Perceptions of injury risk associated with booster seats and seatbelts: the ejection stereotype hypothesis

Takuro Ishikawa[1,2], Andy Jiang[3], Mariana Brussoni[1,2,4], Valerie Reyna[5], Rebecca Weldon[6], Beth Bruce[7], Ian Pike[1,2]

Please cite this article as:
Takuro Ishikawa *et al.*, Perceptions of Injury Risk Associated with Booster Seats and Seatbelts: the ejection stereotype hypothesis. *Hypothesis* 2017, 15(1): e1, doi:10.5779/hypothesis.v14i1.455

Received: 2015/20/05;
Accepted: 2016/06/03;
Posted online: 2017/10/04

[1]Department of Pediatrics, University of British Columbia

[2]British Columbia Children's Hospital Research Institute

[3]Department of Anesthesiology, Pharmacology, and Therapeutics, University of British Columbia

[4]School of Population & Public Health, University of British Columbia

[5]Department of Human Development, Cornell University

[6]Department of Psychology, Juniata College

[7]Faculty of Health Professions, Dalhousie University

*Correspondence: tishikawa@bcchr.ca

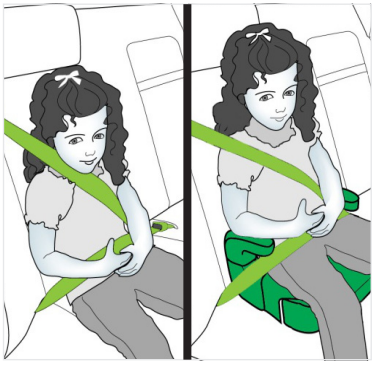

Illustration by Bronwen Barnett; adapted from Children's Hospital of Philadelphia's Center for Injury Research and Prevention

ABSTRACT When children do not have sufficient height or weight to use seatbelts, the straps tend to rest on the wrong places: the lap belt on their bellies and the shoulder belt across their necks. As a result, in the event of a motor vehicle crash, there may be injuries to internal organs and the spine. Thus, it is recommended that children use booster seats to ensure correct fit of the seatbelt. Unfortunately, research indicates that: (a) rates of booster seat use are low even in jurisdictions where it is mandatory, and (b) many parents believe that booster seats are not necessary. Using fuzzy-trace theory, we propose that injuries to children riding in automobiles are stereotypically (and incorrectly) seen as ejection related. This ejection stereotype undermines the perceived safety benefit of booster seats, because seatbelts alone can prevent ejection and, therefore, are thought to provide adequate protection. Interventions to promote booster seat use can be improved, if they include mechanisms to diffuse the ejection stereotype.

INTRODUCTION Road traffic injuries are an important global health problem. Every year, more than one million people die on the world's roads and the direct and indirect costs of these incidents reaches billions of dollars[1]. It is estimated that if no action is taken, by the year 2030, motor vehicle collisions (MVC) will become the fifth leading cause of death globally[1]. In response to this concerning outlook, the nations of the world officially proclaimed 2011 through 2020 the Decade of Action for Road Safety[2]. The global plan that followed, which was spearheaded by the World Health Organization (WHO), included setting and seeking "compliance with laws and evidence-based standards and rules for use of seat-belts and child seat restraints."[2, p16]

Child seat restraint use is the highest in high income countries like Sweden, the United Kingdom, the United States, and Canada, with most children under four years (74% to 97% approximately) restrained in child safety seats (CSS) specifically designed for their age and size[3-6]. However, in these same countries, at least 37% of children between the ages of four and eight are not using a CSS appropriate for their age and size (typically a *booster seat*)[3-6]. Interestingly, in Canada, rates of booster seat utilization are low even in jurisdictions with booster seat legislation[6]. These figures encourage further efforts to investigate why booster seats are not used at the same rates as other child safety seats, and why legislation seems to have little effect on rates of booster seat use.

