

Accidents and Close Call Situations Due to Cell Phone Use While Moving, Driving, and Working

L. Korpinen, R. Pääkkönen, F. Gobba

Abstract—Accidents and close call situations involving cell phones are nowadays possible. The objective of this study was to investigate the accidents and close call situations due to cell phone use while moving, driving, and working among Finns aged between 18 and 65. This work is part of a large cross-sectional study that was carried out on 15,000 working-age Finns. About 26% of people who had an accident, and about half of the people including close call situation with the mobile phone, answered that use of the phone influenced. In the future, it is important to take into account that the use of a mobile phone can be distracting while driving.

Keywords—Blue-collar workers, accident, cell phone, close call situation.

I. INTRODUCTION

MOBILE phones can be related to accidents while driving, moving, or working. Earlier studies have shown the effect of mobile telephone use on driving performance and crash risk [1]. According to Lerner et al. [2], a major issue of concern is that drivers do not consider mobile telephone use as risky as engaging in other activities while driving (for example child care, etc.). Many studies have reported that the important problem with using mobile telephones is the increase in reaction times to driving-related events [3]-[9]. In many countries, legislation has been introduced so that only hands-free cell phone use is allowed or it is not possible to use cell phones at all (e.g., [10], [11]).

Mobile phone users report distraction in many situations, not only while driving. For example, Waard et al. [12] studied and observed bicyclists at six different locations and scored their behavior. They found that compared to five years ago, the use of cell phones while cycling has changed the way how individuals operate bicycles. The frequency was not changed. They typed and texted more than earlier. Waard et al. [12] concluded that shift from calling to screen operation is worrying and potentially dangerous. Terzano et al. [13] have also studied cyclists. They observed 1360 cyclists in The Hague. They noted that 3.5% of them were operating a cell phone.

In Finland, we have studied the accidents and close call situations connected to the use of mobile phones using a

questionnaire. It was part of the larger study on the topic of health effects of new technical equipment. We carried out a cross-sectional study by posting a questionnaire to 15,000 working-age Finns. The questionnaire included questions on, e.g., the familiarity and use of new technical devices, prevalence of different symptoms, and accidents and close call situations associated with the mobile phone use [14]. We received completed questionnaires from 6,121 people. In another publication [15], accidents and close call situations connected to the use of mobile phones are studied. We analyzed how the accidents/close call situations are connected to background information, age, gender, and self-reported symptoms. In the analysis, we used the answers (yes/no) if the respondents had had accidents or close call situations connected to the use of the mobile phones. Altogether 4.5% of respondents had close call situations and 0.4% had accidents at work, in which the mobile phone played a role, during the last 12 months. For example, we found that employed people tend to have more problems with mobile phone usage and accidents/close calls, and there was a slight increase in mobile-phone-related accidents/close calls if the respondent also reported sleep disturbances.

The aim of this paper is to investigate the accidents and close call situations among Finns aged between 18 and 65 in which operating a mobile phone distracted the user from moving, driving, or working.

II. METHODS

A. Study Population

We focused our study on the working-age population and sent the questionnaire to 15,000 people (aged between 18 and 65), and we focused this paper on the accidents and close call situations at work while moving, driving, and making observations at work. We got the names and addresses of the participants as a random sample from the Finnish Population Register Centre. The study design was approved by the Ethical Committee of Pirkanmaa Health District, Finland (decision R02099).

This paper concentrates on respondents who answered “yes” to the question which asks if they have had one or more accidents or close-call situations at work while on a cell phone [15].

B. Statistical Analyses

We used IBM SPSS Statistics version 23 software to perform statistical analyses. We used the following questions: (20) Have you had an accident or accidents at work, in which your mobile phone played a role, during the last 12 months? If

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the answer is yes, then how? (a) distracted concentration while moving, (b) distracted concentration while driving, (c) distracted while observing your environment, (d) the device caused the situation, (e) other; and (21) Have you had a close call situation or situations at work, in which your mobile phone played a role, during the last 12 months? If the answer is yes, then how? (a) distracted concentration while moving, (b) distracted concentration while driving, (c) distracted observing the environment, (d) the phone caused the situation, (e) other. The choices for the questions were: cannot say, not at all, somewhat, fairly noticeable, noticeable, very noticeable, and missing.

To compare differences of close call situations at work between upper-level white-collar workers, lower-level white-collar workers, blue-collar workers, we used the independent samples for Mann-Whitney U-test analyses.

