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Effectiveness of Child Passenger Safety Information for the Safe Transportation of Children

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16. Abstract Background: Parents and caregivers struggle to comply with child passenger safety (CPS) recommendations, and frequently make mistakes when choosing and installing restraints. The objective of this project was to develop and test various methods of framing CPS recommendations, and to determine how to best communicate CPS information to parents/caregivers. Method: Two studies were conducted. In Study 1, a 5 (Message Group) X 2 (Time Periods) randomized experiment was conducted in which 300 parent participants viewed one of four flyer versions or a no-education control version. The four flyers all communicated the same CPS recommendations, but employed different emphasis frames: (1) seat types; (2) premature graduation; (3) risk-reduction rationale; or (4) child age. In a fifth no-education (control) condition, participants viewed marketing material. Six informal discussion groups (N = 32) were held as a follow-up task to Study 1 in order to further examine messaging needs and garner feedback. For Study 2, a 4 (Information Group) X 2 (Time Periods) randomized experiment was conducted in which 240 parent participants viewed one of four flyers that communicated CPS recommendations presented either (1) alone, (2) with installation tips, (3) with normative information, or (4) with installation tips and normative information. For both main studies, participants recruited from northeastern and southeastern cities in the United States responded to computerized pre-post surveys that measured CPS knowledge, attitudes, perceptions of efficacy and risk, and behavioral intentions. Results: Study 1 results indicated that CPS recommendations that emphasize the risk-reducing rationale for the recommendations and use action-oriented headers are most effective. Study 2 indicated that parents with higher preexisting CPS awareness and perceptions attend to and benefit more from simplified reminders of recommendations (e.g., information updates), whereas those with lower preexisting CPS awareness and perceptions benefit more broadly from detailed recommendations that include extra information such as installation tips. Conclusions: This research provides insight for increasing caregiver understanding and compliance with CPS information. Recommendations for the field include communicating the rationale behind the information given, using behavior-based directives in headers, avoiding age-based headers, emphasizing back seat positioning, formatting for reduced text, creating novice-user and experienced-user versions of material, combining communications and scientist expertise, and conducting additional research.			
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Executive Summary

Introduction

Background. Age- and size-appropriate child restraints and rear seating dramatically reduce injury in vehicle crashes. Yet, parents and caregivers struggle to comply with child passenger safety (CPS) recommendations, and frequently make mistakes when choosing and installing restraints. A large number of studies over the past decade have involved some type of intervention to increase the correct use of child restraints, including booster seats and seat belts. Most of these efforts included educational material and messages as part of the interventions. However, very few studies have evaluated the content or design of the messaging associated with these interventions.

Objectives. This document reports the results of two studies examining child passenger safety messages and types of information on which to focus for maximum effectiveness. The goal of the first study was to determine how to best communicate child passenger safety recommendations to parents/caregivers, and which information to emphasize. Thus, this study investigated various ways of framing child passenger safety recommendations, and examined the relative effectiveness on parents/caregivers' knowledge, attitudes, and behavioral intentions related to best practices and proper use of child restraints. Note that the base child passenger safety recommendations were consistent across conditions in this study, but several versions were tested and each employed a different emphasis frame. Emphasis framing is a persuasion technique that involves placing focus on specific aspects of the content in order to encourage or discourage certain interpretations of the content.

The goal of the second study was to investigate child passenger safety recommendations delivered in combination with other types of CPS information, and to determine the type and amount of extra information to include without losing the clarity and power of the key recommendations. Note that the base child passenger safety recommendations were consistent across conditions in this study as well, but several versions were tested with added installation and/or normative information. The added effectiveness of providing installation tips or communicating societal CPS norms to parents (e.g., "3 out of 4 safety seats are misused") with the basic recommendations in a one-page flyer format was not known and required evaluation to determine the relative benefits or detriments of additional information provided with the recommendations. The findings of this research are intended to inform the development of more effective messages for child passenger safety.

Literature Review. The project began with a literature review of studies evaluating CPS message content. A thorough search in highway safety, public health, psychology/sociology, and educational databases was conducted to identify relevant research studies. It was found that most of the studies identified focused on the effectiveness of intervention programs designed to increase the use of child restraints and booster seats. While most of the studies included educational materials and messages as a part of their interventions, very few of the studies identified dealt specifically with an evaluation of the messaging associated with these interventions.

From research that specifically studied messaging associated with CPS interventions, messages that increase parents' and caregivers' feelings of risk and provide succinct and concrete educational messages about the injury prevention benefits of child restraints are most likely to lead to increased use of restraints for children. Combating caregivers' reduced perception of risk for motor vehicle injury will likely be difficult since the risk of being involved in a crash on any given trip in the vehicle is very small that in turn reinforces the perception of minimal risk. Giving parents and caregivers confidence in their ability to minimize this risk is also important.

Methodology

Study Design and Experimental Conditions. For Study 1, a 5 (Message Group) X 2 (Time Periods) randomized experiment was conducted in which 300 parent participants answered a pre-survey, viewed one of four flyer versions or a no-education control version, and completed a post-survey. Computerized surveys measured CPS knowledge, attitudes, perceptions of efficacy and risk, and behavioral intentions. The four flyers compared in this study all communicated the same CPS recommendations in a one-page print flyer, but several versions were tested that each employed a different emphasis frame: (1) recommendations organized by the natural progression of seat types, (2) recommendations that focused on avoiding premature graduation, (3) recommendations that explained the risk-reduction rationale behind the information given, or (4) recommendations that were organized by age. In a fifth no-education (control) condition, participants viewed marketing material.

After the completion of Study 1, six informal discussion groups were held with 32 additional parents as a follow-up task to the results of Study 1 in order to further examine messaging needs and garner feedback to improve the messages for audience readability, clarity of message, and visual appeal.

For Study 2, a 4 (Information Group) X 2 (Time Periods) randomized experiment was conducted in which 240 parent participants answered a pre-survey, viewed one of four informational flyer versions, and completed a post-survey. Computerized surveys measured CPS knowledge, attitudes, perceptions of efficacy and risk, and behavioral intentions. The four flyers compared in this study all communicated the same CPS recommendations in a one-page print flyer, but several versions were tested either alone or in combination with other types of CPS information: (1) recommendations presented alone, (2) recommendations presented with installation tips, (3) recommendations presented with normative information, or (4) recommendations presented with installation tips and normative information.

Recruitment and Testing. Both studies took place in the suburbs of Philadelphia, Pennsylvania (the Delaware Valley area) and in Norfolk, Virginia, and its suburbs (the Hampton Roads area). These two cities, each in the center of a large metropolitan statistical area (MSA) in Northeastern and Southeastern regions of the United States, were selected to increase recruitment from socio-demographically diverse populations and to increase generalizability of the study findings. Study 1 recruited 150 participants from each region (300 total sample), with an additional 32 participants recruited from the Norfolk site for informal discussion groups. Study 2 recruited 120 participants from each region (240 total sample). Both sites used various methods to advertise the study to parents or caregivers of children under age 13, including delivering recruitment flyers via social media to numerous parent clubs, online parent newspapers, and child care facility organizations, with additional assistance from other child-focused agencies to deliver

recruitment flyers directly to parents. Participants were screened to meet the following qualifications:

- at least 18 years old,
- parent or legal guardian of a child younger than 13 years of age (younger than 8 years old for Study 2),
- able to understand English language text displayed on a computer screen, and
- able to commute to the testing site.

Participants of Study 1 were also excluded from participating in Study 2. A secure, web-based study protocol was used for the studies in which participants (randomized to condition upon login) viewed a series of user-friendly screens at their own pace that automatically led them through

- an informed consent document,
- pre-test measures,
- study material specific to condition assignment, and
- post-test measures.

Sessions were conducted in person in computer labs, and a study facilitator was present at all sessions to assist as needed. Secure offsite monitoring of the anonymously recorded data was conducted in real time as well. Each participant was compensated with a \$50 Wal-Mart gift card for participation in the study.

Measures. In both studies, several measurement scales were used to assess

- appropriateness of restraint selection,
- knowledge of restraints,
- perceived efficacy and threat,
- attitudes and intentions,
- judgments of flyer relevance and acceptability, and
- sample demographics.

Study 2 included an additional subscale measuring child restraint installation knowledge. To accurately assess changes in knowledge and perceptions after exposure to the independent variable, most of the measures were asked both at pre-test and post-test. The exceptions were the demographics questions and judgments of relevance and acceptability, which were asked only once (at post-test).

Results

Participants. Three hundred parents and caregivers of children aged birth to 12 participated in Study 1. Mean parent age was 36 years old, with 89 percent of the participants being female. Thirty-four percent of participants were Black and 61 percent were White. Five percent of participants were Hispanic. Fifty-eight percent of participants reported family incomes between \$25,000-\$99,999, with 12 percent below \$25,000 and 23 percent above \$100,000. Demographics did not differ by flyer version, and survey responses did not differ by location.

An additional 32 parents (28 females and 4 males) ranging in age from 22 to 65 participated in six informal discussion groups. Fifty-six percent of discussion group participants were Black, 34 percent were White, and the remaining 10 percent identified as Asian, Hispanic, or other/ two or more races.

For Study 2, there were 240 parents and caregivers of children aged birth to 7 years old participated in the research. Mean parent age was 34, with 91 percent of the participants being female. Twenty-three percent of participants were Black and 72 percent were White. Three percent of participants were Hispanic. Fifty-five percent of participants reported family incomes between \$25,000-\$99,999, with 20 percent below \$25,000 and 18 percent above \$100,000. Demographics did not differ by flyer version, and survey responses did not differ by location.

Main Analyses. For both studies, analyses of covariance (ANCOVA) and pair-wise comparisons with Sidak's adjustment for Type 1 error were used to determine the relationship between group assignment and post-test scores after adjusting for pre-test scores and the interaction between the independent factors when significant. This analysis compared differences among post-scores while controlling for pre-scores.

Study 1. For Study 1, post-test score means revealed a significant main effect for flyer version on 11 subscales after adjusting for pre-test scores:.

(a) Restraint Selection Score (b) Back Seat Knowledge (c) Booster Knowledge; (d) Rear-Facing Knowledge; (e) Total Efficacy; (f) Self-Efficacy; (g) Overall Attitudes; (h) Booster Attitudes; (i) Forward-Facing Attitudes; (j) Rear-Facing Attitudes; and (k) Stated Intentions.

The Risk Reduction Rationale flyer outperformed other flyers for many subscales, and significantly differed from control for the most subscales, including

- restraint selection,
- back seat knowledge,
- rear-facing knowledge and attitudes,
- booster attitudes,
- total efficacy,
- overall attitudes, and
- stated intentions.

The Premature Graduation flyer performed best for efficacy subscales, but did not significantly differ from the Risk Reduction Rationale flyer for total efficacy. For changes in self-efficacy, the Premature Graduation flyer outperformed all other flyers. The Natural Progression flyer performed best for attitudes subscales, but did not significantly differ from the Risk Reduction Rationale flyer. The Age-Based flyer performed significantly better than control only for changes in overall attitudes and stated intentions. However, the Age-Based flyer was outperformed by changes produced by the Risk Reduction Rationale flyer for restraint selection score. All flyers were rated favorably, with no significant differences among flyers for parents' ratings.

Qualitative results from informal discussion groups with parents mirrored empirical results of Study 1 in that the majority of parents (69%) favored the Risk Reduction Rationale version of the

flyer, mostly due to its formatting (i.e., bullets and flow chart/column setup) and its inclusion of the *reasons* behind the recommendations for each stage in simple “Here’s What to Do” and “Here’s Why” sections. Parents suggested numerous improvements to the flyer, including reducing the amount of information and using brighter and varied colors and fonts to accentuate key points and break up the information.

Study 2. For Study 2, post-test score means revealed a significant main effect for flyer version on 7 subscales after adjusting for pre-test scores:

(a) Restraint Selection Score; (b) Total Threat Score; (c) Total Threat Plus Score; (d) Susceptibility; (e) Self-Efficacy; (g) General Attitudes; and (h) Installation Score

Significant interactions with pre-test scores were present for each main effect, indicating that the effectiveness of each flyer was heavily dependent upon the pre-test score of the participant. That is, the amount of “extra” information that is helpful on a flyer differs greatly for parents with low versus high preexisting child passenger safety awareness, efficacy, and threat perceptions. Specifically, the Recommendations Plus Installation version resulted in greater changes in Restraint Selection Scores compared to Recommendations Alone and Recommendations Plus Norms versions for low pre-test scorers only. Among high pre-test scorers, the opposite was true, with the Recommendations Alone version resulting in greater changes in scores. For Threat Subscales, a similar pattern emerged, with the Recommendations Plus Installation plus Norms (All Combined) version leading to greater changes than all other versions only for low pre-test scorers. However, participants with high perceptions of threat at pre-test benefitted the least from the All Combined version compared to all other versions. The pattern of results indicates that in many cases, higher scoring participants at pre-test benefitted more from a flyer that provided the basic recommendations, or just the recommendations and normative information. On the other hand, flyers that included not only the basic recommendations, but also installation information or installation and normative information, produced greater changes in scores for parents with lower incoming scores.

For Self-Efficacy subscales, patterns differed for high versus low scorers, but the divisive content appeared to be the normative information. Flyers with normative information (Recommendations plus Normative Information version and Recommendations Plus Installation plus Normative Information version) were most helpful compared to other flyer versions for participants with low incoming self-efficacy, while these same versions were least helpful among those with high incoming self-efficacy. Finally, the flyers that led to the best performance on the Installation subscale also varied depending on incoming knowledge, but in general, those flyers with installation information led to greater increases in scores. All Study 2 materials were rated favorably, with no significant differences among flyers for parents’ ratings.

Conclusions

This research provides insight for increasing caregiver understanding and compliance with CPS information. Study 1 indicated that CPS recommendations that emphasize the risk-reducing rationale for the recommendations are most effective. Analyses of covariance and pairwise comparisons indicated the Risk-Reduction Rationale flyer outperformed other flyers for many subscales, and significantly differed from no-education control for the most subscales, including restraint selection, back seat knowledge, rear-facing knowledge and attitudes, booster attitudes,

total efficacy, overall attitudes, and stated intentions. The majority of parents in discussion groups also favored the Risk Reduction Rationale version of the flyer due to its inclusion of the *reasons* behind the recommendations for each stage in simple “Here’s What to Do” and “Here’s Why” sections. For increasing participants’ self-efficacy related to child passenger safety, use of headers that state clearly and succinctly what needs to be done (e.g., “use booster seats until the belt fits”) are most effective. The Premature Graduation flyer, which used action-oriented headers, outperformed all other flyers for producing changes in self-efficacy.

In Study 2, parents’ preexisting child passenger safety awareness, efficacy, and threat perceptions affected how they responded to the amount of CPS information provided to them in the educational messages. In general, those with higher awareness and perceptions attended to and benefited more from simplified reminders of recommendations, whereas those with lower awareness and perceptions benefitted more broadly from detailed recommendations that included extra information such as installation tips. For Self-Efficacy subscales, patterns again differed for high versus low scorers, but the important content that separated these groups appeared to be the normative information. Flyers with normative information were most helpful compared to other flyer versions for participants with low incoming self-efficacy, while these same versions were least helpful among those with high incoming self-efficacy.

Recommendations. The objective of this project was to develop and test various methods of framing child passenger safety recommendations, and to determine how to best communicate child passenger safety information to parents/caregivers, and which information to include and emphasize. A number of recommendations for the field are evident from this research, and include:

(a) communicating the rationale behind the information given; (b) using behavior-based directives in headers; (c) avoiding age-based headers; (d) integrating the need for back seat positioning throughout recommendations; (e) using formatting styles that accentuate key points and significantly reduce text; (f) creating novice-user and experienced-user versions of materials; (g) combining expertise of communications professionals and behavioral scientists in message design; and (f) conducting additional research to design more effective CPS messages.

1.0 Introduction

1.1 Background

Age-appropriate restraints and rear seating dramatically reduce injury in a collision (Arbogast, Jermakian, Kallan, & Durbin, 2009; Durbin, Chen, Smith, Elliott, & Winston, 2005; National Highway Traffic Safety Administration, 2010; Rice & Anderson, 2009). The primary reasons for injuries to children restrained at the time of motor vehicle crashes relate to prematurely turning a child forward, premature graduation from harnessed safety seats to booster seats, premature graduation from booster seats to adult safety belts, misuse of safety restraints and seat belts, and children seated in the front seat of the vehicle (Arbogast et al., 2009; Durbin et al., 2005; Henary et al., 2007; Lennon, Siskind, & Haworth, 2008; Rice & Anderson, 2009). Compared to appropriately restrained children, unrestrained children are 3 times more likely to sustain injury in a crash, and children traveling in *inappropriate* restraints for their size are at 2 times the risk of injury (Durbin et al., 2005). Rear seating offers independent and additive safety protections in a crash (Durbin et al., 2005; Lennon et al., 2008).

A large number of studies over the past decade have involved some type of intervention to increase the correct use of child restraints, including booster seats and seat belts. Most of these efforts included educational materials and messages as part of the interventions (Dellinger, Sleet, Shults, & Rinehart, 2007; Dukehart, Walker, Lococo, Decina, & Staplin, 2007; Ebel, Koepsell, Bennett, & Rivara, 2003; King, Monroe, Applegate, & Cole-Farmer, 2007; Snowdon et al., 2008; Weiss-Laxer, Mello, & Nolan, 2009; Winston, Erkoboni, & Xie, 2007; Zaza, Sleet, Thompson, Sosin, & Bolen, 2001). However, very few of the studies identified dealt specifically with an evaluation of the messaging associated with these interventions. For those studies that looked at messaging, research suggests that messages that increase parents' feelings of vulnerability to risk and provide succinct and concrete educational messages about the injury prevention benefits of car seats will be most likely to increase correct use of child restraints for children (Will, 2005; Will, Sabo, & Porter, 2009; Winston et al., 2007). Research also indicates it is important to depict negative consequences in parental safety messages in order to effectively communicate danger and evoke attention and concern (Morrongiello, Bell, Butac, & Kane, 2013). Combating parents' low perceptions of risk for motor vehicle injury will likely be difficult since the risk of being involved in a crash on any given vehicle trip is very small, which in turn reinforces the perception of minimal risk (Will, 2005; Will & Geller, 2004).

1.2 Project Objectives

The objective of this project was to develop and test various methods of framing child passenger safety recommendations for children under age 13. This document reports the results of two studies examining child passenger safety messages and types of information on which to focus for maximum effectiveness.

The goal of the first study was to determine how to best communicate child passenger safety recommendations to parents/caregivers, and which information to emphasize. Thus, this study investigated various ways of framing child passenger safety recommendations, and examined the

relative effectiveness on parents/caregivers' knowledge, attitudes, and behavioral intentions related to best practices and proper use of child restraints. Specifically, should the recommendations be organized by phase of childhood (e.g., by age, or by progression of younger to older)? Should they focus on key issues, such as combating premature graduation? Should they communicate risk-reduction rationale and consequences of noncompliance? Note that the base child passenger safety recommendations were consistent across conditions in this study, but several versions were tested that each employ a different emphasis frame. Emphasis framing is a persuasion technique that involves placing focus on specific aspects of the content in order to encourage or discourage certain interpretations of the content. Considerable research indicates that varying communication frames can affect attitudes and behaviors, even among two otherwise equivalent statements (Chaiken, 1987; Chong & Druckman, 2007; Kahneman, Slovic, & Tversky, 1982).

The goal of the second study was to investigate child passenger safety recommendations delivered in combination with other types of CPS information, and to determine the type and amount of extra information to include without losing the clarity and power of the key recommendations. Note that the base child passenger safety recommendations were consistent across conditions in this study as well, but several versions were tested with added installation and/or normative information. Proper use of a restraint is vital for maximum protection, yet the added effectiveness of providing installation tips with the basic recommendations in a 1-page flyer format was not known and required evaluation to determine effectiveness on knowledge, attitudes, and behavioral intentions. Furthermore, communication of societal norms to parents (e.g., "3 out of 4 safety seats are misused") was also examined. Normative information about CPS misuse and noncompliance is often communicated to parents, yet it may be contraindicated because in many cases the current societal norm is one of *low* compliance. Hence, it may inadvertently reinforce low compliance because often people interpret behaviors that are *normative* among their peers as *acceptable* behavior for themselves. Social norms feedback approaches are typically only used when the base percent *safe* rate in the population is *high* (Marlatt et al., 1998; Miller, Rollnick, & Conforti, 2002; Walters & Neighbors, 2005). Thus, this study provides an important opportunity to empirically examine the relative benefits or detriments of additional information provided with the recommendations.

The findings of this research are intended to inform the development of more effective messages for child passenger safety. For Study 1, it was hypothesized that the varying emphasis frames would have a differential effect on knowledge, attitudes, and behavioral intentions, despite the base CPS recommendations being consistent across conditions. Further, it was hypothesized that all experimental frames would be more effective than the materials viewed in the control condition, and the frame that explained the risk-reduction rationale behind the recommendations would be most effective at improving knowledge, attitudes, and behavioral intentions. For Study 2, it was hypothesized that the various flyer versions would have differential effects on knowledge, attitudes, and behavioral intentions, despite the base CPS recommendations being consistent across conditions. Further, it was expected that the versions including installation information would be more effective at increasing installation knowledge compared to the recommendations viewed alone, and the versions that included normative information would lead to reduced perceptions of threat and reduced behavioral intentions compared to other conditions. These studies and their methods are explained in detail in the Methodology section.

1.3 Literature Review

Literature Search Strategy

As a part of the development of program material and testing instruments for this project, a literature review was conducted for studies published over the past ten years that focus on child passenger safety (CPS) related educational messages and communication modes. This was not intended to be an exhaustive review, but rather an overview to determine whether relevant studies have been conducted recently, and if so, to consider those findings and lessons learned when developing the education messages, other program material, and survey design.

The following database systems were searched for relevant items published in the years 2001-2011: ISI Web-of-Science; Medline; PsychInfo (Psychological Abstracts); TRID¹; and, NTIS (National Technical Information Services). In addition, several cross-disciplinary electronic journal collections were searched, including ScienceDirect, MetaPress, SpringerLink, and the Wiley Online Library, which incorporates the Synergy systems for Blackwell scientific journals.

Once potentially relevant studies were identified, the project team reviewed the abstracts and summaries generated through the searches, noted those studies that contained an education program with behavior change as an outcome measure, and obtained the full document for critical review. The articles determined to be most relevant are summarized below.

Review of Literature

Perhaps the key finding of this literature review that focused on CPS related educational messages and communication modes is that there have been a number of studies conducted that involved some type of intervention to increase use of child restraints – including booster seats and seat belts – and most, if not all, included educational materials and messages as a part of their interventions. However, only a few of the studies identified dealt specifically with the messaging associated with these interventions.

The best example of how different types of messaging influences child safety related behavior was a study by Ricketts, Shanteau, McSpadden, and Fernandez-Medina (2010). While not related specifically to child passenger safety, this study examined the effects of different types of messaging on behavior relating to child safety. In this study three types of warning messages were included in swing set assembly instructions. These included a traditional warning message, a warning message that included a specific example of a child who was hurt when using a swing set, and a warning message that indicated that children have been hurt when using swing sets but did not include a specific example. Study participants were asked to assemble the swing set for a child they cared about and safety behavior was measured by examining the finished swing set. They found that the story-based warning message that included the specific example significantly improved safety behavior.

¹ Transport Research International Documentation (TRID) is an integrated database that combines the records from the Transportation Research Board (TRB)'s Transportation Research Information Services (TRIS) Database and the Organization for Economic Co-operation and Development (OECD)'s Joint Transport Research Centre's International Transport Research Documentation (ITRD), and TRB's Research in Progress database as well as other sources.

