ADOLESCENTS’ PERCEPTIONS OF HELMETWEARING PEERS

THESIS

Submitted to

The College of Arts and Sciences of the

UNIVERSITY OF DAYTON

in Partial Fulfillment of the Requirements for

The Degree

Master of Arts in Psychology

By

Caroline Ivy McNicholas

UNIVERSITY OF DAYTON

Dayton, Ohio

December 2010
ADOLESCENTS’ PERCEPTIONS OF HELMET-WEARING PEERS

APPROVED BY:

Keri Brown Kirschman, PhD
Faculty Advisor

Susan Davis, PhD
Committee Member

Melissa Layman-Guadalupe, PhD
Committee Member

Concurrence:

Carolyn Roecker-Phelps, PhD
Chair, Department of Psychology
ABSTRACT

ADOLESCENTS’ PERCEPTIONS OF HELMET-WEARING PEERS

Name: McNicholas, Caroline Ivy  
University of Dayton

Advisor: Keri J. Brown Kirschman, Ph.D.

Bicycling is a common form of recreation for adolescents. Despite injury risk, adolescent helmet use rates are very low (e.g. 5%-20%). The purpose of this study was to examine adolescent attitudes toward helmet use among hypothetical peers. Participants were 40 adolescent boys aged 10-14; 60% of participants reported “never” or “rarely” wearing a helmet. Youth were presented with a series of three photographs of same-age, same-sex peers riding bicycles with or without helmets. Attitudes towards the hypothetical peers were measured using the Photograph Reaction Questionnaire (PRQ) and the Revised Adjective Checklist (RAC). Analysis of the RAC revealed that peers used more positive adjectives to describe helmet-wearing peers than peers without helmets \(t(39) = 2.60, \ p = .01\). Self-reported helmet use was significantly correlated with friends’ use \(r=.65, \ p<.01\) and parents’ required use \(r=.63, \ p<.01\). Adolescents reported more positive perceptions of hypothetical peers who wore helmets than peers who were featured without helmets. Future studies should attempt to explore the link between peer pressure and helmet-use behavior.
ACKNOWLEDGEMENT

Many people helped immensely in the completion of this thesis. First and foremost, I would like to thank my advisor, Dr. Keri Brown Kirschman. Thank you for your wisdom, guidance, and for introducing me to the study of injury prevention. I would also like to thank my committee members, Dr. Susan Davis and Dr. Melissa Layman-Guadalupe. I am extremely grateful for all of your valuable comments and insights into the research process. I would also like to thank the late Dr. Charles Kimble for his early contributions to this work. Finally, I would like to thank my husband. Your support and encouragement means the world to me, thank you for all of your help throughout this process.
# TABLE OF CONTENTS

**ABSTRACT** ........................................................................................................................ iii

**ACKNOWLEDGEMENTS** ................................................................................................... iv

**LIST OF TABLES** ........................................................................................................ vii

**INTRODUCTION** ............................................................................................................. 1

  Current Safety Equipment Use ................................................................. 2

  Contributions to Low Helmet-use in among Adolescents ....................................... 4

  Peer Influence ................................................................................................. 5

  Health Belief Model......................................................................................... 8

  The Present Study .......................................................................................... 10

**METHOD** ....................................................................................................................... 12

  Participants............................................................................................................. 12

  Materials ................................................................................................................ 12

  Procedure ............................................................................................................... 15

**RESULTS** ......................................................................................................................... 17

  Descriptive Analyses ......................................................................................... 17

  Analyses of Study Hypotheses .......................................................................... 19

**DISCUSSION** .................................................................................................................... 25

  Primary Research Hypotheses ......................................................................... 25
LIST OF TABLES

1. Self-Reported Demographic Information for Sample........................................18

2. Correlations between Demographic Variables and Main Study Variables.............................................................21

3. Mean scores on the subscales of the Helmet Attitudes Scale .......................23

4. Correlations between Demographic Variables and Helmet Attitude Scale subscales.................................................................................24
INTRODUCTION

Some of the most common forms of recreation for adolescents in the United States include bicycling, skateboarding, and inline skating. Although these activities provide undeniable health benefits, they are responsible for significant numbers of injuries. Each year 76,000 inline skaters, 415,000 bicyclists, and 50,000 skateboarders in the United States sustain injuries that are severe enough to warrant emergency department care (American Academy of Pediatrics, 1998, 2002). Among these injuries, one of the most severe is traumatic brain injury (TBI). A TBI can result in death, loss of motor coordination, paralysis, amnesia, along with many other short and long term disabilities. A recent survey conducted by the National Safe Kids Campaign found that a TBI presents a substantial risk for children and adolescents who engage in wheeled sports (Cody, O’Toole, Mickalide, & Paul, 2002). The results of this survey indicate that 47% of children hospitalized for a bicycle-related injury under age 14 had sustained a TBI.

The American Academy of Pediatrics (AAP) currently recommends the use of safety equipment in an effort to reduce the severity of injuries sustained during wheeled recreational activities (AAP, 1998). Several studies indicate that wearing a helmet during wheel-related activities can reduce brain injury risk by as much as 88% (Cody et al., 2002; Thompson, Rivara, & Thompson, 2001). Despite these recommendations, recent research indicated adolescents are using safety equipment at extremely low rates (Brown Kirschman, Alison, & Johnston, 2006; Finnoff, Laskowski, Altman & Diehl, 2001;
Osberg & Stiles, 2000). Due to low safety equipment compliance and characteristic risk-taking behaviors of this age, adolescents are a particularly vulnerable group to injury. In addition, numerous studies indicate adolescents’ decision to wear helmets may be influenced by their peers (Dannenberg et al., 1993; Finnoff et al., 2001; Jacques, 1994; Klassen, Morag MacKay, Moher, Walker, & Jones, 2000; Lajunen & Rasanen, 2001; Stevenson & Lennie, 1992). The purpose of the present investigation was to examine adolescent attitudes toward helmet-use among same age peers in order to better understand the role of peer influence in decisions involving safety equipment. A secondary goal was to examine barriers to helmet-use as outlined in the health belief model (e.g., perceived barriers, cues to action) in an adolescent sample.

Current Safety Equipment Use

Unintentional injury is the number one cause of death in children and adolescents over the age of 12 months (Borse et al., 2008; Mace et al., 2001; National Center for Injury Prevention and Control, 2005). In addition, non-fatal injuries also present a risk of potential harm to adolescents as such traumatic brain injury (TBI). Many of these injuries can be prevented or reduced in severity through the use of proper safety equipment. However, rates of compliance with recommended safety practices are quite low, particularly during adolescence. Multiple studies indicate a pattern of low use for participants of wheeled activities. The helmet-use rate for inline skaters has been found to range from 5.7% to 12.2% (Osberg & Stiles, 2000; Warda et al., 1998). The helmet-use rates have been found to be even lower for skateboarders. Brown Kirschman et al. (2006) found helmet-use rates of 3% for skateboarders on Midwestern skateparks. Klein et al. (2005) studied a multinational sample of cyclists between the ages of 11 and 15.
The reported frequency of bicycle helmet-use varied widely when analyzed by country, between 1.9% and 39.2%, with the United States average at 20.2%.

Given these low rates of use, one strategy that has been used to increase helmet-usage in children and adolescents is the enaction of mandatory helmet laws across the United States. Although there is no federal law requiring the use of a helmet while biking, 21 states have statewide laws that require riders under the age of 17 (sometimes 18) to wear a helmet while riding a bicycle (Bicycle Helmet Safety Institute, 2006). Laws that mandate the use of helmets for skateboarding and inline skating are less common (Bicycle Helmet Safety Institute, 2006).

