DEUKHEE GONG
Evaluation of an Unintentional Injury Prevention Curriculum for Korean-American Students
(Under the direction of PAMELA ORPINAS)

Injury among children is a major public health issue even though it is predictable and often it can be preventable. Behaviors that promote safety can reduce the occurrence of severe injuries among children. However, the frequencies of behaviors that promote safety are low, both among U.S. and Korean-American children.

This study evaluated the impact of an unintentional injury prevention curriculum, Risk Watch, among Korean-American students, using a quasi-experimental design with a nonequivalent control group. Two intervention and two control Korean schools in Atlanta participated in this study. The intervention consisted of weekly traffic, bike and pedestrian, and fire safety lessons, using the Risk Watch curriculum. One hundred two students completed a pretest and a posttest.

The main outcomes were safety behaviors (seat belt use or helmet use) and behavioral intentions. Based on the constructs of the theory of planned behavior, intervening variables were perceived behavioral control, attitudes, subjective norms toward safety behaviors, and knowledge. Analysis of covariance and hierarchical multiple linear regression analyses were used for the statistical analyses.

Strong intervention effects were found on increasing knowledge of all safety topics in the intervention group. Additionally, important intervention effects were detected on increasing seat belt use and helmet use, behavioral intentions to wear a seat belt and to wear a helmet, perceived behavioral control toward a fire-related-preventive behavior, and attitudes toward traffic, bicycle, and fire safeties among pre-kindergarten and kindergarten students. For students in grades 1 and 2, the intervention effects were found on increasing helmet use and subjective norms for parents about seat belt use, helmet use, and response to smoke detectors. Among students in grades 3 to 8, the intervention group showed statistically significant increases on seat belt use and

perceived behavioral control toward a fire-related-preventive behavior, compared to the control group. The positive changes in safety behaviors or behavioral intentions were more likely to be associated with an increase in constructs of the theory of planned behavior among PreK and K students and an the increase in knowledge among older students. Limitations of the study and recommendations for the Risk Watch curriculum and for unintentional injury prevention programs for school children are discussed.

INDEX WORDS: Risk Watch, Korean-American, Unintentional injury prevention, Curriculum evaluation, Theory of planned behavior, TPB, Children, Students, Korean school, Seat belt use, Helmet use, Knowledge, Behavior change, Traffic safety, Bicycle safety, Fire safety.

EVALUATION OF AN UNINTENTIONAL INJURY PREVENTION CURRICULUM FOR KOREAN-AMERICAN STUDENTS

By

DEUKHEE GONG

B.S., The Ewha Womans University, South Korea, 1992

M.S., The Ewha Womans University, South Korea, 1994

A Dissertation Submitted to the Graduate Faculty

of The University of Georgia in Partial Fulfillment

of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2001

EVALUATION OF AN UNINTENTIONAL INJURY PREVENTION CURRICULUM FOR KOREAN-AMERICAN STUDENTS

By

DEUKHEE GONG

Approved:

Major Professor: Pamela Orpinas

Committee: David DeJoy
Seock-Ho Kim
Laura K. McCormick
Joe Wisenbaker

Electronic Version Approved:

Gordhan L. Patel
Dean of the Graduate School
The University of Georgia
August 2001

This dissertation is dedicated to

my husband, Youngjoong Joo, and

my 10-month-old baby, Michelle Heeryung Joo.

ACKNOWLEDGMENTS

Writing this dissertation simply would not have been possible for me without the support and encouragement of a great number of people. A special word of appreciation goes, first and foremost, to Dr. Pamela Orpinas who guided me with patience and respect through personal, intellectual, and scholastic challenges that I encountered. Dr. Orpinas embodies the definition of professor. Not only is she a respected scholar, but her dedication to her students is unsurpassed. As an international student, I found it difficult to study and to take care of a newborn baby, being apart from my family. However, while I was studying in Athens, she was my mother who provided me a support to study, work, and nurse my baby, as well as my teacher and my friend. Having Dr. Orpinas as my advisor was an enormous gift for which I will always be grateful.

I also would like to acknowledge my committee members - Drs. Joe Wisenbaker, Seock-Ho Kim, Laura McCormick, and David DeJoy - for their insight, support, and academic advice.

I am especially grateful to my best friend, Dawn Satterfield, for her endless support, encouragement, patience, and friendship and for reading this entire dissertation. Without her, I couldn't even have finished one semester while studying in the University of Georgia. I also would like to thank Pam Cox for reading several chapters of this dissertation and providing good suggestions. Meeting good American friends who gave me their enthusiastic encouragement and support in the department of Health Promotion and Behavior was the best gift God provided me.

I would like to acknowledge my Korean friends in Athens, Kyoung-Ok Park, Boram Yi, Juhee Hong, and Suck-Je Sohn for being baby-sitters for my 10-month-old baby, Michelle Heeryung, and for giving their support, prayers, and a place to stay while Michelle and I stayed in Athens for my dissertation defense. Without them, I would not have been able to finish this dissertation. I would like also to thank other Korean friends

in Arizona who prayed for me to make this possible, Eun-Je Park, Jiwon Lee, and pastor, Duk-Gon Yun.

I would like to express my appreciation to my family members for their support and belief in me: my mom and dad, Kee-Sun Lee and Won-Kil Gong, my mother and father in law, Hee-Wha Chae and DukHeung Joo, my sister and brother, Jung-Hye and In-Suk Gong, my husband, Youngjoong Joo, and my lovely baby, Michelle Heeryung Joo. “Youngjoong, thank you so much for your deep understanding and your support. Heeryung, you know how sorry I am for not being a good mother to you and how much I thank you for being a good daughter to me. This dissertation wouldn't exist without your help.”

Finally, I would like to thank God for listening to me, for giving his support, his endless love, and his encouragement, for providing good friends while I was studying and working in the University of Georgia, and for watching over Heeryung and me while I was writing up this dissertation. "I am nothing without you. I glorify you."

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

CHAPTER 1

INTRODUCTION

Significance of The Problem

Injury among children and youth is a major public health issue because of the magnitude of the number of injuries, the potential years of life lost because of injury, and the associated costs to society. Injury is the leading cause of death during childhood. Moreover, injury killed more children than all other diseases combined among children aged 5 to 14 years in 1998 (Centers for Disease Control and Prevention [CDC], 2000e).

Approximately 13 million children are injured severely enough each year to require medical attention. About 1.4 million children are treated and released from emergency departments, but 360,000 children require hospitalization. Moreover, it is estimated that 50,000 children each year are permanently disabled by an injury (CDC, 1995a). Because of the large numbers of young victims, injuries claim more potential years of life each year than heart disease, cancer, and stroke combined (Rice et al., 1989). Almost 5.3 million potential years of life are lost annually to injuries, an average of 36 years per fatal injury (Robertson, 1992).

Injury among children is a problem not only in the United States but also in the world. A 1996 World Health Organization report, *Investing in Health Research and Development*, warns that worldwide, "the epidemic of injuries may be among the most neglected health problems of the late 20th century" (World Health Organization, 1996).

Injuries are not caused by "accidents" or random, unavoidable events. They are predictable and can often be prevented. Prevention helps to reduce human suffering, loss of human potential and death. Prevention also reduces medical expenses and economic costs, which ultimately burden the whole society.

In spite of this, children exhibit many unsafe practices. According to the 1999 Youth Risk Behavior Survey (YRBS), 16.4% of high school students had rarely or never worn a seat belt when riding in a car or truck driven by someone else (CDC, 2000d). During the 30 days preceding the survey, 33.1% had ridden with a driver who had been drinking alcohol. Additionally, among respondents who had ridden a bicycle during one year preceding the survey, 85.3% had rarely or never worn a bicycle helmet.

It is difficult for adults to monitor children's safety behavior because they cannot always be around to protect them. Thus, eventually children must acquire the skills necessary to deal with life situations by themselves through injury prevention programs (Gillham & Thomson, 1996).

Injury prevention programs for children and youth can be conducted in a variety of settings such as home, community, or schools. Elementary and middle schools are good settings for establishing injury prevention programs in cooperation with community personnel and parents because they provide access to a large number of children and youth who can receive guidance for developing healthy and safe habits and learning to assess risks before they reach adolescence, a developmental stage characterized by increased risk-taking. Additionally, programs in schools have the potential to affect not only students but also out-of-school siblings, parents, and teachers.

Interventions can be more effective when they are integrated into the community and when approaches are tailored to address unique community characteristics such as ethnicity or socioeconomic status. (Klassen, MacKay, Moher, Walker, & Jones, 2000). In Atlanta, approximately 15 Korean schools are managed by Korean communities or churches, striving to meet the challenges of large influxes of immigrants by providing history, language, and cultural education for children. Health and safety issues have not been considered as a major subject in Korean schools. However, according to a preliminary study, which I conducted to identify Korean-American children's health risk behaviors using YRBS in 1999, several health and safety issues were revealed such as

low prevalence of wearing seat belts and bicycle helmets and high prevalence of riding with a driver who had been drinking alcohol, school fighting, and getting injured due to fighting (See Chapter 2).

Faced with this reality of Korean students' need to increase health and safety behaviors, Korean schools, by implementing safety and injury prevention programs and curricula, can provide a special service to help their students to feel safe in their schools and communities and to acquire good safety and health promotion habits that can contribute to children's healthy lives in the United States. Nonetheless, there is a dearth of research about the implementation and evaluation of safety and injury prevention programs in Korean community or schools.

Purpose of the Study and Research Questions

The purpose of this study is to evaluate the impact of the "Risk Watch" curriculum on safety behaviors among Korean school students in Atlanta. This curriculum was implemented during the summer of 2000. The curriculum was evaluated using a quasi-experimental design with a nonequivalent control group. The intervention group (two Korean schools) received a Risk Watch curriculum, and the control group (two other Korean schools) did not receive any safety education curriculum. Before and after the intervention, two groups completed a pretest and posttest, and they were compared to evaluate the effectiveness of the curriculum.

The study addresses three research questions, which refer to the effectiveness of the curriculum. First, does the Risk Watch curriculum increase Korean school students' self-reported safety behaviors and behavioral intentions for performing safety behaviors: buckling up a seat belt, wearing a helmet, escaping the place when a smoke detector sounds? Second, does the Risk Watch curriculum influence Korean school students' perception of control, attitudes, subjective norms toward safety behaviors, and knowledge related to motor vehicle, bicycle and pedestrian, and fire and burn safety? Finally, are the changes of Korean school students' perceived control, attitudes, subjective norm, and

their knowledge toward safety behaviors related to changes in their self-reported safety behaviors or behavioral intention?

CHAPTER 2

REVIEW OF THE LITERATURE

In this chapter, a review of the literature related to this study is provided. The first section presents Korean-American immigrants' health. This is followed by the literature relevant to childhood unintentional injuries, as well as their protective and risk factors. In section three, theories applied to this study are presented. Finally, the last section provides a description of the Risk Watch curriculum.

Korean-American Immigrants' Health

Asian Americans currently represent 3.6% of the U.S. population and are the fastest-growing minority group in the country (U.S. Census Bureau, 2001). Korean-Americans represent 11% of the Asian American population and are scattered throughout the United States, but nearly half reside in three states: California, New York, and Hawaii (Koh & Koh, 1993). The state of Georgia has also seen a dramatic increase in Asian immigrants in the last two decades, and Koreans comprise the majority of the Asian immigrant population to Georgia in recent years (Federation for American Immigration Reform, 2001). According to Georgia's top ten foreign-born people, the top country of origin was Mexico (the number of Mexican born population was 20,309), followed by Germany (13,268) and Korea (11,678) (Federation for American Immigration Reform, 2001).

Therefore, health problems of the Korean immigrant population can have a significant impact on the state of Georgia. However, any studies related to health for Korean immigrants in Georgia were not found. Moreover, few studies have been conducted to identify Korean immigrants' health. The following information contains Korean immigrants' main health problems identified from the review of the literature.

One of serious and urgent problems facing Asian communities in the United States is spousal abuse, according to some studies. Among diverse Asian immigrant groups, Chinese, Vietnamese, Filipino, Korean, and Asian Indian communities are reported to experience a serious problem of spouse battering (Ho, 1990; U.S. Commission on Civil Rights, 1992; Chin, 1994; Agtuca, 1994). Immigrant Korean families are recognized as having the highest rate of domestic violence among various Asian immigrant groups in Los Angeles County. According to the records of the Los Angeles County Attorneys' Office, which handles domestic violence cases prosecuted in Los Angeles County each year, Korean immigrant males comprised the highest percentage of all Asian defendants accused of spousal abuse (Chun, 1990). Changing gender roles adds stress to marriage. In a survey of 150 Korean women residing in Chicago, 60% of respondents reported that they were battered by their husbands or partners; 75% of these were within 3 to 5 years of immigration (Song-Kim, 1992).

Smoking is another Korean-American immigrants' health problem. According to Behavioral Risk Factor Survey (BRFS) for Korean-Americans in Alameda County, California, in 1992, Kang et al (1997) found that 39% of Korean-American participants had smoked more than 100 cigarettes during their lifetimes, and 21% currently smoked cigarettes. Burns and Pierce (1992) also found that Korean immigrants reported the highest prevalence of smoking (23.5%), whereas Chinese immigrants reported the lowest prevalence of smoking (11.7%) in a statewide telephone survey of 32,125 California households.

Kang et al. (1997) also found that an estimated 12% of participants reported having been told by a health professional that they had high blood pressure and 12% knew that they had high blood cholesterol. Men were significantly more likely than women to report having smoked, to currently smoke, to currently drink, or among current drinkers, to have ever driven after drinking. Women were significantly more likely to report not having exercised during the prior the survey. Moreover, in 1995 BRFS

(Powell-Griner, Anderson, & Murphy, 1997) for the total California population, the most prevalent risk factors among Korean-Americans included no exercise (31% of Korean-Americans vs. 21% of all California adults) and no routine physical examination (18% vs. 7%). In addition, 40% of Korean-American women reported never having had a Pap test, compared with 8% of California women; 57% of Korean women aged 50 years or older reported never having had a clinical breast examination, compared with 10% of all California women in the same age group; and 45% of Korean women aged 50 years or older reported never having had a mammogram, compared with 10% of all California women in the same age.

In addition, many Korean-American families do not have health insurance or appropriate medical care. A survey of more than 6,000 Korean-Americans found that about half of participants did not have health insurance and that nearly a quarter of all households have a family member who, at one time or another, failed to receive appropriate medical care because of an inability to pay, lack of time to visit a doctor, or not knowing where to go for health care (California Korean Health Education and Information and Referral center, 1989).

While some information for Korean-American immigrants' health for adults were available, there was a dearth of information on Korean-American children's health. Korean schools in Korean community can be good settings to identify Korea-American children's health needs because of an easy access to many Korean-American children at a time although they may not be representative of all Korean-American children in U.S. Korean schools are prevalent in most metropolitan urban areas the United States to help preserve the Korean culture for future generations by helping children learn their mother language and cultural norms. In Atlanta, approximately 15 Korean schools are managed by the Korean community or churches. Classes are usually held every Saturday during the school year and daily during several summer months. A total of about 500 students

are enrolled in Korean schools in Atlanta, typically learning Korean history, culture, language, and other special activities.

Korean school students' health survey

To identify Korean-American children' health behaviors in 1999, I conducted a health behavior survey among students who were enrolled in several Korean schools in Atlanta using the Youth Risk Behavior Survey. The study was conducted under the direction of Dr. Pamela Orpinas, as a part of HPRB 9000 study. The survey was administered to all students who were equal to or greater than 5th graders in the public school.

Only 60 students who returned their parents' consent form were eligible to participate in the survey from a total of 130 consent forms sent home with students. In general, the prevalence of participants' health risk behaviors was lower than those of the national 1999 YRBSS nationwide students' health risk behaviors (CDC, 2000d). However, some limitations should be considered. For example, the data were obtained by self-reported survey using convenience-sampling methods among participants who are mostly middle school students (5th through 10th graders), whereas I compared their behaviors to 1997 nationwide participants who were high school students (9th through 12th graders).

According to the findings, 11.3% of students had rarely or never worn seat belts when riding in a car driven by someone else (1999 nationwide: 16.4%). During the 12 months preceding the survey, 78.3% of students had ridden a bicycle and, of these, 58.8% had rarely or never worn a bicycle helmet (nationwide: 85.3%). During the 30 days prior to the survey, 15% of students had ridden one or more times with a driver who had been drinking alcohol (nationwide: 33.1%). Of the participants, 6.8% had carried a weapon anywhere at least one time during 30 days (nationwide: 17.3%). Also, among students, 20.8% had been in a fight one or more times during the 12 months preceding the survey (nationwide: 35.7%), and 13% reported they had been in a fight on school property

(nationwide: 14.2%). Although Korean-American students reported lower prevalence of health-risk behaviors than nationwide participants in 1999 YRBS, considering that Korean-American participants were mostly middle school students, the findings on those health behaviors cannot be ignored.

Childhood Unintentional Injuries

Injury is the third leading cause of death in the United States and is the first leading cause of death for children and young adults (CDC, 2000e).

Table 2.1

Five leading causes of death and numbers of deaths by age group - 1998

Rank	Age Groups (Number of deaths)			
	1-4	5-14	15-24	25-44
1	Unintentional injuries (1,935)	Unintentional injuries (3,254)	Unintentional injuries (13,349)	Unintentional injuries (27,172)
2	Congenital anomalies (564)	Malignant neoplasms (1,013)	Homicide (5,506)	Malignant neoplasms (21,407)
3	Homicide (399)	Homicide (460)	Suicide (4,135)	Heart disease (16,800)
4	Malignant neoplasms (365)	Congenital anomalies (371)	Malignant neoplasms (1,699)	Suicide (12,202)
5	Heart disease (214)	Heart disease (326)	Heart disease (1,057)	HIV (8,658)

Source: National Vital Statistics Reports, Vol. (48), No. 11, 2000.

As shown in Table 2.1 for leading causes of death by age groups in 1998, unintentional injuries are the leading cause for each age group category from ages 1 to 44 years. In 1998, more than 5,100 children ages 14 and under died from unintentional injuries. In addition, each year nearly 120,000 children were permanently disabled. One out of every four children, or more than 14 million children ages 14 and under, sustained injuries that were serious enough to require medical attention each year. These injuries

have enormous financial, emotional and social effects on not only the child and the family, but also the community and society as a whole.

In general, children are primarily at risk of unintentional injury: motor vehicle injuries for occupants, pedestrians, and bicyclists, drowning, fire and burns, suffocation, choking, unintentional firearm injuries, falls, and poisonings.

Motor vehicle related injury

Motor vehicles have accounted for the majority of unintentional injury-related deaths for many years (Rivara, Thompson, Beahler, & MacKenzie, 1999). Moreover, motor vehicle injuries are the leading cause of death in children aged 5 to 14 years. In 1998, nearly 2,000 children younger than 16 years were killed and more than 300,000 were injured as passengers in motor vehicle crashes in the United States. One of the biggest reasons for the high number of injuries is that many children ride either incorrectly restrained or without any restraints at all. In 1998, almost half of children younger than 5 years old who were killed in motor vehicle crashes were riding unrestrained (CDC, 1999).

In the National Interview Survey for the Child Health Supplement to estimate childhood injury morbidity, pedestrian and motor vehicle accidents were the major causes of fatal injuries among children aged 5 to 9 years. Nonfatal injuries from sports were almost as common as those from falls and being struck or cut among children aged 10 to 13 years. Also motor vehicle accidents accounted for less than 5% of nonfatal injuries but were the leading cause of fatal injuries. Moreover, among children aged 14 to 17 years, sports-related accidents were the leading cause of nonfatal injuries, but motor vehicle injuries far exceeded all other causes of death (Bussing, Menvielle, & Zima, 1996).

Child restraints and child safety seats have been shown to be effective in reducing injury. Child safety seats reduce the risk of fatal injury by 71% for infants and 54% for children aged 1 to 4 years (CDC, 1999). Lap/shoulder safety belts reduce the risk of fatal

injury in children aged 5 years and older in passenger cars by 45%, in light trucks by 60% (U.S. Department of Transportation [USDT], 2000b). Between 1975 and 1997, nearly 4,000 lives were saved by child restraints (CDC, 1999). Safety belt use in general has increased dramatically from 11% in 1982 to 66% in 1993 (USDT, 1991, 1994). However, adolescents continue to wear safety belts less than older drivers (USDT, 1994). In a nationwide survey of students, 41% reported that they wore a safety belt the last time they rode in a vehicle. Less than 22% of the students who participated in the national student health survey reported that most of their friends usually wear a safety belt (American School Health Association, 1989). Thus, establishing the habit of wearing safety belts for all trips when children are young is very important.

The U.S. Department of Transportation (USDT) and CDC provided safety tips for child passengers to reduce the risk of children being killed or injured in a motor vehicle crash (USDT, 1999; CDC, 2000a):

- All children aged 12 years and younger should ride in the back seat for two important reasons: the back seat is generally the safest place in a vehicle during a crash; children sitting in the front seat have been injured and killed by passenger air bags as they inflate in a crash. If a vehicle has a passenger air bag, children aged 12 years and younger should always ride in the back.
- Infants should ride in rear-facing child safety seats until they weigh 20 pounds and are one year old. Never place a rear-facing child safety seat in front of an air bag.
- Toddlers and preschoolers aged 1 to 4 years should ride in a forward-facing child safety seat until they weigh about 40 pounds (usually around age four), or until their ears reach the top of the back of the child safety seat, or their shoulders are above the top seat-strap slots.
- Children who have outgrown their child safety seats should ride in a booster seat that positions the shoulder belt across the chest and the lap belt low across the

upper thighs. Children should use a booster seat until the lap and shoulder belts in the car fit properly – usually when they are at least 4 feet, 10 inches tall and weigh at least 80 pounds. To ride comfortably and safely, children must be able to bend their knees over the edge of the seat while sitting with their backs firmly against the seat back (without slouching). In most cases, this means that children aged 4 to 8 years should ride in a booster seat.

- Children who have outgrown their booster seats should always use a safety belt. The child must be tall enough to sit without slouching, with knees bent at the edge of the seat, with feet on the floor. The lap belt must fit low and tight across the upper thighs. The shoulder belt should rest over the shoulder and across the chest. Never put the shoulder belt under the child's arm or behind the child's back.
- Teens and adults should never drink and drive. Also, they should always wear a safety belt.

Bicycle injuries

Bicycling is a popular activity in the United States. Bicycles are owned by approximately 30% of the U.S. population, and 45% of bike owners ride at least occasionally (Kraus, Fife, & Conroy, 1987). Approximately 80 to 90% of children in United States own their bicycles (Waller, 1971; Dannenberg, Gielen, Beilenson, Wilson, & Joffe, 1993).

In 1998, 761 bicyclists were killed, and approximately 53,000 were injured in traffic-related crashes. Children aged 14 years and under accounted for 212 (28%) of these fatalities (USDT, 2000b). Each year almost 400,000 children aged 14 years and under are treated in emergency rooms for bicycle-related injuries (USDT, 2000a).

Head injuries account for 62% of bicycle-related deaths, for 33% of bicycle-related emergency department visits, and for 67% of bicycle-related hospital admissions (CDC, 1995b). Head injury is the most common cause of death and serious disability in bicycle-related crashes (Thompson, Rivara, & Thompson, 1989). From 1984 through

1988, more than 40% of all deaths from bicycle-related head injury were among persons younger than 15 years of age (Sacks, Holmgreen, Smith, & Sosin, 1991). According to the report of National Highway Traffic Safety Administration (NHTSA), bicyclists aged 14 years and under are at five times greater risk for injury than older cyclists (USDT, 2000a).

Bicycle helmet usage can reduce the risk of head injury by about 85% (Thompson, Rivara, & Thompson, 1989; USDT, 2000a) and the risk of brain injury by as much as 88% (USDT, 2000a). Additionally, Dorsch, Woodward, and Somers (1987) indicated that hard helmets were 19 times better than no helmet at all. In the cost savings, every $10 bike helmet saves this country $30 in direct health costs, and an additional $364 in societal costs. If 85% of all child bicyclists wore helmets every time they rode a bicycle for a year, the lifetime medical cost savings would total $109 to $142 million. Fortunately, bicycle helmet usage has increased from 18% in 1991 to 50% in 1998 (Bicycle Helmet Safety Institute, 2000). However, according to the 1997 YRBS, among high school students who had ridden a bicycle during one year preceding the survey, 88.4% had rarely or never worn a bicycle helmet.

As with safety belts, child safety seats, and motorcycle helmets, the enactment of laws requiring the use of bicycle helmets is likely to be the most promising way to increase bicycle helmet usage. Sixteen states including Georgia have helmet laws applying to young bicyclists under age 16; none of them apply to all riders (Bicycle Helmet Safety Institute, 2000; USDT, 2000a).

Moreover, not all bicycle-related injuries and deaths can be reduced by the use of safety equipment alone. Rider actions and reactions – especially obeying traffic laws – play a major role in contributing to injury-free bicycling enjoyment. Therefore, education for bicycle safety should be also followed to help children to have safe bicycling behaviors.

