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Parents' and Caregivers' Attitudes About Child Passenger Safety

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MS, Walden University, 2016

BS, Clemson University, 2008

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Education and Promotion

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Abstract

Motor vehicle crashes are a leading cause of childhood injury and death in the United States. Many car seats are installed incorrectly, and many children under the age of 6 are seriously injured or killed in a motor vehicle crash. The purpose of this study was to examine the relationship between age of child, age of parent/caregiver, attitudes, and behaviors of child passenger safety among parents and caregivers in South Carolina. The influence of age and attitude on consistent car seat use was also examined. The study was based on the theory of planned behavior. A survey design featuring questions from the National Highway Traffic Safety Administration's Motor Vehicle Occupant Safety Surveys of 2007 and 2016 was distributed online via social media, email, and the Walden Participant Pool. Data from the sample ($N = 72$) were analyzed using SPSS v.27.0. Procedures included a logistic regression analysis yielding an adjusted odds ratio, descriptive statistics, and Cronbach's alpha. Study results indicated that no statistically significant relationship existed between study variables. However, results revealed a higher likelihood of consistent car seat use when attitudes were positive toward child passenger safety. Recommendations include further exploration of influencing factors on car seat use. This study contributes to the growing field of child passenger safety by providing insight on parental and caregiver attitudes about child passenger safety. This knowledge may support targeted education programs that promote child passenger safety knowledge and behavior retention.

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Dedication

To my beloved family: Daddy, Ma, Brittany, Jasmine, Bernadette, Caleb, Taylor, and Christian, I love you with all my heart. Thank for your constant support and love. I am so blessed to have you in my life and to call you family. I pray I have made you proud and inspired to go beyond all limitations, for there is no limit in God.

Acknowledgments

First, I give honor and praise to my Lord and Savior, Jesus Christ. The Scripture, "I can do all things through Christ who strengthens me (Philippians 4:13, NKJV)," rings true as I reflect on my educational journey. He strengthened me to write, study, and research, even when I had little desire to do so, and I am so grateful. I am forever submitted to His will and way. To God be the Glory!

Next, I would like to acknowledge my dissertation committee. To my chair, Dr. David M. Brown, thank you for your encouragement, guidance, and patience during this process. I am so appreciative of you and your leadership. To my committee members, Dr. Yitza Arcelay Rojas and Dr. Cheri Langley, thank you for your guidance and expertise. I appreciate your willingness to be a part of my committee. Thank you all!

Lastly, I would like to say thank you to my friends and extended family for their encouragement, wisdom, motivation, and accountability. I thank God for surrounding me with an amazing supportive circle who pushed me to win. Know that I am also in your corner and praying for your continued success. I love you all!

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Chapter 1: Introduction to the Study

Childhood motor vehicle injuries are the leading cause of death for children in the United States (Centers for Disease Control and Prevention [CDC], 2021). Three out of four car seats in the country are installed incorrectly (Park et al., 2018), and in South Carolina, one child under the age of 6 is seriously injured or killed in a motor vehicle crash every 9 to 10 days (South Carolina Department of Public Safety [SCDPS], 2017). Although South Carolina state lawmakers updated the state's child passenger safety laws in 2017, unintentional motor vehicle crash injuries continue to occur among South Carolina children. Child passenger safety is a growing public health issue that warrants further investigation. Despite previous research on ways to improve child passenger safety in the United States and in countries around the world (e.g., Huseth-Zoel, 2018; Mantha et al., 2018; McKenzie et al., 2017), there is a lack of research on the attitudes of parents and caregivers; this gap in research extends to South Carolina. In this research study, I sought to identify parent and caregiver attitudes toward child passenger safety and how these attitudes influence consistent car seat use behaviors. This study may promote positive social change by increasing awareness of child passenger safety. Using the findings from the study, policy makers, researchers, and health educators may be able to improve current and future child passenger safety education programs.

In Chapter 1, I provide background information on the study topic, along with an overview of the study. The chapter includes the problem statement, purpose of the study, and the research questions (RQs) and hypotheses. In addition, I described the theoretical

framework and nature of the study; provide operational definitions; and discuss the assumptions, scope and delimitations, limitations, and significance of the study.

Background

Unintentional childhood deaths and injuries are a major issue in the United States. According to the organization Safe Kids Worldwide (2021), road injuries are the leading cause of preventable deaths and injuries in U.S. children. The correct use and installation of child safety seats reduces the risk of death by 71% (Kendi et al., 2021), but more than 50% of car seats are not used or installed incorrectly (Safe Kids Worldwide, 2021). In 2014, only 15% of people in South Carolina used child restraints properly (SCDPS, 2021), and as of 2019, one child under the age of 8 was injured or killed in a motor vehicle crash every 5 to 6 days (SCDPS, 2019).

These statistics raise concerns about the current state of child passenger safety and how to further improve child passenger safety programs, legislation, and initiatives. Several factors contribute to how child safety seats are used or misused. These include a lack of knowledge (Aita-Levy & Henderson, 2016), cultural and socioeconomic factors (McKenzie et al., 2017), and outdated legislation (Klinich et al., 2017). Different factors, including the efforts of Safe Kids Worldwide, a national organization dedicated to preventing childhood injuries, certified child passenger safety technicians (CPST; Burstein et al., 2017) and the emergence of new technologies (Gielen et al., 2018), have led to an increase in the availability of child passenger safety education programs. Despite these efforts, driver attitudes toward child passenger safety remain a contributing factor to improper car seat use (Lewis et al., 2016; Taubman-Beo-Ari et al., 2016).

Recommendations to improve child passenger safety include increasing child passenger safety education in the clinical setting (Pollok et al., 2019), increasing hands-on training (Mantha et al., 2018), developing tailored child passenger safety messaging (Gielen et al., 2018; McKenzie et al., 2017), and improving the wording of child passenger safety legislation across the United States (Klinich et al., 2017). Although child passenger safety research and education have reduced the number of overall deaths and injuries in children via motor vehicle crashes, more research is needed to ensure that there are fewer injuries and deaths of children on roads in the United States.

Gap in Prior Research

Several researchers have examined child passenger safety in the United States and in countries around the world. Many of these studies have focused on the factors influencing car seat use (Bachman et al., 2016), child passenger safety legislation (Klinich et al., 2017), and child passenger safety education techniques (Gielen et al., 2018). There are very few studies focused on the attitudes toward child passenger safety in the United States (Hogan et al., 2018; Huseth-Zosel, 2018; Omake et al., 2017; Thornton et al., 2017), particularly in South Carolina (Basco et al., 2009) or other Southeastern states (Schewebel et al., 2017). Because child passenger safety is based on behavior, it is imperative to address the attitudes of parents and caregivers toward the behavior of correct, consistent car seat use. In this study, sought to identify the attitudes of parents and caregivers toward child passenger safety and car seat use in South Carolina.

Need for Study

This study was needed to clarify how parents and caregivers view car seat use. I also sought to understand the behaviors of caregivers and parents in the use of child safety restraints. This knowledge may be useful to stakeholders in promoting positive social behavioral changes that enhance child passenger safety. The results of this study could potentially inform future child passenger safety education and intervention programs. By understanding caregiver attitudes, health professionals may be able to better design child passenger safety programs and education and develop other strategies to motivate drivers to correctly use child safety seats during every ride. They may also be able to provide useful knowledge to manufacturers to improve car seat design and instruction. These efforts may potentially decrease the numbers of death and injuries children that experience in car accidents.

Problem Statement

Three out of four car seats in the United States are installed incorrectly, therefore contributing to one of the leading causes of deaths for children, motor vehicle crashes (Park et al., 2018). In South Carolina, one child under the age of 6 is seriously injured or killed in a motor vehicle crash every 9 to 10 days (SCDPS, 2017). These statistics confirm the need for more effective child passenger safety programs to protect the lives of children locally and nationally. Since many parents and caregivers are installing seats incorrectly or not using them at all (Kelly et al., 2017), it is imperative to determine the attitudes and perceptions of car seat use.

Car seats reduce the risk of severe injury by over 70% (Kendi et al., 2021), yet, despite this benefit, many caregivers do not consistently use car seats in a correct manner. Often, grandparents, close relatives, or friends are transporting children, and car seats are not being used correctly if at all (Swanson et al., 2020; Weaver et al., 2013). Current researchers have explored the attitudes and perceptions of parents and caregivers in various countries including China, Brazil, and the United States. Using the theory of planned behavior , some researchers have sought to determine beliefs regarding the use of car seats in Saudi Arabia; they found safety and comfort to be major predictors of intention for car seat use (Nelson et al., 2015). Although research has been conducted in Oregon and Missouri (Hogan et al., 2018; Jones et al., 2017), among other U.S. states, there is limited research on the attitudes of parents and caregivers in South Carolina (Basco et al., 2009). I attempted to fill the gap in understanding how parents and caregivers perceive child passenger safety and car seat use in South Carolina. Child passenger safety is a public health concern due to unintentional motor vehicle injury being a leading cause of death for child passengers in the United States (CDC, 2021). Health education programs can greatly enhance correct car seat use and child passenger safety behaviors (Mantha et al., 2018). This research may contribute to the development of more effective child passenger safety programs to reduce car seat misuse and serious injuries among children and infants.

Purpose of the Study

In this quantitative study, I sought to examine the relationship between attitudes, age of child, age of caregiver, and behaviors of child passenger safety among parents and

caregivers of South Carolina. Also, I explored parents' and caregivers' perceptions of child passenger safety related to subjective norms and perceived behavioral control. I administered a survey to assess attitudes and behaviors of child passenger safety based on the constructs of the theory of planned behavior. The theory of planned behavior asserts that attitudes toward a behavior; subjective norms, or social pressure to perform or not perform a behavior; and perceived behavioral control influence a person's intention to engage or not engage in a specific behavior (Glanz et al., 2015). I measured the construct of attitude toward child passenger safety using scales of at least three items to assess participant attitudes and perceptions of behavioral control and subjective norms. Additional questions included demographics such as age, gender, and county of residence.

The independent variables included in the study were (a) parents' and caregivers' attitudes toward child safety restraints, (b) age of child occupants riding in child safety restraint, (c) and age of parents and caregivers driving with a child under age 6. I measured these variables using questions from the 2007 and 2016 Motor Vehicle Occupant Safety Survey (MVOSS) conducted by the National Highway Traffic Safety Administration (NHTSA). The dependent variable was the use of child safety restraints consistently during every ride. A formative evaluation was completed through feedback from four industry experts to determine if the survey was sufficient to answer the RQ. Participants were recruited in all regions of South Carolina (Upstate, Midlands, Pee Dee and Lowcountry) online through social media and through various channels including day care centers, parent groups, and local businesses.

Research Questions and Hypotheses

RQ1-Quantitative: What is the predictive relationship between age, attitudes of child passenger safety, and consistent use of child safety seats?

$H_0$1: There is no statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

$H_1$1: There is a statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

RQ2-Quantitative: What is the perceived behavioral control of participants toward the use of child safety seats?

RQ3-Quantitative: What are the perceptions of participants regarding subjective norms of child safety seat use?

The study variables were measured using an ordinal level of measurement through Likert scales.

Theoretical Framework

I used the theory of planned behavior as the theoretical framework for this study. This theory, by Icek Ajzen, addresses attitudes, intentions, subjective norms, and their influence on behavioral control (Ajzen, 2005). As such, it can be used in developing more effective child passenger safety programs that promote knowledge and behavior retention. Attitudes and beliefs of parents and caregivers influence their intention to install a car seat correctly each time (Lewis et al., 2016). By using the theory of planned behavior, I sought to determine the most effective way to educate parents and improve injury prevention behaviors based on their attitudes and beliefs about child passenger

safety. This theory suggests that attitudes and subjective norms determine behavioral control (Ajzen, 2005). The theory of planned behavior was appropriate for this study because it enabled identification of factors that influence the intention to practice safe car seat use.

Applying the construct of attitudes influencing behavioral control, I sought to identify how parents' and caregivers' attitudes toward car seat use influence their use of car seats for the children riding in their vehicles. In developing the RQs for the study, I sought to identify whether attitudes directly determine behavioral control of car seat use. Attitudes were also explored through the variable of age, particularly the age of the parent or caregiver, and how their perspectives influence their attitude and engagement in safe child passenger safety practices. I further explain my use of the theory of planned behavior in Chapter 2.

Nature of the Study

I used a quantitative approach featuring a nonexperimental, correlational, cross-sectional survey design. This design was most effective to determine the relationship between attitudes of parents and caregivers, age of child and parent or caregiver (independent variables), and behaviors regarding child passenger safety (dependent variable) in South Carolina. Cross-sectional studies are beneficial in examining multiple factors simultaneously without the need to follow-up (Lau & Kuziemsky, 2017). Using questions from the MVOSS conducted by the NHTSA, I administered surveys to determine how to address concerns of parents and caregivers. Use of a quantitative approach assisted me in gathering the most information possible. Study findings may

provide valuable information that educational researchers can use to develop or revise future child passenger programs that may improve child passenger safety in South Carolina.

Definitions

Following are key operational definitions for the study:

Attitude: A person's perception, whether positive or negative (Glanz et al., 2015), of child passenger safety and car seat use.

Behavior: Anything that an individual does involving action, such as installing a car seat, buckling a child into a car seat, or wearing a seat belt.

Booster seat: "A regulated car seat used without a harness that raises the child so the required adult lap and shoulder seat belt fits over the child correctly" (Safe Kids Worldwide, 2020, "Booster Seat or Belt-Positioning Booster Seat [BPB]" entry). Booster seats may have high backs or be backless (Safe Kids Worldwide, 2020).

Car seat: "A regulated seat that protects a child who is too small and/or immature to safely use the adult seat belt system in a vehicle" (Safe Kids Worldwide, 2020, "Car Seat" entry).

Caregiver: A relative or nonrelative driver who transports a child in a child safety seat.

Child passenger safety technician (*CPST*): Individuals who are certified by Safe Kids Worldwide to teach child passenger safety education and properly install car seats (Safe Kids Worldwide, 2018).

Intention: An individual's motivating factors that influence their behavior and amount of effort they are willing to put toward performing that behavior (Glanz et al., 2015).

Motor Vehicle Occupant Safety Survey (*MVOSS*): A survey that is periodically conducted by the NHTSA to identify occupant safety issues in the United States (NHTSA, 2007).

Perceived behavioral control: An individual's belief regarding how hard or easy it is to complete a behavior (Steinmetz et al., 2016). In this study, perceived behavioral control encompassed installing a car seat correctly or buckling a child into their car seat correctly for every ride.

Subjective norm: Perceived social influences to perform or not perform a behavior (Steinmetz et al., 2016). In this study, subjective norm encompassed installing a car seat correctly or securing a child correctly in a car seat during every ride.

Assumptions

Assumptions are facts that a researcher presumes to be true but does not verify when conducting a research study (Verma & Abdel-Salem, 2019). Although not explicitly stated, these assumptions could affect the outcomes. Articulating them is necessary to the validity of a study (Verma & Abdel-Salem, 2019). I explored the attitudes and child passenger safety behaviors of parents and caregivers in South Carolina. I assumed that all parents and caregivers in the study had access to appropriate child safety seats. Other assumptions were that all participants had prior knowledge of, or experience with, safe car seat use and had been educated on, or had access to, child

passenger safety education. Last, I assumed that all parents and caregivers in the study were aware of South Carolina's child passenger safety law.

