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# Factors contributing on mobile phone use while driving: In-depth accident analysis

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**ABSTRACT:** *The consequences of using and manipulating with a mobile phone while driving has a large negative effect on attention. Driver inattention is the major problem in road safety and generally belongs to the main causes of traffic accidents with a higher representation of rear impact and has been considered as a societal safety issue. Nowadays, distraction during driving has been very often connected with using a mobile phone. The aim of this study has been the analysis of using a mobile phone by accident participants during normal driving. For the purpose of this study, unique data about accident participants collected by Czech In-depth accident study has been used. The results have shown an increasing tendency of mobile phone use with an increase in annual mileage. There is also a greater risk of mobile phone use while driving among young drivers for up to 24 years. The analysis has also shown, that the drivers, who were assessed during the interview as a risky or aggressive, report more often handling of a mobile phone while driving, which contains all activities where is mobile phone actively used, without involving fine motor skills.*

**KEYWORDS:** *accident analysis, distraction, inattention, using a mobile phone, driver*

## 1. INTRODUCTION

As has been resulted by the European Commission (2014), there has been one of the highest numbers of mobile phone users among European countries, compared to the population, in the Czech Republic. Even though using a mobile phone while driving is strictly prohibited in the Czech Republic, many drivers still take the risk and use their cell phone. Not only for making phone calls, but also for texting, searching for direction, taking pictures or making video records. Laberge-Nadeau et al. (2003) collected data from 36078 surveys, focused on comparing the risk of using and not using a mobile phone while driving. Up to 90% of respondents admitted the use of a mobile phone. The survey results showed a 38% higher risk of accident with and without injury for drivers who use their mobile phone while driving. The risk of a traffic accident is increasing with the length of the phone hold. An AAA Foundation for Traffic Safety (2013) survey of 7,328 American drivers have shown, that these drivers do not approve mobile phone device handling, and 67.1% of the respondents consider this behaviour to be dangerous. However, 67.3% of participants admit mobile phone use while driving at least once during the last 30 days. 27.9% of them use a mobile phone regularly while driving. Regarding writing and reading messages, emails, or social networking activities while driving, 34.7% of respondents admitted reading of received messages in the past 30 days, 25.8% of them, reading them.

There has been a number of studies which confirm the negative influence of using a mobile phone during driving to driver attention e.g. (Haigney, et al 2000), (Strayer et al 2001), (Cooper et al 2003), (Patten, et al 2004). The Review and Meta-Analysis of 93 studies and experiments between 1991 – 2015 present that drivers detect and respond slower to important events and targets in the driving environment when having a cell phone conversation while driving. Also, the authors have not found compensatory performance adjustment while using a cell phone when driving. Those findings do not support the conclusions that were presented in different studies (McCartt, Hellinga & Bratiman, 2006). There have not been found differences between reaction time effect size for handled cell phone and hands-free. However a handheld phone has a motion and visual

requirements, that may increase crash risk. Interesting is finding that there is no significant difference in reaction time between having a conversation with a passenger or having a phone call (Caird, Simmons, Wiley, Johnston, & Horrey, 2018).

Mobile phone use affects a wide spectrum of variables involved in safe driving, such as motor aspect when holding and manipulating with phone, visual, auditory and cognitive aspects while watching the screen and having the conversation. Especially dangerous are comprehensive and emotionally demanding phone calls, that increase the risk of the car crash (Dula, Martin & Leonard, 2011). The perception of the road and other road users is affected by cognitive load and distraction.

Very interesting results bring the study of Oviedo-Trespalacios, King, Haque & Washington (2017). The study shows, that 49% of participants use a mobile phone for talking while driving. 50% of participants reported mobile phone use for browsing or texting. At the same time, 72% of drivers are aware of danger linked to the mobile phone calls while driving, and 94% of them are aware of the danger linked to the texting or browsing while driving. However, 72% of them admit scanning the environment for the police while using the phone and 77% of them hold the phone lower, avoid the police.

