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

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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 twice 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 material 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 these studies dealt specifically with 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 (Sheeran, Harris, & Epton, 2014; 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).

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 research note reports on the first of two studies examining child passenger safety messages and types of information on which to focus for maximum effectiveness. The goal of this 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 are consistent across

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conditions in this study, but several versions are 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).

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.

Study Methods

Study Design

A 5 (test conditions) 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, and in Norfolk/Hampton Roads, Virginia. These socio-economically and culturally diverse areas covered urban and suburban 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 from birth to 12 years old. For the Philadelphia site, the team worked with the Safe Kids Chapter of Southeast Pennsylvania to deliver recruitment flyers 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 flyers 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 e-mail 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. Participants were compensated with a $50 Walmart gift card for their participation in the study.

Procedures for 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 for participants who 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), pretest measures, study material specific to condition assignment, and post-test measures, at their own pace. Most participants were able to complete the session in about one-half hour (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.

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 were 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 Figure 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 old 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 Figure 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 communicated 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 Figure 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, Fischoff, & 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). Thus, 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 Figure 4). An age-based frame was included for examination, given its frequent use in CPS and health-related communications to parents. The National Highway Traffic Safety Administration's "Car Seat Recommendations for Children" flyer (released in March 2011) was used as the flyer 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. This exer-

cise allowed for elapsed time between their pretest 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 pretest and post-test. The exceptions were the demographics questions and judgments of relevance and acceptability, which were asked only once (at post-test).

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 pretest 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 Snowden 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 materials. 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.

Results

Participants

Three hundred parents/caregivers of children from 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. Thirty-four percent of participants were Black (59% of the Hampton Roads participants and 9% of the Philadelphia participants). About 3 percent of Philadelphia and 7 percent of Hampton Roads participants were Hispanic. 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

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 (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 pre-scores. Data were 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 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 pretest 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 pretest scores were below 50 percent ($p = .003$). The Premature Graduation, Age-Based, and Control groups did not differ significantly from one another. Figure 5 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.

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 pretest 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 vs. low pre-scores, 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 pretest 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 6 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.

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 pretest 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 pretest 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 7 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.

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 pretest 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 condition in changing attitudes, but the four flyers did not significantly differ from one another. Figure 8 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 pretest 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 pretest 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.

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 pretest 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 pre-scores, 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 pre-scores, the Risk Reduction Rationale flyer resulted in significantly higher post-scores than the Premature Graduation flyer ($p = .04$). Figure 9 depicts mean changes in stated intentions by group.

Judgments of Relevance and Acceptability of Material

Fisher's exact test was used to examine differences among flyers in parents' perceptions of the materials 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 materials presented, 99.2 percent of parents found the information to be organized and coherent, 99.6 percent reported the material to be relevant to their needs, and 97.9 percent believed the amount of information given was appropriate. Regarding parents' perceptions of the quality and clarity of materials, 98 percent found the quality of materials to be good or excellent, and 96.3 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.

Conclusions

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, 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 materials were rated favorably, with no significant differences among flyers for parent's ratings.

It is important to note that although the Risk Reduction Rationale flyer was the most effective 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.

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 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. 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.

For More Information

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Table 1.
Demographics of Study 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)