Scope and Delimitations

This was a quantitative, nonexperimental, correlational study to examine the relationship between age (of parent/caregiver and child), attitudes of parents and caregivers, and consistent car seat use in South Carolina. To address the issue of child passenger safety in South Carolina, it is imperative to know how parents and caregiver attitudes relate to child passenger safety behaviors. The delimitations of this research study include the study design, instrumentation, maturation, and sampling, all of which may affect the study's internal validity. I used a nonexperimental, correlational design using a cross-sectional online survey. I distributed the survey through various channels and used convenience sampling to reach potential participants. Participants were limited to South Carolina residents who are parents and/or caregivers of children aged 6 or younger who have these driven children at least once in the past 12 months.

Limitations

When conducting this study, I navigated challenges related to participant recruitment, achieving an adequate sample size, and potential bias. Because of the sample size, generalizability is limited and may not reflect the full diversity of South Carolina residents. Limitations also include the study location as results are not generalizable beyond South Carolina. Potential barriers include participants' willingness to participate and maintaining confidentiality of participants. There was also a challenge in gaining

access to participants through hospital systems, medical facilities, day care centers, and other organizations that offer children's services.

Additional limitations were related to the nonexperimental, correlational study design, use of a cross-sectional survey, and potential participant bias. The use of convenience sampling also presented a limitation to generalizability. To address these limitations, I distributed the survey online to increase participation and to reach across all regions of South Carolina. Permission was also obtained from directors, managers, and administrators of local businesses and online social media groups where the online survey was advertised. Respondents' familiarity with child passenger safety and/or involvement in child passenger safety activities across the state may have introduced potential bias. Due to low participation, I ultimately made the decision to advertise to these groups. Their perceptions and attitudes were important to include to get a full perspective of child passenger safety among parents and caregivers in South Carolina.

Significance

This study may contribute to child passenger safety education by providing knowledge of how attitudes affect behavioral intentions toward child safety seat use among parents and caregivers in South Carolina. Results identify attitudes and beliefs to be considered when developing programs aimed at improving child passenger safety behaviors. In 2017, 11,499 child vehicle passengers under the age of 6 were involved in a traffic collision in the state of South Carolina, and only 77.8% were restrained by a child safety seat (SCDPS, 2017). To achieve South Carolina's Target Zero campaign goal of zero traffic fatalities (SCDPS, 2017) and to improve child passenger safety education

programs in South Carolina, identifying current attitudes of correct child passenger safety behaviors is imperative. Understanding current attitudes of child passenger safety among parents and caregivers may assist health education professionals to build targeted child passenger safety programs. Effective child passenger safety programs may promote consistency in correct car seat use and safe behavior retention among parents and caregivers. Currently, various methods of child passenger safety education are being implemented throughout the state (SCDPS, 2021). However, in reviewing the literature, I found no research on how attitudes affect the child passenger safety behaviors of caregivers in consistent car seat use application.

By assessing the attitudes parents and caregivers regarding child passenger safety, health educators may be equipped to create programs that better promote child passenger safety knowledge retention and improved safety behaviors. These benefits could contribute to the overall effort to improve correct car seat use. Additionally, positive social change could be achieved by reducing the rate of injury and death of child passengers in motor vehicle crashes in South Carolina. Through targeted health education programs, individuals could have increased child passenger safety knowledge and could expand their willingness to practice safe behaviors during every ride.

Summary

In this chapter, I introduced child passenger safety and discussed the need for this research study. The chapter included background information, the problem statement, and the purpose of the study. The study's RQs and hypotheses, theoretical framework, nature, and limitations were also included, along with current concerns in the field of child

passenger safety. In Chapter 2, I review child passenger safety research. I also provide more information on the theoretical framework and existing research approaches to studying the research problem.

Chapter 2: Literature Review

Introduction

Unintentional injuries and deaths among children from motor vehicle crashes are a major public health issue across the world today (CDC, 2019). The growing concern about child passenger safety demands a deeper look into the attitudes, beliefs, perceptions, and barriers of correct car seat use among parents and caregivers. Although researchers have studied car seat use and safety issues in various regions around the world (e.g., Liu et al., 2016; Ojo, 2018; Shimony-Kanat et al., 2018), a more localized look at attitudes and perceptions of parents and caregivers in South Carolina was warranted. The purpose of this nonexperimental, correlation study was to determine the predictive relationship between attitudes, age of child, age of parent/caregiver, and child passenger safety behaviors. I also explored perceptions of child passenger safety in relation to subjective norms and perceived behavioral control.

Child passenger safety has evolved over the past several decades. Past and current research has shown the growing awareness of unintentional childhood injuries and death and includes calls for further child passenger safety research (Jones et al., 2017). In this literature review, I explore the history of child passenger safety, legislation, and the evolution of child passenger safety in international, national, and local context. I also explore the use of the theory of planned behavior and other theories to improve child passenger safety across the world. Chapter 2 also includes overviews of the literature search strategy and theoretical framework.

Literature Search Strategy

I searched for literature using various keywords, resources, and databases within the past 5 years. Seminal historical research along with research conducted in the past 5 years was included to explore the progression of child passenger safety across the world, including the United States and South Carolina, specifically. Databases used included MEDLINE with Full Text, PsycINFO, PsycARTICLES, CINAHL Plus with Full Text, Dissertations & Theses @ Walden University, and Walden University Library's the Thoreau Multi-Database Search. I searched these databases using the following keywords: *child passenger safety* (3,343 results)*, child passenger safety AND attitudes* (247 results)*, beliefs AND child passenger safety (*41 results)*, perceptions AND child passenger safety* (87 results)*, child passenger safety behaviors* (76 results)*, child passenger safety AND behaviors* (353 results)*, child passenger safety practice* (109 results), *theory of planned behavior* (43,605 results)*, theory of planned behavior AND child passenger safety* (5 results)*, car seats AND theory* (242 results)*, child restraint systems* (3,344 results)*, and car seats* (23,451 results).

Other resources used included Google Scholar as well as local, federal, and national websites with data about child passenger safety and unintentional childhood injuries. Local and national websites dedicated to child passenger safety efforts used to gather data included Safe Kids Worldwide, the NHTSA, SCDPS, and the CDC. These database searches yielded multiple results related to the study topic and the field of child passenger safety, more broadly.

Theoretical Framework

Researchers in the field of child passenger safety have used several theories to determine how to effectively promote positive change in decreasing the number of unintentional motor vehicle injuries among children. From assessing behaviors and attitudes to determining the best child passenger safety education method, child passenger safety research is saturated by several significant theoretical foundations. I used the theory of planned behavior as the theoretical framework for this study. Formulated by Icek Ajzen (1991), this theory asserts that perceived behavioral control is influenced by attitudes, intentions, and subjective norms. An extension of the theory of reasoned action, the theory of planned behavior has been used in various forms across diverse fields of study, particularly in the fields of behavior change and health promotion around the world (Steinmetz et al., 2016).

Glanz et al. (2015) defined intentions as an individual's motivational factors that influence their behavior and the amount of effort they are willing to put toward performing a specific behavior. Higher levels of intention are most often equated to a higher performance of a specific behavior. Perceived behavioral control also plays a part in an individual performing a behavior, which distinguishes the theory of planned behavior from the theory of reasoned action. According to Steinmetz et al. (2016), perceived behavioral control refers to an individual's belief in how hard or easy it is to complete a behavior or task. Similar to the concept of self-efficacy, perceived behavioral control or an individual's level of confidence in performing a behavior influences their

decision to act. Therefore, perceived behavioral control and intention determines behavior completion (Ajzen, 1991).

Along with perceived behavioral control and understanding intention, an individual's attitude toward a specific behavior is key to behavioral achievement. According to the theory of planned behavior, attitude refers to a person's perception of the behavior, whether positive or negative (Glanz et al., 2015). Additionally, the theory also asserts subjective norm as a predictor of intention. Subjective norms convey perceived social influences to perform or not perform a behavior (Steinmetz et al., 2016). A tenet of the theory of planned behavior is that positive attitudes and favorable subjective norms promote higher perceived behavioral control, therefore producing a stronger intention to perform a behavior. Because of this, the theory of planned behavior has been widely used in research, including that on child passenger safety and car seat use (e.g., Johnston et al., 2009; Nelson et al., 2015; Ojo, 2018). Researchers who have applied the theory to study child passenger safety and car seat use have examined countries other than the United States.

Application of Theory to Research on Child Passenger Safety

Use of the theory of planned behavior in child passenger safety research in the United States is limited, but this theory has been used internationally to inform health education practice. In Saudi Arabia, Nelson et al. (2015) used the theory of planned behavior to understand the beliefs of pregnant Saudi women regarding car seat use. The researchers study found that these women's beliefs in the safety and comfort of the infant and the influence of others predicted intent to use car seats. Some participants also

expressed the belief that the infant was safer in their arms and that it is deemed unkind to leave the infant alone in the back seat. Many of these beliefs are influenced by Saudi culture, subjective norms, and a lack of awareness of local child passenger safety laws, the researchers concluded.

In a study published in the prior year, Nelson et al. (2014) used the theory of planned behavior in a quantitative study of 196 pregnant women in Saudi Arabia. Using theory constructs to develop the study questionnaire, researchers found that attitude, subjective norms, and perceived behavioral control predicted 38% of car seat use intention, the researchers found. Although not directly translated into actual car seat use among Saudi women, these results give insight into the influences of car seat use behaviors.

Other researchers have identified similar findings in Ghana. Ojo (2018) used the theory of planned behavior as a framework for their investigation and development of RQs. Behavioral attitudes of car seat use related to gender and perceived behavioral control in the child seating position and vehicle type were tested. This naturalistic, observatory study of vehicle occupants at selected private nursery schools revealed low seatbelt use due to low enforcement of the local child restraint law. Using the theory of planned behavior, Ojo (2018) found that a driver's attitude, gender, vehicle type, and child seating position were influencing factors to car seat use.

A national example of the use of the theory of planned behavior in child passenger safety is illustrated through a qualitative study done in Seattle, Washington. Using an integrated model of the health belief model, social cognitive theory, theory of

reasoned Action, and theory of planned behavior, researchers completed a series of focus groups to inform the development of a tailored child passenger safety intervention to increase booster seat use in multiethnic communities (Johnston et al., 2009). As a result, researchers discovered inaccurate beliefs about booster seats, cost barriers, and parental concern for children not staying seated in their booster seats. Based on their findings, Johnston et al. (2009) identified the need for more targeted education for these communities along with a clear, concise message.

Rationale

In the field of child passenger safety, behaviors associated with consistent, correct car seat use are vital to ensuring the safety of child vehicle occupants (Giannakakos et al., 2018). Because the rate of unintentional child injuries and death in vehicles is increasing (Hogan et al., 2018; Salow et al., 2019), it is imperative for health professionals to understand why. Multiple factors can contribute to these unintentional injuries and deaths, but the theory of planned behavior has been instrumental in helping researchers investigate and understand why car seats are commonly misused (Johnston et al., 2009; Ojo, 2018). Used in various geographical locations and settings by different researchers, the theory of planned behavior provides a theoretical framework to further explain the child passenger safety behaviors of parent and caregivers across the world.

These studies illustrate the use of child passenger safety to inform intervention efforts. This theory relates to the present study because it provides a framework for understanding the influencing factors of car seat use and correct child passenger safety behaviors. Barriers such as perceived ease of use (Eichelberger et al., 2014), cost

(Krishen et al., 2016), and a lack of knowledge (Aita et al., 2016; Bohman et al., 2016; Liu et al., 2016) have been identified in a wide range of settings and across diverse populations. Although extensive research has been conducted to identify these barriers and beliefs, the theory of planned behavior could inform further insight into how attitudes, perceived behavioral control, and subjective norms influence the behaviors of parents and caregivers in South Carolina. Once implemented, the constructs of the theory of planned behavior could help inform child passenger safety intervention and education development to address identified attitudes, beliefs, and barriers to promote sustainable behavior change. Consistent, correct car seat usage will ultimately assist in reducing unintentional motor vehicle child passenger injuries and death (Safe Kids Worldwide, 2021).

Directly related to the theory of planned behavior constructs of attitude, perceived behavioral control, and subjective norms, the RQs of this study concerned how these concepts influenced child passenger safety behaviors. I applied the theory of planned behavior by using its constructs to formulate survey questions and gather data. By using the theory of planned behavior, I was able to determine how attitude, perceived behavioral control, and subjective norms influence intention to correctly install and use a car seat in South Carolina.

Constructs

Attitudes and Perceptions

In the application of constructs of the theory of planned behavior to child passenger safety, there are several interesting findings that fuel the need for this study.

Current attitudes of child passenger safety in the United States reflect the perception that child passenger safety and car seat use is needed to keep children safe (Hogan et al., 2018; Klinich et al., 2017). However, children believe that booster seats are uncomfortable, unstylish, and increases the risk of teasing by their peers (Piotrowski et al., 2020). Parents and caregivers, on the other hand, believe child passenger safety is important because they are concerned about serious motor vehicle crash injury, death, and the safety of their children (Hogan et al., 2018; McKenzie et al., 2017). Child passenger safety education also influences the attitudes of parents and caregivers as it relates to car seat use. After child passenger safety education, attitudes improved (Morrissey et al., 2016) and the use of virtual education by a CPST also helped to promote positive perceptions of car seat use (Schwebel et al., 2017).

Similarly, the theory of planned behavior and health belief model have been used in combination to determine seat belt usage among adults. Simsekoglu and Lajunen (2008) compared these theories to explain self-reported seat belt use and found the theory of planned behavior constructs of attitude and subjective norm to be significant in the intentions of using a seat belt. This study promotes a need for positive seat belt messaging to improve overall attitudes toward buckling up during every ride. Ali et al. (2011) had similar results, finding that higher seat belt usage intention is associated with a more positive attitude, more restrictive norms, and a higher level of perceived behavioral control. Both studies are significant to the present study because parents and caregivers are encouraged to set an example for child occupants by wearing their seat belt during every ride (Safe Kids Worldwide, 2019).

Subjective Norms

There are a variety of identified subjective norms or social influences in child passenger safety. Current child passenger safety laws are a social influence that varies from state to state and has an influence on how parents and caregivers use or do not use car seats (Klinich et al., 2017). Several barriers associated with subjective norms in child passenger safety are family size, disobedient children, and peer pressure (Huseth-Zosel, 2018). Children's comfort level (Piotrowski et al., 2020), which influences error rate (Fong et al., 2017) is also a common subjective norm, as well as driving short distances, carpooling, using a rental car, and borrowing a friend's car (McDonald et al., 2018).

Behavioral Intentions

Behavioral intentions or the motivating factors that influence behaviors can vary in child passenger safety. Often motivated by protecting their children from harm (Johnston et al., 2009; Thornton et al., 2017; Will et al., 2015), parents and caregivers are more likely to have positive intentions toward correct car seat use. Alternatively, parents and caregivers who have had prior experience with car seats are less likely to follow new recommendations for rear-facing seats (Jones et al., 2017). Burstein et al. (2017) also found that prior child passenger safety knowledge doesn't always equate to correct car seat use every time. Parents and caregivers must stay up to date on current recommendations and instructions from the car seat manufacturer's guide (Safe Kids Worldwide, 2021).

Similar behavioral intention findings were found in Japan. Kakefuda et al. (2008) sought to determine car seat use behaviors and intentions among Japanese mothers to use

on future trips. These researchers found that primary reasons for non-use included child resistance and feeling car seats were unnecessary for short drives and when another adult was riding in the car. Despite being knowledgeable about child passenger safety, these mothers still did not demonstrate consistent, correct car seat use in their daily trips, further explaining the low rate of car seat use in Japan (Kakefuda et al., 2008).