Ige, Banstola & Pilkington (2016) consider the use of mobile phone while driving as one of the most serious forms of distraction because of the wide scale of demands on the driver's attention. Lamble, Rajalin & Summala (2002) showed that more than half of the drivers use a mobile phone while driving, and up to 50% of them have ever experienced a dangerous road situation due to mobile phone use while driving. Troglauer, Hels & Christens, (2006) showed that 31% of the interviewed drivers sometimes used or handled the mobile phone while driving despite the ban. 66% of drivers reported, that they found themselves in a dangerous situation caused by using a mobile phone one of the participants in a dangerous situation. 6% of drivers mentioned a dangerous situation due to mobile phone use while driving, and 0.5% of drivers admit that their mobile phone use led to a traffic accident. Also Sanbonmatsu., Strayer, Biondi, Behrends & Moore (2016) found out, that talking on a cell phone diminishes safeness of driving and awareness of the safeness. The comparison of errors while driving and having a phone call does not correlate with objective errors and subjectively perceived errors. The most usual errors are speed inconsistency, weaving across lanes or near misses with other vehicles. The authors also mention the possibility of persistence in believing that drivers can safely talk or text on a cell phone behind the wheel.

Lissy, Cohen, Park & Graham (2000) presented a study where focuses on possible benefits of using a cellular phone while driving. Divides them into five sections: personal, family/household, social network, business benefits, and community benefits. All of them surely bring many advantages and convenience, however, none of them worth the risk.

Impact of using mobile phone has been analysed in various studies, only a small number of studies has been focused on the individual characteristics of drivers who used a mobile phone while driving. Mostly also all type of drivers has been analysed. For the purpose of this study, a special group of drivers - drivers directly involved in the traffic accident have been analysed. Subsequent comparisons with previous studies can reveal whether these characteristics of the accident participants are consistent with the outputs of the driver-focused analysis.

The presented study focuses on mobile phone use while driving in terms of driving style, behaviour, annual mileage and age. It interconnects all variables and looks for the riskiest group among all the mentioned variables. There are several studies focused on reaction time, compensatory behaviour or cognitive overload during mobile phone use while driving. The aim of the presented study is to use the real-life situation and avoid the artificially created one in a driving simulator. Focuses more on personal predispositions to indicate risky behaviour and define the riskiest group, which gives the chance to create adequate safety campaign or develop different tools to prevent this dangerous behaviour. The value of the presented study lies in a unique dataset that has been collecting for the past 8 years during real accident situations in the South Moravia Region of the Czech Republic.

## 2. DATA AND METHODS

### 2.1 Dataset

Data collection was performed within the research project Czech In-depth Accident Study (CzIDAS), which was initiated by the Transport Research Centre in 2011. The project focuses on road accidents with injuries on a defined region of South Moravia. The road accidents are chosen according to a statistical selection with the aim to cover a representative

sample. The current sample of in-depth data from the CzIDAS included more than 1700 crashes, in which at least one participant was admitted to the hospital due to crash-related injuries. All data collected during on-spot research has been subsequently analysed.

The investigation includes also individual interview of psychologist with traffic accident participants, focused on all relevant information related to causes: traffic situation at the time of the accident (traffic flow, difficulty of route, monitoring of objects in a vehicle and outside of a vehicle, etc.), actual mental and physical condition of a participant (mood, course of the day, number of hours at work before the accident, driven distance, number of hours remaining until the end of working shift, quality and length of sleep, fatigue, actual health condition, short-term and long-term illness, allergy, use of medicaments, sight correction, etc.), incidental circumstances, course of road accident (e.g. reactions, recognition of danger), trip purpose and background (other activities while driving, knowledge of local situation). A semi-structured interview has included also basic and sociodemographic information about the participant (sex, age, driving experience, education, etc.). For driving style and behaviour analysis is important to focus on driving habits, practice, accident consequences, past accident experience, driver's verbal and nonverbal communication during the interview and other (in)direct indicators. Very valuable is also information obtained from co-drivers and other people who usually arrive at the scene of an accident to support the individual or take care of the vehicle. If possible, based on this information, the driving style and behaviour is subjectively assessed by the psychologist. Database of collected information may not contain any personal data on road users based on which the road users may be identified.

Interviewing participants is an effective tool of how to understand direct and indirect risk factors leading to inattention and distracted driving in a context of real road accident situations. However, the amount of data obtained in some cases depends on the actual mental and physical condition of crash participants. Road accident is a stressful situation, especially when someone gets injured. Ability to testify depends on the current mental state and coping strategies of the interviewed person. The situation can also affect the quality of the obtained information. Some of the information, such as mobile phone using or compliance of traffic regulations does not reflect the reality. Driver modifies his testimony (un)intentionally. This might be caused by fear of punishment or judgements, despite fact that all acquired information is anonymous and not used in the legal process. Also, reality perception or memories can be changed due to a stressful situation.