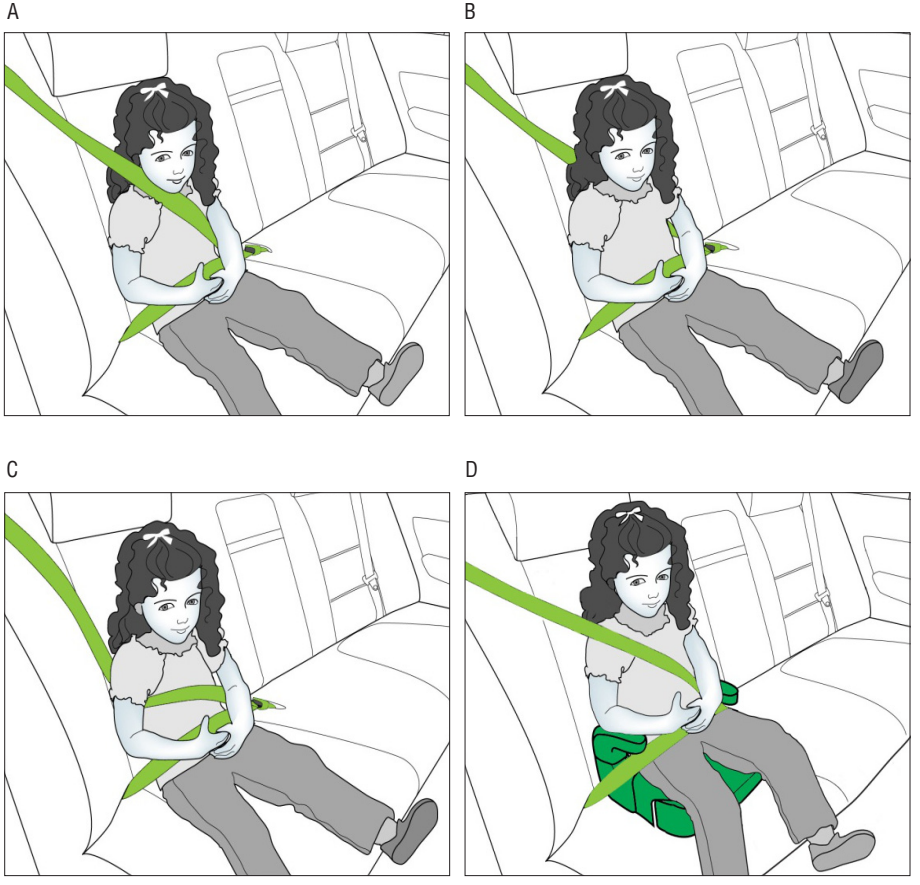

Figure 1 | A) Incorrect fit of a seatbelt with shoulder belt on the neck. **B)** Incorrect fit of a seatbelt with shoulder belt behind the child's back. **C)** Incorrect fit of a seatbelt with shoulder belt under the child's arm. **D)** Correct fit of a seatbelt used with a booster seat: shoulder belt on the shoulder and lap belt across the hips.

Original images courtesy of the Children's Hospital of Philadelphia's Center for Injury Research and Prevention.
Modified by Bronwen Barnett (green color added; shoulder belt in 1D moved to the left).

WHY BOOSTER SEATS ARE NEEDED

Booster seats are a very important safety device to prevent injuries to children riding in motor vehicles. When children do not have sufficient height or weight to wear a seatbelt, as shown in *Figure 1A*, typically, the lap belt rests on their bellies and the shoulder belt cuts across their necks. For comfort, some parents place the shoulder belt behind the child's back or under the child's arm, as shown in *Figures 1B* and *1C* respectively. When used in these ways, during a vehicle collision, seatbelts can cause severe abdominal injury[7-9], spinal cord damage[10,11], injuries to the face and brain[12], and possibly death[13]. During a collision, booster seats can prevent these types of injuries by elevating the child and ensuring the shoulder belt rests on the shoulder and the lap belt is placed across the hips (see *Figure 1D*). In this way, booster seats redirect crash forces to stronger anatomical structures of the body like the hips and chest[7,9,14-16]. In effect, using a booster seat correctly can reduce the risk of injury during a collision by an average of 45% and as much as 82% compared to a child restrained by a seatbelt only[14].

PREVIOUS RESEARCH ON BOOSTER SEAT USE

Previous research on booster seat use has investigated: (i) misuse rates, (ii) predictors of use versus non-use, (iii) predictors of correct or incorrect use, (iv) knowledge of guidelines and law, and (v) interventions

STUDIES ON BOOSTER SEAT MISUSE RATES vary depending on the country, the methodology, and the level of detail. Two country-wide studies report both premature transition to seatbelts and non-use of any kind of restraint for children 4 to 8 years[6,17]. The most recent study reported a decrease in premature transition to seatbelts from 63% in 2006 to 50% in 2010[6]. Studies that surveyed smaller geographical areas provide more specific misuse rates such as improper position of the shoulder belt—under the arm, behind the back, or too loose[18,19]—and incorrect use of locking clips and harnesses[20,21].