Research on the efficacy of these laws and regulations in the United States has produced mixed results. Some studies indicate significant improvements in rates of helmet-use (e.g., Liller et al., 2003; Ji, Gilchick, & Bender, 2006). For example, investigators in one study observed helmet-use rates for children under the age of 16 (n = 400) and found that helmet-use went from 3.6% pre-legislation to 50.1% post-legislation (Liller et al., 2003). Ji and colleagues (2006) studied 1116 bicycle trauma patients in San Diego County and found that rates of helmet-use in children and adults doubled after the passage of a helmet law. However, other studies indicate no significant differences in helmet-use between pre- and post-legislation helmet-use (e.g., Robinson, 2001; Robinson, 2007). One investigator suggested that data showing increases in helmet-use as a result of legislation should be viewed with caution, as many of these studies do not take into account current trends, such as increased helmet-use regardless of legislation (Robinson, 2007). Equivocal results could be due in part to the differences between communities in enforcement of these laws. Indeed, legislation is only as powerful as the
enforcement. More data is available from Australia, due in part to their early adoption of mandatory helmet-use laws in 1990. Finch (1996) found that even three years after helmet-use was mandated by law, less than 25% of teenagers reported that they always wore a helmet. Thus, it is important to investigate developmental and social determinants of helmet-usage in this population in addition to legislative action, so that these mechanisms can be better understood and guide future interventions.

Despite legislation, some adolescents are still at risk for head injury due to resistance to helmet-use recommendations. In general, adolescent boys appear to show the lowest rates of helmet usage. In a sample of in-line skaters, Osberg and Stiles (2000) observed that boys wore less protective gear and skated on riskier surfaces (e.g., streets) than their female counterparts. In this study, ability was also found to be related to helmet-usage. Beginning skaters wore significantly more of all gear types while skaters at the average level had the lowest rates of observed safety equipment use.

Contributions to Low Helmet-use among Adolescents

Risk-taking behavior in adolescence, such as failure to wear protective gear, may be explained in part by biology. Recent magnetic resonance imaging studies have shown that considerable structural development of the brain continues to takes place during adolescence (Choudhury, Blackmore, & Charman, 2006). For example, myelination and pruning in the hippocampal and prefrontal cortex regions of the brain continues to occur throughout this developmental period. The hippocampus and prefrontal cortex are important in problem solving and insight (Luo & Niki, 2003). Therefore, adolescents reasoning and decision making, especially during periods of risk-taking, are immature. Unlike adults, adolescents may rely more on emotions than on logical thought, which
means they may be influenced more by the “in the moment” benefits that result from an action than by the potential consequences of a decision. For example, an adolescent who rides a bicycle in heavy traffic to a friend’s house sans helmet may be focused on the excitement of getting to his/her destination rather than the risks of the situation.

In addition to these biological changes, adolescents go through an intense socialization process whereby they are becoming increasingly aware and concerned about the thoughts of others, especially their peers (Berzonsky & Adams, 2003). Choudhury et al. (2006) argue that the brain regions (e.g., the prefrontal cortex) that undergo the most significant development during adolescence are those that are associated with the ability to take the perspective of another person and to make inferences about another’s mental states. It is during this stage of cognitive development that the influence of peers becomes much greater than in earlier childhood.

Peer Influence

As children begin the transition to adolescence, they spend an increasing amount of time with peers (Brown, 2004). Erikson (1968) maintained that affiliation with a peer group during adolescence is essential to a healthy identity development. While peer affiliation in adolescence is considered healthy behavior, peer influence occurs for a variety of reasons and can have both positive and negative consequences. For example, a study by Prinstein and colleagues (2001) sought to identify models for adolescent risk behavior and associated moderator variables. Adolescents ($n=527$) in grades 9-12 answered questions regarding their own substance use, violent behavior, suicidality, and the health-risk behaviors (e.g., cigarette use) of their friends. Results indicated that the behavior of peers accounted for a significant proportion of the variance
in adolescents’ own health risk behaviors. Adolescents who engaged in marijuana use
and heavy episodic drinking tended to have friends who engaged in deviant behavior and
were substance users. Investigators also found evidence for the positive effects of peer
influence. The prosocial behavior of adolescents’ own friends was negatively associated
with violence and substance abuse of their friends.

Although the fact that peers influence behavior has been established, researchers
are now identifying potential mechanisms by which peers guide behavior as well. For
example, adolescents appear to use peer pressure as a means to convey group norms
(Lieberman et al., 2001). Peers transmit group norms to one another through a process
of rewarding group normative behavior and offering undesirable consequences for
rejecting it (Brown, 1989; Kandel, 1980). This regulation of normative group behavior is
usually accomplished through gossiping and teasing (Eder, Evans, & Parker, 1995),
although there may be more subtle factors at play (Brown, 2004).

The normative group behavior towards helmet-use is of particular interest, given
it is likely to contribute to an adolescent’s willingness to engage in helmet-use. In an
Australian sample of high school-aged cyclists, helmet-users were significantly more
likely than non-users to believe that best friends, other friends, and cyclists wore helmets
and that these groups would approve of the participant’s own helmet-use (O’Callaghan &
Nausbaum, 2006). Thus, perceived peer support of helmet-use may encourage this safety
behavior. In the same vein, adolescents who perceive their peers as anti-helmet may
resist parent/physician recommended helmet-use (and legislation). However, this has not
been examined empirically. A study of children in the United States found that only 25%
thought that their friends would approve of helmet-use (Logan et al., 1995). Therefore,
children and adolescents may believe that their friends will disapprove of them if they wear helmets. To date, however, the reality of these perceptions has not been investigated in the literature.

Another identified mechanism by which peers influence one another that is salient to risk-taking behavior is modeling (Irwin, Igra, Eyre, & Millstein, 1997). Modeling is a component of Albert Bandura’s Social Cognitive Theory, which states that people learn from role models whose behavior they want to imitate (Bandura, 1989). The current evidence to support the influence of peer modeling on adolescent health behavior is strong. A myriad of studies exist to support the claim that peers are more likely to wear helmets if their friends wear helmets (Dannenberg et al., 1993; Finnoff et al., 2001; Jacques, 1994; Klassen, Morag MacKay, Moher, Walker, & Jones, 2000; Lajunen & Rasanen, 2001; Stevenson & Lennie, 1992). Focus groups of Australian youth (n =22) ages 10-17 underscore the strong influence of modeling (Cassell, Clapperton, Aroni, Ashby, Saweyer, 2005). Adolescents reported that they often learned new tricks and developed new skills by imitating the older, more experienced skaters at the skatepark. In addition, many younger skaters reported that those skaters that wore safety equipment were more often ridiculed by their peers for being “uncool”. This highlights the influence that peers have on one another and how that influence can result in negative safety behaviors.

Norms regarding helmet-use may also be conveyed via media representation of helmet-use. In a content analysis of magazines directed towards adolescents, Brown Kirschman, Odar, and Miadich (2010) found that only 52% of BMX bicycle magazines and 6% of skateboarding magazines depict models appropriately wearing helmets. This
contradicts advice of physicians and other health professionals’ recommendations for helmet use.

Peer influence is especially relevant to the study of injury prevention because research indicates that adolescents are more likely to take risks while in the presence of peers (Gardner & Steinberg, 2005; Maxwell, 2002). A potentially effective method of decreasing injury risk behaviors would be to promote helmet use amongst peer groups. Interventions designed to change attitudes regarding safety gear may prove fruitful. However, this notion has received little attention in the current safety literature.