Aitken, Mullins, Lancaster, and Miller (2007) evaluated a school-based intervention aimed at increasing restraint use among elementary school students. This 5 month intervention had a number of components including school announcements, posters, and incentives. As the school mascot was a tiger cub, all material used the “Cubs Click It for Safety” message and messages were often delivered by student peers. Parent and student surveys were administered pre- and post-intervention and observational surveys were conducted three times during the study period.

The proportion of parents who felt a seat belt alone was an appropriate restraint for children ages 5-8 decreased from 37 percent pre-intervention to 25 percent post-intervention. Observed child restraint use increased from 71 percent pre-intervention to 91 percent post-intervention. Observed driver restraint use did not change (80%). While the results of this peer-based messaging seem promising, the lasting effects are unclear. In addition, no attempt was made to deliver or evaluate the effectiveness of different types of messages.

Will, Sabo, and Porter (2009) examined the effects of a 6-minute video intervention on restraint use. The “Boost ‘em in the Back Seat” intervention was designed to evoke fear and feelings of vulnerability in parents while also giving them the knowledge necessary to reduce risks and safely transport their children.

Parents at two afterschool-care centers in southeastern Virginia were shown the video while parents at two other afterschool-care centers served as controls. Observed booster seat use (among booster-sized children) increased 16 percent from 30.4 percent pre-intervention to 35.2 percent post-intervention. In the Control Group booster seat use decreased from 35.8 percent to 28.6 percent. Not all parents at the intervention site chose to watch the video and thus observational data likely includes parents not participating in the intervention.

While not specifically evaluating the effects of a printed child passenger safety message (instead this study examined the effects of a 6-minute video including messaging), this study is notable in that it targeted parents’ feeling of susceptibility by using a fear-based approach. The authors conclude that any successful intervention should address a number of parental biases including crash/injury vulnerability and the effectiveness of booster seats.

King, Monroe, Applegate, and Cole-Farmer (2007) report on the impact of an education, legislation, and service intervention on child passenger safety in Alabama. The education component of this intervention included the message that “80 percent of loving caring parents put their child at risk by not having their car seat properly installed.” This message accompanied a toll free number where parents could ask questions and make an appointment with a fitting station. In addition to this education component, a primary seat belt law was enacted. Observed restraint use increased from 58.5 percent pre-intervention (1994-1999) to 85.8 percent post-intervention (2000-2005), however it is not clear how much of that change is due to the messaging component of the intervention and how much is due to other factors such as the enactment of a primary seat belt law.

The benefits of child restraints and booster seats are well known in the research community but this information has not been translated well to all populations. While a number of studies aimed at increasing appropriate restraint use were identified, none specifically examined the effects of the messaging. In order to develop effective messaging, researchers need to identify why parents

are not using restraints and what types of messaging would encourage and cause them to change their behaviors.

Developing messages to target and address common barriers to restraint use could be a key component of increasing overall and appropriate restraint use. A number of studies discussed barriers to appropriate restraint use. These included not understanding the importance of the child restraint or booster (Weiss-Laxer et al., 2009; Bingham et al., 2006; Johnston et al., 2009; Winston et al., 2007), comfort (Weiss-Laxer et al. 2009), having too many people in the vehicle (Weiss-Laxer et al., 2009; Agran et al., 2006; Johnston et al., 2009; Winston et al., 2007), child behavior (Agran et al., 2006; Johnston et al., 2009; Winston et al., 2007), cost (Bingham et al., 2006; Johnston et al., 2009; Brixey and Guse, 2009; Winston et al., 2007) and inconvenience (Bingham et al., 2006; Johnston et al., 2009; Brixey and Guse, 2009), among other factors.

A number of studies asked parents about what types of child passenger safety messaging would be effective. Although generally limited only to small focus groups, these studies do provide some idea as to the types of messaging preferred by parents and caregivers. However, these studies give no indication of the demonstrated effectiveness of these messages so it is unclear if the types of messaging preferred by study participants would actually result in behavior change.

Rivara, Bennet, Crispin, Kruger, Ebel, and Sarewitz (2001) conducted three focus groups with 10 participants in each to explore parental attitudes about booster seats and messaging techniques. Participants preferred positive messages that were informative, specific, and understandable. The use of specific age and weight recommendations with clear visuals and facts explaining the importance of booster seats were also preferred. The use of fear-based messaging had mixed reviews.

Snowdon and colleagues (2008) conducted two focus groups consisting of parents, expectant parents, grandparents, and healthcare providers to determine what strategies they would find effective to increase proper restraint use. The focus groups recommended including straightforward facts and easily remembered information and using guilt as a way to encourage parents to seek out more information. They also suggested that repetition is a useful tool and thought shock (but not real-life situations) would be useful.

Winston, Erkoboni, and Xie (2007) presented focus group participants with a number of different child passenger safety messaging campaigns that focused on booster seats. Study participants had mixed feelings for most of the messaging campaigns presented such as messages targeted toward children and those emphasizing “the law,” but the authors reported that the parents studied were motivated by “concrete educational messages” regarding the injury prevention benefits of booster seats.

The most thorough discussion of child passenger safety messaging is from a series of articles by Will (Will, 2005; Will and Geller, 2004; Will, Sabo, and Porter, 2009). Her basic premise is that parents lack a sense of risk about the potential for injuries resulting from a motor vehicle crash and thus effective messaging campaigns should be designed to combat this “immunity fallacy” and increase the perception of risk. Consequently, currently available material that feature smiling children happily sitting in their restraints are not reaching the population of parents who do not believe the information applies to them. She suggests that effective messages are those

that increase caregivers' feelings of risk and susceptibility while also giving parents and other caregivers confidence in their ability to minimize this risk.

Discussion and Conclusion

As was previously noted, there have been a relatively large number of studies over the past 10 years that have evaluated the effectiveness of specific interventions designed to increase the use of child restraints and booster seats and most included educational material and messages as a part of their interventions. However, very few of the studies identified dealt specifically with examining the effectiveness of the messaging associated with these interventions.

From the research that has specifically studied messaging associated with child passenger safety interventions, it appears that messages that increase parents' feelings of risk and provide succinct and concrete educational messages about the injury prevention benefits of child restraints will be most likely to lead to increased use of restraints for children. Combating the "immunity fallacy" described above will likely be difficult since the risk of being involved in a crash on any given trip in the car is very small that in turn reinforces the perception of minimal risk.

Another issue to consider when developing messages is that giving parents/caregivers confidence in their ability to minimize this risk may be made more difficult by the abundance of normative information about high misuse rates and lack of compliance that is often communicated to parents through messages such as "3 out of 4 child restraints are misused."

2.0 Methodology

2.1 Study 1

Study Design

A 5 (Message Group) X 2 (Time Periods) experiment was conducted using a randomized controlled trial design to examine relative effectiveness of parent and caregiver preferences for different methods of framing car seat safety recommendations. Participants were electronically randomized to 1 of 5 test condition groups (4 experimental conditions and 1 control group) and responded to pre- and post-survey questions (2 times).

Sampling Plan

The study took place in the suburbs of Philadelphia, Pennsylvania (the Delaware Valley area) and in the city of Norfolk, Virginia (the Hampton Roads area). These two cities, each in the center of a large metropolitan statistical area (MSA) in Northeastern and Southeastern regions of the United States, were selected to increase recruitment from socio-demographically diverse populations and to increase generalizability of the study findings. The Delaware Valley MSA includes 16 counties in four States with a population of over 6.1 million people. The Hampton Roads MSA includes nine independent cities and seven counties in two States (VA-NC), with a population of over 1.7 million. These culturally diverse areas included urban, suburban, and rural concentrations of candidate parents and caregivers. Each site recruited and tested 150 participants each (300 total sample).

Recruitment and Incentives

Each site used various methods to advertise the study to parents or caregivers of children aged birth to 12 years. For the Philadelphia site, the team worked with the Safe Kids Chapter of Southeast Pennsylvania to deliver a recruitment flyer to various parent clubs, online parent newspapers, and child care facility organizations. For the Norfolk site, the team used very similar methods, working with child-focused organizations (Places and Programs for Children, Consortium for Infant and Child Health, etc.) to deliver the recruitment flyer to various groups of parents and child care facilities through their contact networks. Facebook sites were also used to promote the study at both sites. Scheduling of participants was handled through email communications and telephone correspondence. Screening questions ensured participants:

(a) were at least 18 years old; (b) were the parent or legal guardian of a child under the age of 13 years; (c) were comfortable reading English-language text displayed on a computer screen; and (d) had transportation to their local study site.

Each site had various days and times set up for parents/caregivers to participate in the study in a local computer lab setting. Each participant was compensated with a \$50 Wal-Mart gift card for participation in the study.

Procedures of Participation

Enrolled participants were asked to arrive at a designated computer lab center at their appointment time to participate in the study. A secure web-based study protocol was used and participants viewed a series of user-friendly screens that automatically led them through an informed consent document (covering logistics of study, duration, rights as a participant, and remuneration for participation), pre-test measures, study material specific to condition assignment, and post-test measures, at their own pace (see Figure 1). Most participants were able to complete the session in about 30 minutes or less (mean = 26 minutes). A study facilitator was present at all sessions to assist the participants in log-in procedures, to answer any questions and to resolve any administrative issues. The sessions were also monitored off-site by the web site designer to confirm data recording. No person's name or other personal identifiers were stored with the data; an anonymous coding process was used to link pre- and post-data. Upon completion of the testing session, participants signed for and received their compensation, as well as a handout on child passenger safety to take home for reference.

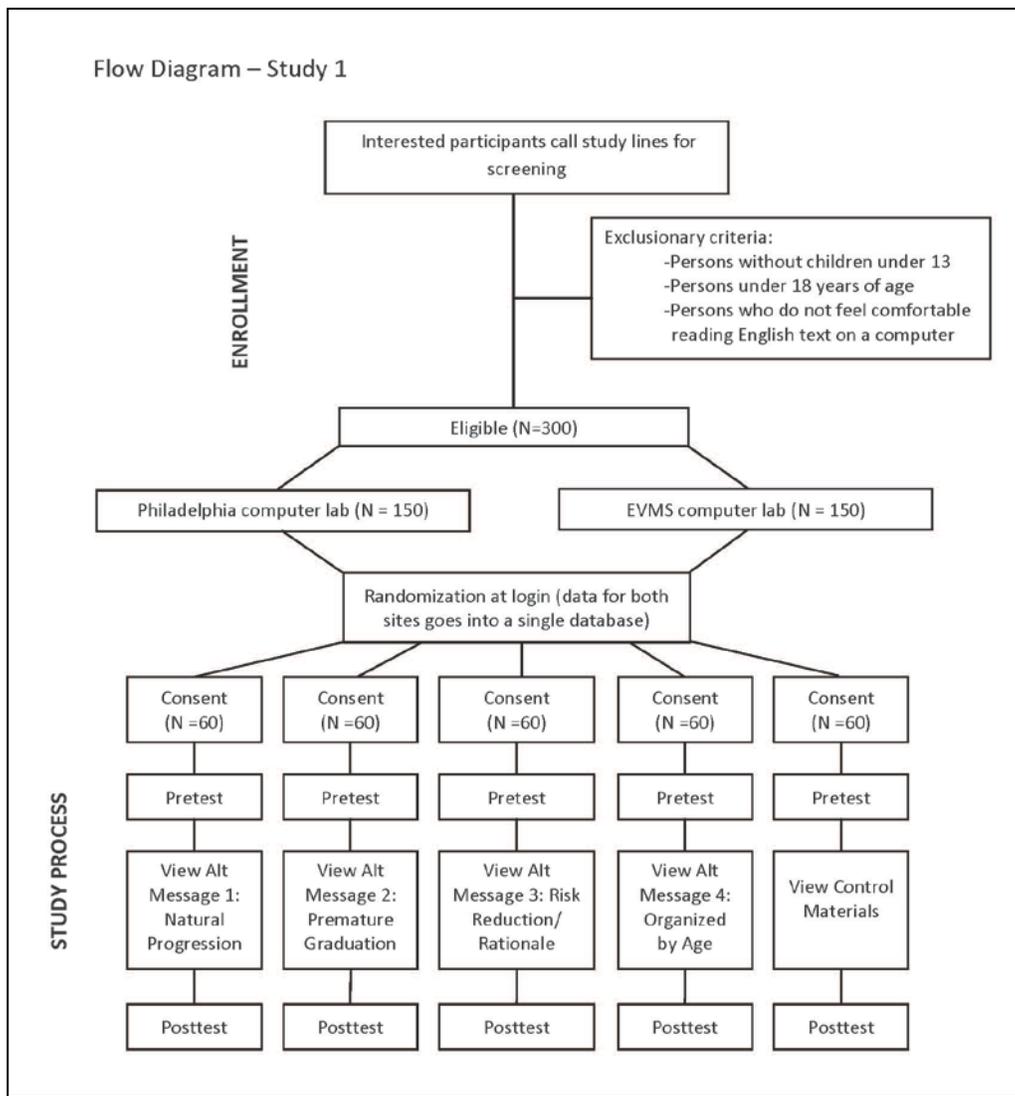


Figure 1. Study 1 Flow Diagram

Test Study Conditions

Participants were electronically randomized to one of the five test groups to view child passenger safety material. Four groups viewed one of four versions of a one-page educational print flyer, and one control group viewed car seat marketing material that was not educational. Randomizing participants to groups allowed for examination of the relative effectiveness of and preferences for different methods of framing child restraint recommendations. The five groups are described below.

Group 1: Child Restraint Recommendations Organized by Natural Progression

Participants in this group viewed a version of car seat recommendations in which both text and pictures highlighted the natural progression of seat types from birth to teen years (see Appendix A, A-1). This version used photos of children representative of each phase of childhood, but removed almost all references to age and all mention of upper limits for common seats as a factor for determining transitions. This message frame was chosen to examine the utility of organizing CPS recommendations by phase of childhood (younger to older progression) without attaching specific age ranges to the phases. Thus, this version was the most similar to the “Organized by Age” flyer (see Group 4 below), but does not include references to ages in the organizing headers. Recommendations for transitioning from rear-facing to forward-facing pushed toward later transition. To quell the perception that age 8 is the maximum, it is mentioned that it may take up to 12 years for a child to be big enough to use a seat belt alone. Recommendations for this condition focused on best practice for determining transitions to the next stage, which include child size and fit of the restraint. For instance, transition to seat belts focused on fit of the belt on the seated child (using the fit test), with usual maximum height for a booster seat (4’ 9”) given as additional guides. Pictures of older children for each phase were used to emphasize the upper transition norms for each stage. The need for back seat positioning was fully integrated and highlighted throughout the recommendations.

Group 2: Child Restraint Recommendations That Focus on Premature Graduation

Participants in this group viewed a version of car seat recommendations in which both text and pictures draw attention to premature graduation (see Appendix A, A-2). This message frame was chosen to determine the value of organizing CPS information around the best practice guidance for delaying transitions between stages of child restraint. In addition to specifying recommendations for each stage, this version specifically emphasized the message that counters premature graduation to the next stage. For instance, the header for stage two read, “Keep Kids in Seats With Harnesses as Long as Possible” to emphasize the need to use harnesses throughout this stage. Parents were encouraged to keep children in harnessed seats for as long as the harness weight and height limits will allow. Similar encouragements against premature graduation were used for each phase as was appropriate for the phase. Accompanying pictures provided additional emphasis. Similar to Group 1, this version also removed almost all references to age and upper limits for common seats, and fully integrates and highlights the need for back seat positioning at all stages.

Group 3: Child Restraint Recommendations That Explain Risk-Reduction Rationale

Participants in this group viewed a version of car seat recommendations that communicates the risk-reduction potential and rationale (in a lay-friendly, succinct manner avoiding statistics) behind each stage's recommended restraint configuration, starting first with the basic rationale for occupant restraints and moving into rationale for specific restraint configurations for the various child sizes. This message frame (see Appendix A, A-3) is consistent with risk communication literature for maximum behavior change, and was chosen to examine the merits of focusing on *why* each seat/configuration makes a difference for safety. Much of the general public fails to recognize the severity of many public health hazards, including motor vehicle travel (Sandman, 1989; Slovic, 1991; Slovic, Fischhoff, & Lichtenstein, 1985; Will & Geller, 2004). For instance, many parents may lack the understanding that an object in motion remains in motion, unless restrained, when the vehicle crashes. They may also fail to grasp that given the abrupt changes in momentum and velocity that occur in mere fractions of a second, crash forces are quite powerful and can result in a child propelling forward with the force of thousands of pounds (National Child Passenger Safety Board, 2014). Most importantly, the *reasons* behind the recommendations were given for each stage in simple "Here's What to Do" and "Here's Why" sections. For instance, parents were not only told to rear-face their children longer, but why rear-facing provides such a benefit in crashes. This version also included pictures to illustrate stages of restraints, removed almost all references to age and upper limits for common seats, and fully integrated the need for back seat positioning at all stages.

Group 4: Child Restraint Recommendations Organized by Age

Participants in this group viewed a version of car seat recommendations that are organized under age-based headers (see Appendix A, A-4). An age-based frame was included for examination, given its frequent use in CPS and health-related communications to parents. NHTSA's "Car Seat Recommendations for Children" flyer released in March 2011 was used for this group. The flyer focuses on age of child for specific type of car seat or restraint; and fit of child based on car seat manufacturer's instructions for size and height of child. The flyer emphasizes importance of harnesses and seat belt positions for rear-facing and forward-facing car seats, as well as booster seats and seat belts. The flyer mentions the need to read the vehicle owner's manual on how to install the car seat using the seat belt or Lower Anchors and Tethers for Children (LATCH) system, and the need to check height and weight limits.

Group 5 (Control): No Education

Participants assigned to this condition did not receive any instructional material related to car seats. Rather, these participants viewed a picture display of various car seats on the market and were asked to rate their preferences based on style, color, and other characteristics (an example of material viewed is presented in Appendix A, A-5). This exercise allowed for elapsed time between their pre-test and post-test measures, as in the other study conditions, without providing education.

Measures

Several measurement scales were used to measure appropriateness of restraint selection, knowledge of restraints, perceived efficacy and threat, attitudes and intentions, judgments of relevance and acceptability, and sample demographics. To accurately assess changes in knowledge and perceptions after exposure to the independent variable, most of the measures were asked in both the pre-test and post-test. The exceptions were the demographics questions and judgments of relevance and acceptability, which were asked only once (at post-test). The complete survey is included in Appendix A and its subscales are describes below.

Restraint Selection

For proper child restraint selection, items were developed that provided participants with a series of specific scenarios that vary the age, weight, and height of a child and asks them to select an appropriate restraint, direction to face, and vehicle row for the hypothetical child. This 8-item knowledge measure used a multiple choice response format, providing an item score of correct/incorrect and a total number correct score for each participant. A sample question is, “Your child is asking you when he/she can just use a seat belt when riding in vehicles. When can your child safely use a seat belt only?” The measure was adapted from a similar existing field-tested measure (Snowdon et al., 2008).

Child Passenger Safety Knowledge

To gauge immediate changes in general knowledge of child passenger safety, as well as differences in knowledge among the groups, a 15-item assessment of parental knowledge was conducted at both pre-test and post-test. This assessment included separate subscales for Back Seat Knowledge, Booster Seat Knowledge, Rear-Facing Knowledge, Forward-Facing Knowledge, and Seat Belt Knowledge. This measure used a Likert-type response format (1 = strongly disagree to 5 = strongly agree) and was tailored for this study from existing field-tested and validated measures used in past research by Snowdon and colleagues (Snowdon et al., 2008; Snowdon, Hussein, Purc-Stevenson, Follo, & Ahmed, 2009), and Will and colleagues (Will et al., 2009). A sample item is, “It is safe for an 11-year old to ride in the front seat.”

Perceptions of Efficacy and Threat

The Risk Behavior Diagnosis Scale (RBDS) (Witte, Cameron, McKeon, & Berkowitz, 1996) was used to assess perceived efficacy and risk. The RBDS is a template survey designed to be tailored for evaluation of any health or safety message. The efficacy subscale assessed participants' perceptions of response efficacy (i.e., confidence that the recommended actions/restraints will work to prevent injuries) and Self-Efficacy (i.e., confidence in one's ability to follow child passenger safety recommendations). The threat subscale assessed participants' perceived risk by measuring susceptibility to and severity of negative consequences from inappropriate child occupant protection. The 16-item RBDS tailored for this study used a 5-point Likert-type response scale (1 = strongly disagree to 5 = strongly agree). A sample Self-Efficacy item is, “I have the skills and knowledge needed to use the correct restraint to reduce my child's chances of injury in a car crash.”

Attitudes and Intentions

Participant's general attitudes and intentions regarding child passenger safety were assessed via an 8-item attitudes subscale, adapted from a survey used in past research (Will et al., 2009), and a 9-item stated intentions subscale. Stated intentions and attitudes were assessed to gauge participants' disposition regarding what is recommended for child occupant protection irrespective of their knowledge. Both subscales used a Likert-type response format (1 = strongly disagree to 5 = strongly agree). A sample attitudes item is, "Rear-facing a child past the first birthday seems harmful because there is not enough room for his/her legs."

Judgments of Relevance and Acceptability

At post-test, participants in each experimental condition were asked their opinions about the child passenger safety material. A 10-item questionnaire was developed that uses a 4-point Likert-type response format to assess participants' judgments of quality and acceptability of the information presented. Specifically, they were asked to rate the child passenger safety information on a variety of factors, including but not limited to style, amount of information, clarity, and likelihood for motivating behavior change. A sample question is, "How would you rate the clarity of the materials that were presented to you today?"

Demographics and Other Participant Information

Demographic information was collected at the post-test. Participants were asked their age, gender, race, ethnicity, education level, income level, and number of and ages of children. Information specific to child passenger safety was also asked, including types of child restraints being used currently and in the past, sources of information about safely transporting children, whether or not they have had their children's restraints inspected by a CPS technician, and their preferred communication channels (e.g., print, television, radio, electronic) for receiving child passenger safety information.

2.2 Study 1 – Additional Data Collection – Informal Discussion Groups

An additional data collection task was used as a follow-up to the results of Study 1 in order to further examine messaging needs and garner feedback to improve the messages for audience readability, clarity of message, and visual appeal. These discussions were informal and were intended to help further fine-tune the educational content of the newly created CPS messages studied empirically in Study 1.

Study Design and Procedures

A telephone meeting with NHTSA was conducted to review what had been learned from the research conducted in Study 1 and identify topics for informal discussions with participants. Six informal discussion groups were conducted in Fall 2014. Discussion groups were made up of parents who had children less than eight years of age, and none of the participants in discussion groups had participated in Study 1. Discussion groups were recruited simultaneously with the rest of the experiment participants for Study 2 (described below). Additional study appointments were planned and reserved for the discussion groups. Rather

than sitting at a computer to respond in the structured (computerized) Study 2 environment, the participants who signed up for these appointments instead participated in an informal discussion about the CPS messages used in Study 1 and provided open-ended feedback regarding likes, dislikes, and suggestions for improvement from a typical parent's perspective.

Discussion groups took place in a private campus classroom in the Norfolk location. Each discussion group had one facilitator and one or two notes takers present, and all groups were audio recorded and transcribed following the session. Facilitators asked a series of structured questions to participants (see Moderators Guide in Appendix A, A-7). The first question was designed to give the facilitator an idea of child ages and car seat types with which participating parents have experience. For the other questions, parents gave their opinion regarding what they liked and didn't like about child seat information and the viewed flyers (Appendix A, A-1 to A-3). Various aspects of the flyers and how the message affects knowledge of car seat use were discussed. All sessions were recorded for qualitative analysis. Discussion groups lasted approximately one hour and fifteen minutes each and participants were each compensated with a \$50 gift card at the completion of the session.