Pedestrian injuries

In 1997, more than 5,000 pedestrians were killed in traffic-related incidents in the United States. Most were young children, elders, and persons who were intoxicated. These deaths among children are highest in the 5- to 9-year-old age group and are higher among boys than girls. In 1996, pedestrian injury deaths were the fourth leading cause of death overall for children aged 5 to 9 years (CDC, 2000c).

As many as 70% of the injuries among children aged 5 to 9 years happened when the child ran out into the street from or darted out between two cars. Additionally, a large portion of the injuries occurred in poor children and Black children and other minority groups (CDC, 1990).

CDC (2000c) presented some examples of how children are injured as pedestrians by age:

- Toddlers' pedestrian injuries are mainly from being run over by a driver backing a vehicle in the driveway. Toddlers' small size makes them difficult for drivers to see, especially if they are playing behind the vehicle.
- Preschoolers' injuries are typically from darting out between two parked cars on a residential street. Small children are easily hidden from the view of drivers by parked cars, trucks, or bushes. Preschool children often are not able to judge distances and vehicle speeds accurately.
- Pedestrian injuries among children ages 6-12 mainly occur from collisions with a car in the middle of the block and on busy streets. Many parents overestimate their children's street-crossing ability. The truth is that many elementary-school-aged children still don't understand traffic signals and patterns and can confuse left and right when crossing a street. Also, adult drivers often incorrectly assume that a child always will yield the right- of-way.

Fire and burn injuries

Home fire is the disaster that children are most likely to experience. It is the fifth leading cause of unintentional injury and death in the United States, behind motor vehicle crashes, falls, poisoning by solids or liquids, and drowning (National Fire Data Center, 1999).

In 1996, fire was responsible for approximately 4,999 deaths, 28,300 injuries, and $9.8 billions in property damage (National Fire Data Center, 1999). Children are most at risk for injury or death from fire. In 1996, in all years, people aged under 5 and over 55 have a much higher death rate than the average population. However, 45% of all victims in multiple-fatality fires were children under 10 years of age (National Fire Data Center, 1999). Among children between the ages of 1 and 5 years, fire and burn-related injury is the third leading cause of injury death (CDC, 2000b).

From 1987 to 1996, approximately 80% of all fire deaths occurred where people slept, such as in homes, dormitories, barracks, or hotels. The majority of fatal fires occurred when people were likely to be less alert, such as nighttime sleeping hours. The majority of arson fires were caused by juveniles (National Fire Data Center, 1999).

The most common causes of home fires are cooking and heating equipment. Heating appliances, including portable space heaters, can ignite furniture and other combustibles left too close to the heater. However, smoking is the leading cause of deaths from fires in the home and is often the result of carelessly discarded cigarettes or matches igniting furniture or mattresses. Alcohol use is also important causes of fire related death (CDC, 2000b).

Most victims of fires die from smoke or toxic gases and not from burns. Fires produce poisonous gases that can spread quickly and far from the fire itself to claim victims who are asleep and not aware of the fire. Even if people awaken, the effects of exposure to these gases can cloud their thinking and slow their reactions so that they

cannot escape. That is why it is so important for people to have early warning so they can escape before their ability to think and move is impaired (CDC, 2000b).

In a typical home fire, people have only about 2 minutes to get outside. It is easy for anyone to panic and be confused during that short time, especially children. During a fire, children often try to hide in a closet or under beds where they feel safe rather than going outside. Therefore, it is important to make a fire escape plan for everyone in the family and practice it at least twice a year as well as to have a smoke detectors at home (CDC, 2000b).

Clothing fires are a major cause of burn injuries for children. Children can set their clothes on fire by playing with matches or getting too close to open fires or stoves. According to fire safety tips provided by SAFEusa, if this happens, children's natural reaction is to run, which will make the situation worse. In addition, children should be taught the "stop, drop, and roll" maneuver to smother the flames. This has saved many lives, and children should practice this with their parents or teachers (CDC, 2000b).

Protective and Risk Factors of Unintentional Injuries and Related Behaviors

Protective mechanisms serve to buffer or protect an individual from injury. The main protective factor against motor vehicle related injury and head injury are the use of a child restraint device or seat belt when driving and a helmet use when riding a bicycle because they reduce the likelihood of serious injury or fatality. Additionally, in Benson's (1993) study, he found common protective factors associated with positive health outcomes. Those related to injuries included parental monitoring of behavior; displaying assertiveness skills; and possessing of friendship-making, decision making, and planning skills. Such skills may decrease children's and youth's susceptibility to injury. The increase of helmet use was statistically related having friends who wore helmets, believing helmet laws are good, and using seat belts regularly (Dannenberg et al., 1993). Additionally, driver's seat belt use was highly related to child restraint use (Decina &

Knoebel, 1997). Adults who reported to always wear a seat belt showed high rates of child-occupant restraint use regardless of the child's age.

On the other hand, risk factors of unintentional injuries or those related behaviors can be specified as follows:

Gender

Injury patterns show distinct gender differences, with males at a much higher risk for most types of injury than females at all ages (Scheidt et al., 1995). Rivara (1992) indicated that males were four times more likely to die form an injury than females during adolescence. In a study of Iowa junior high and high school students' safety behavior, boys were less likely than girls to wear back seat belts and to wear bicycle helmets (Schootman, Fuortes, Zwerling, Albanese, & Watson, 1993).

Age

Injury rates vary dramatically with age, reflecting differences among age groups in their activities, behavior, and injury thresholds. In children under 5 years of age, falls are generally the leading cause of nonfatal injuries, but most deaths result from traffic injuries, drowning, and fires. In the 15-24 year age group, almost one-half of all deaths result from unintentional injuries. This age group has especially high mortality rates from traffic injuries and suicide (Barss, Smith, Baker, & Mohan, 1998). Also, Scheidt et al. (1995) found age increase was positively related to the overall rate and proportion of serious injuries.

Seat belts and helmets use among junior high and high school students decreased dramatically with age. Occurrences of driving or riding while drunk increased with age (Schootman et al., 1993). Additionally, younger drivers were more likely to show lower restraint use of child passengers from the analysis of 1994 Fatal Analysis Reporting System data (Agran, Anderson, & Winn, 1998).

Socioeconomic Status (SES)

Lower socioeconomic status was associated with higher pediatric injury rates (Nersesian, Petit, Shaper, Lemieux, & Naor, 1985) and lower child restraint usage (Wagenaar, Molnar, & Margolis, 1988). Substandard housing with inadequate smoke detectors and poorly accessible evacuation routes, more playtime spent in or near streets, high traffic volume, and older cars with missing or inoperable safety belts increase exposure to many mechanisms of injury. Unintentional injuries disproportionately affect poor children and result in more fatalities compared with those children with greater economic resources (Singer, 1987; CDC, 1995a). Children from low-income families are twice as likely to die in a motor vehicle crash, four times more likely to drown and five times more likely to die in a fire (CDC, 1995a). Additionally, low-income families were less likely than others to use child safety seats. These families are also less likely to use child safety seats correctly (USDT, 1991).

A survey was conducted among Scottish students aged 11, 13, and 15 years to obtain information of the association between non-fatal injuries and socioeconomic status (Williams, Currie, Wright, Elton, & Beattie, 1996). Father's low-salary occupations were associated with bicycle related injuries, and low marital wealth of the family (family affluence) was associated with getting traffic injuries, fighting, and crossing busy streets. By contrast, father's high-salary occupation was associated with sports injuries. Having friends who engaged in dangerous activities and engaging in dangerous activities were more common among students from lower father's occupation backgrounds, as were crossing busy streets. By contrast, high family affluence was predictive of more frequent use of bicycle helmets, safe street crossings, and sports protection.

Ethnicity

Minority status and low-income can be interrelated with each other (Singer, 1987). Minority children are more likely to lack health insurance, have more difficulty obtaining appropriate and necessary medical care, have lower incomes creating

significant financial barriers to care, are more likely to receive care in hospital emergency rooms, are less likely to receive lifesaving preventive services, and practice fewer safety behaviors. Among children aged 14 years and under, African American children have the second highest unintentional injury death rate in the United States and are nearly two times more likely to die from unintentional injury than Caucasian children (CDC, 1995a).

Place of birth

Kestenbaum (1988) found foreign-born persons to be at lower disease and injury mortality risk than U.S.-born persons in the study of mortality by nativity. Shai and Rosenwike (1988) compared injury mortality among Mexican and Cuban immigrants and Puerto Ricans who had moved to the United States. They found different kinds of injury by country of origin: the Puerto Rican-born had the highest death rates from homicide, the Cuban-born from suicide, and the Mexican-born from accidents.

Others

In the study of factors associated with restraint use of children under the age of nice in fatal crashes, kinds of vehicles were associated with the restraint use of children, showing lower prevalence of children's restraint use in older vehicles, in pickups, and large vans (Agran, Anderson, & Winn, 1998). Additionally, for children, family size was related to risks of injury (Barss, Smith, Baker, & Mohan, 1998). If small children are left in the care of young siblings or peers of children may also affect injury risk.

Effectiveness of Unintentional Injury Prevention Program for U.S. Children

A number of unintentional injury prevention programs have been implemented in multiple settings in the world with the goals of increasing children’s safety behaviors and reducing their unintentional injuries. However, few programs targeting children’s safety behaviors in the United States have been documented. In this section, published evaluation of unintentional injury prevention programs for children’s seat belt use or

helmet use that were mainly conducted in school settings or have used school-age children in community settings in the United States are discussed.

A few community-based interventions have been reported to have a strong impact on increasing children's bicycle helmet use. One of the earliest unintentional injury prevention program for bicycle helmet use was conducted in Seattle in the 1980s. It involved a range of agencies and educational methods and provided subsidies towards the cost of helmets. According to a recent evaluation of the program effectiveness among children aged 5 to 15 years, bicycle helmet use was increased from 5% to 38%. Additionally, from 1990 to 1992, the number of children in this age group treated for bicycle-related head injuries decreased 50% at the regional trauma center in Seattle (Parkin et al., 1993).

Dannenberg et al. (1993) conducted community-based program evaluation for children's helmet use. In Howard County, Maryland, a law was passed in 1990 that required children under 16 years of age to wear helmets. An educational campaign was conducted in schools and in the community to increase helmet use. Authors evaluated the combined effect of legislation and education in Howard County, compared with the effect of education alone in the adjacent Montgomery County. A third community, Baltimore County, served as a control community where no formal educational or legislative efforts were in place. The evaluation was conducted among students in grades 4, 7, and 9 from randomly selected schools in the three counties and found a significant increase in self-report helmet use in Howard County, compared to other counties. However, the difference on helmet use between Montgomery County and Baltimore County was not significant.

In schools, several programs designed to increase knowledge and safety behaviors have been evaluated (Arneson & Triplett, 1990; Miller & Davis, 1984; Wright, Rivara, & Ferse, 1995; Neuwel, Coe, Wilkinson, & Avolio, 1989). Most of them found strong intervention effects on increasing knowledge, but not safety behaviors (Arneson &

Triplett, 1990; Miller & Davis, 1984; Neuwel, Coe, Wilkinson, & Avolio, 1989). Arneson and Triplett (1990) evaluated a 5-day education program that was a modified version of the "Riding with Bucklebear" program among preschool students. The evaluation was conducted using a pretest-posttest study design without a control group. Results found that knowledge scores about car safety increased significantly, but wearing a seat belt and sitting in the back seat were not changed significantly.

Miller and Davis (1984) evaluated a multi-media traffic safety program, "Beltman," designed to increase the knowledge about pedestrian safety and increase out-of-school safety behaviors (crossing a street safely, wearing a seat belt, and walking not running) among kindergarten, first- and second-grade students with two intervention groups and one control group. The first intervention group received the Beltman materials that included three filmstrips, numerous props, and teaching aids. The second intervention group added two booster lessons, four months after the initial materials were presented. The control group did not receive any safety education materials. Students' knowledge scores and observed out-of-school safety behaviors by parents were measured at pretest, at posttest, and at 5-month follow-up test. Authors found that significant increases in knowledge in the two intervention groups at both the first posttest and the follow-up test, but the differences on knowledge scores between the two intervention groups were not significantly different at either posttest. In regard to combined out-of-school safety behaviors, no differences among the three groups at the first posttest were found. However, the two intervention group students showed more positive combined safety behaviors than the control group students at the 5-month follow-up test.

Neuwel, Coe, Wilkinson, and Avolio (1989) examined the effectiveness of the Oregon Head Spinal Cord Injury Prevention Program that was implemented in four schools with students in grades 9 to 12. This program was designed to increase students' knowledge, attitudes, and behaviors related to seat belt use and consisted of a 40 to 60 minute assembly presentation. The behavior was measured by observations in the school

parking lots. According to their findings, intervention group students showed a statistically significant increase in knowledge ($p<0.001$), but no change was found in students' attitude or observed seat belt use.

Wright, Rivara, and Ferse (1995) tested the effects of "Think First," head and spinal cord injury prevention program, on knowledge, attitudes, and behavior among 11- to 15-year-old students. "Think First" is an hour-long program based on the health belief model and consists of a short film about the consequences of traumatic brain injury and spinal cord injury, a lecture by a staff speaker who provides information on the frequency and causes of these injuries, a victim of traumatic brain injury or spinal cord injury testifying to the impact of the injury of his or her life, followed by a question and answer session. "Think First" safety topics include the use of seat belts, motorcycle helmets, bike helmets, avoidance of drugs and alcohol while driving or participating in sports activities, and checking for water depth when swimming or diving for one hour. The results found that students' knowledge, attitudes, self-reported seat belt and helmet use, and observed helmet use did not increase in the intervention group, compared students in the control group. Moreover, students' observed seat belt use decreased at 2-week and 3-month follow-up tests.

Interventions to change children's safety behaviors can be more effective if based on appropriate theories and practices in behavioral science, but few studies that applied such theories were found in the literature. Stuy, Gree, & Doll (1993) evaluated the effect of educational clinical intervention based on social learning theory and designed to identify the influence of a childcare center within poor and minority communities. Two randomly selected urban childcare centers enrolling high-risk 2 to 6 year olds were monitored for correct child restraint use during a 5-month educational intervention at one center. Parents in the intervention group were required to sign a policy statement in which they agreed to comply with state laws and day-care center recommendations regarding child safety restraint use. Based on the tenets of social learning theory,

investigators hypothesized that this program would help foster a sense of membership in a social group and that parents would alter their behavior as a result of modeling or reinforcement by other members or because of their own active involvement in the group. This strategy was combined with a comprehensive educational safety program in the school. According to their results, child safety restraint use increased significantly following the intervention in the intervention group (54% to 75%) while it increased in the control group slightly (20% to 30%).

In a word, community-wide comprehensive interventions had significant intervention effects on children's safety behavior change compared to school-based interventions although many school-based programs designed to increase participants' safety knowledge were successful. The lack of intervention effects on students' behavior change in school settings may be attributed to followings:

1) Poor study design with no control group (Arneson & Triplett, 1990) or not well matched control group (Wright, Rivara, Ferse, 1995).
2) Short period of program implementation (Neuwelt et al., 1989; Wright et al., 1995).
3) Poor statistical analysis using paired t-test, no controlling pretest effects between the intervention group and the control group (Neuwelt et al., 1989).
4) Implementation not in the school classroom with a small number of students rather in the assembly with a large amount of students (Neuwelt et al., 1989; Wright et al., 1995).
5) No social and behavioral science theories applied (all studies except Wright et al. (1995).

The effectiveness of reviewed programs for U.S. children is summarized in Table 2.2.

Table 2.2

Summary of effectiveness of unintentional injury prevention programs for U.S. children

Authors	Year & State	Study design	Study participants	Intervention	Main outcome variables	Findings
Parkin et al.	1993 Seattle	Pretest-posttest (control group not presented)	Children aged 5-15	Community based intervention including public & physician education, school safety program in school, media, etc.	1) Helmet use 2) Head injury	Helmet use: 1986 1992 5% ---> 38% Head injury: 50% decrease from 1990 to 1992
Dannenberg, Gielen, Beilensen, Wilson, & Joffe	1993 Maryland	Quasi-experimental study design [a]	IG[b]: 4th, 7th, 9th grade students CG[c]: Same grade students in other schools of adjacent counties	1) Education (in school & in community) only 2) Education + legislation	Helmet use	Helmet use Pre Post (Education+Legislation) 11% --> 37% (Education only) 8% --> 13% (Control) 7% --> 11% * Significant intervention effect on seatbelt use in Education + legislation county.
Arneson & Triplett	1990 Midwestern city	Pretest-posttest without control group	IG[b]: Preschool children	5-day-education and rewards for traffic safety	1) Knowledge 2) Seatbelt use	Knowledge was increased. Pre Post 11.73 13.13 (p=0.002) No intervention effects on wearing a seatbelt nor sitting in the back seat.
Miller & Davis	1984 Oregon	Quasi-experimental study design [a]	IG[b]: Students in K, 1st, 2nd grades CG[c]: Same grade students in the same school district	1) 8-week-"Beltman" materials 2) "Beltman" + 2 booster lessons	1) Knowledge 2) Out-of-school safety behaviors	1) Knowledge Pre Post 5-mo follow-up Beltman: 13.40 18.22 18.27 Beltman + booster 13.22 17.99 18.06 Control: 13.74 15.63 16.31 ($p<0.05$) 2) No intervention effect on seatbelt use, but effects on combined all safety behaviors at second posttest.

Note: [a] Quasi-experimental study design includes not randomly selected intervention group and control group.

[b] IG - Intervention Group. [c] CG - Control group.

(Table continues)

Table 2.2 (Continued)

Summary of effectiveness of unintentional injury prevention programs for U.S. children

Authors	Year & State	Study design	Study participants	Intervention	Main outcome variables	Findings
Neuwel, Coe, Wilkinson, & Avolio	1989 Oregon	Quasi-experimental study design [a]	IG[b]: Students in 9th to 12th grades CG[c]: Same grade students in different schools	Education in an assembly (40 - 60 min)	1) Knowledge 2) Attitudes 3) Behavior (observed seatbelt use)	Knowledge was increased. Pre Post IG 7.6 8.4 ($p<0.001$) No intervention effects on attitudes and observed seatbelt use.
Wright, Rivara, & Ferse	1995 Washington	Quasi-experimental study design [a]	IG[b]: Students in 6th to 9th grades CG[c]: Students in 9th to 12th grades in different schools	One-hour education with "Think First" in an assembly	1) Knowledge 2) Attitudes 3) Behaviors (self-reported & observed seatbelt use/ helmet use)	No intervention effects on knowledge, attitudes, self-reported seatbelt and helmet use, and observed helmet use. Observed seatbelt use was decreased at 2-week and 3-month follow-up tests.
Stuy, Gree, & Doll	1993 --	Randomized experimental study design	IG[b]: Children aged 2 to 6 years and their parents CG[c]: matched and randomized other day care center in the same city	Parent education	Children's seatbelt use	Seatbelt use Pre Post IG 54% --> 75% CG 20% --> 30% * Significant effect on increasing children's seatbelt use ($p<0.01$).

Note: [a] Quasi-experimental study design includes not randomly selected intervention group and control group.

[b] IG - Intervention Group. [c] CG - Control group.

Theories

The absence of social and behavioral science theory and research is a frequent criticism of interventions directed at health behavior change (Parcel, 1983). As found in the literature review, the absence of theory represented a possible explanation for the modest results observed in programs designed to promote seat belt use or helmet use among U.S. children. Besides, without a theoretical framework, practitioners may have difficulties for labeling the successful and unsuccessful elements of an educational program (Nelson & Moffit, 1988). Theories can be used in implementation and evaluation, as well as in development of unintentional injury prevention programs for children. In this study, social cognitive theory and the theory of planned behavior were applied to implement and evaluate the program. Child development theory was used to understand children's developmental stages and the injuries in those developmental stages. Child development theory was also used to select safety topics and an appropriate curriculum.

Social cognitive theory (SCT)

In Bandura's Social Cognitive Theory (SCT), human behavior is explained in terms of a model in which three factors - personal factors, environmental influences, and behavior - continually interact. A basic premise of SCT is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions.

Important constructs of SCT include environment, situation, behavioral capability, expectancies, self-control, observational learning, reinforcements, self-efficacy, and emotional coping responses (Baranowski, Perry, & Parcel, 1997). Behavioral change can be produced through the mediating processes of those constructs (Bandura, 1986). Environment refers to factors physically external to the person; situation refers to one's perception of the environment; behavioral capability addresses one's knowledge and skills to perform a behavior; outcome expectancies are the values

that a person places on a given outcome; self-control involves personal regulation of a goal-directed behavior; observational learning occurs when a person watches the actions of another and the reinforcements that person receives; reinforcements are the responses to a person's behavior that increase or decrease the likelihood of reoccurrence; and emotional coping responses are those strategies and ways of managing stress that a person uses to cope with emotional stimuli (Baranowski, Perry, & Parcel, 1997). Self-efficacy refers to a judgment of one's capability to accomplish a certain level of performance. Bandura and his colleagues proposed that self-efficacy is the most important prerequisite for behavior change because it determines the behaviors, in which a person will engage, how long they will persist, and how much effort people will expend to reach their goals (Baranowski, Perry, & Parcel, 1997). Studies have found relationships between self-efficacy and smoking cessation, weight loss, contraceptive use, maintenance of alcohol abstinence, and exercise adoption and maintenance. Mullen, Gottlieb, Biddle, McCuan, & McAlister (1988) also discovered self-efficacy was highly predictive of study participants' seat belt use, accounting 25% of the variance.

SCT can be applied to design and implement an intervention, as well as to understand or predict a person's behavior. Cheung & Chan (2000) used SCT as a study framework, which posits mediational roles of beliefs concerning one's self-efficacy, the collective efficacy of the promotional organization, and the efficacy of behavior for occupational safety and health. They found a significant contribution of promotional activities through the social learning process of exposure, learning, and development of efficacy beliefs to behavioral change.

To improve routine use of child restraint devices, Stuy, Gree, & Doll (1993) applied SCT to an educational clinical intervention in a childcare center. Based on the tenets of social learning theory, investigators hypothesized that the program would help increase a sense of membership in a social group and that parents would alter their behavior as a result of modeling or reinforcement by other members, combined with a

comprehensive educational safety program in the school. They found significantly higher child safety restraint use in the intervention group than in the control group.

In the Risk Watch manuals, theories are not explicitly described as part of the curriculum. However, several constructs of SCT were used in the design of intervention strategies and in the development curriculum objectives:

- Increase students' knowledge and skills about traffic safety, bicycle and pedestrian safety, and fire and burn safety to perform those related behaviors by Risk Watch curriculum (Behavioral capability).
- Increase students' confidence in wearing a seat belt, wearing a helmet, and getting out of the place when a smoke detector sounds by repeated demonstrations, practices, and lessons (Self-efficacy).
- Make students observe their friends and instructor's demonstrations and practices of wearing a child car restraint (for PreK and K students), wearing a helmet, getting out of the school when a smoke detector sounds, or changing batteries of smoke detector (Observational learning).
- Encourage students to talk about their experiences of traffic, bicycle, or fire/burn related injures and discuss negative consequences of not performing a safety behavior or positive consequences of performing a safety behavior including seat belt use and helmet use and appropriate behavioral response to the smoke detector's sound (Expectations).

Child development theory

It is important that the program for children should be based on an understanding of child development and on recognition that each child is an individual with unique needs, interests, and learning styles (Dodge, 1995). As defined by the National Association for the Education of Young Children, a developmentally appropriate program is both age-appropriate and individually appropriate (Bredekamp 1987; Bredekamp & Rosegrant, 1992). Planning an age-appropriate program means that all

decisions are guided by an understanding of normal sequences of growth typical of children within a given age group. The curriculum must also be individually appropriate, for each child is a unique person with his or her own temperament, interests, learning styles, and cultural background. There are, however, universal, predictable sequences of growth and change that occur during the childhood. As children develop, they need different types of stimulation and interaction to exercise their evolving skills and to develop new ones.

Piaget's theory is well known on the area of child development. In his theory, the child experiences four stages of cognitive development: sensorimotor from birth to approximately age 2; preoperational, from 2 years to approximately age 7; concrete operational, from age 7 to approximately 11 or 12; and formal operations, from age 12 on (Brewer, 2001). Of those stages, the pre-operational stage and concrete operational stage are important because most participants in this study are in these stages. Piaget has divided preoperational stage into the preoperational phase and the intuitive phase. In the preoperational phase, children use language and try to make sense of the world but have a much less sophisticated mode of thought than adults. They need to test thoughts with reality on a daily basis and do not appear to be able to learn from generalizations made by adults. In the intuitive phase the child slowly moves away from drawing conclusions based solely on concrete experiences with objects. However, the conclusions drawn are based on rather vague impressions and perceptual judgments. It becomes possible to carry on a conversation with a child. Children develop the ability to classify objects on the basis of different criteria, learn to count and use the concept of numbers. In concrete operational stage, a person can do mental operations but only with real (concrete) objects, events or situations. Logical reasons are understood. Concrete operational thinkers are able to solve problems of conservation and reversibility. They can coordinate information from more than once source, in solving problems. They are not as egocentric

in their thinking. Because they are aware that others may come to conclusions that differ from theirs, they are much more likely to examine their own conclusions.

