

CROSSWALK SAFETY

by

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ABSTRACT

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There is always some degree of risk involved whenever a pedestrian crosses a street. One would think that risk should be somewhat decreased when a pedestrian crosses a street in a marked crosswalk. However, that is not always the case. Motorists don't always acknowledge crosswalks and some fail to yield to pedestrians who are in crosswalks. This in turn has lead to some tragic outcomes.

When pedestrians fear being able to safely cross a street that becomes a general access issue. By being denied

access to crossing a street, people, especially those individuals with disabilities, are being denied access to employment and leisure activities.

There are some steps that could be taken help ensure safety when crossing a street. For instance, advanced stop lines could be placed on the road so that motorists would stop further away from the crosswalk. Also some type of a sign could be placed, on the side of the road or above the road, to warn motorists of a crosswalk. A flashing yellow light could be used, as well, to warn motorists of a crosswalk.

The crosswalk located at the corner of 10th Street and Broadway Street in Menomonie, Wisconsin is a very dangerous place to cross. It has been the experience of the researcher that at times it is impossible to access this crosswalk. By completing this experimental study, the researcher wanted to draw attention to and make that crosswalk a safer place for everyone.

This research paper is dedicated to my devoted, patient,
and loving husband, Bill James. We did it Hon! Without your
continuous love and support, I would never have survived!

I love you!

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CHAPTER ONE

Introduction

This experimental study investigated crosswalk safety. Who were motorists more likely to yield for in terms of pedestrians with and without disabilities?

Motorists were asked a series of questions regarding crosswalk safety. They were asked questions about different scenarios involving pedestrians with and without disabilities. The pedestrians were divided into four age categories: adolescent, young adult, middle-aged adult, and elderly. The disabilities included were a manual wheelchair user, an individual using a cane, and a blind pedestrian using a walking stick. There were also a few questions regarding Wisconsin state laws and crosswalk safety.

There is always some degree of risk involved whenever a pedestrian crosses a street. That risk should be somewhat decreased when a pedestrian crosses a street in a crosswalk. However, that is not always the case. Motorists don't always acknowledge crosswalks and some fail to yield to pedestrians who are in crosswalks. This in turn has led to some tragic outcomes.

Houten (1988) conducted an experiment, which looked at "The Effects of Advance Stop Lines and Sign Prompts on Pedestrian Safety In a Crosswalk on a Multilane Highway." Houten (1988) stated, "each year in the United States, approximately 400,000

pedestrians are struck by vehicles resulting in about 10,000 deaths and many serious injuries" (p. 245). One focus that Houten had was to take a look at the effect of painting advanced stop lines on crosswalks. He hoped that his inexpensive idea would "reduce conflicts between motorists and pedestrians" (Houten, 1988, p. 250-251). Houten (1988) argued that "because crosswalks must be repainted annually, the cost of painting the advance stop lines on all crosswalks . . . should be minimal" (p. 251). The results of this experiment showed a small increase in the number of motorists who actually yielded to pedestrians, and those motorists who did yield, did so at a safer distance from the pedestrians (Houten, 1988).

Houten's (1988) second focus was to use a sign labeled "STOP HERE FOR PEDESTRIANS." This sign was placed above the stop line of a crosswalk. Houten (1988) did see a small increase in the number of motorists yielding to pedestrians.

Motorists aren't the only ones to blame for injuries in a crosswalk. Pedestrians have some responsibilities as well. Pedestrians are responsible for making sure that it is safe to cross the street prior to actually crossing it. Pedestrians should always stand off of the road and look both ways before crossing a street. They should use marked crosswalks and quickly cross the street.

Harrell (1990) conducted a study that looked at the "Factors Influencing Pedestrian Cautiousness in Crossing Streets." Harrell (1990) looked at the "effects of traffic volume and road conditions on a composite measure of pedestrian

safety: whether a pedestrian checked for oncoming traffic and the distance he or she stood away from the curb" (p. 368). Harrell (1990) found that older adults and women were more cautious when crossing a street. One surprise finding of this study was that "cautiousness was greater for low than high traffic volumes" (Harrell, 1990, p. 371). Harrell (1990) explained that this finding may have been due to vehicles traveling at a faster speed when traffic volumes were low. This study also found that "the presence of large numbers of pedestrians on the opposite side of the street served to reduce cautiousness" (Harrell, 1990, p.371). Harrell (1990) gave a couple of explanations for this finding. The first explanation was "when fewer pedestrians were available to act as lookouts, the subjects assumed the responsibility for themselves" (p. 371).

Another explanation may be a "safety in numbers" effect that may occur when many other pedestrians are also crossing; one might assume that oncoming traffic is better able to see pedestrians and come to a stop when there are many of them huddled at the crosswalks. Consequently, there may be greater trust placed in drivers of motor vehicles to stop under these conditions, eliminating the need for caution by the pedestrian. (Harrell, 1990, p. 371)

As one can see, there are many risk factors that an individual takes when crossing a street. However, there are some precautions that pedestrians can take to make crossing streets a safer place. There also needs to be more awareness of

the laws in each state when it comes to motorists yielding to pedestrians in crosswalks.