The audiotapes were transcribed. No identifiers were present in the notes or transcriptions. Following transcription, the research team independently performed a qualitative analysis of the group discussion data, identifying themes, commonalities, and key feedback from participants. The team then discussed their independent findings and worked to arrive at consensus and summarize the findings.

2.3 Study 2

Study Design

A 4 (Information Group) X 2 (Time Periods) experiment was conducted using a randomized controlled trial design to examine the effectiveness of NHTSA's CPS recommendations in combination with other types of CPS information (i.e., normative and/or installation information). Participants were electronically randomized to 1 of 4 experimental groups and responded to pre- and post-survey questions (2 times).

Sampling Plan

Participants for Study 2 were drawn from the same two broad geographic regions (Delaware Valley MSA and Hampton Roads MSA) as Study 1, with the study taking place in the suburbs of Philadelphia and Norfolk. These socio-economically and culturally diverse areas included urban, suburban, and rural concentrations of candidate parents and guardians. Each site recruited and tested 120 participants each (240 total sample; see Figure 2).

Recruitment and Incentives

Recruitment procedures and incentives were similar to Study 1, with the exception that participants were parents or caregivers of children birth through 7 years. An added exclusion criterion for Study 2 was that the participants could not have participated in Study 1. For the Philadelphia site, the team worked with the Safe Kids Chapter of Southeast Pennsylvania to

deliver a recruitment flyer to various parent clubs, online parent newspapers, and child care facility organizations. For the Norfolk site, the team used very similar methods, working with child-focused organizations (e.g., Places and Programs for Children, Consortium for Infant and Child Health, etc.) to deliver the recruitment flyer to various groups of parents and child care facilities through their contact networks. Facebook sites were also used to promote the study at both sites. Scheduling of participants was handled through email communications and telephone correspondence. Each site had various days and times set up for parents/caregivers to participate in the study in a local computer lab setting. Each participant was compensated with a \$50 Wal-Mart gift card for their participation in the study.

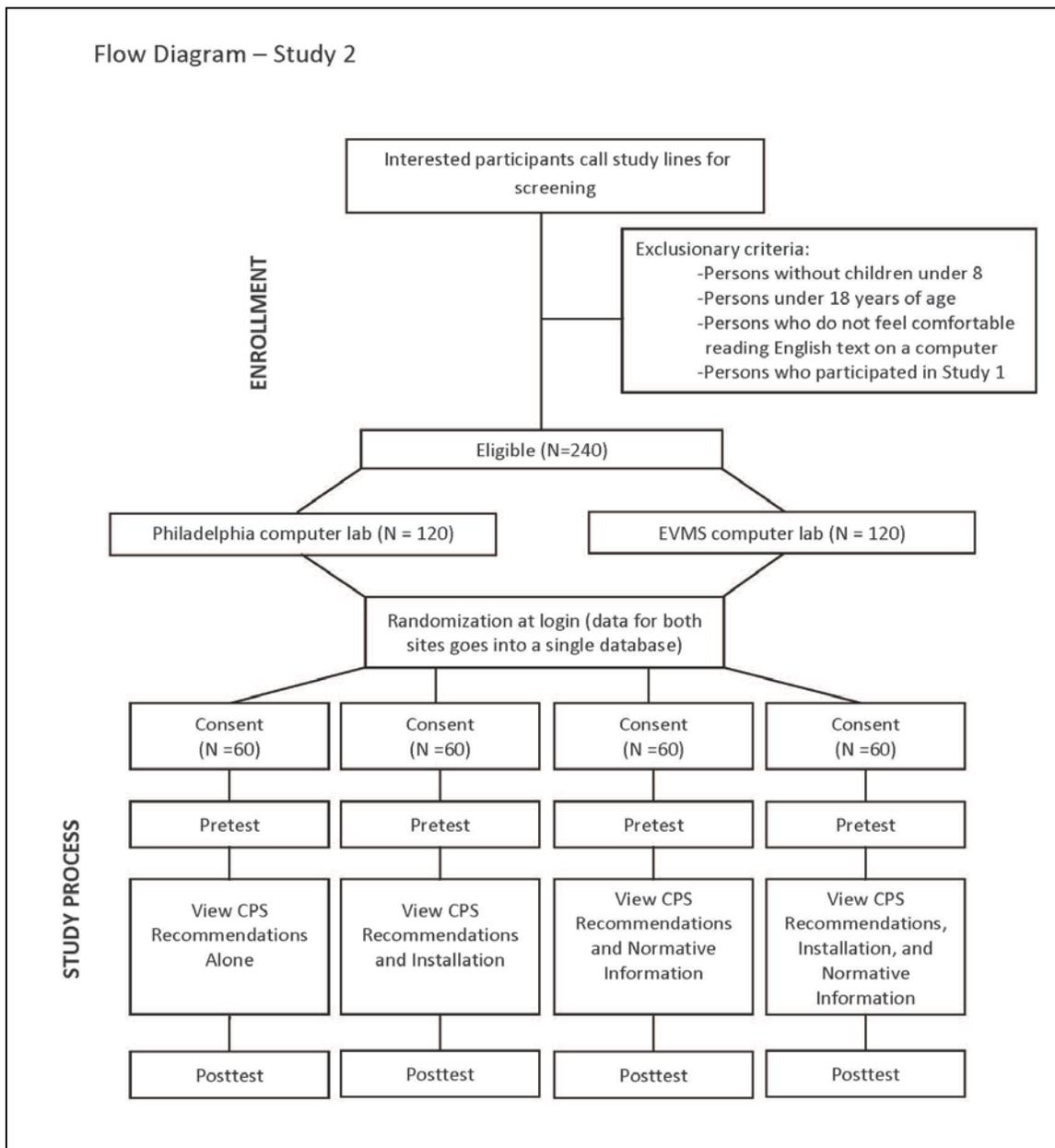


Figure 2. Study 2 Flow Diagram

Procedures for Participation

Study 2 followed the same general procedure for participation as in Study 1. Enrolled participants were asked to arrive at a designated computer lab center at their appointment time to participate in the study. A secure web-based study protocol automatically led participants through an informed consent document (covering logistics of study, duration, rights as a participant, and remuneration for participation), pre-test measures, study material specific to condition assignment, and post-test measures, at their own pace (see Figure 2). Most participants were able to complete the session in about one-half hour. A study facilitator was present at all sessions to assist the participants in log-in procedures, to answer any questions and to resolve any administrative issues. The sessions were also monitored off-site by the web site designer to confirm data recording. No person's name or other personal identifiers were stored with the data; an anonymous coding process was used to link pre- and post-data. Upon completion of the testing session, participants signed for and received their compensation, as well as a handout on child passenger safety to take home for reference.

Test Study Conditions

Participants were electronically randomized into four test groups to view one of four versions of a one-page educational print flyer. Randomizing participants to groups allowed for examination of the relative effectiveness of CPS recommendations delivered in combination with two other types of CPS information: normative information and/or installation tips. The four groups are described below.

Group 1: CPS Recommendations Alone (No Additional Information)

Participants assigned to this condition viewed CPS recommendations presented alone, with no additional information about installation or safety norms (see Appendix B, B-1).

Group 2: CPS Recommendations Combined with Installation/Proper Use Tips

Participants assigned to this condition viewed CPS recommendations as depicted in Group 1, presented in combination with succinctly summarized installation/proper use tips for each stage of occupant restraint (see Appendix B, B-2). For instance, installation tips for stage 2 conveyed that the safety restraint should be installed (a) with the safety belt or child restraint anchors locked tightly in position so that the seat does not move more than an inch; (b) with a snugly positioned top-tether; (c) with the harness straps positioned snugly according to instructions; (d) with the retainer (chest) clip positioned at armpit level; and (e) with harness straps routed at or above shoulders.

Group 3: CPS Recommendations Combined with Normative Information

Participants assigned to this condition viewed CPS recommendations as depicted in Group 1, presented in combination with normative information regarding compliance with the recommendations (see Appendix B, B3). As detailed in the introduction, information regarding societal norms may be contraindicated for child passenger safety interventions because in many cases the societal norm is one of low compliance, and the public often adjusts their own levels of risk exposure to match societal norms (Walters & Neighbors, 2005). The impact of normative

information was empirically tested in this condition by specifying relevant societal norms for each stage of occupant restraints and rear seat use.

Group 4: CPS Recommendations Combined with Installation Tips and Normative Information.

Participants assigned to this condition viewed CPS recommendations as depicted in Group 1, presented in combination with succinct tips for installation/correct use *and* normative information regarding occupant restraint and rear seat use. Thus, this condition presented the information included in Groups 2 and 3 combined (see Appendix B, B-4).

Measures

Several instruments were used to measure various constructs in Study 2, many of which were identical to assessments developed for Study 1. Specifically, measures from Study 1 that were used to evaluate Study 2 include the *Restraint Selection Task*, the *Knowledge of Restraints* measure, Witte and colleagues' (1996) *Risk Behavior Diagnosis Scale* (measuring self-efficacy, response efficacy, and risk perception specific to child passenger safety), the questionnaires assessing *Attitudes and Intentions* and *Judgments of Relevance and Acceptability*, and the survey of *Demographics and Other Participant Information* (refer to Study 1 for descriptions of these measures and Appendix A for the complete survey). An additional *Installation Questions* subscale was added to assess parents' knowledge of correct and incorrect installation configurations. As in study 1, most measures were administered both at pre-test and post-test. The exceptions were the demographics questions and judgments of relevance and acceptability, which were asked only once (at post-test).

3.0 Results

3.1 Study 1

Participants

Three hundred parents/caregivers of children aged birth to 12 participated in the study (150 in the suburbs of Philadelphia and 150 in the Norfolk/Hampton Roads area). Demographics are presented in Table 1 by location and Table 2 by condition. Thirty-four percent of participants were Black (59% of the Hampton Roads participants and 9% of the Philadelphia participants), and 61 percent were White (35% and 86% for Hampton Roads and Philadelphia, respectively). About 3 percent of Philadelphia and 7 percent of Hampton Roads participants were Hispanic. Regarding family income, 58 percent of participants reported incomes between \$25,000-\$99,999, with 12 percent below \$25,000 and 23 percent above \$100,000. Mean parent age was 38 and 33 years old in Philadelphia and Hampton Roads, respectively. Males made up 11 percent of the participants (13% and 9% for Philadelphia and Hampton Roads areas, respectively). Participants at the two sites did not significantly differ on responses to surveys/flyer versions.

Analysis

ANCOVA and pairwise comparisons with Sidak's adjustment for Type 1 error were used to determine the relationship between group assignment (1 of 4 flyer versions or control) and post-test scores after adjusting for pre-test scores and the interaction between the independent factors when significant. This analysis compares differences among post-scores while controlling for prescores. Data was analyzed using SPSS 19 software and the level of significance was set at 0.05. After adjusting for pre-test scores, post-test score means revealed a significant main effect for flyer version on 11 subscales: (a) Restraint Selection Score; (b) Back Seat Knowledge; (c) Booster Knowledge; (d) Rear-Facing Knowledge; (e) Total Efficacy; (f) Self-Efficacy; (g) Overall Attitudes; (h) Booster Attitudes; (i) Forward-Facing Attitudes; (j) Rear-Facing Attitudes; and (k) Stated Intentions.

These findings are presented in Table 3 and described separately below.

Changes in Restraint Selection Score

Analyses for Restraint Selection Score revealed a significant main effect for flyer, $F(4, 293) = 7.72, p < .001, \eta_p^2 = .10$, and a significant interaction with pre-test score, $F(1, 293) = 9.07, p = .003, \eta_p^2 = .03$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. After analyzing the interaction, post-test scores for the Risk Reduction Rationale flyer were significantly higher than the Age-Based flyer across all pre-test scores ($p = .02$). Additionally, participants viewing the Risk Reduction Rationale or Natural Progression versions performed significantly better than participants in the control group when pre-test scores were below 50 percent ($p = .003$). The Premature Graduation, Age-Based, and control groups did not differ significantly from one another. Figure 3 depicts mean changes in restraint selection scores by group. In summary, when faced with the task of selecting appropriate restraints for given

children, the flyer that provided the rationale behind the recommendations led to the greatest improvement in scores from pre to post-test.

Table 1. Demographics of Study 1 Participants by Location

	Philadelphia Suburb, PA	Hampton Roads, VA	Overall
Number of subjects	150	150	300
Age of parent, mean (SD)	38.1 (5.4)	33.1 (8.1)	35.6 (7.3)
Race, n (%)			
American Indian or Alaska Native	0 (0.0)	0 (0.0)	0 (0.0)
Asian	5 (3.3)	4 (2.7)	9 (3.0)
Black or African American	14 (9.3)	89 (59.3)	103 (34.3)
Native Hawaiian or Pacific Islander	1 (0.7)	1 (0.7)	2 (0.7)
White	129 (86.0)	53 (35.3)	182 (60.7)
Other	1 (0.7)	3 (2.0)	4 (1.3)
Ethnicity, n (%)			
Hispanic	5 (3.3)	10 (6.7)	15 (5.0)
Non-Hispanic	15 (96.7)	140 (93.3)	285 (95.0)
Education, n (%)			
Grade school	0 (0.0)	0 (0.0)	0 (0.0)
Some high school	1 (0.7)	2 (1.3)	3 (1.0)
High school diploma/ GED	6 (4.0)	23 (15.3)	29 (9.7)
Some college	15 (10.0)	40 (26.8)	55 (18.3)
2-year degree/trade school	7 (4.7)	32 (21.3)	39 (13.0)
Bachelor's degree	73 (48.6)	38 (25.3)	111 (37.0)
Graduate degree	48 (32.0)	15 (10.0)	63 (21.0)
Income, n (%)			
\$0-15,999	0 (0.0)	18 (12.0)	18 (6.0)
\$16,000-24,999	0 (0.0)	18 (12.0)	18 (6.0)
\$25,000-49,999	16 (10.7)	57 (38.0)	73 (24.4)
\$50,000-99,999	63 (42.0)	37 (24.7)	100 (33.3)
\$100,000+	58 (38.6)	11 (7.3)	69 (23.0)
Decline to answer	13 (8.7)	9 (6.0)	22 (7.3)
Age of children, n (%)			
0-12 months	5 (1.9)	24 (9.3)	29 (5.5)
1-3 years	72 (26.7)	77 (29.8)	149 (28.2)
4-7 years	129 (47.7)	76 (29.5)	205 (38.8)
8-12 years	64 (23.7)	81 (31.4)	145 (27.5)

Table 2. Demographics for Study 1 by Flyer Version

	Overall	Flyer Version					P ^a
		Control Group	Natural Progression	Premature Graduation	Risk Reduction	Age-Based	
Number of subjects	300	58	61	60	58	63	
Age of parent, mean (SD ^b)	35.6 (7.3)	36.2 (8.0)	35.3 (7.4)	35.4 (6.8)	34.2 (6.4)	36.6 (7.9)	.43 ^b
Race, n (%)							.90 ^c
	American Indian or Alaska Native	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Asian	9 (3.0)	3 (5.2)	1 (1.6)	1 (1.7)	2 (3.2)	
	Black or African American	103 (34.3)	20 (34.5)	18 (29.5)	25 (41.7)	19 (30.2)	
	Native Hawaiian or Other Pacific Islander	2 (0.7)	0 (0.0)	1 (1.6)	0 (0.0)	1 (1.6)	
	White	182 (60.7)	34 (58.6)	39 (63.9)	34 (56.7)	41 (65.1)	
	Other	4 (1.3)	1 (1.7)	2 (3.3)	0 (0.0)	0 (0.0)	
Ethnicity, n (%)							.20 ^c
	Hispanic	15 (5.0)	1 (1.7)	3 (4.9)	1 (1.7)	4 (6.3)	
	Non-Hispanic	285 (95.0)	57 (98.3)	58 (95.1)	59 (98.3)	59 (93.7)	
Gender, n (%)							.19 ^d
	Male	33 (11.0)	5 (8.6)	3 (4.9)	9 (15.0)	6 (9.5)	
	Female	267 (89.0)	53 (91.4)	58 (95.1)	51 (85.0)	57 (90.5)	
Location, n (%)							.99 ^d
	Philadelphia	150 (50.0)	29 (50.0)	32 (52.5)	29 (48.3)	32 (50.8)	
	Hampton Roads	150 (50.0)	29 (50.0)	29 (47.5)	31 (51.7)	31 (49.2)	
Education, n (%)							.80 ^d
	Grade school	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Some high school	3 (1.0)	0 (0.0)	2 (3.3)	0 (0.0)	1 (1.6)	
	High school diploma/GED	29 (9.7)	7 (12.1)	3 (4.9)	6 (10.0)	7 (11.1)	
	Some college	55 (18.3)	11 (19.0)	10 (16.4)	13 (21.7)	10 (15.9)	
	2-year degree/trade school	39 (13.0)	5 (8.6)	9 (14.8)	7 (11.7)	6 (9.5)	
	Bachelor's degree	111 (37.0)	22 (37.9)	26 (42.6)	22 (36.7)	25 (39.7)	
	Graduate degree	63 (21.0)	13 (22.4)	11 (18.0)	12 (20.0)	14 (22.2)	
Income, n (%)							.11 ^c
	\$0-15,999	18 (6.0)	5 (8.6)	4 (6.6)	0 (0.0)	5 (7.9)	
	\$16,000-24,999	18 (6.0)	3 (5.2)	3 (4.9)	5 (8.3)	5 (7.9)	
	\$25,000-49,999	73 (24.4)	12 (20.7)	9 (14.8)	20 (33.3)	14 (22.2)	
	\$50,000-99,999	100 (33.3)	20 (34.5)	29 (47.5)	16 (26.8)	16 (25.5)	
	\$100,000+	69 (23.0)	12 (20.7)	11 (18.0)	14 (23.3)	21 (33.3)	
	Decline to answer	22 (7.3)	6 (10.3)	5 (8.2)	5 (8.3)	2 (3.2)	
Age of children ^e , n (%)							.88 ^d
	0-12 months	29 (5.5)	3 (3.3)	7 (6.0)	5 (4.7)	5 (4.4)	
	1-3 years	149 (28.2)	28 (31.1)	29 (24.8)	30 (28.3)	29 (25.7)	
	4-7 years	205 (38.8)	36 (40.0)	46 (39.3)	40 (37.7)	47 (41.6)	
	8-12 years	145 (27.5)	23 (25.6)	35 (29.9)	31 (29.3)	32 (28.3)	

^a SD = standard deviation; ^b P-value calculated using analysis of variance; ^c P-value calculated using Fisher's exact test; ^d P-value calculated using chi-square test; ^e Included multiple children for each parent, if applicable

Table 3. Changes in Scores Over Time by Flyer Version

	Control Group (Δ)	Natural Progression (Δ)	Premature Graduation (Δ)	Risk Reduction (Δ)	Age-Based (Δ)	P ^a	F	Partial eta ²
Number of subjects	58	61	60	58	63			
Restraint Selection Score	1.2 (1.5)	1.8 (1.8)	1.6 (1.8)	2.2 (2.1)	1.3 (2.0)	<.001	F(4,293)=7.72	.10
Total Knowledge Score	3.0 (4.2)	3.6 (6.3)	4.8 (4.7)	4.0 (4.9)	3.5 (4.2)	.14	F(4,294)=1.75	.02
Seat Belt Knowledge	0.9 (2.4)	0.7 (2.0)	0.7 (2.2)	0.1 (2.2)	0.2 (1.8)	.08	F(4,294)=2.10	.03
Back Seat Knowledge	0.2 (1.9)	0.5 (2.3)	1.1 (1.8)	0.9 (2.1)	0.6 (1.8)	.03	F(4,294)=2.84	.04
Booster Knowledge	1.1 (2.4)	0.6 (2.5)	1.8 (2.2)	1.0 (2.0)	1.2 (2.6)	.04	F(4,293)=2.59	.03
Rear-facing Knowledge	0.5 (1.5)	1.3 (2.1)	1.2 (1.5)	1.5 (2.1)	1.1 (1.8)	<.001	F(4,293)=5.33	.07
Forward-facing Knowledge	0.2 (1.4)	0.4 (1.4)	0.1 (1.4)	0.5 (1.1)	0.4 (1.6)	.29	F(4,294)=1.26	.02
Total Threat Score	-0.3 (2.6)	0.4 (2.5)	0.6 (2.5)	0.2 (3.9)	0.8 (1.9)	.37	F(4,294)=1.07	.01
Total Threat Plus Score	0.3 (4.1)	1.7 (3.0)	1.9 (3.7)	1.5 (5.1)	2.0 (3.1)	.14	F(4,294)=1.77	.02
Severity	-0.1 (1.5)	0.5 (1.6)	0.3 (1.3)	0.2 (2.1)	0.2 (1.1)	.38	F(4,294)=1.06	.01
Severity Plus	0.6 (1.9)	1.3 (1.6)	1.3 (1.8)	1.3 (2.0)	1.2 (1.8)	.06	F(4,294)=2.26	.03
Susceptibility	-0.3 (1.6)	-0.1 (1.5)	0.3 (1.6)	0.0 (2.2)	0.6 (1.4)	.24	F(4,294)=1.38	.02
Total Efficacy Score	-0.3 (2.7)	0.8 (1.9)	1.1 (1.7)	1.1 (2.2)	0.6 (2.2)	.01	F(4,294)=3.64	.05
Response Efficacy	-0.3 (1.4)	0.1 (1.0)	0.2 (1.0)	0.3 (1.4)	0.2 (1.4)	.11	F(4,294)=1.88	.03
Self-efficacy	0.0 (1.5)	0.7 (1.3)	0.9 (1.3)	0.8 (1.4)	0.4 (1.4)	.01	F(4,294)=3.48	.05
Total Attitudes Score	-0.2 (3.0)	2.4 (3.8)	2.5 (2.7)	2.3 (3.5)	1.8 (3.3)	<.001	F(4,294)=8.03	.10
Backseat Attitudes	-0.1, 0.0 (0.0-0.0)	0.4, 0.0 (0.0-1.0)	0.4, 0.0 (0.0-1.0)	0.2, 0.0 (0.0-1.0)	0.0, 0.0 (0.0-0.0)	.28	F(4,294)=1.27	.02
Booster Attitudes	-0.1 (1.2)	0.6 (1.2)	0.7 (1.3)	0.6 (1.3)	0.4 (1.1)	.001	F(4,294)=5.00	.06
Forward-facing Attitudes	0.3 (1.1)	0.7 (1.7)	0.9 (1.3)	0.7 (1.6)	0.9 (1.6)	.04	F(4,294)=2.51	.03
Rear-facing Attitudes	0.1, 0.0 (0.0-0.0)	0.7, 0.0 (0.0-1.0)	0.7, 1.0 (0.0-1.0)	0.7, 1.0 (0.0-1.0)	0.4, 0.0 (0.0-1.0)	<.001	F(4,294)=6.43	.08
General Attitudes	-0.4, 0.0 (0.0-0.0)	0.0, 0.0 (0.0-0.0)	-0.1, 0.0 (0.0-0.0)	0.1, 0.0 (0.0-0.0)	0.0, 0.0 (0.0-0.0)	.046	F(4,294)=2.45	.03
Stated Intentions Score	-0.1 (3.0)	1.2 (4.0)	1.3 (2.8)	2.2 (4.1)	1.5 (4.6)	.001	F(4,293)=5.00	.06

Note: Descriptive statistics reported as mean (standard deviation) or mean, median (interquartile range); P-values were adjusted using Sidak's adjustment for multiple comparisons; ^a P-value for main effect for flyer version

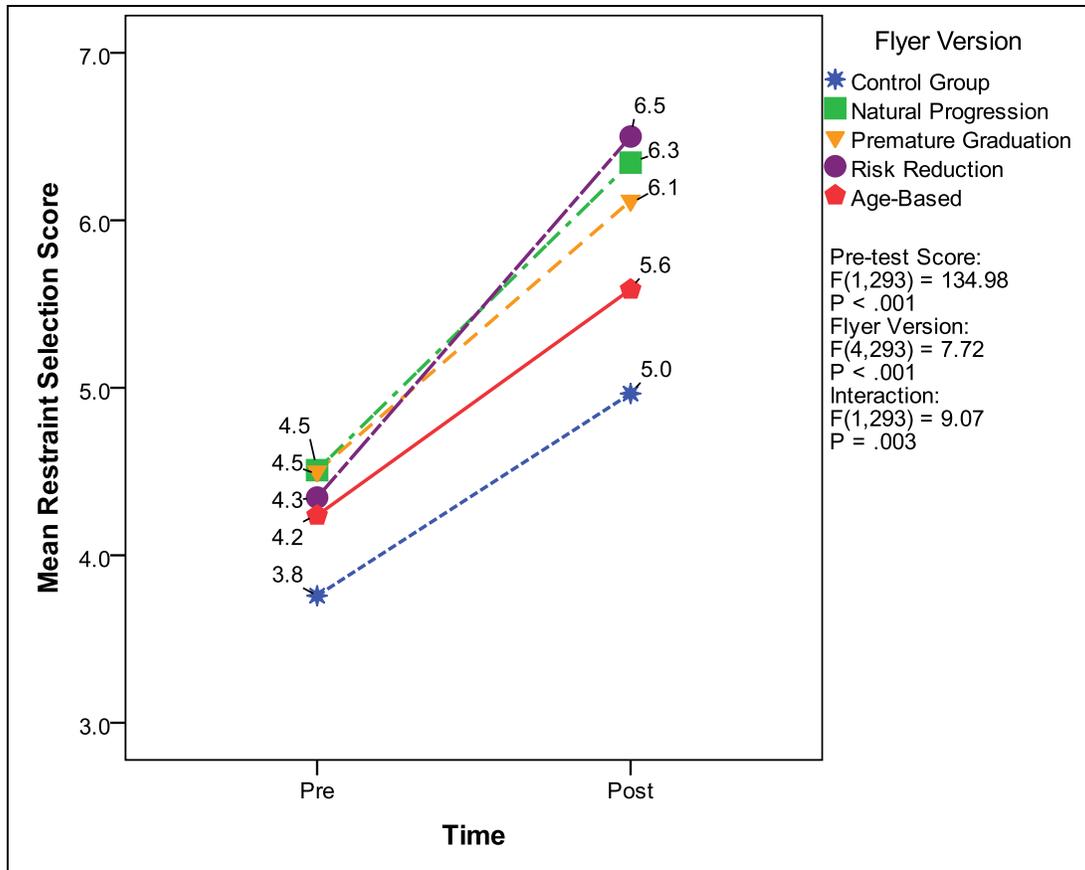


Figure 3. Changes in Restraint Selection Score by Flyer Version

It should be noted that in this analysis, it appears that control group scores improved from pre-test to post-test, despite the lack of education. This is not uncommon in repeated measures tests of knowledge, where participants become more adept at answering questions correctly on a post-survey simply by paying attention to the question wording and response options available in the many subscales of a pre-survey. For example, participants may note the number of times age is present in an item or response choices regarding rear-facing transitions, and after concluding that this must be the right answer, begin choosing this response for subsequent knowledge questions on the post-test.