### Health Belief Model

Another way to conceptualize adolescent safety behavior is to frame it in the context of health behavior theory. The Health Belief Model (HBM) has been used as a guide to understand the factors that contribute to the adoption of health behaviors (Rosenstock, 1974). The HBM details five specific factors that influence preventative behaviors such as helmet use (Glanz, Rimer, & Lewis, 2002). The five factors posited to influence health behavior as they may be related to helmet usage are: perceived barriers to performing the response that is recommended (e.g., “my friends will think helmets are uncool”); perceived benefits of performing the recommended response (e.g., “I think a helmet would keep my head safe”); susceptibility (e.g., “I believe I may fall and need a helmet”); perceived severity (e.g., “I believe a head injury might lead to devastating consequences”); and cues to action (e.g., peer modeling; physician recommendation). According to Rosenstock (1974), the combination of the vulnerability and severity should result in a push towards pro-health behavior.
The HBM has been used in several studies as a framework for examining helmet use. Arnold and Quine (1994) examined the ability of the HBM to predict helmet use among boys ages 11-18. All of the participants in the study regularly used a bicycle to get to and from school. Arnold and Quine designed a 10-item questionnaire that reflected all components of the HBM. Participants’ helmet use was compared two times, separated by four weeks. Perceived barriers to helmet use, perceived benefits of helmet use, and perceived susceptibility to bicycling accidents were all significantly sensitive to helmet-use or non-use. In addition, the cues to action component of the questionnaire proved to be an important predictor of helmet use. Of the participants that had experienced a cycling accident, 74% wore helmets while only 32% of participants who had not been injured reported wearing helmets. Of particular importance is that the complete HBM model accounted for 53% of the variance between helmet-wearers and non-wearers. This highlights the ability of the HBM to predict compliance with recommended safety practices.

In a similar study, Lajunen and Rasanen (2004) examined adolescent helmet-use behavior. A questionnaire measuring all components of the HBM using a 5-point Likert scale was used for this study. Results indicate that some aspects of the HBM combine to form a useful framework for examining helmet use. The strongest predictors of helmet use were the “perceived barriers” and “cues to action” scales of the questionnaire. However, the effect of “perceived severity” and “health motivation” on the intention to use a helmet was not statistically significant. These results add to those of Arnold and Quine (1994) but the discrepancies between the two studies highlights the need for further research to clarify the utility of the HBM in studying helmet-use behavior.
Even though the existing literature is inconsistent, the portion of the Health Belief Model known as cues to action (e.g., physician recommendation, television commercials) and perceived barriers (my friends will think I am not cool) received support from both studies and are particularly relevant to the proposed study. Cues to action are important because this portion of the HBM describes the decision-making process that would lead to a helmet purchase and subsequent use of that helmet. Thus, adolescents who report more cues to action should be more likely to purchase a helmet and to use it on a consistent basis. However, adolescents are still wearing helmets at extremely low rates. This discrepancy highlights the need to study these factors and their relation to injury prevention.

The Present Study

In summary, helmet use is protective against head injuries sustained during recreational wheeled activities (Cody et al., 2002; Thompson et al., 2001). Despite AAP recommendations, adolescents are reported to be wearing helmets at alarmingly low rates (Brown Kirschman et al., 2006; Finnoff et al., 2001; Osberg & Stiles, 2000). The proposed study will attempt to examine adolescent attitudes towards helmet-use via hypothetical vignettes. In addition, the proposed study will seek to answer questions related to the theoretical conceptualization of acceptability of helmet-use among adolescents and helmet-use behavior in general.

Based on this review of literature, the following research questions and hypotheses (H1, H2 and H3) have been generated for examination in the present study:

H1) Are adolescents less accepting of peers who wear helmets while bicycling?

When presented with the study stimuli, it is hypothesized that adolescents will
rate the peers wearing helmets more negatively than the peers not wearing safety equipment.

a. Participants will report lower scores (i.e., indicating lower acceptance) on the Photograph Reaction Questionnaire after viewing the photographs of peers wearing helmets as compared to scores following viewing of peers without helmets.

b. Participants will report lower scores (i.e., indicating more negative attitudes) on the Revised Adjective Checklist when describing helmet-wearing peers as opposed to peers without helmets.

H2) Is acceptance of peer helmet-use related to adolescents’ own self-reported helmet use? It is hypothesized that participants who report more frequent helmet use will also report higher acceptance of helmet-wearing peers, indicated by higher scores on the PRQ.

H3) Are components of the Health Belief Model related to self-reported helmet-use? It is hypothesized that participants with lower scores on the Perceived Barriers subscale of the Helmet Attitudes Scale (i.e., less perceived barriers to helmet-use) and higher scores on the Cues to Action subscale of the HAS (i.e., more cues to action) will endorse more frequent helmet use.
METHOD

Participants

Following approval from the Research Review and Ethics Board in the Department of Psychology at the University of Dayton, 40 boys aged 10-14 (M =12.03, SD =1.48) were recruited from local Midwestern schools during school days and various school-related events (e.g., a district education expo). Early adolescents were targeted for the current study because of the emerging vulnerability to peer pressure and desire for peer acceptance that occurs during this stage of development (Gutgesell & Payne, 2004). Additionally, boys aged 10-14 are at higher risk for injury while riding a bicycle (Agran, Winn, Anderson, Trent, & Walton-Haynes, 2001; Spinks, Macpherson, Bain, & McClure, 2006). The sample was comprised of African American (40%), Caucasian (30%), Bi-racial (17.5%), and Hispanic (5%) participants. All participants reported that they rode bicycles, with the average riding time per week being 145.27 (SD = 304.58) minutes. The range of self-reported average riding times ranged from 0-1800 minutes per week, which varied considerably between summer and the school year. Self-reported helmet-use in this sample was low, with participants reporting that they never (32.5%), rarely (27.5%), often (22.5%), or always (17.5%) wore a helmet while riding a bicycle. In addition, there were no reported head injuries in this sample of adolescents.

Materials

Demographic Questionnaire. Participants were given a demographic questionnaire to assess age, gender, ethnicity, and current helmet-use behaviors (See Appendix A). For
example, questions included “How often do you wear a helmet?” and “Do your parents require that you wear a helmet?” An item about past injuries sustained while participating in wheeled sports was also included. However, all participants in this sample reported sustaining only minor injuries (e.g., scrapes and bruises).

Photographs of Peer During Wheeled Activity. Six photographs featuring one of three 12-year-old boys were used as the wheeled stimuli for examining acceptance of a hypothetical peer (see Appendix B). Three 12-year-old boys served as models for two photographs, once with a helmet on and once without a helmet. Two of the models were Caucasian and one was bi-racial. The volunteers were all asked to stand as if they were ready to mount the bicycle, so that the pose remained consistent across photographs. The background of each photograph was different, as each picture was taken in a different location. Each color photograph was 10 cm x 15 cm and was taken with a digital camera.

Study participants were randomly assigned to view three of the six photographs. Each participant viewed at least one photo featuring a peer with a helmet and one photo featuring a peer without a helmet. For statistical purposes, the average of the two helmet or the two no-helmet scores was calculated and used in the analysis.

Photograph Reaction Questionnaire. The Photograph Reaction Questionnaire contains five questions developed for the present study in order to gauge participants’ attitudes toward a photographed peer (see Appendix C). For example, participants were asked, “How likely is it that you would go to the skateboarding park with this person?” Responses were measured on a 6-point Likert-type scale with 1 indicating “not at all” and 6 indicating “extremely likely”. Scores ranged from 5 to 30 with higher scores indicating more acceptance of the photographed peer. The mean scores for the helmet-wearing
peers and the non-helmet wearing peers were calculated separately. Cronbach alpha was calculated and revealed moderate internal consistency ($\alpha = .54$).