An engineering study is usually required prior to creating a crosswalk especially if the designated area is away from traffic signals or STOP signs (Manual on Uniform Traffic Control Devices for Streets and Highways). Crosswalk markings are used as guide tools and warning indicators. They are used to guide pedestrians in the proper paths and to warn motorists of a pedestrian crossing area. "Crosswalks should be marked at all intersections where there is substantial conflict between vehicle and pedestrian movements" (Manual of Uniform..., 3B-23).

Crosswalk lines shall be solid white lines, marking both edges of the crosswalk. They shall be not less than six inches in width and should not be spaced less than six feet apart. Under special circumstances where a stop line is not provided or where vehicular speeds exceed 35 Miles Per Hour or where crosswalks are unexpected, it may be desirable to increase the width of the crosswalk line up to 24" in width.

Crosswalk lines on both sides of the crosswalk should extend across the full width of pavement to discourage diagonal walking between crosswalks. (Manual on Uniform..., 3B-23)

Crosswalks between intersections present serious safety concerns and in busy traffic areas make it almost impossible to cross between the busy flow of traffic. In cases such as these, where there is a crosswalk located between intersections,

warning signs should be placed. This way motorists would be warned and made more alert to help avoid potential hazards.

In Wisconsin, children under nine years old and the elderly over sixty-five years old are most involved and most seriously injured in automobile accidents involving pedestrians (Pruitt-Thunder). Most pedestrian fatalities in Wisconsin occur in the sixty-five and older age group (Pruitt-Thunder). One reason given for this is due to the elderly being more frail. They tend to succumb to their injuries within a short time while a younger person may last considerably longer and many make a partial recovery. There are about sixty fatalities per year in Wisconsin (Pruitt-Thunder). Males tend to be more involved than females (Pruitt-Thunder). "In 2000 there were fifty-one pedestrian fatalities in Wisconsin" (National Highway Traffic Safety Administration, p.1).

In the United States on average, a pedestrian is killed in a traffic crash every 111 minutes (NHTSA). In [the year] 2000 4,739 pedestrians were killed in traffic crashes. That is a decrease of twenty-seven percent from the 6,482 pedestrians killed in 1990. There were 78,000 pedestrians injured in traffic crashes in 2000. On average a pedestrian is injured in a traffic crash every seven minutes. Most pedestrian fatalities in 2000 occurred in urban areas (seventy-one percent), and nonintersection locations (seventy-eight percent), in normal weather conditions

(ninety-one percent), and at night (sixty-four percent).

More than two-thirds of the pedestrian fatalities in 2000 were males. They more than doubled the rate of females. In 2000, almost one-fourth of all children between the ages of five and nine years who were killed in traffic crashes were pedestrians. Older pedestrians, ages seventy and up accounted for seventeen percent of all pedestrian fatalities and six percent of all pedestrian injured. The death rate for this group, both males and females, were higher than for any other age group. (NHTSA, p.1-2)

There are several State Statutes that pertain to pedestrians. These can be found in the 1999-2000 Wisconsin State Statutes and Annotations book (45th edition) and between sections 346.23 through 346.40. This experimental research incorporated three of the Wisconsin State Statutes: 346.24 Crossing at uncontrolled intersection or crosswalk, 346.25 Crossing at place other than crosswalk, and 346.26 Blind pedestrian on highway (section one only). See appendix A for the definitions of these three statutes as they appear in the 1999-2000 Wisconsin State Statutes and Annotations book (45th edition).

Problem Statement

The purpose of this experimental study was to determine if motorists yielded for pedestrians in crosswalks. The pedestrians in this investigation were people with and without physical disabilities. They were divided into four age

categories. Faculty, Staff, and Students at the University of Wisconsin-Stout were randomly given a survey to fill out. By completing this research, the researcher wanted to draw attention to and make the crosswalk at 10th street and Broadway Street in Menomonie, Wisconsin a safer place. This study took place during the fall semester of 2001.

Purpose

The reporter of this study had used the Broadway Street crosswalk numerous times while living in Menomonie and had some very close encounters with motorists. She also witnessed several other people almost get hit or run over while trying to cross Broadway Street. She felt that the crosswalk situation went beyond that of simply the Broadway Street crosswalk, it was also a general access issue. By being denied access to crossing a street, people, especially those individuals with disabilities, were being denied access to employment and leisure activities. By doing this study and sharing her results with others, she hoped to make crossing Broadway Street a safer place for everyone.

Research Questions

There were several questions that the researcher was looking to answer and they were as follows.

1. Who were motorists most likely to yield for when pedestrians were in the crosswalk:

An adolescent?

A young adult?

A middle-aged adult?

An elderly person?

An individual in a manual wheel chair?

An individual who was using a cane?

An individual who was blind?

2. How was it determined where crosswalks are placed?

3. What were the laws regarding crosswalks in Wisconsin?

4. What was the average, yearly percentage of pedestrians involved in automobile accidents (both nationally and locally)?

Who were most commonly involved?

How many were fatal?

Definition of Terms

Blind walking stick means the same thing as a white cane.