STUDIES ON PREDICTORS OF USE (OR NON-USE) of booster seats have shown that overall, booster seat use is directly related to the perceived safety benefit[22-25], social norms[23,24], and perceived consistent enforcement[23,25]. On the other hand, social norms among children (e.g., children teasing those who use booster seats), cost, and installation difficulty are inversely related to use[23-25], as is child's opposition to riding in a booster seat [23,24]. Finally, having more than one child who requires a booster seat also increases booster seat use, mainly among high-income families[25].

STUDIES ON PREDICTORS OF CORRECT OR INCORRECT USE OF BOOSTER SEATS AND SEATBELTS typically focus on population-level factors associated with premature transition to seatbelts or more specific mistakes. These studies have reported that children 4 to 8 years are less likely to be in the correct child seat for their age if the drivers are: (a) grandparents as opposed to parents[26], (b) fathers instead of mothers[27], and (c) 35 years or older[28]. Interestingly, one study that investigated the type of error (e.g., shoulder belt under the arm or behind the back) found that if the driver is between 15 and 24 years of age, the child is more likely to have at least one error; moreover, if the child weighs less than 40 pounds, there is a higher likelihood of a loose seatbelt, the shoulder belt under the arm, or lap belt on the abdomen[19]. Suboptimal use of booster seats is also associated with belonging to an ethnic or racial minority[22,28,29], and inversely related to income and education level[27,28,30]. Further, low income and size of the family is associated with inappropriate restraint use[22].

STUDIES ON KNOWLEDGE OF CHILD PASSENGER SAFETY often evaluate whether parents know the specific booster seat guidelines or regulations in their jurisdiction (i.e., age, weight, and height requirements to transition children from booster seats to seat belts). Overall, research in this area indicates that most parents are either unaware or are confused about the age, weight, and height requirements for booster seats or seatbelts[31-34]. Further, many parents believe that children 4 to 8 years old are safe in seatbelts[33,35]. One study found that these knowledge deficiencies are also prevalent among physicians, with the exception of pediatricians[35].

STUDIES ON INTERVENTIONS evaluate the policy or programs aimed at increasing booster seat use or to improve correct use. A case-control study found an association between booster seat law and increased correct use[36], but two later studies, a non-randomized trial[31] and a longitudinal study[37], found that legislation increased usage, but did not improve correct use of booster seats. A 2006 systematic review found that interventions including education, seat distribution plus education, and incentive plus education were generally effective in increasing booster seat use[38]. Further, another study found sustained improvement in parents' knowledge and self-reported correct transition from booster seats to seatbelts, after receiving training in correct use and the potential injuries to children riding in motor vehicles[39]. More recently, a "before and after" study found that a similar approach (showing parents the forces involved in a crash without using fear appeals) significantly increased knowledge, risk-reduction attitudes, and sense of efficacy[40]. This is expected since the perceived safety benefit (i.e., perceived reduction of injury risk) is a main motivator for booster seat use[22-25].

In summary, parental perception of the safety benefits afforded by booster seats has been associated with increased use and correct use. However, some questions remain: Why do parents believe that seatbelts alone are enough to protect their children[33,35]? What factors contribute to the accurate understanding of the injury risk reduction afforded by booster seats? How can this understanding be improved? The proposed hypothesis addresses these questions.

FUZZY-TRACE THEORY AND THE EJECTION STEREOTYPE HYPOTHESIS

Fuzzy-trace theory (FTT) is a psychological model of memory and reasoning that explains a wide range of phenomena in cognitive development, decision making, and health behavior. In this section, we discuss how FTT provides a framework of how people may perceive (or misperceive) the safety benefits of booster seats. Tests of FTT predictions can provide key information to help develop interventions that effectively improve people's understanding of the need for booster seats, ultimately encouraging booster seat use.

FTT postulates that misperceptions of the risk reduction associated with a particular safety device can be traced back to three sources[41,42], of which two are relevant to booster seats: *knowledge deficit* and *representational biases*.