The main goal of a psychologist has been the crash participant support (crisis information provision), provision of a space for emotional relief. The psychologist also should respond to participant's individual need because of anxiety and uncertainty reduction and acute stress reaction mitigation. The amount of data obtained varied because they are dependent on the participant actual mental state. There is also a situation in which the interview could not be realized - mostly when participants have been seriously or fatally injured. For the purpose of this study, only cases where participant interview was realized, has been used.

There are a number of studies that analyse the number of drivers who use a mobile phone during driving, especially sociological or naturalistic driving studies e.g. (Torfs et al. 2016, Trigoso et al 2016, Eenink et al. 2014, Klauer 2016). For the purpose of this study, the unique accident database has been used. The aim of this study is to identify risk factors and groups of accident participants that tend to use the mobile phone more frequently when driving.

For purposes of this study "Handling phone" (calling without handsfree) and "Texting, etc." were distinguished. The first group refers to using a mobile phone for making phone calls while driving which is demanding mentally without motor skills demands. The second group refers to any motor activity involved with manipulating with a phone, which usually includes fine motor skills (texting, capturing records or pictures, setting up the mobile phone navigation and others).

## 2.2 Methods

Quantitative analysis was used to compare different groups of drivers in relation using a mobile phone when driving, considering selected driver's characteristics - age, driving experience, driving habits, employment and tendency to risky behaviour or self-assessment of driving skills.

For the statistical analysis, Pearson´s chi-squared test has been used. It has been the most frequently used test of independence between categorical variables (i.e., whether the variables are independent or related). This test utilizes a contingency table to analyse the data.

A contingency table is an arrangement in which data has been classified according to two categorical variables. Based on the result of this test, we are able to reject the zero hypotheses of dependence or homogeneity on a certain level of significance. The test could be used if at least 80 % of expected values have been higher than five and all of them have been higher than one. If this assumption has not been fulfilled, Fisher´s test needs to be used. For the deviations analysis of the fields in the contingency table, the sign schemes formed from the adjusted residues were used.

The adjusted residue is based on the difference between the empirical (observed) and theoretical (expected) frequency. This difference is then standardized by dividing the standard deviation of the residues. Adjusted residues can be tested for statistical significance by using a sign scheme. It has been determined whether statistic values exceed critical values and has been assigned a plus or minus sign to each field, depending on how strongly the deviation is significant and whether the actual and expected frequency difference is positive or negative. This is done according to the selected significance levels (5%, 1%, 0.1%), which corresponds to the appropriate number of signs.

- Empirical frequency does not differ significantly from theoretical. Sign Type “o”.
- Empirical frequency is higher than theoretical. Type of “+” sign.
- Empirical frequency is lower than theoretical. Type of sign “-”.

Up to three plus or minus signs may appear in each table cell, depending on the statistical significance of the deviation. The values 3.29, 2.58 and 1.96 correspond to the quantile values of the normalized normal distribution.

- ‘where abs (z)> = 3.29 replaces +++ resp. ---,
- ‘where abs (z)> = 2.58 replaces ++ resp. -,
- ‘where abs (z)> = 1.96 replaces + resp. -.

The sign diagram shows where there are statistically significant differences between empirical and expected frequencies.

## 3. DATA ANALYSIS

For the use of a mobile phone when driving, 915 of accident participant have been interviewed. A mobile phone using respond 37% (without hands-free). It could be assumed tendentiously and untruthfully responds, especially because of the guilty feelings. According to this, we estimate higher number of drivers using their mobile device while driving. The amount of drivers violating the rule is higher, but surely not lower.

Findings are following:

- 3% of interviewed participants reported having a conversation on a mobile phone while driving fairly often or regularly.
- 11% of the interviewed participants reported having a conversation on a mobile phone while driving rarely.
- 17% of the interviewed participants reported typing text messages or emails while driving. Also, social network and internet use were included. 6% of the interviewed participants reported these activities rarely.

Results of the accidents from CzIDAS database show, that mobile phone use while driving is statistically significantly associated with the driver’s age, the driver’s experience expressed in the annual mileage, the willingness of the driver to take risks (risky drivers, defensive type, neutral type) and driving style (aggressive/careful) as well as self-assessment of driving skills. Statistically insignificant differences have been associated with the job position.