Assumptions of the Research

There were several assumptions which were apparent in this research. These were:

1. There would be a small percentage of motorists who yielded to pedestrians already in the crosswalk.

2. The majority of the motorists wouldn't stop for pedestrians regardless of age or disability.

3. Upon the conclusion and results of this study, there may have needed to be some action taken to make crossing Broadway Street a safer place.

Limitations of the Research

The researcher identified a few limitations. These were:

1. Not all possible disabilities were included in the study.

2. Not everyone in the town of Menomonie was able to complete the survey.
3. Not everyone may have answered the questions honestly.

CHAPTER TWO

Literature Review

The following chapter is a review of the literature gathered regarding issues related to crosswalk safety. This chapter will be a break down of articles gathered by age and disability. It will also contain a couple of other similar studies done on different university campus's in the United States.

Children

A study done by Agran, Winn, and Anderson (1994) compared pedestrian injuries among children ages 0 to 14. They looked at the location where the injury occurred, activity of the child, the outcome of the injury, and the characteristics of the vehicle and roadways. The results of the study were that "11 percent of the children were injured in driveways, 8 percent were injured in parking lots, 53 percent were injured at midblock, and 28 percent were injured at intersections" (Agran, Winn, & Anderson, 1994, p. 284). "The median age was 2 years for driveways, 4 years for parking lots, 6 years for midblocks, and 10 years for intersections" (Agran, Winn, & Anderson, 1994, p. 284).

The authors made the point that in order for interventions to minimize child pedestrian injuries, they must take into consideration driver awareness, as well as normal child behavior (Agran, Winn, & Anderson, 1994). The injuries that occurred in

driveways tended to involve smaller children and larger vehicles backing up (Agran, Winn, & Anderson, 1994). The midblock accidents mainly involved very young children. Often times, these children were considered too young to safely cross the street on their own (Agran, Winn, & Anderson, 1994). Agran, Winn, and Anderson (1994) also suggested that "blocking off certain streets from traffic in residential communities during hours of peak activity may be helpful in decreasing the number of child pedestrian accidents" (p. 288).

Elderly

In an article written by W.A. Harrell, he discussed how elderly pedestrians were vulnerable when it came to crossing the street. Harrell (1991) stated "while as an age group they have one of the lowest injury rates, once they do become involved in a pedestrian accident, they have the highest death rate" (p. 65). One of the studies in this article found that pedestrians were safest when crossing at signal controlled crosswalks and this was also the preferred crossing site for the elderly. This was also where "most accidents involving the elderly occurred" (Harrell, 1991, p. 66).

The main focus of this article was to determine if the elderly were aware of traffic risks (Harrell, 1991). More accurately, "are the elderly less likely than younger pedestrians at signaled crosswalks to check for oncoming traffic before crossing? Do they take for granted that motorists will honor the signal, that they will stop and allow them to proceed across safely?" (Harrell, 1991, p. 66).

This study found that the elderly were more likely than younger pedestrians to check for oncoming traffic before crossing a street. "Regardless of the traffic environment, pedestrians fifty-one years and older were more likely than pedestrians less than thirty-one years old to check" (Harrell, 1991, p. 78).

Visually Impaired and Deaf/Blind

An article written by Gallagher and de Oca (1998) looked at a method to identify crosswalks at signaled intersections which might have benefited from adaptive devices and those that wouldn't have benefited from the modifications. The advantages and disadvantages of two types of adaptive devices were discussed. The two devices discussed were the audible pedestrian signal and the tactile pedestrian adapter.

The audible pedestrian signal worked in combination with the WALK signal of existing pedestrian signals (Gallagher & de Oca, 1998). "...A cuckoo sound is used for north-south crossings, and a peep-peep sound is used for east-west crossings, with the sound emitted only when the WALK signal is on" (Gallagher & de Oca, 1998, p. 638).

The tactile pedestrian adapter consists of a vibrating, raised directional arrow located in the panel directly above the pedestrian push button. The pedestrian needs to press the push button to activate the signal and then place his or her hand on a raised arrow. The arrow vibrates when the WALK signal comes on. (Gallagher & de Oca, 1998, p. 639)

As one might suspect, there were several advantages and disadvantages for using both of these adaptive devices. The authors made the point that there were a wide variety of adaptive devices that were available to pedestrians who are visually impaired (Gallagher & de Oca, 1998).

Another study in a similar area focused on a mobility and orientation approach for an individual who was both deaf and blind. This article, written by Gervasoni (1996), focused on three main strategies for obtaining assistance for safely crossing a street. The three strategies were as follows: "1. locating key travel areas, 2. developing communication strategies and systems, and 3. identifying community resources for assistance" (Gervasoni, 1996, p. 53). The author added that the strategies and techniques discussed in this article could also be applied to individuals who had other multiple disabilities.

The orientation and mobility approach in this article was to use a guide dog while at the same time using a long cane to cross streets. The individual who this study was based on also had a plan developed so she was able to safely use public transportation. Cards were used to help this individual communicate with the bus driver and other people in the community.

