

ASSESSMENT OF YOUNG DRIVERS CRASH RISK

Mohamed Abdel-Aty, PhD, PE

University of Central Florida

Summary

This report summarizes the crash statistics for the leading causes of crashes and/or injuries among the drivers in the age group of 16 – 24, on the State Roads of Florida, namely: 1) Distraction; 2) Speeding; 3) Driving under the Influence (DUI); 4) Safety equipment use; and 5) Aggressiveness. Drivers in the age group of 16 – 24 are responsible for more crashes and/or injuries in the above categories, except for DUI, than any other age group. The analysis done for the years 2006 – 2007 also found an interesting observation for within the age group of 16 – 24. The sub group of 20 – 24 was found to have a higher share in the frequency of crashes in all the above mentioned 5 categories. In addition to that the conditional probability (for a particular age group, given that the crash has already occurred) for severe crashes has been founded to be higher for the sub age group of 20 – 24 as compared to the sub age group of 16 – 19, in all but one of the 5 categories mentioned. Most of the time, it is observed that the frequency of crashes is higher for the older age group (20 – 24 years); however the problem as far as the probability of severe crash occurrence is concerned occurs equally in both the age groups.

Please note that this is preliminary analysis that can be improved by normalizing the results by an appropriate exposure measure, e.g., population of the different age groups, number of licensed drivers in each age group, etc. Also these statistics focus on crashes that occurred at state roads. Other databases, such as that available from the Florida DHSMV would include all crashes. Also, it is well known that property damage only crashes (PDO) tend to be under reported, and thus makes injury crashes to be higher percentage than they really are.

This analysis is only meant to be preliminary, but more in depth analysis considering other factors is needed to pinpoint the problems with the younger driver population, and the locations in the state, for more refined and effective educational and awareness campaigns.

Distraction

In the years 2006 and 2007 a total of 1091 crashes took place on the State Roads of Florida that were caused due to distraction. The distraction variable is not clearly defined in the FL crash form. It is supposed to encompass cell phone use and other distractions, but likely to be under reported. Though the number only reflects 0.35% of the total crashes on the state roads, however it is significant as 35.22% of these crashes resulted in injuries out of which nearly a third of the crashes were incapacitating/ fatal. Distraction is also important when they are discussed in terms of the age group. Of all the crashes resulting from distraction, 29.79% are among the drivers in the age group of 16-24. Figure 1 shows the pie chart for the percentage of crashes in the different age groups.

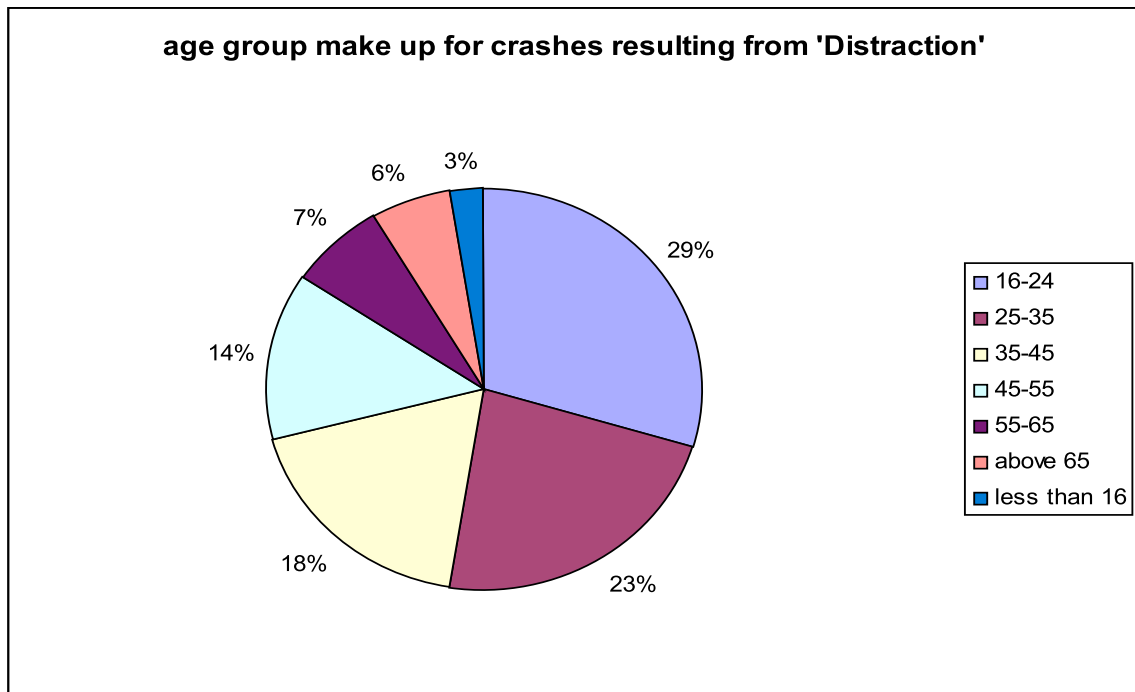


Figure 1: pie chart for age group make up for crashes resulting from ‘Distraction’