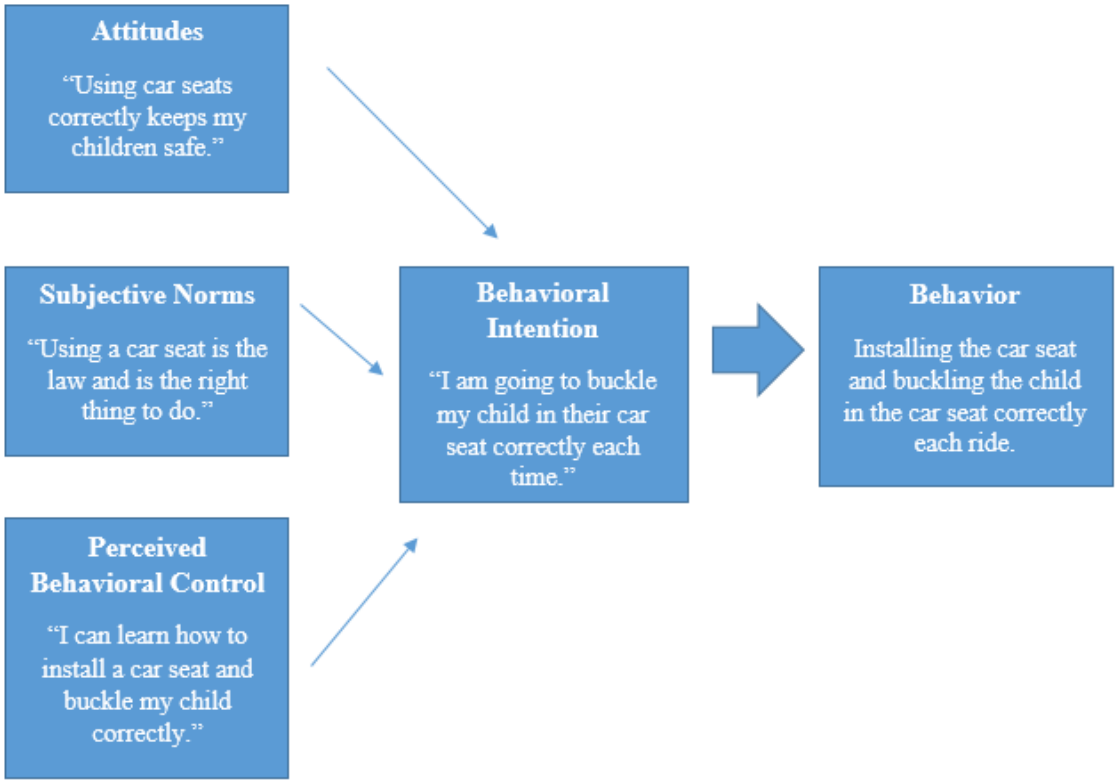
Perceived Behavioral Control and Current Behaviors

Perceived behavioral control, or the belief in how difficult it is to perform a behavior, also influences a person's decision to perform a behavior. In child passenger safety, the perceived behavioral control of booster seat use is high, but there is often a gap in knowledge of when to transition the child to the seat belt (Aita-Levy & Henderson, 2016). Children also have barriers to booster seat use such as discomfort and a fear of teasing by their peers (Piotrowski et al., 2020). An example of how the theory of planned behavior is applied to the field of child passenger safety is illustrated in Figure 1. Despite an often-positive level of perceived behavioral control, attitudes, and intentions, car seats are often misused at a rate of 97% (Bachman et al., 2016). Hoffman et al. (2016) found incorrect installation of car seats with at least one error in a random sample of 267 families with a newborn in Oregon. Most errors include non-use of top tether with forward-facing seats and not securing the seat and harness tightly (Safe Kids Worldwide, 2017), despite these staggering numbers, behaviors were improved after having child passenger safety education and a consultation with a child passenger safety technician (CPST) (Burstein et al., 2017; Morrissey et al., 2016).

Figure 1 displays an example of the theory of planned behavior applied to child passenger safety. If a parent has a positive attitude toward car seats believing that using car seats correctly keeps their child safe, along with subjective norms of following the child passenger safety laws in their state and positive perceived behavioral control of learning how to install a car seat and buckle their child correctly, their level of behavioral intention increases. This parent will have an increased behavioral intention to installing the car seat and buckling their child in the car seat correctly each ride which yields a consistency of child passenger safety behaviors.

Figure 1

Theory of Planned Behavior Application to Child Passenger Safety



Literature Review Related to Key Variables and/or Concepts

National Research Implications of Child Passenger Safety

Based on the number of past and current research studies, child passenger safety is a growing field of inquiry among researchers across the world and particularly in the United States. From Oregon to Rhode Island, various studies have been conducted to reduce the risk of unintentional childhood injury and death by motor vehicle (Burstein, 2017; Huseth-Zosel, 2018; Schwebel et al., 2017; Thornton et al., 2017). A common theme is a lack of child passenger safety knowledge among parents and caregivers across the country (Aita-Levy & Henderson, 2016; Eichelberger, et al., 2014). Despite parents being concerned about their children injured in a car crash (Hogan et al., 2018; Thornton et al., 2017), parents in the United States need more child passenger safety education and support to properly install their car seats and use them correctly each time (Gielen et al., 2015; Johnston et al., 2009; Hoffman, et al., 2016).

There are no studies directly aimed at studying the relationship between parent age, attitudes, and child passenger safety behaviors. Two studies examine age, specific to child passengers. Jones et al. (2017) explored prevalence and determinants of rear-facing car seat use for children 17-19 months of age and McDonald et al. (2018) explored factors associated with cell phone use while driving among parents and caregivers of children ages 4 to 10 years old.

Although education alone does not guarantee correct car seat use (Burstein et al., 2017), it is imperative to determine the barriers to positive child passenger safety behaviors among parents and caregivers. Barriers such as a lack of knowledge (Aita-Levy

& Henderson, 2016), large family size (Huseth-Zosel, 2018), driving a short distance or carpooling (McDonald et al., 2018), low literacy levels (McKenzie et al., 2017), and perceived difficulty of use (Eichelberger et al., 2014) have been identified in several states including Louisiana, Pennsylvania, Virginia, Washington, Ohio, and North Dakota. These barriers warrant a need for tailored messaging for culturally diverse groups (McKenzie et al., 2017) and targeted child passenger safety education programs for lower income communities across the United States (Jones et al., 2017). Nationally, organizations such as Safe Kids Worldwide, the American Academy of Pediatrics (AAP), and the NHTSA have collaborated to provide education, research, and programs to improve proper car seat use and reduce unintentional childhood injuries and death in motor vehicle crashes.

First, parents and caregivers must be educated on new and evolving child passenger safety guidelines and legislation (Huseth-Zoel, 2018). Hoffman et al. (2016) suggests that child passenger safety education should start in prenatal and postpartum care visits with a CPST. Conducted in Oregon, researchers found that prenatal child passenger safety education by a CPST reduced overall car seat misuse (Hoffman et al., 2016). Burstein et al. (2017) also had similar findings. Additionally, it is suggested that medical providers, such as primary care providers and pediatricians, provide child passenger safety education during well visits (Huseth-Zosel, 2018; Jones et al., 2017) to promote an early start to positive child passenger safety behaviors and correct car seat use. Morrissey et al. (2016) found in Rhode Island, that if pediatric interns are trained in

child passenger safety, then they are more likely to educate parents about proper car seat use during well child visits.

There have been several recommendations for the most effective child passenger safety education method through research conducted in the United States. Mantha et al. (2018) conducted a study in Houston, Texas to compare hands-on child passenger safety education and online child passenger safety education. Researchers found hands-on training to be more effective with higher installation scores for rear and forward-facing car seats. Despite this finding, virtual child passenger safety education methods have become increasingly popular to enhance child passenger safety programs with technological advances. Schewebel et al. (2017) found that a virtual CPST assistance program may be effective to reduce car seat misuse and help overcome barriers in Florida and Alabama.

In further exploration of how technology can deliver consistent child passenger safety messaging, Gielen et al. (2015) and Gielen et al. (2018) developed and tested a smartphone application to communicate child passenger safety education and to determine its impacts on parental self-efficacy towards car seat use. In development of the app, Gielen et al. (2015) created tailored messages and found that specific messages are more effective in behavior change to promote consistent, correct car seat use. Through a randomized-controlled trial, Gielen et al. (2018) evaluated the effectiveness of this application named “Safety in Seconds v. 2.0.” Implemented in two pediatric emergency centers in Maryland and Arkansas, researchers discovered that technological child passenger safety programs, such as the Safety in Seconds 2.0 app, can be used to

increase child passenger safety knowledge and encourage positive safety behaviors (Gielen et al. 2018).

Along with technology use to innovate child passenger safety efforts, it is important to consider how these messages are presented to parents and caregivers across the country. Will et al. (2015) explored the best way to communicate child passenger safety guidelines to parents and the impacts to their knowledge, attitudes, and behavioral intentions. As a results, a risk reduction approach was found to be most effective. These researchers identified that it is best to explain injury risks behind the information being given while ensuring that the messaging is presentable, attractive, and reader friendly (Will et al., 2015).

Historical Perspective of Child Passenger Safety

Child passenger safety has evolved over the past few decades as awareness of unintentional childhood injuries and deaths has increased. Unintentional injuries by motor vehicle are the leading cause of death for children in the United States (CDC, 2019). The risk of death reduces by 71% for infants, 54% for toddlers (ages 1 to 4) and 45% for young children (ages 4 to 7) when they are correctly buckled in a secure car seat or booster seat (Dodington et al., 2017). Although preventable with correct, consistent car seat use, research has shown that laws and policies related to child passenger safety can have a major impact on child passenger safety behaviors (Klinich et al., 2017).

In the United States, child passenger safety laws requiring the use of car seats began to start being adopted in all fifty states between 1977 and 1985 (Bae et al., 2014). As of 1986, every state in the United States has an active child passenger safety law, but

how these laws are worded and enforced vary from state to state (Bae et al., 2014). Some states require primary enforcement of their child passenger safety law, while others only require secondary enforcement which does not promote full compliance (Elkbuli et al., 2020). Although not in detail, these laws were the first step to ensuring that children were properly secured in a child restraint system while riding in vehicles.

In 1981, federal legislation (FMVSS 213-80) was first passed to require crash testing of car seats by car seat manufacturers for children under fifty pounds (Dodington et al., 2017) and was updated in 2002 to include children up to sixty-five pounds. In the 1990s, the National Highway Traffic Safety Association (NHTSA) and the American Academy of Pediatrics (AAP) developed safety standards for child passengers to protect children from further injury (Bae et al., 2014). According to Durbin and Hoffman (2018), a greater awareness of child passenger safety began in 1995 when the first reports of children being killed by deploying passenger air bags surfaced. As research in child passenger safety progressed, a greater demand for stricter laws increased, while revealing a lag in federal action toward restricting current laws to align with current research (Weatherwax et al., 2016).

Despite motor vehicle injuries being the leading cause of death for children, there has historically been inconsistency between state and federal legislation in the field of child passenger safety to follow best practice recommendations (Dodington et al., 2017). State legislation has significantly improved to enhance child passenger safety and to prevent child passenger injury and death across the United States. Current AAP guidelines recommend that children should remain rear facing as long as possible, until

they reach the highest weight or height limit of the car seat being used (AAP, 2018). Previously, the AAP recommended that children should stay rear facing until age two. Although inconsistent in alignment with current best practice recommendations (Bae et al., 2014), state child passenger safety laws have helped to increase public awareness. State child passenger safety laws are different in every state, but all cover the minimum standards for motor vehicle safety (Dodington et al., 2017). It is also recommended by parents that child passenger safety laws be consistent (Huseth-Zoel, 2018) to positively impact consistent child passenger safety behaviors. Child passenger safety is continuously changing, and as innovative restraint systems and child passenger safety research is completed, legislators are faced with the urgent need to keep up in this ever-evolving field.

While providing basic car seat safety legislation, the wording of these laws has a significant impact on correct car seat use and misuse (Klinich et al., 2017). For example, legislation that specifies a car seat be required by a specific age, height or weight may not be a best practice recommendation for all children (Klinich et al., 2017). It is imperative for best practice recommendations to be followed to ensure a safe ride every time. Current best practice recommendations are for children to remain in a rear-facing car seat as long as possible, until they reach the highest size limits of the car seat (AAP, 2018). As of January 2020, Washington State is the only state that has a law that complies with current best practice recommendations (Washington Traffic Safety Commission, 2019).

Due to several differentiating factors, child passenger safety legislation and the need for imperative updates are vital to increasing child passenger safety across the

United States. State child passenger safety legislation impacts child passenger safety behaviors and attitudes among parents and caregivers (Klinich et al., 2017) and impacts the consistency of correct car seat installation and use during every ride.

Local Research Implications of Child Passenger Safety

Although studied in a myriad of ways across the United States, there are very few studies focused specifically on child passenger safety in South Carolina. In May 2017, South Carolina's child passenger safety law was amended to read that infants or children under age two must be properly secured in a rear-facing car seat while restrained in a rear passenger seat of the vehicle until the child exceeds the height or weight limit allowed by the car seat manufacturer. According to the SCDPS (2021), a child at least two or under age two, who has outgrown their rear-facing seat, must be in a forward-facing seat until they reach the height or weight limits of their car seat. A child at least 4, who has outgrown their forward-facing seat, must be in a booster seat used with a lap and shoulder belt, until they reach the height requirements of an adult safety seat belt. A child at least age 8 or at least fifty-seven inches tall may be restrained by an adult safety belt if they meet the proper belt fit requirements (SCDPS, 2021). Previously, the law allowed for infants less than twenty pounds and less than one year of age to be in a rear-facing car seat, allowing parents to transition these children to a forward-facing seat at an earlier age and lighter weight (SCDPS, 2021). Despite these changes, there is no requirement for parents or caregivers to complete child passenger safety education.

When the previous law was in effect, Basco et al. (2009) researched the impact of weight on correct car seat selection among South Carolina children in accordance with

South Carolina law. They sought to determine the number of children in South Carolina considered overweight for the age-appropriate car seats required by South Carolina law at that time. Their study found that a high percentage of children under age 6 were found to be overweight for age-appropriate car seats. Their research also asserted that increasing weights of children in the United States may have negative impact on child passenger safety and injury reduction through the use of appropriate car seats (Basco et al., 2009).

Despite these significant findings, this is the only study solely focused on child passenger safety in South Carolina and the impacts on its children. Although South Carolina has been included in comprehensive data research in the United States, after a thorough search, there is a lack of child passenger safety research conducted in the state and among its resident population. Specifically, research that addresses the attitudes and perceptions of South Carolina parents and caregivers regarding child passenger safety is severely lacking and needs to be identified to develop effective child passenger safety programs.

Summary and Conclusions

Based on a thorough review of the literature, major themes of unaligned legislation with best practice recommendations, barriers to car seat use, lack of knowledge, and the need for more effective child passenger safety education programs emerge. A lag in child passenger safety legislation across the United States (Dodington et al., 2017) may contribute to the lack of awareness and urgency in parents not correctly installing and buckling their children during every ride (Klinich et al., 2017). There is a clear lack of knowledge among parents and caregivers around proper car seat installation

and use (Aita-Levy & Henderson, 2016; Jones et al., 2017), which warrants the need for targeted, culturally tailored child passenger safety programs (Gielen et al., 2018; Jones et al., 2017; McKenzie et al., 2017). To develop these child passenger safety programs, it is imperative to address current barriers to use. Identified barriers include not using a car seat when driving a short distance, carpooling (McDonald et al., 2018), income, and car size (Johnston et al., 2019).