It is also important to use teaching methods that fit with the child's growth pattern, not only in the cognitive area, but also in the affective, perceptual and motor areas. Activities should provide the child with a developmentally appropriate challenge. There is no value in presenting concepts and tasks before a child is developmentally ready to understand them. Integrated interventions promoting social, emotional and spiritual development as well as cognitive learning can take advantage of varied forms of learning, consistent with the culture, even while taking into account the fact that there are recognized sequences and activities that facilitate learning.

Risk Watch, which was selected as an unintentional injury prevention curriculum for Korean-American students, is well developed based on child's various developmental stages. The curriculum is divided into five different modules (PreK/Kindergarten, Grades 1-2, Grades 3-4, Grades 5-6, and Grades 7-8). Each module includes its own class lessons and activities with its own character role appropriate to their age group and developmental stages. Preschoolers and kindergartners are cast in the role of storytellers who share their thoughts and experiences as they learn new injury prevention skills. In Grade 1-2 module, children become detectives, exploring the relationship between cause and effect as it pertains to safe decision-making. By the time students reach Grades 3-4, they are able to function in the role of reporter, applying critical-thinking skills to analyze situations and alert others to potential risks. Students in Grades 5-6 use advanced communication skills as promoters to research and "market" injury prevention practices to their peers, family members, and the community. Finally, in Grades 7-8, students assume the role of coach, becoming role models and advocates for safety in their own community and throughout society, according to the curriculum's guidance document (National Fire Protection Association [NFPA], 1999b).

When children start school, they typically spend less time with their families and parents, and more time with their friends or in school or outside. Expected sorts of injuries differ depending on the developmental stages, too. According to the suggested minimal injury prevention at progressive developmental stages (Table 2.3), children aged 5 to 10 years should have, at minimum, traffic safety and bicycle safety education and pre-adolescents and adolescents should additionally receive guidance injury-related prevention. In this study, three safety topics in the Risk Watch curriculum – traffic, bicycle and pedestrian, and fire safeties – were covered for Korean-American students.

Table 2.3

Suggested minimal injury prevention at developmental stages

Age	Developmental stage	Suggested injury prevention
5 to 6 years	Riding bicycles, outdoor play, starts school	Car seat belts Bike safety: helmets Street safety: need for adult crossing supervision Fire safety: matches and play
7 to 10 years	Independent play, more time on bicycle or in car, does daring things	Car seat belts Bike safety: helmets, rules of the road Water safety: adult supervision, swimming instruction, personal floatation device
Pre-adolescent and adolescent	Increased socialization with peers and peer pressure Increased risk of substance abuse Starts to drive, firearm access	Alcohol use: especially related to driving and water safety Car seat belts Firearms and violence prevention: suicide risks Bike safety: helmets Burns: gasoline

Source: Losh (1994), p. 736

The theory of planned behavior

The theory of planned behavior (TPB) is an extension of Ajzen and Fishbein's theory of reasoned action (TRA). "Perceived behavioral control" was added to the theory of reasoned action in an effort to account for factors outside the individual's control that may affect his or her intention and behavior (Montano, Kasprzyk, & Taplin, 1997). The TPB maintains that a person's behavioral intention is the most important determinant of his or her behavior (Figure 2.1). The stronger the intention to engage in a behavior, the more likely should be its performance. However, a behavioral intention can find expression in behavior only if the behavior is under volitional control, i.e., if the person can decide at will to perform or not perform the behavior (Azjen, 1991). The direct determinants of an individual's behavioral intention are the attitude toward performing the behavior, the subjective norm associated with the behavior, and the perceived behavioral control of the behavior. Attitude is determined by the individual's beliefs about outcomes or attributes of performing the behavior (behavioral beliefs), weighted by evaluations of those outcomes or attributes. Thus, a person who holds strong beliefs that positively valued outcomes will result from performing a behavior will have a positive attitude toward that behavior. Conversely, a person who holds strong beliefs that negatively valued outcomes will result from a behavior will have a negative attitude toward that behavior, which is similar as outcome expectations of social learning theory. A person's subjective norm is determined by his or her normative beliefs – whether important referent individuals approve or disapprove of performing the behavior, weighted by his or her motivation to comply with those referents. Thus, a person who believes that certain referents (i.e., parents or friends) think he or she should perform a behavior, and who is motivated to meet the expectations of those referents, will hold a positive subjective norm. Conversely, a person who believes certain referents think he or she should not perform the behavior will have a negative subjective norm, and a person who is less motivated to comply with the referents will have a relatively neutral

subjective norm (Montano, Kasprzyk, & Taplin, 1997). The perceived behavioral control is composed of control belief and perceived power. A person's perception of control over behavioral performance, together with intention, is expected to have a direct effect on behavior, particularly when the perceived control is an accurate assessment of actual control over the behavior and when volitional control is not high (Madden, Ellen, & Ajzen, 1992).

Accumulated evidence indicates that attitudes, subjective norms, and perceived behavioral control are reliable predictors of intentions to perform health behaviors and generally account for 40-50% of the variance in meta-analytic reviews (Ajzen, 1991, Conner & Sparks, 1996; Sheeran & Taylor, 1999). Similarly, meta-analyses indicate that intentions and perceived behavioral control typically explain between 20% and 40% of the variance in health behaviors in prospective studies (Conner & Sparks, 1996; Godin & Kok, 1996; Sheeran & Orbell, 1998).

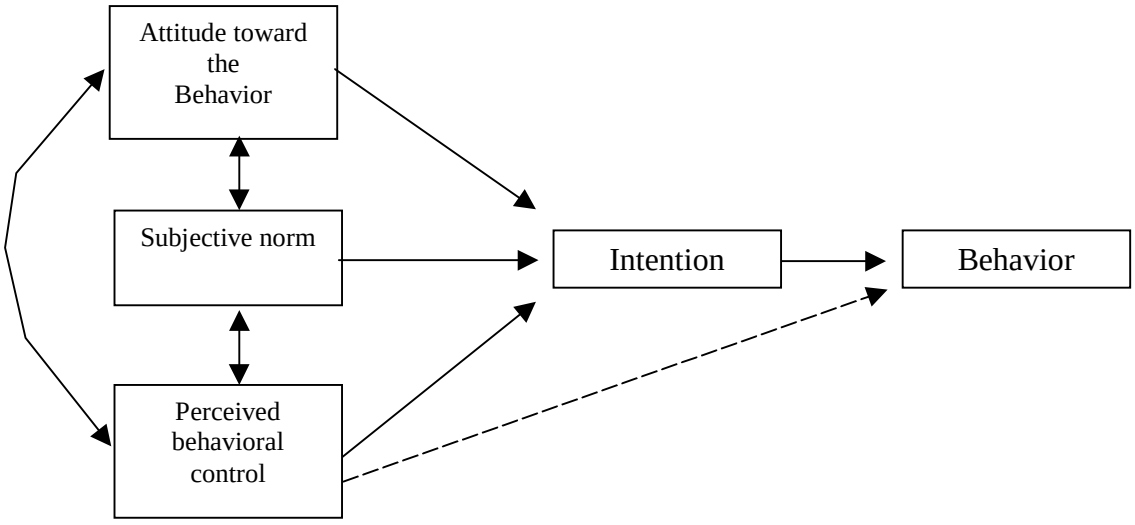


Figure 2.1. Theory of planned behavior (Adapted from Ajzen (1991) p. 182)

However, few applications of the TRA or TPB to safety behaviors or behavioral intentions have been identified. Parker, Manstead, Stradling, & Reason (1992) examined the TPB constructs for drivers' intentions to commit four specific driving violations: drinking and driving, speeding, close following, and overtaking in risky circumstances. According to their findings, all the TPB constructs were able to explain 23% - 48% of the variance in intention to commit driving violations. Perceived behavioral control was found to have a particularly important role, adding 3% - 21% to the amount of explained variance in driving violation intentions. The relation between subjective norms and behavioral intentions was consistently stronger than that between attitudes toward behaviors and behavioral intentions. The important role of perceived behavioral control has been further confirmed in relation to the use of car restraint for children (Richard, Dedobbeleer, Champagne, & Potvin, 1994) and to intentions for road crossing for pedestrians (Evans & Norman, 1998). Besides, attitude was also an important predictor for the use of car restraint (Richard, Dedobbeleer, Champagne, & Potvin, 1994), intention to use seat belt among women (Martin & Newman, 1990), and college students' wearing a seat belt and intention to wear a seat belt with subjective norms (Wittenbaker, Gibbs, Kahle, 1983).

The TPB can be used to design, implement, and evaluate the intervention to change behaviors or behavioral intentions, as well as to identify their main predictors (Becker, 1990). However, there was a dearth of studies applying TPB to design, implement, and evaluate interventions or to provide strategies to promote its effectiveness. Since the TPB constructs have been identified as important determinants for safety behaviors, if those constructs are changed by the intervention, their changes should produce changes in the behaviors or behavioral intentions (Ajzen, n.d.).

In this study, the TPB was used to evaluate the impact of the Risk Watch curriculum to change participants' safety behaviors and behavioral intentions by changing the TPB constructs, as well as safety-related knowledge. The TPB was used to

develop the instruments that were used to evaluate the intervention (see chapter 3). Moreover, the extent to which changes among TPB constructs and safety-related knowledge are related to changes in safety behaviors or behavioral intentions after the intervention were investigated. To describe how the TPB constructs can be applied to the Risk Watch curriculum, relevant objectives and elements of Risk Watch curriculum are presented in Table 2.4.

Description of the Program

General characteristics

Risk Watch is a school-based unintentional injury prevention curriculum for children in preschool through eighth grade. It was developed by the National Fire Protection Association (NFPA) in 1998. The Risk Watch curriculum is designed to help children and families create safer homes and communities by teaching them the skills and knowledge that they need to make positive choices about their personal safety and well-being (NFPA, 1999b). The Risk Watch curriculum seeks to prevent the major unintentional injuries that threaten children in this age group. As presented in the previous section, the curriculum is divided into five modules (PreK/Kindergarten, Grades 1-2, Grades 3-4, Grades 5-6, and Grades 7-8), each of which addresses the following topics: motor vehicle safety, fire and burn prevention, choking, suffocation, and strangulation prevention, poisoning prevention, falls prevention, firearms injury prevention, bike and pedestrian safety, and water safety.

Each module includes a set of warm-up exercises and tips to help students step into character roles appropriate to their age group and developmental state (role of storytellers, detectives, reporter, promoters, and coach). The goals of each module in Risk Watch are to develop and expand each student's safety knowledge, risk awareness, independent thinking, personal and social responsibility, prevention behaviors, and motivation to protect oneself and others.

Table 2.4

TPB's constructs and related elements of Risk Watch curriculum

Constructs	Objectives	Elements of Risk Watch curriculum
Perceive behavioral control	1) Increase students' knowledge and skills to perform a safety behavior 2) increase students' control belief for performing a safety behavior 3) Increase students' perceived power of performing a safety behavior	* Safety topic lesson cards * Repeated practices
Attitudes	1) Increase knowledge about positive consequences of safety behaviors and about negative consequences of unsafe behaviors 2) Increase students' favorable evaluations of outcomes or attributes of performing safety behaviors	* Safety topic lesson cards * Shared stories by classmates' experiences of injuries * Repeated practices
Subjective norms	1) Increase parents' concern and interest in their child's safety behaviors 2) Increase classmates' concern and interest in other students' safety behaviors 2) Increase students' favorable subjective norms	* Caregiver letters * Observation of other students' practice (Candy reward for students who brought back the signed caregiver letters to make sure their parents read them)

Learning objectives and class activities are listed as an example in Table 2.5 for PreK and K students and third and fourth graders.

Evaluation

Because this curriculum was developed in 1998, curriculum evaluations are in progress, conducting a 3-year analysis of the impact of Risk Watch on children's knowledge of important safety behaviors by the Interwest Project evaluators (NFPA, 1999a). In the first year, Risk Watch was field-tested comparing participants' knowledge between the pretest and the posttest. A comparison of the pretest and posttest scores provided the knowledge gain for the field test. Fifty-one teachers and 923 students representing all five learning levels (preschool through grade 7) participated in the field test. A control group of students for each learning level were given the pretest and posttest without receiving any Risk Watch lessons. Although testing effect in control groups was found in some grade levels, students who received the curriculum increased their knowledge by 6% to 31% whereas the control group increased their knowledge by 0% to 23% among all grade levels. Youngest children showed the most knowledge gain (NFPA, 1999a).

Strengths and weaknesses

Strengths:

- Developmental stages. Educational intervention curriculum for children should be developed based on their level of knowledge and developmental stages because children develop mentally, physically, and cognitively at various rates until they become adults. Risk Watch is designed based on children's developmental stages using five modules, Pre-K/Kindergarten, Grades 1 & 2, Grades 5 & 6, and Grades 7 & 8. Besides, each module includes particular character roles that are appropriate to children's age group and developmental stages (storyteller, detective, reporter, promoter, and coach).

Table 2.5

Objectives and class activities for PreK & K students and third & fourth graders

Safety topics	Objectives	Class activities
PreK & K		
Traffic safety	1. Ride buckled up in a child safety seat or booster seat in the rear seat 2. Demonstrate two bus safety rules	1. Have child share stories about their favorite things to take for a long ride in the car, on a bus, or on an airplane 2. Have children practice taking 5 giant steps
Bicycle and Pedestrian safety	1. Identify a bicycle helmet as an important item to wear when riding a bike 2. Demonstrate the correct procedure for crossing the street with a grown-up	1. Have children share their stories about bicycles 2. Have students bring their own bicycle helmet and demonstrate of wearing it in front of students 3. Practice of crossing the street with a teacher
Fire safety	1. Identify three things that are hot or that can become hot 2. Respond to the presence of matches and lighters by telling a grown-up 3. Recognize the sound of a smoke detector 4. Demonstrate the correct response when the smoke detector sounds	1. Have children share stories about their experiences of burn or fire 2. Make children do coloring pictures about warm, hot, and cold things 3. Have children practice "stop, drop, and roll"
Grades 3 & 4		
Traffic safety	1. Identify the safety belt as an item to be used when riding in a motor vehicle 2. State a minimum of two bus safety rules	Make some groups. Distribute information about traffic safeties from the Icon Card. Then, have students discuss the content asking questions using the five Ws: Who, What, When, Why, and Where
Bicycle and Pedestrian safety	1. State two rules for being safe when riding a bike, walking, and playing outside 2. Identify a helmet as an item to wear every time you ride a bike	1. Ask students figure out what's going on after watching the teacher's pantomime about pedestrian safety 2. Read some stories related to bicycle and bicycle helmet to students and make them report following five ws
Fire safety	1. Identify stop, drop, roll - cool and call as the correct procedure to extinguish a clothing fire 2. Name three elements of a home escape plan 3. Identify three fire hazards found in the home 4. Know how to change batteries of smoke detector	1. Provide four messages on the back of the Fire and Burn Icon Card. Have students talk about how the five Ws might apply. 2. Demonstrate how to check out and change batteries of smoke detectors 3. Have students make an escape plan with a teacher in the school and with parents at home

- Skills and information. Risk Watch is designed to give children in preschool through grade eight the information and skills to prevent unprecedented injuries and support they need to make positive choices about their personal safety and well-being through class lessons and various activities. In addition to the class lessons, the caregiver letters were sent to students' parents, which included information about that day's lesson to create the safest possible environment at home and help parents or guardians reinforce their children's learned skills and knowledge at home.
- Manual. The manual is well organized. Each module is separated by grade level and includes specific instructions for the character role, lessons, activities, caregiver letters, and community resources. Although making photocopies for students' activity papers and caregiver letters are necessary, such steps are well described in the teacher's manual. Additionally, each lesson in the manual has well specified objectives, procedures, preparation, and activities following each module's character role.
- Community resources. Risk Watch curriculum also provides good lists of community resources. It includes a sample letter to invite local community experts to visit the classroom and contact information to reach resources.

Weaknesses:

- Theory. The Risk Watch curriculum does not provide details about how it was developed and what kinds of theories were applied.
- Evaluation. Because this curriculum was developed recently, curriculum evaluations are still in progress. Thus, there is little empirical evidence that the curriculum works well to increase participants' skills, knowledge, preventive attitudes, and safety behaviors. Additionally, in their baseline evaluation (NFPA, 1999a), only children's knowledge of safety behaviors after the Risk Watch

curriculum implementation was evaluated. Participants' behaviors (e.g., seat belt use or helmet use) as well as knowledge should be evaluated.

- Evaluation instruments. The Risk Watch curriculum provides an established evaluation instruments. However, the evaluation instruments comprised few knowledge questions for each topic, and most questions are quite easy. If few safety topics are selected to teach, it is difficult to evaluate the curriculum with those easy and few questions, so more appropriate questions should be added.
- Transfer of skills to real life situation. Skills learned in the classroom may not generalize to real-life situation if the skills are not related to their actual real-life situation. For example, although students learn how to and when to wear bicycle helmet, if they do not own a bicycle and/or a helmet, they cannot apply their skills and knowledge, and these may diminish over time.

CHAPTER 3

METHODOLOGY

This chapter discusses the methods of the study. The first section defines the hypotheses that were examined. This is followed by a description of the study design, study participants, procedures for data collection, definition of variables, and questionnaire development and instruments that were used to evaluate the impact of the curriculum. The final section describes the data management and statistical analyses of data.

Hypotheses

The purpose of this study is to evaluate the Risk Watch curriculum among Korean summer school students in Atlanta. The hypotheses examined were:

Hypothesis 1: Students who received the Risk Watch curriculum will increase their self-reported safety behaviors and their behavioral intentions for performing safety behaviors – buckling up a seat belt, wearing a helmet, and escaping the house when a smoke detector sounds – compared to students who did not receive the Risk Watch curriculum.

***Hypothesis 2*:** Students who received the Risk Watch curriculum, compared to students who did not receive the Risk Watch curriculum, will report a positive change of their knowledge, perception of behavioral control, attitudes, and subjective norms toward safety behaviors.

Hypothesis 3: Students' positive change of knowledge, perception of behavioral control, attitudes, and subjective norms will be associated with a

positive change of safety behaviors or behavioral intentions to perform safety behaviors.

It is difficult to measure wearing a helmet if students do not own a bicycle. Similarly, it is difficult to measure behaviors related to escaping the house when a fire occurs or a smoke detector sounds due to the low frequency of these events in students' life. However, intention is the cognitive representation of a person's readiness to perform a behavior, and it is considered to be the immediate antecedent of behavior (Ajzen, 1991). Thus, for these low frequent behaviors, behavioral intentions were used as outcome variables, instead of the actual behavior.

Changes in safety behaviors and behavioral intentions to perform safety behaviors can be directed by one or more of their determinants: attitudes, subjective norms, or perceptions of behavioral control (Ajzen, 1991). If those constructs are changed by the intervention, their changes should produce changes in behaviors or behavioral intentions. According to the literature review, attitudes toward a particular safety behavior (Martin & Newman, 1990) or past behaviors (Budd, North, & Stradling, 1984; Thuen & Rise, 1994) and perceived behavioral control (Richard, Dedobbeleer, Champagne, & Potvin, 1994) were the main predictors of behavioral intention. Therefore, positive changes in attitudes and perceived behavioral control toward safety behaviors would have a strong association with changes in safety behaviors or behavioral intentions from pretest to posttest. In addition, increases in behavioral intentions toward wearing a seat belt and a helmet are anticipated to be an important predictor related to changes in those behaviors. While the associations between changes in outcome variables and changes in all intervening variables are examined, the effects of students' demographic variables – gender, grades, place of birth, and self-identity – will be also controlled.

Study Design

To address the hypotheses, this study used a quasi-experimental design with a nonequivalent control group, which has an intervention group and a control group (Campbell & Stanley, 1963). A pretest and a posttest were administered to both groups. The study protocol was reviewed and approved by the Institutional Review Board at the University of Georgia.

Four Korean summer schools participated in this study. A pretest was conducted in all schools before the intervention. The results of the pretest will show the degree to which the two groups are similar, although not equivalent (see the result section 4.2). The intervention, which is the Risk Watch curriculum, was implemented in two schools (intervention group). The other two schools did not receive any safety education curriculum (control group).

Study Participants

The goal of this study is to evaluate an unintentional injury prevention curriculum among Korean American students. Approximately 15 Korean schools are located in Atlanta, but only some of them provided summer school programs. I contacted five Korean schools to request their participation in the study. Two Korean schools were interested in implementing and evaluating the Risk Watch curriculum, two schools desired to participate in this study with the purpose of identifying their students' safety behaviors, and one school rejected to participate in the study. The intervention and control groups did not have pre-experimental sampling equivalence because they were not selected randomly.

Every student in the two groups of schools completed the pretest (N=161). Since this study was conducted during the summer, it was anticipated that some students would be unavailable to complete the posttest. Of all students who completed the pretest, 59 students did not complete the posttest because of traveling, participating in other summer programs, being sick, or dropping out of the summer school program. The final sample

size was composed of 102 students, consisting of 26 pre-Kindergarten and Kindergarten (PreK and K) students, 25 first- and second-grade students, and 51 third- to eighth-grade students.

Table 3.1 presents a summary of the demographic characteristics of study participants. The mean age of the students was 4.4 years for PreK and K students, 6.3 years for students in grades 1 and 2, and 10.3 years for students in grades 3 to 8. Participating students also reported their place of birth and their self-identity.

Table 3.1

Demographic characteristics of study participants

	Control group (n= 54) %	Intervention group (n= 48) %
Gender - % boys	40.7	63.8
Grade level		
PreK, K	20.4	31.3
Grades 1, 2	18.5	31.3
Grades 3 to 8	61.1	37.5
Place of Birth		
United States	40.0	50.0
Korea	58.0	43.2
Other	2.0	6.8
Self-identity		
American	0.0	6.3
Korean	73.5	56.3
Korean-American	26.5	37.5

Note: Some percentages do not add up to 100% due to rounding.

Procedures

The curriculum and its evaluation were components of participating schools' summer programs, so students' parental consent to answer the questionnaires was not required. However, parents in all schools were informed orally or by letter about conducting the pretest and posttest. Additionally, parents of intervention schools were informed about the curriculum implementation.

A pretest was conducted during the first week of the school program in the intervention group and second or third week of the school program in the control group. The Risk Watch was implemented in the two intervention schools by me between June 12, 2000 and July 7, 2000, covering three topics: motor vehicle safety, bike and pedestrian safety, and fire safety. Following the guidelines of Risk Watch that were developed based on child developmental differences, each topic was taught by grade levels once a week for a 2-hour class, for a total of 6 hours of instruction. A posttest was conducted one week after the curriculum implementation in the intervention group and four weeks after the pretest in the control group, using the same questionnaire as in the pretest.

Six volunteers who spoke both Korean and English helped to conduct the pretest and the posttest. All volunteers were trained to administer the questionnaires. During the pretest and posttest administrations, volunteers or I read the prepared instructions to the students. Overhead transparencies were used for students in grade 1 and 2. For PreK and K students, both tests were administered individually and orally. In addition, for students who were not fluent in English, the volunteers translated the questionnaire to them individually and orally. All teachers in the control group were informed that they should not discuss safety-related topics in the class between pretest and posttest except normal communication about school safety rules in order to control the contamination of study in the control group.

Definition of Variables

The outcome variables were safety behaviors and behavioral intentions to perform safety behaviors.

a. Safety behaviors are defined as specific behaviors that reduce the risk of unintentional injuries caused by motor vehicle or bicycle crashes. Two safety behaviors were measured: buckling-up a seat belt and wearing a helmet if students owned a bicycle.

b. Behavioral intention refers to perceived likelihood of performing a behavior to reduce the risk of unintentional injuries caused by motor vehicle, bicycle crashes, or home fires. Three behavioral intentions were measured: wearing a seat belt when they ride in a car, wearing a helmet when they ride a bicycle, and escaping the house when a smoke detector sounds.

The four variables that presumably influence outcome variables were knowledge, perception of control, attitudes, and subjective norms, based on the theory of planned behavior. These variables will be called intervening variables.

a. Knowledge refers to specific factual information students acquired through the implementation of Risk Watch, such as concepts or facts related to motor vehicle safety, bicycle and pedestrian safety, and fire safety.

b. Perceived behavioral control is defined as students' perception of their ability to perform a safety behavior. It is composed of control belief and perceived power (Ajzen, 1991). Students who have a positive perception of behavioral control toward safety behavior are expected to perform those behaviors confidently or easily. Perceived behavioral control was measured as the ease or difficulty of performing the safety behavior and as the likelihood that students could do it.

c. Attitude toward a safety behavior is defined as a relatively constant positive or negative value assigned to the performance of safety behavior. Attitudes can be measured by two constructs: individual's beliefs about outcomes or attributes of

performing the behavior (behavioral beliefs) and evaluations of those outcomes or attributes (Fishbein & Ajzen, 1975). However, in this study, attitudes toward a safety behavior were measured by outcome evaluation toward seat belt use, bicycle helmet use, and smoke detector.

d. Subjective norms refer to students' perceived social pressure or concern from significant persons to perform the behavior. In this study, significant persons are specified as parents, siblings, and friends.

Additionally, participants' demographic characteristics were measured in this study (Table 3.2).

