Car Crash Severity

Group 5

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GUIDING QUESTION:

What factors impact the severity of a car crash?

Defining Factors & Severity

Possible Factors--

movement, weather, **speed limit**, time/date, **light**

Measuring Severity--

3 types of crashes- property damage, injury, fatal

Finding Data

- Initial difficulties with first question
- https://data.gov/
- Crash Reporting - Drivers Data

Understanding the Dataset

Police collision reports within Montgomery County, MD

-Most populous county in Maryland, part of Washington DC metropolitan area

-Average household income is 20th highest in the nation

-Highest percentage of residents with post-grad degrees (29.2%)

First table (columns A–S):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Report Nu	Local Case	Agency Na	ACRS Rep	Crash Dat	Route Typ	Road Nam	Cross-Stre	Cross-Stre	Off-Road	Municipal	Related N	Collision T	Weather	Surface C	Light	Traffic Co	Driver Sub	Non-Moto
2	MCP30400	1.9E+08	Montgom	Property D	########					PARKING LOT OF 3215 SPARTAN			OTHER	CLEAR		DAYLIGHT	N/A	UNKNOWN	
3	EJ7885003	2.3E+08	Gaithersb	Property D	########	Maryland	FREDERIC	Unknown	WATKINS MILL RD	N/A			STRAIGHT	CLEAR	DRY	DAYLIGHT	TRAFFIC SI	NONE DETECTED	
4	MCP20090	2.3E+08	Montgom	Property D	########	Maryland	GEORGIA	Maryland	NORBECK RD	N/A			STRAIGHT	CLEAR	DRY	DAYLIGHT	TRAFFIC SI	NONE DETECTED	
5	MCP32010	2.3E+08	Montgom	Property D	########	County	CRYSTAL R	County	WATERS LANDING DI	N/A			STRAIGHT	CLEAR	DRY	DAYLIGHT	NO CONTF	NONE DETECTED	
6	MCP23290	2.3E+08	Montgom	Property D	########	County	MONTGO	County	CENTERWAY RD	N/A			HEAD ON	CLOUDY	DRY	DAYLIGHT	TRAFFIC SI	NONE DETECTED	
7	MCP29520	2.3E+08	Montgom	Property D	########	County	WAYNE A	County	ALLEY	N/A			SAME DIR	CLEAR	DRY	DAYLIGHT	NO CONTF	NONE DETECTED	
8	MCP33510	2.3E+08	Montgom	Property D	########	Maryland	COLESVILL	US (State)	COLESVILLE RD	N/A			SAME DIR	CLEAR	DRY	DUSK	NO CONTF	NONE DETECTED	
9	EJ7869003	2.3E+08	Gaithersb	Injury Cra	########	Maryland	CLOPPER F	Unknown	STRUC #15093 GREA	N/A			SINGLE VE	CLEAR	DRY	DARK -- UI	NO CONTF	ALCOHOL PRESENT	
10	MCP32440	2.3E+08	Montgom	Property D	########	US (State)	GEORGIA	Unknown	NW EASTERN AVE (D	N/A			SAME DIR	CLEAR	DRY	DAYLIGHT	TRAFFIC SI	UNKNOWN	
11	MCP28630	2.3E+08	Montgom	Property D	########	Maryland	WOODFIE	County	MIDCOUNTY HWY	N/A			SAME DIR	CLEAR	DRY	DAYLIGHT	OTHER	NONE DETECTED	
12	MCP24560	2.3E+08	Montgom	Property D	########	County	OLD COLU	County	BRIGGS CHANEY RD	N/A			SAME DIR	CLEAR	DRY	DAYLIGHT	TRAFFIC SI	NONE DETECTED	
13	MCP20090	2.3E+08	Montgom	Property D	########	Maryland	GEORGIA	Maryland	NORBECK RD	N/A			STRAIGHT	CLEAR	DRY	DAYLIGHT	TRAFFIC SI	NONE DETECTED	
14	MCP93650	2.3E+08	Montgom	Injury Cra	########	Maryland	SANDY SPI	County	DINO DR	N/A		BICYCLIST	SAME DIR	CLEAR	DRY	DAYLIGHT	N/A	NONE DET	NONE DET

Second table (columns T–AL):