Child passenger safety research has clearly outlined barriers and needs in a national sense, but there are few localized studies to identify the attitudes, perceptions, and behaviors of parents and caregivers in smaller states such as South Carolina. Taking a more localized approach will help public health professionals to further develop and implement targeted child passenger safety education programs to improve the safety of children riding in cars each day. This study addressed the gap of few localized child passenger safety studies done in the Southeastern United States. From this study, public health officials in South Carolina will be able to identify the best child passenger safety education method to improve child passenger safety knowledge and proper car seat use across major regions of the state. Focusing on the Upstate, Midlands, Pee Dee, and Lowcountry regions of South Carolina, this study sought to identify ways to improve child passenger safety and reduce unintentional injuries and deaths for South Carolina's children. The next chapter will describe research methods including the research design and rationale, methodology, sampling, recruitment strategies, instrumentation and operationalization of constructs, data analysis plan, threats to validity, and ethical procedures.

Chapter 3: Research Methods

Introduction

In this study, I sought to determine the predictive relationship between age of child, age of parent/caregiver, attitudes, and behaviors of child passenger safety among parents and caregivers of South Carolina. I administered an online survey, using the constructs of the theory of planned behavior, to assess parents' and caregivers' attitudes and behaviors of child passenger safety. The theory of planned behavior asserts that attitudes toward a behavior; subjective norms, or social pressure to perform or not perform a behavior; and perceived behavioral control influences a person's intention to engage or not engage in a specific behavior (Glanz et al., 2015). I measured several constructs, including attitudes and beliefs regarding subjective norm and perceived behavioral control, using scales of at least three items to assess participant knowledge, barriers, and beliefs. Additional questions included demographics such as age, gender, number of children, and age of children. A formative evaluation was completed using feedback from four experts from the public health and child passenger safety industries to determine if the survey would answer the RQ. Participants were recruited in all regions of South Carolina (Upstate, Midlands, Pee Dee, and Lowcountry), online, and through local businesses in each region of the state. In this chapter, I describe the research design and rationale the research methods that I used in conducting this study. Details on the study population, sampling strategy, and data collection procedures are included. Threats to validity and ethical considerations are also discussed in this chapter.

Research Design and Rationale

The RQs and hypotheses for the study were as follows:

RQ1-Quantitative: What is the predictive relationship between age, attitudes of child passenger safety, and consistent use of child safety seats?

$H_0$1: There is no statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

$H_1$1: There is a statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

RQ2-Quantitative: What is the perceived behavioral control of participants toward the use of child safety seats?

RQ3-Quantitative: What are the perceptions of participants regarding subjective norms of child safety seat use?

I used the theory of planned behavior to determine the attitudes, perceptions, and beliefs about child passenger safety among parents and caregivers in South Carolina and how these factors relate to consistent child passenger safety behaviors. The independent variables in the study were

- attitudes of parents and caregivers toward child safety restraints and their use as measured using the 2007 and 2016 MVOSS
- age of child occupants riding in child safety restraint
- age of parents and caregivers driving with a child under age 6

The dependent variable was the use of child safety restraints consistently during every ride. Control variables included geographical location. I did not control the variables of gender and race in the study.

I used a nonexperimental, correlational design to capture the current beliefs and attitudes of child passenger safety among South Carolina parents and caregivers. Use of this design provided a clear method of determining the relationship between attitudes, perceptions, and barriers of child passenger safety and associated behaviors related to car seat use. Quantitative research is associated with the collection and analysis of numerical data (Bruce et al., 2018). The nonexperimental, correlational design describes the relationship between variables (Salazar et al., 2015). Using this design, I administered a cross-sectional, online survey, which helped to reduce time in data collection and to expand the reach of the survey across the state of South Carolina. This research design also reduced cost and time in comparison to conducting an experimental study, which would have entailed higher costs and longer timelines (Lau & Kuziemsky, 2017).

Nonexperimental, correlational designs are effective in collecting data among a diverse population in shorter amounts of time. Using this design, I was able to identify factors that might inform the development and/or refinement of child passenger safety education programs. This design has been used previously in child passenger safety research and has yielded results to assist child passenger safety professionals with gaining knowledge and insight for future programs and interventions (Liu et al., 2018; Rok Simon et al., 2017; Shimony-Kanat et al., 2018). Other research designs used in child passenger safety research include qualitative designs, observational designs, and pretest

and posttest designs (Nelson et al., 2015; Ojo, 2018; Will et al., 2015). All research designs have been effective in yielding adequate results, but the correlational design was best suited for this study because of the ability to reach a higher number of South Carolina residents with reduced cost in a shorter amount of time. The ability to explore relationships between study variables was another benefit to this research design.

Methodology

Population

The study population consisted of parents and caregivers of children under age 6 in South Carolina. According to the United States Census Bureau (2022), South Carolina had a population of 5,118,425 in 2019. There were approximately 1,975,915 households in South Carolina, and 5.6% of South Carolina's population were children under the age of 5 (United States Census Bureau, 2022).

Sampling and Sampling Procedures

I used convenience sampling in this study. Convenience sampling is a nonprobability sampling method that allows researchers to easily access a priority population that meets certain criteria (Etikan et al., 2016). Although having a disadvantage of limited generalizability (Jager et al., 2017), this sampling strategy was appropriate for this study because it allowed for convenient participant recruitment online and at local businesses across the state. An assumption of convenience sampling is that the target population is homogenous; therefore, results will not differ if a different sampling strategy is used (Etikan et al., 2016).

I drew the study sample from the social media platform Facebook through parent groups, online chat rooms, the Walden Participant Pool, and local businesses in each major region of South Carolina (Upstate, Midlands, Pee Dee, and Lowcountry). The online survey was introduced to South Carolina parent groups across the internet, and survey invitations were distributed to local businesses, such as day care centers in each major state region. Inclusion criteria included parents and caregivers of children aged 6 and under in South Carolina. South Carolina's child passenger safety law requires children ages 7 and under to be in a child safety restraint system (SCDPS, 2021). However, according to the SCDPS (2017), one child under the age of 6 is seriously injured or killed in a motor vehicle crash every 9 to 10 days. Exclusion criteria included parents and caregivers of children ages 7 and older and adults who do not transport children.

I used G*Power Analysis 3.1.9.2 software to calculate the target sample size for this study, which was 85 participants. The alpha level, typically set at .05 or less, is the point at which the statistical significance of a test is determined (Salazar et al., 2015). The alpha level for this study was set at .05. A logistic regression analysis was conducted to test the variables of this study. Researchers use logistic regression to predict the outcome of a binary dependent variable based on one or more independent variables (Salazar et al., 2015). In logistic regression, an adjusted odds ratio, or the odds that an outcome will occur based on a specific exposure compared to the opposite of that effect, is yielded.

Power in a statistical test detects true effects between variables and is influenced by sample size, effect size, and the alpha level (Salazar et al., 2015). I calculated the

power of this study at 95%, which means there was a 95% chance of correctly rejecting the null hypothesis that a particular value of the main predictor variables (attitudes, age of children, and age of parent/caregiver) was not associated with the value of the outcome variable (consistency in car seat use) with 85 participants. The effect size describes the level of association between two variables and is often measured by the odds ratio (Salazar et al., 2015). The effect size of this study as calculated in the odds ratio was 2.3333333. A lower alpha level, higher power level, and higher effect size reduces the likelihood of Type I and Type II errors. All these factors are key to ensuring true statistical results.

Procedures For Recruitment, Participation, and Data Collection

I obtained permission from Walden University's Institutional Review Board (IRB; approval no. 11-17-20-0518752) to conduct this study. Recruiting was done via online platforms and email invitations to local businesses in each region of South Carolina. Parents and caregivers of children aged 6 and under were the priority population of this study. Demographic questions included age of parent/caregiver, gender, geographical region of South Carolina (Upstate, Midlands, Pee Dee, or Lowcountry), age of children, number of children, ethnicity, and parent/caregiver status. I included questions to collect this demographic information in the study survey. A prescreening questionnaire (see Appendix A) was included in the survey to determine participation. These prescreening questions asked participants about their South Carolina resident status and whether they were a parent or caregiver of a child aged 6 or younger.

Participants were provided informed consent after completing the prescreening questionnaire and before completing the study survey. Informed consent provided participants with detailed information about the purpose of the study, confidentiality, and privacy. I did not collect specific identifying information such as name, address, phone number, or email in the survey. The consent form included information on the benefits of study participation, including assisting with development of new child passenger safety programs and improving child passenger safety in South Carolina. There were no previously perceived risks for study participation. Contact information was also included if participants had any questions or concerns after completing the survey. The online survey was free to all participants, and a link to Safe Kids Worldwide's Car Seat Safety website (https://www.safekids.org/car-seat) was provided at the end of the survey.

I collected data via an online survey instrument hosted on SurveyMonkey, an online survey platform. I distributed the online survey to various online platforms to recruit participants. The online survey included a prescreening questionnaire of two questions to determine eligibility to participate. These pre-screening questions addressed South Carolina resident status and confirmed that the potential participant was a parent or caregiver of a child that is age 6 or younger. The online survey was distributed on Facebook, through various South Carolina parent groups and community organizations, via online chat rooms and blogs, via emailed invitations to local businesses (day care centers, local Safe Kids coalitions, etc.), and via the Walden Participant Pool. Permission was obtained from each site before data collection began. Along with demographic questions, the survey included questions from NHTSA's MVOSS from 2007 and 2016.

The end of the survey included a link to child passenger safety education provided by Safe Kids Worldwide. No follow-up procedures were necessary for this study.

Instrumentation and Operationalization of Constructs

I used questions from NHTSA's MVOSS of 2007 and 2016 to collect data from participants. These surveys were conducted to determine occupant protection issues in the United States for adult and child passengers (NHTSA, 2019). Specific questions in the surveys address child passenger safety behaviors regarding car seat use, as well as drivers' attitudes toward child passenger safety. I did not need to obtain permission to use the NHTSA survey questions as they are in the public domain (see Appendix B).

NHTSA's MVOSS was introduced in 1994 to provide a report on the attitudes, knowledge, and behaviors of motor vehicle occupant safety. Since 1994, MVOSS has been conducted 6 additional times in 1996, 1998, 2000, 2003, 2007, and 2016. Questions about seat belts, child safety seats, motorcycle helmet use, bicycle safety, emergency medical services (EMS), and pedestrian safety were included in each survey conducted.

Validity and reliability were established through NHTSA's collaboration with the National Center for Health Statistics (NCHS) of the U.S. Department of Health and Human Services (NHTSA, 1995). Using a three-step process, the questionnaire was developed and validated for use. First, subject matter experts assisted with drafting survey questions. Next, in-person cognitive interviews were conducted to address conceptual problems and cognitive difficulties of the drafted questions, along with examination of possible responses. Lastly, simulated phone surveys and in-person retrospective interviews were conducted to complete the questionnaire. The three-step

process was conducted in the NCHS Questionnaire Design Research Laboratory (NHTSA, 1995). Two versions of the survey were developed. Version I or A addressed seat belts, speeding, air bags, cell phone use, and alcohol-impaired driving. Version II or B addressed child passenger safety, EMS, and emergency questions. This study used specific questions from Version II of the 2007 MVOSS and Version B of the 2016 MVOSS.

The 2007 MVOSS was completed by phone using a national probability sample of American adults aged 16 and older. Using a four-stage system to develop a population-based sample, the 2007 MVOSS used the same techniques as the previous surveys conducted. Changes to the MVOSS administration in 2007 included an extension of the field period to 4 months, an increase to 22 maximum contact attempts, elimination of gender quotas, and the inclusion of new and revised questions for the Version II questionnaire. Cognitive testing was conducted to reduce potential response issues.

As stated previously, MVOSS study populations have included U.S. motor vehicle occupants aged 16 and older (NHTSA, 2016). The 2016 MVOSS was changed slightly to increase data collection through technological advances. In 2016, NHTSA changed to address-based sampling and web and mail responses for U.S. adults ages eighteen and older from telephone administration used in previous years. Because of these changes, the 2016 MVOSS was self-administered instead of interviewer-administered, and the questionnaire length was reduced by removal of some questions. Cognitive testing, usability testing, and pilot testing were conducted on the questionnaire before administration.

Because selected questions from the 2007 MVOSS and 2016 MVOSS were used, my dissertation committee reviewed the study questionnaire to establish face validity. The study questionnaire was reviewed by four individuals with expertise in the field of research and child passenger safety to ensure validity. These experts included methods expert, Dr. David M. Brown of Walden University; content expert, Dr. Yitza A. Arcelay Rojas of Walden University; subject matter expert Kevin Poore, child passenger safety technician instructor of the South Carolina Department of Health and Environmental Control; and subject matter expert Bridgette Watson, program coordinator of Safe Kids Upstate.

Each expert was sent a copy of the study survey to review and provide feedback. Their recommendations included adding in additional questions to specifically address the constructs of the theory of planned behavior and simplifying verbiage to help participants better understand the questions being asked. Experts also suggested considering booster seat use, changing question 28 to ask for the county of residence, and changing some questions to allow for multiple answer selections, specifically questions 14, 15, and 19a. A detailed list of each survey question is listed in Table 1.

Table 1

Child Passenger Safety Attitudes and Behaviors Survey Questions

Survey Questions	Variables/Constructs Being Measured
Survey Questions	Variables/Constructs Being Measured
1-2, 5, 8, 25-28	Demographics
6-7, 13, 16-17, 20-22	Attitudes

8	Child occupant age
25	Parent/caregiver age
9-10, 18-19a, 23	Car seat use
16-18, 20-22	Perceived behavioral control
14-15	Subjective norms
4, 11-12	Child passenger safety behaviors
14-15, 24	Child passenger safety education

Reliability

Reliability statistics or Cronbach's Alpha was calculated to determine internal consistency for survey scale questions (Laerd Statistics, 2018). Calculated at .736, this Cronbach's Alpha result indicates a high level of internal consistency for the survey scale, as shown in Table 2.

Table 2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Maximum Alpha if Items Removed
.736	.763	8	.837

Note. This table displays the reliability coefficient of the survey scale.

Variables

For the first RQ of this study, the dependent variable was the use of car seats consistently during every ride (ordinal scale of measurement). The independent variables

of the RQ were attitudes of parents and caregivers (ordinal scale of measurement), the age of child occupants (ratio scale of measurement), and the age of parents and caregivers (ratio scale of measurement). Each variable, its operational definition, and coding are outlined in Table 3.

Table 3

Dependent and Independent Variables

Variable	Definition	Coding/Operational Definition
Attitudes Independent Variable	Attitudes of child passenger safety of parents and caregivers of children ages six and under	1-Very easy 2-Somewhat easy 3-Neither easy or difficult 4-Somewhat difficult 5-Very difficult
Child Occupant Age Independent Variable	Child passenger occupant age in years	Less than 12 months=0 12 months and 1 day, but less than 24 months=1 24 months and 1 day, but less than 36 months=3 36 months and 1 day, but less than 48 months=4, etc. up to 110 years
Parent/Caregiver Age Independent Variable	Age of parents/caregivers in years who travels with children aged six and under	Less than 12 months=0 12 months and 1 day, but less than 24 months=1 24 months and 1 day, but less than 36 months=3 36 months and 1 day, but less than 48 months=4, etc. up to 110 years
Variable	Definition	Coding/Operational Definition
Car Seat Use Dependent Variable	Consistency of child safety seat use during each trip	1-All of the time 2-Most of the time 3-Some of the time 4-Rarely 5-Never

Data Analysis Plan

The first step in analyzing survey data consisted of entering all data into SPSS v.27.0 and cleaning the data set. I treated all open-ended questions as string variables for further analysis. Data cleaning was performed by screening the data for inconsistencies, duplicates, syntax, scaling, and missing values. All statistical analyses were performed using SPSS v.27.0 (IBM Corporation). These statistical analyses included logistic regression analysis, descriptive statistics and analysis, and Cronbach's alpha.