Table 3.2

Variables of demographic characteristics

Demographic Variables	Definition
Gender	Girl or boy
Age	Current age in years
Grade level	Grade level from coming semester (PreK to Grade 8)
Place of birth	Unites States, Korea, or other country
Participants' self-identity	How they identify themselves (American, Korean, Korean-American, or other)

Questionnaire Development and Instruments

The student questionnaire was developed for three levels based on the grade level: PreK and K, grades 1 and 2, and grades 3 to 8. All items for measuring behavioral intention, perception of behavioral control, attitudes, and subjective norms were created for this study based on the theory of planned behavior. Most knowledge questions were taken from the established evaluation instruments of the Risk Watch curriculum. However, the evaluation instruments comprised few questions for each topic, so I created additional knowledge questions based on the contents of the topics in the Risk Watch curriculum.

A pilot evaluation of the questionnaire was conducted prior to its implementation. To identify if any questionnaire items were confusing, ambiguous, or difficult and to ensure that students understood the instructions, five Korean-American students who were not enrolled in the participating schools answered the questionnaire. Additionally, to validate the content of the instruments, a content validation form was created. It consisted of definitions and dimensions of constructs, questionnaire items, and their relevance to the constructs to each safety topic (Appendix A). Then, three experts in the injury prevention area reviewed the questionnaire using this form. While reviewing questionnaire items, they identified the construct that the item best represented and rated the extent to which each item was relevant to its identified construct in a 5-point scale. Also, they reported any content areas that were missing. According to their reports, most of original items were moderately or highly relevant to their assigned constructs for behaviors, behavioral intentions, perceived behavioral control, attitudes, and subjective norms. However, double negative questions and redundant questions were suggested to be removed, and several items such as testing or replacing smoke detector batteries were suggested to be included in the student questionnaire. Based on students' pilot tests and the content validation, the questionnaire items were modified.

The final questionnaires consisted of items of demographic characteristics, knowledge, perceived behavioral control, attitudes, safety behaviors, and behavioral intentions, covering three safety topics (Appendix B). Subjective norms were included in the questionnaire only for grades 1 to 8.

- Safety behaviors included wearing a seat belt for traffic safety and wearing a helmet for bicycle safety (Table 3.3). Students who did not ride a bicycle were excluded from the analysis of data. Behavioral intentions were measured toward wearing a seat belt, wearing a helmet, and getting out of the house when a smoke detector sounds (Table 3.4).

- Knowledge of PreK and K students was measured by seven traffic safety questions, five bicycle and pedestrian safety questions, and eight fire safety questions. Fourteen knowledge questions were presented by pictures to let students circle the correct one on the picture directly. The remaining questions had Yes or No or multiple-choice response categories. For grade 1 and 2, knowledge questions comprised eight traffic safety questions, eight bicycle & pedestrian safety questions, and another eight fire safety questions. Students in grade 3 to 8 had seven traffic safety questions, 11 bicycle and pedestrian safety questions, and 12 fire safety questions. To obtain total knowledge scores, all correct answers were summed and divided by the number of questions for each safety topic. Therefore, all the scales ranged from zero to one point. If a student did not answer any questions, the items were coded as incorrect ones (0). If a student got 0.75 points for the knowledge score for traffic safety, this represents he or she responded correctly 75% of the traffic safety knowledge.
- For PreK and K students, perceived behavioral control was measured by one item for control beliefs for each safety topic, and the item itself represents the perceived behavioral control to wear a seat belt, wear a helmet, and get out of the house when a smoke detector sounds (Table 3.4). For students in grades 1 to 8, perceived behavioral control was measured by items for control beliefs and items for perceived power with bipolar difficult-easy scale (Table 3.5). To obtain scales of perceived behavioral control, items for control beliefs and those for perceived power were summed for the three safety topics. The procedures yielded a possible range of scores from two to seven (Table 3.5).
- Attitudes toward safety behaviors were assessed by several items. They were summed and divided by the total number of items to obtain attitude scales for seat belt use, helmet use, and smoke detector. The response categories for attitudes items ranged from 1 to 2 for PreK and K students and from 1 to 5

Table 3.3

Items and response categories of safety behaviors and behavioral intentions by topics and grade levels

Construct and Topic	Items	Response categories
PreK & K		
Safety Behaviors		
Wearing a seatbelt	How often do you wear a seat belt?	1=Never
Wearing a helmet	How often do you wear a bicycle helmet? *	2=Sometimes
		3=Always
Behavioral intentions		
Wearing a seatbelt	The next time, I will buckle up.	1=No
Wearing a helmet	The next time, I will wear a helmet	2=Yes
Getting out if smoke detector sounds	The next time, I will get out the house when it sounds	
Grades 1-8		
Safety Behaviors		
Wearing a seatbelt	How often do you wear a seat belt?	1=Never
Wearing a helmet	How often do you wear a bicycle helmet? *	2=Sometimes
		3=Always
Behavioral intentions		
Wearing a seatbelt	The next time, I will buckle up.	1=Never
Wearing a helmet	The next time, I will wear a helmet	2=Sometimes
Getting out if smoke detector sounds	The next time, I will get out the house when it sounds	3=Always

* Students who do not ride a bicycle are excluded from the analysis.

Table 3.4

Items and response categories of perceived control and attitudes - PreK & K

Construct and Topic	Items	Response categories
Perceived behavioral control		
Wearing a seatbelt	I know how to buckle up correctly by myself	1=No
Wearing a helmet	I know how to wear a helmet correctly by myself	2=Yes
Getting out if smoke detector sounds	I know how to escape from my house when a smoke detector sounds	
Attitudes		
Traffic safety	It is OK to wave your hands to your parents or friends out of the window	1=No 2=Yes
	Wearing a seatbelt is comfortable	
	Wearing a seatbelt is important	
Bicycle safety	Wearing a helmet is comfortable	
	Wearing a helmet is important	
Fire safety	It is OK to touch an iron or oven to find out it is hot	
	My house must have a smoke detector	
	The smoke detector is important	
	It is OK to play with a smoke detector or fire extinguisher	

Table 3.5

Items and response categories of perceived control and attitudes - Grades 1 to 8

Construct and Topic	Items	Response categories	Scale	Alpha [#] Grades 1& 2	Alpha [#] Grades 3-8
Perceived behavioral control					
Control belief					
Wearing a seatbelt	I know how to buckle up correctly	1=No	PC-seatbelt *		
Wearing a helmet	I know how to wear a helmet correctly	2=Yes	PC-helmet*		
Getting out if smoke detector sounds	I know how to escape from my house when a smoke detector sounds		PC-escape*		
Perceived power					
Wearing a seatbelt	Difficult-easy	1=Very			
Wearing a helmet	Difficult-easy	2=Somewhat			
Getting out of the house when fire occurs is	Difficult-easy	3=So-so			
Getting out of the house when smoke detector sounds is	Difficult-easy	4=Somewhat			
Changing batteries of smoke detector	Difficult-easy	5=Very			
Attitudes				(n=24)	(n=51)
Seatbelt use	Uncomfortable-comfortable	1=Very	At-seatbelt	0.55	0.77
	Unimportant-important	2=Somewhat			
	Foolish-smart	3=So-so			
	Hurts me - does not hurt me	4=Somewhat			
Helmet use	Uncomfortable-comfortable	5=Very	At-helmet	0.77	0.73
	Unimportant-important				
	Foolish-smart				
	Hurts me - does not hurt me				
Smoke detector	Unfamiliar-familiar		At-smoke	0.74	0.75
	Unimportant-important				
	Loud-quiet				
	Unnecessary-necessary				
	Foolish-smart				
	Hurts me - does not hurt me				

* This is obtained by adding items for control belief and for perceived power, ranging from 2 to 7.

[#] Cronbach's alpha

for students in grades 1 to 8. Higher scores indicate a positive attitude toward each safety topic. To identify the internal consistency of the scores for attitudes, the reliability analysis was computed with the baseline data among students in grades 1 to 8, using *Cronbach's alpha*. Internal consistency of the scores of the final items for the attitude scales toward wearing a seat belt, wearing a helmet, and having a smoke detector ranged between 0.55 and 0.77 for students in grades 1 and 2 and between 0.73 and 0.77 for those in grade 3 to 8. The items and their *Cronbach's alphas* by topics and grade levels are presented in Table 3.5.

- Subjective norms items were specified as referents of parents, siblings, and friends. The measure of subjective norms was obtained by summing the items. Responses ranged from never (1) to always (3). High scores indicate positive students' subjective norms toward a safety behavior. To estimate the internal consistency of the scores of the subjective norms items, *Cronbach's alpha* was computed. If the scores of a scale showed a higher value of *alpha if one item is deleted* than the value of the initial *Cronbach's alpha* and if an item showed an inconsistent pattern of correlation with other items such as negative correlation with other items, that item was removed from the original scale. For example, the items for parents' wearing a seatbelt and wearing a helmet were removed from the original items because those items were not related to parents' approval or interest for their child's safety behaviors, and they were negatively correlated with other related subjective norms items for parents. Table 3.6 presents the final subjective norms items by referents and *Cronbach's alphas* of the scores by the safety topics and by referents. The internal consistency coefficient of subjective norms scores ranged between 0.37 and 0.77 for students in grades 1 and 2 and between 0.51 and 0.84 for those in grades 3 to 8 (Table 3.6).

Table 3.6

Items of subjective norms and their internal consistencies by referents

Topics/Referents	Items	Alpha			
		n	Grade1 & 2	n	Grade 3 to 8
Wearing a seatbelt					
Parents	care that I wear a seatbelt	24	0.53	49	0.82
	tell me to buckle up if I do not wear a seatbelt				
Siblings	care that I wear a seatbelt	18	0.64	46	0.83
	tell me to buckle up if I do not wear a seatbelt				
Friends	care that I wear a seatbelt	24	0.37	51	0.69
	tell me to buckle up if I do not wear a seatbelt				
Wearing a helmet					
Parents	care that I wear a bicycle helmet	24	0.77	50	0.84
	tell me to put on if I do not wear a helmet				
Siblings	care that I wear a bicycle helmet	17	0.57	46	0.84
	tell me to put on if I do not wear a helmet				
Friends	care that I wear a bicycle helmet	24	0.67	50	0.73
	tell me to put on if I do not wear a helmet				
Smoke detector					
Parents	tell me where a smoke detector is	21	0.74	50	0.84
	tell me what to do when a smoke detector sounds				
	tell me to get out of the house when a smoke detector sounds				
Siblings	knows where a smoke detector in our house is	14	0.56	48	0.51
	knows what to do when a smoke detector sounds				
	thinks I should get out of the place immediately				
Friends	knows where a smoke detector in my house is	20	0.33	51	0.71
	knows what to do when a smoke detector sounds				
	thinks I should get out of the place immediately				

Data Management and Statistical Analyses

Completed questionnaires were carefully reviewed for invalid responses such as patterned or multiple responses. Data were entered into a computerized database using Excel software. To check the accuracy of the data entry, all data were double-checked by a volunteer. For the analysis of data, the *Statistical Package for the Social Sciences* (SPSS/PC) version 8.0 (Norusis, 1997) was used. All data analyses were conducted separately by safety topics and grade levels (PreK and K, Grades1 and 2, and Grades 3 to 8).

Baseline comparisons.

To evaluate significant differences at baseline between students in the control group and those in the intervention group and between students who did not complete a posttest and those who completed both tests, demographic variables, outcome variables, and intervening variables at baseline were compared. A Chi-square test was used to calculate significant differences for categorical variables, and analysis of variance (ANOVA) was used to test for mean differences of age between the two groups.

Analysis of hypotheses.

To examine the effectiveness of the intervention, analyses of hypotheses 1 and 2 were conducted using analysis of covariance (ANCOVA) to compare adjusted posttest means of behaviors, behavioral intentions, knowledge, perceived behavioral control, subjective norms, and attitudes between the control group and the intervention group, using the pretest as a covariate. If a student did not respond to any items during the pretest or the posttest, his or her items were excluded from the analysis. The scales for subjective norms for siblings in all safety topics and subjective norms for friends in fire safety were excluded from the analysis due to small sample size in the control group among students in grades 1 and 2. Therefore, paired t-tests were used to examine the effectiveness of the intervention for those variables in the intervention group. Differences with $p < 0.05$, which is a one tailed p value obtained from the original p

divided by 2 where the direction of the sample differences were consistent with the research hypotheses, were considered to be significant. Additionally, 95% confidence intervals for all mean differences were calculated. To obtain effect size for the intervention effectiveness, Glass' delta (D) (Glass et al., 1981) was calculated, which is defined as the adjusted posttest mean difference between the intervention group and control group divided by the standard deviation of the control group. Any delta of .50 or larger was considered as an important intervention effect.

To determine the extent to which changes in safety behaviors and behavioral intention were related to changes in intervening variables that presumably influence safety behaviors or behavioral intentions, analysis of hypothesis 3 consisted of hierarchical blockwise multiple linear regression analyses. This analysis was conducted only for significantly changed outcome variables and for all students. Since instruments for grades 1 and 2 and for grades 3 to 8 had equivalent constructs, the data for students in grades 1 and 2 and the data for students in grades 3 to 8 were combined in the hierarchical blockwise multiple linear regression analysis to increase the sample size and to identify the relation of the changes in outcome variables with grade levels. The changes in all variables from pretest to posttest were assessed by subtracting the baseline score from the posttest score.

In hierarchical blockwise multiple regression analyses, intervening variables were entered in blocks to assess the influence of each set of predictors over the influence of previous variables. Thus, for a change in safety behavior, the first block entered in the regression analysis was a change in behavioral intention. Block 2 comprised changes in TPB constructs: perceived behavioral control, attitudes, and subjective norms. Then, a change of knowledge scores was entered as block 3, followed by the final block of demographic variables, which were gender, grade level, place of birth, and self-identity. For behavioral intention as another outcome variable, the block entered in the regression equation first consisted of TPB constructs changes, and the knowledge score change was

entered as the second block. The final block was demographic variables. For preK and K, place of birth and self-identity were excluded from the block of demographic variables due to small case numbers. Variables for place of birth and self-identity for grades 1 to 8 were transformed into dummy variables (Table 3.7).

Table 3.7

Dummy coding for demographic variables in the multiple regression analysis

Variables	Dummy coding
Gender	Boy=1 and Girl=0
Place of birth	United States=1 and others=0
Self-identity	Korean=1 and American=0

To diagnose potential multicollinearity, Pearson's correlations between intervening variables and tolerances were calculated. The more the tolerance approaches zero, the higher the intercorrelations of the variables. Correlations between intervening variables ranged between 0.00 and 0.63, and all tolerances for those variables from the multiple regression analyses were above 0.46. Thus, multicollinearity was not anticipated.

Additionally, to detect outliers, standard residuals for outcome variables in the regression analyses were computed. Outliers can influence regression equations, affecting R^2 and regression coefficients. However, no case whose absolute value of standard residuals was greater than 3.0 was found.

CHAPTER 4

RESULTS

This chapter presents the results of the study in four sections. The first section describes baseline comparisons of demographic characteristics and outcome variables – seat belt use and helmet use – between students who failed to complete the posttest and those who completed both the pretest and the posttest. In section two, baseline comparisons of demographic variables, outcome variables, and intervening variables between the control group and the intervention group are presented. Section three describes the impact of the Risk Watch curriculum. Finally, in section four, the association between changes in outcome variables and those in intervening variables between the baseline and the posttest are described.

Baseline Comparisons between Students Who Did Not Complete and Students Who Completed the Posttest

One hundred and fifty six students completed the pretest. Both the pretest and the posttest were completed by 102 students. No statistically significant differences were found between the 59 students who did not complete the posttest and the 102 students who completed both tests on most demographic variables: gender, intervention or control group assignment, grade level, birth of place, and self-identity (Table 4.1). However, students who failed to take the posttest were more likely to be older than those who completed the both tests, F (1, 152)= 4.61, p=.033. The mean age of the students who did not complete the posttest was slightly higher (M=8.8, SD = 2.64) than those who completed both tests (M=7.9, SD = 2.83). These two groups of students displayed no significant differences in safety behaviors and behavioral intentions of wearing a seat belt, wearing a helmet, and getting out of the house if a smoke detector sounds.

Table 4.1
Baseline comparisons of demographic characteristics between students who did not complete and those who completed the posttest

	Students who did not complete (n= 59) %	Students who completed (n= 102) %
Gender - % boys	56.1	51.5
Intervention type		
Control	66.1	52.9
Intervention	33.9	47.1
Grade level		
PreK, K	20.0	25.5
Grades 1, 2	20.0	24.5
Grades 3 to 8	60.0	50.0
Place of Birth		
United States	51.9	44.7
Korea	40.4	51.1
Other	7.7	4.3
Self-identity		
American	4.1	3.1
Korean	46.9	64.9
Korean-American	49.0	32.0
Age: Mean (SD)	8.8 (2.64)	7.9 (2.83)*

Note: Some percentages do not add up to 100% due to rounding.
Some variables do not have the same total number of participants due to missing data.
* p=.033

Baseline Comparisons between the Control and Intervention Groups

The purpose of this section is to identify whether or not the control group and the intervention group had pretest differences on demographic variables, outcome variables, and intervening variables.

The two groups had no statistically significant differences on demographic variables, which included gender, place of birth, self-identity, and age. A summary of the baseline comparisons of demographic characteristics is presented in Table 4.2.

Of PreK and K students, 69.6% reported they always wore a seat belt when they rode in a car. Ninety-two percentage of students owned a bicycle, and 43.5% of them reported they always wore a helmet when they rode a bicycle. The differences in those behaviors and behavioral intentions toward safety behaviors between the control group and the intervention group were not statistically significant (Table 4.3).

Of first and second graders, 40% reported they always wore a seat belt when they rode in a car. Eighty-four percentage of students owned a bicycle, and 19% of them indicated that they always wore a helmet when riding a bicycle. Of students in grades 3 to 8, 41% reported they always wore a seat belt when riding in a car. Eighty-two percentage of students reported they owned a bicycle, and 26% of them reported that they wore a helmet when they rode a bicycle. The differences in wearing a seat belt and wearing a helmet were not statistically significant between the control and the intervention groups among students in grades 1 to 8. Moreover, the baseline comparisons of behavioral intentions toward all safety behaviors between the control and intervention groups indicated there was no statistically significant difference for all grade levels (Table 4.4).

For PreK and K students, intervening variables included knowledge, perception of behavioral control and attitudes toward a safety behavior (Table 4.5). The PreK and K control and intervention groups did not show statistically significant differences on knowledge scores or attitudes toward all safety behaviors. However, statistically significant differences were found between the two groups on perceived behavioral control with the control group more likely to perceive that they could wear a seat belt correctly by themselves than those in the intervention group, χ^2 (1, $\underline{n}$ = 26) = 4.54, $\underline{p}$= 0.05.

Table 4.2

Baseline comparisons of demographic characteristics between control and intervention groups

	PreK & K		Grades 1 & 2		Grades 3 to 8	
	Control (n=11) %	Intervention (n=15) %	Control (n=10) %	Intervention (n=15) %	Control (n=33) %	Intervention (n=18) %
Gender - % boys	27.3	28.6	50.0	73.3	42.4	83.3
Place of Birth						
United States	57.1	41.7	20.0	42.9	42.4	61.1
Korea	42.9	58.3	80.0	35.7	54.5	38.9
Other	0.0	0.0	0.0	21.4	3.0	0.0
Self-identity						
American	0.0	20.0	0.0	0.0	0.0	0.0
Korean	100.0	73.3	100.0	66.7	60.6	33.3
Korean-American	0.0	6.7	0.0	33.3	39.4	66.7
Age: Mean (SD)	4.4 (0.81)	4.5 (0.74)	6.1 (0.74)	6.5(0.91)	10.3(1.42)	10.4(1.57)

Note: Some variables do not have the same total number of participants due to missing data.
Differences between two groups were not statistically significant.

Table 4.3
Baseline comparisons of safety behaviors and behavioral intentions between control and intervention groups - PreK and K

	Total (n=26) %	Control (n=11) %	Intervention (n=15) %
Behaviors			
Always wears a seat belt	69.6	88.9	57.1
Always wears a helmet [a]	43.5	55.6	35.7
Behavioral intentions [b]			
Will wear a seat belt	80.0	80.0	80.0
Will wear a helmet	79.2	90.0	71.4
Will get out if smoke detector sounds	68.0	70.0	66.7

Note: Some variables do not have the same total number of participants due to missing data. Differences between intervention and control groups were not statistically significant.

[a] Percentages were calculated among those who ride a bicycle.

[b] Percentage of students responding yes.

Table 4.4
Baseline comparisons of safety behaviors and behavioral intentions between control and intervention groups - grades 1 to 8

	Grades 1 & 2			Grades 3 to 8		
	Total (n=25) %	Control (n=10) %	Intervention (n=15) %	Total (n=51) %	Control (n=33) %	Intervention (n=18) %
Behaviors						
Always wears a seat belt	40.0	30.0	46.7	41.2	39.4	44.4
Always wears a helmet *	19.0	37.5	7.7	26.2	29.2	22.2
Behavioral intentions						
Will always wear a seat belt	60.0	60.0	60.0	62.0	54.5	76.5
Will always wear a helmet	58.3	70.0	50.0	42.2	39.4	47.1
Will always get out if smoke detector sounds	80.0	70.0	86.7	84.0	84.8	82.4

Note: Some variables do not have the same total number of participants due to missing data. Differences between intervention and control groups were not statistically significant at $p<0.05$.

* Percentages were calculated among those who ride bicycles.

Table 4.5
Baseline comparisons of intervening variables between control and intervention groups - PreK and K

	Total (n=26)	Control (n=11)	Intervention (n=15)
Knowledge			
Traffic safety (mean)	0.77	0.81	0.74
Bicycle and pedestrian safety (mean)	0.55	0.67	0.55
Fire safety (mean)	0.60	0.56	0.58
Perceived behavioral control [a]			
Seat belt use (%)	80.8	100.0	66.7*
Helmet use (%)	60.0	54.5	64.3
Escaping from house in fire situation (%)	72.0	81.8	64.3
Escaping if smoke detector sounds (%)	76.0	72.7	78.6
Attitudes			
Traffic safety (mean)	1.65	1.73	1.59
Bicycle and pedestrian safety (mean)	1.75	1.78	1.72
Fire safety (mean)	1.84	1.92	1.79

Note: Some variables do not have the same total number of participants due to missing data.
[a] Percentage of students responding yes.
* p=.05

For first and second graders, the knowledge scores of bicycle and pedestrian safety were statistically higher among control group students than intervention group students at baseline, F (1, 23)= 7.61, p=0.01. However, there were no statistically significant differences in overall perceived behavioral controls and attitudes toward all safety behaviors between the two groups.

In grades 3 to 8, intervention group students were more likely to have strong perceptions of behavioral control for wearing a helmet than control group students, F (1, 49)= 4.66, p=0.04. The analysis of baseline comparisons on knowledge scores, perceived behavioral control toward other safety behaviors, attitudes, and subjective norms between the control and intervention groups indicated there were no significant differences between two groups (Table 4.6).

Table 4.6
Baseline comparisons of intervening variables between control and intervention groups - Grades 1 to 8

	Grades 1 & 2		Grades 3 to 8	
	Control (n=10)	Intervention (n=15)	Control (n=33)	Intervention (n=18)
Knowledge	M	M	M	M
Traffic safety	0.70	0.65	0.56	0.56
Bicycle and pedestrian safety	0.83	0.63 *	0.71	0.70
Fire safety	0.73	0.56	0.66	0.70
Perceived control [a]				
Seat belt use	6.40	6.13	6.09	6.78 *
Helmet use	4.90	6.07	6.09	6.50
Fire related preventive behavior [b]	4.87	5.54	4.89	5.18
Subjective norms				
Seatbelt use				
Parents	5.30	4.93	5.27	5.56
Siblings [c]	--	--	3.39	4.00
Friends	4.00	3.86	4.15	3.94
Helmet use				
Parents	5.30	4.21	4.84	4.67
Siblings [c]	--	--	3.57	3.44
Friends	3.50	3.86	3.63	3.61
Escaping if smoke detector sounds				
Parents	6.00	6.53	6.69	7.00
Siblings [c]	--	--	7.10	7.56
Friends [c]	--	--	7.39	7.89
Attitudes				
Traffic safety	4.10	4.02	3.58	3.96
Bicycle and pedestrian safety	3.63	3.77	3.46	3.65
Fire safety	4.15	4.12	3.84	4.19

Note: Some variables do not have the same total number of participants due to missing data.
[a] Higher number indicates students perceive to perform it easily or confidently.
[b] It includes escaping from the house in fire, escaping if smoke detector sounds, and changing batteries of smoke detector.
[c] '--' These scales were excluded from the statistical analysis due to small valid sample size among the control group students in grades 1 & 2.
* $p<0.05$

Impact of the Risk Watch

The purpose of this section is to evaluate the impact of the Risk Watch curriculum based on hypotheses 1 and 2. The first hypothesis was that students from the intervention group would increase their safety behaviors and behavioral intentions, compared to the control group. The second hypothesis was that students in the intervention group would change positively their knowledge, perceived behavioral control, attitudes, and subjective norms, compared to the control group. Analysis of covariance (ANCOVA) was conducted to test for posttest differences between the control group and the intervention group using the pretest as a covariate to reduce the effects of pretest mean differences between the two groups. Additionally, effect sizes were calculated for statistically significant changes for the intervention effects, using Glass' delta (D) (Glass et al. 1981). A delta larger than .50 was considered as an important intervention effect. The effectiveness of the intervention in terms of subjective norms for siblings in all safety topics and for friends in the fire safety among students in grades 1 and 2 was evaluated only for the intervention group by paired t-tests because of the small sample size in the control group.