*The Revised Adjective Checklist.* The Revised Adjective Checklist (Siperstein, 1980) was designed to measure children’s attitudes toward peers (see Appendix D). It was originally intended to measure the attitudes of children toward peers with handicaps but has since been modified to be appropriate for measuring adolescents’ attitudes toward peers without a disability (Kury, Rodrigue, & Perri, 1998). The checklist consists of 32 adjectives with a positive (e.g., smart, healthy) or negative (e.g., dumb, weak) value. Siperstein (1980) determined the positive or negative value of the adjectives via factor analysis. In order to score this checklist, the number of negative adjectives circled is subtracted from the number of positive adjectives circled. A constant score of 20 is then added. The scores can range from 4 to 36 with scores under 20 indicating more negative attitudes and scores above 20 indicating more positive attitudes toward the hypothetical peer. The Revised Adjective Checklist (RAC) has been used in several studies, including those with adolescents (e.g., Gray & Rodrigue, 2001; Kury et al., 1998). Gray and Rodrigue (2001) reported good internal consistency with a Cronbach alpha score of .82 in a sample examining attitudes of adolescents with cancer. Similar results were reported by Swaim and Morgan (2001) and Siperstein (1980), who reported coefficient alphas of .81 and .91, respectively. In addition, a review by Vignes and colleagues (2008) of instruments used to measure children’s perceptions of disabled peers concluded that the RAC has excellent construct validity, as measured by correlations with measures of behavioral intentions (e.g., $r = 0.76$).
The Helmet Attitudes Scale. The Helmet Attitudes Scale (Ross, Ross, Cataldo, & Rahman, 2008) was designed to measure helmet-use motives in a sample of college students (see Appendix E). Several of the questions in the original measure were modified to be age-appropriate for the younger adolescents in this sample. For example, Item 66 previously read, “My parents made me wear a helmet when I was a child”, and now reads, “My parents make me wear a helmet”. This measure consists of 57 items based on the principles of the Health Belief Model (HBM) and is divided into five sections representing each component of the model. Respondents indicate their answers on a 6-point Likert-type type scale (1 = “Strongly Disagree” to 6 = “Strongly Agree”). Internal consistency was gauged using Chronbach alpha. The first section measures Perceived Vulnerability and yielded 2 subscales: Perceived Exemption from Harm (α = .67) and Perceived Danger of Cycling (α = .69). The next section is Perceived Severity of Harm (α = .82), which has no subscales. Perceived Benefits has two subscales: Emotional Benefits (α = .85) and Safety Benefits (α = .69). The next section is Perceived Barriers which has Cost Barriers (α = .78) and Personal Vanity and Discomfort Barriers (α = .91) as its two subscales (Ross, Ross, Cataldo, & Rahman, 2008). Finally, the Cues to Action section has three subscales: Friends and Family (α = .91), Parental Rules in Childhood (α = .29), and Media Influences (α = .72). Internal consistency was comparable to that reported by Ross and colleagues (2008).

Procedure

Forty early-adolescent boys aged 10-14 were recruited from a Midwestern school and a district school expo fair held at a local community college. Only boys were examined due to their increased vulnerability to injury over girls (Cody et al., 2002; Osberg &
Stiles, 2000). The school administrator was contacted and given an explanation of the
current study. Following approval of the school administrator, an informed consent form,
child assent form, and a letter were sent to caregivers of students explaining the purpose
of the study.

Informed consent was acquired from caregivers and assent was obtained from
youth before any study-related procedures began. (See Appendices F and G.) In this
study, youth were individually interviewed at their school or the district’s expo event
about their perceptions of a male peer in three different photographs. A series of
structured questions was asked of each participant individually to ensure comprehension
and so that peer influence would not confound the participants’ answers. The participants
were shown the set of photographs and the interviewer administered the questionnaires.
In total, study procedures took approximately 30 mins. per participant.

Participants were randomly assigned to view a combination of three pictures with
at least one helmeted peer and one non-helmeted peer represented. Participants then
completed the Photograph Reaction Questionnaire and the Revised Adjective Checklist
after viewing each of the photographs. The order of these two questionnaires was
randomized in order to minimize potential order effects. Subsequently, each participant
filled out the Helmet Attitudes Scale and the demographic questionnaire. The order of
these last two measures was randomized as well. At the conclusion of the study, all
participants were given educational materials about preventing injuries while engaging in
wheeled activities. They also received information about where to purchase helmets.
RESULTS

Data analysis for the present study occurred in three phases. Following appropriate data screening, the first phase consisted of descriptive analyses including means, standard deviations, and ranges for study variables. The second phase consisted of paired sample t-tests to examine the relationship between photograph (helmet and no helmet) and scores on the Photograph Reaction Questionnaire (PRQ) and Revised Adjective Checklist (RAC). The third phase of data analysis included Pearson correlation coefficient tests and the presentation of a correlation matrix which examined the relationships between study variables.

Descriptive Analyses

Table 1 summarizes demographic information as well as rates of participant reported helmet use for self, parents, and friends. A chi-square analysis was conducted to determine the strength of the ethnicity variable, using self-reported helmet use as the dependent variable, and was nonsignificant \( \chi^2(1, N = 40) = 14.096, \ p = .518 \).
Table 1.  
*Self-reported Demographic Information for Sample*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
<th>M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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<td></td>
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<tr>
<td>Ethnicity</td>
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</tr>
<tr>
<td>Minutes bicycling per week</td>
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<td></td>
<td>145.27(304.58)</td>
</tr>
<tr>
<td>Helmet-use</td>
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</tr>
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<td>Always</td>
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<tr>
<td>Often</td>
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</tr>
<tr>
<td>Reasons for not wearing*</td>
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<td>1</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Always wear helmet</td>
<td>6</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>Parents' required helmet-use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>11</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Most of the time</td>
<td>5</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Some of the time</td>
<td>12</td>
<td>30.0</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>12</td>
<td>30.0</td>
<td></td>
</tr>
<tr>
<td>Parents' own helmet-use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>2</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Most of the time</td>
<td>3</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Some of the time</td>
<td>6</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>6</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>Parents do not ride</td>
<td>23</td>
<td>57.5</td>
<td></td>
</tr>
<tr>
<td>Friends' own helmet-use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>5</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Most of the time</td>
<td>10</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td>Some of the time</td>
<td>9</td>
<td>22.5</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>16</td>
<td>40.0</td>
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</tr>
</tbody>
</table>

*Note: Participants had the option of choosing more than one response*
Analyses of Study Hypotheses

It was hypothesized that adolescents would view the photographed peers who wear helmets more negatively than the photographed peers not wearing helmets, as measured by scores on the PRQ and the RAC. In order to test these hypotheses, paired-samples t-tests were conducted. Since participants each viewed either two helmet or two no-helmet photographs, the average of the two scores was used in this analysis. Participants’ scores on the PRQ did not significantly differ as a function of photograph type (i.e., helmet vs. no-helmet), $t(39) = 1.74, p > .05$. However, there was a significant difference in RAC scores for the helmet and no-helmet photographs $t(39) = 2.60, p = .01$. The results indicated that the mean scores describing helmet photographs ($M = 27.34, SD = 3.78$) were higher (i.e., more positive adjectives selected) than the mean scores for the non-helmet photographs ($M = 24.66, SD = 5.75$). The standardized effect size index, $d$, was 0.55, indicating a moderate effect size. Thus, participants perceived helmet-wearing peers more positively than they perceived peers without helmets on the RAC, but not on the PRQ. A table of frequencies for each adjective on the RAC is available (see Appendix H).

