HOSTED BY

ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jtte

Original Research Paper

Distracted walking: Examining the extent to pedestrian safety problems

Judith Mwakalonge [a,*], *Saidi Siuhi* [b], *Jamario White* [a]

[a] *Department of Civil and Mechanical Engineering Technology and Nuclear Engineering, South Carolina State University, Orangeburg, SC 29117, USA*

[b] *Department of Civil Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*

ARTICLE INFO

Article history:
Available online 7 August 2015

Keywords:
Distracted walking
Pedestrian distractions
Public awareness campaigns
Walking safety rules/tips
Pedestrian fatalities
Traffic fatalities

ABSTRACT

Pedestrians, much like drivers, have always been engaged in multi-tasking like using hand-held devices, listening to music, snacking, or reading while walking. The effects are similar to those experienced by distracted drivers. However, distracted walking has not received similar policies and effective interventions as distracted driving to improve pedestrian safety. This study reviewed the state-of-practice on policies, campaigns, available data, identified research needs, and opportunities pertaining to distracted walking. A comprehensive review of literature revealed that some of the agencies/organizations disseminate useful information about certain distracting activities that pedestrians should avoid while walking to improve their safety. Various walking safety rules/tips have been given, such as not wearing headphones or talking on a cell phone while crossing a street, keeping the volume down, hanging up the phone while walking, being aware of traffic, and avoiding distractions like walking with texting. The majority of the past observational-based and experimental-based studies reviewed in this study on distracted walking is in agreement that there is a positive correlation between distraction and unsafe walking behavior. However, limitations of the existing crash data suggest that distracted walking may not be a severe threat to the public health. Current pedestrian crash data provide insufficient information for researchers to examine the extent to which distracted walking causes and/or contributes to actual pedestrian safety problems.

1. Introduction

Walking is one of the active transport modes with many public health benefits and precedes all other transportation modes. It helps with reducing greenhouse gas emissions, which is responsible for global warming, climate change, and poor air quality. Walking can also help relieve traffic related congestion problems. Like other modes of transportation, interactions between pedestrians and vehicles on the same

* *Corresponding author*. Tel.: +1 803 536 8321.
E-mail addresses: jmwakalo@scsu.edu (J. Mwakalonge), Saidi.siuhi@adu.ac.ae (S. Siuhi), Jwhite78@scsu.edu (J. White).

Peer review under responsibility of Periodical Offices of Chang'an University.
http://dx.doi.org/10.1016/j.jtte.2015.08.004

roadway create safety concerns. Pedestrian fatalities accounted for 11% of the U.S. total traffic fatalities in 2003 and 14% in 2012 (NHTSA, 2014a). Fig. 1 shows the trend of total fatalities and pedestrian fatalities resulting from traffic crashes from 2003 to 2012 extracted from traffic safety facts 2012 data (NHTSA, 2014a). The figure shows that on average, pedestrian fatalities steadily decreased from 2004 to 2009 and gradually increased from 2009 to 2012. In 2012, almost 73% of pedestrian fatalities occurred in an urban setting versus a rural setting (NHTSA, 2014a).

According to 2009 National Household Travel Survey (NHTS), walking trips accounted for 10.9% of all trips reported in the survey (FHWA, 2010). Factors contributing to pedestrians' fatalities include environment, infrastructure, and human factors (Sarkar et al., 2011). Factors cited in the literature that significantly contribute to fatal and non-fatal pedestrian crashes include improper crossing of a roadway, inattentiveness, and failure to obey traffic signs. These unsafe behaviors have been shown to account for 28%, 15%, and 3% of pedestrian deaths (Bungum et al., 2005). In addition, factors of pedestrians crash types also included pedestrians walking along the roadway, failing to yield, crossing the roadway, crossing highway and darting/dashing midblock (HSIS, 2011).

Pedestrians, much like drivers, have always engaged in multi-tasking like using hand-held devices, listening to music, snacking, or reading that draw their attention while walking. The effects of distracted walking are similar to those experienced in distracted driving (Sarkar et al., 2011; Nasar et al., 2008; Hyman Jr. et al., 2010). Market penetration of electronic devices among walkers and drivers is on the rise and so are safety issues related to distracted walking. For example, The Wireless Association reported that in December 2012, about 171.3 billion text messages were sent in the U.S. (includes Puerto Rico, Guam, and the U.S. Virgin Islands) every month (CTIA, 2013). Similarly, they reported that wireless penetration—e.g. the number of active units divided by the total U.S. and territorial population (Puerto Rico, Guam, and the U.S. Virgin Islands) was 102.2%. In addition, the focus on livable communities or health and fitness programs may increase walking and pedestrian-vehicle conflicts and if pedestrians or motorists are distracted, the potential for crashes increases (Hedlund, 2010). However, distracted walking has not received similar interventions and policies to curb its impacts on pedestrian safety.

Although distracted walking problems are imminent threats to safety, few or even no data are collected for research and quantification of distracted walking. A report prepared for Governors Highway Safety Association reported that several states noted crash reports or anecdotal evidence of pedestrian crashes in which distraction was a factor (Hedlund, 2010). In recent years, researchers have investigated the impact of distracted walking on pedestrian safety. Additionally, in the wake of distracted walking problems, agencies within the nation and abroad have taken measures to improve the safety of distracted walkers. However, no compilation of such efforts exists which would enable practitioners to share experiences. Furthermore, this study was unable to find sufficient and accurate data currently available for evaluating distracted walking problems. While distracted pedestrian literature is growing, this study aimed to review the state-of-practice on policies, programs, data sources for current studies, and identified data collection opportunities and research needs pertaining to distracted walking.

2. Research studies on pedestrian distractions

This study conducted comprehensive searches of the literature on distracted walking. The main focus of the review was to determine the contributing factors to distracted walking. The findings of these studies are crucial in revealing the safety hazards associated with distracted walking and effective countermeasures for improving safety. The studies are classified as observational-based, survey-based, crash-based and experimental-based with the majority of the studies being experimental. A concise explanation on methods and major findings from each study is provided on the following sub-sections.

2.1. *Experimental-based studies*

Hyman et al. (2010) observed and compared the walking behavior of people conversing on a cell phone with individuals walking alone with no electronics, individuals walking and listening to a music player, and individuals walking in pairs. The study found that individuals walking while talking on a cell phone displayed inattentional

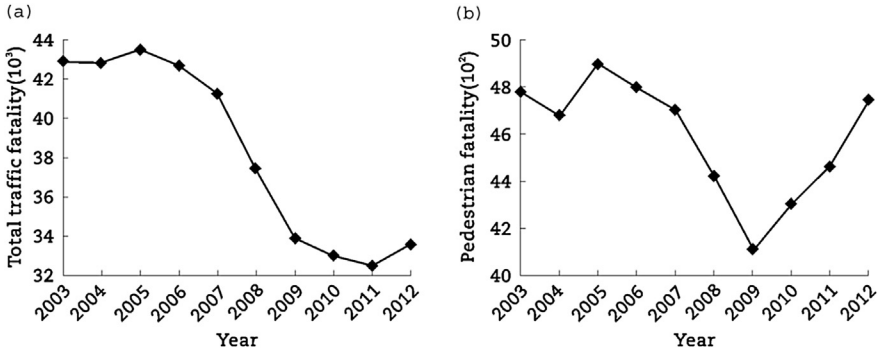

Fig. 1 – Total traffic fatalities and pedestrian fatalities in traffic crashes from 2003 to 2012. (a) Total traffic fatality. (b) Pedestrian fatality.