The intervention effects on outcome variables (safety behaviors and behavioral intentions) and on intervening variables (knowledge, perceived behavioral control, attitudes, and subjective norms) are presented for each variable in Table 4.7 and in Table 4.8, respectively. These tables include adjusted means (means for posttest adjusted for baseline value), mean differences, confidence intervals for the difference in means, F-tests, one tailed p-values, and effect sizes. Additionally, means and standard deviations of outcome variables and of intervening variables at baseline and posttest for each variable are presented in Appendix C and Appendix D, respectively.

Safety behaviors and behavioral intentions

In regard to safety behaviors, students were asked how often they wore a seat belt when they rode in a car and how often they wore a bicycle helmet when they rode a bicycle.

The students were able to indicate how frequency they practiced these safety behaviors by responding Never (1), Sometimes (2), or Always (3). PreK and K students in the intervention group showed a statistically higher adjusted posttest mean of seat belt use than those in the control group after the intervention, F (1, 19) = 4.63, p=0.02 (effect size (D) = 0.98). Additionally, students in the intervention group showed a marginally significant increase in helmet use after the intervention, compared to the control group, F (1, 18) = 2.73, p=0.06, D = 0.81. Although the mean difference on helmet use between the two groups was larger than the mean difference on seat belt use was, the effect size and the statistical significance of helmet use were lower than those of seat belt use because the standard deviation of helmet use was larger than that of helmet use among PreK and K students (Appendix C). Students in the intervention group showed statistically positive changes in behavioral intentions to wear a seat belt and to wear a helmet, compared to those in the control group (F (1, 22) = 5.91, p=0.01, D= 0.91; F (1, 21) = 13.16, p=0.00, D= 0.74, respectively). However, for the behavioral intention to get out of the house when a smoke detector sounds, although intervention group students showed a positive change, it was not statistically significant (Table 4.7).

For students in grades 1 and 2, a statistically significant adjusted posttest mean difference between the control group and the intervention group was found on helmet use, F (1, 15) = 3.27, p=0.05, D=0.81. However, no statistically significant intervention effects were found on wearing a seat belt and behavioral intentions for all safety behaviors.

Among students in grades 3 to 8, the intervention group showed a significantly higher adjusted posttest mean score on wearing a seat belt after the intervention than the control group, F (1, 48) = 4.37, p=0.02, D=0.52. However, no statistically significant differences on the behavior of wearing a helmet nor behavioral intentions for all safety behaviors were detected between the two groups (Table 4.7).

Intervening variables

Among PreK and K students, significant improvements of knowledge scores were found in the intervention group while the control group students reported consistent knowledge scores of all topics from pretest to posttest (for traffic safety, F (1, 23) = 17.40, p=0.00, D=1.18; for bicycle and pedestrian safety, F (1, 23) = 7.21, p=0.01, D=0.95; for fire safety, F (1, 23) = 43.80, p=0.00, D=1.54) (Table 4.8). Additionally, students in the intervention group experienced a significant intervention effect on their perceived behavioral control of getting out of the house when a fire occurs and when the smoke detector sounds (F (1, 22) = 4.18, p=0.03, D=0.83). Moreover, students in the intervention group showed statistically positive changes in attitudes toward traffic, bicycle and pedestrian, and fire safeties than those in the control group (F (1, 22) = 13.78, p=0.00, D= 1.34; F (1, 21) = 4.15, p=0.03, D= 0.93; F (1, 22) = 4.13, p=0.03, D= 0.84, respectively). However, no statistically significant intervention effects were found on students' perception of behavioral control toward wearing a seat belt and wearing a helmet (Table 4.8).

For students in grades 1 and 2, the intervention group had statistically significant increases in knowledge scores for all safety topics after the intervention, compared to the control group (F (1, 22) = 20. 04, p=0.00, D=1,38 for traffic safety; F (1, 22) = 13. 46, p=0.00, D=1.39 for bicycle and pedestrian safety; F (1, 22) = 10.34, p=0.00, D=0.87 for fire safety). The effect sizes for adjusted posttest means of knowledge ranged from 1.14 to 1.39. Students in the intervention group showed a higher degree of subjective norms for parents regarding wearing a seat belt, wearing a helmet, and escaping from the house when a smoke detector sounds at posttest than those in the control group, F (1, 21) = 2. 29, p=0.07, D=0.63; F (1, 18) = 3. 27, p=0.04, D=0.78; F (1, 18) = 4.96, p=0.04, D=0.84, respectively. No differences in perceived behavioral control and attitudes toward all safety topics at posttest were found between the two groups (Table 4.8). Paired t-tests revealed no significant changes in subjective norms for siblings in all safety topics and no

significant changes in subjective norms for friends in the fire safety topic among students in the intervention group.

For students in grades 3 to 8, the differences in adjusted means of knowledge scores at posttest between the control and intervention groups were statistically significant (Table 4.8). Students in the intervention group increased their knowledge of traffic safety by 51%, of bicycle and pedestrian safety by 20%, and of fire safety by 25% after the intervention. Additionally, students in the intervention group showed a statistically higher adjusted posttest mean of perceived behavioral control in performing fire-related preventive behaviors than those in the control group, F (1, 44) = 9.41, p=0.00, D=0.80. However, there were no significant adjusted posttest mean differences on subjective norms and attitude scales between the control group and the intervention group.

Intervention effects on all variables are summarized in Table 4.9, based on the effect sizes.

Association of Changes in Outcome Variables with Changes in Intervening Variables between the Pretest and Posttest

The purpose of this section is to identify the association between changes in outcome variables (behaviors and behavioral intentions) that increased significantly following the intervention and changes in intervening variables (perceived behavioral control, attitudes, and subjective norms) between the pretest and the posttest, using hierarchical blockwise multiple linear regression analyses.

For changes in safety behaviors, the four blocks entered into the regression analysis were composed of (1) a change in behavioral intention, (2) changes in constructs of the theory of planned behavior (perceived behavioral control, attitudes, and subjective norms for parents and for friends), (3) a change in knowledge scores, and (4) demographic variables.

Table 4.7

Intervention effects in outcome variables between control and intervention groups

		Adjusted [a]		Mean	95% CI		F	p[c]	Effect
		M_C	M_I	Difference	Lower	Upper			Size
PreK and K									
Behaviors	Wearing a seat belt	2.26	2.89	0.63	0.02	1.24	4.63	0.02	0.98
	Wearing a helmet	2.00	2.64	0.64	-0.17	1.45	2.73	0.06	0.81
Behavioral intentions	Wearing a seat belt	0.70	1.00	0.30	0.04	0.56	5.91	0.01	0.91
	Wearing a helmet	0.49	1.01	0.52	0.22	0.83	13.16	0.00	0.74
	Getting out of the house [b]	0.90	1.00	0.10	-0.07	0.27	1.44	0.12	0.50
Grades1 and 2									
Behaviors	Wearing a seat belt	2.50	2.60	0.09	-0.34	0.53	0.20	0.33	0.18
	Wearing a helmet	1.96	2.66	0.70	-0.13	1.52	3.27	0.05	0.81
Behavioral intentions	Wearing a seat belt	2.78	2.88	0.10	-0.22	0.42	0.43	0.26	0.27
	Wearing a helmet	2.65	2.61	-0.05	-0.66	0.56	0.03	0.44	-0.07
	Getting out of the house [b]	2.85	2.84	-0.01	-0.23	0.20	0.01	0.46	-0.02
Grades 3 to 8									
Behaviors	Wearing a seat belt	2.35	2.63	0.28	0.01	0.56	4.37	0.02	0.52
	Wearing a helmet	1.75	2.03	0.28	-0.20	0.76	1.42	0.12	0.34
Behavioral intentions	Wearing a seat belt	2.59	2.67	0.08	-0.15	0.31	0.47	0.25	0.16
	Wearing a helmet	2.35	2.36	0.01	-0.31	0.32	0.00	0.48	0.01
	Getting out of the house [b]	2.91	2.94	0.03	-0.14	0.20	0.12	0.36	0.11

Note: a 'Adjusted' refers to ANCOVA-adjusted means at posttest using a pretest as a covariate.

Adjusted M_C = adjusted mean for control group students; Adjusted M_I = adjusted mean for intervention group students.

[b] Getting out of the house when a smoke detector sounds.

[c] One tailed p-value, which was obained from the original p divided by 2, where the direction of the sample differences were consistent with the research hypotheses

Table 4.8

Intervention effects in intervening variables between control and intervention groups

	Adjusted [a]		Mean	95% CI		F	p [c]	Effect
	M_C	M_I	Difference	Lower	Upper			Size
PreK and K								
Knowledge of								
Traffic safety	0.79	0.99	0.20	0.10	0.30	17.40	0.00	1.18
Pedestrian/Bicycle safety	0.69	0.89	0.20	0.03	0.36	6.21	0.01	0.95
Fire safety	0.51	0.88	0.37	0.26	0.49	43.80	0.00	1.54
Perceived control toward								
Wearing a seat belt	1.74	1.92	0.18	-0.14	0.50	1.40	0.12	0.49
Wearing a helmet	1.73	1.86	0.13	-0.22	0.48	0.59	0.22	0.33
Getting out of the house [b]	0.62	0.94	0.33	0.00	0.66	4.18	0.03	0.83
Attitudes toward								
Seat belt	1.62	1.96	0.33	0.15	0.52	13.78	0.00	1.34
Helmet	1.60	1.90	0.30	-0.01	0.61	4.15	0.03	0.93
Smoke detector	1.73	1.92	0.18	-0.01	0.38	4.13	0.03	0.84

Note: [a] 'Adjusted' refers to ANCOVA-adjusted means at posttest using a pretest as a covariate.

Adjusted M_C = adjusted mean for control group students; Adjusted MI = adjusted mean for intervention group students.

[b] It includes getting out of the house in case of fire, getting out the house when a smoke detector sounds, and changing batteries of smoke detectors.

[c] One tailed p-value, which was obtained from the original p divided by 2, where the direction of the sample differences were consistent with the research hypotheses

(table continues)

Table 4.8 (continued)

Intervention effects in intervening variables between control and intervention groups

	Adjusted [a]		Mean	95% CI		F	p[c]	Effect
	M_C	M_I	Difference	Lower	Upper			Size
Grades 1 and 2								
Knowledge of								
Traffic safety	0.75	0.93	0.18	0.10	0.27	20.04	0.00	1.38
Pedestrian/Bicycle safety	0.72	0.97	0.25	0.11	0.39	13.46	0.00	1.39
Fire safety	0.70	0.94	0.24	0.09	0.40	10.34	0.00	1.14
Perceived control toward								
Wearing a seat belt	6.60	6.87	0.27	-0.51	1.04	0.51	0.24	0.31
Wearing a helmet	6.50	6.93	0.43	-0.36	1.22	1.30	0.13	0.37
Conducting fire related preventive behaviors	5.14	5.64	0.49	-0.48	1.47	1.10	0.15	0.44
Subjective norms								
Seatbelt use - Parents	4.74	5.40	0.66	-0.25	1.57	2.29	0.07	0.63
Seatbelt use - Friends	3.77	3.66	-0.11	-1.42	1.20	0.03	0.43	-0.07
Helmet use - Parents	4.49	5.47	0.97	-0.15	2.09	3.27	0.04	0.78
Helmet use - Friends	4.30	3.57	-0.74	-1.71	0.24	2.47	0.07	-0.55
Escape [c] - Parents	5.03	6.85	1.82	0.10	3.55	4.96	0.02	0.84

Note: [a] 'Adjusted' refers to ANCOVA-adjusted means at posttest using a pretest as a covariate.

Adjusted M_C = adjusted mean for control group students; Adjusted MI = adjusted mean for intervention group students.

[b] It includes getting out of the house in case of fire, getting out the house when a smoke detector sounds, and changing batteries of smoke detectors.

[c] One tailed p-value, which was obtained from the original p divided by 2, where the direction of the sample differences were consistent with the research hypotheses

(table continues)

Table 4.8 (continued)

Intervention effects in intervening variables between control and intervention groups

	Adjusted [a]		Mean	95% CI		F	p [c]	Effect
	M_C	M_I	Difference	Lower	Upper			Size
Grades 1 and 2								
Attitudes toward								
Seat belt use	4.49	4.33	-0.15	-0.77	0.46	0.46	0.14	-0.21
Helmet use	4.20	4.39	0.19	-0.52	0.90	0.32	0.29	0.19
Smoke detector	4.18	4.12	-0.01	-0.58	0.46	0.06	0.41	-0.02
Grades 3 to 8								
Knowledge of								
Traffic safety	0.54	0.85	0.31	0.22	0.40	48.15	0.00	1.35
Pedestrian/Bicycle safety	0.73	0.81	0.08	0.03	0.13	9.14	0.00	0.66
Fire safety	0.63	0.86	0.23	0.16	0.30	43.14	0.00	1.21
Perceived control toward								
Wearing a seat belt	6.30	6.29	-0.01	-0.59	0.57	0.00	0.49	-0.01
Wearing a helmet	6.38	6.38	0.00	-0.59	0.59	0.00	0.50	0.00
Conducting fire-related preventive behaviors [b]	5.17	6.00	0.83	0.29	1.38	9.41	0.00	0.80

Note: [a] 'Adjusted' refers to ANCOVA-adjusted means at posttest using a pretest as a covariate.

Adjusted M_C = adjusted mean for control group students; Adjusted MI = adjusted mean for intervention group students.

[b] It includes getting out of the house in case of fire, getting out the house when a smoke detector sounds, and changing batteries of smoke detectors.

[c] One tailed p-value, which was obtained from the original p divided by 2, where the direction of the sample differences were consistent with the research hypotheses

(table continues)

Table 4.8 (continued)

Intervention effects in intervening variables between control and intervention groups

	Adjusted [a]		Mean	95% CI		F	p[c]	Effect
	M_C	M_I	Difference	Lower	Upper			Size
Grades 3 to 8								
Subjective norms								
Seatbelt use - Parents	5.14	5.21	0.07	-0.48	0.63	0.07	0.40	0.06
Seatbelt use - Siblings	3.57	3.62	0.04	-0.85	0.93	0.01	0.46	0.02
Seatbelt use - Friends	3.97	4.06	0.10	-0.76	0.95	0.05	0.41	0.07
Helmet use - Parents	4.78	4.97	0.19	-0.55	0.92	0.26	0.30	0.13
Helmet use - Siblings	3.51	3.54	0.03	-0.76	0.82	0.01	0.47	0.02
Helmet use - Friends	3.99	3.69	-0.30	-1.02	0.42	0.71	0.20	-0.18
Escape [d] - Parents	7.34	7.19	-0.15	-1.14	0.83	0.10	0.38	-0.08
Escape - Siblings	7.36	7.99	0.63	-0.46	1.72	1.35	0.13	0.36
Escape - Friends	7.46	7.69	0.23	-0.67	1.12	0.27	0.30	0.15
Attitudes toward								
Seat belt use	3.77	4.07	0.30	-0.80	0.68	2.49	0.06	0.33
Helmet use	3.84	3.86	0.02	-0.37	0.42	0.01	0.46	0.02
Smoke detector	4.01	4.24	0.23	-0.06	0.52	2.38	0.07	0.37

Note: [a] 'Adjusted' refers to ANCOVA-adjusted means at posttest using a pretest as a covariate.

Adjusted M_C = adjusted mean for control group students; Adjusted MI = adjusted mean for intervention group students.

[c] One tailed p-value, which was obtained from the original p divided by 2, where the direction of the sample differences were consistent with the research hypotheses

[d] "escape" refers getting out of the house when a smoke detector sounds.

Table 4.9
Summary of intervention effects

Variables	PreK and K	Grades 1 & 2	Grades 3 to 8
Behaviors			
Seat belt use	Important	--	Important
Helmet use	Important	Important	--
Behavioral intentions			
Seat belt use	Important	--	--
Helmet use	Important	--	--
Escape [a]	--	--	--
Knowledge			
Traffic safety	Important	Important	Important
Bicycle and pedestrian safety	Important	Important	Important
Fire safety	Important	Important	Important
Perceived control			
Seat belt use	--	--	--
Helmet use	--	--	--
Fire related behavior	Important	--	Important
Subjective norms			
Seatbelt use - Parents	na[b]	Important	--
Seatbelt use - Siblings	na	--	--
Seatbelt use - Friends	na	--	--
Helmet use - Parents	na	Important	--
Helmet use - Siblings	na	--	--
Helmet use - Friends	na	--	--
Escape [a] - Parents	na	Important	--
Escape [a] - Siblings	na	--	--
Escape [a] - Friends	na	--	--
Attitudes toward			
Seat belt	Important	--	--
Helmet	Important	--	--
Smoke detector	Important	--	--

Note. important : Effect size (Delta) > 0.50, '--' : Effect size $\leq$0.50

[a] Escape - getting out of the house when a smoke detector sounds.

[b] Not available

For changes in behavioral intentions, changes in TPB constructs were entered into the regression equation first, followed by the block for knowledge score change and the last block for demographic variables. The results of the hierarchical blockwise regression analyses are summarized in Table 4.12 to Table 4.16. The results displayed include possible regression models, their added blocks, R^2, the change in the R^2, the F-statistic and the significance (p-value) of the change in R^2.

PreK and K

Multiple regression analysis for a change in wearing a seat belt with four blocks of changes in intervening variables and demographic variables revealed that only the first model that included the first block for a change in behavioral intention to wear a seat belt led to a significant R^2 for a behavior change in wearing a seat belt (Table 4.10).

Students who had an increase in a behavioral intention to wear a seatbelt were more likely to have an increase in actual seatbelt use. The first block explained 22% of the variance of the increase in wearing a seat belt ($p=0.04$). Although the second block for changes in TPB determinants of behavioral intention (perceived behavioral control and attitudes), the third block for a change in knowledge, and the final block for demographic variables were entered in regression models consecutively, their increments in R^2 for a change in wearing a seat belt were not statistically significant. For a change in wearing a helmet, the first model that included the first block, a change in behavioral intention to wear a bicycle helmet, showed the highest increment in R^2 for a behavior change in wearing a helmet, but it was not statistically significant nor was the increment in R2 significant for the other models that had other blocks (Table 4.11).

For a change in behavioral intention for wearing a seat belt as an outcome variable, hierarchical blockwise multiple regression analysis produced one statistically significant regression model (Table 4.12). The first block, which included a change in perceived behavioral control and a change in attitudes toward seat belt use, had the highest increment in R^2 for the increase in behavioral intention for wearing a seat belt,

accounting for 53% of the variance on the positive change in behavioral intention (p= 0.00). For a change in behavioral intention for wearing a helmet, the first model, which included the changes of TPB constructs, showed a higher increment in R^2 than other models that included other blocks of a change in knowledge about bicycle and pedestrian safety and demographic variables, but no R^2 increments were statistically significant (Table 4.13).

Grades 1 to 8

In the hierarchical blockwise multiple regression analysis for a change in wearing a seat belt, the second model, which included the first block for a change in behavioral intention to wear a seat belt and the second block for changes in TPB constructs, produced the highest R^2 increments (Change in $R^2 = 0.11$), but it was not statistically significant. Inclusion of the block for knowledge change and demographic variables did not show significant R^2 increments (Table 4.14). For an increase in helmet use, while the first model, which had the block of TPB constructs, and the second model, which included the first block and the second block of change in TPB constructs, did not produce any statistically significant R^2 increments, the inclusion of the third block of knowledge change in the third model had a significant increment of R^2 in helmet use change (Change in $R^2 = 0.17$, $F=9.43$, $p=0.00$). Additionally, in the last model, demographic variables added a significant R^2 increment in the explained variance (Change in $R^2 = 0.21$, $F=3.69$, $p=0.01$) (Table 4.15). Younger students had more helmet use increase than older students.

Table 4.10

Summary of hierarchical multiple regression analysis for a change in wearing a seat belt - PreK and K (n=19)

Model	Blocks	R^2	R^2 Change	F for R^2 Change	p
1	Block 1	0.22	0.22	4.79	0.04
2	Block 1 + 2	0.34	0.12	1.42	0.27
3	Block 1 + 2 + 3	0.42	0.07	1.75	0.21
4	Block 1 + 2 + 3 + 4	0.49	0.08	0.90	0.43

Note: Block 1 includes a change in behavioral intention to wear a seat belt
Block 2 includes changes in perceived behavioral control and attitudes
Block 3 includes changes in knowledge about traffic safety
Block 4 includes demographic variables (gender & grade level)

Table 4.11

Summary of hierarchical multiple regression analysis for a change in wearing a helmet - PreK and K (n=15)

Model	Blocks	R2	R2 Change	F for R2 Change	p
1	Block 1	0.06	0.06	0.82	0.38
2	Block 1 + 2	0.11	0.05	0.33	0.72
3	Block 1 + 2 + 3	0.13	0.01	0.14	0.71
4	Block 1 + 2 + 3 + 4	0.14	0.02	0.09	0.92

Note: Block 1 includes change in behavioral intention to wear a helmet
Block 2 includes changes in perceived behavioral control and attitudes
Block 3 includes changes in knowledge about bicycle and pedestrian safety
Block 4 includes demographic variables (gender & grade level)

Table 4.12

Summary of hierarchical multiple regression analysis for a change in behavioral intention for seatbelt use - PreK and K (n=22)

Model	Blocks	R^2	R^2 Change	F for R^2 Change	p
1	Block 1	0.53	0.53	10.89	0.00
2	Block 1 + 2	0.60	0.06	2.89	0.11
3	Block 1 + 2 + 3	0.68	0.08	1.93	0.18

Note: Block 1 includes changes in perceived behavioral control and attitudes for wearing a seat belt
Block 2 includes changes in knowledge about traffic safety
Block 3 includes demographic variables (gender & grade level)

Table 4.13

Summary of hierarchical multiple regression analysis for a change in behavioral intention for helmet use - PreK and K (n=18)

Model	Blocks	R^2	R^2 Change	F for R^2 Change	p
1	Block 1	0.22	0.22	2.17	0.15
2	Block 1 + 2	0.32	0.10	2.06	0.17
3	Block 1 + 2 + 3	0.33	0.01	0.10	0.91

Note: Block 1 includes changes in perceived behavioral control and attitudes for wearing a bicycle helmet
Block 2 includes changes in knowledge about bicycle and pedestrian safety
Block 3 includes demographic variables (gender & grade level)

Table 4.14

Summary of hierarchical multiple regression analysis for a change in wearing a seatbelt - Grades 1 to 8 (n=67)

Model	Blocks	R^2	R^2 Change	F for R^2 Change	p
1	Block 1	0.04	0.04	2.85	0.10
2	Block 1 + 2	0.15	0.11	1.87	0.13
3	Block 1 + 2 + 3	0.17	0.02	1.60	0.21
4	Block 1 + 2 + 3 + 4	0.19	0.02	0.37	0.83

Note: Block 1 includes a change in behavioral intention to wear a seat belt
Block 2 includes changes in perceived behavioral control, attitudes, subjective norms for parents, and subjective norms for friends
Block 3 includes a change in knowledge about traffic safety
Block 4 includes demographic variables (gender, grade level, place of birth, & self-identity)

Table 4.15

Summary of hierarchical multiple regression analysis for a change in wearing a helmet - Grades 1 to 8 (n=48)

Model	Blocks	R^2	R^2 Change	F for R^2 Change	p
1	Block 1	0.03	0.03	1.16	0.29
2	Block 1 + 2	0.09	0.07	0.74	0.57
3	Block 1 + 2 + 3	0.26	0.17	9.43	0.00
4	Block 1 + 2 + 3 + 4	0.48	0.21	3.69	0.01

Note: Block 1 includes change in behavioral intention to wear a helmet
Block 2 includes changes in perceived behavioral control, attitudes, subjective norms for parents, and subjective norms for friends
Block 3 includes changes in knowledge about bicycle and pedestrian safety
Block 4 includes demographic variables (gender, grade level, place of birth, & self-identity)

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to evaluate the impact of the Risk Watch curriculum among Korean school students in Atlanta. The first hypothesis referred to the impact of the intervention on the outcome variables of students' safety behaviors and behavioral intentions to perform the safety behaviors. It was hypothesized that students from the intervention group would increase their safety behaviors and behavioral intentions, compared to the control group. The second hypothesis was that students in the intervention group would increase their knowledge, perceived behavioral control, attitudes, and subjective norms, compared to the control group. The final hypothesis was that changes in outcome variables (safety behaviors and behavioral intentions) would be associated with the changes in intervening variables (knowledge, perceived behavioral control, attitudes, and subjective norms).

This chapter provides conclusions and discussion of the study, focusing on two major results: the impact of the intervention on all outcome and intervening variables and the association between changes in the outcome variables and those in the intervening variables. Additionally, study limitations and recommendations for the Risk Watch curriculum and for unintentional injury prevention programs for school children are presented.