Research Question and Hypotheses

RQ1-Quantitative: What is the predictive relationship between age, attitudes of child passenger safety, and consistent use of child safety seats?

$H_0$1: There is no statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

$H_1$1: There is a statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

RQ2-Quantitative: What is the perceived behavioral control of participants toward the use of child safety seats?

RQ3-Quantitative: What are the perceptions of participants regarding subjective norms of child safety seat use?

Analysis Plan

The goal of this research study in data analysis was to provide a rigorous test of the RQ while maintaining validity. Assumptions in survey research considered before performing statistical analyses were data cleaning, participant understanding of survey

questions, participant interest, correct responses from participants, and no prior knowledge of subject jargon (Verma & Abdel-Salem, 2019). To ensure valid results and to control variability through delimitation and limitation, these assumptions must be fulfilled (Verma & Abdel-Salem, 2019).

Before data analysis was completed, survey questions were validated by four experts in the field of health education and child passenger safety, including the two members of my dissertation committee and two child passenger safety subject matter experts in the state of South Carolina. Population parameters were clearly defined, and exclusions identified. To safeguard participant interest, the survey was distributed to Facebook parent groups and local businesses, including daycare centers.

To begin data analysis, data cleaning was performed in SPSS v.27.0 to ensure consistent data and to identify outliers. Next, descriptive statistical analysis was completed yielding mean, frequency, and standard deviation values for survey data, specifically demographic data and targeted survey questions. Cronbach's alpha was also analyzed for this study. No potential covariates and/or confounding variables were anticipated for this study.

To test the hypothesis, logistic regression analysis was performed in SPSS v.27.0. A binary dependent variable (consistent car seat use) and three continuous and categorical independent variables (age of child, age of parent/caregiver, and attitudes of parent/caregiver) were presumed assumptions for logistic regression. Assumptions of logistic regression including linearity, errors and residuals, homoscedasticity (Verma &

Abdel-Salem, 2019) were met and logistic regression analysis was performed in SPSS v.27.0.

Logistic regression analysis, performed with dichotomous dependent variables, raises an exponent to the power of beta, therefore yielding an adjusted odds ratio (Salazar et al., 2015). The dependent variable, consistent car seat use, was analyzed to identify its relationship with each independent variable, age of child, age of parent/caregiver, and attitudes of parent/caregiver. The yielded odds ratio allowed me to further interpret the study data. Results were interpreted using the calculated odds ratio, confidence interval, and key parameter estimates.

Threats to Validity

External Validity

External validity is determined by the generalizability of the study or the ability to generalize study findings (Salazar et al., 2015). Threats to external validity have the potential to reduce the generalizability of the study's results (Laerd Dissertation, 2012; Taylor, 2013). External threats to validity include selection and volunteer bias due to non-probability sampling. Individuals who choose to take the survey may already have an interest in child passenger safety or car seat safety for their child(ren). To reduce selection and volunteer bias, the survey was not intended to be distributed to parents or caregivers directly involved with local Safe Kids coalitions, child passenger safety classes, and car seat check events. This originally intended for a more general sample of South Carolina's population to participate in the study without a predisposition to a vested interest in child passenger safety and its programs. Although volunteer bias may

be more difficult to avoid due to individuals opting into the survey because of child passenger safety interest, the intention to eliminate direct child passenger safety programs as a site of survey distribution helped to reduce volunteer bias.

Experimenter bias was also a threat to external validity. As the experimenter, I have served as a Safe Kids coordinator of a local coalition in South Carolina and have taught numerous parents and caregivers in several counties about child passenger safety and proper installation of their car seats. I am also a CPST certified by Safe Kids Worldwide and trained to teach individuals proper car seat installation and child passenger safety practices. To reduce experimenter bias, the study was performed online and not in-person. Also, I, as the researcher, committed to conducting data analysis and presenting study results in an accurate fashion without manipulation of the data to fit my personal assumptions.

Internal Validity

Internal validity confirms that conclusions made by the research study are accurate in relation to the RQ being studied (Laerd Dissertation, 2012; Taylor, 2013). Threats to internal validity include history effects, maturation, and instrumentation. History effects are a threat to internal validity because events such as a car crash involving children can influence participants to over or under-report their child passenger safety behaviors. Maturation was another threat to internal validity that was minimized by including a limited number of survey questions to minimize the amount of time needed to complete the questionnaire. Instrumentation was also a potential threat to validity in how survey questions are asked or not asked. To minimize this, the survey

instrument was reviewed by content, methods, and field experts for validation. Subject effects were a threat to validity because participants may have answered survey questions the way they think they should be answered without telling the truth. A statement was included in the informed consent process to let participants know they would remain anonymous and asked participants to be as honest as possible when they answered survey questions.

Construct Validity

A threat to construct validity was examining one measure of child passenger safety versus analyzing multiple aspects of the construct. The results of this study were not able to be applied or generalized to the full concept of child passenger safety since one aspect of child passenger safety is being evaluated, consistent car seat use. Another threat to construct validity included inexact definitions of constructs. This threat was addressed by clearly defining the operational definitions of all constructs included in the study by specifying individual constructs to be addressed, such as consistent car seat use. Lastly, levels of measurements of constructs were reduced by using categories for continuous variables such as age, to minimize this treat to validity.

Ethical Procedures

Before conducting the study, IRB approval was received from Walden University. Permission from NHTSA was obtained to use survey questions from the 2007 and 2016 MVOSS surveys. No data from these surveys were used and no personal, identifiable information was included in this study. To gain access to participants, a formal email was

sent to the directors and managers of daycare centers, Facebook groups, local grocery stores, and parent groups across the state of South Carolina.

Ethical considerations were assessed before conducting the study. The survey was conducted online via SurveyMonkey and each participant remained anonymous. No personal identifiable information was collected from participants. To ensure that no personal contact information was collected, a link to child passenger safety education by Safe Kids Worldwide was automatically included on the last page of the survey. This prevented participants from reporting their email address. A search for Facebook parent groups across the state was conducted and each group's administrator was asked for permission to post the survey link to their group members. Local daycare centers in each region of South Carolina were contacted via email to ask for permission to post flyers about the survey on their community boards and for the survey to be distributed to parents. A copy of the study's survey was also included in the Walden Participant Pool. As the researcher, I had no intentional direct involvement in recruiting to prevent bias, coercion, or privacy and confidentiality concerns.

Informed consent was provided to each participant before they began the online survey. Directors and managers were asked to simply post the survey link and description provided online or via flyer and to not coerce or recruit individuals to participate. This reduced the likelihood of recruitment bias. When collecting data, there were ethical concerns of participants refusing participation and early withdrawal. Because the survey was online, participants who refused to participate were not identifiable. Potential participants were not judged or harmed in any way because of taking this survey. Those

who decided to withdraw or stop the survey during completion were also not identifiable or harmed. Any blank questions or uncompleted surveys were excluded from data analysis.

Full consent was provided to each participant before survey completion. Consent was presented in an honest, transparent manner, addressing each objective of the study without bias. Potential risks, benefits, and obligations were also communicated. The privacy, confidentiality, and anonymity of each participant was protected throughout each stage of the research study. An IRB process through Walden University was completed before conducting this study. This study did not begin without approval from Walden University's IRB. Participants had a very low likelihood of experiencing injury while completing the online questionnaire. Participation in the study was free of charge and strictly voluntary. An option to not participate or withdraw was available to all participants without penalty.

Collected data was anonymous and housed via a password-protected SurveyMonkey account. Data was also be stored on a password-protected computer. Only I, as the researcher, have access to data collected. Data was analyzed and disseminated based on the doctoral study research process of Walden University to all appropriate parties. Data was disposed after all data had been assessed, evaluated, and disseminated.

Other ethical issues considered were conducting the study in personal work environments, conflicts of interest, and the use of incentives. This study was not conducted in a personal work environment and presented no conflicts of interest.

Participation in the study was free of charge and a link to child passenger safety education provided by Safe Kids Worldwide was included at the end of the survey for participants to learn more about child passenger safety. No additional monetary or gift incentives was provided for participation.

Summary

This chapter provided a summary of research methods related to this study. An overview of the quantitative non-experimental, correlational study design and rationale including the intended population, sampling procedures, recruitment, participation, and data collection procedures. A plan for instrumentation, operationalization, data analysis, threats to validity, and ethical concerns were defined and addressed in detail. The details outlined in this chapter informed the data collection and analysis of Chapter 4.

Chapter 4: Results

Introduction

The purpose of this study was to determine the relationship between attitudes, age of child, age of parent/caregiver, and child passenger safety behaviors among parents and caregivers of South Carolina. I also explored the perceptions of child passenger safety regarding subjective norms and perceived behavioral control. I investigated the following RQs and hypotheses using a cross-sectional, online survey design:

RQ1-Quantitative: What is the predictive relationship between age, attitudes of child passenger safety, and consistent use of child safety seats?

$H_0$1: There is no statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

$H_1$1: There is a statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

RQ2-Quantitative: What is the perceived behavioral control of participants toward the use of child safety seats?

RQ3-Quantitative: What are the perceptions of participants regarding subjective norms of child safety seat use?

In this chapter, I discuss data collection procedures and treatment and intervention fidelity and present the study results.

Data Collection

Using an online survey created through SurveyMonkey, I collected data for a total of 4 months from December 2020 to April 2021. The survey was promoted on Facebook

through my personal social media page and Walden's Participant Pool website. The survey link was also distributed to various Facebook groups, local daycare centers, and community groups. A total of 87 responses were received, with a 76% completion rate among participants.

Due to the small sample size, study participants did not fully represent the current demographics of South Carolina. As of July 2019, 68.6% of South Carolina's residents identify as Caucasian/White, 27% identify as Black, and 6% identify as Hispanic or Latino (United States Census Bureau, 2021). The percentage breakdown for this study differed, with 58.3% of study participants self-identifying as Caucasian/White, 38.9% as Black/African American, and 2.8% as Hispanic/Latino or Other. There was also a difference in gender as compared to South Carolina's current population. Although women and girls represented 51.6% of South Carolina's population, according to 2021 data from the United States Census Bureau, 93.1% of this study's participants self-identified as female.

There were a few discrepancies in data collection from the originally presented plan. I did not distribute the survey to local businesses due to restricted access. This, along with a slow response to social media requests, led to lower participation in the early stages of data collection than anticipated. To increase participation, I also distributed the online survey link to the Safe Kids South Carolina network, local Safe Kids groups, and community partners. All other data collection procedures were followed as previously outlined in Chapter 3.

Descriptive Data and Sample Demographics

Although I distributed the online, cross-sectional survey through multiple channels, I received 87 responses, slightly surpassing the estimated sample size goal of 85 participants. However, only 72 adults over age 18 fully completed the survey. Partial participation can be attributed to the length of the survey, survey subject, relevance, and time commitment needed to complete the survey.

Demographic information collected from participants include race/ethnicity, gender, parent/caregiver status, South Carolina region of residence, and age. Tables 4-9 display the demographics of participants. In total, 58.3% of study participants self-identified as Caucasian/White, 38.9% as Black/African American, and 2.8% as Hispanic/Latino or Other (see Table 4), with 93.1% of participants self-identifying as female and 6.9% as male (see Table 5).

Table 4

Participants' Race/Ethnicity

Race/Ethnicity	Frequency	%
White	42	58.3
Hispanic or Latino	1	1.4
Black or African American	28	38.9
Other	1	1.4
Total	72	100.0

Table 5

Participants' Gender

Gender	Frequency	%
Male	5	6.9
Female	67	93.1
Total	72	100.0

Of 72 adult participants, 66.7% of participants self-identified as parents, 12.5% as grandparents, and 19.5% as a relative or non-relative (see Table 6). Regarding South Carolina region of residence, the majority (54.17%) of participants reported residing in the Midlands region, 22.22% in the Upstate region, 12.5% in the Pee Dee region, and 11.11% in the Lowcountry region of South Carolina (see Table 7).

Table 6

Participants' Relationship to Child

Relationship to child	Frequency	%
Child/stepchild	48	66.7
Grandchild	9	12.5
Other relative	11	15.3
Non-relative	3	4.2
System missing	1	1.3
Total	72	100.0

Note. This table displays study participants' relationship to the child that rides in their vehicle.

Table 7

Participants' South Carolina Region of Residence

Race/Ethnicity	Frequency	%
Lowcountry	8	9.2
Midlands	39	44.8
Pee Dee	9	10.3
Upstate	16	18.4
System missing	15	17.2
Total	87	100.0

Note. This table displays South Carolina region of residence of study participants.

As shown in Table 8, most study participants were between the ages of 26-35 (54.2%) and ages 36-45 (26.4%). The age of children driven by participants varied, with the largest category (19.5%) being children who were 4 years of age (see Table 9).

Table 8

Participants' Age

Age	Frequency	%
18-25	3	4.2
26-35	39	54.2
36-45	19	26.4
46-60	7	9.7
Over 60	4	5.6
Total	72	100.0

Table 9

Age of Children Driven by Study Participants

Age	Frequency	Percent
0	7	16.1
1	12	13.8
2	10	11.5
3	12	13.8
4	17	19.5
5	8	9.2
6	7	8.0
Total	72	100.0

According to the United States Census Bureau (2022), there were 5.1 million South Carolina residents in 2019. Almost 52% of South Carolina's population was female. In addition, 68.6% identified as Caucasian/White, 27% identified as Black, and 6% identified as Hispanic or Latino (United States Census Bureau, 2021). The study's sample is not fully representative of South Carolina's current population, but participants

from large demographic groups are included in the study. As such, survey results offer a broad look into the attitudes of child passenger safety among South Carolina parents and caregivers.

Results

In this section, I present the results from statistical analysis of data collected for each RQ. I discuss statistical assumptions followed by an analysis of findings for each RQ. The data display the attitudes, perceived behavioral control, and subjective norms of parents and caregivers in South Carolina toward child passenger safety.

Statistical Assumptions

I considered assumptions in performing statistical analyses. Assumptions in survey research include data cleaning, participant understanding of survey questions, participant interest, correct responses from participants, and no prior knowledge of jargon (Verma & Abdel-Salem, 2019). Fulfilling all data and statistical assumptions in analysis is key to ensuring valid and accurate results, according to Verma and Abdel-Salem (2019).

Before completing data analysis, I ensured that the survey questions were clearly defined and population parameters set. Survey questions were reviewed by four experts to ensure that each question was clearly framed and understood. These four experts included my dissertation committee and two child passenger safety subject matter experts in the state of South Carolina. Population parameters of parents and caregivers of children aged 6 and under in South Carolina were clearly defined, and exclusions identified. The survey was also distributed to parent groups via social media and local

businesses, including daycare centers to ensure participant interest. These preliminary steps were needed to control variability through delimitation and limitation (see Verma & Abdel-Salem, 2019).

To begin data analysis, I performed data cleaning to ensure consistent data and to identify outliers. A binary dependent variable and three independent variables that are continuous and categorical were presumed assumptions for logistic regression. Logistic regression was performed, and, therefore, assumptions including linearity, errors and residuals, homoscedasticity were met (see Verma & Abdel-Salem, 2019).