There were four significant components to this community-based instructional program and they were:

1. finding areas to which the individuals can safely and easily travel, areas with business that are relevant

to their needs; 2. finding businesses that will provide appropriate assistance; 3. developing and implementing communication strategies and systems; and 4. contacting and educating community resources. (Gervasoni, 1996, p. 58)

Cognitive Disabilities

An article written by Page, Iwata, and Neef looked at teaching individuals with mental retardation how to safely cross the street. The authors pointed out that these skills were important for a number of reasons, but the two biggest reasons were: 1. "Crossing the street may be a 'prerequisite' for employment in the community", and 2. "Learning safety skills would greatly reduce potentially hazardous situations that exist in the community and have been a major obstacle to successful placement" (Page, Iwata, & Neef, 1976, p. 433).

The purpose of this study was to develop classroom curriculum to teach appropriate and safe pedestrian skills to individuals with mental retardation (Page, Iwata, & Neef, 1976). The researchers focused on the classroom because they felt that training there would present fewer problems than training at city intersections (Page, Iwata, & Neef, 1976).

The results of this study found that "pedestrian skills can be taught to [individuals with mental retardation] in a classroom setting, and ... these skills may be generalized to the natural environment with little or no additional training" (Page, Iwata, & Neef, 1976, p. 442). The reason behind doing this study was to increase individual independence (Page, Iwata,

& Neef, 1976). Individuals who are independent have a wider range of opportunities available to them.

In a similar article written by Pattavina, Bergstrom, Marchand-Martella, and Martella, the authors looked at teaching street-crossing skills to a student with traumatic brain injury (TBI). The purpose of this study was to assist this individual in successful community integration by teaching him how to function as independently as possible (Pattavina, Bergstrom, Marchand-Martella, & Martella, 1992). "The program involved the use of photographs and community-based instruction. The investigation also assessed the student's generalization and long-term maintenance of the skills" (Pattavina, Bergstrom, Marchand-Martella, & Martella, 1992, p. 33).

The individual in the article proved that he had learned the necessary skills to cross streets both with and without crosswalks (Pattavina et al., 1992). It took him approximately six weeks to master the skills (Pattavina, Bergstrom, Marchand-Martella, & Martella, 1992). "At his 2, 4, and 16 week postcheck assessments, [the student] demonstrated that he had maintained his acquired skills and generalized them to new streets in the community" (Pattavina, Bergstrom, Marchand-Martella, & Martella, 1992, p. 34).

In conclusion to this article, the authors gave a few reasons why this program offered a promising method of teaching street-crossing skills to individuals with "severe disabilities." They stated that

first, the program includes the use of street-crossing simulations in the classroom, which provides a safe alternative to beginning instruction directly in the community. Second, it builds upon the skills acquired in simulations by incorporating several phases of community-based instruction. Third, it promotes the generalization of skills to various streets in the community. Finally, the program promotes skill maintenance, which otherwise is often lost after a student acquires a particular skill and instruction ends. (Pattavina, Bergstrom, Marchand-Martella, & Martella, 1992, p. 35)

Other University Studies

The following study was conducted at a large university in southwest Virginia (Boyce & Geller, 2000). The researchers were looking to improve pedestrian safety. They took a community-wide approach to improve the safety of pedestrians. The researchers allowed faculty, staff, students, and members of the community to enter raffle drawings (Boyce & Geller, 2000). However, the only way they could enter the raffle drawing was to have signed a pedestrian safety promise card (Boyce & Geller, 2000). "The promises committed participants to use crosswalks when walking across campus roads and, when driving, to yield to pedestrian crosswalks" (Boyce & Geller, 2000, p. 504).

The results of this study were positive. There appeared to be more drivers yielding to the pedestrians in the crosswalks (Boyce & Geller, 2000). The researchers pointed out "a special advantage of community behavioral interventions is that these

technologies can be used effectively by members of the community with minimal effort and training" (Boyce & Geller, 2000, p. 518).

A similar study was conducted at the University of California-Los Angeles. This study, conducted by DeVeause, Kim, Peek-Asa, McArthur, & Kraus (1999) looked at five things:

1. the frequency of full stops at crosswalks with stop signs
2. compliance variations by site, time of day, and number of pedestrians in the crosswalks
3. the characteristics of the vehicles that stop and those that do not
4. the proportion of vehicles that, once stopped, wait until the crosswalk is clear before proceeding
5. the frequency of compliance with full stops of those vehicles that are making turns. (p. 270)

There were three different crosswalks which recorded data. The results of the study varied at each of the three crosswalks. "The overall compliance rate for stop signs was 22.8 per 100 vehicles" (DeVeause, Kim, Peek-Asa, McArthur, & Kraus, 1999, p. 269). "Compliance increased to 53 per 100 vehicles when pedestrians were present in the crosswalk" (DeVeause, Kim, Peek-Asa, McArthur, & Kraus, 1999, p. 269). The lowest compliance rate was observed for bicycles and motorcycles" (DeVeause, Kim, Peek-Asa, McArthur, & Kraus, 1999, p. 269).

CHAPTER THREE

Methodology

The following chapter will describe the subjects of this study as well as the selection of the sample. It will also cover both the data collection and data analysis procedures. Finally this chapter will look at limitations of the method and procedures used.