Due to the high number of minority participants represented in the sample, a 2x3 ANOVA was conducted to determine whether attitudes toward each photographed peer differed as a function of participant ethnicity. Ethnicity was collapsed into two groups, minority and Caucasian. The mean scores on the PRQ for the three photographed models were not significantly different based on ethnicity $F(2, 76) = .336, p > .05$. In addition, there was no significant difference in scores on the RAC between models $F(2, 76) = .749, p > .05$. 
Hypothesis 2 stated that participants who reported more frequent helmet-use (i.e., responses were coded such that higher scores equal more helmet-use) on the Demographics Questionnaire would have higher scores (i.e., higher acceptance of helmet-wearing peers) on the PRQ. Pearson correlation tests indicated that the relationship between self-reported helmet-use and scores on the PRQ for both the helmet condition, \( r(38) = .18, p = .26 \), and no-helmet condition, \( r(38) = .06, p = .69 \), was not significant. Additional correlation tests were conducted using scores on the RAC, which also indicated that the relationship between helmet, \( r(38) = .23, p = .15 \), and no-helmet, \( r(38) = .01, p = .96 \), photographs and self-reported helmet-use was not significant. Therefore, there was no relationship between self-reported helmet-use and acceptance of hypothetical peers in this sample of adolescent boys. Further Pearson correlation testing indicated that there was a significant negative correlation between participants’ age and parents’ required helmet use, \( r(38) = -.49, p < .01 \). In addition, it was found that self-reported helmet-use was significantly related to parents’ required helmet-use, \( r(38) = .63, p < .01 \) and friends’ helmet-use, \( r(38) = .65, p < .01 \). Finally, parents’ required helmet use was related to friends’ helmet use, \( r(38) = .57, p < .01 \) (see Table 2).
Table 2.
*Correlations between Demographic Variables and Main Study Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Helmet-use</td>
<td>-.26</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Parents’ Required Use</td>
<td>-.49**</td>
<td>.63**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Parents’ Own Use</td>
<td>.19</td>
<td>.31</td>
<td>.14</td>
<td>--</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Friends’ Use</td>
<td>-.28</td>
<td>.65**</td>
<td>.57**</td>
<td>.15</td>
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<tr>
<td>6. PRQ – Helmet</td>
<td>-.06</td>
<td>.18</td>
<td>.00</td>
<td>-.04</td>
<td>.29</td>
<td>--</td>
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</tr>
<tr>
<td>7. RAC - Helmet</td>
<td>.00</td>
<td>.23</td>
<td>-.12</td>
<td>-.05</td>
<td>.14</td>
<td>.50**</td>
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<tr>
<td>8. PRQ – No Helmet</td>
<td>-.17</td>
<td>.06</td>
<td>-.02</td>
<td>-.12</td>
<td>-.03</td>
<td>.69**</td>
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<tr>
<td>9. RAC – No Helmet</td>
<td>-.25</td>
<td>.00</td>
<td>.02</td>
<td>-.29</td>
<td>-.30</td>
<td>.21</td>
<td>.11</td>
<td>.61**</td>
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</tbody>
</table>

*p < .05, **p < .01
For Hypothesis 3, it was posited that participants with lower scores on the Perceived Barriers subscales (i.e., Personal Vanity and Discomfort and Cost Barriers scales) of the HAS and higher scores on the Cues to Action subscales (i.e., Friends and Family, Parent Rules in Childhood, and Media scales) would report more helmet-use. Table 3 summarizes the mean scores on the Helmet Attitudes Scale (HAS). The highest mean was for the Safety Benefits scale, indicating that adolescents in this study are aware of the benefits of helmet use. Results of Pearson correlation tests indicate that the relationship between the Personal Vanity and Discomfort Barriers subscale and self-reported helmet-use was significant, $r(38) = -.50, p = .001$, indicating that participants with low levels of helmet-use found helmets to be unattractive and uncomfortable. In addition, the relationship between scores on the Cost Barriers scale and self-reported helmet-use was significant, $r(38) = -.41, p < .01$, meaning that participants that reported less helmet-use also perceived cost as a barrier to helmet-use.

Only one component of the Cues to Action subscale was significantly related to self-reported helmet-use. Participants that reported experiencing more encouragement from loved ones to wear a helmet (i.e., Friends and Family scale) were significantly more likely to wear a helmet, $r(38) = .63, p < .001$. On the Parental Rules in Childhood scale, however, higher scores did not reflect an agreement that parents encouraged helmet-use during childhood, $r(38) = .25, p = .12$. Finally, results indicate that greater exposure to media influences that encouraged helmet-use was not significantly related to self reported helmet-use, $r(38) = .30, p = .06$. (See Table 4.)
Table 3.  
*Mean Scores on the subscales of the Helmet Attitudes Scale (N=40)*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Perceived Vulnerability</strong></td>
<td></td>
</tr>
<tr>
<td>Perceived Exemption from Harm</td>
<td>3.27 (1.41)</td>
</tr>
<tr>
<td>Perceived Danger of Cycling</td>
<td>3.93 (1.06)</td>
</tr>
<tr>
<td>Perceived Severity of Harm</td>
<td>3.29 (1.38)</td>
</tr>
<tr>
<td><strong>2. Perceived Benefits</strong></td>
<td></td>
</tr>
<tr>
<td>Emotional Benefits</td>
<td>3.25 (1.27)</td>
</tr>
<tr>
<td>Safety Benefits</td>
<td>4.65 (0.98)</td>
</tr>
<tr>
<td><strong>3. Perceived Barriers</strong></td>
<td></td>
</tr>
<tr>
<td>Personal Vanity &amp; Discomfort Barriers</td>
<td>3.17 (1.50)</td>
</tr>
<tr>
<td>Cost Barriers</td>
<td>2.80 (1.45)</td>
</tr>
<tr>
<td><strong>4. Cues to Action</strong></td>
<td></td>
</tr>
<tr>
<td>Friends and Family</td>
<td>3.19 (1.63)</td>
</tr>
<tr>
<td>Parent Rules in Childhood</td>
<td>3.38 (1.15)</td>
</tr>
<tr>
<td>Media</td>
<td>3.11 (1.30)</td>
</tr>
</tbody>
</table>

*Note.* Higher scores indicate more favorable attitudes towards helmet-use on all subscales except Personal Vanity and Discomfort Barriers and Cost Barriers.
Table 4. *Correlations between Demographic Variables and Helmet Attitude Scale subscales*

<table>
<thead>
<tr>
<th>Variable</th>
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<th>4</th>
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<th>12</th>
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<tr>
<td>1. Age</td>
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<tr>
<td>2. Helmet-use</td>
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</tr>
<tr>
<td>3. Parents’ Required Use</td>
<td>-.49**</td>
<td>.63**</td>
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<td>4. Parents’ Own Use</td>
<td>.19</td>
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<td>5. Friends’ Use</td>
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<td>.57**</td>
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<td>6. Perc. Exemption from Harm</td>
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<td>7. Perc. Danger</td>
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<td>.50**</td>
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</tr>
<tr>
<td>9. Emotional Benefits</td>
<td>-.38*</td>
<td>.47**</td>
<td>.50**</td>
<td>.18</td>
<td>.46**</td>
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<td>.11</td>
<td>.61**</td>
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<td>10. Safety Benefits</td>
<td>-.20</td>
<td>-.07</td>
<td>.20</td>
<td>-.06</td>
<td>.33**</td>
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<tr>
<td>11. Cost Barriers</td>
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<td>-.42**</td>
<td>-.22</td>
<td>-.25</td>
<td>-.41**</td>
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<td>12. Vanity and Discomfort</td>
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<td>-.41**</td>
<td>-.20</td>
<td>-.47**</td>
<td>.50**</td>
<td>-.47**</td>
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<td>-.37**</td>
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<td>.71**</td>
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<td>.55**</td>
<td>-.65**</td>
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<td>-.12</td>
<td>-.39*</td>
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<td>14. Parental Rules</td>
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<td>.26</td>
<td>.01</td>
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<td>15. Media Influences</td>
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<td>.00</td>
<td>-.17</td>
<td>-.22</td>
<td>.57**</td>
<td>.31*</td>
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</table>

*p <.05, ** p<.01
DISCUSSION

The present study was designed to examine whether adolescents reported more negative attitudes towards helmet-wearing peers as compared to those peers who chose not to wear safety gear. In addition, the Health Belief Model (HBM) was examined to determine whether any of the subscales (e.g., Perceived Barriers, Cost Barriers, Friends and Family) were related to demographic variables (e.g., self-reported helmet-use, friends’ reported helmet-use). Adolescent boys were shown a series of photographed peers, with some peers wearing helmets and some without helmets. The attitude scores on the helmet and non-helmet photographs were compared to determine whether a significant difference existed. Previous research indicates that peers’ influence may play a role in helmet-use as adolescents have been found to be more likely to wear helmets if their friends wear helmets (Dannenberg et al., 1993; Finnoff et al., 2001; Jacques, 1994; Klassen et al., 2000; Lajunen & Rasanen, 2001; Stevenson & Lennie, 1992). However, previous research has not examined adolescent attitudes towards peers who wear helmets more broadly.