Research Question 1

RQ1-Quantitative: What is the predictive relationship between age, attitudes of child passenger safety, and consistent use of child safety seats?

$H_0$1: There is no statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

$H_1$1: There is a statistically significant relationship between age, attitudes of child passenger safety, and consistent use of child safety seats.

In analyzing the data, I sought to determine the predictive relationship of the independent variables of age of child, age of parent/caregiver, and attitudes of child passenger safety related to the dependent variable of consistent use of child safety seats. A total of 72 participants fully completed the study survey to answer the RQ.

I performed a binary logistic regression analysis that included variable predictors derived from study survey questions. Regression analysis is used to evaluate and quantify the relationship between a dependent variable and multiple independent variables,

(Verma & Abdel-Salem, 2019). The following section displays results of the relationships between the dependent variable, consistent car seat use, and each independent variable, attitude of parent/caregiver, age of child, and age of parent/caregiver.

Attitudes of Parents and Caregivers

Table 10 displays the results of binary logistic regression analysis to determine the impact of attitudes of parents and caregivers on consistent car seat use. Results show that both Cox & Snell R Square and Nagelkerke R Square are 0.000 or 0.0%. The results indicate that the amount of variation in the dependent variable of consistent car seat use explained by the independent variable, attitude, was 0.0%. This means that there is no significant amount of variation in consistent car seat use caused by the attitude of parents and caregivers.

Table 10

Model Summary

Step	-2 Log likelihood	Cox & Snell R square	Nagelkerke R square
1	97.801[a]	.000	.000

Note. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Table 11 shows the probability of consistent car seat use. If the estimated probability of a safely attached car seat during every ride is more than 0.5, then there is more probability that this event will occur consistently. If the estimated probability of a safely attached car seat is less than 0.5, then there are most likely less occurrences of

consistent car seat use. Based on Table 11, the percentage of predicted cases of consistent car seat use is 58.3%. There is a higher probability that parents and caregivers drive with the child's car seat securely attached on a consistent basis.

Table 11

Classification Table

			Predicted		
			Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?		Percentage
	Observed		Yes	No	Correct
Step 1	Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?	Yes	0	30	.0
		No	0	42	100.0
	Overall Percentage				58.3

Note. The cut value is .500

As displayed in Table 12, attitudes of parents and caregivers (p = .954) were not statistically significant in relation to consistent car seat use. The odds ratio (Exp (B)) of this independent variable at a 95% confidence interval was 1.083. This means that the odds of consistent car seat use are 8.3% greater for those who have a positive attitude toward child passenger safety.

Table 12

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Attitude	.080	1.388	.003	1	.954	1.083	.071	16.449
	Constant	.254	1.455	.030	1	.861	1.289		

Note. Variable(s) entered on step 1: Attitude.

Age of Parents and Caregivers

In using binary logistic regression analysis to determine the impact of the age of parents and caregivers on consistent car seat use, Tables 13-15 display analysis results. Table 13 shows that Cox & Snell R Square is 0.019 or 1.9% and Nagelkerke R Square is 0.026 or 2.6%. The results indicate that the amount of variation in the dependent variable of consistent car seat use explained by the independent variable, age of parents and caregivers, ranges from 1.9% to 2.6% resulting in a small amount of variation in consistent car seat use caused by the attitude of parents and caregivers.

Table 13

Model Summary

Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	96.411[a]	.019	.026

Note. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Table 14 displays the probability of consistent car seat use as related to the age of parents and caregivers. If the estimated probability of a safely attached car seat during

every ride is more than 0.5, then there is more probability that this event will occur consistently. If the estimated probability of a safely attached car seat is less than 0.5, then there are most likely less occurrences of consistent car seat use. Based on Table 14, the percentage of predicted cases of consistent car seat use is 59.7%. This result confirms there is a higher probability that parents and caregivers drive with the child's car seat securely attached on a consistent basis.

Table 14

Classification Table

			Predicted		
			Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?		Percentage
	Observed		Yes	No	Correct
Step 1	Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?	Yes	2	28	6.7
		No	1	41	97.6
	Overall Percentage				59.7

Note. The cut value is .500

As displayed in Table 15, the age of parents and caregivers (p = .250) was not statistically significant in relation to consistent car seat use. The odds ratio (Exp (B)) of this independent variable at a 95% confidence interval was 1.372. This means that the

odds of consistent car seat use are 37.2% greater for parents and caregivers who have a higher age.

Table 15

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Age of Parent	.316	.275	1.323	1	.250	1.372	.801	2.350
	Constant	-.471	.734	.412	1	.521	.624		

Note. Variable(s) entered on step 1: Age of Parent.

Age of Child

Binary logistic regression analysis was also applied to determine the impact of the child's age on consistent car seat use, as displayed in Tables 16-18. Table 16 shows that Cox & Snell R Square is .004 or 0.4% while Nagelkerke R Square is .006 or 0.6%. Results indicate that the amount of variation in the dependent variable of consistent car seat use explained by the independent variable, age of child, ranges from 0.4% to 0.6%.

Table 16

Model Summary

Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	97.487[a]	.004	.006

Note. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Table 17 shows the probability of consistent car seat use as related to the age of the child. If the estimated probability of a safely attached car seat during every ride is more than 0.5, then there is more probability that this event will occur consistently. If the estimated probability of a safely attached car seat is less than 0.5, then there are most likely less occurrences of consistent car seat use. Based on Table 17, the percentage of predicted cases of consistent car seat use is 58.3%. There is a higher probability that parents and caregivers drive with the child's car seat securely attached on a consistent basis in relation to the age of the child.

Table 17

Classification Table

			Predicted		
			Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?		Percentage
	Observed		Yes	No	Correct
Step 1	Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?	Yes	0	30	.0
		No	0	42	100.0
	Overall Percentage				58.3

Note. The cut value is .500

As displayed in Table 18, child's age (p = .584) is also not statistically significant in relation to consistent car seat use. The odds ratio (Exp (B)) of this independent variable

at a 95% confidence interval was 1.059. This means that the odds of consistent car seat use are 5.9% greater for children with a higher age.

Table 18

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Age of Child	.057	.105	.300	1	.584	1.059	.863	1.300
	Constant	.125	.450	.078	1	.780	1.134		

Note. Variable(s) entered on step 1: Age of Child.

Research Question 2

RQ2-Quantitative: What is the perceived behavioral control of participants toward the use of child safety seats?

Perceived behavioral control, a construct of the theory of planned behavior, is an individual's belief of how difficult or easy it is to complete a behavior (Steinmetz et al., 2016). This descriptive question explores the perceptions of perceived behavioral control of parents and caregivers of South Carolina regarding child passenger safety. Descriptive and correlational data is presented through frequency data tables, figures, and correlational analysis results.

There were varying perceptions toward the ease or difficulty of car seat installation instructions. Almost 42% of participants felt car seat installation instructions were very easy, 33.3% responded somewhat easy, 6.9% responded neither easy or difficult, 15.3% responded somewhat difficult, and 2.8% did not read the instructions. In

response to the ease or difficulty of installing the car seat, 51.4% felt installation was very easy, 31.9% responded somewhat easy, 6.9% felt it was neither easy or difficult, 8.3% responded somewhat difficult and only 1.4% felt it was very difficult. When completing a correlation analysis (see Table 19) between the ease or difficulty of the instructions and the ease or difficulty of attaching the car seat to the vehicle, there is a relatively strong correlation between the two ($r = .596$).

Table 19

Ease or Difficulty of Instructions vs. Attachment of Car Seat

		How easy or difficult were the instructions to install the car seat?	How easy or difficult is it for you to attach the child car seat to the vehicle you usually drive?
How easy or difficult were the instructions to install the car seat?	Pearson Correlation	1	.596
	Sig. (2-tailed)		.000
	N	72	72
How easy or difficult is it for you to attach the child car seat to the vehicle you usually drive?	Pearson Correlation	.596	1
	Sig. (2-tailed)	.000	
	N	72	72

Note. This table displays correlations between Questions 16 & 17 of the study.

There are similar variations for perceived behavioral control of ease or difficulty of buckling the child into the car seat. Despite these variations, 81.9% of participants feel very confident that the car seat is correctly installed in their vehicle before transporting the child. A correlational analysis between the confidence in correct car seat installation and ease or difficulty of buckling the child into the car seat revealed a positive

association (r = .247). As the confidence in correct car seat installation increases, so does the ease of properly buckling the child into the installed car seat (see Table 20).

Table 20

Confidence in Correct Installation vs. Ease of Bucking Child into Car Seat

		When you attach the car seat to your vehicle, how confident do you usually feel that the car seat is correctly attached?	How easy is it for you to properly buckle the child into the child car seat?
When you attach the car seat to your vehicle, how confident do you usually feel that the car seat is correctly attached?	Pearson Correlation Sig. (2-tailed) N	1 72	.247 .035 72
How easy is it for you to properly buckle the child into the child car seat?	Pearson Correlation Sig. (2-tailed) N	.247 .035 72	1 72

Note. This table displays correlations between Questions 20 and 21of the study.

Out of 72 respondents, 93.1% use child safety restraints all the time, 98.6% strongly agree that it is important to correctly install a car seat in their vehicle, and 100% agree that the safest place for a car seat in the vehicle is the back seat (see Table 22). There is also a relatively strong correlation between participants' perceptions of the importance of correct buckling of the child into the car seat for each ride, and how often the child rides in the car seat (r = .509), as reflected in Table 21.

Table 21

Importance of Buckling Child vs. Consistent Car Seat Use

		It is important to buckle my child in their car seat correctly for each ride.	When you are driving and the child rides in the vehicle with you, how often does he/she ride in a car seat?
It is important to buckle my child in their car seat correctly for each ride.	Pearson Correlation Sig. (2-tailed) N	1 72	.509 .000 72
When you are driving and the child rides in the vehicle with you, how often does he/she ride in a car seat?	Pearson Correlation Sig. (2-tailed) N	.509 .000 72	1 72

Note. This table displays correlations between Questions 7 and 9 of the study.

Table 22

Safest Place for a Car Seat in the Vehicle

Safest Place for a Vehicle Car Seat	Frequency	Percent
Front seat	0	0.0
Back seat	72	100.0
Depends on type of car seat	0	0.0
Total	72	100.0

Note. This table displays the response to Question 13 of the study.

All participants strongly agree that having a car seat correctly installed in their vehicle is important (see Table 23).

Table 23

Importance of Correctly Installing a Car Seat

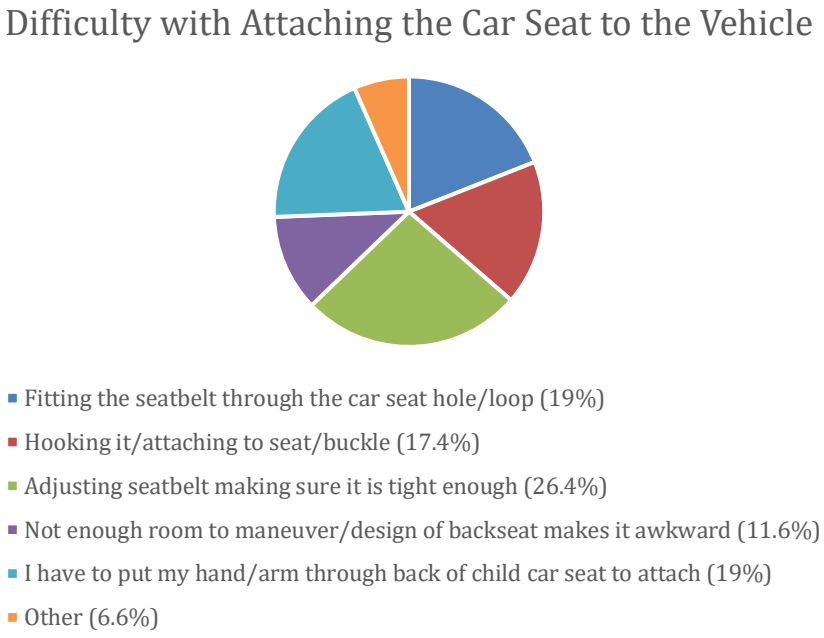
Importance of Correctly Installing a Car Seat	Frequency	Percent
Strongly agree	72	100.0
Total	72	100.0

Note. This table displays the response to Question 6 of the study.

Perception of difficulty in attaching the car seat varied among study participants. Most participants reported difficulty in adjusting the seatbelt to make sure it is tight enough (26.4%), fitting the seatbelt through the car seat hole/loop (19%), and putting their hand/arm through the back of the car seat (19%) as shown in Figure 2.

Figure 2

Difficulty with Attaching the Car Seat to the Vehicle



Over 40% of participants reported driving with the child in the car seat and later found that the car seat was not securely attached (see Table 24). Based on survey

responses, this happened because the car seat was put in by someone else who did not attach it correctly (24.6%), the car seat was moved between cars or within the same car (14.5%), and the child in the seat loosened it (11.6%). Over 20% of participants also chose the answer response "Other" and stated that this has never happened (24.6%) as displayed in Figure 3.

Table 24

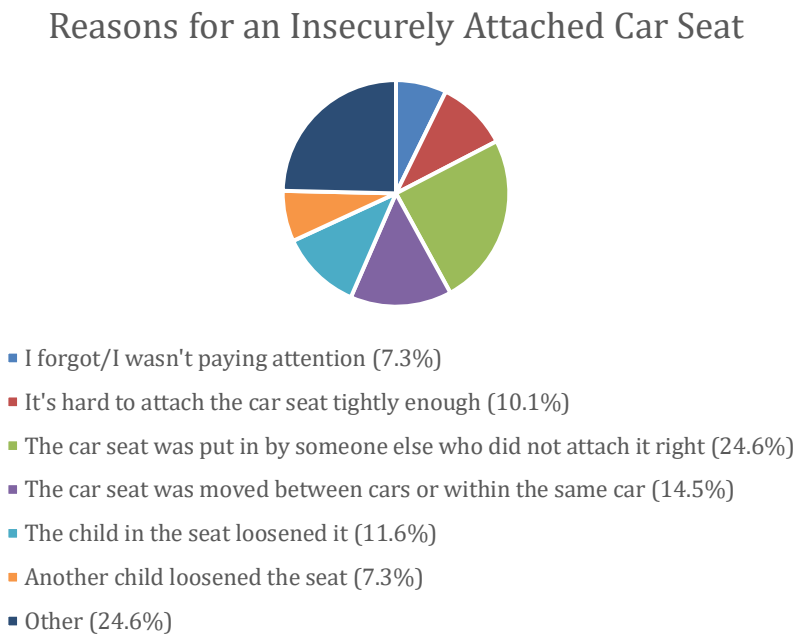
Driving with the Child and Later Finding an Insecurely Attached Car Seat

Driving with the Child and Later Finding an Insecurely Attached Car Seat	Frequency	Percent
No	42	58.3
Yes	30	41.7
Total	72	100.0

Note. This table displays the response to Question 19 of the study.

Figure 3

Reasons for an Insecurely Attached Car Seat



Difficulty in buckling the child into the car seat also varied among study participants. As displayed in Table 25, reasons given by participants are adjusting shoulder straps to fit properly/tightness of seat (23.6%), the child doesn't sit still/down/uncooperative/squirms (22.2%), and heavy/bulky/winter clothing makes it difficult to buckle child (20.8%).