Description and Selection of Subjects

There were several subjects of this study. The subjects were divided into two categories: motorists and pedestrians. Motorists were the ones given the survey. The pedestrian category was made up of both individuals with and without disabilities, in different age groups.

The first age group was adolescents. The next age group was young adults. The following age group was middle-age adults. The final age group was elderly. The disabilities included in this study were a person who was blind, an individual using a cane, and an individual using a manual wheelchair.

Four age groups were identified to determine if there was discrimination, by age, for motorists yielding to pedestrians. The disabilities that were chosen for this study were done so because they were the three most common disabilities the researcher saw using the crosswalk at the corner of 10th Street and Broadway Street in Menomonie, Wisconsin.

Data Collection Procedures

Data was collected by handing out surveys to faculty, staff, and students on the University of Wisconsin-Stout campus.

Data Analysis Procedures

All appropriate descriptive statistics were used to analyze the data. Frequency and mean were calculated.

Limitations of Method or Procedures

The researcher identified a few limitations. These were:

1. Not all possible disabilities were included in the study.
2. Not everyone in the town of Menomonie was able to complete the survey.
3. Not everyone may have answered the questions honestly.

CHAPTER FOUR

Results

This chapter will present the results of the crosswalk safety survey. The demographic information and descriptive statistics will be reported first. Data collected on each of the research questions will then be given.

Demographic Information

One hundred surveys were given out and forty-five were returned. Of the forty-five people responding to the survey, twenty-one of them, or 84.44% identified themselves as being White, Caucasian, American or a combination of the three. Two people, 4.44% identified themselves as being Bi-racial. Two point twenty-two percent of the people responding to the survey, or one person in each group, identified themselves as being White/Hispanic, Caucasian/Pacific Islander, and Finnish. There were 4.44%, two people, that did not answer this item on the survey.

There were ten age brackets that individuals taking the survey could put themselves into. The majority of people were between 18 and 25 years old. Twenty-two or 48.89% of the people completing the survey, were in this category. Six or, 13.33%, of the people taking the survey were between the ages of 26-30. Three or, 6.66% of the people who completed the survey were between the ages of 31-35. One or, 2.22% of the people taking the survey was between the ages of 36-40. Four or, 8.89% of those taking the survey were between the ages of 41-45, and 46-50. Three or, 6.66% of the people taking the survey were

between the ages of 51-55. Two or, 4.44% of the people taking the survey were between the ages of 56-60. No one fell into the categories of 61-65 or older.

Twenty-two point twenty-two percent, ten people, of the people who filled out the survey were male. Seventy-five point fifty-six percent, thirty-four people, of those who filled out the survey were female. One or, 2.22%, did not fill out this item of the survey.

Everyone who filled out the survey held a valid driver's license. All reported having a valid driver's license for two or more years. The mean years with a valid driver's license was 15.82 years old.

Research Questions

The remaining part of this chapter will specifically address the research questions. A mean was calculated by assigning a value of one to a "no" response, a value of two to a "maybe" response and a value of three to a "yes" response.

Of the forty-five people who completed the survey, twenty-three people stated that they would yield to an adolescent who was standing on the curb of a crosswalk, waiting to cross the street. Eighteen people replied maybe and four people replied that they wouldn't yield to an adolescent who was standing on the curb of a crosswalk, waiting to cross the street. The mean response was 2.42.

Of the forty-five people who filled out the survey, thirty-nine individuals responded that they would yield to an adolescent who was standing with one foot in the crosswalk. Six

individuals responded that "maybe" they would yield. The mean response was 2.87.

Of the forty-five people who took the survey. Forty-two people stated that "yes" they would yield to an adolescent who had both feet in a crosswalk. Three people stated "maybe" they would yield to an adolescent who had both feet in a crosswalk. The mean response was 2.93.

Of the forty-five people who completed the survey, twenty motorists stated that they would yield to a young adult who was standing on the curb of a crosswalk, waiting to cross the street. Seventeen people replied "maybe" they would yield to this young adult. Seven people stated that they would not yield to a young adult who was standing on the curb of a crosswalk, waiting to cross the street. One individual did not answer this question. The mean response was 2.24.

Of the forty-five people who took the survey, thirty-two people replied "yes" that they would yield to a young adult who was standing with one foot in a crosswalk. Twelve people responded "maybe" they would yield. One person did not answer that question. The mean response was 2.67.

Of the forty-five people who filled out the survey, forty motorists responded that they would yield to a young adult who had both feet in a crosswalk. Four people responded "maybe" they would yield to a young adult who had both feet in a crosswalk. One person did not answer that question. The mean response was 2.84.

Of the forty-five people who completed the survey, twenty people stated they would yield to a middle-aged adult who was standing on the curb of a crosswalk, waiting to cross the street. Eighteen people replied "maybe" they would yield. Six people stated they would not yield to a middle-aged adult who was standing on the curb of a crosswalk, waiting to cross the street. One person did not answer that question. The mean response was 2.04.