Figure 1.
Natural Progression flyer viewed by participants in Group 1

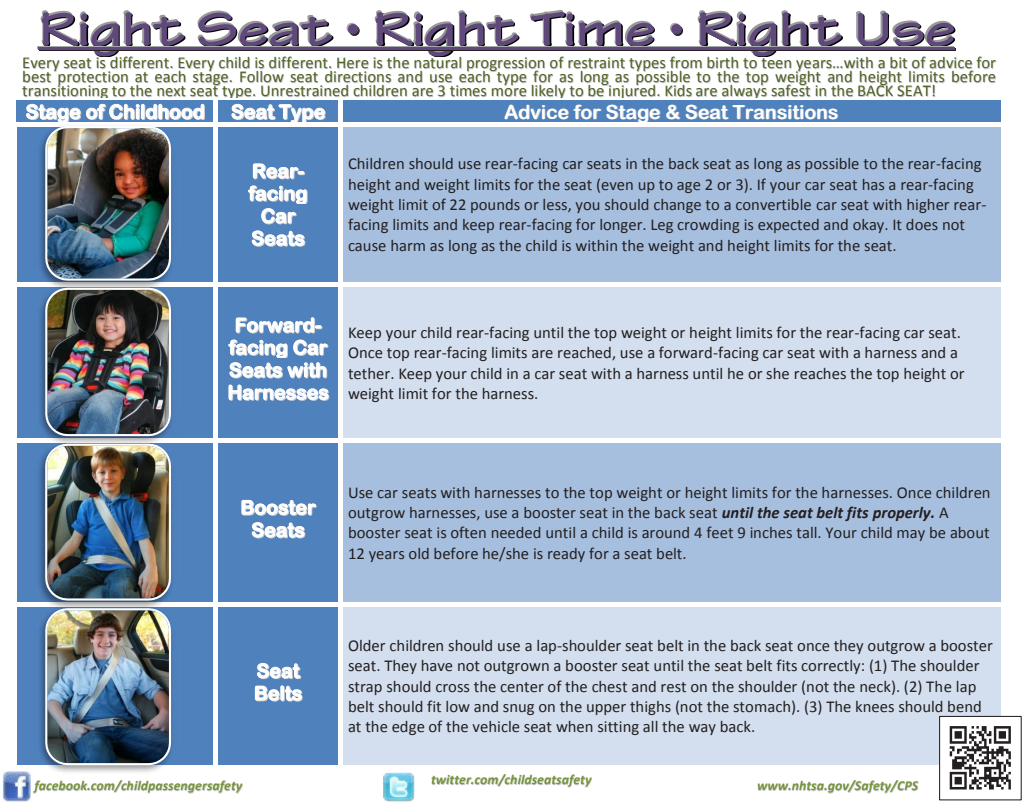


Figure 2.
Premature Graduation flyer viewed by participants in Group 2