Table 25

Difficulty with Buckling the Child into the Car Seat

Difficulty with Buckling the Child into the Car Seat	Frequency	Percent
Difficult for adult to crawl/squeeze into rear of vehicle to buckle	6	8.3
Child doesn't sit still/down/uncooperative/squirms	16	22.2
Heavy/bulky/winter clothing makes it difficult to buckle child	15	20.8
Difficulty with Buckling the Child into the Car Seat	Frequency	Percent

Adjusting shoulder straps to fit properly/tightness of seat	17	23.6
Hard to snap/buckle	6	8.3
Other	12	16.8
Total	72	100.0

Note. This table displays the response to Question 22 of the study.

Additionally, Figure 4 displays participants' reasons for why the child may not ride in a car seat. Although most participants selected "Other" because their child always rides in a car seat (32.3%), the child's size (13.5%), and only being in the car for a short time (11.5%) were prominent reasons reported by study participants. Most also recognized the need for the next stage of child safety restraint with 65.3% expecting their child to use a booster seat and 22.2% expecting to move their child to a different type of car seat that is not a booster seat, such as a forward-facing car seat, as displayed in Table 26.

Figure 4

Reasons the Child May Not Ride in a Car Seat

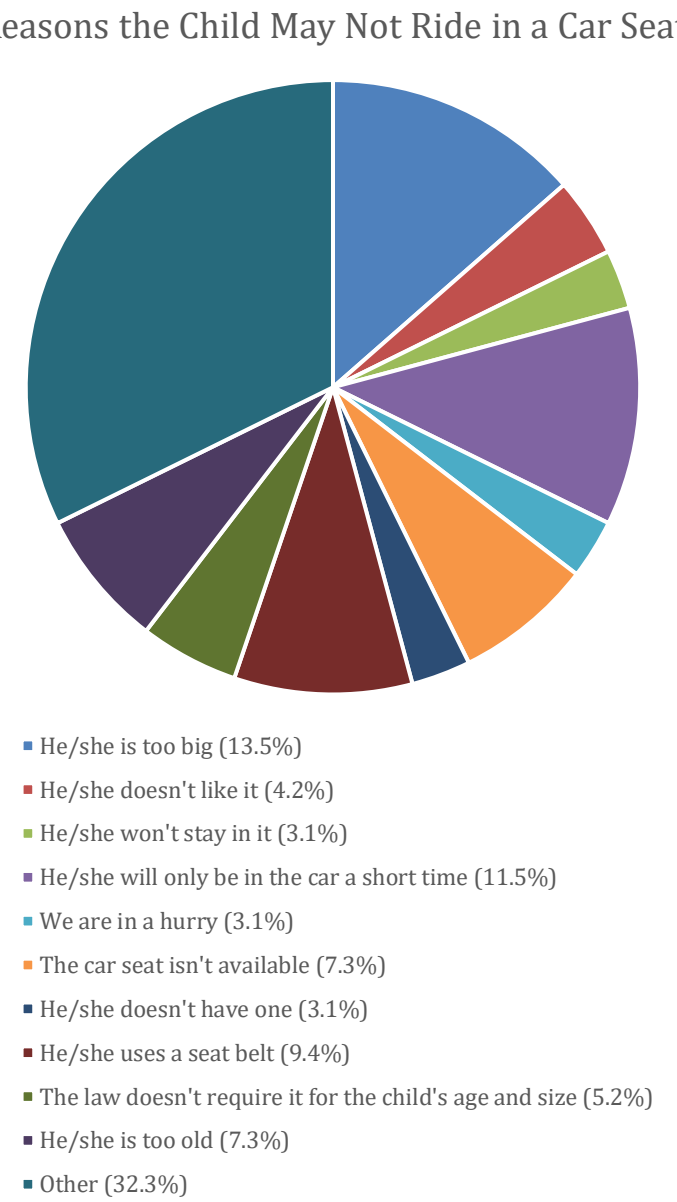


Table 26

Expectations for the Next Child Safety Restraint

Expectations for the Next Child Safety Restraint	Frequency	Percent

Expectations for the Next Child Safety Restraint	Frequency	Percent
Nothing, no car seat nor seat belt	1	1.4
A seat belt only	7	9.7
A booster seat	47	65.3
A different type of car seat that is not a booster seat	16	22.2
Other	1	1.4
Total	72	100.0

Note. This table displays the response to Question 24 of the study.

Research Question 3

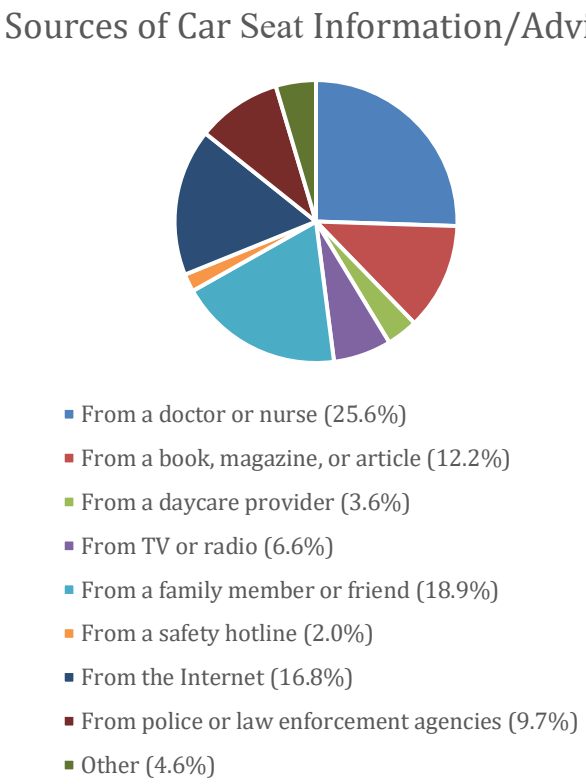
RQ3-Quantitative: What are the perceptions of participants regarding subjective norms of child safety seat use?

The following tables and figures discuss further the subjective norms of parents and caregivers of South Carolina based on survey data. Subjective norms are perceived social influences to perform or not perform a behavior (Steinmetz et al., 2016). This descriptive question explores the perceptions of subjective norms of parents and caregivers of South Carolina regarding child passenger safety. Descriptive data conducted through frequency distributions is presented by the following figures.

Participants reporting gaining child passenger safety information from several sources. Of 72 participants, 25.6% received information from a doctor or nurse, 18.9% from a family member or friend, and 16.8% from the Internet (see Figure 5).

Figure 5

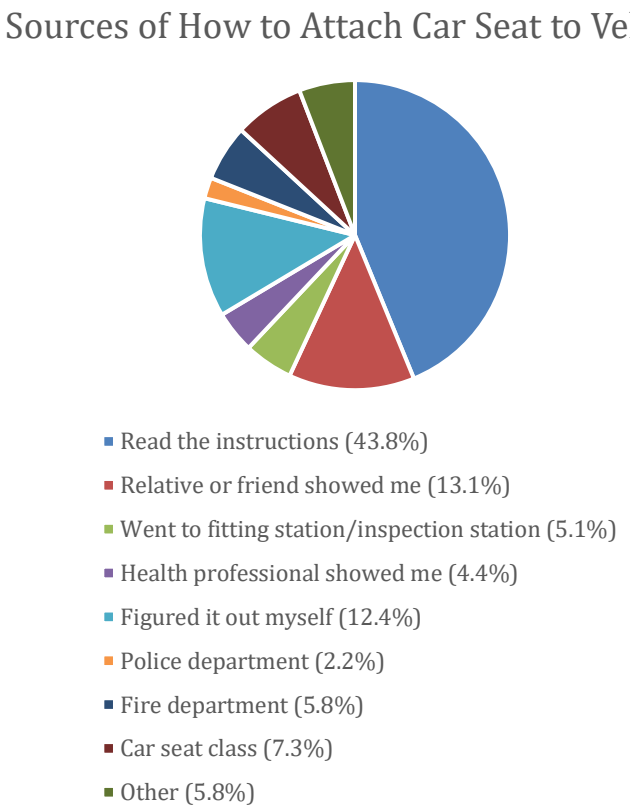
Sources of Car Seat Information/Advice



When examining where participants learned how to attach the car seat to the vehicle, 43.8% of participants reported reading the instructions, 13.1% learned from a relative or friend, and 12.4% figured it out on their own (see Figure 6).

Figure 6

Sources of How to Attach Car Seat to Vehicle



Summary

Data analysis and results show that there is no statistically significant relationship between attitudes of child passenger safety, age of child, age of parent/caregiver, and consistent car seat use among parents and caregivers of South Carolina. However, results indicate that there are higher probabilities of consistent car seat use when these variables are considered. This chapter detailed the data collection, data analysis, and results of the study. Chapter 5 discusses interpretation of results, study limitations, recommendations, and implications.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Childhood injury and death from motor vehicle crashes have been a leading cause for concern in recent years. According to the CDC (2021), this issue is heavily influenced by the use or nonuse of child safety restraints and the parent or caregiver's own seat belt use. This growing public health issue warrants the attention of public health professionals to explore the area of child passenger safety. More than 35% of children who died in a car crash in 2019 were not buckled up (CDC, 2021).

Correct, consistent car seat use reduces the risk of injury by 71-82% when riding in a vehicle (CDC, 2021). Therefore, those undertaking child injury prevention efforts should focus on the use and correct installation of car seats for every child (Huseth-Zosel, 2018; McKenzie et al, 2017; Schwebel et al., 2017). Injuries and deaths can be reduced through focused child passenger safety campaigns aimed at educating parents and caregivers on correct car seat use, research shows (Bachman et al., 2016; McDonald et al., 2018; Will et al., 2015). In this quantitative study, I sought to examine the relationship between attitudes and behaviors of child passenger safety among parents and caregivers of South Carolina.

The independent variables were attitude, age of the child, and age of the parent/caregiver. Using questions from NHTSA's MVOSS 2007 and 2016 surveys, I administered an online survey among South Carolina parents and caregivers. Logistic regression analysis was completed to determine the relationship between consistent car seat use, age of child, age of parent/caregiver, and attitudes of child passenger safety

among respondents. Although study results did not yield a statistically significant relationship between variables, results did show that there are higher odds of consistent car seat use when these factors are considered.

Interpretation of the Findings

In conducting the study, I sought to determine the relationship between attitudes of child passenger safety, age of child, age of parent/caregiver, and consistent car seat use. I also explored the perceptions of subjective norms and perceived behavioral control of parents and caregivers of South Carolina. Study findings support the connection between varying factors and correct car seat use (Bachman et al., 2016; Ojo, 2018). Positive attitudes have a higher probability of influencing parents and caregivers to install and use car seats correctly. Although age did not show a significant impact, there are other factors that can be considered.

In Chapter 2, I discussed previous research on how correct car seat use reduces the risk of injury and death for children in motor vehicle crashes (Kelly et al., 2017; McDonald et al., 2018; Park et al., 2018). Because 46% of car seats are not used correctly (CDC, 2021), there is a need to determine the causes of car seat misuse. This study, although conducted only in South Carolina, can be expanded to a broader population to determine causative factors of child passenger safety behaviors. Attitudes of parents and caregivers are important to consider especially when correct car seat use is not consistently at 100%.

Study results revealed that the child's age and the parent/caregiver's age were not statistically significant factors in relation to consistent car seat use. In comparison to

previous research, Nie et al. (2013) found that a child's age was not a significant predictor in determining correct car seat use among parents and caregivers. McDonald et al. (2018) also found that driver age was not a significant contributing factor to cell phone use while driving children ages 4-10, despite finding that drivers who did not use their normal child safety seat for their child were more likely to use their phone while driving. On the contrary, Vachal (2019) found a child's age, specifically under age 4, to be a significant factor in child safety seat use especially when analyzed in comparison to parent or caregiver seat belt use. Jones et al. (2017) also found caregiver age to be a significant factor in association with children ages 17-19 months riding in a rear-facing car seat.

In this study, parent/caregiver age and the child's age did not have a significant impact on child passenger safety behaviors, similar to the findings of previous research (McDonald et al., 2018; Nie et al., 2013). Although most participants (parents and caregivers) were under the age of 45, there was not a direct correlation to consistent car seat use. However, additional research can be done to further explore the effects of age on child passenger safety behaviors.

I examined the attitudes of parents and caregivers through the lens of the theory of planned behavior. Attitudes and perceptions have an impact on behaviors, according to the theory of planned behavior (Ajzen, 2005). Based on study results, attitudes toward child passenger safety by South Carolina parents and caregivers were not a statistically significant factor when examining the child passenger safety behavior of consistent car seat use. Results are similar to previous research that suggests that parental perceptions

are a poor indicator of misuse (Fong et al., 2017). However, using the theory of planned behavior, Lewis et al. (2016) found that positive attitudes among parents promoted greater intention toward self-checking child safety seats. Also, Liu et al. (2018) found that false beliefs decrease consistent child safety seat use. Although Fong et al. (2017) and Liu et al. (2018) do not cite a specific theoretical foundation, perceptions, attitudes, and beliefs about child passenger safety are found to be important topics to consider.

There are several other theories that have been used in child passenger safety research, including the parallel process model (Thornton et al., 2017), conflict theory of decision-making (Shimony-Kanat et al., 2018), and the information processing theory (Krishen et al., 2016). Using the parallel process model, Thornton et al. (2017) found that child safety seat use is associated with risk of maternal fear and worry. Likewise, using the information processing theory and perceived price and folk theories-of-mind, Krishen et al. (2016) found evidence showing that consumers will often choose a lower priced car seat and compromise safety even if they have sufficient child passenger safety knowledge. However, the theory of planned behavior was best for this study's purpose of exploring attitudes, perceptions, and beliefs of parents and caregivers in relation to car seat use in South Carolina. This theory provided a look into the comprehensive view of parents and caregivers of South Carolina regarding child safety seats. Despite the use of multiple theories in previous research, parent and caregiver attitudes would still be a factor to further explore in child passenger safety research, especially on a larger scale.

I also explored other concepts of the theory of planned behavior, perceived behavioral control and subjective norm, in this study to achieve its purpose. Perceived

behavioral control is a person's confidence in performing a behavior that shapes their decision to act (Ajzen, 2005). Perceived behavioral control is influenced by attitudes and subjective norms. Although most participants were in strong agreement regarding the importance of correct car seat installation and acknowledged the importance of it, there were varying perceptions to the ease or difficulty of car seat installation. Most reported that car seat installation instructions and installation itself were very easy or somewhat easy, but there were still over 20% of participants who reported a higher level of difficulty. However, confidence in correct car seat installation was relatively high among participants with most feeling very confident that the car seat was correctly attached to the vehicle. Correct car seat installation was not visually inspected in this study, but these findings confirm previous research showing that child passenger safety knowledge and confidence does not equate correct car seat use (Burstein et al., 2017; Fong et al., 2017; Jones et al. 2017). Further exploration into confidence and car seat installation behaviors can be done to better understand this relationship.

Reported reasons for difficulty in attaching the car seat to the vehicle include adjusting the seat belt to ensure it is tight enough, having to put their hand/arm through the back of the car seat to attach to the vehicle, and fitting the seatbelt through the car seat hole/loop. Likewise, Bachman et al. (2016) had similar findings when observing child restraint misuse, such as improper use of the top tether, seatbelts not being in locking mode, loose car seat installations, and loose harness straps. These issues are mechanical in nature, but also vital to correct child safety seat installation. It is interesting to note that participants were able to identify when the car seat was not attached correctly

and how it occurred, including the car seat being put in by someone other than themselves, the car seat being moved between cars, and the child loosening the seat. This observation points to the importance of understanding current knowledge and subjective norms of parents and caregivers regarding child passenger safety.

