



Self-reported circumstances and consequences of driving while sleepy



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ABSTRACT

Driver surveys are indispensable sources of information when estimating the role of sleepiness in crash causation. The purpose of the study was to (1) identify the prevalence of driving while sleepy among Finnish drivers, (2) determine the circumstances of such instances, and (3) identify risk factors and risk groups. Survey data were collected from a representative sample of active Finnish drivers ($N = 1121$). One-fifth of the drivers (19.5%) reported having fallen asleep at the wheel during their driving career, with 15.9% reporting having been close to falling asleep or having difficulty staying awake when driving during the previous twelve months. Epworth Sleepiness Scale scores were found to be associated with both types of sleepiness-related driving instances, while sleep quality was associated only with the latter. Compared to women, men more often reported falling asleep at the wheel; the differences were somewhat smaller with respect to fighting sleep while driving during the previous twelve months. The reported discrepancy in sleepiness-related instances (high prevalence of fighting sleep while driving during the previous twelve months and lower proportion of actually falling asleep) identifies young men (≤ 25 years) as one of the main target groups for safety campaigns. Approximately three-quarters of drivers who had fallen asleep while driving reported taking action against falling asleep before it actually happened. Furthermore, almost all drivers who had fallen asleep while driving offered at least one logical reason that could have contributed to their falling asleep. These data indicate some degree of awareness about driving while sleepy and of the potential pre-trip factors that could lead to sleepiness while driving, and supports the notion that falling asleep at the wheel does not come as a (complete) surprise to the driver.

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1. Introduction

Given that official statistics regarding sleepiness-related crashes are often not collected (Horne & Reyner, 1999) or tend to underestimate sleepiness as a causal factor (Åkerstedt, 2000), in addition to in-depth accident analysis (Beanland, Fitzharris,

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Young, & Lenné, 2013), naturalistic studies (Barr, Yand, Hanowski, & Olson, 2005) and case-control studies (Connor, Whitlock, Norton, & Jackson, 2001), driver surveys are still indispensable sources of information when estimating the numbers of such crashes. On the rare occasion when official statistics do consider sleepiness, they typically show a low frequency of sleepiness-related crashes (1–3% of total crashes), while drivers' self-reports often indicate a high degree of driving while sleepy and a somewhat higher frequency of crashes related to driver sleepiness.

For example, a study examining sleepy driving incidents in Britain reported that 29% of British men have experienced being close to falling asleep while driving in the last 12 months. Moreover, 7% of the drivers who had crashed during the last 3 years attributed it to tiredness (Maycock, 1997). In a study on Norwegian crash-involved drivers, 27% of participants reported having fallen asleep while driving at least once since starting to drive, with 8.3% reporting falling asleep in the last 12 months. Overall, 3.9% of the participants in the Norwegian study reported that falling sleep or fatigue had either caused or contributed to their accident (Sagberg, 1999). Regarding Finnish drivers, one of the few existing sleepy driving studies examined incidents of sleepy driving among a stratified random sample of the adult population in the Finnish city of Tampere. Overall, 15% of the drivers reported an incident in which they had dozed off at the wheel and 1.3% reported having been involved in a 'tiredness-related' crash (Martikainen, Hasan, Urponen, Vuori, & Partinen, 1992). Despite these large estimation variations, driver sleepiness is a substantial crash risk factor with sleep-related crashes often being more severe with higher fatality rates (Pack et al., 1995).

Driver surveys are not only carried out to estimate the number and proportion of sleepiness-related crashes, but also to reveal risk factors and groups, the circumstances of such driving, driver awareness of associated risks, as well as the use of countermeasures. It has often been reported that men (particularly younger), those suffering from acute sleep loss, and drivers with unrecognized and untreated sleep apnea are at higher risk for sleepiness-related crashes (Horne & Reyner, 1999; Phillips & Sagberg, 2013).

Excessive daytime sleepiness, an important sign or criterion for many medical conditions including sleep apnea, narcolepsy, etc., has been found to correlate with the likelihood of falling asleep while driving. The nine-item Epworth Sleepiness Scale (ESS), an inexpensive and easily administered self-report measure of daytime sleepiness, has been frequently used in traffic safety research (Carter, Ulfberg, Nyström, & Edling, 2003; Howard et al., 2004; Maycock, 1997; Powell, Schechtman, Riley, Li, & Guilleminault, 2002). An even shorter (one question) measure, the global dissatisfaction with sleep (GSD), has also been used (Ohayon & Zulley, 2001).

Regardless of whether those suffering from excessive daytime sleepiness are aware of their condition, it is unlikely that they would fall asleep while driving without experiencing sleepiness before actual falling asleep (e.g., Reyner & Horne, 1998; Williamson, Friswell, Olivier, & Grzebieta, 2014). This might not be the case only for those suffering from serious sleep disorders such as narcolepsy. Drivers do experience increased sleepiness before falling asleep at the wheel; however, these signs of sleepiness might not be recognized as serious enough. In general, driving while sleepy might not be considered a particularly risky driving behavior. Survey studies of drivers reveal that driver sleepiness is not typically rated as a critical risk factor for crashes (Pennay, 2008; Vanlaar, Simpson, Mayhew, & Robertson, 2008). The behavior of some drivers seems to mirror this perception, as 73% of drivers in a Norwegian study stated they continue to drive even when aware of their increasing sleepiness (Nordbakke & Sagberg, 2007). Furthermore, drivers quite often act inappropriately by applying ineffective countermeasures such as opening a window or listening to music (e.g., Dawson, 2005; Maycock, 1997; Nordbakke & Sagberg, 2007). Even taking a rest break might not be as effective a countermeasure to reduce sleepiness (e.g., Phipps-Nelson, Redman, & Rajaratnam, 2011; Watling, Smith, & Horswill, 2014) as many drivers believe (Armstrong, Obst, Banks, & Smith, 2010; Nordbakke & Sagberg, 2007).

The purpose of this study was to (1) identify the prevalence of driving while sleepy among Finnish driving population, (2) determine the circumstances of such instances, and (3) identify risk factors and risk groups. The primary motivation for the study was the lack of information, based on a representative Finnish sample, regarding the circumstances and consequences of driving while sleepy.

2. Method

The data for the study were gathered in 2007 as a part of the annual driver survey of the Central Organization for Traffic Safety in Finland (Liikenneturva). The market research company TNS Gallup Finland was responsible for the data collection. From the stratified (age, sex and municipality) initial sample ($N = 1563$) of Finnish adults, only persons who drove a motor vehicle at least a few times per year ($N = 1126$) were included in the study. These individuals were interviewed face-to-face. Five subjects were later excluded due to a large number of missing values, leaving for the statistical analysis 1121 drivers who at least sometimes drove a motor vehicle.

The questionnaire was divided into two parts. The first included general background questions concerning driving exposure, work situation and attitudes toward traffic law enforcement, as well as the Epworth Sleepiness Scale (Johns, 1991) and a question about sleep quality. The latter was based on the GSD question (Ohayon, 1995) and can be found in the appendix. All participants were asked to answer these questions. Participation in the second part of the questionnaire depended on the responses to the following two questions (1) Have you ever fallen asleep while driving (this includes also dozing off), (2) Have you been close to falling asleep or have you found it difficult to stay awake while driving during the previous 12 months? Those who positively answered either question were asked several additional questions regarding the

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