Comparison of age groups shows, that drivers between 18-24 years use mobile phone without hands-free up to 2.5 times more often (46 %) than a group of drivers with age over 65 years (17.6% cases). Young drivers also use mobile phones more often than middle-aged drivers.

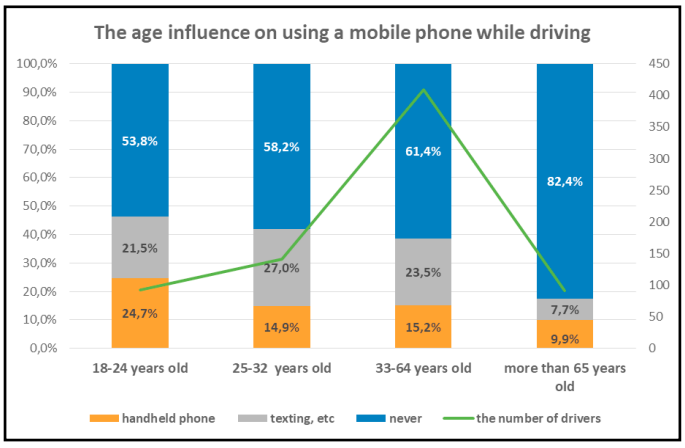


***Figure 1: The age influence on using a mobile phone while driving (n=734).***

***Table 1: The age influence on using a mobile phone while driving (n=734, chi-square 0.000).***

| Age group | Never | Handheld phone | Texting, etc. |
|---|---|---|---|
| 18-24 | O | + | O |
| 25-32 | O | O | O |
| 33-64 | O | O | O |
| >65 | +++ | O | --- |

Comparing the results of the frequency of mobile phone use among vehicle accident participant show an increasing tendency of mobile phone use, connected with the increasing annual mileage. Drivers with annual mileage lower than 15.000 km per year compared to the others less frequently use mobile phone without hands-free during driving. Compared to that, drivers with annual mileage higher than 60.000 km use handheld phone more often.

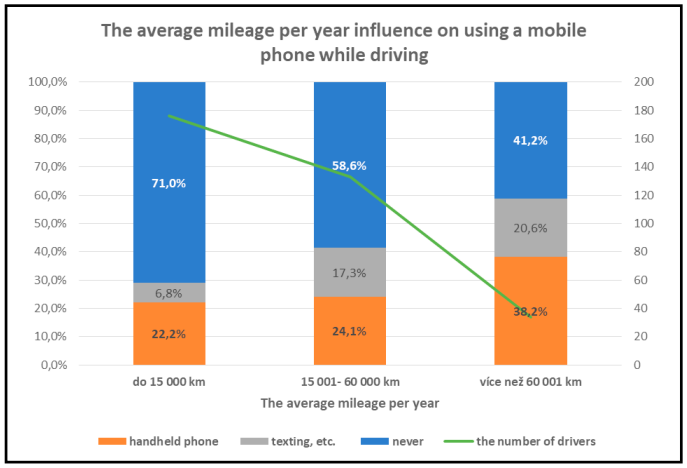


***Figure 2: The average mileage per year influence on using a mobile phone while driving (n=343).***

***Table 2: The average mileage per year influence on using a mobile phone while driving (n=343, chi-square 0.005).***

| Mileage per year | Never | Handheld phone | Texting, etc. |
|---|---|---|---|
| < 15.000 | ++ | O | -- |
| 15.000-60.000 | O | O | + |
| >60.000 | -- | + | O |

The use of a mobile phone without hands-free while driving has been also related to driving habits and driver personal characteristics as well as could be influenced by driver self-assessment of his experience. Self-assessment of experience valuation is realized on a scale 1 - 5, (1 - excellent, 2 - quite good, 3 - good, 4 and 5 - decent). Most of the drivers in our databases evaluate their driving skills as quite good. For the needs of analysis were the group of drivers, who evaluates themselves as a bad driver, is not considered. A typical user of mobile phone while driving evaluates his driving skills as excellent and has aggressive driving style.

