

Whitepaper:

How human factors affect our risk exposure when we drive - a review





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Key insights

This paper summarises the findings from a number of recent research studies. It shows:

- The risk of crash involvement while driving a company car is 29 - 49% higher compared to driving a privately owned car
- Environmental issues affect driver behaviour – ‘role overload’ and ‘safety climate’
- Factors that increase the chances of crashing, including; time pressure; fatigue; distraction; stress; personality; health
- Some people may enjoy driving under time pressure, if they believe they have the skills to do so
- Female drivers are less influenced by time pressure
- Young drivers are more likely to accept higher levels of risk
- Older drivers report less levels of stress than younger drivers
- Anger is associated with adverse traffic events, including violation and minor collisions
- Driving behaviour is directly linked with a driver's attitude towards violations, errors, anger and fatigue
- Driving behaviours are clear indicators of heightened risk exposure of drivers being involved in adverse traffic incidents

Background

The increased likelihood of being involved in a road collision while driving for work in the UK is well researched and documented. It has been suggested that the risk of crash involvement while driving a company car is 29% higher compared to driving a privately-owned car¹. Other research found the figure was even higher at 49%².

Environmental Influences

This would suggest there are several specific issues that impact on a driver when driving for work purposes. Overall, these could be described as ‘role overload’ and ‘safety culture’.

Role overload occurs when the employee feels the task they are attempting to complete is too difficult, or they have insufficient resources to complete it. When this occurs, the employee is more likely to prioritise finishing a task, possibly leading to a reduction in safety. Role overload is therefore likely to lead to increased levels of stress, greater time demands, increased levels of fatigue and greater levels of distraction³.

Safety climate can be described as the employees understanding of the priority given by an organisation to safety over competing task demands. Safety climate has been established as an important influence on driving behaviour⁴.

Given the combination that safety climate and role overload have on driving behaviour, it is not surprising to discover that the following collision factors have been associated with the increased risks associated with driving for work:

- Time pressure
- Fatigue
- Distraction
- Stress
- Personality;
 - Sensation seeking
 - Driver anger
- Health

Occupational Risk Factors

While there is minimal research on time pressures, one study⁵ found that:

“Time pressure generally impairs performance because it places constraints on the capacity for thought and action that limit exploration and increase reliance on well-learned or heuristic strategies. Thus, time pressure increases speed at the expense of quality.”

If this was related to driving, it is likely that a driver would try to prioritise speed over safety.

In addition, a link was found to risk-taking and driving under time pressures. A study identified there are likely to be 3 main factors associated with time pressure⁶.

- Time constraint
- Uncertainty
- Goal importance

This study⁶ also raised significant concerns that there was an element of conditioning at work, with drivers becoming conditioned to feel under time pressure even when the pressure did not exist. This could be conditioned, for some at least through a complex interaction between pleasure, self-efficacy and self-assessment of driving under time pressure. This interaction would suggest that some people may enjoy driving under time pressure, if they believe they have the skills to do so.

The same study suggested that female drivers were less influenced by time pressure, although they could be under more intense pressure, and young and older drivers were less exposed to time pressures. Although, concern was raised that for young drivers any exposure could have a disproportionate effect, as they are more likely to accept higher levels of risk.

Fatigue

Fatigue and sleepiness has been associated with between 16% and 20% of collisions in the UK⁷. Fatigue is defined as a loss of efficiency, and disinclination for any kind of effort. Sleepiness is defined as a difficulty in remaining awake⁸.

A critical view of the evidence, drew the following conclusions⁹:

- That young males are over-represented in collisions where fatigue was a contributory factor
- Shift-workers and commercial vehicle drivers appear to have a higher risk of fatigue related collisions, as a result of a number of work-related issues including:
 - Long driving / working hours
 - Poor sleep patterns
 - Stress
 - Insufficient sleep before the start of a shift
 - Unregulated hours for car drivers

Distraction

Driver distraction has not received a universal definition; instead 6 definitions were provided¹⁰. However, all 6 definitions have overlapping elements, namely the diversion of attention away from activities needed to maintain safety to another competing activity. These other competing activities can be internal or external from the vehicle and from a study¹¹ can be broadly categorised as:

- Objects
- Events
- Passengers
- Other road users
- Animals
- Internal stimuli

3 types of distraction were identified¹²:

- General withdrawal – for example, as a result of fatigue
- Withdrawal of attention – this describes where the driver maintains control of the vehicle, but hazard perception is decreased as the driver is prioritising other thoughts
- Biomechanical interference – this refers to body movements, for example, removing a hand, or hands from the steering wheel when eating



Another issue associated with distraction is how well a driver can cope with the distraction. There are several factors that could influence this, including:

- Level of task demand being experienced (both from the driving task and distraction)
- Age
- The level of driving experience
- Driver's state (e.g. drunk, fatigued, emotionally aroused etc.)
- Driver's personality

Stress

Stress has been defined as “any circumstances that threaten or are perceived to threaten one's well-being and tax one's coping abilities”¹³. Stress can either be related to the driving task, or as a result of external issues.

Another study¹⁴ revealed, driving stress has been associated with:

- Driving aggression
- Dislike of driving
- Irritation when overtaking
- Overtaking tension
- Driving alertness

Studies ¹⁴ & ¹⁵ have also identified a link between stress and age, with older drivers reporting less levels of stress than younger drivers. As stress is related to one's feeling of being able to cope, it is possible that this is related to experience.



Personality

There has been extensive research which has attempted to correlate personality traits with traffic collisions. Based on the literature, it would appear to be a consensus around the following traits:

- Extroversion – degree to which someone is outgoing or withdrawn
- Neuroticism – degree to which someone can control negative emotional responses
- Conscientiousness - degree to which someone likes to be organised
- Sensation seeking – the desire, or not, for novel and intense sensations
- Driver anger – degree to which someone can become angry when driving

One study¹⁶ identified the following:

Extroversion has been associated with motor vehicle collisions, fatalities, traffic violations and driving under the influence of alcohol.

Neuroticism has been associated with driving fatalities, collisions, aggression whilst driving and dislike of driving.

Conscientiousness has been associated with at-fault collisions, collisions and moving traffic violations.

Sensation Seeking

Sensation seeking has been defined as the degree to which someone seeks out novel and intense stimuli. A review of 40 studies¹⁷ into sensation seeking identified that it accounted for between 10 - 15% variance in risky driving. Other findings¹⁸ revealed it has been associated with drink-driving, exceeding the speed limit, racing other drivers etc.

Driver Anger

Numerous studies have found that anger is associated with adverse traffic events, including violation and minor collisions.

In summary, being high on the personal characteristic of becoming angry behind the wheel, predisposes a person to more frequent and intense anger, more frequent aggressive and risky behaviour on the road, and to more adverse outcomes¹⁹.

Health

Notifiable conditions are anything that could affect your ability to drive safely. They can include:

- Epilepsy
- Strokes
- Other neurological and mental health conditions
- Physical disabilities
- Visual impairments

In the UK, drivers must tell the DVLA if they have or develop a 'notifiable' medical condition or disability or that their condition or disability has got worse since their licence was obtained.

Summary & conclusions

This research shows that many of the factors associated with the increased collision involvement, associated with driving for work, overlap.

Driving behaviour is directly linked with a driver's attitude towards violations, errors, anger and fatigue. Indeed, these driver behaviours are clear indicators of heightened risk exposure of drivers being involved in adverse traffic incidents.

References

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- 5 Moore (2012)
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- 13 Weiten (2005, p.360)
- 14 Guilian (1992)
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- 19 Deffenbacher et al (2001, p.718)

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About DriveTech

DriveTech is the world leader in fleet risk and safety management, and driver training. It is also the UK's largest provider of driver offender retraining courses.

With a track record built over the last 25 years, DriveTech now delivers fleet consultancy, driver assessment and training services in over 95 countries, in more than 30 languages through over 50 partners.

Our fleet solutions improve driver safety, reduce fleet running costs and ensure compliance with legal and duty of care responsibilities.

Our customers range from companies with small fleets through to large corporate customers where driver training is a core activity, an understanding of their sector required and a clear return on investment is demanded. DriveTech is part of the Automobile Association.

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