

# Analysis of Using Mobile Phones in Process of Crossing the Street

Ziyu ZHAO, Lixia WU, Beibei WANG

School of Traffic and Transportation, Chongqing Jiaotong University, Chongqing, 400074, CHINA

**Abstract:** Using mobile phones influence the traffic safety and traffic environment, we should take effective measures to control it, this study plays a vitally practical role in the traffic safety and traffic condition. The investigation on pedestrians using mobile phones in progress of crossing situation and road, and selecting the proportion, purposes, reason and attitude of using mobile phones in progress of crossing street to analysis, discussing the influence of using mobile phone on crossing the street, it influences the safety of pedestrian, the time of crossing the street and traffic capacity. It is necessary to enhance the safety awareness of pedestrians, improve sanctions and adopt intelligent zebra.

**Keywords:** Pedestrian crossing; Mobile phones; Diagnoses; Hidden danger of traffic; Measures

## 1. Introduction

The development of the social economic promote the frequency of using mobile phones, they still play an important role in our life. Mobile phones' software is updating every moment, they bring convenience to our life, but mobile phones are used in inappropriate occasions bring security issues, especially make or dial phone call and lower the head to use mobile phones can divert attention from crossing the street. This kind of behavior makes pedestrians ignore the traffic environment, not only makes themselves in danger, but also influences other pedestrians and vehicles.

In order to alleviate the negative impact caused by the use of mobile phones, countries are taking positive measures to text and control this behavior all time. In May 2014, NTT DOCOMO, Japan's company, simulating a scene that 1500 people cross the street with using mobile phones, the result showed that many people fell down or collided with others in the process, and through the intersection under the condition of safety is only 547 people, account for 36.47% of the total. The experiment show that the use of mobile phones in the process of crossing the street can influence pedestrians' traffic safety, and extend the time of crossing the street. Hiroshi Saito , Japan's senior lawyers, pointed out that government should lay down the law to prevent the phenomenon that pedestrians cross the street with using the mobile phone. In September the same year, on the northwest of Washington DC, the street number 18 design a channel called "Mobile Phones' Channel", but the function isn't meet people's satisfaction. Because pedestrians focus on mobile phones, they are easy to walk into "No Mobile Phones' Channel", this kind of behavior will affect others. In order to avoid a collision with others in the school, the university of Utah valley set up a channel for the use of

mobile phones, but the real purpose is that attracting the attention of people to reduce the use of mobile phones in the process of walking. In September 2014, Foreigner Street of Chongqing set up the first channel for mobile phones' users in China, the aim is to protect the safety of mobile phones' users. But the road is not flat, if they don't pay attention to walk, they are also likely to be falling. As can be seen, the use of mobile phones in the process of walking has received the attention of scholars, and they explore many methods to solve this problem, but the effect is not satisfaction, it is necessary to do further research.

This paper adopt field survey and questionnaire survey to collect data about the use of mobile phones in the process of crossing the street, analyzing the proportion, purpose, reasons, and attitude of the use of mobile phones in the process of crossing the street. Using mobile phones can increase risk, extend the time of crossing the street, reduce the traffic capacity, make traffic congestion become more serious. In order to avoid pedestrians using a mobile phones in the process of crossing the street, we should enhance the sense of traffic safety, take corresponding measures and combine with modern science and technology to improve the safety of pedestrians crossing the street.

## 2. Investigation and Analysis of Data

This study adopted field survey and questionnaire survey to collect data, the aim is to analysis the use of mobile phone in the process of crossing the street. The content of the investigation include the use of mobile phones' proportion, purposes, reasons and attitude.

### 2.1. Field survey

The survey select five intersections and three roads in Jinan, capital of East China’s Shandong province, survey the number of people who use mobile phones during the

peak hour. Survey’s methods include artificial counting method and video analysis, the statistical data shown in Table 1.

**Table 1. The statistics of date of people using mobile phone in Jinan**

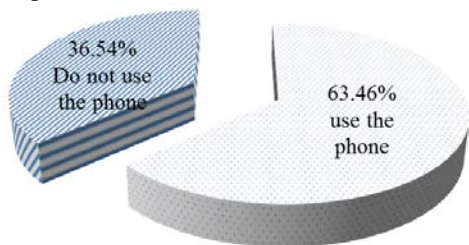
	Place of survey	Date of people using mobile phone	Total number of crossing the street	Proportion for people using mobile phone(%)
intersections	Wei 12 Rd-Jing 10 Rd	431	2556	16.86
	Wei 12 Rd-Jing 2 Rd	295	2196	13.43
	Wei 1 Rd-Jing 4 Rd	342	1884	18.15
	Wei 11 Rd-Jing 1 Rd	191	1723	11.09
	LuoYuan Street- LuoWen Road	246	1265	19.45
roads	Jing 4 Rd(Wanda square’s road)	138	796	17.34
	LuoYuan Street(spring city square’s road)	239	974	24.54
	Baotu spring - south road (Baotu spring’s road)	179	845	21.18