The drivers in the younger age group of 16 – 24 have a larger share of the crashes caused due to distraction. For that particular group, nearly 46% of the drivers are under 19 and

the remaining 54% are between the ages 20 – 24. Table 1 shows the contingency table for age group and the severe crashes distribution.

Table 1: percentage distribution of crashes in terms of severity

| | 16 – 19 age group | 20 – 24 age group |
|-----------------------------------|--------------------------|--------------------------|
| %age of non-severe crashes | <i>93.29</i> | <i>89.21</i> |
| %age of severe crashes | <i>6.71</i> | <i>10.79</i> |

It could be observed from the table that the conditional probability of a severe crash will be higher for the 20 – 24 age group ($p = 0.62$) as compared to the age group of 16 – 19 ($p = 0.38$). This statistic reveals that the age group 20 - 24 is more problematic than any other as far as crashes due to distraction are concerned.

Speeding

The number of crashes that resulted due to exceeding of safe speed limit on the Florida state roads was 3513. More than 38% of these crashes have resulted in injuries out of which 544 crashes were incapacitating/ fatal. The state roads of Florida have high design standards, where a significant mileage of the roads has speed limits exceeding 40 mph. Hence the crashes which take place due to speeding are likely to result in higher severity as all cars involved may not have good crash recovery. Again in this category also we observe that the drivers in the age group of 16 – 24 are responsible for 35.61% of the crashes. Figure 2 shows the pie chart for the percentage of crashes in the different age groups.

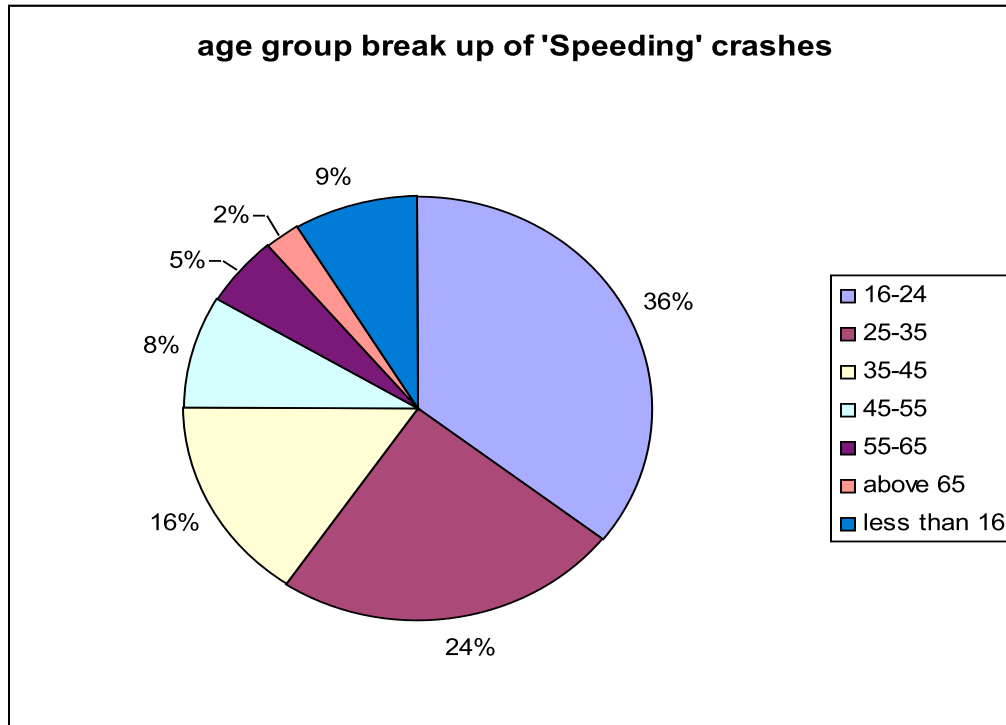


Figure 2: pie chart for age group make up for crashes resulting from ‘Speeding’

Nearly 60% of the drivers in the age group of 16 – 24 are above the age of 20. The contingency table for the severity and the age groups are shown in Table 2 which is then used for calculating the conditional probability.

