



Distraction/Inattention in Large Truck and Passenger Vehicle Studies

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The Studies and Causation

Large Truck Crash Causation Study (LTCCS)

2001 – 2003: 963 fatal and injury crashes

National Motor Vehicle Crash Causation Study (NMVCCS)

2005 – 2007: 2,095 Passenger vehicle crashes

Causation: factors that increase the risk of having a crash, such as driver behavior, vehicle condition, roadway problems, or weather events



Coded Variables

- 1. Critical Event:** Makes crash unavoidable
- 2. Critical Reason for Critical Event:**
Immediate reason for critical event
- 3. Crash Associated Factors:** All factors that may be important that were present at time of crash

Note: Driver Distraction/Inattention can be recorded as an Associated Factor at crash scene and then coded later as the Critical Reason for a crash

Critical Reasons – for Trucks from LTCCS; for Passenger Vehicles from NMVCCS

<u>Reasons</u>	<u>Trucks*</u>	<u>Cars*</u>
Driver Non-Performance (sleep, sick)	12%	16%
Driver Recognition (inattention)	29%	30%
Driver Decision (speed, aggressive)	38%	24%
Driver Performance (overcompensate)	5%	19%
Driver - unknown error	3%	4%
Vehicle (brakes, tires, lights)	10%	3%
Environment (roadway, weather)	3%	4%
TOTAL	100%	100%

Note: * Percentages are for those vehicles coded with the Critical Reason

Critical Reasons – Truck/Passenger Vehicles

Crashes by Critical Reason: NMVCCS

<u>Reasons</u>	<u>Trucks*</u>	<u>Cars*</u>
Driver Non-Performance (sleep, sick)	0%	14%
Driver Recognition (inattention, etc.)	29%	37%
Driver Decision (speed, aggressive)	39%	20%
Driver Performance (overcompensate)	3%	26%
Vehicle (brakes, tires, lights)	14%	1%
Environment (roadway, weather)	3%	1%
Unknown/Missing	12%	1%
TOTAL	100%	100%

Note: * Percentages are only for those vehicles coded with the Critical Reason

Driver Associated Factors - LTCCS for Truck; NMVCCS for Passenger Vehicles

Factors	Trucks*	Factors	Cars*
Prescription drugs	26%	Prescription drugs	34%
Speeding	23%	Distracted/Inattentive	29%
Unfamiliar with road	22%	Inadequate surveillance	25%
Distracted/Inattentive	20%	Inadequate control	15%
OTC drugs	18%	Physical Impairment	14%
Inadequate surveillance	14%	Unfamiliar with road	11%
Fatigue	13%	Illegal maneuver	8%
Illegal maneuver	9%	Incorrect assumption	8%
Work pressure	9%	Fatigue	8%

Note - * Percentages are for factors coded for all Trucks in the LTCCS sample and all Passenger Vehicles in the NMVCCS; can be more than one per vehicle

Driver Associated Factors - Truck/ Passenger Vehicle Crashes: NMVCCS

Factors	Trucks*	Factors	Cars*
Distraction/Inattention	13%	Distraction/Inattention	28%
Inadequate surveillance	13%	Prescription drugs	23%
Incorrect assumption	12%	Inadequate surveillance	23%
Prescription drugs	11%	Fatigue	14%
Unfamiliar with route	8%	Unfamiliar with route	12%
Illegal maneuver	5%	Upset	10%
Following too close	3%	Work pressure	10%
OTC drugs	3%	Inadequate evasive action	7%
Inadequate evasive action	2%	Incorrect assumption	7%

Note - * Percentages are for factors coded for all Trucks in the LTCCS sample and all Passenger Vehicles in the NMVCCS; can be more than one per vehicle

Relative Risk – Ratio of Factors to assignment of Critical Reason: LTCCS, NMVCCS

Factors	Trucks	Factors	Cars
Distracted/Inattentive	2.2	Inadequate control	2.0
Inadequate Surveillance	2.2	Inadequate surveillance	1.8
Fatigue	2.1	Speeding	1.7
Following too close	2.1	Alcohol	1.7
Illegal maneuver	2.0	Illness	1.7
Speeding	1.9	Illegal maneuver	1.6
Work Pressure	1.8	Illegal drug use	1.6
Unfamiliar with road	1.4	Fatigue	1.5
Illness	1.4	Inexperienced driver	1.5

Danger Index – Associated Factor times Relative Risk Ratio times 100

Factors	Trucks	Factors	Cars
Distracted/Inattentive	44.0	Inadequate surveillance	45.0
Speeding	43.7	Distracted/Inattentive	40.6
Unfamiliar with road	30.8	Inadequate control	30.0
Inadequate surveillance	30.8	Physical impairment	16.8
Fatigue	27.3	Speeding	13.6
Work pressure	21.6	Illegal maneuver	12.8
OTC drug use	19.8	Fatigue	12.0
Illegal maneuver	18.0	Alcohol	10.2
Following too close	10.5	Inexperienced driver	7.5



Logistic Regression Analysis I

1. Odds are defined as the probability of Y occurring divided by the probability of Y not occurring.
2. Estimated effect of several variables on odds of (1) presence of inattention/distraction associated factors for the driver and (2) odds of driver having been coded with an inattention/distraction critical reason.
3. Report the multiplicative effect on the odds for each variable. This focuses on variables that **increase** the odds of inattention/distraction associated factors and critical reason (that is, those with odds ratios greater than 1). We present only those factors with an effect that was significant at least at a 10% level.

Logistic Regression Analysis II

Regressed several factors on Inattention & Distraction factors

Odds Ratios for Factors increasing Distraction/Inattention (Significant at 5%)

	Trucks			Passenger Vehicles		
Y=	Inattention	Internal Distraction	External Distraction	Inattention	Internal Distraction	External Distraction
Fatigue				2.0		
Work Pressure	3.2			3.7		
Prescription Drugs						2.4
OTC Drugs		2.1				
Illegal Drugs					3.0	
Hours Driving*			1.2		1.4	1.6
Time: 6:00-8:45am	3.3		11.2			
Conversation				2.4		
Occupant Movement						

* Hours driving interpreted XH; e.g. for 6 hours, odds ratio for external distraction in trucks is $1.24 \approx 3$. For cars, $1.56 \approx 12$

Logistic Regression Analysis III

Regressed same factors on the combined
Inattention/Distraction CR

Odds Ratios:
Factors Increasing Inattention/Distraction CR
(Significant at 5%)

	Trucks	Cars
Conversation	9.3	4.1
Floor retrieval	124.1	313.9
Time: 09:00–14:59		2.0
Time: 06:00-8:49	3.3	
Approaching traffic		3.6
Occupant movement		11.7



Summary and Conclusions

1. Driver Error is the key causative factor in an overwhelming number of motor vehicle crashes, for both large trucks and passenger vehicles.
2. Distraction/Inattention was the most dangerous driver error for large truck drivers.
3. Work pressure led to Inattention, OTC drugs led to internal distraction, and hours driving led to external distraction for large truck drivers. Driving during the morning rush hour led to inattention and external distraction for large truck drivers.
4. Conversation, floor retrieval, and morning rush hour driving led to inattention/distraction being coded as a critical reason for large truck crashes.
5. Further research is needed to determine what causes driver Distraction and Inattention.



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