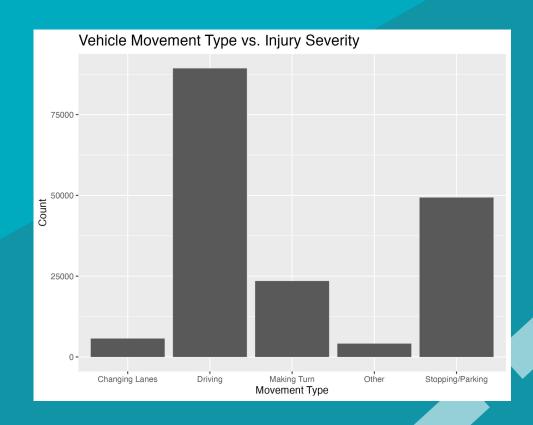| T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
Person ID	Driver At F	Injury Sev	Circumsta	Driver Dist	Drivers Lic	Vehicle ID	Vehicle Da	Vehicle Fir	Vehicle Se	Vehicle Bo	Vehicle M	Vehicle Co	Vehicle Go	Speed Lim	Driverless	Parked Ve	Vehicle Ye	Vehicle Ma
DE2A24CD	Yes	NO APPAR	N/A	UNKNOWN		165AD539	SUPERFICI	ONE OCLC	ONE OCLC	PASSENGE	PARKING	North	North	15	No	No	2004	HONDA
E7058A8E	No	NO APPAR	N/A	NOT DISTF	MD	1C3C3E2F	DISABLING	THREE OC	TWO OCL	PASSENGE	MAKING L	East	South	40	No	No	2011	GMC
2B404D6D	Yes	NO APPAR	N/A	NOT DISTF	MD	0483CE47	FUNCTION	TWELVE O	TWELVE O	PICKUP TR	ACCELERA	North	North	35	No	No	2019	FORD
637D8107	Yes	NO APPAR	N/A	LOOKED B	MD	4406AA84	FUNCTION	TWELVE O	TWELVE O	PASSENGE	STARTING	East	East	40	No	No	2016	KIA
52F904CB	Yes	NO APPAR	N/A	NOT DISTF	CA	148FAA0F	FUNCTION	TWELVE O	TWELVE O	(SPORT) U	MAKING L	West	North	35	No	No	2016	TOYT
800B57CA	No	NO APPAR	N/A	NOT DISTF	MD	E9504EBF	FUNCTION	SIX OCLOC	SIX OCLOC	TRANSIT B	STOPPED I	East	East	30	No	No	2016	GILL
3F9D8C7E	Yes	NO APPAR	ANIMAL, N	NOT DISTF	MD	870FF895-	DISABLING	TWELVE O	TWELVE O	(SPORT) U	SLOWING	South	South	25	No	No	2014	SUBA
6247C8F6-	Yes	SUSPECTE	N/A	UNKNOWN	MD	5D60FF00	DESTROYE	TWELVE O	FOUR OCL	PASSENGE	MOVING C	North	North	35	No	No	2013	BMW
41DDE59B	Yes	NO APPAR	N/A	UNKNOWN		1B98988B	N/A	TWELVE O	TWELVE O	PASSENGE	STARTING	South	South	35	No	No	2020	HYUNDAI
D3E6DAAI	Yes	NO APPAR	N/A	INATTENT	MD	ED90B6F6	SUPERFICI	TWELVE O	TWELVE O	(SPORT) U	SLOWING	North	North	30	No	No	2022	VOLK
AFE3019A	No	NO APPAR	N/A	NOT DISTF	MD	96DD6BD8	FUNCTION	SIX OCLOC	SIX OCLOC	VAN	STOPPED I	West	North	35	No	No	2013	FORD
175152ED	No	NO APPAR	N/A	NOT DISTF	MD	8AC1AAF7	DISABLING	FOUR OCL	FIVE OCLO	PASSENGE	ACCELERA	East	East	35	No	No	2017	FORD

Cleaning the Data

- More than 170k accident instances
- Group by movement, speed limit, light, and injury severity, and summarise the count for each combination
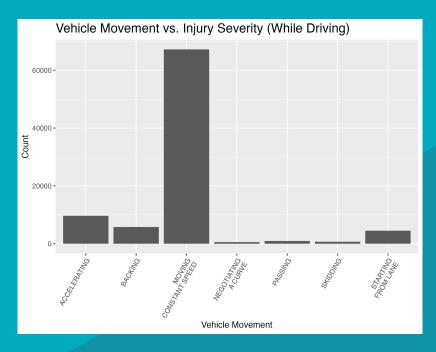- Further summarise the count and calculate the proportion for each factor
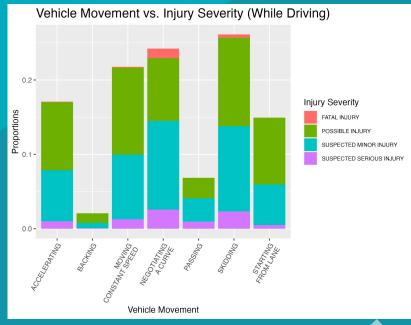
Vehicle Movement Results