First, we chose the persons who answered yes to the question "Have you had a close call situation or situations at work, in which the mobile phone played a role, during the last 12 months?" Then, we analyzed the questions 21a, 21b, 21c, and 21d. In addition, we scored the responses in such a way that the choices fairly noticeable, noticeable and very noticeable were 1 (yes) and others were 0 (no). We conducted the following analyses:

- (1) Comparison of upper-level white-collar (Group 1) and lower-level white-collar workers' (Group 2) answers to Question 21a, b, c, and d: "Have you had a close call situation or situations at work, in which the mobile phone played a role, during the last 12 months? If the answer is yes, then how? (a) distracted concentration while moving, (b) distracted concentration while driving, (c) distracted observations of your environment, (d) the mobile device caused the situation," (Analysis I);
- (2) Comparison of upper-level white-collar (Group 1) and blue-collar workers' (Group 3) answers to Question 21a, b, c and d (Analysis II);
- (3) Comparison of lower-level white-collar (Group 2) and blue-collar workers' (Group 3) answers to Question 21a, b, c and d (Analysis III);

We did not conduct those analyses from the accidents at work, because we got only some "yes" answers.

III. RESULTS

A. Accidents While Using a Cell Phone

From all respondents, 34 persons (11 women and 23 men) have had an accident at work while calling someone on the phone. Table I shows their answers to Questions 20a-e.

TABLE I
ACCIDENT WHILE USING A CELL PHONE (%)

Q	cannot say	not at all	somewhat	fairly n.*	n.*	very n.*	Missing
20a	-	17.6	44.1	5.9	17.6	2.9	11.8
20b	-	32.4	29.4	5.9	8.8	11.8	11.8
20c	-	5.9	55.9	8.8	17.6	8.8	2.9
20d	2.9	50.0	8.8	11.8	2.9	14.7	8.8
20e	17.6	44.1	2.9	5.9	2.9	2.9	23.5

Q= question, n.* = noticeable

Fig. 1 shows the respondents' (who had an accident while operating a cell phone) answers to Questions 20a and Fig. 2 of Question 20b.

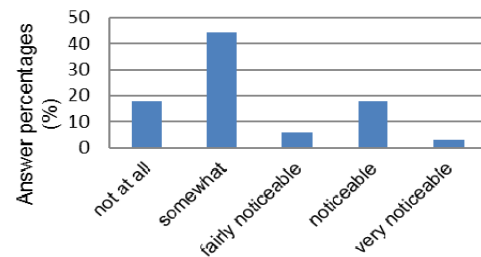


Fig. 1 Respondents' (who had an accident while using a cell phone) answers to Question 20a

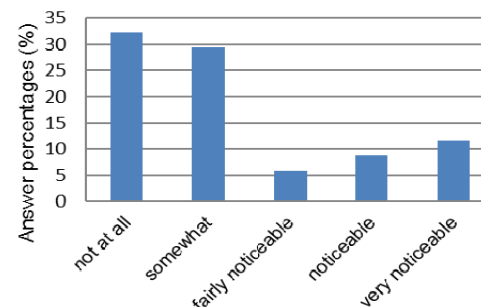


Fig. 2 Respondents' (who had an accident while using a cell phone) answers to Question 20b

Fig. 3 shows the respondents' (who had an accident while a cell phone) answers to Question 20c and Fig. 4 of Question 20d.

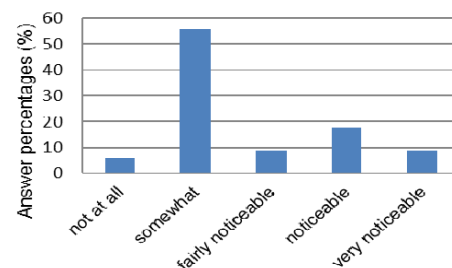


Fig. 3 Respondents' (who had an accident while using a cell phone) answers to Question 20c

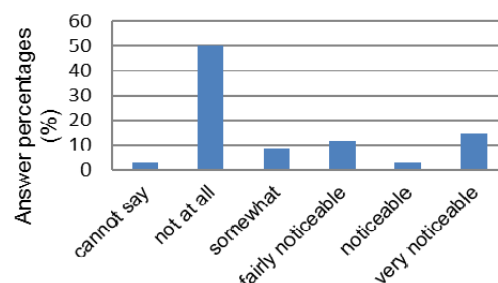


Fig. 4 Respondents (who had an accident while using a cell phone) answers to Question 20d

B. All Respondents Who Had a Close Call Situation While Using a Cell Phone

From all respondents, 225 persons have had a close call situation while calling someone on the phone. Table II shows their answers to Questions 20a-e.