Primary Research Hypotheses

The primary hypothesis stated that adolescents would view the photographed peers wearing helmets more negatively than the photographs of peers not wearing helmets. Attitudes toward the photographed peers were measured using the PRQ and the RAC. This hypothesis was not supported. There was no difference in PRQ scores based
on helmet-use of the photographed hypothetical peer. There was a significant difference between attitudes toward the helmet and no-helmet photographs on the RAC, although not in the expected direction. Adolescents used more positive adjectives to describe photographed peers wearing helmets than they did to describe photographed peers without helmets.

This study’s findings regarding helmet-attitudes and behavior are contrary to what would be expected based on the literature. Attitudes have been shown to be valid and reliable predictors of behavior (Kraus, 1995). Kraus (1995) documented a substantial relationship between attitudes and behavior by conducting a meta-analysis of 88 attitude-behavior studies (p < .001). Further, Kraus (1995) found that when people have a direct experience with the attitude object (e.g., helmet); their attitudes are substantially more predictive. Given that attitudes do appear to predict behavior, it stands to reason that the RAC, a measure of attitudes, would be strongly associated with increased helmet-use behavior. However, this was not the case. The RAC was not related to self-reported helmet-use in this sample of early adolescent boys.

The present study contradicts the results of Logan and colleagues (1995), who found that adolescents feared that their friends would disapprove of their helmet-use, thus suggesting that adolescents convey to one another that safety equipment is “uncool”. However, the present study found that adolescents viewed helmet-wearing peers more positively than non-helmet wearing peers. This unexpected result may be due to measurement error instead of true attitudes. There may be an element of social desirability influencing responses on the RAC. Participants reported knowledge that
helmets were safe on the Safety Benefits scale of the HAS and may therefore answer the
questionnaires based on the answers they perceive to be “correct”.

Although the difference in adolescent attitudes toward helmet and no-helmet
photographs was significant on the RAC, there were no differences found on the PRQ. In
other words, adolescents did not differ in their acceptance of helmeted and non-helmeted
hypothetical peers as measured by the PRQ. While it is possible that adolescents felt
similarly toward helmet and non-helmet peers, measurement issues may also play a role.
The PRQ was developed specifically for this study, and included six questions intended
to capture participants’ attitudes toward a photographed peer. It has not been used prior
to this study, so psychometric data is not available. Moderate internal consistency (α = .54)
suggests that questions on the PRQ may be measuring more than one concept. In
other words, the PRQ may be measuring something other than peer acceptance. The PRQ
may not have been measuring adolescent attitudes toward a hypothetical peer; it may
have measured the attitudes toward engaging in the particular activity in each question
(e.g., bike riding, going to the mall). Examining the literature for examples of common
activities enjoyed by adolescents that are demographically similar to those in the present
study may be useful in developing future survey questions. In addition, using
photographs featuring models that are the same ethnicity as the participant may increase
the validity of the results.

Another potential explanation for our findings on the PRQ is the fact that the
adolescents in the present study were not tested in the presence of their peers. That is, the
mere presence of a peer group may be part of what drives adolescent decision-making
regarding their peers outside the laboratory. Adolescents may be more likely to succumb
to the influence of social norms when those peers are present during decision-making. However, research suggests that many individual factors (e.g., openness to influence, social status of the influencing peer) affect the degree to which one is influenced by peers (Brown & Larson, 2009). Thus, asking peers to comment on the photos in the presence of their friends may be a more realistic assessment of their views of helmet-use amongst peers. Behavioral observations in a natural setting (e.g., skate park) would also be helpful in understanding the influence of peers on helmet use decisions.

Hypothesis 2 posited that participants who reported more helmet-use would also report more acceptance of helmet-wearing peers (higher scores on the PRQ). This relationship was found to be nonsignificant. Thus, when measured by both the PRQ and the RAC, it appears that ratings of peer acceptance are not related to adolescents’ own helmet-use. However, results on the RAC indicated that adolescents’ attitudes toward helmet-wearing peers were significantly different from their attitudes toward peers without helmets. These results add to the large body of literature that indicates that adolescents are more likely to wear helmets when their friends wear helmets (Dannenberg et al., 1993; Finnoff et al., 2001; Jacques, 1994; Klassen et al., 2000; Lajunen & Rasanen, 2001; Stevenson & Lennie, 1992). In addition, there is an even larger body of literature that suggests that adolescents like peers who are similar to them. For example, investigators have determined that adolescents are more likely to select peers with similar backgrounds, tastes, values, and interests as friends (Brown & Larson, 2009).

The third hypothesis stated that participants with higher self reported helmet use would have lower scores on the Perceived Barriers scales (i.e., Personal Vanity and
Discomfort and Cost Barriers subscales) of the HAS and higher scores on the Cues to Action scales (i.e., Friends and Family, Parent Rules in Childhood, and Media subscales). As expected, there was a significant relationship between the Personal Vanity and Discomfort subscale and self-reported helmet-use. Therefore, participants with low levels of self-reported helmet-use reported that helmets were uncomfortable and unattractive. These results add to the findings of Ross and colleagues (2008), who found that the Personal Vanity and Discomfort subscale was predictive of helmet use in college students, particularly girls.

Additionally, the other Perceived Barriers subscale, i.e., Cost Barriers, was significantly related to self-reported helmet-use. In other words, participants that perceived helmets as more costly reported lower levels of helmet-use. In addition, the present study found that one subscale of the Cues to Action scale was significantly correlated with self-reported helmet use. Participants that experienced encouragement from loved ones to wear a helmet reported more helmet-use. One caveat regarding the HAS should be noted: due to revision of the originally validated items to fit the target age group, (e.g., Parent Rules in Childhood Scale) results may not be valid. Regardless, these findings are consistent with the previous literature that indicates that children are more likely to wear helmets if their parents and friends encourage them to do so (Dannenberg et al., 1993; Finnoff et al., 2001; Jacques, 1994; Klassen et al., 2000; Lajunen & Rasanen, 2001; Ross et al., 2008; Stevenson & Lennie, 1992). Finally, a multiple regression analysis to ascertain whether any subscales on the HAS predict self-reported helmet use is an important next step. In the present study, however, low sample size precluded this analysis.
Study Limitations

A discussion of the present study would not be complete without addressing its limitations. First, there may be a selection bias in favor of children whose parents were willing to let their children participate in this research study. For example, parents that signed the consent form may be more safety conscious than parents who did not elect to have their child participate. Lack of information on non-participant families negates the ability to examine these differences statistically. However, adolescents reported that many parents did not wear helmets (15%, n=6), nor did they require them to be worn by their child (30%, n= 12), suggesting that this sample is not biased in favor of the safety conscious.

The fact that this study population was exclusively with boys may also be a limitation. Girls were excluded by design because boys are at higher risk for injury than are girls in this age range (Finnoff et al., 2001; Osberg & Stiles, 2000). Although several studies indicate that boys appear to be at higher risk for injury, including girls may have added to our understanding of the influence of peers on helmet-use. Perhaps girls would be less accepting of a peer wearing a helmet, or the presence of peers of the opposite sex may have changed the attitudes reported by the boys in this study sample. It is likely that both boys and girls contribute to the social norms in regards to helmet-use decisions.