Table 2: percentage distribution of crashes in terms of severity

| | 16 – 19 age group | 20 – 24 age group |
|-----------------------------------|--------------------------|--------------------------|
| %age of non-severe crashes | <i>82.61</i> | <i>82.15</i> |
| %age of severe crashes | <i>17.39</i> | <i>17.85</i> |

The conditional probability (for a particular age group, given that the crash has already occurred) of a severe crash is only slightly higher for the 20 – 24 age group ($p = 0.51$) as compared to the age group of 16 – 19 ($p = 0.49$). As far as the frequency of the crashes are concerned the age group of 20 – 24 has a bigger share, but from a safety aspect in terms of the probability of severe crash occurrences, both age groups are almost equal.

Driving under the Influence

Driving under the Influence (DUI) related crashes are the least tolerated of the crashes. The State of Florida shows almost zero tolerance for DUI related crashes. Crashes occurring due to DUI are considered to be felonies and the driver typically has his license suspended or revoked. It is to be noted that the age group of 16 – 24 accounts for 23.1% of the crashes related to DUI. However, almost 10% of the crashes under DUI have drivers who are under-age for drinking. Figure 3 shows a bar chart with percentage of drivers involved in DUI crashes. The one inside the red oval shows the instances of under-age driving resulting in crashes. Of all these crashes 663 of them are incapacitating/ fatal crashes.

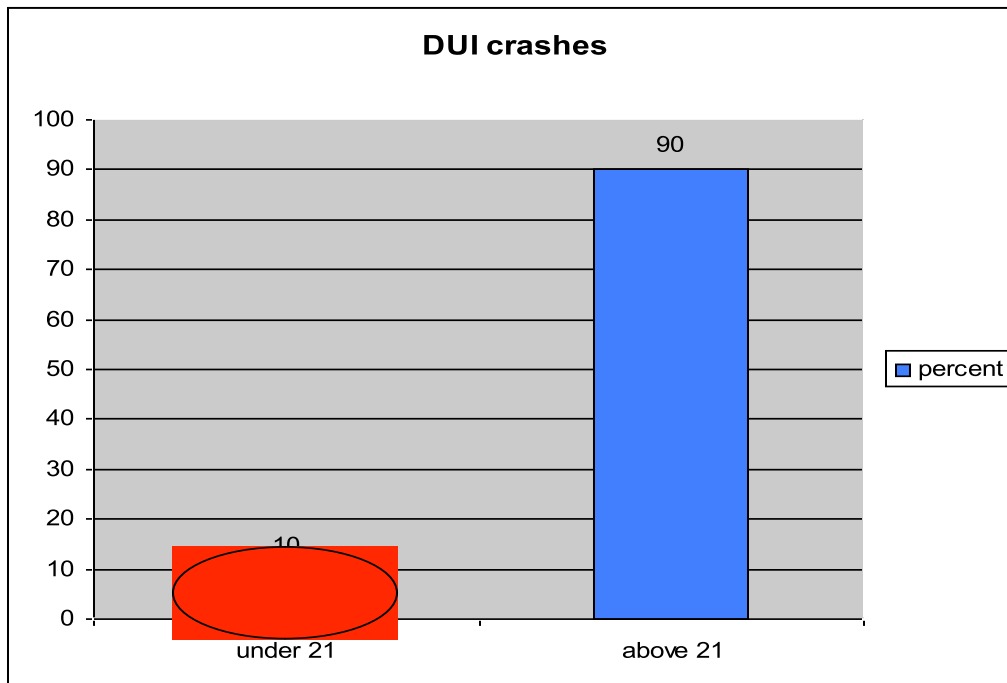


Figure 3: bar graph for age group make up for crashes resulting from ‘DUI’

Table 3 (similar to Tables 1 and 2) will be used to calculate the conditional probability of severe crashes among the two age groups namely: under-21 and above 21.

Table 3: percentage distribution of crashes in terms of severity

| | Under 21 | Above 21 - 24 |
|-----------------------------------|-----------------|----------------------|
| %age of non-severe crashes | <i>84.43</i> | <i>82.81</i> |
| %age of severe crashes | <i>15.57</i> | <i>17.19</i> |

The conditional probability (for a particular age group, given that the crash has already occurred) of a severe crash is slightly higher for the 21 - 24 age group ($p = 0.52$) as compared to the age group of 16 – 20 ($p = 0.48$). The results are of concern as it not only reflects the safety issue in both the age groups but also highlights under-age drinking and its potential hazard.

Safety Equipment Use

Use of safety equipment is not a contributing cause for a crash; however it is critical for saving the driver and passengers. About 33% of the crashes reported have no use of safety equipment during the time of crash. The age group of 16 – 24 accounts for 16.1% of the crashes with no safety equipment in use. Within that age nearly 61% of the drivers belong to the age of 20 and above. Figure 4 shows this within group variation and the one inside the red oval is the problematic age group from a crash frequency point of view.