Discussion and Conclusion

Impact of the intervention

Overall, the Risk Watch had significant impact on increasing students' behaviors and knowledge. The intervention effects can be discussed specifically by grade levels. PreK and K students exhibited more intervention effects in safety behaviors and behavioral intentions than students in grades 1 to 8. This difference could be explained

by several facts. Younger children (aged 3 to 5 years) may be more likely than older children to establish new routines with a minimum of resistance, maybe because they tend to like learning new concepts and pleasing adults who are significant to them by following their directions (Dodge, 1995).

The 3-week intervention may not have long enough to change older children's safety behaviors and behavioral intentions. Similarly, other studies that had short periods of intervention have failed to impact safety behaviors among middle and high school students (Neuwel, Coe, Wilkinson, & Avolio, 1989; Wright, Rivara, & Ferse, 1995). However, the effects of the intervention on behaviors can appear later on because a behavior change may take a longer period of time than was measured. For example, Miller and Davis (1984) found that the intervention effects on students' safety behaviors were detected at the 5-month follow-up posttest but not at the first posttest. Therefore, a follow-up test for this study should be conducted.

Another possible explanation may include a measurement effect. While students in grades 1 to 8 answered the questionnaire by themselves, PreK and K students were assisted on an individual basis by volunteers. Younger children's interest in pleasing adults may have influenced the positive answers they provided to their assisting volunteer.

Finally, different curricula by grade levels may influence the different changes in safety behaviors and behavioral intentions. The Risk Watch may be more appropriate for young children. However, the different intervention effects by age group should be further investigated.

As expected, strong intervention effects were found on increasing knowledge about all safety topics and among all age groups. Similarly, most interventions described in the literature have successfully increased children's knowledge (Miller & Davis, 1984; Arneson & Triplett, 1990; Neuwel, Coe, Wilkinson, & Avolio, 1989). This finding

supports that the Risk Watch is a well-developed curriculum for increasing students' knowledge.

On the other hand, few intervention effects were found on students' perceived behavioral control, attitudes, and subjective norms. The Risk Watch curriculum may not be strong enough to affect students' perception of behavioral control, attitudes, and subjective norms for safety behaviors because this curriculum was developed mainly to increase knowledge and skills. However, several possible explanations can be provided for the lack of intervention effects on those variables among students in grades 1 to 8.

First, students in the intervention group had high perception of behavioral control and attitudes toward safety behaviors at baseline; thus, changes were more difficult to achieve. Second, in regard to attitudes, other studies have also failed to find intervention effects on improving attitudes toward seat belt use or helmet use (Neuwel, Coe, Wilkinson, & Avolio, 1989; Wright, Rivara, & Ferse, 1995). According to the theory of planned behavior, attitudes should be measured by two constructs: individual's beliefs about outcomes or attributes of performing the behavior (behavioral beliefs) and evaluations of those outcomes or attributes (Ajzen, 1991). However, in this study, attitudes were measured only by outcome evaluation toward seat belt use, bicycle helmet use, and response to smoke detectors. Measuring attitudes with one of their components may have resulted in an inadequate measurement of the intervention effects on attitudes. Third, the measurement instrument itself may have contributed to the low intervention effects on several subjective norms because of the low reliabilities of these subjective norm scores. Finally, developmental theory provides some explanation for weak intervention effects on TPB constructs. In their early intellectual development, young children may not have attained the capacity to respond to the questions related to subjective norms and perceived behavioral control. For example, to assess students' subjective norms, students were asked how they perceived referents' (parents, siblings, and friends) concern or approval about their safety behaviors. Because young children

have difficulty in retrieving others' beliefs about their safety behaviors, these questions may not have assessed the subjective norms well. Similarly, little confidence can be placed in assessment of the perceived behavioral control among young children because adopting behaviors such as helmet use or seat belt use are dependent on their parents' help.

Association between changes in safety behaviors or behavioral intentions and changes in intervening variables

For PreK and K students, a change in students' behavioral intention to perform a behavior, that of wearing a seat belt, was more likely to explain an increase in their subsequent seat belt use than were demographic variables or a change in their knowledge score. Similarly, for predicting a change in the behavioral intention to wear a seat belt, the changes in TPB constructs (perceived behavioral control and attitudes) seemed more likely to explain the change in behavioral intention than the change in knowledge. On the other hand, among older students (first to eighth graders), the increased frequency of wearing a helmet was more likely to be explained by the knowledge change with the grade level than by the change in behavioral intention and changes in the TPB constructs. As students gained knowledge about bicycle and pedestrian safety, they increasingly reported helmet use. Younger students reported more helmet use increase than older students.

While the knowledge increase was more likely to explain the behavior change (helmet use) among older students, the changes in TPB constructs were more likely to explain the change in a safety behavior (seat belt use) or behavioral intention to perform it among PreK and K students. For PreK and K, a threshold level of knowledge and understanding may be necessary for some behaviors to occur, such as recognizing how dangerous it is to ride in a car without fastening a seat belt. However, even after that level of knowledge is attained, additional information does not necessarily promote additional behavior change in young children. According to Green and Kreuter (1991),

an increase in knowledge alone does not always lead to behavior change. Health knowledge of some kind is necessary before a conscious personal health behavior can occur, but the desired health behavior does not occur unless a person receives a cue strong enough to trigger the motivation to act on that knowledge. Therefore, although increased knowledge did not explain the variance of behavior change or behavioral intention change among PreK and K students, the knowledge that they gained from the intervention may be able to reinforce safety behaviors later on.

For grades 1 to 8, the changes in TPB constructs were not much associated with the behavior change although students in grades 1 and 2 had statistically significant intervention effects on subjective norms for parents. This may be because, in the hierarchical multiple regression analyses, the data for grades 1 and 2 and data for grades 3 to 8 were combined, and the subjective norms were grouped with other TPB constructs that did not have statistically significant increases in one block, so the effects for association between changes in safety behaviors and changes in TPB constructs must have been diminished. Therefore, if the analyses are conducted with data for grades 1 and 2 separately, the effects on subjective norms will be identified as an important predictor for behavior change. Additionally, the examination of the association between a behavior change and an individual TPB construct will be necessary to identify which variable best explains children's positive behavior change for future study.

In summary, the Risk Watch curriculum was effective in increasing some safety behaviors and behavioral intentions, all safety knowledge, and several components of safety behaviors among Korean-American students. The positive changes in safety behaviors and behavioral intentions were more likely to be associated with an increase in the TPB constructs among PreK and K and with an increase in knowledge among grades 1 to 8. Therefore, to increase students' seat belt use and helmet use and those related behavioral intentions to perform these actions effectively, interventions may need to

focus on increasing related TPB constructs, as well as knowledge, among PreK and K and on increasing knowledge among older students.

Study Limitations

This study has several limitations that should be considered. One of the primary limitations of this study was a small sample size due to the difficulty of recruiting Korean-American students attending Korean schools in the summer. The sample size may account for the lack of significant intervention effects and low statistical power on the several variables. However, considering that the changes on most of those variables were in the right direction, the intervention effects would have continued to be significant in this direction with a larger sample size.

Since the curriculum was implemented by grade levels, evaluating the intervention effects by grade levels was necessary. The data were analyzed separately for PreK and K students and for Grades 1 and 2. However, due to the small sample size among students in higher-grade levels, it was impossible to separate them by grade levels for the analyses. Thus, controlling the effect of grade levels was necessary in the hierarchical blockwise multiple linear regression analyses.

Another limitation was the high attrition rate of participants. The participating schools were not regular public schools but rather supplemental schools that are managed by the Korean community or Korean churches and experience inconsistent summer attendance rates because of family activities. However, the baseline comparisons between students who did not complete and those who did complete the posttest showed that students in these two groups did not differ on key variables related to this study.

The theory of planned behavior provided the theoretical framework for all scale items for perceived behavioral control, attitudes, and subjective norms. The psychometric properties for perceived behavioral control, attitudes, and some of subjective norms scales were good. I hope that the development of these scales will contribute to the literature. However, the internal consistencies of some other subjective

norm scores were low. As stated before, this measurement problem may be attributed to the difficulty children have in assessing others' beliefs about their safety behaviors. Additionally, students showed high baseline scores on attitudes and perceived behavioral control toward safety behaviors, limiting the possibility of detecting intervention effects on those variables. Therefore, the instruments for those variables need to be further refined, although this was a good initial scale.

The last limitation was the use of a nonequivalent control group design. Random assignment was not possible because few Korean schools were available in the Atlanta area and student enrollment in these schools was low. Although the study design was not as strong as a true experimental design, the baseline comparisons between the control and the intervention groups found no differences on demographic variables, outcome variables, and most intervening variables. Additionally, to examine the effectiveness of the intervention, the effects of pretest score differences between the control and intervention groups were statistically controlled to compare adjusted posttest mean differences using the analysis of covariance.

Recommendations for the Risk Watch Curriculum

Based on the experience and findings of this study, several recommendations are provided to improve the Risk Watch curriculum.

Evaluation instruments.

The Risk Watch curriculum provides established evaluation instruments in its manuals for all grade levels. However, the instruments contain few knowledge questions for each topic, and most questions are quite easy. If only a few safety topics are selected for teaching, it is difficult to evaluate the impact of the curriculum on knowledge with the provided questions. Therefore, more appropriate questions should be developed and included. Additionally, the instruments should include more questions to measure students' safety behaviors, as well as related components such as behavioral intention or attitudes.

Parental involvement.

Performance of safety behaviors by children is largely dependent on parents' help or interest. For example, although a child may have increased awareness of the importance of, as well as a behavioral intention to wear a bicycle helmet, if his or her parents do not purchase a helmet, the child does not have the capability to adopt this behavior. The manual for the Risk Watch curriculum includes caregiver letters, which provide brief information about all lessons to inform parents why the safety and injury topics are important, what their child is learning from the lesson, and what they can do to promote their child's safety at home. However, all information is grouped into one section of the caregiver letter. In the present study, the parents' letters were separated by the safety topics and included more information related to their children's safety behaviors. Additionally, I included children's prevalence of seat belt use and helmet use at baseline so that parents would know that the rates were low. The letters were translated into Korean and sent to parents through students' hands following the topic of the day. Students were asked to bring them back after obtaining their parents' signature. PreK and K students and first and second graders were more likely to bring it back well than older students. Additionally, students' subjective norms for parents were statistically increased after the intervention among students in grades 1 and 2. Therefore, I would suggest mailing the caregiver letters to parents instead of handing them over to students in order to add additional weight to the importance of this information and to ensure their delivery.

Other components of safety behaviors.

For PreK and K students, the changes in behavioral intention and its related constructs such as perceived behavioral control and attitudes were more likely to be associated with a behavior change or behavioral intention change. Therefore, I would suggest emphasizing these components in the curriculum. Strengthening these

components could help this curriculum serve as a valuable tool for promoting safety behaviors.

Recommendations for Unintentional Injury Prevention Interventions for School Children

1) Unintentional injury prevention programs for school children should be implemented in the early years of their schooling.

The results of this study indicated PreK and K students were more likely to have strong intervention effects than students in grades 1 and 2 and grades 3 to 8. Therefore, I would suggest implementing unintentional injury prevention programs for children in the early years of their schooling.

2) Unintentional injury prevention programs should be developed to impact other cognitive components of safety behaviors in addition to knowledge.

The results of this study provided several unique insights that should be considered in the future development of unintentional injury prevention programs for children. While many school-based unintentional injury prevention programs have focused on increasing knowledge for students, the results of this study showed that the TPB constructs were also associated with a change in behavior or behavioral intention as well as in knowledge. Therefore, several recommendations related to this issue can be suggested:

- Identify the effect of specific factors associated with children's safety behaviors.
- Develop unintentional injury prevention programs to impact other factors (e.g., perceived behavioral control) for increasing safety behaviors or behavioral intentions, as well as those related to knowledge.
- Develop theory-driven interventions to achieve more successful intervention effects.

3) Follow-up research should be conducted.

The present study only investigated the short-term impact of the interventions. Therefore, it remains uncertain whether the intervention effects found will be sustained in the long run and whether the effects not found will appear later on. Thus, follow-up research among participating students is recommended.

4) Finally, interventions for unintentional injury prevention are recommended to provide information in several languages for parents who are diverse in ethnicity.

This study, which was conducted among Korean-American students, had more and stronger intervention effects than previous studies, which were conducted among more ethnically diverse students. A possible explanation could be that interventions are more likely to be effective when they are integrated into the community and when approaches are tailored to address unique community characteristics, such as ethnicity or socioeconomic status (Klassen et al., 2000). Another reason may be that while students in public schools receive some safety education, parents who do not read or converse in English may not be aware of this instruction and are, therefore, unlikely to reinforce the wearing of seat belts or wearing of helmets, for example. However, the caregiver letters for parents delivered in this intervention were translated into Korean, perhaps providing some parents with this information in an understandable format for the first time. Therefore, interventions for unintentional injury prevention for children are recommended to include information about their lessons or activities in diverse languages for parents who are not fluent in English in order to reinforce the impact of the intervention on their child's safety behavior change. Additionally, because the Risk Watch curriculum showed promising results, this program should be replicated in other settings, including culturally diverse schools.

In conclusion, injury among children is a major public health issue although it is predictable and often preventable. Safety behaviors such as seat belt use or helmet use can reduce the occurrence of severe injuries and death among children. Our children

should adopt safety behaviors to protect themselves and to promote their well-being. Therefore, identifying successful curricula to reduce unintentional injury, tailoring it for children of a specific culture, and delivering them by a caring teacher should be a high priority in all schools. Such programs hold hope for reducing unintentional injuries within a learning environment that reflects a philosophy of concern for the welfare of its students.

REFERENCES

Agran, P. F., Anderson, C. L., & Winn, D. G. (1998). Factors associated with restraint use of children in fatal crashes. Pediatrics, 102, E39.

Agtuca, J. (1994). A community secret: For the Filipino in an abusive relationship. Seattle, WA: Seal Press.

Ajzen, I. (n.d.). Behavioral interventions based on the theory of planned behavior. Retrieved April 20, 2001, from the World Wide Web: http://people.ne.mediaone.net/aizen/tpb.intervention.pdf

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, (50), 179-211.

American School Health Association, Association for the Advancement of Health Education, & Society for Public Health Education. (1989). The National Adolescent Health Survey: A report on the health of American youth. Oakland, CA: Third Party Publishing Company.

Arneson, S. W., & Triplett, J. L. (1990). Riding with buckle-bear: An automobile safety program for preschoolers. Journal of Pediatric Nursing, 5, 115-122.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Baranowski, T., Perry, C. L., & Parcel, G. S. (1997). Models of interpersonal health behavior. In K. Glanz, F. M. Lewis, & B. K. Rimer (Eds.), Health behavior and health education (2 ed., pp. 153-178). San Francisco, CA: Jossey-Bass.

Barss, P., Smith, G. S., Baker, S. P., & Mohan, D. (1998). Determinants of injuries. In Authors, Injury prevention: An international perspective epidemiology, surveillance, and policy (pp. 75-102). New York: Oxford University Press.

Becker, M. H. (1990). Theoretical models of adherence and strategies for improving adherence. In S.A. Shumaker, B. S. Eleanor, J. K. Ockene, C. T. Parker, J. L. Probstfield, & J. M. Wolle (Eds.), The handbook of health behavior change (pp. 5-43). New York: Springer.

Benson, P. (1993). The troubled journey: A portrait of 6th -12th grade youth. Minneapolis, MN: Search Institute.

Bicycle Helmet Safety Institute (2000). Mandatory helmet laws: A summary Bicycle Helmet Safety Institute. Retrieved May 5, 2000, from the World Wide Web: http://bhsi.org/webdocs/mandator.htm

Bredekamp, S. (1987). Developmentally appropriate practice in early childhood programs serving children from birth through age 8. Washington, DC: National Association for the Education of Young Children.

Bredekamp, S., & Rosegrant, T. (1992). Appropriate curriculum and assessment for young children (vol. 1). Washington, DC: National Association for the Education of Young Children.

Brewer, J. A. (2001). Young children growing, thinking, and learning. In J.A. Brewer (Ed.), Introduction to early childhood education: Preschool through primary (4th ed., pp. 1-33). Needham Heights, MA: Allyn & Bacon.

Budd, R.J., North, D., & Stradling, S.G. (1984). Understanding seat-belt use: A test of Bentler and Speckart's extension of the theory of reasoned action. European Journal of Social Psychology, 14(1), 69-78.

Burns, D., & Pierce, J. P. (1992). Tobacco use in California, 1990 ~ 1991 Sacramento: California Department of Health Services.

Bussing, R., Menvielle, E., & Zima, B. (1996). Relationship between behavioral problems and unintentional injuries in US children. Findings of the 1988 National Health Interview Survey. Archives of Pediatrics and Adolescent Medicine, 150, 50-56.

Campbell, D.T., & Stanley, J.C. (1963). Experimental and quasi-experimental designs for research. Boston: Houghton Mifflin.

California Korean Health Education and Information and Referral Center. (1989). 1989 Korean Health Survey in Los Angeles County. Los Angeles: Author.

CDC. (1990). Childhood injuries in the United States. American Journal of Diseases of Children, 144, 649-652.

CDC. (1995a). Childhood injury: Cost and prevention facts. Washington, DC: Author.

CDC. (1995b). Injury-control recommendations: Bicycle helmets. Morbidity and Mortality Weekly Report, 44, 1-17.

CDC. (1999). National child passenger safety week - February 14-20. Morbidity and Mortality Weekly Report, 48, 83-84.

CDC. (2000a). SAFE USA: Child passenger safety. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

CDC. (2000b). SAFE USA: Fire safety. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

CDC. (2000c). SAFE USA: Walking safety. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

CDC. (2000d). Youth risk behavior surveillance - United States, 1999. Morbidity and Mortality Weekly Report, 49(SS05), 1-96.

CDC. (2000e). Deaths: Final data for 1998. Monthly Vital Statistics Report, 48, 1-108.

Chin, K. L. (1994). Out-of town brides: International marriage and wife abuse among Chinese immigrants. Journal of Comparative Family Studies, 15, 53-69.

Chun, E. (1990). The Korean battered spouse: Where to go for help. KoreAm Journal, 1(3), 22-23.

Cheung, C., & Chan, C. (2000). Learning to work safely with reference to a social-cognitive model. Social Behavior and Personality, 28(3), 293-308.

Conner, M., & Sparks, P. (1996). The theory of planned behavior and health behaviors. In M. Conner & P. Norman (Eds.), Predicting health behavior. Buckingham, England: Open University Press.

Dannenberg, A. L., Gielen, A. C., Beilenson, P. L., Wilson, M. H., & Joffe, A. (1993). Bicycle helmet laws and educational campaigns: An evaluation of strategies to increase children's helmet use. American Journal of Public Health, 83, 667-674.

Decina, L. E., & Knoebel, K. Y. (1997). Child safety seat misuse patterns in four states. Accident: Analysis and Prevention, 29, 125-132.

Dodge, D. T. (1995). The importance of curriculum in achieving quality child day care programs. Child Welfare, 74, 1171-1188.

Dorsch, M., Woodward, A. J., & Somers, R. J. (1987). Do bicycle safety helmets reduce the severity of head injuries in real crashes? Accident Analysis & Prevention, 20, 447-458.

Evans, D., & Norman, P. (1998). Understanding pedestrians' road crossing decisions: An application of the theory of planned behavior. Health Education Research, 13, 481-489.

Federation for American Immigration Reform. (2001). FAIR - Georgia State Profile. Washington, DC: Author. Retrieved June 12, 2001, from the World Wide Web: http://www.fairus.org/html/042ga702.htm

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research. Reading, MA: Addison Wesley.

Glass, G.V., McGaw, B., & Smith, M.L. (1981). Meta-analysis in social research. Beverly Hills, California: Sage Publications.

Gillham, B., & Thomson, J. A. (1996). The challenge of child safety research. In B. Gillham & J. A. Thomson (Eds.), Child safety: Problem and prevention from preschool to adolescence (pp. 1-11). New York: Routledge.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. American Journal of Health Promotion, 11, 87-98.

Green, L.W., & Kreuter, M.W. (1991). Health education planning: An educational an environmental approach. (2 ed.). Mountain View, CA: Mayfield.

Ho, C. (1990). Analysis of domestic violence in Asian American communities. Women and Therapy, 9, 129-150.

Kang, S. H., Chen, A., Lew, R., Min, K., Moskowitz, J. M., Wismer, B. A., & Tager, I. B. (1997). Behavioral risk factor survey of Korean Americans - Alameda County, California, 1994. Morbidity and Mortality Weekly Report, 46, 774-777.

Kestenbaum, R. (1988). Mortality by nativity. Demography, 23, 87-90.

Klassen, T. P., MacKay, J. M., Moher, D., Walker, A., & Jones, A. L. (2000). Community-based injury prevention intervention. The Future of Children, 10, 83-110.

Koh, H. K., & Koh, H. C. (1993). Health issues in Korean Americans. Asian American and Pacific Islander Journal of Health, 1, 176-193.

Kraus, J. F., Fife, D., & Conroy, C. (1987). Incidence, severity, and outcomes of brain injuries involving bicycles. American Journal of Public Health, 77, 76-78.

Losh, D. P. (1994). Injury prevention in children. Primary Care, 21, 733-746.

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. Personality and Social Psychology Bulletin, 18, 3-9.

Martin, G. L., & Newman, I. M. (1990). Women as motivators in the use of safety belts. Health Values: Health Behavior, Education & Promotion, 14, 37-47.

Miller, D. A., & Davis, L. G. (1984). An evaluation of the Beltman traffic safety program for children. Health Education, 15, 51-53.

Montano, D. E., Kasprzyk, D., & Taplin, S. H. (1997). The theory of reasoned action and the theory of planned behavior. In K. Glanz, F. M. Lewis, & B. K. Rimer (Eds.), Health behavior and health education (2nd ed., pp. 85-112). San Francisco, CA: Jossey-Bass.

Mullen, P. D., Gottlieb, N. H., Biddle, A. K., & McCuan, R. A. (1988). Predictors of safety belt initiative by primary care physicians. A social learning theory perspective. Medical Care, 26, 378-382.

National Fire Data Center. (1999). Fire in the United States 1987 - 1996, 11th Edition. Quincy, MA: National Fire Data Center, United States Fire Administration. (Rep. No. EMW-95-C-4717)

National Fire Protection Association (NFPA). (1999a). Results from the First Year of Risk Watch. Quincy, MA: Author.

NFPA. (1999b). Risk Watch: A leaders' guide to preventing childhood injury in the community. Quincy, MA: Author.

Nelson, G. D., & Moffit, P. B. (1988). Safety belt promotion: Theory and practice. Accident Analysis & Prevention, 20, 27-38.

Nersesian, W. S., Petit, M. R., Shaper, R., Lemieux, D., & Naor, E. (1985). Childhood death and poverty: A study of childhood deaths in Maine. Pediatrics, 75, 41-50.

Neuwelt, E.A., Coe, M.F., Wilkinson, A.M., & Avolio, A.E. (1989). Oregon head and spinal cord injury prevention program and evaluation. Neurosurgery, 24, 453-458.

Norusis, M.J. (1997). SPSS Base 8.0 User's Guide. Chicago: SPSS.

Parcel, G. S. (1983). Theoretical models for application in school health education research. Health Education, 54, 39-49.

Parker, D., Manstead, A. S., Stradling, S. G., & Reason, J. T. (1992). Intention to commit driving violations: An application of the theory of planned behavior. Journal of Applied Psychology, 77, 94-101.

Parkin, P., Spence, L., Hu, X., Wesson, D., Shortt, L., Nassau, F., Anderson, A., Leicester, P., Roads, V. I. C., Young, A., Rivara, F. P., Thompson, D. C., & Thompson, R. S. (1993). Bicycle helmet promotion programs - Canada, Australia, and United States. Morbidity and Mortality Weekly Report, 42, 203-210.

Powell-Griner, E., Anderson, J. E., & Murphy, W. (1997). State and sex specific prevalence of selected characteristics: Behavioral risk factor surveillance system, 1994 and 1995. Morbidity and Mortality Weekly Report, 46, 1-29.

Rice, D. M., MacKenzie, E. J., Hones, A. S., Kaufman, S. R., deLissovoy, G. V., Max, W., McLoughlin, E., Miller, T. R., Robertson, L. S., Salkever, D. S., & Smith, G. S. (1989). Cost of injury in the United States: A report to Congress. San Francisco: University of California Institute for Health and Aging and Johns Hopkins University Injury Prevention Center.

Richard, L., Dedobbeleer, N., Champagne, F., & Potvin, L. (1994). Predicting child restraint device use: A comparison of two models. Journal of Applied Social Psychology, 24, 1837-1847.

Rivara, F. J. (1992). Prevention of injuries to children and adolescents. In H.M. Wallace, K. Patrick, G. S. Parcel, & J. B. Igoe (Eds.), Principles and practices of student health (pp. 89-102). Oakland, CA: Third Party.

Rivara, F. P., Thompson, D. S., Beahler, C., & MacKenzie, E. J. (1999). Systematic reviews of strategies to prevent motor vehicle injuries. American Journal of Preventive Medicine, 16, 1-5.

Robertson, L. S. (1992). Injury epidemiology. New York: Oxford University Press.