Changes in Child Passenger Safety Knowledge

Child Passenger Safety Knowledge analyses revealed a significant main effect for flyer for Back Seat Knowledge, $F(4, 294) = 2.84, p = .03, \eta_p^2 = .04$. Specifically, after adjusting for pre-test scores, post-test scores for the Risk Reduction Rationale ($p = .04$) and Premature Graduation ($p = .04$) flyers were significantly higher than the control group. For Booster Seat Knowledge, there was a significant main effect for flyer, $F(4, 293) = 2.59, p = .04, \eta_p^2 = .03$. While it appears the Premature Graduation version resulted in greater change in Booster Knowledge, there was an interaction indicating flyers performed differently for high versus low prescores, $F(1, 293) = 7.11, p = .01, \eta_p^2 = .02$. Further comparisons for Booster Knowledge lacked power to reach significance. Regarding Rear-Facing Knowledge, there was a significant main effect for flyer, $F(4, 293) = 5.33, p < .001, \eta_p^2 = .07$, and a significant interaction between pre-test score and flyer

version, $F(1, 293) = 9.61, p = .002, \eta_p^2 = .03$. After analyzing the interaction, participants viewing the Risk Reduction Rationale ($p = .03$) or Natural Progression ($p = .003$) versions performed significantly better than participants in the control group for all but the highest 20 percent of pre-test scores. Participants in the Premature Graduation version performed somewhere in the middle, no better than those in the Control and no worse than those in the Risk Reduction Rationale and Natural Progression Groups. Figure 4 depicts mean changes in rear-facing knowledge by group. No significant main effects for flyer were evident for Seat Belt Knowledge or Forward-Facing Knowledge subscales. In summary, the greatest changes in knowledge were found most often among participants who viewed either the flyer that emphasized the rationale behind the recommendations, or the one that focused on dissuading premature graduation.

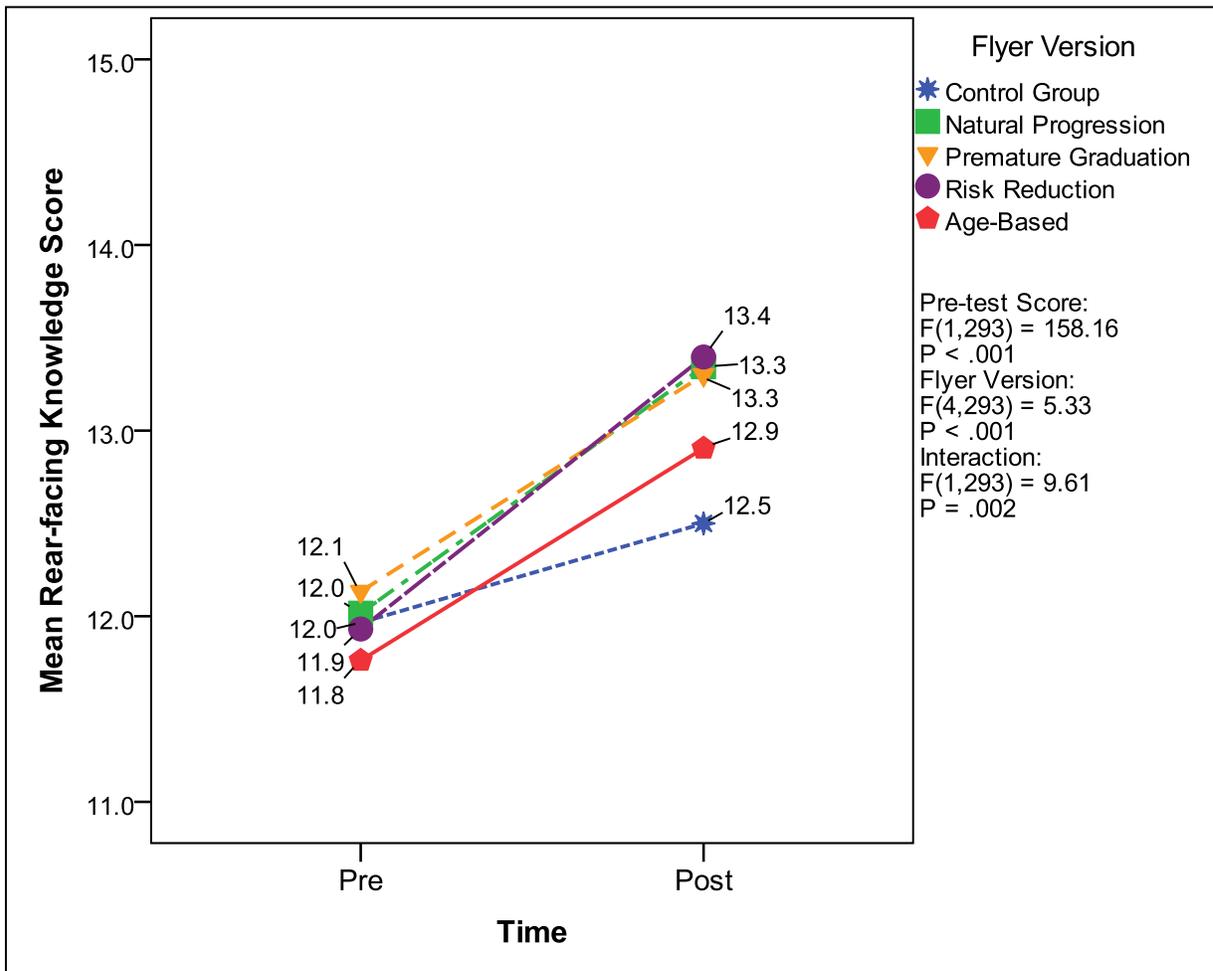


Figure 4. Changes in Rear-Facing Knowledge by Flyer Version

Changes in Perceptions of Efficacy and Threat

Analyses of Threat and Efficacy subscales revealed a significant main effect for flyer for Total Efficacy, $F(4, 294) = 3.64, p = .01, \eta_p^2 = .05$, and for Self-Efficacy, $F(4, 294) = 3.48, p = .01, \eta_p^2 = .05$. After adjusting for pre-test scores, participants viewing the Risk Reduction Rationale ($p = .02$) or Premature Graduation ($p = .01$) flyers reported significantly higher total efficacy than participants in the control group at post-test. Participants viewing the Natural Progression or Age-Based versions did not differ significantly from the control group. After adjusting for pre-test scores, participants viewing the Premature Graduation flyer had significantly higher Self-Efficacy scores at post-test ($p = .01$) compared to those in the control group. No other groups differed from Control for Self-Efficacy. Figure 5 presents changes in Self-Efficacy scores by group. No significant main effects for flyer were evident for the Threat Perceptions (Severity and Susceptibility) or Response Efficacy Subscales. In summary, participants who viewed the flyer that focused on dissuading premature graduation exhibited greater increases in efficacy compared to participants in other groups.

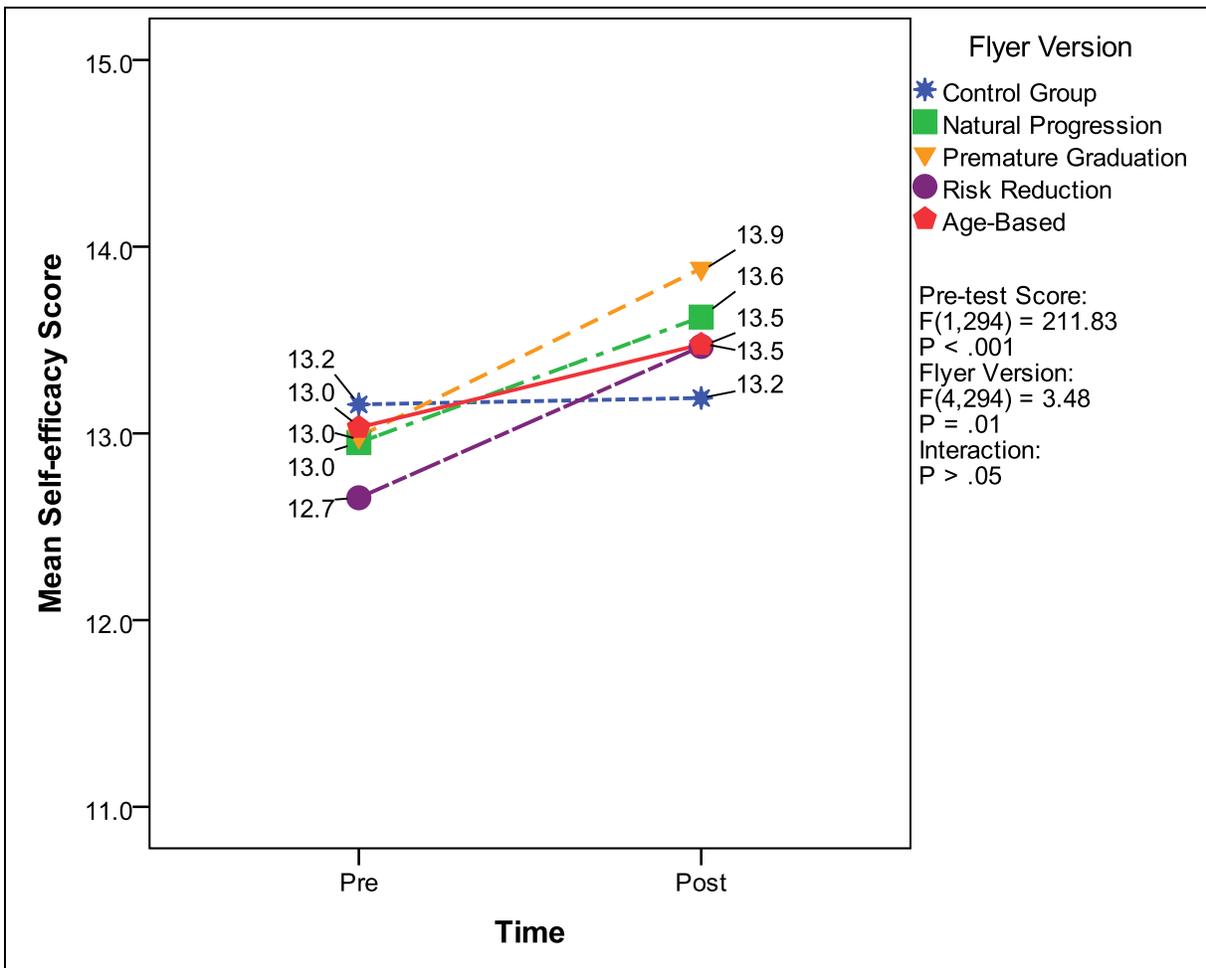


Figure 5. Changes in Self-Efficacy by Flyer Version

Changes in Attitudes and Intentions

Analyses of the Overall Attitudes scale revealed a significant main effect for flyer, $F(4, 294) = 8.03, p < .001, \eta_p^2 = .10$. After adjusting for pre-test scores, the Natural Progression ($p < .001$), Premature Graduation ($p < .001$), Risk Reduction Rationale ($p < .001$), and Age-Based ($p = .01$) flyers performed significantly better than the control group in changing attitudes, but the four flyers did not significantly differ from one another. Figure 6 presents mean changes in overall attitudes by group. Regarding the Booster Attitudes subscale, there was a significant main effect for flyer, $F(4, 294) = 5.00, p = .001, \eta_p^2 = .06$, where post-test scores for the Risk Reduction Rationale ($p = .01$), Natural Progression ($p = .001$), and Premature Graduation ($p = .004$) flyers were significantly higher than Control after adjusting for pre-test scores. There was also a significant main effect for flyer for the Forward-Facing Attitudes subscale, $F(4, 294) = 2.51, p = .04, \eta_p^2 = .03$. However, pairwise comparisons lacked power to reach significance. It appears that all 4 flyers were likely different from control in their ability to change Forward-Facing Attitudes. Analyses for the Rear-Facing Attitudes subscale revealed a significant main effect for flyer, $F(4, 294) = 6.43, p < .001, \eta_p^2 = .08$. Pairwise comparisons for Rear-Facing Attitudes revealed post-test scores for the Risk Reduction Rationale ($p = .001$), Natural Progression ($p = .001$), and Premature Graduation ($p = .002$) flyers were all significantly higher than the Control after adjusting for pre-test scores. No significant main effect for flyer was evident for the Back Seat Attitudes subscale. In summary, all four flyer versions performed equally well in regards to overall attitude change; however, the Age-Based flyer did not differ from Control when looking specifically at Booster Attitudes and Rear-Facing Attitudes.

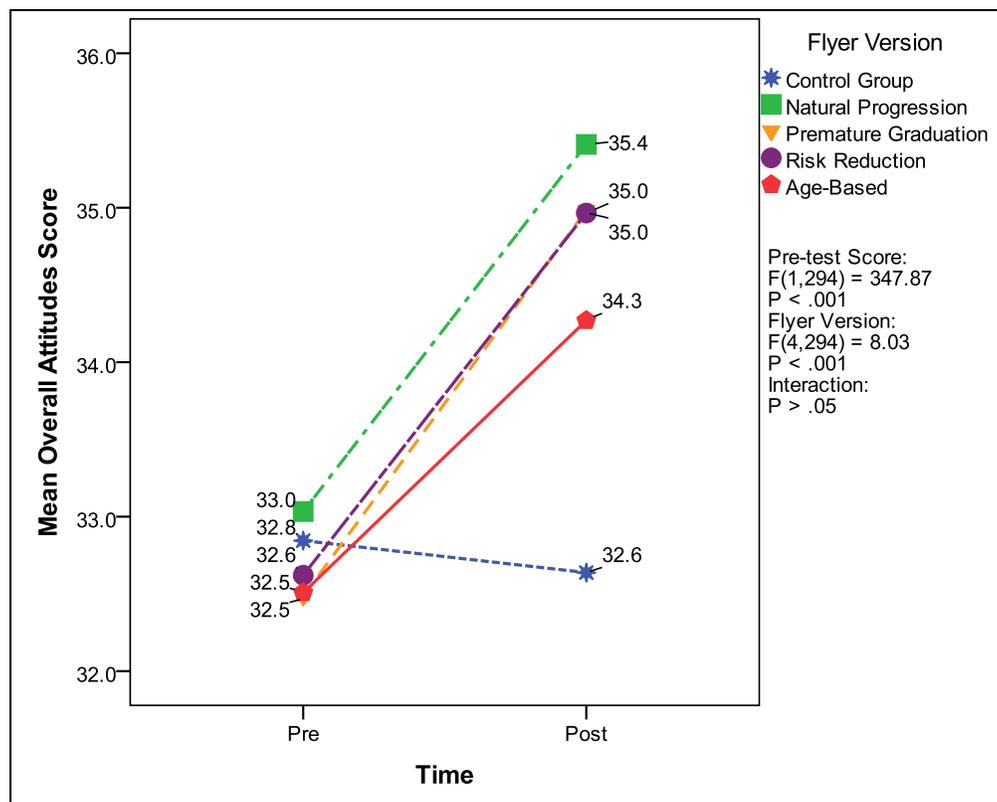


Figure 6. Changes in Overall Attitude by Flyer Version

Analyses for parents' Stated Intentions revealed a significant main effect for flyer, $F(4, 293) = 5.00, p = .001, \eta_p^2 = .06$, and a significant interaction with pre-test score, $F(1, 293) = 12.87, p < .001, \eta_p^2 = .04$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. For all except the highest prescores, Risk Reduction Rationale ($p = .04$), Natural Progression ($p = .04$), and Age-Based ($p = .04$) flyers all resulted in significantly higher post-scores than control.

Additionally, except for the highest prescores, the Risk Reduction Rationale flyer resulted in significantly higher post-scores than the Premature Graduation flyer ($p = .04$). Figure 7 depicts mean changes in stated intentions by group.

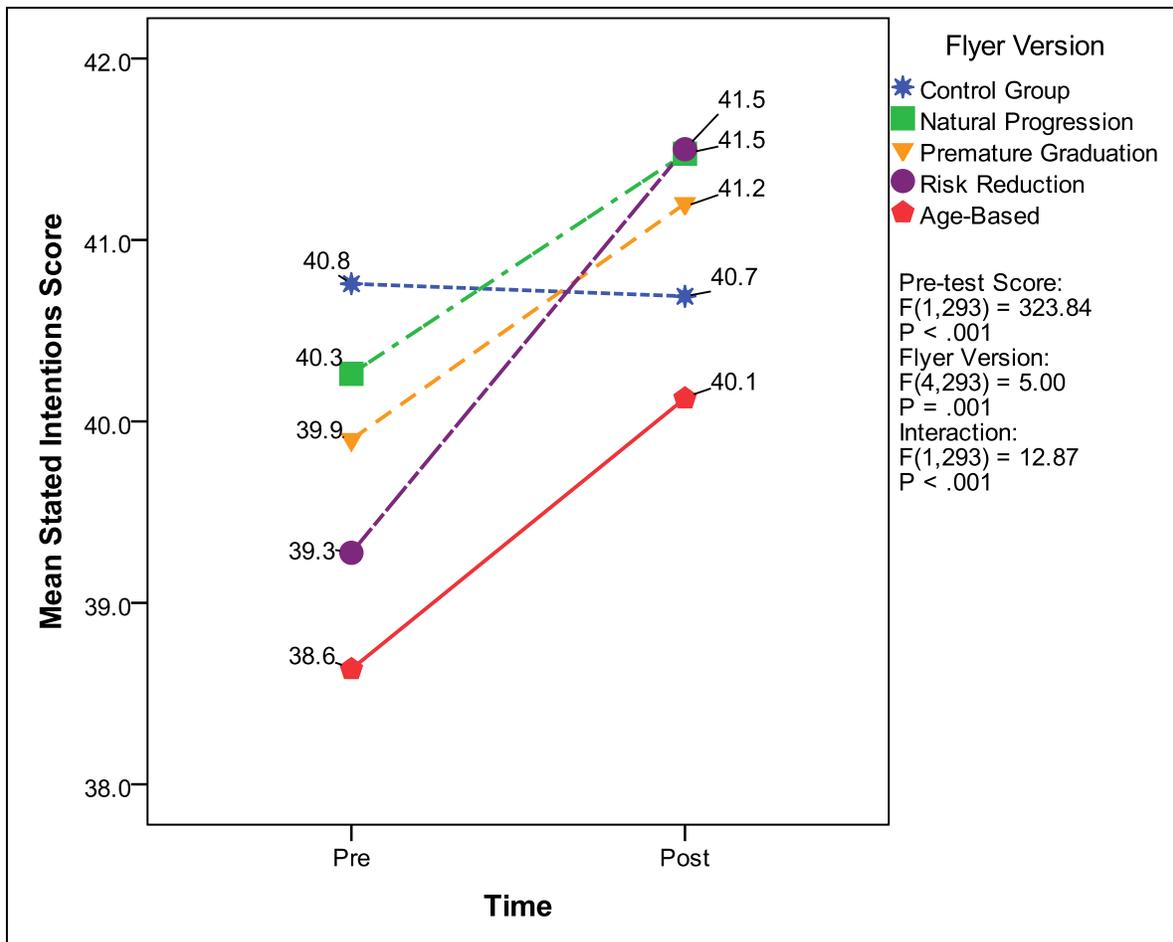


Figure 7. Changes in Stated Intentions by Flyer Version

Judgments of Relevance and Acceptability of Materials

Fisher's exact test was used to examine differences among flyers in parents' perceptions of the material presented. All flyers were rated favorably, and no significant differences were found among the four informational flyers for any of the subscales. Regarding parents' perceptions of the material presented, 99 percent of parents found the information to be organized and coherent, 99.6 percent reported the material to be relevant to their needs, and 98 percent believed the amount of information given was appropriate. Regarding parents' perceptions of the quality and clarity of material, 98 percent found the quality of material to be good or excellent, and 96 percent reported the clarity of the information to be good or excellent. Regarding parents' perceptions of learning and likelihood of changing behavior, 88 percent reported that they gained some or a lot of knowledge, and 83.1 percent believed they were likely to change behavior as a result of receiving the information.