Figure 4: bar graph for within age group variation for crashes with no safety equipment in use

Table 4: percentage distribution of crashes in terms of severity

| | 16 – 19 age group | 20 – 24 age group |
|-----------------------------------|--------------------------|--------------------------|
| %age of non-severe crashes | <i>83.61</i> | <i>83.81</i> |
| %age of severe crashes | <i>16.39</i> | <i>16.19</i> |

Table 4 above shows the contingency table for the severity within the age groups. Though the occurrences of crashes with no safety equipment in use are more frequent in the age group of 20 – 24, the conditional probability of a severe crash occurring is slightly higher in the age group of 16 – 19 ($p = 0.51$).

Aggressiveness

The police reports do not have any particular parameter to define aggressive driving. Therefore in order to understand this problem certain contributing factors have to be merged. The choice of these factors is entirely based on the researchers' concept of the problem. In this case study we have combined careless driving, along with disregards to traffic controls, following too closely, improper passing, and fleeing police. The percentage of crashes that at least result in injuries is 25.06%, out of which 30.73% are crashes that are incapacitating/ fatal. Here again the drivers belonging to the age group of 16 – 24 have a larger share of the crashes related to aggressive driving. The within group variation is again similar to the ones found in other factors discussed earlier. The sub age group of 20 – 24 has more instances of such crashes (nearly 60%). Figure 5 shows the pie chart for the different age group make up.

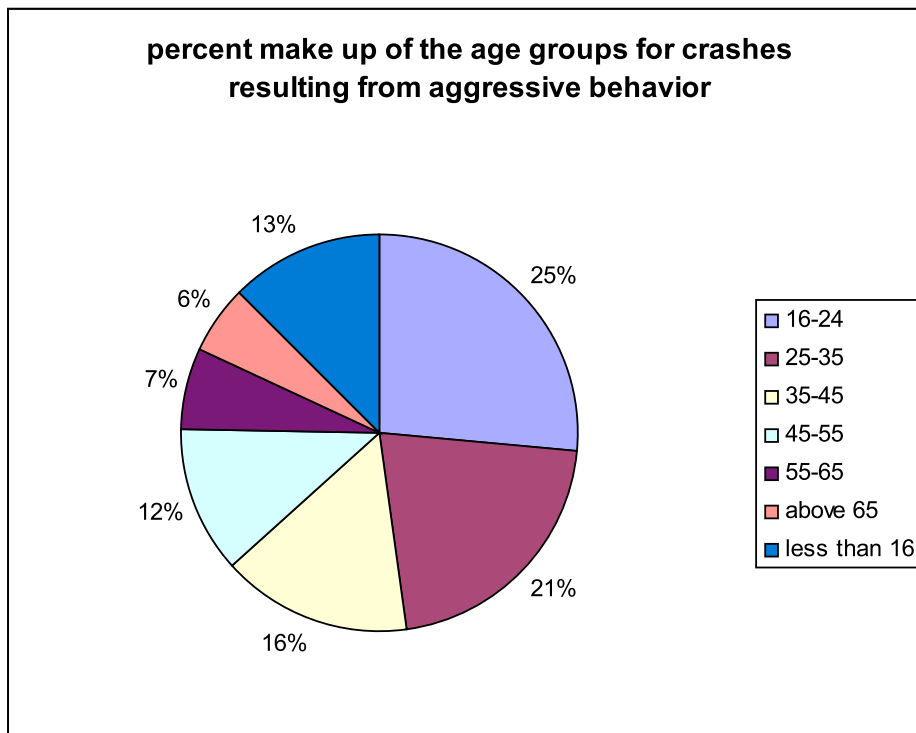


Figure 5: pie chart for age group make up for crashes resulting from aggressive behavior

The conditional probability is again calculated for crashes related to aggressive drivers to establish which group has a bigger problem in terms of safety.

Table 5: percentage distribution of crashes in terms of severity

| | 16 – 19 age group | 20 – 24 age group |
|-----------------------------------|--------------------------|--------------------------|
| %age of non-severe crashes | <i>92.07</i> | <i>91.38</i> |
| %age of severe crashes | <i>7.93</i> | <i>8.62</i> |

The values in Table 5 indicate that the conditional probability of a severe crash occurring is again slightly higher in the age group of 20 – 24 ($p = 0.52$) as opposed to the age group of 16 – 19 ($p = 0.48$). Though the frequency of crashes is much higher in the 20 – 24 age group, the problem as far as the probability of severe crashes is concerned occurs equally in both.