Sacks, J. J., Holmgreen, P., Smith, D. M., & Sosin, D. M. (1991). Bicycle-associated head injuries and deaths in the United States from 1984 through 1988: How many are preventable? Journal of the American Medical Association, 266, 3016-3018.

Scheidt, P. C., Harel, Y., Trumble, A. C., Jones, D. H., Overpeck, M. D., & Bijur, P. E. (1995). The epidemiology of nonfatal injuries among U.S. children and youth. American Journal of Public Health, 85, 932-938.

Schootman, M., Fuortes, L. J., Zwerling, C., Albanese, M. A., & Watson, C. A. (1993). Safety behavior among Iowa junior high and high school students. American Journal of Public Health, 83, 1628-1630.

Shai, D., & Rosenwike, I. (1988). Violent deaths among Mexican-, Puerto Rican-, and Cuban-born migrants in the United States. Social Science and Medicine, 26, 276.

Sheeran, P., & Orbell, S. (1998). Do intentions predict condom use? Meta-analysis and examination of six moderator variables. British Journal of Social Psychology, 37, 231-250.

Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. Journal of Applied Social Psychology, 29, 1624-1675.

Singer, S. (1987). Victims in a birth cohort. In M. Wolfgang, T. Thornberggy, & R. Figlio (Eds.), From boy to man, from delinquency to crime (pp. 163-169). Chicago: University of Chicago Press.

Song-Kim, Y. I. (1992). Battered Korean women in urban United States. In S.M. Furuto, R. Biswas, D. K. Chung, K. Murase, & F. Ross-Sherriff (Eds.), Social work practice with Asian Americans (pp. 213-226). Newbury Park, CA: Sage.

Stuy, M., Gree, M., & Doll, J. (1993). Childcare centers: A community resource for injury prevention. Journal of Developmental and Behavioral Pediatrics, 14, 224-229.

Thompson, R. S., Rivara, F. P., & Thompson, D. S. (1989). A case-study of the effectiveness of bicycle safety helmets. New England Journal of Medicine, 320, 1361-1367.

Thuen, F., & Rise, J. (1994). Young adolescents intention to use seat belts: The role of attitudinal and normative beliefs. Health Education Research, 9(2), 215-223.

U.S. Census Bureau. (2001). Overview of race and Hispanic origin: Census 2000 Brief. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. Retrieved June 12, 2001, from the World Wide Web: http://www.census.gov/prod/2001pubs/c2kbr01-1.pdf

U.S. Commission on Civil Rights. (1992). Civil rights issues facing Asian Americans in the 1990s. Washington, DC: Author. (No. 005-902-00058-4)

U.S. Department of Transportation (USDT). (1991). Strategies to increase the use of Child Safety Seats by low-income families: A report to the committees on Appropriations, U.S. House of Representatives, U.S. Senate. Washington DC: U.S. Department of Transportation, National Highway Traffic Safety Administration.

USDT. (1994). Occupant Protection Idea Sampler. Washington, DC: Department of Transportation, National Highway Traffic Safety Administration.

USDT. (1999). Traffic safety facts, 1998. Washington DC. Department of Transportation, National Highway Traffic Safety Administration.

USDT. (2000a). Bicycle helmet use laws. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration.

USDT. (2000b). State legislative fact sheet: Strengthening child passenger safety laws - Increase car seat and belt use, decrease crash fatalities and injuries. Washington, DC U.S: Department of Transportation, National Highway Traffic Safety Administration.

Wagenaar, A.C., Molnar, L.J., & Margolis, L.H. (1988). Characteristics of child safety seat users. Accident Analysis & Prevention, 20, 311-322.

Waller, J. A. (1971). Bicycle ownership, use and injury patterns among elementary school children. Pediatrics, 47, 1042-1050.

Williams, J. M., Currie, C. E., Wright, P., Elton, R. A., & Beattie, T. F. (1996). Socioeconomic status and adolescent injuries. Social Science & Medicine, 44, 1881-1891.

Wittenbaker, J., Gibbs, B. L., & Kahle, L. R. (1983). Seat belt attitudes, habits, and behaviors: An adaptive amendment to the Fishbein model. Journal of Applied Social Psychology, 13, 406-421.

World Health Organization. (1996). Investing in health research and development: Report of the Ad Hoc committee on health relating to future intervention options Geneva: Author.

Wright, M., Rivara, F.P., & Ferse, D. (1995). Evaluation of the Think First head and spinal cord injury prevention program. Injury Prevention, 1, 81-85.

APPENDIX A

CONTENT VALIDATION FORM

Content validation for 1st & 2nd graders

- The survey comprises three safety topics (motor vehicle safety, bicycle & pedestrian safety, and fire & burns safety).
- Within each topic, six kinds of dimensions are represented. Its definitions are described below.
- For each item, please identify the dimension the item best represents and mark the space provided. If you feel that an item equally represents more than one dimension, mark each dimension. If the item does not represent any of the dimensions, simply leave that area of the form blank.
- Also I would like you to rate the extent to which each item is relevant to its assigned dimension on a 1 to 5 scale with 1 indicating low relevance, 3 indicating moderate relevance, and 5 indicating high relevance.

Dimensions:

1. **Behavior**: Safety behaviors related motor vehicle safety, bicycle and pedestrian safety, or fire and burns safety.
2. **Behavioral Intention**: Perceived likelihood of performing the safety behaviors (for the next time).
3. **Attitudes**: Individual's beliefs about attributes of performing the safety behaviors or evaluations of those attributes.
4. **Subjective Norm**: Individual's belief about whether important referents (parents, siblings, or friends) approve or disapprove of performing the safety behaviors or about what important referents think about respondent's performing behaviors.
5. **Perceived control**: Individual's confidence in performing safety behaviors (perceived power or belief to perform safety behaviors).
6. **Knowledge**: Individual's knowing specific factual information about safety behaviors

I. Topic 1 - Traffic safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
1. Where do you usually sit when you ride in a car											
2. Circle the one picture that shows you how to stop a an intersection											
3. How often you do wear a seat belt when you ride in a car?											
4. The school bus has just dropped you off after school. How many giant steps should you take to move away from the bus? 1) 3 giant steps 2) 5 giant steps											
5. You are going for a car ride with your grandmother. Where is the safest place for you to sit? 1) back seat 2) front seat											
6. What should you do every time you ride in a car? 7. 1) sit near a window 2) buckle up											
8. The school bus driver is not my teacher, so I do not need to listen to her or him.											
9. It's OK to wave your hands to your friends or parents out the window while the bus is moving.											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
10. If you drop something near the school bus that you need, you have to tell the bus driver.											
11. I know how to buckle up by myself.											
12. The next time that I ride in a car, I will buckle up.											
13. I believe wearing a seat belt is uncomfortable-comfortable.											
14. I believe wearing a seat belt is unimportant-important.											
15. I believe wearing a seat belt is unsafe-safe.											
16. I believe wearing a seat belt is foolish-smart.											
17. I believe wearing a seat belt is hurts me-doesn't hurt me.											
18. I believe wearing a seat belt is difficult-easy.											
19. My parents wear a seat belt.											
20. My parents care I wear a seat belt.											
21. My parents tell me to buckle up if I do not wear a seat belt.											
22. My parents let me not to wear a seat belt.											
23. My brother or sister wears a seat belt.											
24. My brother or sister cares I wear a seat belt.											
25. My brother or sister thinks I should wear a seat belt.											
26. My brother or sister tells me to buckle up if I do not wear a seat belt.											
27. My brother or sister teases me when I wear a seat belt.											
28. My brother or sister thinks it is OK to take in a car without wearing a seat belt.											
29. My best friend wears a seat belt.											
30. My best friend cares I wear a seat belt.											
31. My best friend thinks I should wear a seat belt.											
32. My best friend tells me to buckle up if I do not wear a seat belt.											
33. My best friend teases me when I wear a seat belt.											
34. My best friend thinks it is OK to take a car without wearing a seat belt.											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

II. Topic 2 – Bicycle and Pedestrian safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
1. Which one looks like you when you ride a bicycle?											
2. If you don't ride a bicycle but you plan to ride one, which picture will look like you when you ride a bicycle?											
3. What is the one thing you always need to have with you when you cross the street? 1) A grown-ups 2) Bicycle 3) Car 4) Toy											
4. Before crossing a street, what must people always do? 1) Glance at the road and make a run for it 2) Look left, right, and left again before crossing a street.											
5. Football players and bicyclists wear helmets to protect their.. 1) Back 2) Brain 3) Hair											
6. How often do you wear a helmet when you ride a bicycle?											
7. You are going for a bike ride with your mom. You get your bike out of the garage and stop to put something on. What would you need to put on before you begin riding your bike? 1) A sweater 2) A helmet											
8. You are shopping with your aunt. She has just parked the car in the parking lot. You begin to walk toward the store. What should you do? 1) Walk close to my aunt 2) Hold my aunt's hand.											
9. It is a warm, sunny day and you are playing in your yard. You see your best friend playing ball in his yard across the street. You are excited to see him and what to play. How should you cross the street? 1) With a grown-up 2) Run quickly											
10. People who ride bicycles should always ride on the right side of the road in the same direction as cars and other vehicles. (True or False)											
11. A grown-up does not need to wear a helmet when riding a bicycle.											
12. Bicycle riders do not have to obey the same rules of the road as vehicle drivers.											
13. I have a bicycle.											
14. I know how to put on a helmet by myself.											
15. The next time that I ride a bicycle, I will put on a helmet.											
16. I believe wearing a helmet is uncomfortable-comfortable											
17. I believe wearing a helmet is uncomfortable-comfortable											
18. I believe wearing a helmet is unimportant-important											
19. I believe wearing a helmet is unsafe-safe											
20. I believe wearing a helmet is foolish –smart											
21. I believe wearing a helmet hurts me-doesn't hurt me											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
22. I believe wearing a helmet is difficult-easy											
23. My parents wear a helmet when they ride a bicycle.											
24. My parents care I wear a bicycle helmet											
25. My parents tell me to put on if I do not wear a helmet when I ride a bicycle.											
26. My parents let me not to wear a bicycle when I ride a bicycle.											
27. My brother or sister wears a bicycle helmet.											
28. My brother or sister cares I wear a bicycle helmet.											
29. My brother or sister thinks I should wear a bicycle helmet.											
30. My brother or sister tells me to put on if I do not wear a helmet when I ride a bicycle.											
31. My brother or sister teases me when I wear a bicycle helmet.											
32. My brother or sister thinks it is OK to ride a bicycle without wearing a bicycle helmet.											
33. My best friend wears a bicycle helmet.											
34. My best friend cares I wear a bicycle helmet.											
35. My best friend thinks I should wear a bicycle helmet.											
36. My best friend tells me to put on if I do not wear a helmet when I ride a bicycle.											
37. My best friend teases me when I wear a bicycle helmet.											
38. My best friend thinks it is OK to ride a bicycle without wearing a bicycle helmet.											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

III. Topic 3 – Fire and Burn safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
1. Which one makes a noise and lets people know that there is smoke of fire in the home?											
2. If you found matches lying on a table, would you tell a grown-up or give them to a grown-up? 1) Tell 2) Give											
3. If your smoke detector/alarm sounds, what would you do? Would you hide, ignore, or get out of the house?											
4. Smoke alarms must function properly in order to alert people of smoke and fire in the home, school, or ther buildings. (T or F)											
5. If you want to find out if the iron or oven is hot, it is OK to touch them.											
6. I know where the fire extinguishers and smoke detectors are at school.											
7. I know where the smoke detectors are at home.											
8. Hot things such as a toaster, iron, and hot water can hurt you.											
9. I know how smoke detector sounds.											
10. I know how to escape from my house when the fire occurs.											
11. I know how to get out of the house when the smoke detector sounds.											
12. The next time that the smoke detector sounds at home, I will get out of the place immediately.											
13. Having a smoke detector is unfamiliar-familiar											
14. Having a smoke detector is unimportant-important											
15. Having a smoke detector is unsafe-safe											
16. Having a smoke detector is loud –quiet											
17. Having a smoke detector is unnecessary-necessary											
18. Having a smoke detector is foolish –smart											
19. Having a smoke detector hurts me-doesn't hurt me											
20. Having a smoke detector is difficult-easy											
21. Getting out of the house immediately when the fire occurs is difficult – easy											
22. Getting out of the house immediately when the smoke detector sounds is difficult – easy											
23. My parents like having a smoke detector.											
24. My parents tell me where a smoke detector is.											
25. My parents tell me what to do when a smoke detector sounds.											
26. My parents let me stay at home although a smoke detector sounds.											
27. My parents tell me to get out of the house when a smoke detector sounds											
28. My brother or sister knows where a smoke detector in our house is.											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
29. My brother or sister knows what to do when a smoke detector sounds.											
30. My brother or sister keeps playing at home although a smoke detector sounds.											
31. My brother or sister teases if I get out of the house when a smoke detector sounds.											
32. My brother or sister thinks it is fun to play with a smoke detector or fire extinguisher.											
33. My brother or sister thinks I should get out of the place immediately when a smoke detector sounds											
34. My best friend knows where a smoke detector in my house is.											
35. My best friend knows what to do when a smoke detector sounds.											
36. My best friend keeps playing at home although a smoke detector sounds.											
37. My best friend teases if I get out of the house when a smoke detector sounds.											
38. My best friend thinks it is fun to play with a smoke detector or fire extinguisher.											
39. My best friend thinks I should get out of the place immediately when a smoke detector sounds.											
40. How important is it to you what your parents tell you about safety											
41. How important is it to you what your brother or sister tells you about safety											
42. How important is it to you what your best friend tells you about safety											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

Any questions or comments for the questionnaire – grades in 1 & 2.

Content validation - 3rd to 8th graders

- The survey comprises three safety topics (motor vehicle safety, bicycle & pedestrian safety, and fire & burns safety).
- Within each topic, six kinds of dimensions are represented. Its definitions are described below.
- For each item, please identify the dimension the item best represents and mark the space provided. If you feel that an item equally represents more than one dimension, mark each dimension. If the item does not represent any of the dimensions, simply leave that area of the form blank.
- Also I would like you to rate the extent to which each item is relevant to its assigned dimension on a 1 to 5 scale with 1 indicating low relevance, 3 indicating moderate relevance, and 5 indicating high relevance.

Dimensions:

7. **Behavior**: Safety behaviors related motor vehicle safety, bicycle and pedestrian safety, or fire and burns safety.
8. **Behavioral Intention**: Perceived likelihood of performing the safety behaviors (for the next time).
9. **Attitudes**: Individual's beliefs about attributes of performing the safety behaviors or evaluations of those attributes.
10. **Subjective Norm**: Individual's belief about whether important referents (parents, siblings, or friends) approve or disapprove of performing the safety behaviors or about what important referents think about respondent's performing behaviors.
11. **Perceived control**: Individual's confidence in performing safety behaviors (perceived power or belief to perform safety behaviors).
12. **Knowledge**: Individual's knowing specific factual information about safety behaviors

IV. Topic 1 - Traffic safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4	5. High
1. The school bus has just dropped you off after school. As you step onto the ground, how many giant steps should you take to move away from the bus? 1) 3 giant steps 2) 5 giant steps											
2. How often do **you** wear a seat belt when you ride in a car?											
3. How often do **you** sit on the front seat when you ride in a car?											
4. When is it important to wear your seat belt?1) Always 2) Never 3) Only long trips and vacations 4) Only short trips around town											
5. How should you line up for the school bus?1) Single file 2) With a partner 3) First in line											
6. Which of the following is a bus safety rule? 1)Stay in your seat 2)Talk quietly 3)Both of the above											
7. I know how to buckle up.											
8. The school bus driver is not my teacher, so I do not need to listen to her or him.											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4	5. High
9. It's the law for everyone to wear a seat belt when he or she rides in a car.											
10. The next time that I ride in a car, I will buckle up.											
11. I believe wearing a seat belt is uncomfortable-comfortable											
12. I believe wearing a seat belt is unimportant-important											
13. I believe wearing a seat belt is unsafe-safe											
14. I believe wearing a seat belt is foolish-smart											
15. I believe wearing a seat belt is hurts me-doesn't hurt me											
16. I believe wearing a seat belt is difficult-easy											
17. My parents wear a seat belt.											
18. My parents care I wear a seat belt.											
19. My parents tell me to buckle up if I do not wear a seat belt.											
20. My parents let me not to wear a seat belt.											
21. My brother or sister wears a seat belt.											
22. My brother or sister cares I wear a seat belt.											
23. My brother or sister thinks I should wear a seat belt.											
24. My brother or sister tells me to buckle up if I do not wear a seat belt.											
25. My brother or sister teases me when I wear a seat belt.											
26. My brother or sister thinks it is OK to take a car without wearing a seat belt.											
27. My best friend wears a seat belt.											
28. My best friend cares I wear a seat belt.											
29. My best friend thinks I should wear a seat belt.											
30. My best friend tells me to buckle up if I do not wear a seat belt.											
31. My best friend teases me when I wear a seat belt.											
32. My best friend thinks it is OK to take a car without wearing a seat belt.											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

V. Topic 2 – Bicycle and Pedestrian safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
1. Before crossing a street, what must people always do?1) Glance at the road and make a run for it 2) Look left, right, and left again before crossing a street											
2. When **you** ride a bicycle, how often do **you** wear a helmet?											
3. None of the children in your neighborhood wear a helmet when riding a bike. Your mother makes you wear one. The kids tease you. What should you do? 1)Ride your bike when the kids are not around 2)Take your helmet off when you are out of sight of your mother 3)Wear your helmet no matter what anyone says											
4. I know how to wear a helmet.											
5. People who ride bicycles should always ride on the left side of the road in the different direction as cars and other vehicles.											
6. Pedestrians must always look for cars and then run across a street or intersection.											
7. A grown-up does not need to wear a helmet when riding a bicycle.											
8. Bicycle riders do not have to obey the same rules of the road as vehicle drivers.											
9. I have a bicycle.											
10. The next time that I ride a bicycle, I will put on a helmet.											
11. I believe wearing a helmet is uncomfortable-comfortable											
12. I believe wearing a helmet is uncomfortable-comfortable											
13. I believe wearing a helmet is unimportant-important											
14. I believe wearing a helmet is unsafe-safe											
15. I believe wearing a helmet is foolish –smart											
16. I believe wearing a helmet hurts me-doesn't hurt me											
17. I believe wearing a helmet is difficult-easy											
18. My parents wear a helmet when they ride a bicycle.											
19. My parents care I wear a bicycle helmet											
20. My parents tell me to put on if I do not wear a helmet when I ride a bicycle.											
21. My parents let me not to wear a bicycle when I ride a bicycle.											
22. My brother or sister wears a bicycle helmet.											
23. My brother or sister cares I wear a bicycle helmet.											
24. My brother or sister thinks I should wear a bicycle helmet.											
25. My brother or sister tells me to put on if I do not wear a helmet when I ride a bicycle.											
26. My brother or sister teases me when I wear a bicycle helmet.											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
27. My brother or sister thinks it is OK to ride a bicycle without wearing a bicycle helmet.											
28. My best friend wears a bicycle helmet.											
29. My best friend cares I wear a bicycle helmet.											
30. My best friend thinks I should wear a bicycle helmet.											
31. My best friend tells me to put on if I do not wear a helmet when I ride a bicycle.											
32. My best friend teases me when I wear a bicycle helmet.											
33. My best friend thinks it is OK to ride a bicycle without wearing a bicycle helmet.											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

VI. Topic 3 – Fire and Burn safety

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
1. If your clothes catch a fire, what should you do first? 1)Run as fast as possible 2)Call to my parents 3)Stop immediately where I am, drop to the ground, & roll over and over and back and forth 4)Get out of the place											
2. In a fire, smoke will:1) settle near the floor 2) rise to the ceiling 3)stay near the fire											
3. Stop, drop, roll - cool and call should be done when: 1)You need to go through smoke 2)A smoke detector sounds 3)Your clothes catch fire											
4. Which of the following is a fire hazard? 1)A window blocked by furniture 2)Matches and lighters 3)Both of the above											
5. If you needed to report a fire or medical emergency, what telephone number would you use?											
6. A home fire escape plan should have: 1)One smoke detector, one way out, and a meeting place 2) Several smoke detectors, two ways out, and a meeting place 3)Batteries, one smoke detector, and one way out											
7. Food heated in a microwave: 1)Heats to room temperature 2)Is warm on the outside 3)Can be very hot											
8. I know where the fire extinguishers and smoke detectors are in school.											
9. I know how smoke detector sounds.											
10. I know where the smoke detectors are at home.											
11. I know how to escape from my house when the fire occurs.											
12. I know how to get out of the house when the smoke detector sounds.											
13. Smoke alarms must function properly in order to alert people of smoke and fire.											
14. The next time that the smoke detector sounds at home, I will get out of the place immediately.											
15. Having a smoke detector is unfamiliar-familiar											
16. Having a smoke detector is unimportant-important											
17. Having a smoke detector is unsafe-safe											
18. Having a smoke detector is loud –quiet											
19. Having a smoke detector is unnecessary-necessary											
20. Having a smoke detector is foolish –smart											
21. Having a smoke detector hurts me-doesn't hurt me											
22. Having a smoke detector is difficult-easy											
23. Getting out of the house immediately when the fire occurs is difficult – easy											
24. Getting out of the house immediately when the smoke detector sounds is difficult – easy											
25. My parents like having a smoke detector.											
26. My parents tell me where a smoke detector is.											

Items	Dimension						Relevance				
	Behavior	B. Intention	Attitudes	Subjective Norm	Perceived control	Knowledge	1. Low	2.	3. Moderate	4.	5. High
27. My parents tell me what to do when a smoke detector sounds.											
28. My parents let me stay at home although a smoke detector sounds.											
29. My parents tell me to get out of the house when a smoke detector sounds											
30. My brother or sister knows where a smoke detector in our house is.											
31. My brother or sister knows what to do when a smoke detector sounds.											
32. My brother or sister keeps playing at home although a smoke detector sounds.											
33. My brother or sister teases if I get out of the house when a smoke detector sounds.											
34. My brother or sister thinks it is fun to play with a smoke detector or fire extinguisher.											
35. My brother or sister thinks I should get out of the place immediately when a smoke detector sounds											
36. My best friend knows where a smoke detector in my house is.											
37. My best friend knows what to do when a smoke detector sounds.											
38. My best friend keeps playing at home although a smoke detector sounds.											
39. My best friend teases if I get out of the house when a smoke detector sounds.											
40. My best friend thinks it is fun to play with a smoke detector or fire extinguisher.											
41. My best friend thinks I should get out of the place immediately when a smoke detector sounds.											
42. How important is it to you what your parents tell you about safety											
43. How important is it to you what your brother or sister tells you about safety											
44. How important is it to you what your best friend tells you about safety											

Please indicate if any important content is missing or if you have any comments.

1. **Behavior:**_____
2. **Behavioral intention:**_____
3. **Attitudes:**_____
4. **Subjective norm:**_____
5. **Perceived control:**_____
6. **Knowledge:**_____

Any questions or comments for the questionnaire – grades in 3 to 8.

APPENDIX B

STUDENT QUESTIONNAIRES

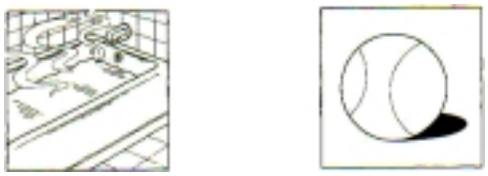
2000 Summer School
Pre-K and K (Name:)

♣ Circle the best answer.

A.	Boy Girl	Are you a boy or a girl?
B.	Pre-kinder Kinder	What grade are you in?
C.	Yes No	Can you speak Korean?
D.	English Korean	Do your parents speak English or Korean at home?
E.	USA Korea	Where were you born?
F.	4 5 6	How old are you?
G.	American Korean Korean-American Other	Do you identify yourself as an:

♣ Circle the picture around the best answer.

1.		Where do you usually sit when you ride in a car, van, or other vehicle?
2.		Which one looks like you when you ride a bicycle?
3.	911 411	Which telephone numbers you should call if you need help or want to report a fire or emergency?

4. 		Where is the safest place for you to sit in a car?
5. 		Which one could be hot and hurt you?
6. 		If you found matches lying on a table, which picture shows the safest thing to do?
7. 		Which picture shows what you do if the smoke detector/alarm sounds?
8. 		Which picture shows a child riding safely?
9. 		Which picture shows the safest way to ride the bus?
10. 		Circle one picture that show that you must stop at an intersection?
11. 		Which one makes a noise and lets people know that there is smoke or fire in the home?

12.	 	Which picture shows the child crossing the street safely?
13.	 	Which picture shows the child riding safely?

♣ Circle the word around the best answer.

14.	1) YES	2) NO	It's OK to wave my hands to my friends or parents out the window while the bus is moving.
15.	1) YES	2) NO	If I drop something near the school bus that I need, I have to tell the bus driver.
16.	1) YES	2) NO	If I want to find out if the iron or oven is hot, it's OK to touch them.
17.	1) YES	2) NO	I know the school rules about school safety.
18.	1) YES	2) NO	It's OK to run in the hallway in the school building.
19.	1) YES	2) NO	I know where the fire extinguishers and smoke detectors are at school.
20.	1) YES	2) NO	I know what the smoke detector is.
21.	1) YES	2) NO	I know how to buckle up by myself.
22.	1) YES	2) NO	I know how to put on a helmet by myself.
23.	1) YES	2) NO	I know where the smoke detectors are at home.
24.	1) YES	2) NO	I know how to escape from my house when a fire occurs.