Of the forty-five people who responded to the survey, thirty-two people replied they would yield to a middle-aged adult who was standing with one foot in a crosswalk. Eleven people stated "maybe" they would yield to this individual. One person did not answer that question. The mean response was 2.62.

Of the forty-five people who completed the survey, forty motorists stated they would yield to a middle-aged adult who had both feet in a crosswalk. Four people replied "maybe" they would yield. One person did not answer that question. The mean response was 2.84.

Of the forty-five people who took the survey, thirty-three people stated that they would yield to an elderly person who was standing on the curb of a crosswalk, waiting to cross the street. Seven people replied "maybe" they would yield. Four people said they would not yield to an elderly person who was standing on the curb of a crosswalk, waiting to cross the street. One person did not respond to that question. The mean response was 2.60.

Of the forty-five who responded to the survey, forty-three motorists replied "yes" they would yield to an elderly person who was standing with one foot in the crosswalk. Two people said "maybe" they would yield to an elderly person who was standing with one foot in the crosswalk. The mean response was 2.96.

All forty-five people who took the survey stated they would yield to an elderly person who had both feet in a crosswalk. The mean response was 3.0.

Of the forty-five people who responded to the survey, thirty-six individuals responded that they would yield to an individual using a manual wheelchair, regardless of age, who was on the curb of a crosswalk, waiting to cross the street. Six people stated "maybe" they would yield. Three people said they would not yield to an individual using a manual wheelchair, regardless of age, who was on the curb of a crosswalk, waiting to cross the street. The mean response was 2.73.

Of the forty-five people who took the survey, forty-three motorists responded they would yield to an individual using a manual wheelchair, regardless of age, who had the front portion of their chair in a crosswalk. Two people said they "maybe" would yield to an individual using a manual wheelchair regardless of age, who had the front portion of their chair in a crosswalk. The mean response was 2.96.

All forty-five people who completed the survey stated they would yield to an individual using a manual wheelchair,

regardless of age, who was entirely in a crosswalk. The mean was 3.0.

Of the forty-five people who filled out the survey, thirty-five people stated they would yield to an individual using a cane, regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street. Six people said "maybe" they would yield. Four people stated they would not yield to an individual using a cane, regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street. The mean response was 2.69.

Of the forty-five people who responded to the survey, forty-two people stated they would yield to an individual using a cane, regardless of age, who had one foot in a crosswalk. Three people replied they "maybe" would yield to an individual using a cane, regardless of age, who had one foot in a crosswalk. The mean response was 2.93.

Of the forty-five people who took the survey, all of them stated that they would yield to an individual using a cane, regardless of age, who had both feet in a crosswalk. The mean was 3.0.

Of the forty-five people who completed the survey, thirty-nine stated they would yield to an individual using a blind walking stick, regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street. Four people replied they "maybe" would yield. Two people said they would not yield to an individual using a blind walking stick,

regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street. The mean response was 2.82.

Of the forty-five people who responded to the survey, forty-three people replied they would yield to an individual using a blind walking stick, regardless of age, who had one foot in a crosswalk. Two people stated they "maybe" would yield to an individual using a blind walking stick, regardless of age, who had one foot in a crosswalk. The mean response was 2.96.

All forty-five people who filled out the survey replied they would yield to an individual using a blind walking stick, regardless of age, who had both feet in a crosswalk. The mean was 3.0.

The last four questions on the survey were true and false questions. The mean was determined by assigning a value of one to a "true" response and assigning a value of two to a "false" response. There was no value assigned to a missing answer.

Of the forty-five people who completed the survey, thirty people responded yes to the question "according to the Wisconsin State Law, motorists must yield to pedestrians who are standing on the curb, who appear to be preparing to cross a street at a marked crosswalk". Fourteen people responded false to this question. There was one person who did not answer that question. He/She wrote, "I'm from Minnesota and am not familiar with the Wisconsin laws". The mean response was 1.29.

Of the forty-five people who completed the survey, forty-two of them believed that according to the Wisconsin state law, motorists must yield to pedestrians who have one foot in a

marked crosswalk. Three people believed that was false. The mean response was 1.07.

Of the forty-five people who took the survey, forty-four of them believed that according to Wisconsin state law, motorists must yield to pedestrians who have both feet in a marked crosswalk. One person found that statement to be false. The mean response was 1.02.

Forty-one of the forty-five people who completed the survey believed the following statement to be false, "according to Wisconsin state law, motorists do not need to yield to pedestrians in a marked crosswalk". Four people found that statement to be true. The mean response was 1.91.

CHAPTER FIVE

Discussion, Conclusion, and Recommendations

Introduction

This chapter will include a discussion of the results of the study and conclusions. The chapter will conclude with some recommendations for further research.

Discussion

Everyone who completed the survey responded unanimously to four items. According to the research, everyone surveyed responded that they would yield to an individual using a cane, regardless of age, who had both feet in a crosswalk. Everyone surveyed agreed that they would yield to an individual who was blind, using a white can, regardless of age, who had both feet in a crosswalk. They also agreed they would yield to an elderly person who had both feet in a crosswalk. Finally, everyone agreed they would yield to an individual using a manual wheelchair, regardless of age, who was entirely in a crosswalk.