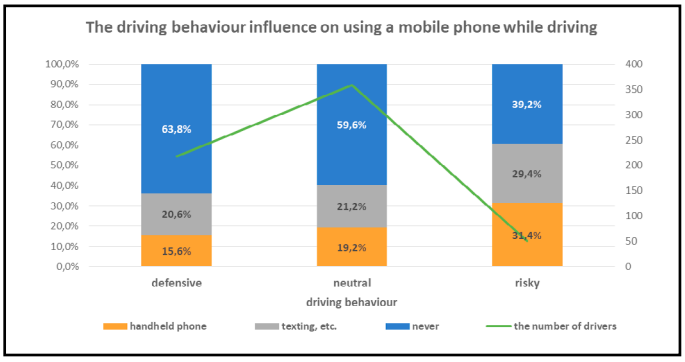


***Figure 3: The driving behaviour influence on using a mobile phone while driving (n=628).***

***Table 3: The risky driving behaviour influence on using a mobile phone while driving (n=628, chi-square 0.024).***

| | Never | Handheld phone | Texting, etc. |
|---|---|---|---|
| Defensive | O | O | O |
| Neutral | O | O | O |
| Risky | -- | + | O |

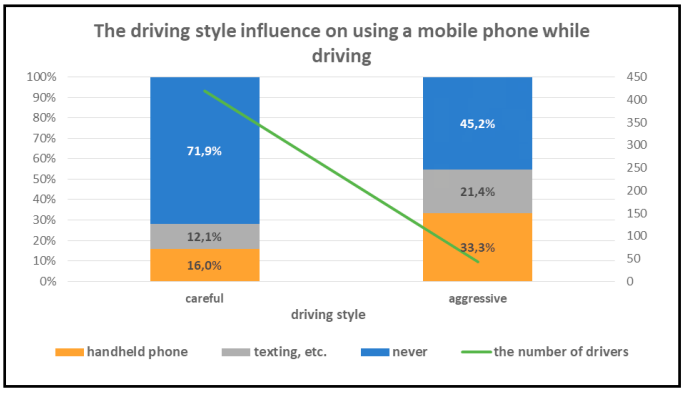


***Figure 4: The driving style influence on using a mobile phone while driving (n=462).***

***Table 4: The driving style influence on using a mobile phone while driving (n=462, chi-square 0.001).***

| | Never | Handheld phone | Texting, etc. |
|---|---|---|---|
| Aggressive | --- | ++ | O |
| Careful | +++ | -- | O |

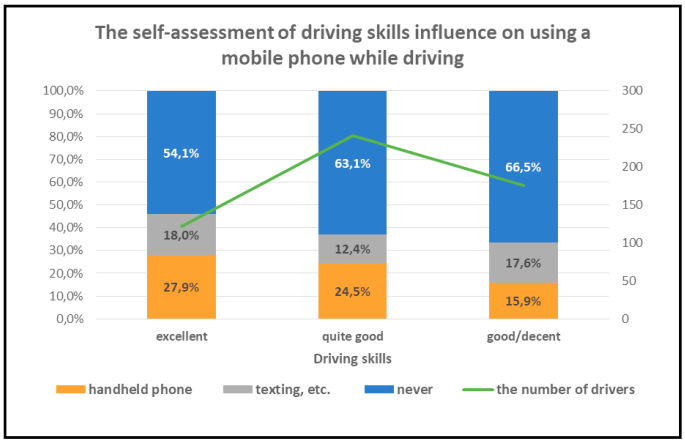


***Figure 6: The self-assessment of driving skills influence on using a mobile phone while driving (n=734).***

***Table 6: The self-assessment of driving skills influence on using a mobile phone while driving (n=734, chi-square 0.000).***

| | never | Handheld phone | Texting, etc. |
|---|---|---|---|
| Excellent | - | O | O |
| Quite good | O | O | O |
| Good/decent | O | - | O |

## 4. DISCUSSION AND CONCLUSION

Mobile phone use while driving has a negative impact on road safety, which has been confirmed by the number of studies (e.g. Ige, Banstola & Pilkington (2016), Sanbonmatsu., Strayer, Biondi, Behrends & Moore (2016)). For the analysis of using mobile phone while driving mostly sociological or naturalistic driving studies has been used. Distracted driving has been analysed in the international sociological survey ESRA: E-survey of Road Users attitudes (Torfs et al. 2016, Trigoso et al 2016). Interaction of the driver with mobile phone and other vehicle systems was analysed in the project INTERACTION, the distraction was also analysed in the naturalistic driving study UDRIVE (Eenink et al. 2014). For the purpose of this study, the unique in-depth accident database has been used. The tendency to use a mobile phone without hands-free while driving decreases with the age of the driver. Whether it's a phone call without hands-free or handling a mobile device while driving. One of the possible explanations of the mentioned phenomenon can be the extremely rapid development and range of ICT and their interconnection with a common life and the related emergence of the information society. The speed with which ICT evolves and penetrates into our lives does not correspond to the processes of socialization and "experiencing" something new within the framework of a single generation as it used to be. Webster (2006) explained the term information society in 2006. Media surrounds us and, mediates news, messages and provides information and entertainment. We respond to those at our own discretion. It is important to note, that in comparison to 2006, the ubiquity of new information media is even larger.