KNOWLEDGE DEFICIT is the simplest source of faulty estimation of risk reduction. Naturally, if people do not know that seatbelts can severely or fatally injure children when they do not fit correctly (i.e., the shoulder belt on the shoulder and the lap belt across the hips), then they are likely to overestimate the safety benefit of seatbelts and/or underestimate the reduction of injury risk afforded by

boosters seats. Knowledge deficit can be ameliorated simply by ensuring that individuals acquire and memorize relevant information (e.g., biomechanics of booster seats; injury rates for children restrained in booster seats versus those who are not).

REPRESENTATIONAL BIASES, unlike knowledge deficit occur not because of absence of information, but in spite of it. According to FTT, this occurs because individuals generally do not act upon memorized facts and figures. Instead, they tend to make judgments and decisions based on "fuzzy" memory traces that form the gist of relevant knowledge; the bottom-line meaning of the information[43]. Consider, for example, a father who learns that "compared with seatbelts alone, booster seats reduce the risk of injury by an average of 45%"[43]. This information can be interpreted as "booster seats are safe and seatbelts alone are not" or as "booster seats are better, but seatbelts alone are okay". If the father adopts the latter interpretation, then he is likely to underestimate the safety benefit of booster seats.

Because the gist is a subjective interpretation based on context, emotions, education, culture, experience, mindset, and development[44], sometimes people form an incorrect or stereotyped gist of the issue, which leads to biased judgments[41]. For example, Reyna and Adam[41] and Adam and Reyna[42] demonstrated that the tendency to incorrectly view sexually transmitted infections (STI) as primarily fluid-borne led knowledgeable individuals (i.e., healthcare professionals) to overestimate the effectiveness of condoms. Indeed, individuals who think of STI as primarily fluid-borne will consider only fluid-borne infections in their estimations (e.g., HIV, gonorrhea), neglecting STI that are transmitted through the skin (e.g., herpes simplex and human papillomavirus). As a result, these individuals are likely to overestimate the STI risk reduction afforded by condoms: STI are fluid-borne; condoms block fluids; therefore, condoms prevent all STI.

We propose that a similar representational bias may help explain why people misunderstand the need for and use of booster seats. Because injuries to vehicle occupants are typically described as ejection related, people may be prone to overestimating the protection afforded by seatbelts, and to underestimating the safety benefit of booster seats: child passenger injuries are ejection related; seatbelts prevent ejection; therefore, seatbelts provide sufficient protection (i.e., booster seats are not needed). In effect, by focusing on preventing ejection, parents may overlook other injury hazards that need to be prevented; namely, injuries to the abdomen or the spine caused by incorrect positioning of the seatbelt. We call this representational bias the *ejection stereotype*.

As a representational bias, the ejection stereotype must be distinguished from knowledge deficit: we are not proposing that people are just unaware of the physics and mechanics relevant to booster seats, or the difference in injury rates between children who use booster seats versus those who do not. Rather, we submit that the ejection stereotype emerges because injuries caused by ejection are more salient and available in memory than injuries caused by seatbelts.

Indirect evidence supports the ejection stereotype. First, ejection from the vehicle seems to be the typical, most salient exemplar of injuries to drivers and passengers, as it is often covered in the news and depicted in movies. In contrast, crash injuries caused by seatbelts are rarely seen on screen. Psychological research on risk perception has shown that media coverage of adverse events shapes people's perception of risk[45]. A notable example of this body of research pertains to people's anxiety about flying compared with driving: people tend to be more fearful of flying because plane crashes are covered in the news more often and more intensely than motor vehicle crashes. Second, ejection seems to be the preferred persuasion example in the injury prevention community, as evident in the following excerpt from an academic article on child passenger safety: "the child will be hurled like a missile that bursts when it lands."[46,p157] Finally, parents' misgivings about booster seats not being anchored to the vehicle[47] suggests that they perceive injuries to children riding in cars as ejection related.

The ejection stereotype hypothesis can be studied and tested in many ways. For example, it is expected that even people who have relevant knowledge would still be prone to underestimating the safety benefit of booster seats. Consequently, if experts in CSS are asked "what is the injury risk reduction afforded by booster seats?" their estimates should be significantly lower than published estimates. We expect that this effect would be independent of their level of knowledge of CSS, which could be tested in a survey study. Furthermore, FTT predicts that this type of representational bias can be defused simply by reminding participants of all the potential injuries that booster seats help to prevent. Thus, differences in survey responses can be examined for

participants that do and do not receive information regarding abdominal and other seatbelt related injuries.