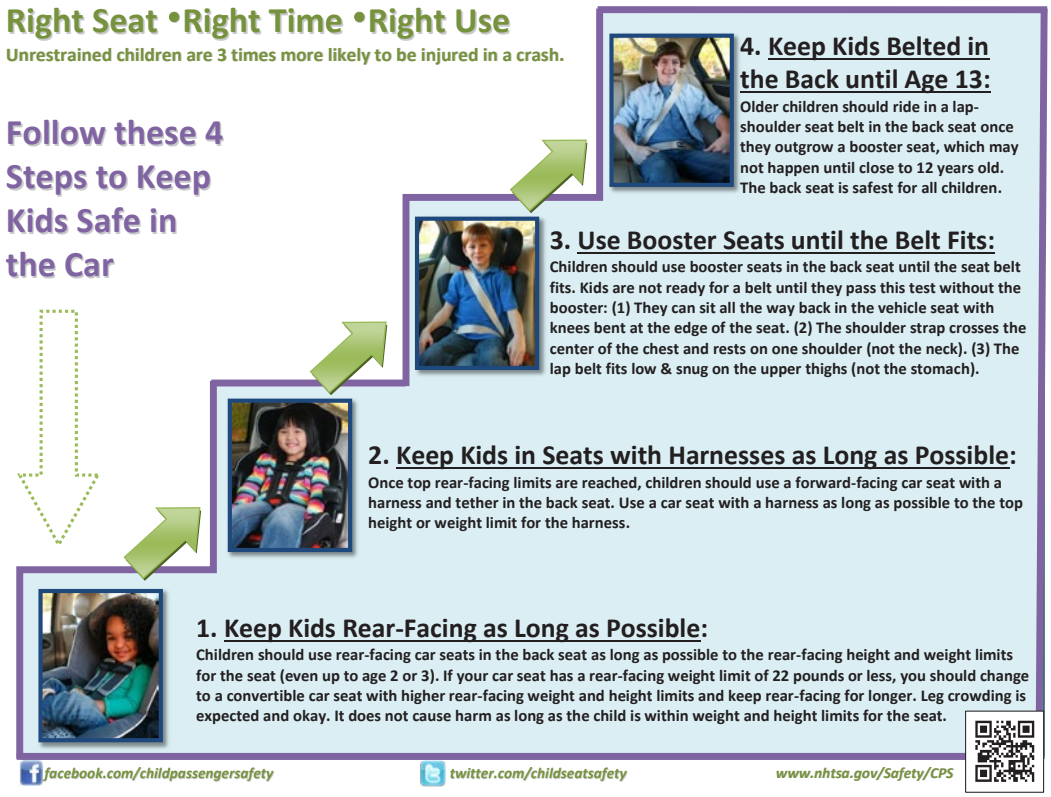


Figure 3.
Risk Reduction Rationale flyer viewed by participants in Group 3

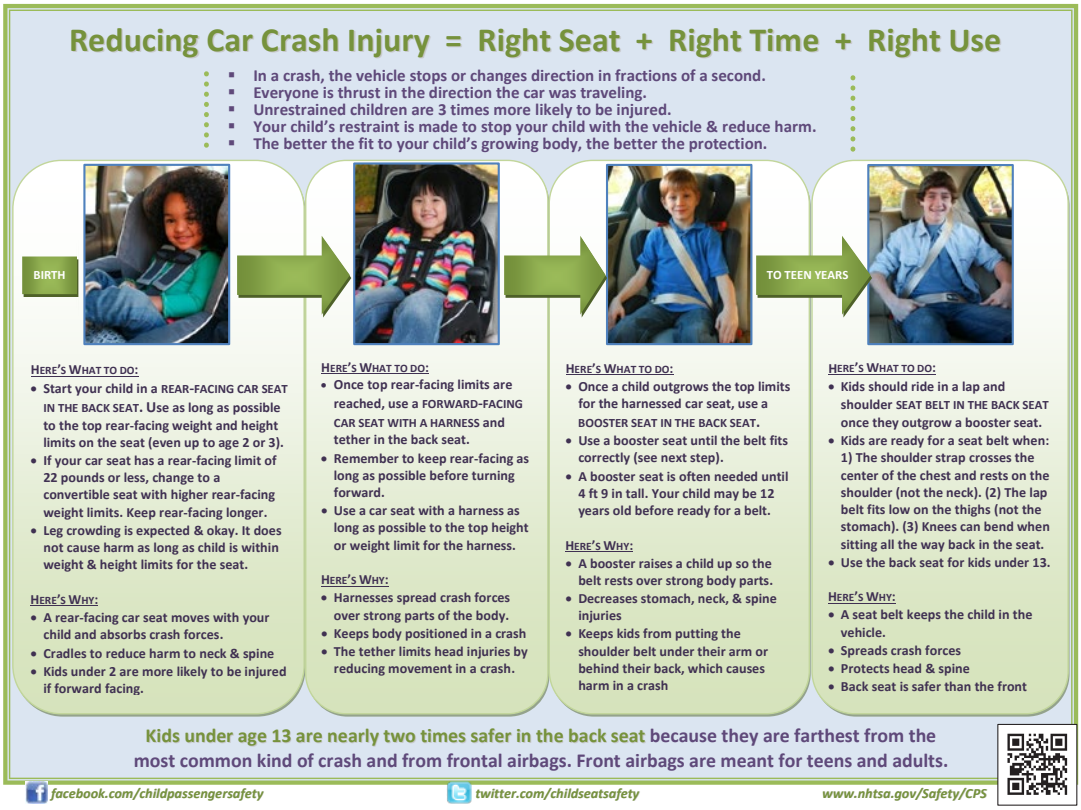