TABLE II
ALL RESPONDENTS WHO HAD A CLOSE CALL SITUATION WHILE USING A CELL PHONE (%)

Q	cannot say	not at all	somewhat	fairly n.*	n.*	very n.*	Missing
20a	0.9	24.9	47.1	10.7	6.7	2.2	7.6
20b	2.2	12.0	50.2	20.9	7.1	5.3	2.2
20c	0.4	9.3	55.1	16.4	9.8	3.1	5.8
20d	6.2	62.2	12.0	4.0	3.6	1.3	10.7
20e	18.2	53.8	3.1	0.9	-	0.4	23.6

Q= question, n.* = noticeable

Fig. 5 shows the respondents' (who had a close call situation while using a cell phone) answers to Question 21a and Fig 6. of Question 21b.

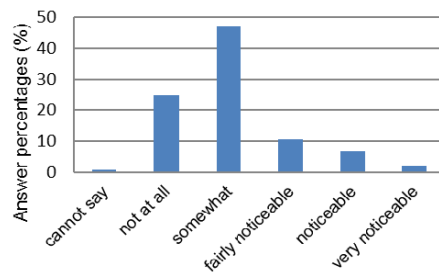


Fig. 5 Respondents' (who had a close call situation while using a cell phone) answers to Question 21a

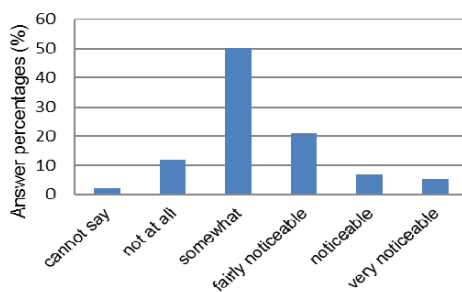


Fig. 6 Respondents' (who had a close call situation while using a cell phone) answers to Question 21b

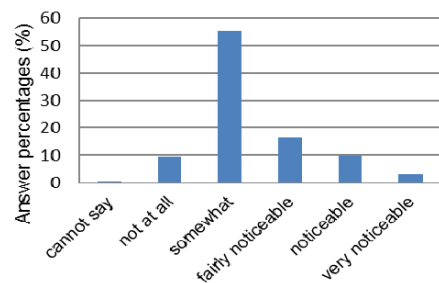


Fig. 7 Respondents' (who had a close call situation while using a cell phone) answers to Questions 21c

Fig. 7 shows the respondents' (who had a close call situation while using a cell phone) answers to Question 21c and Fig. 8 of Question 21d.

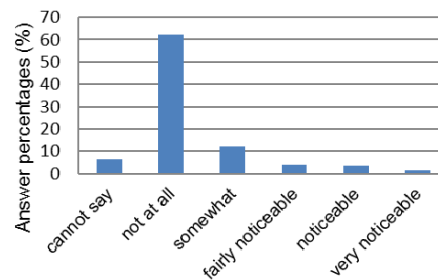


Fig. 8 Respondents' (who had a close call situation while using a cell phone) answers to Question 21d

C. White-Collar and Blue-Collar Workers Who Had a Close Call Situation while Operating a Cell Phone

From workers who had a close call situation while operating a cell phone, 60 were upper-level white-collar workers, 56 were lower-level white-collar workers, and 53 were blue-collar workers. Table III shows the answers of upper-level white-collar workers to Questions 20a-e.

TABLE III
UPPER-LEVEL WHITE-COLLAR WORKERS WHO HAD A CLOSE CALL SITUATION WHILE USING A CELL PHONE (%)

Q	cannot say	not at all	somewhat	fairly n.*	n.*	very n.*	Missing
20a	1.7	28.3	45.0	6.7	3.3	5.0	10.0
20b	1.7	8.3	51.7	26.7	1.7	10.0	-
20c	1.7	11.7	51.7	16.7	5.0	6.7	6.7
20d	8.3	56.7	13.3	1.7	-	5.0	15.0
20e	13.3	51.7	3.3	-	-	-	31.7

Q= question, n.* = noticeable

Table III shows the answers of lower-level white-collar workers to Questions 20a-e. Table III shows the answers of blue-collar workers to Questions 20a-e.