3.2 Study 1 – Additional Data Collection – Informal Discussion Groups

Participants

In total, 32 parents (28 females and 4 males) participated in six discussion groups. The age range of parents was 20 to 65, with most ranging in age from approximately 22 to 45 years-old; 56 percent of participants were Black, 34 percent were White, and the remaining 10 percent identified as Asian, Hispanic, or other/ two or more races.

Analysis

The audiotapes were transcribed. No identifiers were present in the notes or transcriptions. Following transcription, the research team independently performed a qualitative analysis of the group discussion data, identifying themes, commonalities, and key feedback. The team then discussed their independent findings and worked to arrive at consensus and summarize the findings. The ideas and themes provided from participants helped the team better understand parents' preferences and needs regarding the information they receive.

Discussion of Car Seat Use Issues

When discussing the biggest problems or issues associated with child seat use, several responses were stated in most discussion groups. Parents felt the guidelines are not well known. One parent noted a particular issue with rapidly changing recommendations and child size:

“The thing is the information is always changing. They say rear face until 2, but what if you have a child that is really small? And at 5 years old they're the typical size of the 2 year old.”

Proper use of child safety seats is made further difficult due to the fact that state laws and child seat guidelines are not in sync. Information tends to be confusing and inconsistent, leading parents to feel unsure of the correct and safe use of child seats, especially with booster seats. Several parents admitted they did not understand why a booster seat was necessary. State laws also vary widely, leading to further inconsistency. Some parents felt the recommendations are

“unrealistic and overzealous,” such as the recommendation to keep children rear-facing up to or past the age of two. Appropriate transitioning, when to move a child into the next child seat or into a seat belt, was one of the biggest issues discussed.

“Well, I had some conflicting information with turning them face forward from rear facing. Ya know, some things I read said 18 months, some said 2 years, some said 3 years. So that was a little confusing, in that aspect.”

Several parents noted that while they understood a child is safer when rear-facing as long as possible, they do not follow the recommendation. Many parents explained that it upset their child to rear-face or that they did not think it was necessary.

“The crunchy mom thing that they’re doing and, ohhhh, raising all this heck about rear-facing and their 2-year-olds and I know how big a 2-year-old — the average 2-year-old and they’re still [rear-facing]. That’s what you want to do that’s fine I just don’t understand how we’re supposed to do that because their feet are too long and yeah ... I’m not saying times haven’t changed, but I think it is misleading. It’s not set in stone. It’s more of an opinionated guideline and not really a ‘let’s do this; this is what it needs to be.’”

“And like I said about the guidelines being misleading, I just felt my 1-year-old, technically, is supposed to be rear-facing and I just feel he’s entirely too big and is very hard for me to take his big seat, that’s a full car seat and put it backwards and have him—like he’s not going to sit in the car, his feet are pushing against the chair. There’s no way.”

Installation was a common area of difficulty, both with getting the seat into the car and getting the child properly and securely seated, especially given the wide variety of seat types and car models. Parents also reported having issues with understanding how to use all the belts and LATCH system correctly. Parents conveyed that it was difficult to ensure their child is properly restrained (harness tightened appropriately). Other problem areas for proper child seat use included a lack of hospital help upon discharge after delivery, lack of pediatrician guidance, and difficulty understanding car seat expirations.

Discussion of Pictures Used in Flyers

Parents overwhelmingly approved of the diversity used in the photos.

“One of the benefits that I did see is that you did use different ethnicities of the children, because unfortunately like some people are very, um, I don’t want to say prejudice, but some people do tend to relate to information if they do see someone that you know looks like them or reminds them of their child.”

“Looks appealing, right? I think one thing which attracts my attention is there is actually an Asian kid there. Not very often, right?”

The ages/sizes of the children depicted were well-received, and parents noted and liked the fact that older children for each phase were depicted to indicate the upper range of the recommendation. However, some parents would prefer to see two children depicted for the rear-

facing seat, an infant in a carrier and the older one as shown. It was suggested in several discussion groups that the photo for the rear-facing child should be shown from a wider angle so that it is easier to see that she is rear-facing. Another parent suggested two photos of rear-facing and booster-aged children.

“What about like multiple pictures, because convertible car seat is not the only kind that can be rear facing ... you can have a high back booster and just a regular booster.”

Several parents noted that the rainbow striped shirt worn by the child in stage 2 made it difficult to see the harnesses. They suggested putting all children in solid, light-colored clothing to visualize the restraints.

Discussion of Formatting Used in Flyers

With all flyer versions, general formatting themes came up. Parents would prefer a flyer that was brighter, with more eye-catching colors. Information that is most important was recommended to be highlighted or bolded. Parents felt bullet points would be more effective to convey important information rather than paragraphs, and preferred action-oriented headers as in Flyer 2 (Appendix A, A-2).

Discussion of Wording Used in Flyers

All flyer versions were reported to have too much verbiage. Parents wanted to read much less, stating that only the most important information should be given. The use of paragraphs was discouraged; instead bullet points with formatting for emphasis were suggested.

“Just tell me what I need to do. What do they need to weigh? How old do they need to be? What does their height need to be? Don’t make me read all of this. Honestly, as a parent... just tell me what I need to do. Don’t make me read all of this.”

During a discussion of recommended ages being included or not included on the flyers, one parent noted that while ages are what a parent wants to see, they may actually detract from the industry’s desired behavior change.

*“So, maybe even if that’s what we want to see, if you’re trying to help change the overall, we have a fixed mindset of certain things right now. If you’re trying to change that, maybe putting the specific ages on there is not going to be as effective as what you’re wanting to do. Even though we want to see that ... Take off the ages. Even though I agree with you (*nodding towards another participant), that is what I would prefer to see, but if your aim is really is try to reeducate us and change our fixed mindset, you would probably maybe not put that on there.”*

Parents had a difficult time understanding more technical terms, such as “harnesses” and “convertible” and vague terms, such as “until height and weight limits are met.” It was suggested to explain those terms better.

Parents tended to like the information included to convey danger, such as “Unrestrained children are three times more likely to be injured.” They noted that such statements really helped them to understand the risk of injury if their child is not properly restrained.

Discussion Specific to Flyer 1 (Appendix A, A-1)

Upon first glance, parents overwhelmingly felt there was far too much information to read. Some parents felt the children pictured were too big to be in the seats they were in, though as the conversation progressed they understood why those pictures were selected. The parents felt the older kids should be kept, if an infant was also pictured. Many parents admitted they will use the information on the flyer to check the height and weight limits on their current child safety seats. Parents liked the use of rows and columns for presentation of the information, but recommended bulleted points be used instead of paragraphs.

Discussion Specific to Flyer 2 (Appendix A, A-2)

Parents really liked the step visual and the numbered progression as it was visually more appealing, though many groups suggested it go from top to bottom rather than the current bottom step to top step. The amount of words was perceived as better, though still too much to read and the preference was noted for bullets. Participants liked the action-oriented headers in particular because they stated the most important information for each step.

Discussion Specific to Flyer 3 (Appendix A, A-3)

Parents in many groups reported preferring the flow diagram columns over the row formatting used in Flyer 1 and 2. Some parents thought the information to convey the dangers of crash forces at the top of the flyer were informative, while others felt it could be removed to improve use of space on the page. Parents suggested incorporating the headers from Flyer 2 at the top of each column of for Flyer 3. The “Here’s What to Do” and “Here’s Why” sections were highly favored and reportedly improved parent’s understanding of the need for proper restraint, when to transition, the rationale behind the recommendations.

“I really like how you have that on the bottom, you know. The bottom keeps letting me know, like, if you get into a crash, the baby will really get hurt.”

“It gives you a here’s why. If you can actually give me a good reason why they should be this way for that long then I’ll comply.”

Flyer Versions Preferred and Why

The majority (69%) of participants preferred Flyer 3 because of very informative regarding reasons for the recommendations; “Here’s What to Do” and “Here’s Why” sections for each stage; bulleted points; and flow diagram/column format. Twenty-eight percent of the participants preferred Flyer 2 because: headings/titles summarizing key actions; bolded sections; steps approach is visually appealing; and fewer words than the others. Only 1 participant preferred Flyer 1 because of the formatting style.

The remaining participants did not have a preference, instead noting favorite aspects of each version.

3.3 Study 2

Participants

Two hundred forty parents/caregivers of children aged birth to 7 years participated in the study (120 in the Philadelphia area and 120 in Norfolk/Hampton Roads area). Demographics are presented in Table 4 by location and Table 5 by condition. Twenty-three percent of participants were Black (36% of the Hampton Roads participants and 10% of the Philadelphia participants), and 72 percent were White (56% and 88% for Hampton Roads and Philadelphia, respectively). About 2 percent of Philadelphia and 5 percent of Hampton Roads participants were Hispanic. Regarding family income, 55 percent of participants reported incomes from \$25,000 to \$99,999, with 20 percent below \$25,000 and 18 percent above \$100,000. Mean parent ages were 35 and 33 years old in Philadelphia and Hampton Roads, respectively. Males made up 9 percent of the participants (11% and 8% for Philadelphia and Hampton Roads, respectively). Participants at the two sites did not significantly differ on responses to surveys/flyer versions.

Analysis

ANCOVA and pair-wise comparisons with Sidak's adjustment for Type 1 error were used to determine the relationship between group assignment (1 of 4 flyer versions) and post-test scores after adjusting for pre-test scores and the interaction between the independent factors when significant. This analysis compares differences among post-scores while controlling for prescores. Data was analyzed using SPSS 19 software and the level of significance was set at 0.05. After adjusting for pre-test scores, post-test score means revealed a significant main effect for flyer version on 7 subscales: (a) Restraint Selection Score; (b) Total Threat Score; (c) Total Threat Plus Score; (d) Susceptibility; (e) Self-Efficacy; (g) General Attitudes; and (h) Installation Score. These findings are presented in Table 6 and described separately below.

Changes in Restraint Selection Score

Analyses for Restraint Selection Score revealed a significant main effect for flyer, $F(3, 234) = 4.85, p = .003, \eta_p^2 = .06$, and a significant interaction with pre-test score, $F(1, 234) = 10.78, p = .001, \eta_p^2 = .04$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. After analyzing the interaction, the Recommendations Plus Installation version was more helpful than the Recommendations Alone version ($p = .02$) and the Recommendations plus Norms version ($p = .04$) for individuals with lower incoming restraint selection scores at pre-test. However, for individuals with higher incoming restraint selection scores at pre-test, the Recommendations Alone version was more helpful than the Recommendations Plus Installation version ($p = .02$). Figure 8 depicts mean changes in restraint selection scores by group for low and high pre-test scorers. In summary, the flyer that led to the best performance on the Restraint Selection Task varied depending on incoming knowledge regarding restraint and transition recommendations. For those with low restraint selection knowledge, additional installation information was most helpful; however, for those with high restraint selection knowledge, the basic recommendations without extra information appeared to be most helpful.

Table 4. Demographics of Study 2 Participants by Location

	Philadelphia Suburb, PA	Hampton Roads, VA	Overall
Number of subjects	120	120	240
Age of parent, mean (SD)	35.2 (6.5)	32.7 (6.7)	33.9 (6.7)
Race, n (%)			
American Indian or Alaska Native	0 (0.0)	1 (0.8)	1 (0.4)
Asian	1 (0.8)	2 (1.7)	3 (1.3)
Black or African American	12 (10.0)	43 (35.8)	55 (22.9)
Native Hawaiian or Other Pacific Islander	0 (0.0)	2 (1.7)	2 (0.8)
White	105 (87.5)	67 (55.8)	172 (71.7)
Other	0 (0.0)	0 (0.0)	0 (0.0)
Ethnicity, n (%)			
Hispanic	2 (1.7)	6 (5.0)	8 (3.3)
Non-Hispanic	118 (98.3)	114 (95.0)	232 (96.7)
Education, n (%)			
Grade school	0 (0.0)	0 (0.0)	0 (0.0)
Some high school	2 (1.7)	4 (3.3)	6 (2.5)
High school diploma/ GED	14 (11.7)	16 (13.3)	30 (12.5)
Some college	24 (20.0)	34 (28.3)	58 (24.2)
2-year degree/trade school	16 (13.3)	17 (14.2)	33 (13.8)
Bachelor's degree	42 (35.0)	33 (27.5)	75 (31.3)
Graduate degree	22 (18.3)	16 (13.3)	38 (15.8)
Income, n (%)			
\$0-15,999	6 (5.0)	21 (17.5)	27 (11.3)
\$16,000-24,999	7 (5.8)	14 (11.7)	21 (8.8)
\$25,000-49,999	21 (17.5)	33 (27.5)	54 (22.5)
\$50,000-99,999	41 (34.2)	37 (30.8)	78 (32.5)
\$100,000+	33 (27.5)	10 (8.3)	43 (17.9)
Decline to answer	12 (10.0)	5 (4.2)	17 (7.1)
Age of children, n (%)			
0-12 months	23 (11.3)	30 (14.7)	53 (13.0)
1-3 years	56 (27.6)	73 (35.8)	129 (31.7)
4-7 years	102 (50.2)	78 (38.2)	180 (44.2)
8-12 years	22 (10.8)	23 (11.3)	45 (11.1)

Table 5. Demographics for Study 2 by Flyer Version

		Overall	Flyer Version			<i>P</i>	
			Recs Alone	Recs + Install	Recs + Norms	All Combined	
Number of subjects		240	62	61	59	58	
Age of parent, mean (SD ^a)		33.9 (6.7)	34.7 (7.6)	33.4 (6.3)	32.4 (5.6)	35.2 (7.0)	.09 ^b
Race, n (%)							.58 ^{cd}
	American Indian or Alaska Native	1 (0.4)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.7)	
	Asian	3 (1.3)	0 (0.0)	1 (1.6)	1 (1.7)	1 (1.7)	
	Black or African American	55 (22.9)	10 (16.1)	13 (21.3)	19 (32.2)	13 (22.4)	
	Native Hawaiian or Other Pacific Islander	2 (0.8)	0 (0.0)	1 (1.6)	1 (1.7)	0 (0.0)	
	White	172 (71.7)	48 (77.4)	45 (73.8)	37 (62.7)	42 (72.4)	
	Other	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Ethnicity							.09 ^c
	Hispanic	8 (3.3)	0 (0.0)	1 (1.6)	3 (5.1)	4 (6.9)	
	Non-Hispanic	232 (96.7)	62 (100.0)	60 (98.4)	56 (94.9)	54 (93.1)	
Gender, n (%)							.24 ^e
	Male	22 (9.2)	5 (8.1)	8 (13.1)	2 (3.4)	7 (12.1)	
	Female	218 (90.8)	57 (91.9)	53 (86.9)	57 (96.6)	51 (87.9)	
Location, n (%)							.92 ^e
	Philadelphia	120 (50.0)	33 (53.2)	31 (50.8)	28 (47.5)	28 (48.3)	
	Hampton Roads	120 (50.0)	29 (46.8)	30 (49.2)	31 (52.5)	30 (51.7)	
Education							.98 ^e
	Grade school	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
	Some high school	6 (2.5)	1 (1.6)	2 (3.3)	2 (3.4)	1 (1.7)	
	High school diploma/GED	30 (12.5)	10 (16.1)	5 (8.2)	7 (11.9)	8 (13.8)	
	Some college	58 (24.2)	12 (19.4)	18 (29.5)	12 (20.3)	16 (27.6)	
	2-year degree/trade school	33 (13.8)	7 (11.3)	9 (14.8)	9 (15.3)	8 (13.8)	
	Bachelor's degree	75 (31.3)	21 (33.9)	18 (29.5)	21 (35.6)	15 (25.9)	
	Graduate degree	38 (15.8)	11 (17.7)	9 (14.8)	8 (13.6)	10 (17.2)	
Income, n (%)							.74 ^e
	\$0-15,999	27 (11.3)	4 (6.5)	10 (16.4)	6 (10.2)	7 (12.1)	
	\$16,000-24,999	21 (8.8)	7 (11.3)	3 (4.9)	7 (11.9)	4 (6.9)	
	\$25,000-49,999	54 (22.5)	12 (19.4)	12 (19.7)	14 (23.7)	16 (27.6)	
	\$50,000-99,999	78 (32.5)	19 (30.6)	22 (36.1)	18 (30.5)	19 (32.8)	
	\$100,000+	43 (17.9)	15 (24.2)	10 (16.4)	9 (15.3)	9 (15.5)	
	Decline to answer	17 (7.1)	5 (8.1)	4 (6.6)	5 (8.5)	3 (5.2)	
Age of children ^f , n (%)							.32 ^e
	0-12 months	53 (13.0)	15 (13.8)	13 (12.3)	13 (13.8)	12 (12.2)	
	1-3 years	129 (31.7)	34 (31.2)	31 (29.2)	33 (35.1)	31 (31.6)	
	4-7 years	180 (44.2)	51 (46.8)	44 (41.5)	44 (46.8)	41 (41.8)	
	8-12 years	45 (11.1)	9 (8.3)	18 (17.0)	4 (4.3)	14 (14.3)	

^a SD = standard deviation; ^b *P* value calculated using analysis of variance; ^c *P* value calculated using Fisher's exact test; ^d Hypothesis test for Black or African American vs. White vs. all other races; ^e *P* value calculated using chi-square test; ^f Included multiple children for each parent, if applicable

Table 6. Changes in Scores Over Time by Flyer Version

	Recs Alone (Δ)	Recs + Install (Δ)	Recs + Norms (Δ)	All Combined (Δ)	<i>P</i> ^a	F	Partial eta ²
Number of subjects	62	61	59	58			
Restraint Selection Score	1.8 (1.7)	2.4 (2.2)	1.8 (1.8)	2.1 (1.8)	.003	F(3,234)=4.85	.06
Total Knowledge Score	4.5 (5.2)	5.8 (5.3)	4.8 (5.0)	3.9 (5.6)	.18	F(3,235)=1.64	.02
Seat Belt Knowledge	0.7 (2.0)	0.8 (2.4)	0.7 (1.9)	0.8 (2.2)	.90	F(3,235)=0.19	.002
Back Seat Knowledge	0.9 (2.0)	1.3 (2.2)	1.0 (1.8)	0.7 (2.3)	.17	F(3,235)=1.70	.02
Booster Knowledge	1.4 (2.3)	1.3 (2.3)	1.3 (2.1)	1.5 (2.7)	.86	F(3,235)=0.25	.003
Rear-facing Knowledge	1.3 (1.8)	1.8 (1.9)	1.3 (1.6)	1.0 (1.8)	.10	F(3,235)=2.09	.03
Forward-facing Knowledge	0.2 (1.3)	0.5 (1.3)	0.4 (1.6)	-0.1 (1.5)	.14	F(3,235)=1.83	.02
Total Threat Score	0.7 (1.9)	0.4 (1.9)	0.9 (2.2)	0.8 (3.2)	<.001	F(3,234)=6.65	.08
Total Threat Plus Score	1.9 (3.4)	1.9 (3.2)	2.1 (3.6)	1.8 (5.1)	.003	F(3,234)=4.66	.06
Severity	0.4 (1.0)	0.5 (1.4)	0.5 (1.5)	0.4 (1.7)	.07	F(3,234)=2.36	.03
Severity Plus	1.3 (2.1)	1.5 (1.9)	1.2 (2.2)	1.0 (2.5)	.67	F(3,235)=0.52	.01
Susceptibility	0.3 (1.3)	-0.1 (1.5)	0.5 (1.7)	0.4 (1.9)	.01	F(3,234)=4.15	.05
Total Efficacy Score	0.6 (2.1)	0.7 (2.0)	1.0 (2.6)	0.8 (2.6)	.86	F(3,235)=0.25	.003
Response Efficacy	0.3 (1.4)	0.1 (1.1)	0.2 (1.6)	0.2 (1.7)	.89	F(3,235)=0.21	.003
Self-efficacy	0.3 (1.2)	0.6 (1.3)	0.8 (1.8)	0.6 (1.4)	.001	F(3,234)=5.79	.07
Total Attitudes Score	2.5 (3.6)	2.4 (3.1)	2.6 (3.6)	2.4 (2.8)	.57	F(3,235)=0.68	.01
Backseat Attitudes	0.0, 0.0 (0.0-1.0)	0.4, 0.0 (0.0-1.0)	0.3, 0.0 (0.0-1.0)	0.1, 0.0 (0.0-0.0)	.62	F(3,235)=0.60	.01
Booster Attitudes	1.0 (1.0)	0.9 (1.2)	0.6 (1.4)	0.8 (1.4)	.13	F(3,235)=1.88	.02
Forward-facing Attitudes	0.2, 0.0 (0.0-0.0)	-0.1, 0.0 (0.0-0.0)	0.1, 0.0 (0.0-1.0)	0.4, 0.0 (0.0-1.0)	.19	F(3,235)=1.62	.02
Rear-facing Attitudes	1.2 (1.8)	1.2 (1.6)	1.5 (2.0)	1.1 (1.9)	.28	F(3,235)=1.29	.02
General Attitudes	0.1, 0.0 (0.0-0.0)	0.0, 0.0 (0.0-0.0)	0.2, 0.0 (0.0-0.0)	0.0, 0.0 (0.0-0.0)	.01	F(3,234)=4.35	.05
Stated Intentions Score	1.8 (3.3)	2.0 (3.8)	1.6 (2.8)	1.0 (3.2)	.41	F(3,235)=0.98	.01
Installation Score	0.0 (2.1)	5.3 (5.1)	-0.3 (2.4)	4.6 (3.7)	<.001	F(3,234)=29.27	.27

Note: Descriptive statistics reported as mean (standard deviation) or mean, median (interquartile range); *P* values for multiple comparisons were adjusted using Sidak's adjustment for Type I error; ^a *P* value for main effect for flyer version

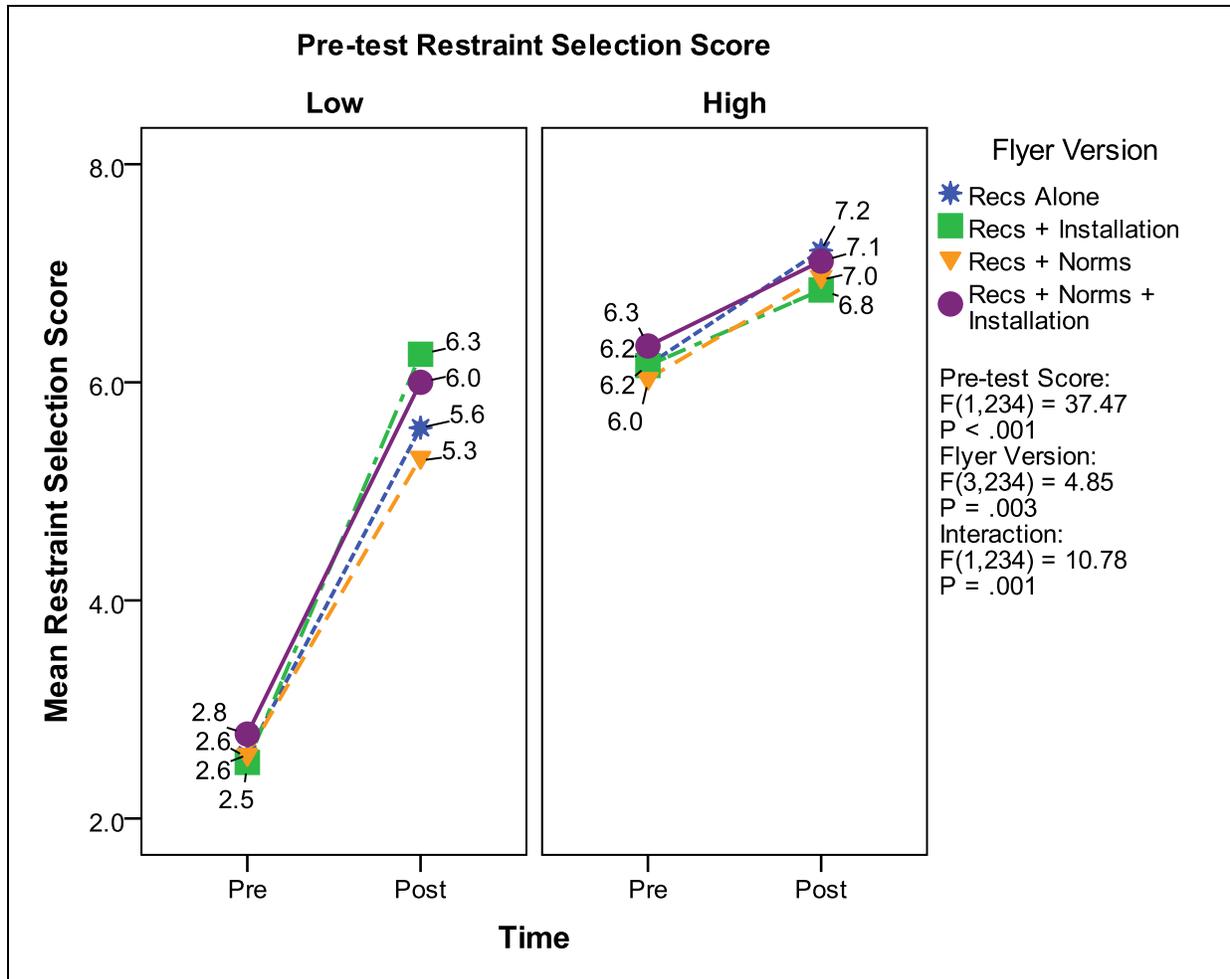


Figure 8. Change in Restraint Selection Score Over Time by Flyer Version and Pre-Test Score

Changes in Child Passenger Safety Knowledge

Child passenger safety knowledge analyses revealed no significant main effects for flyer, indicating the flyer versions failed to have a differential effect on more general CPS knowledge.

