Analysis of Mean Trip Speed of Motorcycles
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Introduction
- Motorcyclist fatalities are disproportionately higher than those of automobile passengers (24.8 vs 0.8 fatalities per 100 million miles driven). [1]
- Passenger vehicle and large truck fatality rates have been decreasing since the 1970’s, but motorcyclist fatality rates have not experienced steady decline. [1]
- Deviation from average traffic speeds has been shown to increase the likelihood of a crash. [2,3]
- Previous studies of motorcyclist speed have been primarily from accident reports or fixed observation areas.
- Continuous observation is needed to report on true rider speed behavior. [4]
- Naturalistic studies have become useful in providing this constant observation. [4]
- The MSF 100 Motorcyclists Naturalistic Study is the first large scale naturalistic motorcycle to be conducted.

Methods
Dataset:
- 100 Participants on their personal motorcycles
- Observed between 2 months and 24 months
- Located in Irvine California, Orlando Florida, Blacksburg Virginia and Phoenix Arizona
- 2 non-functioning GPS Units
- Age range from 21 to 79 years old
- 29,267 trips analyzed

Analysis:
- A 3x22 between subjects experimental
  - Motorcycle Type (Cruiser, Sport, and Touring)
  - Gender (Male and Female)

Type Male Female Total
Cruiser 27 14 41
Sport 13 7 20
Touring 36 1 37
Total 76 22 98

Materials
- Designed by Hardware Engineering Lab at VTTI
- Mounted in inconspicuous housing to preserve naturalistic nature of research
- Capable of recording video from 5 separate cameras:
  - Forward
  - Rear
  - Left hand
  - Right hand
  - Face
- Records sensor data such as:
  - Brake light activation
  - Brake lever inputs
  - Engine RPMs
  - Accelerations about 3 axes
  - Rotation about 3 axes
  - GPS location
  - Speed
  - Heading
  - Turn signal activation

Results
Mean Trip Speed:
- The General Linear Model was used.
- No significant difference between mean trip speeds by Motorcycle Type, Gender or Gender X Motorcycle Type.

Maximum Trip Speed:
- The General Linear Model was used.
- No significant difference between mean trip speeds by Motorcycle Type, Gender or Gender X Motorcycle Type.
- Four participants were recorded riding at speeds in excess of 140 mph, some of them multiple times.

Conclusions
- Speed range was collected across different types of roads in many different conditions.
- Data were collected in urban and non-urban environments.
- Mean trip speed of motorcyclists mean speeds seem to be slightly higher than those of normal light passenger cars (29 mph). [4]
- Consistent with average pre-crash speed from both the MAIDS study and the Hurt Report
- Extreme cases of maximum trip speed are higher than expected from passenger vehicles.
- Basic descriptive statistics were found that offer a view into the speed behavior of motorcyclists.
- Data set contains speeds from a wide array of riders belonging to various demographic groups and riding different kinds of motorcycles.
- A wide array of speeds were present, ranging from slow trips to speeds well above any posted speed limit in North America.

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References