CONCLUSION The ejection stereotype hypothesis represents a theoretical and practical leap forward in our current understanding of booster seat use. It enables researchers to distinguish between two separate causes of faulty judgments of the risk reduction afforded by booster seats: *knowledge deficit*, which is well known in the literature on booster seat use, and *representational bias* which leads even knowledgeable people to underestimate the benefit of booster seats. This distinction is very important for public health practice because, without it, all misperceptions of the benefit of booster seats would be interpreted as knowledge deficit. As a result, prevention programs could inadvertently engage in efforts to impart knowledge with limited effectiveness. The ejection stereotype implies that, in order to effectively educate the public about the safety benefits of booster seats, interventions should aim at correcting both knowledge deficit and the ejection stereotype. **END**

ACKNOWLEDGMENTS

This research is funded by the AUTO21 Network of Centres of Excellence, Canada's automotive research program. AUTO21 is supported by the Government of Canada through a Networks of Centres of Excellence program.

CONFLICTS OF INTEREST

Authors declare no conflicts of interest.

ABOUT THE AUTHORS

Takuro Ishikawa is a PhD student, and conducts behavioral research to understand and improve people's judgments about health risks and related decisions. Andy Jiang studies pharmacology and therapeutics. Dr. Mariana Brussoni investigates child injury prevention. Dr. Valerie Reyna is co-developer of fuzzy-trace theory; her research integrates behavioral approaches to understand and improve judgment and decision making across the lifespan. Dr. Rebecca Weldon is an assistant professor and studies cognitive control and decision making. Dr. Beth Bruce is consultant in public health research, with emphasis on injury prevention. Dr. Ian Pike pursues a broad injury research program encompassing social marketing, road safety, and surveillance.

REFERENCES

1 World Health Organization. Global status report on non-communicable diseases 2010. 2011.

2 World Health Organization. Global plan for the decated of action for road safety 2011-2020. 2011.

3 Jakobsson L, Isaksson-hellman I. Safety for the growing child– Experiences From Swedish Accident Data. Distribution. 2004;

4 Greenspan AI, Dellinger AM, Chen J. Restraint use and seating position among children less than 13 years of age: Is it still a problem? J Safety Res. 2010;41(2):183–5. http://dx.doi.org/10.1016/j.jsr.2010.03.001.

5 Road Safety Observatory. Child Resrtaint Systems. 2012.

6 Snowdon AW, Hussein A, Ahmed E, Snowdon, Anne W; Hussein, Abdulkadir; Ahmed E. Canadian National Survey on Child Restraint Use 2010. AUTO21; 2011.

7 Klinich, K.D., Manary, M.A., Weber K. Crash Protection for Child Passengers: Rationale for Best Practice. 2012;

8 Arbogast KB, Jermakian JS, Ghati Y. Abdominal injuries in belt-positioning booster seats. Ann Adv Automot Med. 2009 Oct;53(October):209–19.

9 Arbogast KB, Kent RW, Menon R a, Ghati Y, Durbin DR, Rouhana SW. Mechanisms of abdominal organ injury in seat belt-restrained children. J Trauma. 2007 Jun;62(6):1473–80. http://dx.doi.org/10.1097/01.ta.0000231965.20704.16.

10 Rasouli MR, Rahimi-Movaghar V, Maheronnaghsh R, Yousefian A, Vaccaro AR. Preventing motor vehicle crashes related spine injuries in children. World J Pediatr. 2011 Nov;7(4):311–7. http://dx.doi.org/10.1007/s12519-011-0327-z.

11 Davies KL. Buckled-up children: understanding the mechanism, injuries, management, and prevention of seat belt related injuries. J Trauma Nurs. 2004 Jan-Mar;11(1):16-24. http://dx.doi.org/10.1016/j.aap.2008.03.004

12 Durbin DR, Elliott MR, Winston FK. Belt-positioning booster seats and reduction in risk of injury among children in vehicle crashes. JAMA. 2003 Jun 4;289(21):2835–40. http://dx.doi.org/10.1001/jama.289.21.2835.