Based on this explanation is possible to conclude, that typical representatives of the information society are young individuals. They have a higher need for a presence in cyberspace, which can leads except for mobile phone use while driving, also to internet or smartphone use addiction. On the other hand, this phenomenon occurs occasionally with older people who have experienced massive ICT development at a later age. This assumption is also supported by general awareness about digital natives and digital immigrants. These terms were used for the first time in 1996 as a part of the Declaration of the Independence of Cyberspace and divide people into two big groups. Those, who were born before massive digital extension and had to learn during their life how to use these devices and those who were born after massive digital extension (1980+) and these devices have been part of their lives ever since. According to Prensky (2001), digital natives are used to receive information really fast, they like to parallel process and multi-task. Some experts also mention possible neurological changes in the brains of digital natives. However, with internet expansion that has started in the 90s and smartphones development during the past decade, the digital world expanded from houses into every moment of the day. As are digital natives recognised by the development of digital devices, development of cell phones and the possibility to easily communicate with whomever we want, to capture every moment of our lives and share it with whomever we want or work from wherever we are. People who were born during this era and mobile or smartphones have been involved in their livers ever since perceive the higher need of using them. These young people have different phone use patterns and incentives. As Sanbonmatsu, Strayer, Medeiros-Ward, Behrends & Watson (2015) suggest, that drivers have different incentives to use a mobile phone while driving, it can be a connection with family or friends, getting work done and others. As was mentioned above, to a similar conclusion came Lissy at al. (2000) possible

benefits coming phone mobile phone use while driving are personal benefits (searching for faster road etc.), family/household benefits (parental an familial peace of mind etc.), social network benefits (social contact), business benefits (increasing productivity and efficiency, etc.), community benefits. However, involvement in phone use while driving and different incentives for different age group could be further explored in future studies.

Findings of Tison, Chaudhary, & Cosgrove (2011) have shown, that drivers younger than 25 years more often send text messages or e-mails while driving than older drivers (2-3 times more). 44% of drivers between 18-20 years and 49% between 21-24 years send messages or emails while driving.

However, the predominant group is not always easy to identify. For example, according to WHO (2011), mobile phones are mostly used in young people between 15-24 years.

These results correspond to the results of other studies. The impact of age on mobile phone use while driving is also documented in the study of Dula et al. (2011). As the riskiest was among all drivers identified a group of young males. Almost half of the drivers, who use mobile phones while driving experienced a dangerous traffic situation related to mobile phone use (especially novice drivers). The analysis of post-accident interview has shown, that drivers who consider their driving style as safe, avoid using the mobile phone while driving. Mobile phone use while driving may also be related to willingness to risky behaviour by drivers. These, compared to other groups, are statistically significantly more likely to make phone calls without hand-free use while driving. Also, other studies indicate, that mobile phone use while driving in young drivers is riskier in comparison to older drivers (Bener, Lajunen, Özkan & Haigney 2006). The results of the AAA Foundation for Traffic Safety (2013) show, that the most often use the mobile phone while driving people between 25-39 years. The authors explain these results by saying, that drivers in this age group consider themselves as an experienced driver. This leads to risk tendency and neglection of the possible consequences of their actions.

Young & Lenné (2009) focused on distracting stimuli occurred during driving. Results have shown, that 58% of drivers use a mobile phone while driving, and one third handle mobile phone device while driving despite knowingly violating the law. Younger drivers (18-25 years) use the mobile phone while driving to send text messages, at least once during the journey. The results also have shown, that mobile phone use, but also food or beverage consumption is significantly higher among young drivers. These variables with a lack of driving experience and a limited ability to fully manage driving are very risky factors. Findings from focus groups of young drivers between 16-18 have shown, that despite recognizing the danger, teens still engage the mobile phone use into the driving process. They were aware of distraction due to mobile pho use and its consequences (McDonald & Sommers, 2015).