In addition to the previously mentioned limitations, the present study was conducted in one Midwest metropolitan area. Research on the prevalence of safety equipment use varies widely between geographic areas so it is possible that the same study might yield different results in another community (Osberg & Stiles, 2000). Indeed, different municipalities enacted helmet laws at varying times and research
indicates that these laws do result in increases in rates of helmet-use (Osberg & Stiles, 2000). A city that just passed a mandatory helmet ordinance will likely have higher rates of helmet use or more positive attitudes towards helmet use than a city with no ordinance or a city that has had an ordinance in place for years. The cities and townships in which the present study took place all have helmet laws in place, with the most recent passed in 2004 (Bicycle Helmet Safety Institute, 2010). Furthermore, the greater prevalence of mandatory helmet laws and the greater acceptance of safety gear in popular culture may have shaped more positive attitudes toward helmet-use, but may not have changed the perception that peers will not be accepting of helmet users.

One final location-related limitation is that the background of each photograph was different, although all photographs were taken in a suburban location. Participants that live in urban areas may have trouble relating to a peer that appears to live in a different geographic area. Indeed, research indicates that adolescents tend to become friends with peers who are similar to them (e.g., Brown & Larson, 2009).

Finally, direct observation of helmet use was not conducted and so participants’ self-reported helmet use could not be verified. However, several studies examining the self-report data from adolescents show a high level of validity and reliability (Midanik, 1982; Needle, 1983). Further, rates of self-reported helmet-use in this study were consistent with previous observational studies (Brown Kirschman et al., 2006; Finnoff et al., 2001; Osberg & Stiles, 2000). In addition, the participants’ bicycle riding ability was not measured. There is good reason to suspect that ability level is a very salient component of helmet attitudes. For example, Osberg and Stiles (2000) found that more experienced in-line skaters might be at higher risk of injury because they tend to skate at
more dangerous locations and take greater risks while skating; this increased amount of risk-taking behavior is particularly problematic because it was found that advanced skaters tended to wear the least amount of safety equipment.

Future Directions

As noted in the introduction, injuries from wheeled sports activities are quite common among children and adolescents (American Academy of Pediatrics, 2002). However, the present study and many others have found helmet-use rates to be extremely low among samples of adolescents (Cody et al., 2002; Thompson et al., 2001). Until the helmet-use rates of children and adolescents increase by a substantial number, we will likely continue to see high rates of serious injuries, such as traumatic brain injury.

While results from the present study do not support a link between attitudes and helmet-use rates among adolescents, more explanation regarding peer pressure and safety behavior is needed. These attitudes may play an important role in the resistance to helmet-use during adolescence. Results indicate that adolescents have a more positive attitude toward hypothetical peers that wear helmets than they do toward hypothetical peers without helmets. If the present study’s assessment of adolescents’ attitudes towards helmet-use is accurate, an examination of the barriers that prevent these positive attitudes from translating to helmet use in the context of peers is needed. Furthermore, health promotion professionals should take note that adolescents are aware of the safety benefits of helmets; yet still wear them infrequently. Examinations of attitudes expressed openly in a peer group (as opposed to alone in a study) are important to measure as well.
REFERENCES


Appendix A

Demographics Questionnaire

Please answer the following questions to the best of your ability. If you have any questions, please ask!

1. What is your date of birth?
   Month__________Day___________Year_________

2. How old are you? ________________

3. Ethnicity (please circle one):
   a. African-American
   b. Caucasian
   c. Hispanic
   d. Asian
   e. Native American
   f. Hawaiian/ Pacific Islander
   g. Bi-racial
   h. I do not want to answer this question
   i. Other (please write in)_______________________

4. How many minutes per week do you ride your bicycle?________minutes

5. When you ride your bicycle, how often do you wear a helmet?
   a. Always
   b. Often
   c. Rarely
   d. Never
   e. N/A
6. Why do you wear a helmet? (please circle all that apply)
   a. My parents make me
   b. It protects me from a head injury
   c. My friends wear a helmet
   d. I am required by law to wear a helmet
   e. I never wear a helmet
   f. Other ________________________________

7. What are the reasons you do not wear a helmet? (please circle all that apply)
   a. Never thought of it
   b. None/only a few of my friends wear a helmet
   c. I do not need to wear a helmet
   d. Helmets are uncomfortable
   e. Helmets are too expensive
   f. I always wear a helmet
   g. Other ________________________________

8. How often do your parents require that you wear a helmet? (please circle only one)
   a. Every time I bike
   b. Most of the time
   c. Some of the time
   d. Never

9. If you have ever been injured while bicycling, please indicate where your injuries occurred on the body below:
10. Please list the dates and types (e.g., fracture, sprain) of injuries below:

<table>
<thead>
<tr>
<th>Date of Injury</th>
<th>Type of Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXAMPLE:</strong> July 2006</td>
<td>broken arm</td>
</tr>
</tbody>
</table>

11. How often do your parents wear helmets?
   a. Every time they ride
   b. Most of the time
   c. Some of the time
   d. Never
   e. My parents do not ride a bicycle

12. How often do your friends wear helmets?
   a. Every time they ride
   b. Most of the time
   c. Some of the time
   d. Never

Thank you for filling out this questionnaire! Please return it to the experimenter.
Appendix B

Example Photograph:
Appendix C

Photograph Reaction Questionnaire

1. How likely is it that you would go bike riding with this person?

1  2  3  4  5  6
Not at all  Extremely Likely

2. How likely is it that you would go to the movies with this person?

1  2  3  4  5  6
Not at all  Extremely Likely

3. How likely is it that you would play video games with this person?

1  2  3  4  5  6
Not at all  Extremely Likely

4. How likely is it that you would go over to this person’s house to hang out?

1  2  3  4  5  6
Not at all  Extremely Likely

5. How likely is it that you would go to the mall with this person?

1  2  3  4  5  6
Not at all  Extremely Likely
Appendix D

Revised Adjective Checklist

If you had to describe this person to your classmates, what kinds of words would you use? Below is a list of words to help you. CIRCLE the words you would use. You can use as many or as few as you want. Here is the list:

<table>
<thead>
<tr>
<th>smart</th>
<th>dumb</th>
<th>greedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>weak</td>
<td>slow</td>
<td>bright</td>
</tr>
<tr>
<td>dirty</td>
<td>friendly</td>
<td>honest</td>
</tr>
<tr>
<td>helpful</td>
<td>healthy</td>
<td>selfish</td>
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<td>kind</td>
<td>stupid</td>
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<td>careless</td>
<td>ugly</td>
</tr>
<tr>
<td>lonely</td>
<td>cheerful</td>
<td>neat</td>
</tr>
<tr>
<td>sloppy</td>
<td>foolish</td>
<td>careful</td>
</tr>
<tr>
<td>ashamed</td>
<td>clever</td>
<td>unhappy</td>
</tr>
<tr>
<td>good-looking</td>
<td>glad</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E

Helmet Attitudes Scale

Please read each statement and circle the answer that best describes you.