**2.2. Random questionnaire’s survey**

We survey situations of the use of mobile phone by questionnaire, investigations’ way include the random sampling survey and the network questionnaire survey, we collected 432 effective questionnaires.

*1) The proportion of people who use mobile phones in process of crossing the street*

As shown in figure 1, there are 63.46% of people who have the behavior of using mobile phones in process of crossing the street, and there are only 36.54% of people who don’t have the behavior of using mobile phones. The use of mobile phones in the street activities has become a common phenomenon.



**Figure 1. The Proportion of the pie chart of people who use mobile phone in process of crossing the street**

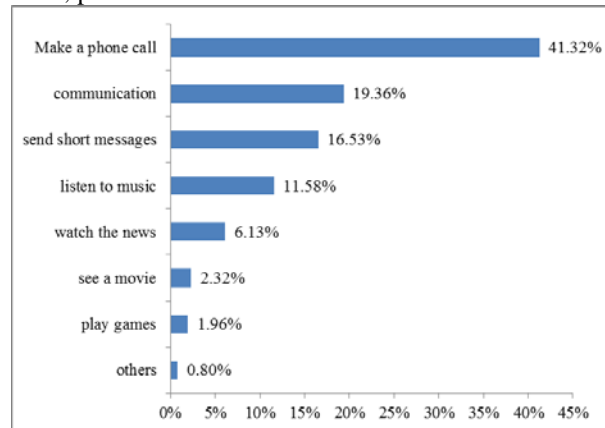
*2) The purpose of using mobile phones in process of crossing the street*

As shown in Figure 2, the main purpose of using mobile phones in process of crossing the street is that making a phone call with others, the proportion is as high as 41.32%, the next is that chat with others by social software and send short messages, and there are some people listen to music by mobile phones, there are little people use mobile phones to watch the news and movies or play games.

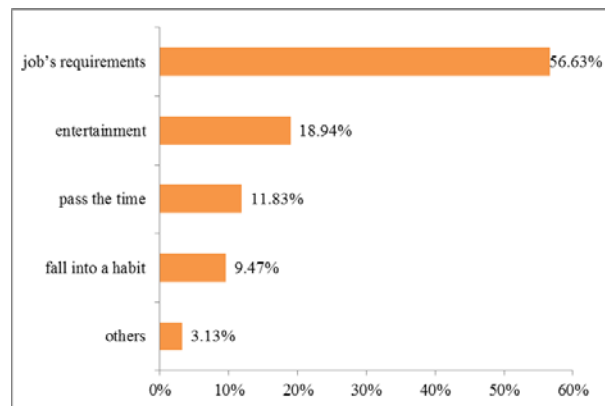
*3) The reason of using mobile phones in process of crossing the street*

As shown in Figure 3, More than half of the pedestrians use mobile phone because of job’s requirements, there

are some people use mobile phone because of entertainment, pass the time or habit.



**Figure 2. The purpose of using mobile phone in process of crossing the street**



**Figure 3. The reason of using mobile phone in process of crossing the street**

*4) The attitude of using mobile phone in process of crossing the street*

In order to fully understand the attitude of people about the use of mobile phones in process of crossing the street, select indicators include refuse to use mobile phone, use

mobile phones under security situation, use mobile phones under necessary situation and use mobile phones at any time. The result of the survey is shown in Figure 4.

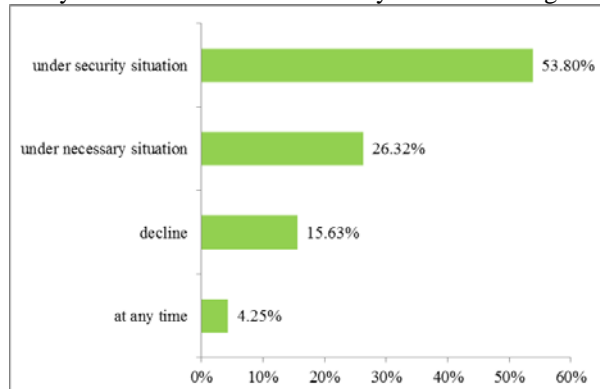


Figure 4. The attitude of using mobile phone in process of crossing the street

### 2.3. Analysis of statistical data

We can get the following conclusions by the above data analysis:

(1) The phenomenon of crossing with using mobile phones are common.