The frequency of mobile phone usage rises in connection with the increasing annual mileage. Drivers who drive more than 60,000 kilometres a year in comparison to other groups are more likely to make phone calls during the driving. These findings are consistent with the findings of the study which shows, that drivers with higher annual mileage are more likely to use a mobile phone while driving. Similar results also prove Zhao. According to Zaho, Reimer, Mehler, D'Ambrosio & Coughlin (2013), drivers with an annual mileage above 10.000 km, less often indicate that they do not use the mobile phone while driving.

Drivers with a higher annual mileage have a largely automated steering process. As Šucha, Rehnová, Kořán & Černochová (2013) notes, this automated process can also be dangerous due to a divergence of attention to the stimuli that is not essential in terms of handling the traffic situation.

According to Zhao et al. (2013), those who report more frequent cell phone use while driving show evidence of engaging in riskier driving behaviour. Psychologist of the CzIDAS project interviews drivers directly at the accident scene. They also focus on the driving style and drivers personality characteristics. The results from statistical analysis also show the differences between different driving styles which were divided into two main groups (aggressive and careful). Aggressive drivers are more likely to use mobile phone devices while driving than drivers who are careful. For aggressive drivers is a specific lack of respect for traffic rules and its violating. These drivers are impulsive, emotionally unstable and impatient (Štikar, Hoskovec & Štikarová, 2003). However, it is important to note, that aggressive drivers were not asses as aggressive because they admit mobile phone use while driving. The conclusion was based on many variables found during the interview with the psychologist. These are mentioned above.

Mobile phone use while driving is related to the driver's perception and self-assessment of driving

skills. Our findings have shown, that the typical driver who uses a mobile phone while driving evaluates his/her driving skills as a perfect. This can be caused by confidence and trust in their own driving skills. The drive may believe that he/she is good enough to manage safe driving and mobile phone use. Drivers that evaluate their driving skills as a perfect, may not feel the danger towards them and other road users coming from distraction caused by mobile phone use while driving. Anyways, handling the mobile phone (texting, etc) while driving is represented approximately with the same frequency for all kinds of drivers. Independently of the self-assessment of driving skills. Differences are not statistically significant.

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## REFERENCES

AAA Foundation for Traffic Safety. (2013). Distracted and Risk-Prone Drivers. Select Findings from the 2013 Traffic Safety Culture Index. Washington, DC: AAA Foundation for Traffic Safety.

Bener, A., Lajunen, T., Özkan, T., Haigney, D. (2006). The effect of mobile phone use on driving style and driving skills. International Journal of Crashworthiness, 11(4), 10.1533

Caird, J. K., Simmons, S. M., Wiley, K., Johnston, K. A., & Horrey, W. J. (2018). Does Talking on a Cell Phone, With a Passenger, or Dialing Affect Driving Performance? An Updated Systematic Review and Meta-Analysis of Experimental Studies. Human Factors. The Journal of the Human Factors and Ergonomics Society, 60(1), 101–133. doi:10.1177/0018720817748145

Cooper, P. J., Zheng, Y., Christian, R., Vavrik, J., Heinrichs, B., & Siegmund, G. (2003). The impact of hands-free message reception/response on driving task performance. Accident Analysis and Prevention , 35, 23-35.

Dula, Ch., Martin, A., B., Leonard, R., L. (2011). Differing types of cellular phone conversations and dangerous driving. Accident Analysis & Prevention, 2011, 43.1: 187-193

EENINK, Rob, et al. UDRIVE: the European naturalistic driving study. In: Proceedings of Transport Research Arena. IFSTTAR, 2014.

European Commission. (2014). Special Eurobarometer 414 "E-Communications and Telecom Single Market Household Survey.

Haigney, D. E., Taylor, R. G., & Westerman, S. J. (2000). Concurrent mobile (cellular) phone use and driving performance; Tasks demand characteristics and compensatory processes. Transportation research Part F , 3, 113.121.

Ige, J., Banstola, A., & Pilkington, P. (2016). Mobile phone use while driving: Underestimation of a global threat. Journal of Transport & Health, 3(1), 4–8.doi:10.1016/j.jth.2015.11.003

Klauer, S. G., T. A. Dingus, V. L. Neale, J. D. Sudweeks, and D. J. Ramsey. The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data. Report DOT-HS-810-594. NHTSA, U.S. Department of Transportation, Washington D.C., 2006.

Laberge-Nadeau, C., Maag, U., Bellavance, F., Lapierre, S.,D., Desjardins. D., Messier, S., Saidi, A. (2003). Wireless telephones and the risk of road crashes. Accident Analysis & Prevention, 35.5: 649-660.