Figure 4.
Age-Based flyer viewed by participants in Group 4

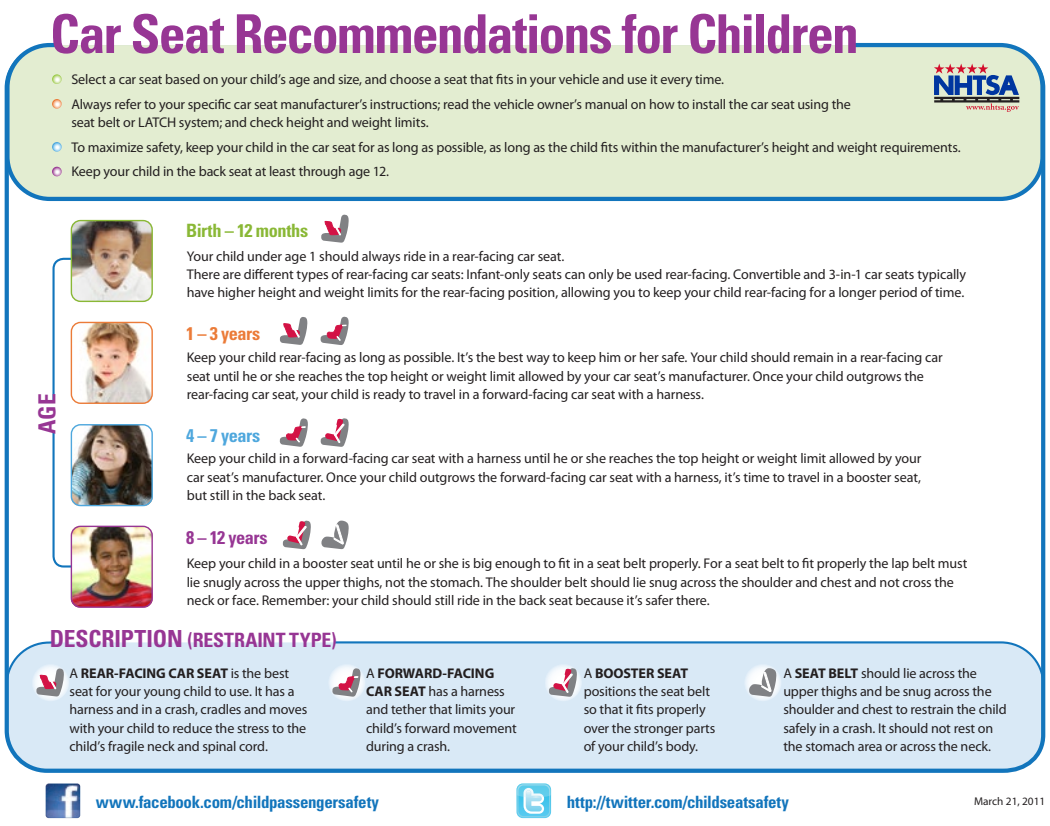


Figure 5.
Changes in Restraint Selection Score by Flyer Version

