: CU Roadwa	ay Curvature and Gr
ECu	urve Right and Dow	n Grade	5774	2.25	6209	1.50	1.494*	1909.774		
E Cu	urve Right and Leve	A I	8212	3.20	10681	2.59	1.235*	1564.586		
E Cu	urve Left and Down	Grade	5794	2.26	6955	1.69	1.339*	1465.495		
Strai	ight with Down Grad	le	25644	9.99	39481	9.57	1.044*	1072.652		
ECu	urve Right and Up G	irade	3446	1.34	4633	1.12	1.195*	562.612		
E Cu	urve Left and Up Gr	ade	2964	1.15	4235	1.03	1.125*	328.311		
ECu	urve Left and Level		6798	2.65	10637	2.58	1.027	177.970		
Strai	ight with Up Grade		18929	7.37	31975	7.75	0.951*	-970.922		
Strai	ight and Level		179251	69.80	297837	72.18	0.967*	-6110.476	Sort by Sum of Ma	ix Gain
						a Integrated Crash ay Curvature and C				
	100									
Frequency	50									
	0					E Curve Right	ECurve Left EC	Curve Left Straig	nt with Straight	

All items that had less than 1% of the total AD crashes were suppressed.

Crashes on downgrades are expected when AD drivers are distracted by other things and do not realize that the braking distance may have increased by a factor of 2 or 3 compared to level road-way. Similarly, all of the curve categories were over-represented.

C409 CU Traffic Control

All items that had less than 1% of the total of the AD crashes were suppressed. The larges and most significant over-representations involve traffic signals and yield signs.

	ARE 10.1.0.19 - [IN ile <u>D</u> ashboard <u>F</u> ilters	1PACT Results - 2 <u>A</u> nalysis <u>I</u> mpact				sh Data - Ag	ggressive D	riving AND	Not — 🗖 💌			
¢?	2013-2017 Alabama Integrat	ed Crash Data	×	Aggressive Driving			× 💡 🔞	1/ 1/2013 v	12/31/2017 🗸 🔋 🕞			
Order	r: Max Gain 🗸 🗸	Descending 🗸	Suppress Zero-	/alued Rows		Sig	gnificance: Over	Representation	✓ Threshold: 2.0 ▲			
C409	: CU Traffic Control	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C409: CU Tra	ffic Control			
•	Traffic Signals	73332	28.90	88192	21.55	1.341*	18659.842					
	Yield Sign	7239	2.85	9540	2.33	1.224*	1324.944					
	Lane Control Device	5475	2.16	8053	1.97	1.097*	482.768					
	No Passing Zone	21812	8.60	35942	8.78	0.979*	-469.235					
	No Controls Present	131191	51.71	220801	53.95	0.958*	-5688.389					
	Stop Sign	14677	5.78	46759	11.42	0.506*	-14309.931	Sort by Sum	of Max Gain			
	Image: Image of the second											
				2013-2017 Alabam C409: CU	a Integrated Crasi	n Data						
	60 40 0											
		Traffic Signals	Yield Sign	Lane Control Devi C409: Cl	ce No Passing J Traffic Control	J Zone No Conti	rols Present	Stop Sign				

C415 CU Workzone Related

AD crashes are under-represented in workzones, their having 92.5% of their crashes there as opposed to 93.0% for non-AD crashes. The comparison below is for those crashes that do occur in workzones. Large construction projects are clearly the greatest problem in both the absolute and the relative sense. Lane closures fall a distant second and are not significant. Interestingly, lane shifts are even fewer, but they do show a significantly higher proportion than the non-AD crashes.