Harrell (1990) concluded in one of his studies that "as an age group [the elderly] have one of the lowest injury rates [when crossing a street]" (p.65). According to the research finding, a possible explanation may be due to motorists yielding more often for this population, as everyone surveyed agreed they would yield to an elderly person who had both feet in a crosswalk. This however, contradicts the statistics of

Wisconsin that suggest that the elderly are among the most involved in accidents between pedestrians and motorists (Pruitt-Thunder). Yet, it supports the idea that the elderly have a higher death rate when injured (Pruitt-Thunder).

As for the children, six people, out of forty-five, responded to the survey saying that maybe they would yield to an adolescent who was standing with one foot in a crosswalk. This helps support the statistic that children are among the most involved in motor vehicle and pedestrian accidents.

In the survey, the young adult pedestrian category was the one that showed the greatest potential to getting injured as twelve people, out of forty-five, responded that they would maybe yield to them standing with one foot in a crosswalk. Seven people responded they would not yield to a young adult if they were standing on the curb of a crosswalk waiting to cross the street. Finally, four, out of forty-five people responded they would maybe yield to them if they had both feet in a crosswalk. These findings are consistent with Agran, Winn, and Anderson (1994), who found that over seventy-five percent of all children pedestrian (ages 0-14) injuries occurred when they were in or around streets.

Of all the people who responded to the survey, there were individuals who expressed that they would not yield to pedestrians in each of the seven categories (adolescent, young

adult, middle-age adult, elderly, individual using a manual wheelchair, individual using a cane, and an individual using a blind walking stick) who were standing on the curb of a crosswalk waiting to cross the street. The response is consistent with the fourteen, out of forty-five people, who believed that it was not a Wisconsin law that motorists must yield to pedestrians who are standing on the curb, who appear to be preparing to cross a street at a marked crosswalk. The fact is that Wisconsin State Statute 346.24 states that "the operator of a vehicle shall yield the right-of-way to a pedestrian . . . in a manner which is consistent with the safe use of a crosswalk . . ." (p.4143). Four, out of forty-five people who completed the survey believed that in Wisconsin motorists do not need to yield to pedestrians in a marked crosswalk.

Two people out of the forty-five surveyed stated that maybe they would yield to an individual using a blind walking stick who had one foot in the crosswalk. This is in violation of Wisconsin State Statute 346.26 that reads a motorist " . . . shall stop the vehicle before approaching closer than ten feet to a pedestrian who is carrying a [white cane] . . ." (p.4143). Even if the pedestrian is violating any of the pedestrian laws, the motorist must still stop (99-00 Wisconsin Statutes).

One of the significant components that Gervasoni (1996) found in his research, of a community-based instructional

program for individuals who were blind, was the importance of contacting and educating community resources on ways to assist pedestrians in the community. Maybe, it would be beneficial to educate communities at large on the statistics and laws regarding crosswalk safety.

Conclusions

Although the sample size was small, the results concur with most of the previous research conducted on pedestrians and crosswalk safety.

If children are defined as ages zero through eighteen, then the results of the research are consistent with the statistics in both Wisconsin and the United States. These statistics suggest that they are among the most commonly involved in pedestrian and motorist accidents.

One surprise finding was that according to the survey, middle-age adults were the second highest category of greatest potential of becoming injured in a crosswalk. This finding is inconsistent with the statistics. Overall, motorists were more likely to yield to someone with a visible physical disability versus someone without.

It was discovered that some motorists are unaware of the laws regarding crosswalk safety in Wisconsin. This should cause concern for the safety of pedestrians in Wisconsin, especially in Menomonie, Wisconsin.

Recommendations for Further Research

Several suggestions are offered for further research on crosswalk safety. These are:

1. Replication of this study using a larger sample could enhance the results for possible generalization.
2. Modifying the type of research by using actual pedestrians and observing them crossing at a crosswalk, specifically at 10th Street and Broadway street in Menomonie, Wisconsin, may give more accurate results.
3. Observe actual pedestrian crossing a street in a crosswalk at different times throughout a day may give more accurate results.
4. Observe actual pedestrians crossing a street in a crosswalk on different days of the week may give more accurate results.
5. Replication of this study using more and different types of disabilities could enhance the results for possible generalization.

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Appendix A

Appendix A

1999-2000 Wisconsin State Statutes:

Printed exactly as they read in the 1999-2000 Wisconsin Statutes and Annotations book (45th Edition) p. 4143.

346.24 Crossing at uncontrolled intersection or crosswalk.

- (1) At an intersection or crosswalk where traffic is not controlled by traffic control signals or by a traffic officer, the operator of a vehicle shall yield the right-of-way to a pedestrian, or to a person riding a bicycle in a manner which is consistent with the safe use of the crosswalk by pedestrians, who is crossing the highway within a marked or unmarked crosswalk.
- (2) No pedestrian or bicyclist shall suddenly leave a curb or other place of safety and walk, run, or ride into the path of a vehicle which is so close that it is difficult for the operator of the vehicle to yield.
- (3) Whenever any vehicle is stopped at an intersection or crosswalk to permit a pedestrian or bicyclist to cross the roadway, the operator of any other vehicle approaching from the rear shall not overtake and pass the stopped vehicle.