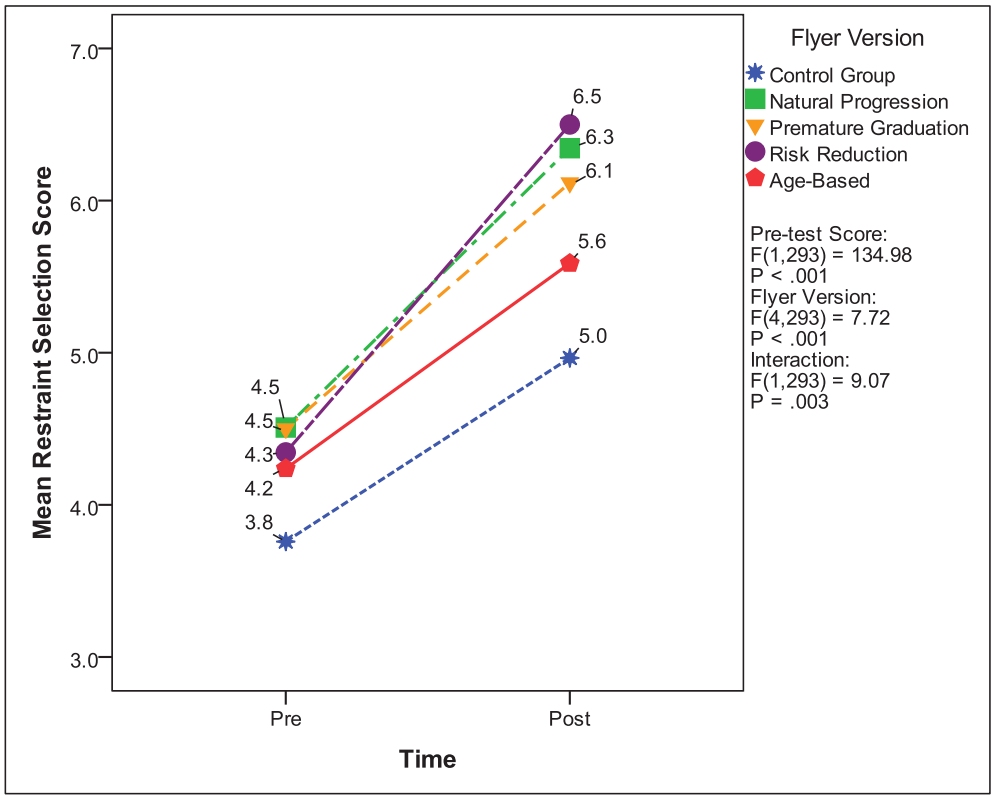


Figure 6.
Changes in Rear-facing Knowledge by Flyer Version

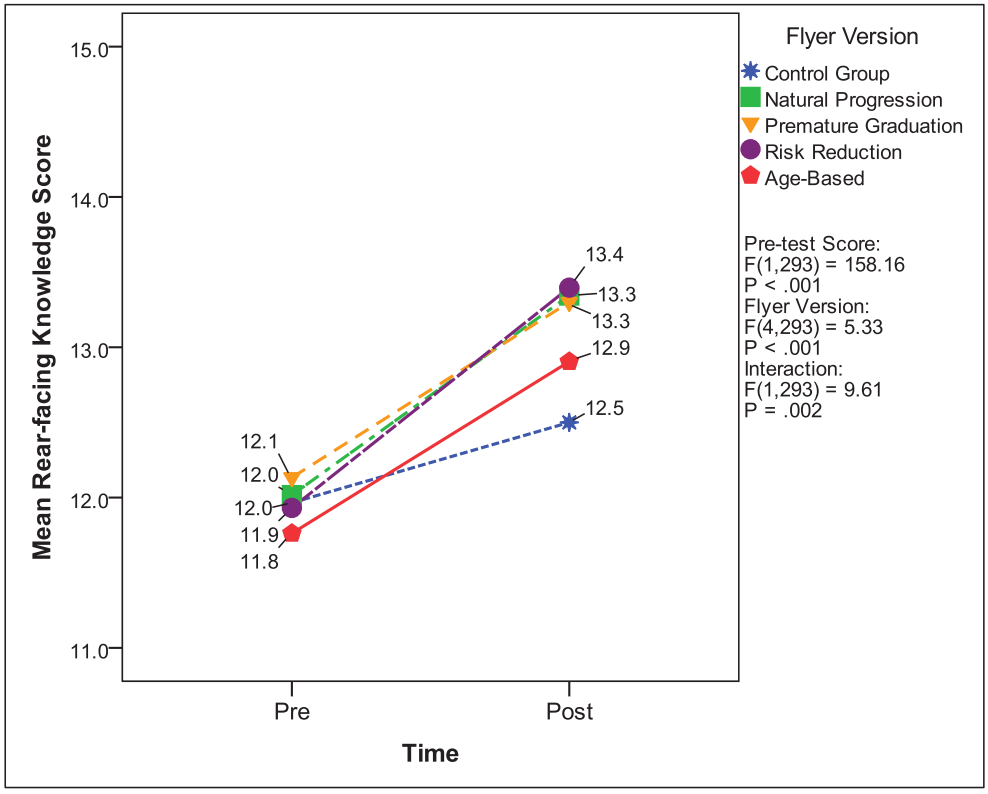


Figure 7.