25. 	1) YES 2) NO	I know how to get out of the house when the smoke detector sounds.
26. 	1) YES 2) NO	Wearing a seat belt is comfortable.
27. 	1) YES 2) NO	Wearing a seat belt is important.
28. 	1) YES 2) NO	Wearing a helmet is comfortable.
29. 	1) YES 2) NO	Wearing a helmet is important.
30. 	1) YES 2) NO	My house must have a smoke detector.
31. 	1) YES 2) NO	The smoke detector is important.
32. 	1) YES 2) NO	It is OK to play with a smoke detector or fire extinguisher.
33. 	1) YES 2) NO	A grown-up does not need to wear a helmet when riding on a bicycle.
34. 	1) YES 2) NO	The next time, I will buckle up.
35. 	1) YES 2) NO	The next time, I will put on a helmet.
36. 	1) YES 2) NO	The next time that the smoke detector sounds, I will get out of the place.
37. 	1) A grown-up 2) Bicycle 3) Car 4) Toy	What is the one thing you always need to have with you when you cross the street?
38. 	1) Always 2) Sometimes 3) Never 4) no bicycle	How often do you wear a helmet when you ride on a bicycle?
39. 	1) Always 2) Sometimes 3) Never 4) no bicycle	How often do your parents wear a helmet when they ride on a bicycle?
40. 	1) Always 2) Sometimes 3) Never	How often do you wear a seat belt when you ride in a car?

41. 	1) Always 2) Sometimes 3) Never	How often do your parents wear a seat belt when they ride in a car?
42. ☺	1) back 2) brain 3) hair	Football players and bicyclists wear helmets to protect their..
43. 	1) Glance & make a run 2) Look left, right, and left	Before crossing a street, what must people always do?
44. 	1) Walk close to my aunt 2) hold my aunt's hand	You are shopping with your aunt. After she parks the car in the parking lot, you begin to walk toward the store. What should you do?

For volunteers to read questions (question 5 to 9 and question 12 & 13)

5. 	Look at the two pictures. One picture shows a bathtub filled with water. One picture shows a ball. Which could be hot and hurt you? 1) Bathtub Filled with steaming water 2) A ball	Which one could be hot and hurt you?
6. 	Look at the two pictures. The first picture shows a child giving the matches to the grown-up. The second picture shows a child telling a grown-up to put the matches away. If you found matches lying on a table, which picture shows the safest thing to do? 1) A child giving matches to a grown-up 2) A child telling a grown-up about the matches	If you found matches lying on a table, which picture shows the safest thing to do?
7. 	Look at the two pictures. The first picture shows children still paying a game. The second picture shows children going out of the house. Which picture shows what you do if the smoke detector/alarm sounds? 1) Two children playing in a home 2) The children going out the front door	Which picture shows what you do if the smoke detector/alarm sounds?
8. 	Look at the two pictures of the child riding a bike. Which picture shows a child riding safely? 1) A child riding with a helmet 2) A child riding without a helmet	Which picture shows a child riding safely?
9. 	Look at the two pictures of children on a bus. Which picture shows the safest way to ride the bus? 1) A child sitting in a seat 2) A child standing on the seat	Which picture shows the safest way to ride the bus?
12. 	Look at the pictures of a child crossing the street. Which picture shows the child crossing the street safety? 1) A child crossing the street alone 2) A child crossing the street at the crosswalk with a grown-up	Which picture shows the child crossing the street safety?
13. 	Look at the pictures of a child riding in a car. Which picture shows the child riding safely? 1) A child riding in a booster seat in the back seat 2) A child riding in the front seat without a seat belt	Which picture shows the child riding safely?

2000 Summer school (Name:)
1st & 2nd graders

♣ Circle the best answer.

Boy Girl	Are you a boy or a girl?
1 2	What grade will you be in from fall?
_____ years old	How old are you?
Always Sometimes Never	When you are with your best friend, how often do you speak **Korean**?
Always Sometimes Never	When you are with your parents, how often do you speak **Korean**?
United States Korea	Where were you born?
American Korean Korean-American Other	Do you identify yourself as an:

My usual grades in the public school are:
1) Mostly As and Bs (90s and 80s)
2) Mostly Bs and Cs (80s and 70s)
3) Mostly Cs and Fs (70s and 60s)

♣ Circle the picture around the best answer.

1.		Where do you usually sit when you ride in a car, van, or other vehicle?
2.		Which one looks like you when you ride a bicycle?
3.		Circle one picture that shows you how to stop at an intersection.
4.		Which one makes a noise and lets people know that there is smoke or fire in the home?

♣ Circle the best answer.

5. 	1) A grown-ups 2) Bicycle 3) Car 4) Toy	What is the one thing you always need to have with you when you cross the street?
6. 	1) Glance at the road and make a run for it 2) Look left, right, and left again before crossing a street	Before crossing a street, what must people always do?
7. 	1) BACK 2) BRAIN 3) Hair	Football players and bicyclists wear helmets to protect their
8. 	1) Always 2) Sometimes 3) Never	How often do **you** wear a seat belt when you ride in a car?
9. 	1) Always 2) Sometimes 3) Never 4) I do not ride a bicycle	How often do **you** wear a helmet when you ride a bicycle?
10. 	3) School bus 1) 4) Walking area 2)	Where is the most dangerous zone of the school bus ?

♣ Circle the best answer.

11. 	1) Tell 2) Give	If you found matches lying on a table, would you tell a grown-up or give them to a grown-up?
12. 	1) hide 2) ignore it 3) get out	If your smoke detector/alarm sounds, what would you do? Would you hide, ignore it, or get out of the house?
13. 	1) A sweater 2) A helmet	You are going for a bike ride with your mom. You get your bike out of the garage and stop to put something on. What would you need to put on before you begin riding your bike?
14. 	1) Walk close to my aunt 2) Hold my aunt's hand	You are shopping with your aunt. She has just parked the car in the parking lot. You begin to walk toward the store. What should you do?

15. 	1) With a grown-up 2) Run quickly	It is a warm, sunny day and you are playing in your yard. You see your best friend playing ball in his yard across the street. You are excited to see him and want to play. How should you cross the street?
16. 	1) 5 giant steps 2) 7 giant steps	The school bus has just dropped you off after school. How many giant steps should you take to move away from the bus?
17. 	1) back seat 2) front seat	You are going for a car ride with your grandmother. Where is the safest place for you to sit?
18. 	1) sit near a window 2) buckle up	What should you do every time you ride in a car?
19. 	If your clothes catch on fire, what should you do first? 1) Run as fast as possible 2) Call my parents 3) Stop immediately where I am, drop to the ground, & roll over and over and back and forth 4) Get out of the place	

♣ Circle Yes (true) or No (false) to the following questions.

20. 	1) Yes	2) No	People who ride bicycles should always ride on the right side of the road in the same direction as cars and other vehicles.
21. 	1) Yes	2) No	A grown-up does not need to wear a helmet when riding a bicycle.
22. 	1) Yes	2) No	Smoke alarms must function properly in order to alert people of smoke and fire in the home, school, or other buildings.
23. 	1) Yes	2) No	Bicycle riders do not have to obey the same rules of the road as vehicle drivers.
24. 	1) Yes	2) No	It's OK to wave my hands to my friends or parents out the window while the bus is moving.
25. 	1) Yes	2) No	If I want to find out if the iron or oven is hot, it's OK to touch them.
26. 	1) Yes	2) No	I know where the fire extinguishers and smoke detectors are at this school.
27. 	1) Yes	2) No	I know where the smoke detectors are at home.
28. 	1) Yes	2) No	Hot things such as a toaster, iron, and hot water can hurt me.

29.	1) Yes	2) No	I have a bicycle.
30.	1) Yes	2) No	I know how to buckle up correctly by myself.
31.	1) Yes	2) No	I know how to put on a helmet correctly by myself.
32.	1) Yes	2) No	I know how a smoke detector sounds.
33.	1) Yes	2) No	I know how to escape from my house when a fire occurs
34.	1) Yes	2) No	I know how to get out of my house when the smoke detector sounds.
35.	1) Yes	2) No	IT is the law for everyone to wear a seat belt when he or she rides in any place of the car.

♣ The following statements are asking about your opinion related to seat belt use, bicycle helmet use, smoke alarm, etc. Please, read carefully and circle the number.

		Never	Some-times	Always
1.	The next time that I ride in a car, I will buckle up.	1	2	3
2.	The next time that I ride a bicycle, I will put on a helmet.	1	2	3
3.	The next time that the smoke detector sounds at home, I will get out of the place immediately.	1	2	3

<SEAT BELT>

I believe wearing a seat belt is something

		Very	Some-what	So-So	Some-what	Very	
4.	Uncomfortable	1	2	3	4	5	Comfortable
5.	Unimportant	1	2	3	4	5	Important
6.	Foolish	1	2	3	4	5	Smart
7.	Hurts me	1	2	3	4	5	Doesn't hurt me
8.	Difficult	1	2	3	4	5	Easy

What do your parents, brothers/sisters, and a best friend think about wearing a seat belt?

	My parents:	Never	Some-times	Always
9.	wear a seat belt.	1	2	3
10.	care that I wear a seat belt.	1	2	3
11.	tell me to buckle up if I do not wear a seat belt.	1	2	3
12.	allow me to ride in a car although I do not wear a seat belt.	1	2	3

	My brother or sister:	Never	Some-times	Always
13.	wears a seat belt.	1	2	3
14.	cares that I wear a seat belt.	1	2	3
15.	tells me to buckle up if I do not wear a seat belt.	1	2	3
16.	thinks it is OK to ride in a car without wearing a seat belt.	1	2	3
	My best friend:	Never	Some-times	Always
17.	wears a seat belt.	1	2	3
18.	cares that I wear a seat belt.	1	2	3
19.	tells me to buckle up if I do not wear a seat belt.	1	2	3
20.	thinks it is OK to ride in a car without wearing a seat belt.	1	2	3

	How important is it to you	Very Important	Important	So-So	Unimportant	Very Unimportant
21.	what your parents tell you about safety?	1	2	3	4	5
22.	what your brother or sister tells you about safety?	1	2	3	4	5
23.	what your best friend tells you about safety?	1	2	3	4	5

<BICYCLE HELMET >

I believe wearing a helmet is something

		Very	Some-what	So-So	Some-what	Very	
24.	Uncomfortable	1	2	3	4	5	Comfortable
25.	Unimportant	1	2	3	4	5	Important
26.	Foolish	1	2	3	4	5	Smart
27.	Hurts me	1	2	3	4	5	Doesn't hurt me
28.	Difficult	1	2	3	4	5	Easy

What do your parents, brothers/sisters, and friends think about wearing a bicycle helmet?

	My parents:	Never	Some-times	Always
29.	wear a helmet when they ride a bicycle.	1	2	3
30.	care that I wear a bicycle helmet.	1	2	3
31.	tell me to put on if I do not wear a helmet when I ride a bicycle.	1	2	3
32.	allow me to ride a bicycle although I do not wear a helmet.	1	2	3

	My brother or sister:	Never	Some-times	Always
33.	wears a bicycle helmet.	1	2	3
34.	cares that I wear a bicycle helmet.	1	2	3
35.	tell me to put on if I do not wear a helmet when I ride a bicycle.	1	2	3
36.	thinks it is OK to ride a bicycle without wearing a helmet.	1	2	3
	My best friend:	Never	Some-times	Always
37.	wears a bicycle helmet.	1	2	3
38.	cares that I wear a bicycle helmet.	1	2	3
39.	tell me to put on if I do not wear a helmet when I ride a bike.	1	2	3
40.	thinks it is OK to ride a bicycle without wearing a helmet.	1	2	3

<SMOKE DETECTOR >

Having a smoke detector is something

		Very	Some-what	So-So	Some-what	Very	
41.	Unfamiliar	1	2	3	4	5	Familiar
42.	Unimportant	1	2	3	4	5	Important
43.	Loud	1	2	3	4	5	Quiet
44.	Unnecessary	1	2	3	4	5	Necessary
45.	Foolish	1	2	3	4	5	Smart
46.	Hurts me	1	2	3	4	5	Doesn't hurt me
47.	Difficult	1	2	3	4	5	Easy

	How easy or difficult are the followings?	Very difficult	Difficult	So-So	Easy	Very easy
48.	Getting out of the house immediately when the fire occurs is	1	2	3	4	5
49.	Getting out of the house immediately when the smoke detector sounds is	1	2	3	4	5
50.	Changing batteries of smoke detectors is	1	2	3	4	5

What do your parents, brothers/sisters, or friends think about a smoke detector?

	My parents:	Never	Some-times	Always
51.	like having a smoke detector.	1	2	3
52.	tell me where a smoke detector is.	1	2	3
53.	tell me what to do when a smoke detector sounds.	1	2	3
54.	let me stay at home although a smoke detector sounds.	1	2	3
55.	tell me to get out of the house when a smoke detector sounds.	1	2	3

	My brother or sister:	Never	Some-times	Always
56.	knows where a smoke detector in our house is.	1	2	3
57.	knows what to do when a smoke detector sounds.	1	2	3
58.	keeps playing at home although a smoke detector sounds.	1	2	3
59.	thinks I should get out of the place immediately when a smoke detector sounds	1	2	3
	My best friend:	Never	Some-times	Always
60.	knows where a smoke detector in my house is.	1	2	3
61.	knows what to do when a smoke detector sounds.	1	2	3
62.	keeps playing at home although a smoke detector sounds.	1	2	3
63.	thinks I should get out of the place immediately when a smoke detector sounds.	1	2	3

2000 Summer school
3rd – 8th graders

(Name:)

♣ Circle or write the best answer.

A.	Are you a boy or a girl?	Boy Girl
B.	What grade will you be in from fall?	( ) Grade
C.	How old are you?	( ) years old
D.	When you are with your best friend, how often do you speak Korean?	Always Sometimes Never
E.	When you are with your **parents**, how often do you speak Korean?	Always Sometimes Never
F.	Where were you born?	U.S. Korea Others
G.	How well do your **parents** speak **English**?	Very well Fair Little Not at all
H.	How well do **you** speak **English**?	Very well Fair Little Not at all
I.	How well do **you** speak **Korean**?	Very well Fair Little Not at all
J.	How well do **you** understand **English**?	Very well Fair Little Not at all
K.	How well do **you** understand **Korean**?	Very well Fair Little Not at all
L.	Do you identify yourself as an:	American Korean Korean-American Other
M.	My usual grades in the public school are: 4) Mostly As and Bs (90s and 80s) 5) Mostly Bs and Cs (80s and 70s) 6) Mostly Cs and Fs (70s and 60s)	

♣ Circle the best answer.

1. If your clothes catch on fire, what should you do first?
   1) Run as fast as possible
   2) Call my parents
   3) Stop immediately where I am, drop to the ground, & roll over and over and back and forth
   4) Get out of the place

2. The school bus has just dropped you off after school. As you step onto the ground, how many giant steps should you take to move away from the bus?
   1) 5 giant steps 2) 7 giant steps

3. In a fire, smoke will:
   1) settle near the floor
   2) rise to the ceiling
   3) stay near the fire

4. How often do **you** wear a seat belt when you ride in a car?
   1) Always 2) Sometimes 3) Never

5. How often do **you** sit on the front seat when you ride in a car?
   1) Always 2) Sometimes 3) Never

6. Before crossing a street, what must people always do?
   1) Glance at the road and make a run for it
   2) Look left, right, and left again before crossing a street

7. When is it important to wear your seat belt?
   1) Always
   2) Never
   3) Only long trips and vacations
   4) Only short trips around town

8. A home fire escape plan should have:
   1) One smoke detector, one way out, and a meeting place
   2) Several smoke detectors, two ways out, and a meeting place
   3) Batteries, one smoke detector, and one way out

9. When **you** ride a bicycle, how often do **you** wear a helmet?
   1) Always 2) Sometimes 3) Never 4) I don't ride a bicycle

10. Stop, drop, roll - cool and call should be done when:
    1) You need to go through smoke
    2) A smoke detector sounds
    3) Your clothes catch fire

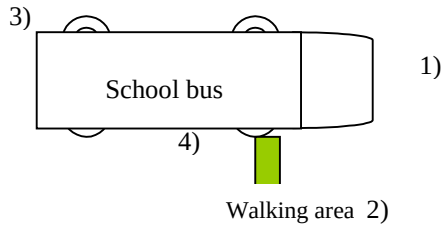
11. Which of the following is a fire hazard?
    1) A window blocked by furniture
    2) Matches and lighters
    3) Both of the above

12. None of the children in your neighborhood wear a helmet when riding a bike. Your mother makes you wear one. The kids tease you. What should you do?
    1) Ride your bike when the kids are not around
    2) Take your helmet off when you are out of sight of your mother
    3) Wear your helmet no matter what anyone says

13. Which of the following is a bus safety rule?
    1) Stay in your seat
    2) Talk quietly
    3) Both of the above

14. Food heated in a microwave:
    1) Heats to room temperature
    2) Is warm on the outside
    3) Can be very hot

15. Where is the most dangerous zone of the school bus?



♣ The following statements are about bicycles. Circle the best answer.

16.	Wearing a bicycle safety helmet is only important when riding at faster speeds.	1)True 2)False
17.	The seat of a bike is the right height if when you sit on it, you can touch the ground with toes of both feet.	1)True 2)False
18.	Only automobiles are required to make a complete stop at a stop sign.	1)True 2)False
19.	Riding with traffic, on the right side of a road or street, is always safer than riding on the left side facing traffic.	1)True 2)False
20.	In the city, many bicycle accidents occur during rush-hour traffic.	1)True 2)False
21.	Hand signals showing that you intend to turn will alert other drivers to your intention.	1)True 2)False

22.	I know where the fire extinguishers and smoke detectors are in the Korean school.	1)True 2)False
23.	I know where the smoke detectors are at home.	1)True 2)False
24.	I know how to buckle up.	1)True 2)False
25.	I know how to wear a helmet.	1)True 2)False
26.	I know how smoke detector sounds.	1)True 2)False
27.	I know how to escape from my house when the fire occurs.	1)True 2)False
28.	I know how to get out of the house when the smoke detector sounds.	1)True 2)False
29.	People who ride bicycles should always ride on the left side of the road in the different direction as cars and other vehicles.	1)True 2)False
30.	Pedestrians must always look for cars and then run across a street or intersection.	1)True 2)False
31.	A grown-up does not need to wear a helmet when riding a bicycle.	1)True 2)False
32.	Smoke alarms must function properly in order to alert people of smoke and fire.	1)True 2)False
33.	Bicycle riders do not have to obey the same rules of the road as vehicle drivers.	1)True 2)False
34.	It's the Georgia law for everyone to wear a seat belt when he or she rides in any place of the car.	1)True 2)False
35.	Children weighing 55 pounds do not need to wear a booster seat.	1)True 2)False
36.	I know how to replace batteries in a smoke detector.	1)True 2)False
37.	I know how to check whether the smoke detector is working.	1)True 2)False
38.	I have a bicycle.	1)True 2)False

♣ The following statements are asking about your opinion related to seat belt use, bicycle helmet use, smoke alarm, etc. Please, read carefully and circle the number.

		Never	Some-times	Always
1.	The next time that I ride in a car, I will buckle up.	1	2	3
2.	The next time that I ride a bicycle, I will put on a helmet.	1	2	3
3.	The next time that the smoke detector sounds at home, I will get out of the place immediately.	1	2	3

<SEAT BELT>

I believe wearing a seat belt is something

		Very	Some-what	So-So	Some-what	Very	
4.	Uncomfortable	1	2	3	4	5	Comfortable
5.	Unimportant	1	2	3	4	5	Important
6.	Foolish	1	2	3	4	5	Smart
7.	Hurts me	1	2	3	4	5	Doesn't hurt me
8.	Difficult	1	2	3	4	5	Easy

What do your parents, brothers/sisters, and a best friend think about wearing a seat belt?

	My parents:	Never	Some-times	Always
9.	wear a seat belt.	1	2	3
10.	care that I wear a seat belt.	1	2	3
11.	tell me to buckle up if I do not wear a seat belt.	1	2	3
12.	allow me to ride in a car although I do not wear a seat belt.	1	2	3
	My brother or sister:	Never	Some-times	Always
13.	wears a seat belt.	1	2	3
14.	cares that I wear a seat belt.	1	2	3
15.	tells me to buckle up if I do not wear a seat belt.	1	2	3
16.	thinks it is OK to ride in a car without wearing a seat belt.	1	2	3
	My best friend:	Never	Some-times	Always
17.	wears a seat belt.	1	2	3
18.	cares that I wear a seat belt.	1	2	3
19.	tells me to buckle up if I do not wear a seat belt.	1	2	3
20.	thinks it is OK to ride in a car without wearing a seat belt.	1	2	3

	How important is it to you	Very Important	Important	So-So	Unimportant	Very Unimportant
21.	what your parents tell you about safety?	1	2	3	4	5
22.	what your brother or sister tells you about safety?	1	2	3	4	5
23.	what your best friend tells you about safety?	1	2	3	4	5

<BICYCLE HELMET >

I believe wearing a helmet is something

		Very	Some-what	So-So	Some-what	Very	
24.	Uncomfortable	1	2	3	4	5	Comfortable
25.	Unimportant	1	2	3	4	5	Important
26.	Foolish	1	2	3	4	5	Smart
27.	Hurts me	1	2	3	4	5	Doesn't hurt me
28.	Difficult	1	2	3	4	5	Easy

What do your parents, brothers/sisters, and friends think about wearing a bicycle helmet?

	My parents:	Never	Some-times	Always
29.	wear a helmet when they ride a bicycle.	1	2	3
30.	care that I wear a bicycle helmet.	1	2	3
31.	tell me to put on if I do not wear a helmet when I ride a bicycle.	1	2	3
32.	allow me to ride a bicycle although I do not wear a helmet.	1	2	3
	My brother or sister:	Never	Some-times	Always
33.	wears a bicycle helmet.	1	2	3
34.	cares that I wear a bicycle helmet.	1	2	3
35.	tell me to put on if I do not wear a helmet when I ride a bicycle.	1	2	3
36.	thinks it is OK to ride a bicycle without wearing a helmet.	1	2	3
	My best friend:	Never	Some-times	Always
37.	wears a bicycle helmet.	1	2	3
38.	cares that I wear a bicycle helmet.	1	2	3
39.	tell me to put on if I do not wear a helmet when I ride a bike.	1	2	3
40.	thinks it is OK to ride a bicycle without wearing a helmet.	1	2	3

<SMOKE DETECTOR >

Having a smoke detector is something

		Very	Somewhat	So-So	Somewhat	Very	
41.	Unfamiliar	1	2	3	4	5	Familiar
42.	Unimportant	1	2	3	4	5	Important
43.	Loud	1	2	3	4	5	Quiet
44.	Unnecessary	1	2	3	4	5	Necessary
45.	Foolish	1	2	3	4	5	Smart
46.	Hurts me	1	2	3	4	5	Doesn't hurt me
47.	Difficult	1	2	3	4	5	Easy

How easy or difficult are the followings?		Very difficult	Difficult	So-So	Easy	Very easy
48.	Getting out of the house immediately when the fire occurs is	1	2	3	4	5
49.	Getting out of the house immediately when the smoke detector sounds is	1	2	3	4	5
50.	Changing batteries of smoke detectors is	1	2	3	4	5

What do your parents, brothers/sisters, or friends think about a smoke detector?

	My parents:	Never	Some-times	Always
51.	like having a smoke detector.	1	2	3
52.	tell me where a smoke detector is.	1	2	3
53.	tell me what to do when a smoke detector sounds.	1	2	3
54.	let me stay at home although a smoke detector sounds.	1	2	3
55.	tell me to get out of the house when a smoke detector sounds.	1	2	3
	My brother or sister:	Never	Some-times	Always
56.	knows where a smoke detector in our house is.	1	2	3
57.	knows what to do when a smoke detector sounds.	1	2	3
58.	keeps playing at home although a smoke detector sounds.	1	2	3
59.	thinks I should get out of the place immediately when a smoke detector sounds	1	2	3
	My best friend:	Never	Some-times	Always
60.	knows where a smoke detector in my house is.	1	2	3
61.	knows what to do when a smoke detector sounds.	1	2	3
62.	keeps playing at home although a smoke detector sounds.	1	2	3
63.	thinks I should get out of the place immediately when a smoke detector sounds.	1	2	3

APPENDIX C

MEAN SCORES, STANDARD DEVIATIONS, SAMPLE SIZES OF OUTCOME VARIABLES AT BASELINE AND POSTTEST BETWEEN THE CONTROL GROUP AND THE INTERVENTION GROUP

Appendix c

APPENDIX D

MEAN SCORES, STANDARD DEVIATIONS, SAMPLE SIZES OF INTERVENING VARIABLES AT BASELINE AND POSTTEST BETWEEN THE CONTROL GROUP AND THE INTERVENTION GROUP