Changes in Perceptions of Efficacy and Threat

Analyses of threat subscales revealed several significant main effects and interaction effects. First, analyses for the Total Threat Subscale revealed a significant main effect for flyer, $F(3, 234) = 6.65, p < .001, \eta_p^2 = .08$, and a significant interaction with pre-test score, $F(1, 234) = 18.02, p < .001, \eta_p^2 = .07$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. After analyzing the interaction, the Recommendations Plus Installation plus Norms (All Combined) version was most helpful for participants with lower Total Threat prescores compared to the Recommendations Alone version ($p = .001$), the Recommendations plus Norms version ($p = .001$), and the Recommendations Plus Installation version ($p = .001$). However, for individuals with higher incoming Total Threat scores at pre-test, the Recommendations Plus

Installation plus Norms (All Combined) version was least helpful compared to all other versions, including the Recommendations Alone version ($p = .001$), the Recommendations plus Norms version ($p = .001$), and the Recommendations Plus Installation version ($p = .001$). Figure 9 depicts mean changes in Total Threat scores by group for low and high pre-test scorers. These results were repeated for the Threat Plus subscale, which includes additional items measuring perceived threat, main effect for flyer, $F(3, 234) = 4.66, p = .003, \eta_p^2 = .06$, and a significant interaction with pre-test score, $F(1, 234) = 14.14, p < .001, \eta_p^2 = .06$. Again, the All Combined flyer version outperformed the other three flyers when incoming scores were low, but this result was flipped for higher pre-test scorers as each of the other three flyer versions outperformed the All Combined version (all comparisons significant at $p = .001$).

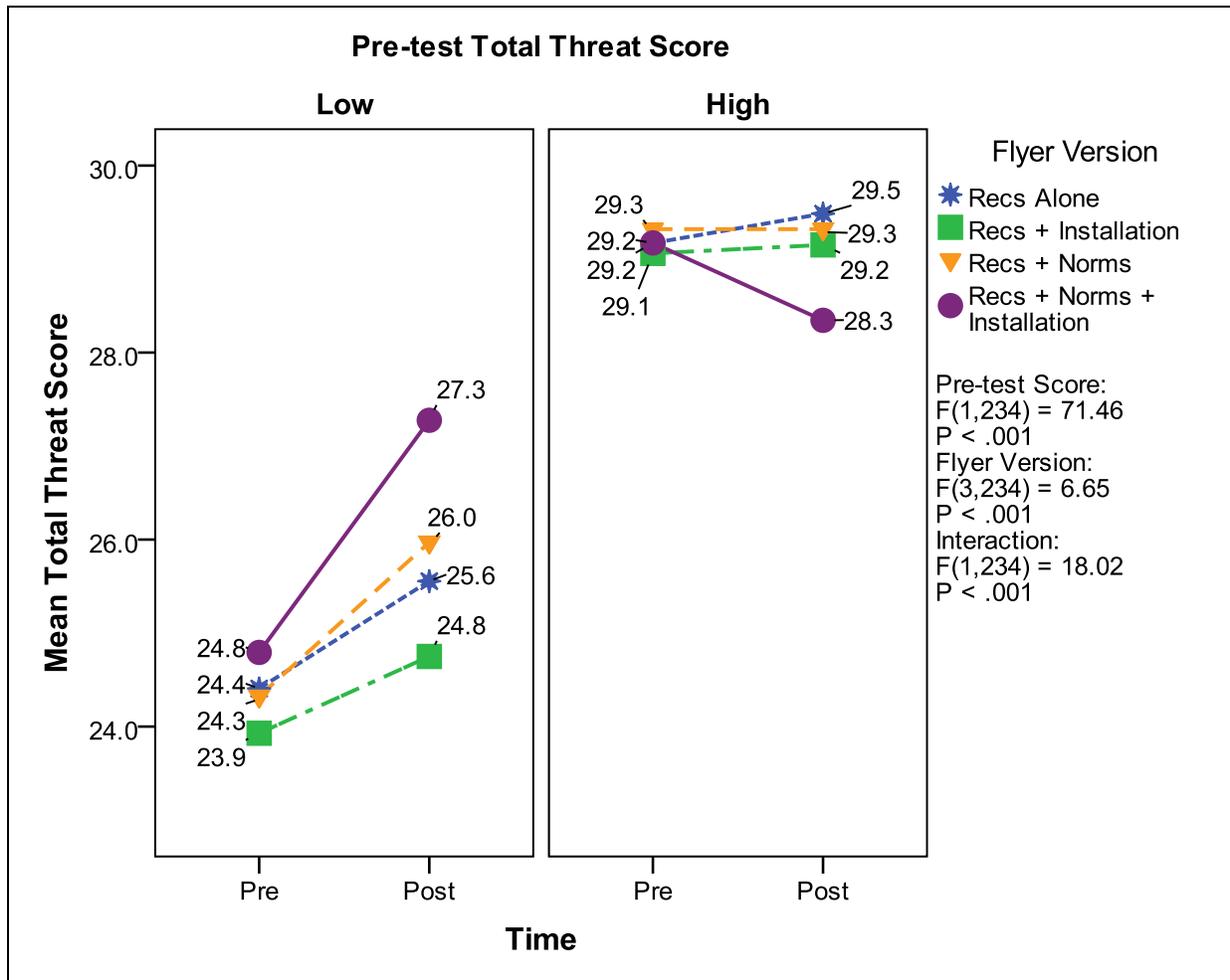


Figure 9. Change in Total Threat Score Over Time by Flyer Version and Pre-Test Score

Analyses for the Susceptibility Subscale revealed a significant main effect for flyer, $F(3, 234) = 4.15, p = .01, \eta_p^2 = .05$, and a significant interaction with pre-test score, $F(1, 234) = 7.64, p = .01, \eta_p^2 = .03$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. After analyzing the interaction, the Recommendations Plus Installation plus Norms (All Combined) version outperformed the Recommendations Plus Installation version for all but the highest prescorers on the Susceptibility subscale ($p = .047$). Figure 10 depicts mean changes in Susceptibility scores by group for low and high pre-test scorers.

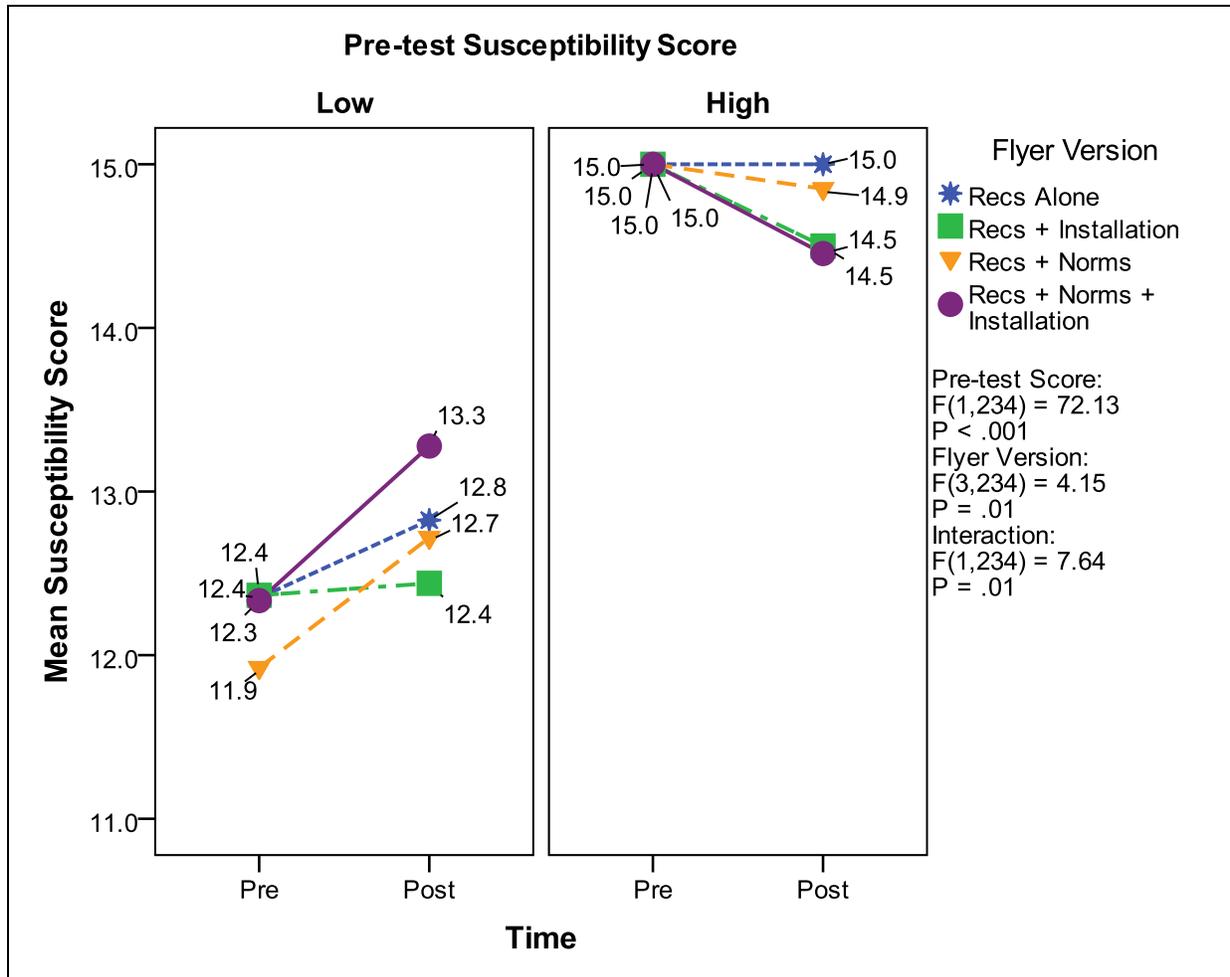


Figure 10. Change in Susceptibility Score Over Time by Flyer Version and Pre-Test Score

Regarding Efficacy subscales, analyses revealed a main effect for flyer for Self-Efficacy, $F(3, 234) = 5.79, p = .001, \eta_p^2 = .07$, and a significant interaction with pre-test score, $F(1, 234) = 14.32, p < .001, \eta_p^2 = .06$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. Among low scorers at pre-test, the versions of the flyer including normative information (Recommendations plus Norms and Recommendations plus Norms Plus Installation) led to greater changes in Self-Efficacy compared to Recommendations alone and Recommendations Plus Installation versions (comparisons significant at $p = .001$). However, among high scorers at pre-test, the opposite was true where versions of the flyers without normative information (Recommendations Alone and Recommendations Plus Installation) led to greater changes in Self-Efficacy (comparisons significant at $p = .001$). Figure 11 depicts mean changes in Self-Efficacy scores by group for low and high pre-test scorers.

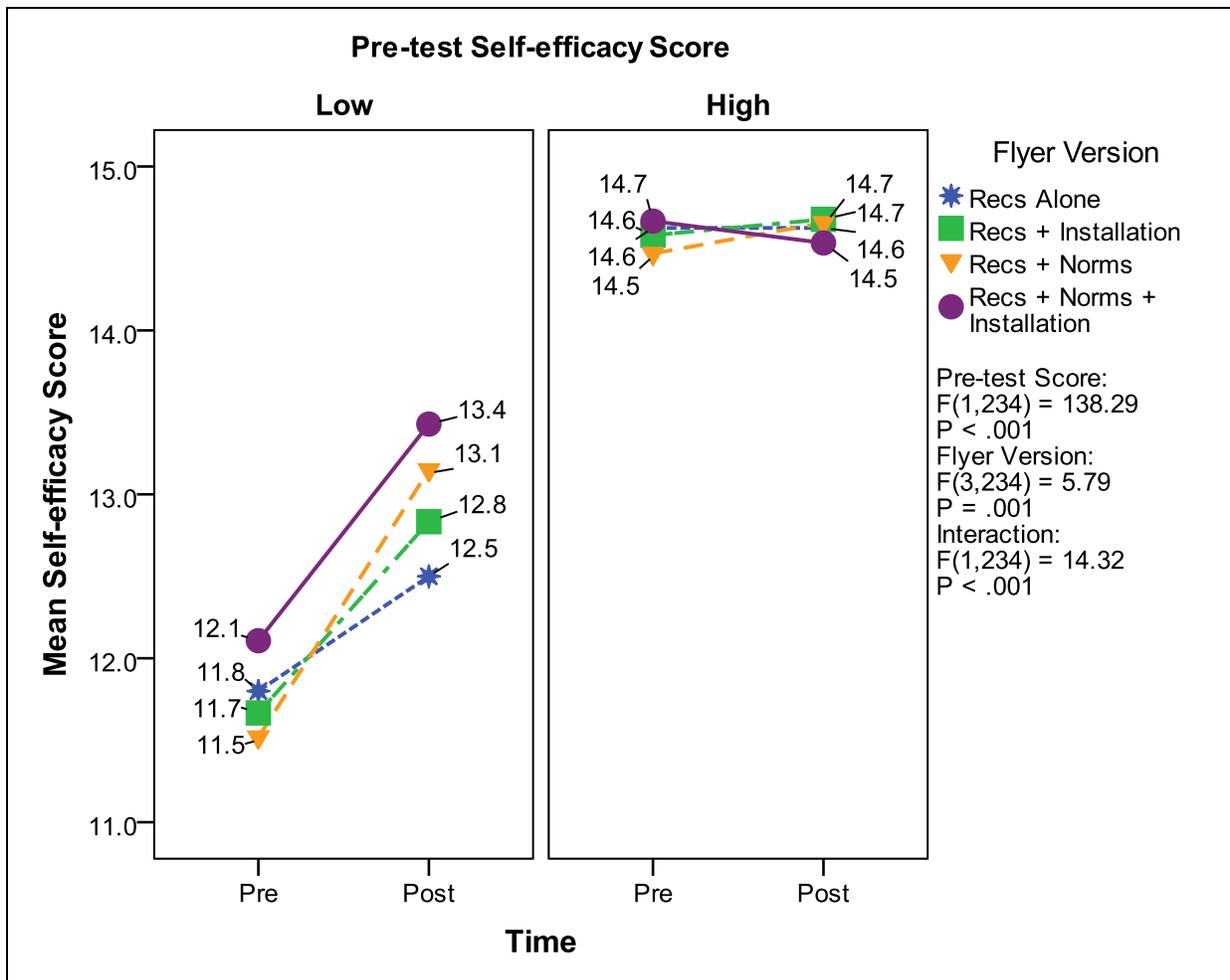


Figure 11. Change in Self-Efficacy Score Over Time by Flyer Version and Pre-Test Score

Changes in Attitudes and Intentions

Analyses of the General Attitudes scale revealed a significant main effect for flyer, $F(3, 234) = 4.35, p = .01, \eta_p^2 = .05$, and a significant interaction with pre-test score, $F(1, 234) = 11.59, p = .001, \eta_p^2 = .05$. When General Attitudes scores were low at pre-test, the Recommendations Alone version outperformed the Recommendations Plus Installation version ($p = .01$) and the All Combined versions ($p = .01$). Further, the Recommendations plus Norms version outperformed the Recommendations Plus Installation version ($p = .049$) and the All Combined version ($p = .01$) when pre-test scores were low. There were no significant differences among flyers for participants with high pre-test scores. Figure 12 depicts mean changes in General Attitudes scores by group for low and high pre-test scorers.

Stated intentions analyses revealed no significant main effects for flyer, indicating the flyer versions failed to have a differential effect on participants' behavioral intentions.

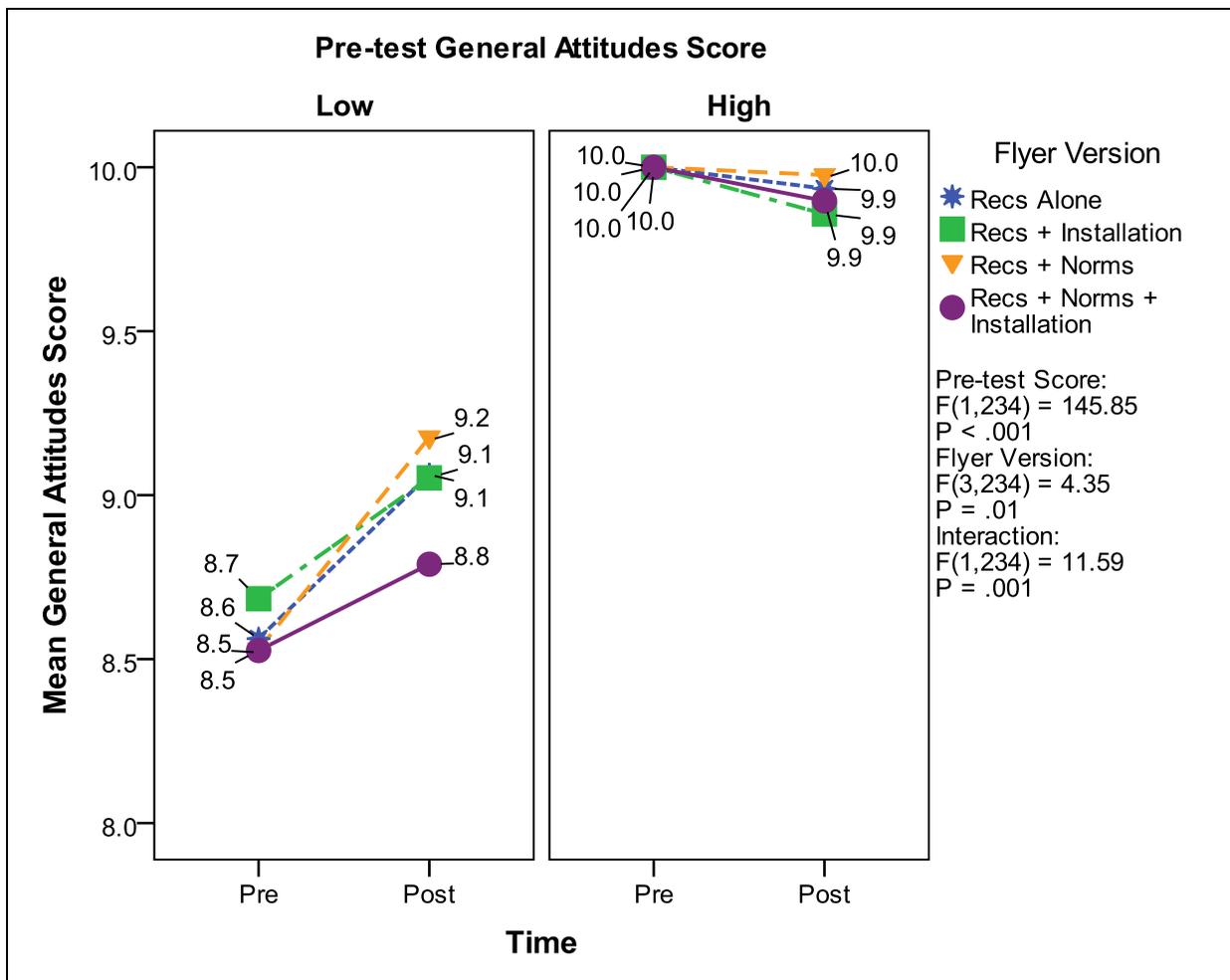


Figure 12. Change in General Attitude Score Over Time by Flyer Version and Pre-Test Score

Changes in Installation Scores

Analyses for Installation Score revealed a significant main effect for flyer, $F(3, 234) = 29.27$, $p < .001$, $\eta^2 = .27$, and a significant interaction with pre-test score, $F(1, 234) = 9.87$, $p = .002$, $\eta^2 = .04$. Given the significant interaction between pre-test score and flyer version, the effectiveness of each flyer on the post-test score was dependent upon the pre-test score. Across all participants, the post-test Installation Score was significantly higher for the Recommendations Plus Installation version compared to the Recommendations Alone version ($p = .002$), for the All Combined version compared to the Recommendations Alone version ($P < .001$) and the Recommendations plus Norms version ($p < .001$). There were additional differences among low pre-test scorers, but no additional differences limited to high pre-test scorers. Specifically, among those with low pre-test scores, the change in Installation Score was significantly greater for the Recommendations Plus Installation version compared to the Recommendations plus Norms version ($p = .04$) and the All Combined version ($p = .04$). Figure 13 depicts mean changes in Installation Scores by group for low and high pre-test scorers. In summary, the flyers that led to the best performance on the Installation subscale varied depending on incoming knowledge, but in general, those flyers with installation information led to greater increases in scores.