TABLE IV
LOWER-LEVEL WHITE-COLLAR WORKERS WHO HAD THE CLOSE CALL SITUATION WHILE USING A CELL PHONE (%)

Q	cannot say	not at all	somewhat	fairly n.*	n.*	very n.*	Missing
20a	-	19.6	53.6	12.5	7.1	1.8	5.4
20b	3.6	17.9	44.6	19.6	7.1	1.8	5.4
20c	-	8.9	57.1	17.9	7.1	1.8	7.1
20d	5.4	64.3	10.7	5.4	-	1.8	12.5
20e	14.3	57.1	3.6	-	-	-	25.0

Q= question, n.* = noticeable

TABLE V
BLUE-COLLAR WORKERS WHO HAD A CLOSE CALL SITUATION WHILE USING A CELL PHONE (%)

Q	cannot say	not at all	somewhat	fairly n.*	n.*	very n.*	Missing
20a	1.9	22.6	49.1	9.4	11.3	-	5.7
20b	3.8	17.0	47.2	20.8	5.7	3.8	1.9
20c	-	13.2	47.2	20.8	9.4	1.9	7.5
20d	9.4	54.7	13.2	5.7	3.8	3.8	9.4
20e	22.6	50.9	5.7	3.8	-	-	17.0

Q= question, n.* = noticeable

D. Results of the Independent Samples Mann-Whitney U-Test Analyses

We did Mann-Whitney U-test analyses to the following groups' answers to Questions 21a, b, c, and d: (1) upper-level white-collar (Group 1) and lower-level white-collar workers (Group 2); (2) upper-level white-collar (Group 1) and blue-collar workers (Group 3); (3) lower-level white-collar (Group 2) and blue-collar workers (Group 3). The statistical analyses did not show that there were significant differences.

IV. DISCUSSION

When comparing "yes" answers to the questions "(20) Have you had an accident or accidents at work, in which the mobile phone played a role, during the last 12 months?" and "(21) Have you had a close call situation at work, in which the mobile phone played a role, during the last 12 months?", it can be seen that there are 6.6 times more close call situations than accidents connected to mobile phones. However, from Table I and Table II, it is possible to note that the persons who have had an accident answered "very noticeable" to questions 20a-e more than the persons who have had a close call situation. However, we had only 34 persons who had an accident in which the mobile phone played a partial effect.

Table I shows that about 18–26% of persons who had an accident in which the mobile phone played a role answered "noticeable" or "very noticeable" to Questions 21a–21d. The highest value was 26.4% to Question 21c (distracted observing the environment).

Table II shows that about 12–13% of persons who had a close call situation in which the mobile phone played a role answered "noticeable" or "very noticeable" to Questions 21b (distracted concentration while driving) and 21c (distracted observing the environment). To Question 21a (distracted concentration while moving), the value was lower, at 8.9%. However, about 50% of persons who had a close call situation in which the mobile phone played a role answered "somewhat."

Tables III–V show the results of the white-collar and blue-collar workers. Typically, only some workers answered "very noticeable" to Questions 21a, b, c, and d. However, 10% of upper-level white-collar workers answered "very noticeable" to Question 21b. In Table V, 11.3% of blue-collar workers answered "noticeable" to Question 21a (distracted concentration while moving).

On the Mann-Whitney U-test analyses of close call situations, we compared the following groups: (1) upper-level white-collar (Group 1) and lower-level white-collar workers (Group 2); (2) upper-level white-collar (Group 1) and blue-collar workers (Group 3); (3) lower-level white-collar (Group 2) and blue-collar workers (Group 3). However, we did not find significant differences. Perhaps, our material is too limited to identify individuals who have experienced close call situations.

From Tables II–V, it is possible to ascertain that part of respondents thought that the mobile phone distracted them while moving, driving, or observing their environments. The

question on distractions while driving received more "very noticeable" answers than the question on being distracted while moving. This shows that it is also possible to get into close call situations or accidents when persons use mobile phone and move, not only when they are driving. The mobile phone can affect a person's environmental observations.

V. CONCLUSION

There were almost 7 times more close call situations than accidents connected to mobile phones. About 18–26% of persons who had an accident in which the mobile phone played a role answered "noticeable" or higher to Questions 21a–21d. The highest value was 26.4% to Question 21c (distracted while observing the environment). Utilizing a mobile phone could be a dangerous distraction in different situations—not only while driving a car.

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