346.25 Crossing at a place other than crosswalk.

Every pedestrian or bicyclist crossing a roadway at any point other than within a marked or unmarked crosswalk shall yield the right-of-way to all vehicles upon the roadway.

346.26 Blind Pedestrian on highway.

- (1) An operator of a vehicle shall stop the vehicle before approaching close than 10 feet to a pedestrian who is carrying a cane or walking stick which is white in color or white trimmed with red and which is held in an extended or raised position or who is using a dog guide and shall take such precautions as may be necessary to avoid accident or injury to the pedestrian. The fact that the pedestrian may be violating any of the laws applicable to pedestrians does not relieve the operator of a vehicle from the duties imposed by this subsection.

Appendix B

Please answer each of the following questions truthfully and honestly.

1. What is your ethnicity? (fill in the blank) _____

2. Place a mark in the age category that describes you:

_____ 18-25	_____ 41-45	_____ 56-60
_____ 26-30	_____ 46-50	_____ 61-65
_____ 31-35	_____ 51-55	_____ older
_____ 36-40		

3. What is your gender? _____ male _____ female

4. How many years have you held a valid driver's license?

(fill in the blank) _____

For each of the following questions (#5-#25), put an X in the space provided that best answers your response to the following questions:

5. As a motorist, would you yield to an adolescent who was standing on the curb of a crosswalk, waiting to cross the street?

_____ no _____ maybe _____ yes

6. As a motorist, would you yield to an adolescent who was standing with one foot in a crosswalk?

_____ no _____ maybe _____ yes

7. As a motorist, would you yield to an adolescent who had both feet in a crosswalk?

_____ no _____ maybe _____ yes

8. As a motorist, would you yield to a young adult who was standing on the curb of a crosswalk, waiting to cross the street?

_____ no _____ maybe _____ yes

9. As a motorist, would you yield to a young adult who was standing with one foot in a crosswalk?

_____ no _____ maybe _____ yes

10. As a motorist, would you yield to a young adult who had both feet in a crosswalk?

_____ no _____ maybe _____ yes

11. As a motorist, would you yield to a middle aged adult who was standing on the curb of a crosswalk, waiting to cross the street?

_____ no _____ maybe _____ yes

12. As a motorist, would you yield to a middle aged adult who was standing with one foot in a crosswalk?

_____ no _____ maybe _____ yes

13. As a motorist, would you yield to a middle aged adult who had both feet in a crosswalk?

_____ no _____ maybe _____ yes

14. As a motorist, would you yield to an elderly person, who was standing on the curb of a crosswalk, waiting to cross the street?

_____ no _____ maybe _____ yes

15. As a motorist, would you yield to an elderly person, who was standing with one foot in a crosswalk?

_____ no _____ maybe _____ yes

16. As a motorist, would you yield to an elderly person who had both feet in a crosswalk?
_____ no _____ maybe _____ yes
17. As a motorist, would you yield to an individual using a manual wheelchair, regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street?
_____ no _____ maybe _____ yes
18. As a motorist, would you yield to an individual using a manual wheelchair, regardless of age, who had the front portion of their chair in a crosswalk?
_____ no _____ maybe _____ yes
19. As a motorist, would you yield to an individual using a manual wheelchair, regardless of age, who was entirely in a crosswalk?
_____ no _____ maybe _____ yes
20. As a motorist, would you yield to an individual using a cane, regardless of age, who was standing on the curb of a crosswalk, waiting to cross the street?
_____ no _____ maybe _____ yes
21. As a motorist, would you yield to an individual using a cane, regardless of age, who had one foot in a crosswalk?
_____ no _____ maybe _____ yes
22. As a motorist, would you yield to an individual using a cane, regardless of age, who had both feet in a crosswalk?
_____ no _____ maybe _____ yes
23. As a motorist, would you yield to an individual using a

blind walking stick, regardless of age, who was standing on
the curb of a crosswalk, waiting to cross the street?

_____ no _____ maybe _____ yes

24. As a motorist, would you yield to an individual using a
blind walking stick, regardless of age, who had one foot in
a crosswalk?

_____ no _____ maybe _____ yes

25. As a motorist, would you yield to an individual using a
blind walking stick, regardless of age, who had both feet
in a crosswalk?

_____ no _____ maybe _____ yes

For the last four questions, place an X in the space provided
that you believe correctly answers the question.

26. According to the Wisconsin State Law, motorists must yield
to pedestrians who are standing on the curb, who appear to be
preparing to cross a street at a marked crosswalk?

_____ true _____ false

27. According to the Wisconsin State Law, motorists must yield
to pedestrians who have one foot in a marked crosswalk?

_____ true _____ false

28. According to the Wisconsin State Law, motorists must yield
to pedestrians who have both feet in a marked crosswalk?

_____ true _____ false

29. According to the Wisconsin State Law, motorists do not need to yield to pedestrians in a marked crosswalk?

_____ true

_____ false

Thank you for taking the time to complete this survey! I really appreciate it!