Changes in Self-efficacy by Flyer Version

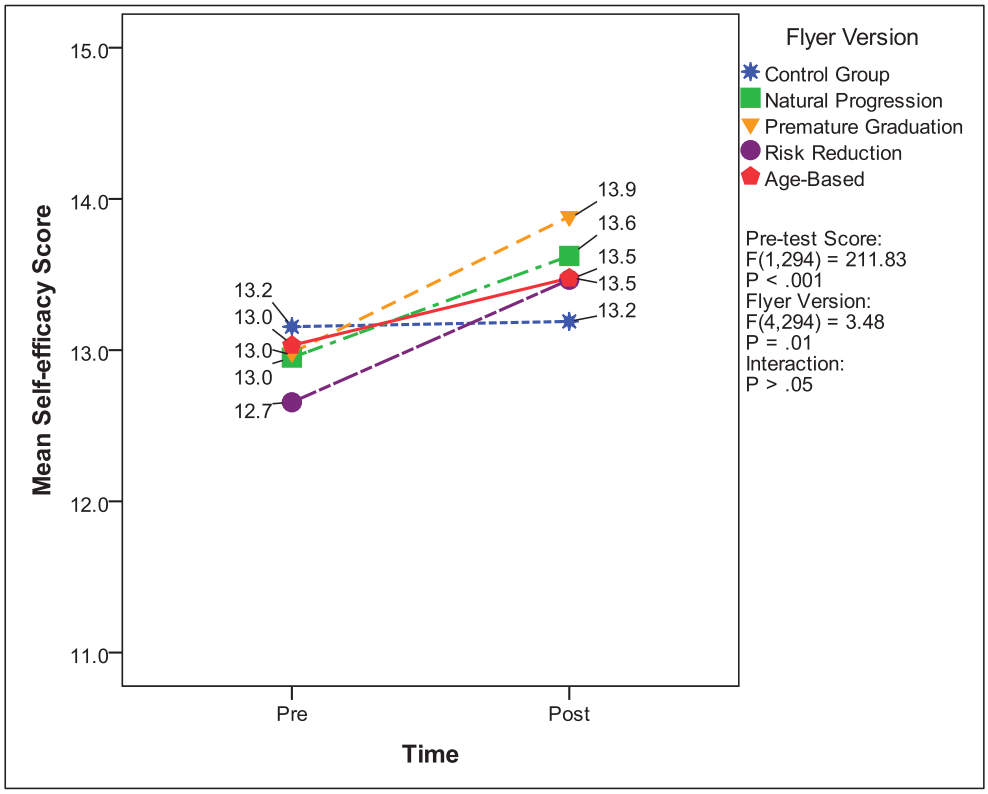


Figure 8.
Changes in Overall Attitudes by Flyer Version

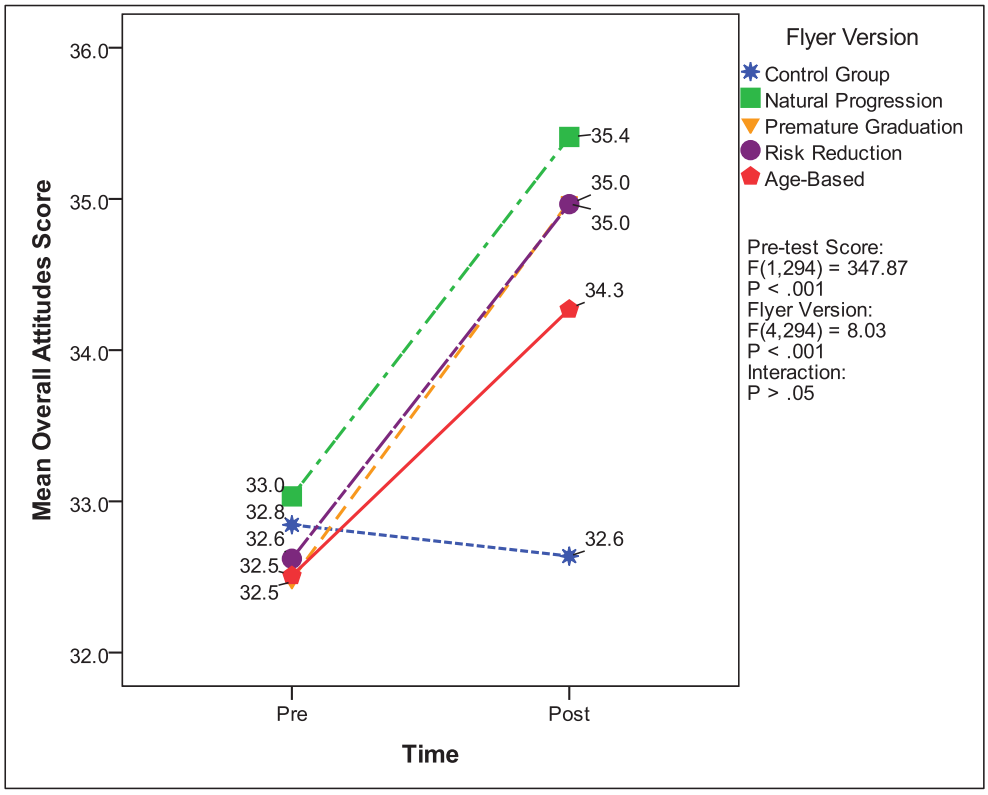