**Personal Vulnerability**

*Perceived Exemption From Harm*

1. I do not go fast enough to need head protection in a crash.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

2. I feel that helmets are unnecessary for very short rides.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

3. Being an experienced rider, I can easily avoid an accident when riding.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

4. Bicycle helmets are less important for those who ride their bikes infrequently.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

5. Bicycle helmets are more important for those who ride their bikes long distances.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

6. Since I’m not racing or doing any bike stunts, I don’t really need a helmet.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

*Perceived Danger of Cycling*

7. When I’m bicycling, I am at risk of being injured by other bicyclists.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree

8. When I’m bicycling, I am at risk of being injured by motor vehicles.
   
   1 2 3 4 5 6
   
   Strongly Disagree  Strongly Agree
9. If I head had accident while riding to school or work and hit my head, I would be likely to suffer brain damage.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

10. Bicycling is dangerous on slippery/wet roads.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

11. There is a good chance that I could get hurt while riding my bicycle.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

12. Generally speaking, I believe that bicycling in the street is a dangerous activity.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

**Perceived Severity of Harm**

13. If I injured my head while riding my bike, it could seriously affect my social life with my friends.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

14. If I injured my head while riding my bike, it could seriously affect my relationships with my family members.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

15. If I injured my head while riding my bike, it could seriously affect my ability to function at school.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

16. If I injured my head while riding my bike, it could seriously affect my ability to function at work.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

**Perceived Benefits**

**Emotional Benefits**

17. I feel unsafe bicycling without a helmet.

   1  2  3  4  5  6
   Strongly Disagree Strongly Agree

18. I feel guilty bicycling without a helmet.

   1  2  3  4  5  6
19. Wearing a helmet would make me feel less anxious when I ride a bike.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

20. I think it is my obligation to keep myself safe for the people who care about me by wearing a helmet when I ride.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

21. Wearing a helmet while bicycling makes me feel safer.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

22. When I wear helmets I feel more aware of the potential dangers of bicycling.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

23. Wearing a helmet makes me more likely to “take care” when I ride.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

24. In general, I think people who choose to wear helmets are being safe and responsible.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

25. Helmets are effective at reducing my risk of injury during a bicycle-related accident.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

26. The event of an accident, a helmet would protect my head.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

27. I believe that wearing a helmet can prevent a serious head injury if I have a bicycle accident.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6

28. In the event of an accident, wearing a helmet could save me money by avoiding expensive medical treatment.
   Strongly Disagree  Strongly Agree
   1 2 3 4 5 6
Perceived Barriers

Personal Vanity and Discomfort Barriers

29. I would feel embarrassed wearing a bicycle helmet.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

30. I feel foolish wearing a helmet just to ride around town.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

31. Wearing a helmet makes me look foolish if no one else is wearing one.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

32. Quite frankly, wearing a helmet looks stupid.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

33. Wearing a helmet is too hot.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

34. Wearing a bike helmet strap pinches/would pinch my neck or
    sometimes irritates my skin.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

35. A bike helmet strap is uncomfortable, and it feels like I’m being choked.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

Cost Barriers

36. The cost of helmets is generally more than they are worth.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

37. The cost of buying a helmet would affect whether I wore one or not.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

38. The best helmets (that look the coolest and are most comfortable)
    are too expensive for me to buy.
   1 2 3 4 5 6
   Strongly Disagree                      Strongly Agree

39. I would not want to spend money to buy a bicycle helmet.
Strongly Disagree  2  3  4  5  6  Strongly Agree

40. A helmet is not a worthwhile way to spend my money.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

41. A bicycle helmet is not worth the cost.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

42. I believe that bicycle helmets are over priced.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

Cues to Action
Friends and Family

43. I have several friends that routinely wear helmets when they ride.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

44. I keep my helmet in a visible place so I won’t forget to wear it.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

45. I usually keep my helmet on or near my bike.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

46. I know that I will feel bad if I don’t wear a helmet, because my parents or somebody that cares about me wants me to wear it.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

47. My friends think I should wear a helmet when I ride my bike.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree

48. My close friends think I should wear a helmet when I ride my bike.
    1  2  3  4  5  6
    Strongly Disagree  Strongly Agree
Parent Rules in Childhood
49. My parents make me wear a helmet.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

50. My parents never insist that I wear a helmet.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

51. My parents used to make me wear a helmet when I was younger.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

52. My parents encourage me to wear a helmet right now.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

Media
53. I recall seeing TV commercials, billboard ads or posters about the importance of wearing a helmet while bicycling during the past year.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

54. During the past year, I have received advice from my doctor about wearing a helmet while bicycling.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

55. During the past year, I have received a post card or other form of reminder in the mail from my doctor advising me to wear a helmet while bicycling.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

56. During the past year, I recall seeing magazine ads or newspaper flyers from sporting goods stores or bike shops advertising helmet sales/discounts.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree

57. During the past year, I recall some form of helmet-use promotion event at school or in the community.
   1 2 3 4 5 6
   Strongly Disagree Strongly Agree
Appendix F

Informed consent to participate in a research project

**Project Title:** Adolescents’ Perceptions of Peers Using Safety Equipment: Implications for Injury Prevention

**Investigator(s):** Caroline McNicholas, B.A. & Dr. Keri Brown Kirschman, Ph.D.

**Description of Study:** This study is designed to examine how adolescents view a hypothetical peer wearing a helmet. We are also examining how well the Health Belief Model predicts helmet-use. The Health Belief Model is a way of explaining the reasons why people do or do not take health-related actions. All information gained during the study will be analyzed to see if adolescents are choosing peers based on helmet-use.

**Adverse Effects:** Participants may feel psychological discomfort in reflecting on past injuries. Some children may feel more uncomfortable than others while answering personal questions. If you/your child feel uncomfortable at any time you may end your child’s participation without penalty.

**Duration of Study:** The study is expected to take about 30 minutes.

**Confidentiality of Data:** All responses will be kept confidential and will be only identified by a participant number in a data set. Informed consent forms and all data collected will be stored under lock and key.

**Contact person:** Participants may contact Caroline McNicholas at (513) 295-9141 or via email at mcnichcw@notes.udayton.edu or Dr. Keri Brown Kirschman at (937) 229-5404 or via email at kirschke@notes.udayton.edu with any questions or if you experienced any problems during or following the study. Dr. Kirschman’s address is: 300 College Park, St. Joseph Hall, Psychology Department, University of Dayton, Dayton, OH 45469-1430. If families have questions about their rights as
participants in this study or to voice an ethical complaint they should contact the chair of the Department of Psychology's Research Review and Ethics Committee, Greg Elvers, Ph.D. at (937) 229-2171 or greg.elvers@notes.udayton.edu. Dr. Elvers may also be reached at the following address: 300 College Park, St. Joseph Hall room 312, University of Dayton, Dayton OH 45469-1430.

<table>
<thead>
<tr>
<th>Consent to Participate:</th>
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<tbody>
<tr>
<td>I have voluntarily decided to allow my child to participate in this study. The investigator named above has adequately answered any and all questions I/my child have about this study, the procedures involved, and my child’s participation. I understand that the investigator named above will be available to answer any questions about research procedures throughout this study. I also understand that I may voluntarily terminate my child’s participation in this study at any time. I also understand that the investigator named above may terminate my child’s participation in this study if s/he feels this to my in my child’s best interest. In addition, I certify that I am 18 (eighteen) years of age or older.</td>
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</tbody>
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<th>Parent’s Name (printed)</th>
<th>Date</th>
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<tr>
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<table>
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<th>Child’s Name</th>
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</table>
Appendix G

Assent

The researchers here at University of Dayton would like to know more about how kids think. We would like to ask you some questions about your feelings toward other kids. We will show you some pictures of a student and ask you to answer some questions about him. We will give you a questionnaire to fill out about whether or not you would want to be friends with this student. This is done in order for us to figure out if there are certain things kids like about other kids. We will also be asking about the kinds of activities you do for fun and if you have ever been injured during those activities. This is done to see if we can help kids be safer. We think this will be fun for you, but you can decide not to talk to the researcher if you’d like. If you decide not to finish the study, that’s OK too. If you have any questions about the study, you can call Keri Kirschman, one of the researchers, at 937-229-5404 or Caroline McNicholas 513-295-9141. We’ll give these numbers to your parent also.

I understand what I will be doing and agree to talk to the researchers.
Yes_____                                    No_____

______________________________________

________________________
Appendix H

*Revised Adjective Checklist (Siperstein, 1980) Frequencies*

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<tr>
<td>Dirty</td>
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<td>Helpful</td>
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<td>Sad</td>
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