According to survey results, buckling the child into the car seat presented challenges as well for parents and caregivers of South Carolina. Difficulty with adjusting shoulder straps to fit properly, the child not sitting still, and bulky winter clothing were the most reported reasons for difficulty (Bachman et al., 2016). However, these exact reasons are not prominent when examining why the child may not ride in a car seat. The child being too big, being in the car for a short time, and using a seat belt are primary reasons for this issue as reported by study participants. McDonald et al. (2018) found similar reasons for not buckling the child in the car seat each ride, such as driving for a short distance, using a rental or friend's car, and carpooling. It is also important to note that over 85% of participants reported their belief that buckling the child into the car seat is easy to do. Again, further exploration into the relationship between confidence and performing child passenger safety behaviors are needed.

Subjective norms express perceived social influences to perform or not perform a behavior which predicts intention (Steinmetz et al., 2016). Most participants received child passenger safety information or advice from medical professionals, family members or friends, and the internet. Additionally, sources of information and education were explored in this study to understand where parents and caregivers learned about child passenger safety to further understand subjective norms. Most participants learned how to

attach the car seat by reading the instructions, learning from a relative or friend, and by figuring it out for themselves. However, previous research suggests the increased need for child passenger safety education to come from medical professionals and health educators, such as doctors, nurses, and child passenger safety technicians (Burstein et al., 2017; Jones et al., 2017; Schwebel et al., 2017). Participant responses reveal the social influences on correct child passenger safety behaviors and should be considered when designing child passenger safety education programs.

Limitations of the Study

As an online, cross-sectional survey, there were several limitations in the study affecting generalization and sampling. After 4 months of survey distribution, 85 responses were received with 72 surveys fully completed after multiple efforts to reach a larger sample size. The survey was limited in distribution to social media and emailed invitations due to lockdowns and restrictions set in place during the coronavirus pandemic. Original research plans included distributing the survey at local businesses. Due to these restrictions, which also impacted day care attendance, survey distribution was limited to digital outlets. Additionally, to increase survey participation, outreach was made to child passenger safety groups and local Safe Kids coalitions in South Carolina. Although not ideal due to the level of knowledge and interest in child passenger safety, it was still important to capture the responses of this population.

Study participants did not fully represent the current demographics of South Carolina, due to a smaller sample size, which also limits generalizability. According to the United States Census Bureau (2021), as of July 2019, 51.6% of South Carolina's

population is female, 68.6% identify as Caucasian/White, 27% identify as Black, and 6% identify as Hispanic or Latino. However, 58.3% of study participants identified as Caucasian/White, 38.9% as Black/African American, 2.8% as Hispanic/Latino or Other, and 93.1% of participants identifying as female.

There was also a limitation with self-reported responses. Because the survey was completed online, participants were able to report their responses individually. Due to the research topic of child passenger safety, participants were also subject to bias at the start of the survey once aware of the topic at hand. This bias could have caused them to answer in a way that expresses what they should do versus their actual behaviors.

This study was based on the statistic of one child under the age of 6 having serious injury or death due to a motor vehicle crash every nine to ten days in South Carolina (SCDPS, 2017). The study survey was designed based on this statistic and surveyed parents with children aged 6 and under about their child passenger safety behaviors and attitudes. However, as the study progressed, new data released indicates that, as of 2019, one child under age eight is injured or killed every five to six days (SCDPS, 2019). This statistic indicates that more research needs to be done to decrease childhood motor vehicle crash injury and death.

Recommendations

Despite the limitations of this study, there are several considerations to extend and expand child passenger safety research. First, there are various identified barriers to correct car seat use including perceived ease of use, lack of knowledge, cost, and lack of awareness of inspection stations and child passenger safety technician services (Aita, et

al., 2016; Bohman, et al., 2016; Krishen, et al., 2016; Levi et al., 2020). Further research can be conducted to explore additional factors and barriers to correct car seat use, including attitudes and perceptions of parents and caregivers. A deeper dive can be done to understand how parent and caregiver attitudes affect consistency of correct child passenger safety behaviors. This can be achieved by conducting research with a larger sample and targeted survey questions.

Furthermore, exploration of the relationship between age and child passenger safety can be expanded. Previous research has revealed different results (Nie et al., 2013; Vachal, 2019) about whether age is a significant predictor of car seat use. Continued study of the age of the child and the age of the parent or caregiver, in relation to child passenger safety is warranted to enhance current education programs and to promote behavior retention. Future research can focus on the impacts of children aged eight and under to include all levels of child passenger safety. As child passenger safety laws change, research can be done to get a comprehensive understanding of how to improve education programs that promote effective change.

Additionally, researchers can explore the concepts of the theory of planned behavior in relation to child passenger safety, car seat use, and other causative factors. They can explore attitudes, subjective norms, behavioral intentions, and perceived behavioral control. Such research, along with that on additional factors such as ethnic/cultural influences, access to child passenger safety education, geographical location, and so forth, can provide child passenger safety professionals with a deeper understanding of how to improve child passenger safety education and outreach.

Implications

This study sought to identify the relationship between child passenger safety behaviors, age of the child, age of the parent or caregiver, and attitudes of parents and caregivers of South Carolina. Study results did not reveal a statistically significant relationship but suggest that there is a higher probability of consistent car seat use when positive attitudes are increased. This study took the first step in understanding how attitudes influence child passenger safety behaviors, along with exploring perceptions of subjective norms and perceived behavioral control among participants. Because car seat misuse increases the risk of motor vehicle crash injury and death among children, it is imperative to explore ways to improve child passenger safety in the United States.

This study has several potential impacts on positive social change. First, this study promotes the need for more positive attitudes toward child passenger safety which could potentially help health educators develop interventions that could improve child passenger safety knowledge in parents and caregivers. As a result, these individuals will have greater awareness of the importance of safer rides with their children to protect them from motor vehicle crash injury and death. This could also influence parents and caregivers to be positive role models for their children by wearing their seat belts consistently, ensuring a safe ride for everyone in the vehicle. Additionally, this study helped parents and caregivers consider reasons for car seat installation difficulty and difficulty of buckling their child into the car seat. These barriers can be further addressed by health educators and child passenger safety technicians in targeted child passenger safety programs.

Organizationally, child passenger safety professionals could be equipped to educate parents and caregivers. More targeted child passenger safety programs could be developed to ensure child passenger safety knowledge and behavior retention. Improvements to current child passenger safety programs could include identifying barriers to car seat use, innovative education strategies, and expansion of access to child safety seat checks. Topics including how to select the correct car seat, current state laws, understanding car seat manufacturer's guides, and how to properly install car seats in various types of vehicles can also be discussed. Lastly, implications for positive social change includes educating practitioners to educate more people about child seat safety which will result in more caregivers following child passenger safety legislation and less childhood injuries and deaths from motor vehicle crashes on the nation's roads.

Recommendations for practice include creating targeted child passenger safety programs that are more effective in helping parents remain consistent with child passenger safety behaviors. As a public health professional, I would contribute to the health education field by first assessing current child passenger safety programs. Then, I would develop improved education programs that promote behavior retention and increased child passenger safety awareness. These new child passenger safety programs would focus on improved technique for car seat installation and buckling the child, addressing the barriers to correct installation such as having difficulty tightening the seatbelt and adjusting shoulder straps to fit properly. Through these programs, the confidence of parents and caregivers to install the car seat will match their technique and ability to install a car seat correctly which in turn improves the quality of child passenger

safety education being shared among relatives and friends. I would also work to improve and/or develop targeted programs to increase child passenger safety awareness through grassroot efforts and collaborations with local SafeKids coalitions. Community events and general education classes can be scheduled to promote child passenger safety and the importance of correct car seat installation.

Additionally, to further my work in understanding attitudes, barriers, subjective norms, and perceived behavioral control, I would seek to make a personal connection with parents and caregivers. For example, one-on-one appointments can be set with parents and caregivers so that further evaluation can be completed and a true understanding of attitudes toward car seats and barriers to consistent car seat use can be achieved. With this information, future child passenger safety education programs can address identified attitudes, beliefs, and barriers to child safety seat use to aid the public health goal of zero childhood injuries and fatalities on U.S. roads. Public health professionals and health educators across the United States can also seek to better understand parents' and caregivers' barriers to child passenger safety behaviors and address as appropriate, especially at car seat inspection stations.

Conclusion

Although there are many cars on the road each day, only 54% of car seats are used correctly (CDC, 2021). Motor vehicle crashes are a leading cause of injury and death for children (CDC, 2021), which means that child passenger safety is an emergent public health need. Because parents and caregivers are responsible for buckling their children in, it is imperative to identify attitudes to child passenger safety. Although not

determined to be a strong indicator of consistent car seat use, parent and caregiver attitudes are more likely to impact car seat use especially when those attitudes are positive toward child passenger safety.

Child passenger safety has evolved along with technology in expanding the types of car seats available to consumers. Despite this, there is not a one size fits all approach to child passenger safety. From varying state legislation, sources of information, barriers, perceptions, and beliefs, parents and caregivers ultimately make the decision to engage in correct child safety behaviors. Individual factors, such as attitudes, subjective norms, and perceived behavioral control, contributing to car seat misuse must be identified and examined so that targeted programs can be developed and refined to ensure that all children ride safely every time.

As this study has found, positive attitudes toward child passenger safety increases the likelihood of consistent car seat use. Although parents and caregivers expressed confidence in car seat installation and buckling their child into their car seat, there are still perceptions of difficulty that can hinder their consistency. Zero childhood injuries and deaths from motor vehicle crashes should be the reality, but, unfortunately, there is more work to be done. The next generation, ultimately, depends on it.

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Appendix A: Child Passenger Safety Attitudes and Behaviors Survey

Pre-Screening Questions:

1. Are you a resident of South Carolina?
   Yes
   No

   If no, message of thanks for participating.
   Thanks for participating in our survey!

   If yes, move to question 2.

2. In the past 12 months, have you driven with any children under age 6?
   Yes
   No

   If no, message of thanks for participating.

   Thanks for participating in our survey!

   If yes, move to question 3

3. Informed Consent
   Agree
   Disagree

   If agree, move to question 3.

   If no, message of thanks for participating.

   Thanks for participating in our survey!

Survey Questions:

4. How often do you drive with children under age 6?
   Almost every day
   A few days a week
   A few days a month
   A few days a year

5. What is your relationship to the child or children under age 6 that you at least sometimes drive with?
   Child/stepchild

Brother/sister
Grandchild
Other relative
Non-relative

6. Correctly installing a car seat for my child for every ride is important.
   Strongly agree
   Agree
   Neither agree nor disagree
   Disagree
   Strongly disagree

7. It is important to buckle my child in their car seat correctly for each ride.
   Strongly agree
   Agree
   Neither agree nor disagree
   Disagree
   Strongly disagree

   Of the children that you at least sometimes drive under age 6, identify the one who had the most recent birthday. Please answer the following questions for this child.

   The most recent birthday is a method of random selection important to producing accurate estimates.

8. What is the age of the child you identified?

9. When you are driving and the child rides in the vehicle with you, how often does he/she ride in a car seat? Car seats include booster seats. Would you say he/she rides in a car seat…?
   All of the time
   Most of the time
   Some of the time
   Rarely
   The child never rides in a car seat.

10. When was the last time the child DID NOT ride in a car seat when you were driving? Was it?
    Today
    Within the past week
    Within the past month
    Within the past 12 months

A year or more ago
Never, the child has always ridden in a car seat

11. When the child rides in the car seat, does the child wear harness straps that go over the shoulders and buckle between the legs?
    Yes
    No

12. Is the child usually in a front-facing position when riding in the car seat, where the child faces towards the front of the vehicle? Or is the child usually in a rear-facing position when riding in the car seat, where the child faces towards the rear of the vehicle?
    Front-facing
    Rear-facing

13. Where would you say it is safest to place a car seat in the vehicle: in the front seat or in the back seat?
    Front seat
    Back seat
    Depends on type of car seat

14. Did you ever read or hear of any information or receive any advice about the need to use car seats from any of the following sources? Did you get any information…? Please check all that apply.
    From a doctor or nurse
    From a book, magazine, or article
    From a daycare provider
    From TV or radio
    From a family member or friend
    From a safety hotline
    From the Internet
    From police or law enforcement agencies

15. How did you learn to attach the car seat to the vehicle? Did you…? Please check all that apply.
    Read the instructions
    Relative or friend showed me
    Went to fitting station/inspection station
    Health professional showed me
    Figured it out myself
    Car seat came attached to car
    TV program
    Police department

Fire department
Car seat class

16. How easy or difficult were the instructions to install the car seat?
    Very easy
    Somewhat easy
    Neither easy or difficult
    Somewhat difficult
    Very difficult

17. How easy or difficult is it for you to attach the child car seat to the vehicle you usually drive?
    Very easy
    Somewhat easy
    Neither easy nor difficult
    Somewhat difficult
    Very difficult

18. What is difficult about attaching the child car seat to the vehicle? Please select all that apply.
    Fitting the seatbelt through the car seat hole/loop
    Hooking it/attaching to seat/buckle
    Adjusting seatbelt making sure it is tight enough
    Not enough room to maneuver/design of backseat makes it awkward
    I have to put my hand/arm through back of child car seat to attach
    Other (open-ended)

19. Have you ever driven with the child in the car seat and later found that the car seat was not securely attached?
    Yes
    No

    19a. If yes, why did this happen? Was it because…? Please select all that apply.
        I forgot/I wasn't paying attention
        It's hard to attach the car seat tightly enough
        The car seat was put in by someone else who did not attach it right
        The car was moved between cars or within the same car
        The child in the seat loosened it
        Another child loosened the seat
        Other (open-ended)

20. When you attach the car seat to your vehicle, how confident do you usually feel that the car seat is correctly attached?

Very confident
Somewhat confident
Not confident

21. How easy is it for you to properly buckle your child into the child car seat?
    Very easy
    Somewhat easy
    Neither easy or difficult
    Somewhat difficult
    Very difficult

22. What is difficult about buckling your child into the child car seat?
    Hard to snap/buckle
    Adjusting shoulder straps to fit properly/tightness of seat
    Heavy/bulky/winter clothing makes it difficult to buckle child
    Child doesn't sit still/down/uncooperative/squirms
    Difficult for adult to crawl/squeeze into rear of vehicle to buckle
    Other (open-ended)

23. Please indicate which of the following statements are true. Again, car seats include booster seats. When my child doesn't ride in a car seat, it is sometimes because… Please select all that apply.
    He/she is too big
    He/she doesn't like it
    He/she won't stay in it
    There is no room for the seat in the car
    He/she will only be in the car a short time
    We are in a hurry
    The car seat isn't available
    He/she doesn't have one
    He/she uses a seat belt
    The law doesn't require it for the child's age and size
    He/she is too old
    Other (open-ended)

24. When your child outgrows his/her current car seat, what do you expect him/her to use when riding in a motor vehicle?
    A different type of car seat that is not a booster seat
    A booster seat
    A seat belt only
    Nothing, no car seat nor seat belt
    Other (open-ended)

25. What is your age?
    18-25
    26-35
    36-45
    46-60
    Over 60

26. What is your race/ethnicity?
    White
    Hispanic or Latino
    Black or African American
    Native American or American Indian
    Asian/ Pacific Islander
    Other

27. What is your gender?
    Male
    Female
    Other

28. What region of South Carolina do you reside in?
    Lowcountry
    Midlands
    Upstate
    Pee Dee

Appendix B: Authorization to Use National Highway Traffic Safety Administration Survey Questions

NHTSA Service Desk <noreply@telesishq.com>
Mon 3/9/2020 5:44 PM
To: Latoya Wider <redacted>

@Latoya Wider

Good Day Ms. Wider,

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Thank you,

NHTSA.dot.gov Response Team

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