13 Skjerven-Martinsen M, Naess PA, Hansen TB, Rognum TO, Lereim I, Stray-Pedersen A. In-depth evaluation of real-world car collisions: fatal and severe injuries in children are predominantly caused by restraint errors and unstrapped cargo. Traffic Inj Prev. 2011 Oct;12(5):491–9. http://dx.doi.org/10.1080/15389588.2011.596868.

14 Arbogast KB, Jermakian JS, Kallan MJ, Durbin DR. Effectiveness of belt positioning booster seats: an updated assessment. Pediatrics. 2009 Nov;124(5):1281–6. http://dx.doi.org/10.1542/peds.2009-0908.

15 Durbin DR, Arbogast KB, Moll EK. Seat belt syndrome in children: a case report and review of the literature. Pediatr Emerg Care. 2001 Dec;17(6):474–7.

16 Winston FK, Durbin DR, Kallan MJ, Moll EK. The Danger of Premature Graduation to Seat Belts for Young Children. Pediatrics. 2000 Jun 1;105(6):1179–83. http://dx.doi.org/10.1542/peds.105.6.1179.

17 Snowdon AW, Hussein A, Purc-Stevenson R, Bruce B, Kolga C, Boase P, *et al.* Are we there yet? Canada's progress towards achieving road safety vision 2010 for children travelling

in vehicles. Int J Inj Contr Saf Promot. 2009 Dec;16(4):231–7.
http://dx.doi.org/10.1080/17457300903308308.

18 Macy ML, Reed MP, Freed GL. Driver report of improper seat belt position among 4- to 9-year-old children. Acad Pediatr. 2011;11(6):487–92.
http://dx.doi.org/10.1016/j.acap.2011.08.009.

19 O'Neil J, Daniels DM, Talty JL, Bull MJ. Seat belt misuse among children transported in belt-positioning booster seats. Accid Anal Prev. 2009 May;41(3):425–9.
http://dx.doi.org/10.1016/j.aap.2009.01.003.

20 Brown J, Hatfield J, Du W, Finch CF, Bilston LE. The characteristics of incorrect restraint use among children traveling in cars in New South Wales, Australia. Traffic Inj Prev. England: Informa Healthcare: London; 2010;11(4):391–8.

21 Smithers J, Cramm C, Bruce B. Roadside observation of car seat restraint use. Canadian Injury Prevention and Safety Promotion Conference. Vancouver; 2011.

22 Keay L, Hunter K, Brown J, Bilston LE, Simpson JM, Stevenson M, *et al.* Child restraint use in low socio-economic areas of urban Sydney during transition to new legislation. Accid Anal; Prev. 2012 Jan;50:984–91.

23 Bruce BS, Snowdon AW, Cunningham C, Cramm CL, Whittle K, Correale H, *et al.* Predicting parents' use of booster seats. Inj Prev. 2011 Oct;17(5):313–8.
http://dx.doi.org/10.1136/ip.2010.029181.

24 Cunningham CE, Bruce BS, Snowdon AW, Chen Y, Kolga C, Piotrowski C, *et al.* Modeling improvements in booster seat use: a discrete choice conjoint experiment. Accid Anal Prev.; 2011 Nov;43(6):1999–2009.
http://dx.doi.org/10.1016/j.aap.2011.05.018.

25 Bingham CR, Eby DW, Hockanson HM, Greenspan AI. Factors influencing the use of booster seats: a state-wide survey of parents. Accid Anal Prev. 2006 Sep;38(5):1028–37.
http://dx.doi.org/10.1016/j.aap.2006.04.014.

26 Henretig FM, Durbin DR, Kallan MJ, Winston FK. Grandparents driving grandchildren: an evaluation of child passenger safety and injuries. Pediatrics. 2011 Aug;128(2):289–95.
http://dx.doi.org/10.1542/peds.2011-0046.

27 Snowdon AW, Hussein AA, Ahmed SE. Children at risk: predictors of car safety seat misuse in Ontario. Accid Anal Prev. ed. 2008 July;40(4):1418–23.
http://dx.doi.org/10.1016/j.aap.2008.03.004

28 Winston FK, Chen IG, Smith R, Elliott MR. Parent driver characteristics associated with sub-optimal restraint of child passengers. Traffic Inj Prev. ed. 2006 Nov;7(4):373–80.
http://dx.doi.org/10.1080/15389580600789143

29 Macy ML, Freed GL. Child passenger safety practices in the U.S.: disparities in light of updated recommendations. Am J Prev Med.; 2012 Sep;43(3):272–81.
http://dx.doi.org/10.1016/j.amepre.2012.05.023.