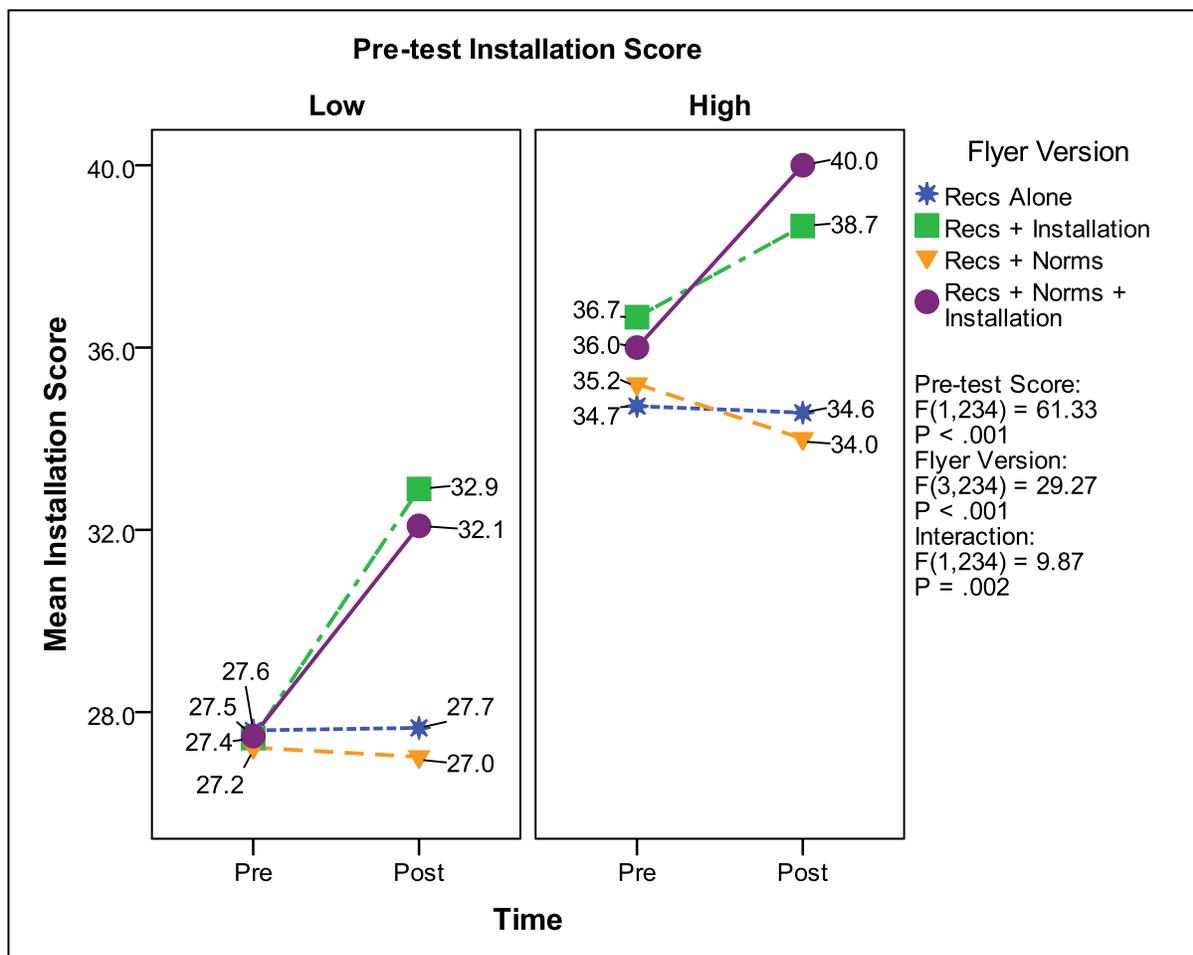


Figure 13. Change in Installation Score Over Time by Flyer Version and Pre-Test Score

Judgments of Relevance and Acceptability of Material

Fisher's exact test was used to examine differences among flyers in parents' perceptions of the material presented. All flyers were rated favorably, and no significant differences were found among the four flyer combinations for any of the subscales. Regarding parents' perceptions of the material presented, 98 percent of parents found the information to be organized and coherent, 99.6 percent reported the material to be relevant to their needs, and 99 percent believed the amount of information given was appropriate. Regarding parents' perceptions of the quality and clarity of material, 96 percent found the quality of material to be good or excellent, and 93 percent reported the clarity of the information to be good or excellent. Regarding parents' perceptions of learning and likelihood of changing behavior, 91 percent reported that they gained some or a lot of knowledge, and 84 percent believed they were likely to change behavior as a result of receiving the information.

4.0 Conclusions

Study 1

For Study 1, the Risk Reduction Rationale flyer outperformed other flyers for many subscales, and significantly differed from control for the most subscales, including restraint selection, back seat knowledge, rear-facing knowledge and attitudes, booster attitudes, total efficacy, overall attitudes, and stated intentions. The Premature Graduation flyer performed best for efficacy subscales, but did not significantly differ from the Risk Reduction Rationale flyer for total efficacy. For changes in self-efficacy, the Premature Graduation flyer outperformed all other flyers. The Natural Progression flyer performed best for attitudes subscales, but did not significantly differ from the Risk Reduction Rationale flyer. The Age-Based flyer performed significantly better than control only for changes in overall attitudes and stated intentions. However, the Age-Based flyer was outperformed by changes produced by the Risk Reduction Rationale flyer for restraint selection score. All material was rated favorably, with no significant differences among flyers for parents' ratings.

Qualitative results from discussion groups with parents mirrored empirical results of Study 1 in that the majority of parents favored the Risk Reduction Rationale version of the flyer, mostly due to its formatting (i.e., bullets and flow chart/column setup) and its inclusion of the *reasons* behind the recommendations for each stage in simple "Here's What to Do" and "Here's Why" sections. Parents suggested numerous improvements to the flyer, including reducing the amount of information and using brighter and varied colors and fonts to accentuate key points and break up the information.

It is important to note that although the Risk Reduction Rationale flyer was the most effective and most favored by parents in a laboratory setting, the flyer has a great deal of information on it and thus needs work in order to be ready for the market. What this study has revealed is that the most advantageous way of framing CPS recommendations is to explain the injury risks behind the information given. The challenge that remains is for marketers and communications professionals to figure out how to present injury risks in a way that is aesthetically pleasing and reader-friendly.

Study 2

For Study 2, significant interactions with pre-test scores were present for each main effect, indicating that the effectiveness of each flyer was heavily dependent upon the pre-test score of the participant. That is, the amount of "extra" information that is helpful on a flyer differs greatly for parents with low versus high preexisting child passenger safety awareness, efficacy, and threat perceptions. In many cases, higher scoring participants at pre-test benefitted more from a flyer that provided the basic recommendations, or just the recommendations and normative information. On the other hand, flyers that included not only the basic recommendations, but also installation information or installation and normative information, produced greater changes in scores for parents with lower incoming scores.

Specifically, the Recommendations Plus Installation version resulted in greater changes in Restraint Selection Scores compared to Recommendations Alone and Recommendations plus Normative Information versions for low pre-test scorers only. Among high pre-test scorers, the opposite was true, with the Recommendations Alone version resulting in greater changes in scores. For Threat Subscales, a similar pattern emerged, with the Recommendations Plus Installation plus Normative Information (All Combined) version leading to greater changes than all other versions only for low pre-test scorers. However, participants with high perceptions of threat at pre-test benefitted the least from the All Combined version compared to all other versions.

For Self-Efficacy subscales, patterns differed for high versus low scorers, but the important content that separated these two groups appeared to be the normative information. Flyers with normative information (Recommendations plus Normative Information version and Recommendations Plus Installation plus Normative Information version) were most helpful compared to other flyer versions for participants with low incoming self-efficacy, while these same versions were least helpful among those with high incoming self-efficacy. Finally, the flyers that led to the best performance on the Installation subscale also varied depending on incoming knowledge, but in general, those flyers with installation information led to greater increases in scores. All Study 2 material was rated favorably, with no significant differences among flyers for parents' ratings.

Limitations

This study recruited volunteer participants in two metropolitan areas and thus may not be generalizable to all demographic groupings. Moreover, the flyers were tested in a controlled laboratory setting, where participants had incentive to read the flyer carefully. Thus, it is not known if the same results would be gleaned from their use in the field. The very short time frame from pre-test to post-test is also a limitation, as one criterion for causality is time. Real behavior was not observed, only behavioral intentions, which do not always lead to actual behavior change. Finally, these are print flyers developed by a research team, not multi-media messages developed by a graphic design/communications team. The authors recognize that print flyers are but one of many modes of communication and other modes may be more effective than print communication. Our aim was not to advocate for print media over other formats, but rather to inform the field regarding helpful emphasis frames for CPS messages.

5.0 Recommendations

The objective of this project was to develop and test various methods of framing child passenger safety recommendations, and to determine how to best communicate child passenger safety information to parents/caregivers, and which information to include and emphasize. A number of recommendations are evident from this research.

1. *Communicate risk-reduction rationale behind the recommendations.* With its focus on the reasons underlying the recommendations, the Risk Reduction Rationale flyer outperformed all other flyers on the most subscales and was the favorite among discussion group participants. It is important to tell parents what to do and why it is safer, in straightforward and simple terms. Educational material should communicate the reason behind the recommendation, avoiding use of statistics or abstract comparisons to explain statistics.
2. *Use clear behavior-based directives in headers.* With its action-oriented headers, the Premature Graduation flyer also performed well on a number of subscales, and outperformed all others in its ability to bolster parents' Self-Efficacy for carrying out the recommendations. Headers should state clearly what needs to be done (e.g., keep kids rear-facing as long as possible), with subtext giving additional details for clarity. It is best to avoid questions in headers and taglines, as it is a missed opportunity for education.
3. *Avoid age-based headers.* In contrast to the Age-Based flyer, the other three flyers did not use age in the organizing headers and to the extent possible, avoided references to age and upper limits for common seats within the text. Age is just one of many factors to consider when choosing a restraint. It is known from research on judgmental heuristics that people employ mental shortcuts in making everyday judgments (Chaiken, 1987; Cialdini, 1993; Kahneman et al., 1982). Thus, once an age-based header is used, human nature dictates that many parents will not read the subtext below the header that qualifies the age range given. While it is important to organize the information according to child maturity for parents' ease of use, it is best to convey age progression through the use of stages, arrows, representative pictures, or other means. Information on age parameters can be included in the subtext, but it is not recommended as an organizing header.
4. *Fully integrate the need for back seat positioning at all stages.* Because rear seating offers independent and additive safety protections in a crash, back seat positioning should be recommended concurrently with each restraint configuration. The flyers that fully integrated the need for back seat positioning with each seat recommendation (e.g., "use a booster seat in the back seat") were the most effective in the study.
5. *Use formatting styles that accentuate key points and significantly reduce text.* Although parents welcomed the extra "Here's Why" information, they also recommended significant reductions in text on the flyers. Parents preferred the use of bullets and other formatting techniques (e.g., flow diagrams or columns) to organize and reduce text and accentuate important information. Bright colors and fonts were also recommended.

6. *Create and promote novice-user and experienced-user versions of material.* Parents' preexisting child passenger safety awareness, efficacy, and threat perceptions affect how they respond to the amount of CPS information provided to them in an educational message. Those with higher awareness and perceptions attend to and benefit more from simplified reminders of recommendations (e.g., information updates), whereas those with lower awareness and perceptions benefit more broadly from detailed recommendations that include extra information such as installation tips.
7. *Combine expertise of communications professionals and behavioral scientists.* Behavioral science researchers and marketing/communication professionals can combine expertise to improve the effectiveness of risk communication efforts in child passenger safety.
8. *Support additional research.* Additional research is needed to design and investigate communications that combine the most effective and attractive features of the flyers tested in this laboratory study. New material could be tested in real world scenarios, comparing their utility versus other existing marketing material in directing parents' choice and use/installation of a restraint for randomly assigned child sizes and vehicle models.

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APPENDIX A: STUDY 1

A-1. Natural Progression flyer viewed by participants in Group 1

Right Seat • Right Time • Right Use

Every seat is different. Every child is different. Here is the natural progression of restraint types from birth to teen years...with a bit of advice for best protection at each stage. Follow seat directions and use each type for as long as possible to the top weight and height limits before transitioning to the next seat type. Unrestrained children are 3 times more likely to be injured. Kids are always safest in the BACK SEAT!

Stage of Childhood	Seat Type	Advice for Stage & Seat Transitions
	Rear-facing Car Seats	Children should use rear-facing car seats in the back seat as long as possible to the rear-facing height and weight limits for the seat (even up to age 2 or 3). If your car seat has a rear-facing weight limit of 22 pounds or less, you should change to a convertible car seat with higher rear-facing limits and keep rear-facing for longer. Leg crowding is expected and okay. It does not cause harm as long as the child is within the weight and height limits for the seat.
	Forward-facing Car Seats with Harnesses	Keep your child rear-facing until the top weight or height limits for the rear-facing car seat. Once top rear-facing limits are reached, use a forward-facing car seat with a harness and a tether. Keep your child in a car seat with a harness until he or she reaches the top height or weight limit for the harness.
	Booster Seats	Use car seats with harnesses to the top weight or height limits for the harnesses. Once children outgrow harnesses, use a booster seat in the back seat until the seat belt fits properly . A booster seat is often needed until a child is around 4 feet 9 inches tall. Your child may be about 12 years old before he/she is ready for a seat belt.
	Seat Belts	Older children should use a lap-shoulder seat belt in the back seat once they outgrow a booster seat. They have not outgrown a booster seat until the seat belt fits correctly: (1) The shoulder strap should cross the center of the chest and rest on the shoulder (not the neck). (2) The lap belt should fit low and snug on the upper thighs (not the stomach). (3) The knees should bend at the edge of the vehicle seat when sitting all the way back.

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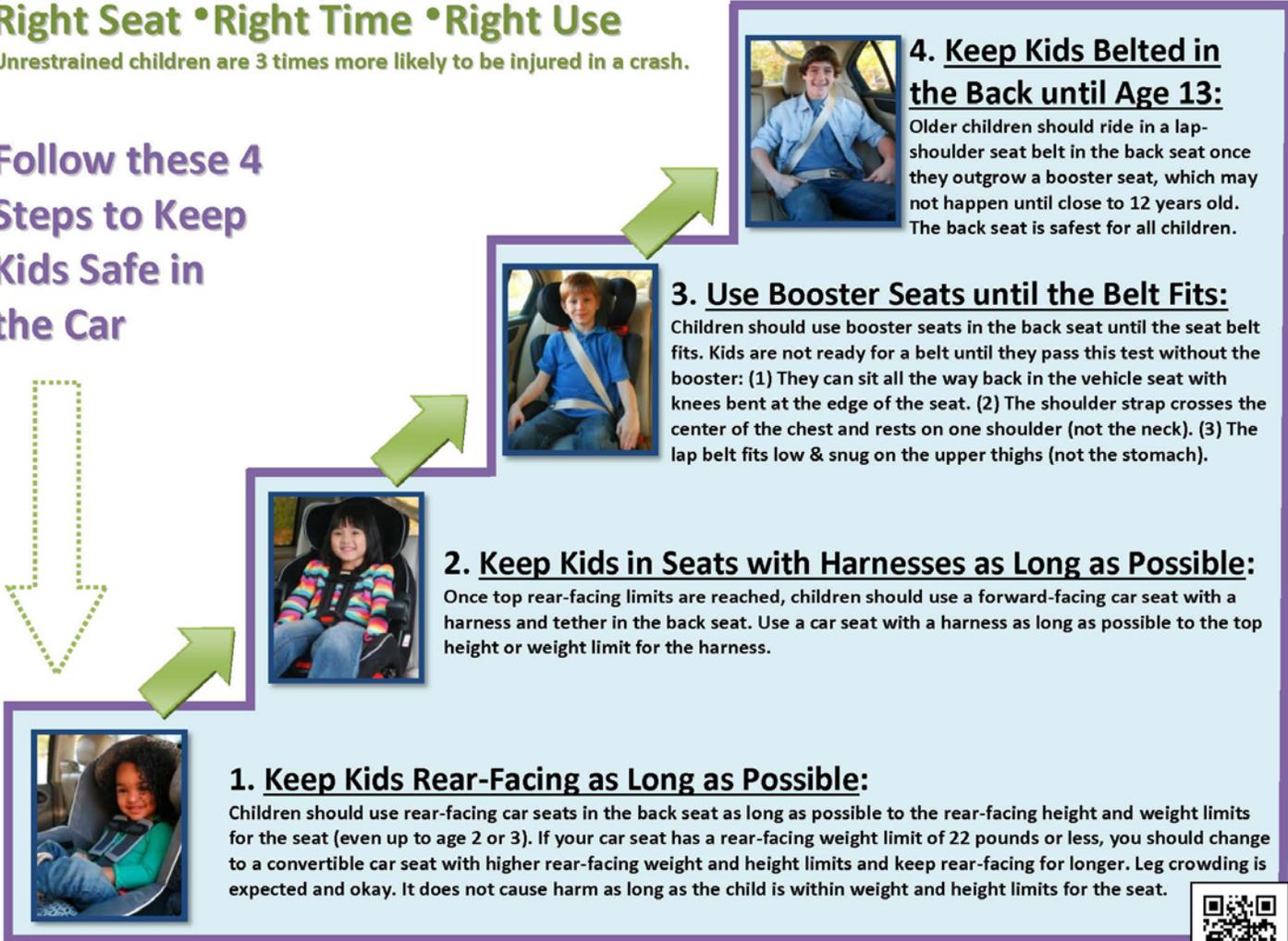
 twitter.com/childseatsafety

www.nhtsa.gov/Safety/CPS



Right Seat • Right Time • Right Use
Unrestrained children are 3 times more likely to be injured in a crash.

Follow these 4 Steps to Keep Kids Safe in the Car



1. Keep Kids Rear-Facing as Long as Possible:
Children should use rear-facing car seats in the back seat as long as possible to the rear-facing height and weight limits for the seat (even up to age 2 or 3). If your car seat has a rear-facing weight limit of 22 pounds or less, you should change to a convertible car seat with higher rear-facing weight and height limits and keep rear-facing for longer. Leg crowding is expected and okay. It does not cause harm as long as the child is within weight and height limits for the seat.

2. Keep Kids in Seats with Harnesses as Long as Possible:
Once top rear-facing limits are reached, children should use a forward-facing car seat with a harness and tether in the back seat. Use a car seat with a harness as long as possible to the top height or weight limit for the harness.

3. Use Booster Seats until the Belt Fits:
Children should use booster seats in the back seat until the seat belt fits. Kids are not ready for a belt until they pass this test without the booster: (1) They can sit all the way back in the vehicle seat with knees bent at the edge of the seat. (2) The shoulder strap crosses the center of the chest and rests on one shoulder (not the neck). (3) The lap belt fits low & snug on the upper thighs (not the stomach).

4. Keep Kids Belted in the Back until Age 13:
Older children should ride in a lap-shoulder seat belt in the back seat once they outgrow a booster seat, which may not happen until close to 12 years old. The back seat is safest for all children.

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A-3. Risk Reduction Rationale flyer viewed by participants in Group 3

Reducing Car Crash Injury = Right Seat + Right Time + Right Use

- In a crash, the vehicle stops or changes direction in fractions of a second.
- Everyone is thrust in the direction the car was traveling.
- Unrestrained children are 3 times more likely to be injured.
- Your child's restraint is made to stop your child with the vehicle & reduce harm.
- The better the fit to your child's growing body, the better the protection.

-
-
-
-
-



BIRTH







TO TEEN YEARS

HERE'S WHAT TO DO:

- Start your child in a REAR-FACING CAR SEAT IN THE BACK SEAT. Use as long as possible to the top rear-facing weight and height limits on the seat (even up to age 2 or 3).
- If your car seat has a rear-facing limit of 22 pounds or less, change to a convertible seat with higher rear-facing weight limits. Keep rear-facing longer.
- Leg crowding is expected & okay. It does not cause harm as long as child is within weight & height limits for the seat.

HERE'S WHY:

- A rear-facing car seat moves with your child and absorbs crash forces.
- Cradles to reduce harm to neck & spine
- Kids under 2 are more likely to be injured if forward facing.

HERE'S WHAT TO DO:

- Once top rear-facing limits are reached, use a FORWARD-FACING CAR SEAT WITH A HARNESS and tether in the back seat.
- Remember to keep rear-facing as long as possible before turning forward.
- Use a car seat with a harness as long as possible to the top height or weight limit for the harness.

HERE'S WHY:

- Harnesses spread crash forces over strong parts of the body.
- Keeps body positioned in a crash
- The tether limits head injuries by reducing movement in a crash.

HERE'S WHAT TO DO:

- Once a child outgrows the top limits for the harnessed car seat, use a BOOSTER SEAT IN THE BACK SEAT.
- Use a booster seat until the belt fits correctly (see next step).
- A booster seat is often needed until 4 ft 9 in tall. Your child may be 12 years old before ready for a belt.

HERE'S WHY:

- A booster raises a child up so the belt rests over strong body parts.
- Decreases stomach, neck, & spine injuries
- Keeps kids from putting the shoulder belt under their arm or behind their back, which causes harm in a crash

HERE'S WHAT TO DO:

- Kids should ride in a lap and shoulder SEAT BELT IN THE BACK SEAT once they outgrow a booster seat.
- Kids are ready for a seat belt when:
 - 1) The shoulder strap crosses the center of the chest and rests on the shoulder (not the neck).
 - 2) The lap belt fits low on the thighs (not the stomach).
 - 3) Knees can bend when sitting all the way back in the seat.
- Use the back seat for kids under 13.

HERE'S WHY:

- A seat belt keeps the child in the vehicle.
- Spreads crash forces
- Protects head & spine
- Back seat is safer than the front

Kids under age 13 are nearly two times safer in the back seat because they are farthest from the most common kind of crash and from frontal airbags. Front airbags are meant for teens and adults.

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A-4. Age-Based flyer viewed by participants in Group 4

Car Seat Recommendations for Children



- Select a car seat based on your child's age and size, and choose a seat that fits in your vehicle and use it every time.
- Always refer to your specific car seat manufacturer's instructions; read the vehicle owner's manual on how to install the car seat using the seat belt or LATCH system; and check height and weight limits.
- To maximize safety, keep your child in the car seat for as long as possible, as long as the child fits within the manufacturer's height and weight requirements.
- Keep your child in the back seat at least through age 12.

AGE



Birth – 12 months 

Your child under age 1 should always ride in a rear-facing car seat. There are different types of rear-facing car seats: Infant-only seats can only be used rear-facing. Convertible and 3-in-1 car seats typically have higher height and weight limits for the rear-facing position, allowing you to keep your child rear-facing for a longer period of time.



1 – 3 years  

Keep your child rear-facing as long as possible. It's the best way to keep him or her safe. Your child should remain in a rear-facing car seat until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the rear-facing car seat, your child is ready to travel in a forward-facing car seat with a harness.



4 – 7 years  

Keep your child in a forward-facing car seat with a harness until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the forward-facing car seat with a harness, it's time to travel in a booster seat, but still in the back seat.



8 – 12 years  

Keep your child in a booster seat until he or she is big enough to fit in a seat belt properly. For a seat belt to fit properly the lap belt must lie snugly across the upper thighs, not the stomach. The shoulder belt should lie snug across the shoulder and chest and not cross the neck or face. Remember: your child should still ride in the back seat because it's safer there.

DESCRIPTION (RESTRAINT TYPE)



A REAR-FACING CAR SEAT is the best seat for your young child to use. It has a harness and in a crash, cradles and moves with your child to reduce the stress to the child's fragile neck and spinal cord.



A FORWARD-FACING CAR SEAT has a harness and tether that limits your child's forward movement during a crash.



A BOOSTER SEAT positions the seat belt so that it fits properly over the stronger parts of your child's body.



A SEAT BELT should lie across the upper thighs and be snug across the shoulder and chest to restrain the child safely in a crash. It should not rest on the stomach area or across the neck.


www.facebook.com/childpassengersafety


<http://twitter.com/childseatsafety>

March 21, 2011

A-5. Example of non-educational marketing questions viewed by participants in the Control Group

Please answer the following questions:



1. Which car seat do you prefer?
 - a) The car seat on the left
 - b) The car seat in the middle
 - c) The car seat on the right
2. What is the most important reason for your choice?
 - a) Color of the car seat
 - b) Style of the car seat
 - c) That car seat looks more safe
 - d) The features of the car seat

Child Passenger Safety Survey

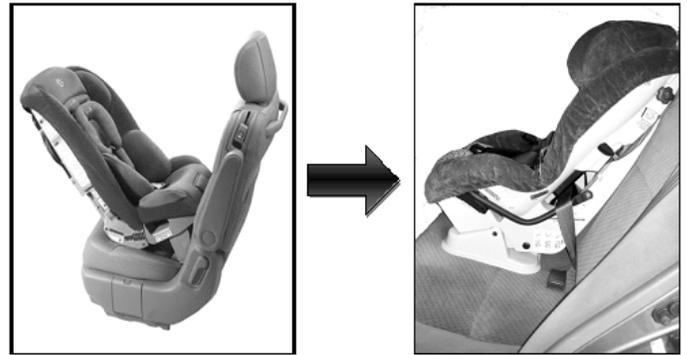
Instructions: Please choose the best answer for each item. Answer as best as you can even if you are not sure.