25 Vehicle Movements ➜
5 Movement Types

For example, the type of "driving" contains 7 movements: accelerating, backing, moving at constant speed, passing, negotiating a curve, skidding, starting from lane
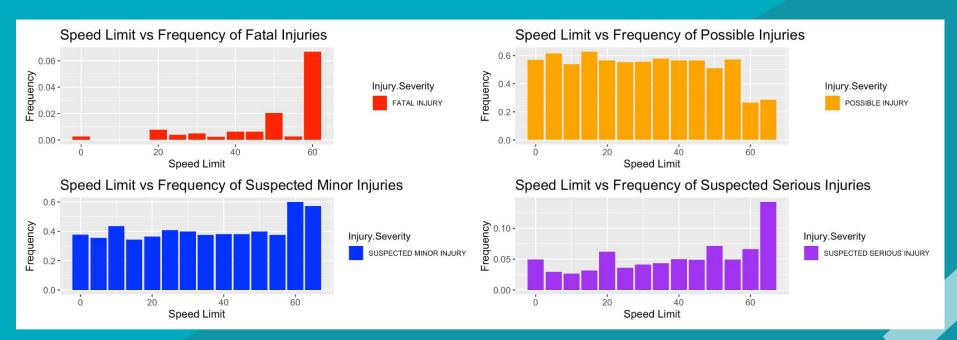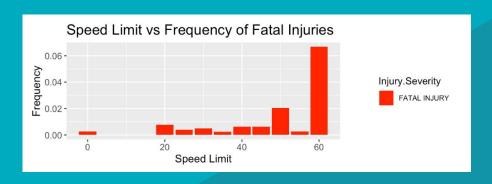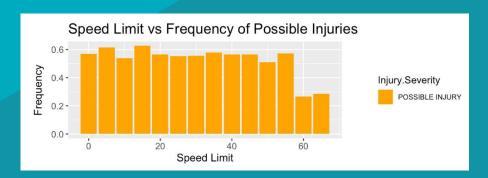
Vehicle Movement Results

Vehicle Movement vs. Injury Severity (While Driving)

Vehicle Movement vs. Injury Severity (While Driving)

Speed Limit Results

Speed Limit vs Frequency of Fatal Injuries

Speed Limit vs Frequency of Possible Injuries

Speed Limit vs Frequency of Suspected Minor Injuries

Speed Limit vs Frequency of Suspected Serious Injuries
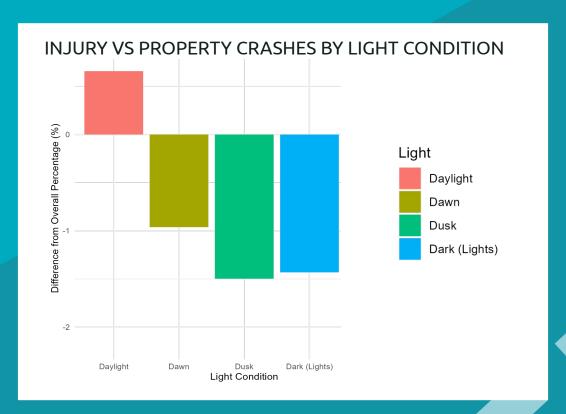
Speed Limit Results

Light Results

Compares each injury percentage to the base injury percentage

Higher injury crash percentage means **more** injury, less property crashes

INJURY VS PROPERTY CRASHES BY LIGHT CONDITION

Conclusions

We should be more careful when

- Negotiating a curve, skidding
- Driving at high speed, and/or
- Driving in the daylight

Challenges

Finding and accessing a useful dataset proved to be challenging

Fatal car crashes were a very small percentage for each factor, so hard to measure impact with so little data

Our data set contained many factors and 172,075 crash reports, which made it hard to manipulate

Next Steps

Look at additional factors -

- Date/Time of year
- Weather
- Locations

Focus on fatal injuries

Analyze the correlation between different factors