30 Yoon HS, Kim YD. Parental awareness and perception for correct use of child occupant restraints in Korea. Traffic Inj Prev. England: Informa Healthcare: London; 2010;11(3):279–85.

31 Brixey S, Ravindran K, Guse CE. Legislating child restraint usage and it's effect on self-reported child restraint use rates in a central city. J Safety Res. 2010;41(1):47–52.

32 Cease AT, King WD, Monroe KW. Analysis of child passenger safety restraint use at a pediatric emergency department. Pediatr Emerg Care. 2011 Feb;27(2):102–5.
http://dx.doi.org/10.1097/PEC.0b013e3182094312.

33 Snowdon AW, Polgar J, Patrick L, Stamler L. Parents' knowledge about and use of child safety systems. Can J Nurs Res. ed. 2006;38(2):98–114.

34 Vesentini L, Willems B. Premature graduation of children in child restraint systems: an observational study. Accid Anal Prev. 2007 Sep;39(5):867–72.
http://dx.doi.org/10.1016/j.aap.2006.08.005.

35 Brixey SN, Guse CE. Knowledge and behaviors of physicians and caregivers about appropriate child passenger restraint use. J Community Health. 2009 Dec;34(6):547–52.
http://dx.doi.org/10.1007/s10900-009-9176-2.

36 Farmer P, Howard A, Rothman L, Macpherson A. Booster seat laws and child fatalities: a case-control study. Inj Prev. 2009 Oct;15(5):348–50.
http://dx.doi.org/10.1136/ip.2008.021204.

37 Brixey SN, Corden TE, Guse CE, Layde PM. Booster seat legislation: does it work for all children? Inj Prev. 2011 Aug;17(4):233-7.
http://dx.doi.org/10.1136/ip.2010.029835

38 Ehiri JE, Ejere HOD, Hazen AE, Emusu D, King WD, Osberg SJ. Interventions to Increase Children's Booster Seat Use: A Review. Am J Prev Med. 2006;31(2):185–92.

39 Snowdon AW, Hussein A, Purc-Stevenson R, Follo G, Ahmed E. A longitudinal study of the effectiveness of a multi-media intervention on parents' knowledge and use of vehicle safety systems for children. Accid Anal Prev. ed. 2009 May;41(3):498–505.
http://dx.doi.org/10.1016/j.aap.2009.01.013

40 Will KE, Dunaway KE, Kokorelis D A, Sabo CS, Lorek EJ. Challenges and opportunities for promoting booster seat use: progressive dissemination of a high-threat message. Health Promot Pract. 2012 Nov;13(6):772–8.
http://dx.doi.org/10.1177/1524839910393279.

41 Reyna VF, Adam MB. Fuzzy-trace theory, risk communication, and product labeling in sexually transmitted diseases. Risk Anal. 2003 Apr;23(2):325–42.

42 Adam MB, Reyna VF. Coherence and correspondence criteria for rationality: experts' estimation of risks of sexually transmitted infections. J Behav Decis Mak. 2005 Jul;18(3):169–86.
http://dx.doi.org/10.1002/bdm.493.

43 Klinich, K.D., Manary, M.A., Weber K. Crash Protection for Child Passengers : Rationale for Best Practice. Res Rev. 2012;43(1):1–35.

44 Reyna VF. A theory of medical decision making and health: fuzzy trace theory. Med Decis Making. 2008;28(6):850–65.

http://dx.doi.org/10.1177/0272989X08327066.

45 Girasek DC. Would society pay more attention to injuries if the injury control community paid more attention to risk communication science? Inj Prev. 2006 Apr;12(2):71–3. *http://dx.doi.org/10.1136/ip.2005.008839.*

46 Garrison HG, Harris JS, Vaca F, McKay MP. Not enough children ages four through eight using booster seats. Ann Emerg Med. 2005;45(2):157.

47 Simpson EM, Moll EK, Kassam-Adams N, Miller GJ, Winston FK. Barriers to Booster Seat Use and Strategies to Increase Their Use. Pediatrics. 2002 Oct 1;110(4):729–36. *http://dx.doi.org/10.1542/peds.110.4.729.*