SECTION I: RESTRAINT SELECTION SCENARIOS

Each of the following questions presents a child safety scenario. Please choose the best answer that you think will keep the child as safe as possible.

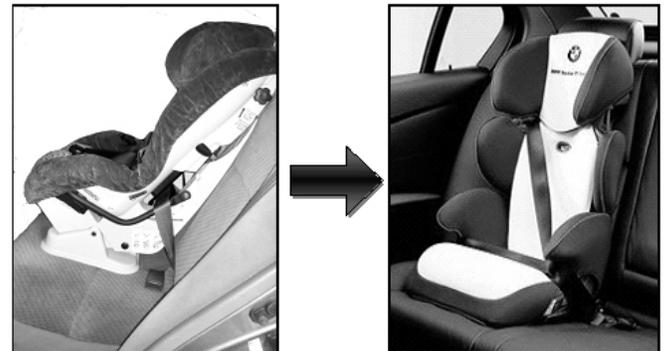
1. One of your friends calls you to ask when their baby should be moved from a Rear-Facing car seat to a Forward-Facing car seat. When should you tell your friend to move their baby to a Forward-Facing car seat?

- a. When the child's legs are beginning to look "crowded" (i.e., folding at knees)
- b. 1 year old and at least 20 pounds
- c. When the child is 18 months old
- d. A child should remain Rear-Facing as long as possible to the weight or height limits for the seat, even up to 2 years old.



2. Your cousin thinks it is time to move their child into a booster seat and asks you when it is safe to do this. When should you tell your cousin it is safe to move their child from a Forward-Facing car seat with harnesses to a booster seat?

- a. 2 years old
- b. 3 years old
- c. 4 years old
- d. 5 years old
- e. 6 years old
- f. At 30 pounds
- g. Once the child's feet can touch the floorboard
- h. Once the child has reached the top height/weight limits for the harnesses



3. Your child is asking you when he/she can just use a seat belt when riding in vehicles. When can your child safely use a seat belt only?

- a. 5 years old
- b. 6 years old
- c. 8 years old
- d. 10 years old
- e. 12 years old
- f. At 80 pounds
- g. Once he/she is 4 feet tall
- h. Once he/she is in the third grade
- i. Once the seat belt fits properly in every way appropriate



4. Your child is 1 year old. She weighs 21 pounds and is 29 inches tall. Based on current safety recommendations, which restraint would be most appropriate for her?

- a. Rear-Facing car seat with harnesses
- b. Forward-Facing car seat with harnesses
- c. Booster seat
- d. Seat belt in the back seat
- e. Seat belt in the front seat
- f. Either a or b

5. Your child is 11 years old. He weighs 85 pounds and is 4 feet 10 inches (58 inches) tall. Based on current safety recommendations, which restraint would be most appropriate for him?

- a. Rear-Facing car seat with harnesses
- b. Forward-Facing car seat with harnesses
- c. Booster seat
- d. Seat belt in the back seat
- e. Seat belt in the front seat
- f. Either d or e

6. Your child is 19 months old. He weighs 26 pounds and is 27 inches tall. Based on current safety recommendations, which restraint (assuming he is within the weight and height limits for the seat) would be most appropriate for him?

- a. Rear-Facing car seat with harnesses
- b. Forward-Facing car seat with harnesses
- c. Booster seat
- d. Seat belt in the back seat
- e. Seat belt in the front seat
- f. Either b or c

7. Your child is 4 years old. She weighs 36 pounds and is 3 feet (36 inches) tall. Based on current safety recommendations, which restraint would be most appropriate for her?

- a. Rear-Facing car seat with harnesses
 - b. Forward-Facing car seat with harnesses
 - c. Booster seat
 - d. Seat belt in the back seat
 - e. Seat belt in the front seat
 - f. Either b or c
-

8. Your child is 9 years old. He weighs 63 pounds and is 4 feet 3 inches (51 inches) tall. Based on current safety recommendations, which restraint would be most appropriate for him?
- Rear-Facing car seat with harnesses
 - Forward-Facing car seat with harnesses
 - Booster seat
 - Seat belt in the back seat
 - Seat belt in the front seat
 - Either d or e

SECTION II: KNOWLEDGE SURVEY		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<i>The following items test your knowledge of safety restraints. Please indicate the extent you agree or disagree with each statement.</i>						
9.	The seat belt's primary purpose is to prevent being thrown from the vehicle.	1	2	3	4	5
10.	Seat belts are not enough to protect 7 year old children in crashes.	1	2	3	4	5
11.	It is safe for an 11 year old to ride in the front seat.	1	2	3	4	5
12.	A child should remain in a booster seat until the vehicle seat belt fits properly, or until the child is 4 feet 9 inches tall.	1	2	3	4	5
13.	The purpose of a booster seat is to position a seat belt properly on a child.	1	2	3	4	5
14.	Booster seats are recommended for many children older than 8 years old.	1	2	3	4	5
15.	The seat belt provides the same basic protection as a booster seat.	1	2	3	4	5
16.	Seat belts are made to fit adults only.	1	2	3	4	5
17.	Because of frontal airbags, children age 10 or older are better protected in the front seat than the back seat of vehicles.	1	2	3	4	5
18.	A child is safer in the back seat.	1	2	3	4	5
19.	A 14-month-old child is too big for a Rear-Facing car seat.	1	2	3	4	5
20.	A child should be in a Rear-Facing convertible car seat until the maximum height and weight limits of the safety seat.	1	2	3	4	5

21.	A Rear-Facing car seat helps keep a child's body aligned in a crash.	1	2	3	4	5
22.	A Forward-Facing car seat with a harness provides the same basic protection as a booster seat.	1	2	3	4	5
23.	A Forward-Facing car seat with a harness should be used up to maximum height and weight limits for the harness.	1	2	3	4	5

SECTION III: THREAT AND EFFICACY PERCEPTIONS

Please indicate the extent you agree or disagree with each statement.

****NOTE: Restraint = Use of a car seat, booster seat or seat belt**

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
24.	I believe that using poorly fitted car seats/seat belts has serious negative consequences.	1	2	3	4	5
25.	If improperly restrained, it is likely that my child will get hurt in a car crash.	1	2	3	4	5
26.	If I use the correct restraint for my child's size, my child is less likely to get injured in a car crash.	1	2	3	4	5
27.	I can easily use the right restraint for my child to prevent injury in a car crash.	1	2	3	4	5
28.	I believe using a restraint that isn't recommended for my child's size is extremely harmful.	1	2	3	4	5
29.	I believe it is severely risky for a child to be transitioned to a seat belt before the belt fits them correctly.	1	2	3	4	5
30.	It is possible that my child will get an injury due to improper restraint in a car crash.	1	2	3	4	5
31.	I believe that allowing a child to ride in the front seat earlier than age 13 is extremely harmful.	1	2	3	4	5
32.	I have the skills and knowledge needed to use the correct restraint to reduce my child's chances of injury in a car crash.	1	2	3	4	5
33.	I believe that turning a car seat forward earlier than age 2 has serious negative consequences.	1	2	3	4	5
34.	I am able to use the recommended restraint for my child to prevent him/her from getting injured in a car crash.	1	2	3	4	5

35. I believe using car seats/seat belts that are too big or too small for my child is dangerous.	1	2	3	4	5
36. If not appropriately restrained, my child is at risk for getting unnecessarily injured in a car crash.	1	2	3	4	5
37. Properly fitted car seats/seat belts work to prevent unnecessary injury in a car crash.	1	2	3	4	5
38. I believe that using a booster seat for a child that should still be in a harnessed car seat has serious negative consequences.	1	2	3	4	5
39. Using a properly fitted car seat/seat belt is effective in preventing injury in a car crash.	1	2	3	4	5

SECTION IV: ATTITUDES

We would like to know your honest opinions about certain safety trends. Please indicate the extent you agree or disagree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
40. I find it unnecessary to make a 10-year-old child ride in the back seat when nobody is in the front passenger seat.	1	2	3	4	5
41. Booster seats are an important step between car seats and seat belts.	1	2	3	4	5
42. For most 3-year-olds, I think a booster seat is just as safe as a car seat with harnesses.	1	2	3	4	5
43. I find booster seats to be unnecessary after a child is 8-years-old.	1	2	3	4	5
44. It is important to always buckle up kids even if you're just going around the corner.	1	2	3	4	5
45. I think that keeping kids Rear-Facing until age 2 is a good idea.	1	2	3	4	5
46. Rear-Facing a child past the first birthday seems harmful because there is not enough room for their legs.	1	2	3	4	5
47. As long as my child is buckled in some way, I don't believe the restraint type or how it is installed really matters that much.	1	2	3	4	5

SECTION V: STATED INTENTIONS					
<i>We would like to know your honest answers about what you would do in these situations. Please indicate the extent you agree or disagree with each statement.</i>					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
48. I will purchase whatever type of restraint is needed for my child.	1	2	3	4	5
49. I will require that my child rides in the back seat until age 13.	1	2	3	4	5
50. I will follow the current child passenger safety recommendations.	1	2	3	4	5
51. I will seek additional information to make sure my kids are restrained properly.	1	2	3	4	5
52. I will make sure my child uses the recommended restraint every time they are in the car.	1	2	3	4	5
53. If <u>my</u> child were an infant today, I would probably keep him/her in a Rear-Facing car seat until the upper weight and height limits for the car seat are reached (even up to age 2).	1	2	3	4	5
54. If <u>my</u> child were a toddler today, I would probably keep him/her in a car seat with a harness until they have reached the maximum weight and height limits of the seat.	1	2	3	4	5
55. If <u>my</u> child were in first grade today, I would probably keep him/her in a booster seat until 4 feet 9 inches tall.	1	2	3	4	5
56. If <u>my</u> child were a fifth grader today, I would probably make him/her ride in the back seat until age 13.	1	2	3	4	5

SECTION VI: INSTALLATION QUESTIONS (THIS SECTION USED IN STUDY 2 ONLY)					
<i>The following items ask about installation and use of safety restraints. Please indicate the extent you agree or disagree with each statement.</i>					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
57. A Rear-Facing car seat should be at a 75 degree angle when installing into a vehicle.	1	2	3	4	5
58. A LATCH system and seat belt should be used together when installing car seats.	1	2	3	4	5

- | | | | | | |
|--|---|---|---|---|---|
| 59. Harness straps should be threaded through the seat above the shoulders when using a Forward-Facing car seat. | 1 | 2 | 3 | 4 | 5 |
| 60. When using car seats with a harness, the chest clip should be fastened at armpit level. | 1 | 2 | 3 | 4 | 5 |
| 61. When installing infant and toddler seats tightly in a vehicle, seat movement should be restricted to 2 inches of movement. | 1 | 2 | 3 | 4 | 5 |
| 62. For kids in boosters and seat belts, lap-only seat belts are safe for use. | 1 | 2 | 3 | 4 | 5 |
| 63. Top tether straps can be used with the seat belt or lower anchors to reduce forward movement in a crash. | 1 | 2 | 3 | 4 | 5 |
| 64. Harness straps should be fastened loosely for comfort. | 1 | 2 | 3 | 4 | 5 |
-

SECTION VII: JUDGMENTS OF RELEVANCE AND ACCEPTABILITY (THIS SECTION USED FOR POSTTEST ONLY)

We would like your assessment of the car safety materials that were presented to you today. Please answer the following questions as completely, carefully and candidly as possible.

65. How would you rate the overall quality of the materials that were presented to you today?

1	2	3	4
Excellent	Good	Fair	Poor

66. How would you rate the clarity of the materials that were presented to you today?

1	2	3	4
Excellent	Good	Fair	Poor

67. Was the information presented in an organized and coherent manner?

1	2	3	4
Yes, definitely	Somewhat	Not entirely	No, not at all

68. Were the materials interesting to you?

1	2	3	4
Very Interesting	Interesting	Not very interesting	Not interesting at all

69. Were the materials relevant to your needs?

1	2	3	4
Very relevant	Somewhat relevant	Not very relevant	No, not at all relevant

70. How much did you learn from the materials?

1	2	3	4
A great deal	Gained some knowledge	Gained little knowledge	Nothing

71. How useful would you say the materials will be to you in the future?

1	2	3	4
Extremely Useful	Somewhat useful	Not very useful	Not at all useful

72. How likely will the materials you received cause a change in your behavior?

1	2	3	4
Extremely Likely	Likely	Not very likely	Not at all likely

73. Was the amount of information given today appropriate for you?

1	2	3	4
Yes, definitely	Somewhat	Not very much	No, not at all

74. Comments/suggestions about the materials:

	<u>83. Child 1</u>	<u>87. Child 2</u>	<u>91. Child 3</u>
Current restraint used:	Rear Facing Car Seat	Rear Facing Car Seat	Rear Facing Car Seat
	Forward Fac. Car Seat	Forward Fac. Car seat	Forward Fac. Car Seat
	Booster seat	Booster seat	Booster seat
	Seat belt	Seat belt	Seat belt

92. What is your annual family income?

- a. \$0-\$15,999
- b. \$16,000 - \$24,999
- c. \$25,000 - \$49,999
- d. \$50,000 - \$99,999
- e. \$100,000+
- f. Decline to answer

93. What is your highest level of education?

- a. Grade school
- b. Some high school
- c. High school diploma/GED
- d. Some college
- e. 2-year degree/trade school
- f. Bachelor's degree
- g. Graduate degree

94. In the last 30 days, how often have you used a seat belt?

- a. Always
- b. Fairly often
- c. Not very often
- d. Never

95. What do you think is the most effective method to distribute information about car seats/restraints?

(Check up to 2 preferences)

- | | | |
|----------------------------------|---------------------|---------------------|
| a. Television | d. Email | h. Billboards |
| b. Internet | e. Radio | i. Consumer reviews |
| c. Smartphone/Tablet application | f. Postal mail | j. Other: _____ |
| | g. Brochures/flyers | _____ |

96. Who or where do you go to for your information about car seats/restraints? (Check all that apply)

- a. My child's school
- b. Doctor's office
- c. Friends
- d. Family
- e. Public Health Department
- f. Website
- g. Fire station
- h. Police station
- i. Store where purchased seat
- j. Other:

97. Have you ever had a car seat/restraint inspected by a Child Passenger Safety technician for correct installation (e.g., at a fire station, police station, seat-check event)?
- a. Yes
 - b. No

Effectiveness of Child Passenger Safety Messages Discussion Group Moderator's Guide

Reminders for facilitators:

- Have participants sign consent forms
- Turn on voice recorder

Opening Statement

A Hi. Thanks for participating in this group. My name is _____ (and my name is _____) and I'll (we'll) be leading this discussion today. This will be an informal discussion group. Today we want to get parent perceptions of child seat information. We'll talk about 60-75 minutes. Since we're very thankful that you all are participating in this focus group, each of you will get a \$50 gift card to Walmart when we're done. Before we can start, we need each of you to read this consent form very carefully and sign and date it.

Participants sign consent forms

Turn on voice recorder

Discussion Questions

B Today we will be discussing your thoughts and opinions about the instructional messages that parents receive about child safety seats. We will also be recording and taking notes of your answers just to make sure our notes are accurate. Please do not be shy because we want to hear from everyone. There are no right or wrong answers; we want to hear your honest opinions. Your personal information, such as your name, will not be transcribed. We want to know what you really think. Any questions before we start?

- 1) First of all, can you tell us about your experience as a parent, such as how many children you have, their ages, and types of child restraints they are using.
- 2) What do you feel is the biggest problem associated with child safety seat information?
 - a) *Write on board*
- 3) What do you feel is the most difficult aspect when using a child safety seat?
 - a) *Write on board*
 - b) *PROMPTS: choosing the seat, when to move a child to the next seat, installing the seat*

C

I am now going to show you three flyers with child seat information on the, one at a time. [Pass out natural progression flyers.] This is flyer one. Let's take a few moments to review it on our own and then we'll discuss.

- 4) What is the first thing you think of when I show you this flyer?
- 5) What about this flyer appeals to you?
 - a) *FOLLOW-UP: Gauge reaction, response*
- 6) What do you not like about this flyer?
 - a) *PROMPT: Is anything confusing?*
- 7) Can you tell us your ideas for improving upon this flyer?
 - a) *PROMPTS: Amount of words? Reading level? Organization? Presentation?*
- 8) How do you think this flyer will affect what you already know about child safety seats?
 - a) *PROMPT: Is there any surprising information?*
 - b) *PROMPT: Will it change the way you restrain your own child?*

D

[Pass out premature graduation flyers.] This is flyer two. Take a few moments to review it on your own and then we'll discuss.

- 9) What is the first thing you think of when I show you this flyer?
- 10) What about this flyer appeals to you?
 - a) *FOLLOW-UP: Gauge reaction, response*
- 11) What do you not like about this flyer?
 - a) *PROMPT: Is anything confusing?*
- 12) Can you tell us your ideas for improving upon this flyer?
 - a) *PROMPT: Amount of words? Reading level? Organization? Presentation?*
- 13) How do you think this flyer will affect what you already know about child safety seats?
 - a) *PROMPT: Is there any surprising information?*
 - b) *PROMPT: Will it change the way you restrain your own child?*

E

[Pass out risk reduction rationale flyers.] This is flyer three. Take a few moments to review it on your own and then we'll discuss.

- 14) What is the first thing you think of when I show you this flyer?
- 15) What about this flyer appeals to you?
 - a) *FOLLOW-UP: Gauge reaction, response*

16) What do you not like about this flyer?

a) *PROMPT: Is anything confusing?*

17) Can you tell us your ideas for improving upon this flyer?

a) *PROMPT: Amount of words? Reading level? Organization? Presentation?*

18) How do you think this flyer will affect what you already know about child safety seats?

a) *PROMPT: Is there any surprising information?*

b) *PROMPT: Is there any part of it that will change the way you restrain your own child?*

F

Final Question:

19) Of all the flyers you saw today, which is your favorite and why? If you don't have a favorite, feel free to tell us aspects of each that appealed to you.

That is it for today. I want to thank each of you for your open and honest opinions. This will help us determine parents' preferences regarding child seat information.

IMPORTANT REMINDER FOR FACILITATORS:

***Distribute informational flyer, gift cards, and parking passes; be sure participants sign gift card receipt.*

APPENDIX B: STUDY 2

B-1. CPS Recommendations Alone flyer viewed by participants in Group 1

Reducing Car Crash Injury: Right Seat • Right Time • Right Use

- 

1. **Rear-Facing Car Seats:** Children should use rear-facing car seats in the back seat as long as possible to the rear-facing height and weight limits for the seat (even up to age 2 or 3). As your child grows, you may need to change to a convertible seat with higher rear-facing height and weight limits in order to keep your child rear-facing for longer. Leg crowding is expected and okay. It does not cause harm as long as the child is within the weight and height limits for the car seat.
- 

2. **Forward-Facing Car Seats with Harnesses:** Keep your child rear-facing until the top weight or height limits for the rear-facing seat. Once top rear-facing limits are reached, use a forward-facing car seat with a harness and a tether, in the back seat. Keep your child in a car seat with a harness until he or she reaches the top height or weight limit for the harness.
- 

3. **Booster Seats:** Use car seats with harnesses to the top weight or height limits for the harnesses. Once children outgrow harnesses, use a booster seat in the back seat *until the seat belt fits properly* (see Step 4). A booster seat is often needed until a child is around 4 feet 9 inches tall. Your child may be about 12 years old before he/she is ready for a seat belt.
- 

4. **Seat Belts:** Older children should use a lap-shoulder seat belt in the back seat once they outgrow a booster seat. They have not outgrown a booster seat until the seat belt fits correctly: (1) The shoulder strap should cross the center of the chest and rest on the shoulder (not the neck). (2) The lap belt should fit low and snug on the upper thighs (not the stomach). (3) The knees should bend at the edge of the vehicle seat when sitting all the way back.

Seats and cars vary! Check the car seat instructions and vehicle owner's manual for help specific to your needs.
Unrestrained children are 3 times more likely to be injured than restrained children. Kids are always safest in the back seat!

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B-2. CPS Recommendations Plus Installation Information flyer viewed by participants in Group 2

Reducing Car Crash Injury: Right Seat • Right Time • Right Use



1. Rear-Facing Car Seats: Children should use rear-facing car seats in the back seat as long as possible to the rear-facing height and weight limits for the seat (even up to age 2 or 3). As your child grows, you may need to change to a convertible seat with higher rear-facing height and weight limits in order to keep your child rear-facing for longer. Leg crowding is expected and okay. It does not cause harm as long as the child is within the weight and height limits for the car seat.

- Use the back seat; NEVER put a rear-facing seat in front of an active frontal airbag.
- Install the seat rear-facing at a 45 degree angle.
- Install the seat tightly in the vehicle—there should be less than an inch of movement.
- If using the vehicle seat belt to install, you must lock it to keep it tight—refer to instructions for locking.
- You may use the lower car seat anchors to install *instead* of the seat belt (never both); follow car seat anchor weight limits.
- Tighten the harness snugly with the chest clip at armpit level and shoulder straps at or below the shoulders.



2. Forward-Facing Car Seats with Harnesses: Keep your child rear-facing until the top weight or height limits for the rear-facing seat. Once top rear-facing limits are reached, use a forward-facing car seat with a harness and a tether, in the back seat. Keep your child in a car seat with a harness until he or she reaches the top height or weight limit for the harness.

- Install the seat tightly in the vehicle—there should be less than an inch of movement.
- If using the vehicle seat belt to install, you must lock it to keep it tight—refer to instructions for locking.
- You may use the lower car seat anchors to install *instead* of the seat belt (never both); follow car seat anchor weight limits.
- Always use the top tether (positioned tightly) when forward facing.
- Tighten the harness snugly with the chest clip at armpit level and shoulder straps at or above the shoulders.



3. Booster Seats: Use car seats with harnesses to the top weight or height limits for the harnesses. Once children outgrow harnesses, use a booster seat in the back seat *until the seat belt fits properly* (see Step 4). A booster seat is often needed until a child is around 4 feet 9 inches tall. Your child may be about 12 years old before he/she is ready for a seat belt.

- The seat belt should fit low across the hips, cross the center of the chest, and rest on one shoulder away from the neck and face.
- The shoulder belt is just as essential as the lap belt. Never place it behind the back or under the arm.
- Be sure to use a high-back booster if the vehicle seat does not have head restraints.



4. Seat Belts: Older children should use a lap-shoulder seat belt in the back seat once they outgrow a booster seat. They have not outgrown a booster seat until the seat belt fits correctly: (1) The shoulder strap should cross the center of the chest and rest on the shoulder (not the neck). (2) The lap belt should fit low and snug on the upper thighs (not the stomach). (3) The knees should bend at the edge of the vehicle seat when sitting all the way back.

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- The back seat is safest until age 13.

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Reducing Car Crash Injury: Right Seat • Right Time • Right Use



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Kids at Risk—Some Startling Facts:

- 3 out of 4 car seats are used incorrectly
- Nearly half of the kids who die in car crashes are unrestrained
- 9 out of 10 kids' car seats are turned forward-facing before they are ready
- 1 out of 4 kids are moved out of harnessed car seats too early
- 1 out of 2 kids' forward-facing car seats are not attached with a tether
- 3 out of 5 booster-age children are moved to seat belts too soon
- 3 out of 4 kids between ages 8 and 13 ride in the front seat frequently

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