Due to the role of the mobile phone in people's life became more and more important, people has higher degree of dependence on mobile phones, the phenomenon of pedestrians crossing with the use of mobile phones are common. We can come to a conclusion that the proportion of people using mobile phones achieve 24.54%, the result from the analysis of the questionnaire is that there are 63.46% of people in the street activity use mobile phones, this kind of phenomenon is very common in our life, people are not fully realized the dangers of pedestrians crossing with using mobile phones.

(2) The main purpose of using mobile phone is communication.

The results of the survey show that communicate with others accounted for 77.21%. According to the results of the survey, we can take measures to reduce the frequency of using mobile phones for this people in process of crossing the street.

(3) Job's requirements are main reason for people using mobile phones.

Mobile phones for work to provide demand is inevitable, but the pedestrians can cross the street after work activities by the mobile phones, it can avoid the use of mobile phones in the process of crossing the street. However, most of pedestrians in order to save time, they make a phone call while crossing the street, this kind of behavior increases the risk of crossing the street. And many people use mobile phones to do other activities.

4) Safety awareness of pedestrians is low.

Known from the analysis of investigation results, most people think that under the condition of ensure the safety

of the street you can use the mobile phones, and some people think that mobile phones can be used in process of crossing the street under the necessary situation, however, people who refuse to use mobile phones only account for 15.63%. This result shows that people don't object to use mobile phones in process of crossing the street, safety awareness of pedestrians is low, we should take some measures to prevent this kind of behavior.

### 3. The Influence of Using Mobile Phones in Process of Crossing the Street

the phenomenon of the use of mobile phones in process of crossing the street has been very common, which caused by traffic accidents is rising year by year. Countries has not made specific provision to prevent the use of mobile phones, But to be sure, the use of mobile phones in process of crossing the street will inevitably produce some negative effects.

#### 3.1. The risk crossing is increased

Crossing the street is a very dangerous activity, pedestrians need to be vigilant, they should pay attention to cars from both sides. If pedestrians make a phone call or listen to music by mobile phones, the attention would be scattered, it would be difficult to determine the characteristics of the car's speed, turning and other aspects, this behavior make pedestrians in danger [1]. In addition, pedestrians use mobile phones to send short messages, chat with others, watch news or movies would make pedestrians' visual sensitivity tends to zero, pedestrians are easy to ignore the traffic environment, the perception of the outside world become lower than before, sometimes pedestrians can't respond to danger [2].

#### 3.2. Extend the time of crossing the street

The use of mobile phones in process of crossing the street divert pedestrians' attention, affect the agility of the action, the speed of crossing the street become lower than before [3]. Especially when pedestrians receive some messages that make them excite or profound sadness, it was likely to make them stop in the middle of the street, this behavior extend the time of crossing street, increase dangerousness and influence street traffic. The result of survey show that the use of mobile phones in process of crossing street reduce the speed of crossing street, people cross 3.4 lanes will be accordingly increased by 1.87 seconds with sending messages. In the intersection and road where there are a lot of pedestrians during peak period of time, the use of mobile phones influence their own speed and other pedestrians followed by them, make traffic jam become more serious [4].

#### 3.3. Reduce the traffic capacity

Pedestrians who use mobile phones in process of crossing the street are easy to ignore vehicles around, have

wrong behavior, lead to the occurrence of traffic accidents [5]. In addition, in order to avoid knocking with pedestrians, drivers would slow down or stop the cars, the speed of the car would lower than the general situation, and the interference of pedestrians on the street reduce the traffic capacity.

#### 4. The Analysis of Control Measures

Pedestrians use mobile phones while crossing the street not only increase their own risk, but also influence the motion of the vehicle, reduce the traffic capacity, and increase traffic jam. So it's necessary to take measures to solve this kind of problem.

##### 4.1. Improve pedestrians' traffic safety awareness

The activity of using mobile phones in the street neglect traffic safety, so we should take relevant measures to improve the safety awareness of pedestrians, every pedestrian should responsible for themselves safety.

It's a good idea is that promoting traffic safety knowledge of pedestrians by the media. Traffic safety education can be carried out in the form of television, newspaper, broadcast and so on, it can also set up LED screens around the zebra, they brought to the harm masses of using mobile phones in the street through video, pictures, combined with the actual case to give people a warning, improve the awareness of people traffic safety effectively [6].