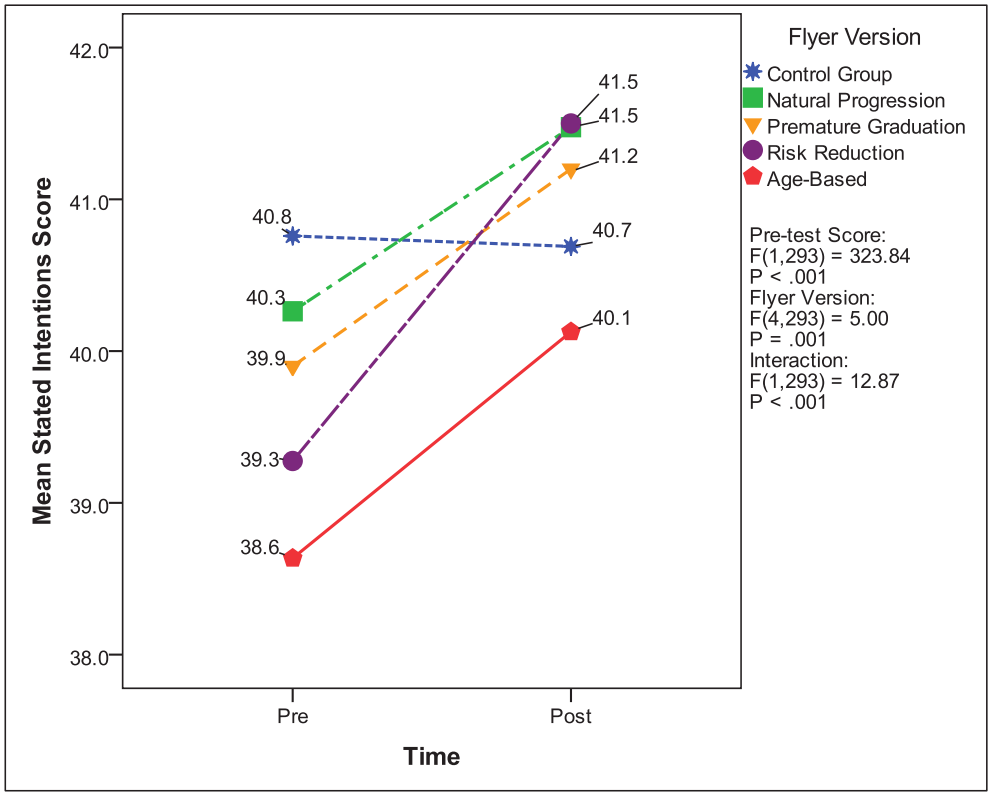


Figure 9.
Changes in Stated Intentions by Flyer Version



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