Lamble, D., Rajalin, S., Summala, H. (2002) Mobile phone use while driving: public opinions on ¨ restrictions. Transportation. 29: 223-236.

Lissy, S., K., Joshua H., P., N., Cohen, T., J., Mary, Y. Park, S., M., John, D., Graham, D., G. (2000). Cellular Phone Use While Driving: Risks and Benefits. Harvard Center for Risk Analysis, Harvard School of Public Health. Boston. Massachusetts.

McDonald, C., C., Sommers, S., M. (2015), Teen Drivers' Perceptions of Inattention and Cell Phone Use While Driving, Traffic Injury Prevention,16 (2): 52-58. DOI: 10.1080/15389588.2015.1062886

McCartt, A., Hellinga, L. A., & Bratiman, K. A. (2006). Cell phones and driving: Review of research. Traffic Injury Prevention, 7(2), 89–106.

Oviedo-Trespalacios O., King M., Haque M. M., Washington S. (2017). Risk factors of mobile phone use while driving in Queensland: Prevalence, attitudes, crash risk perception, and task-management strategies. PLoS ONE 12(9): e0183361. https://doi.org/10.1371/journal.pone.0183361

Patten, C. J., Kircher, A., Ostlund, J., & Nilsson, L. (2004). Using mobile telephones; cognitive workload and attention resource allocation. Accident Analysis and Prevention, vol. 36, no. 3, p. 341-350. , 341-350.

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. On the Horizon, Vol. 9 (5): 1-6. DOI: 10.1108/10748120110424816

Sanbonmatsu, D. M., Strayer, D. L., Biondi, F., Behrends, A.,A. & Moore, M.S. (2016). Cell-phone use diminishes self-awareness of impaired driving Psychonomic Bulletin & Review. 23(2): 617-623.

Sanbonmatsu, D. M., Strayer, D. L., Medeiros-Ward, N., Behrends, A. A. & Watson, J. M. (2015). Why drivers use cell phones and why they support legislation to restrict this practice. Accident Analysis and Prevention. 92; 22–33.

Strayer, D. L., & Johnston, W. A. (2001). Driven to distraction; Dual-task studies of simulated driving and conversing on a cellular telephone. Psychological Science , 9, 462-466.

Štikar, J., Hoskovec, J. &, Štikarová, J. (2003). Psychologie v dopravě. Praha: Karolinum.

Šucha, M., Rehnová, V., Kořán, M., Černochová, D. (2013) Dopravní psychologie pro praxi. Výběr, výcvik a rehabilitace řidičů. 2013. 978-80-247-4113-0

Tison, J., Chaudhary, N., & Cosgrove, L. (2011, December). National phone survey on distracted driving attitudes and behaviors. (Report No. DOT HS 811 555). Washington, DC: National Highway Traffic Safety Administration.

Torfs, K., Meesmann, U., Van den Berghe, W., & Trotta, M. (2016). ESRA 2015 – The results. Synthesis of the main findings from the ESRA survey in 17 countries. ESRA project (European Survey of Road users' safety Attitudes). Brussels: Belgium: Belgian Road Safety Institute.

Trigoso, J., Areal, A., & Pires, C. (2016). Distraction and fatigue. ESRA thematic report no. 3. ESRA project (European Survey of Road users' safety Attitudes). Lisbon: Portugal: Prevenção Rodoviária Portuguesa.

Troglauer, T., Hels, T., Christens, F., P. (2006). Extent and variations in mobile phone use among drivers of heavy vehicles in Denmark. Accident Analysis & Prevention, 38(1), 105 - 111. DOI:10.1016/j.aap.2005.07.008

WHO, 2011. Mobile phone use: a growing problem of driver distraction. Available at: ⟨http://www.who.int/violence_injury_prevention/publications/road_traffic/distracted_driving_en.pdf). (accessed 05.04.2019)

Webster, F. (2006). Theories of the Information Society. 3rd. London: Routlege.

Young, K.L., Lenné, M.G. (2010) Driver engagement in distracting activities and the strategies used to minimise risk. In: Safety Science, 48 (3), p. 326-332.

Zhao, N., Reimer, B., Mehler, B., D'Ambrosio, L. A., & Coughlin, J. F. (2013). Self-reported and observed risky driving behaviors among frequent and infrequent cell phone users. Accident Analysis & Prevention, 61, 71-77.