In addition, it can set the striking traffic signs with some slogans on both sides of street, the aim is to remind pedestrians not use mobile phone in the process of crossing the street and enhance the awareness of traffic safety [7]. Traffic signs should simple and clear, drivers can understand it in an instant.

##### 4.2. Increase sanctions

China doesn't make clear provisions on the use of mobile phones in the street, and don't introduce the corresponding punishment measures. In order to reduce frequency of the use of mobile phone in the street, it is essential to take the corresponding punishment measures. "The People's Republic of China on road traffic safety rules for its implementation" issued in 2004 show that drivers must not have call the phone in the process of driving a motor vehicle. The phenomenon of using mobile phones in process of driving is less than before because of this regulations, the result suggest that sanctions Play an important role in refusing to use mobile phones in process of driving. Sanctions should be made to reduce the negative impact of using mobile phones in process of crossing the street.

The punishment for using mobile phones in process of crossing street is taken many forms. For example, in order to attract people's attention, the person who violates rules should be taken a certain economic punishment.

Fines for its can be used to establish a special fund, it's used for traffic safety of prevention and management of the traffic jam, the measure will play an important role in warning people, and raise more money to solve the traffic problems. the person who violates regulations also should be forced to learn the knowledge of traffic safety, and arrange he assist the traffic police to manage the problem of pedestrians crossing the street within the prescribed time [8]. In addition, reporting persons who use mobile phone in process of crossing street.

##### 4.3. The setup of intelligent zebra

With the development of modern science and technology, intelligent transportation applications are used more and more widely in life, therefore, intelligent zebra line system can be set up, the aim is to shield the mobile phones, it can be forced pedestrians to abandon the use of mobile phone in process of crossing street.

Intelligent zebra crossing system connected to pedestrian signal lights, the zebra crossing system is launched when signal lamp show a green light, mobile phones' signal is shielded. The measure force pedestrians pay attention to cross the street without using mobile phones.

#### 5. Conclusions

This paper made investigation and analysis about the situation of using mobile phones in process of crossing the street, the results show that using mobile phones in process of crossing the street is a Common phenomenon, the main reason is that Communicating with others by mobile phones, But for the traffic safety consciousness is generally low. The use of mobile phones in process of crossing the street divert pedestrians' attention, increase risk of crossing the street, reduce their walking speed, extend the time of crossing the street, reduce street traffic capacity, make the traffic congestion is more serious. In order to prevent the use of mobile phones in the process of pedestrians in the street, increasing the safety awareness of pedestrians, formulating measures combining with modern science and technology are effective measures.

#### References

- [1] THOMPSON L L, RIVARA F P, AYYAGARI R C, et al. Impact of Social and Technological Distraction on Pedestrian Crossing Behavior: An Observational Study [J]. *Injury Prevention*, 2013, 19(4): 232-237.
- [2] MONH AMMED, S TARAWNEH. Evaluation of Pedestrian Speed in Jordan with Investigation of Some Contributing Factors [J]. *Journal of Safety Research*, 2001, 32: 229- 236.
- [3] TISON J, CHAUDHARY N, COSGROVE L. National Phone Survey on Distracted Driving Attitudes and Behaviors[R]. USA. NHTSA. 2011.
- [4] YUAN Hong-wei. Study on the Unsafe Behaviors of Pedestrians Based on Traffic Psychology [J]. *China Safety Science Journal*. 2008, 1: 20-26.

- 
- [5] LIU Guang-xin, LI Ke-ping, NI Ying. An Overview on Pedestrian Psychology and Behavior when Crossing Intersections [J]. *Technology & Economy in Areas of Communications*. 2008, 5: 58-61.
- [6] PAN Han-zhong, CHEN Peng, MA Jing-jie. Pedestrians' Group Psychology about Violating Traffic Laws to Cross Road at Signalized Crossing[J]. 2010, (12): 151-156.
- [7] Zhao Xuan, Zhao Hui. Survey of Urban Pedestrian Crossing Behavior Characteristics[J]. *Urban Roads Bridges & Flood Control*. 2013, (12): 151-153.
- [8] Zhang Qian. Study of Pedestrian Violation Behavior on Urban Road [D]. Chengdu: Southwest Jiaotong university. 2014



**Subscriptions and Individual Articles:**

<b>User</b>	<b>Hard copy:</b>
Institutional:	800 (HKD/year)
Individual:	500 (HKD/year)
Individual Article:	20 (HKD)