Determinants of Booster Seat Usage: What Makes Parents Commit to Using Booster Seats on a Regular Basis

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ABSTRACT

Booster seats can protect children's lives when used properly on a regular basis. Toward that end in 2007, a program called *Ollie's Seatbelt and Booster Seat Safety Program* was initiated in Tennessee aiding over 57,184 children from 2,928 classrooms in 154 schools from K-4 representing 95 counties of Tennessee. Ollie Otter has already impacted over 13 percent of Tennessee's 1,156 elementary schools in its first year as of September 30, 2008. A research stream has also been started in parallel to this program. The current paper focuses on the following research question: What are the determinants of booster seat usage? Specifically, it investigates what makes parents commit to using booster seats on regular basis. Discussion of results and future research avenues are also provided.

INTRODUCTION

When children ride in motor vehicles unrestrained, death and/or injury will likely occur in a crash (Washington State Booster Seat Coalition, 2003; NHTSA, 2006). Motor vehicle collisions are the most important factor that causes death of children from 4 to 8 years old (Washington State Booster Seat Coalition, 2003). However, only 10 to19 percent of children had been restrained in booster seats by parents and other adults (National SAFE KIDS Coalition, 2003; adcouncil.org, 2007). Fortunately, this ratio has been increasing steadily and about 4 out of 10 child passengers between the ages of 4 and 7 were restrained in booster seats in 2006 (Glassbrenner and Ye, 2007). The bad news is that the majority of those children restrained in a booster seat secured by a safety belt, or just by a regular (adult) safety belt alone, were not restrained properly and this misuse will likely to increase risk of injury during a crash (NHTSA 2006).

"Tennessee was the first state in the nation to enact a law making it mandatory for children to be restrained in a safety seat" (Tennessee Department of Safety, 2008). In 1978, this first law in Tennessee and in the nation required children under age of 4 to ride in a car seat (Savage and Teigen, 2008). As stated by Governor Phil Bredesen, "Within six years, every other state in the country had followed [Tennessee's] example with a similar law to save children's lives". Today, Tennessee is one of only 18 states that currently require children up to the age 8 to be restrained in a booster seat (Tennessee Department of Safety, 2008).

A four-year-old Anton Skeen, a child passenger restrained by an adult seat belt in an SUV, was killed in an accident in 1996, led to the first booster seat law which was enacted in 2000 in Washington state and went into effect in 2002 (Higgins, 2005). The child restraint law, also known as the Anton Skeen Act, was revised on June 1, 2007, and requires the use of booster seats for older children (Washington State Booster Seat Coalition, 2008) as indicated below:

> "Effective June 1, 2007, children less than eight years old must be restrained in child restraint systems, unless the child is four feet nine inches or taller."... "A child who is eight years old or older, or four feet nine inches or taller, must be properly restrained either with the motor vehicle's safety belt or an appropriately fitting child restraint system." (Washington State Booster Seat Coalition, 2008).

Thirty years after the first child safety seat law enacted in the nation, there are still two points worth to highlight. First, "most state laws today still far short of what we know are the best practices, especially 4-to-8-year-old children, who should be riding in booster seats" as stated by Hersman in Business Wire (2008). Second, according to survey findings released by AAA, 93 percent of responding parents said "they are aware of their state's child restraint law" but only 39 percent "can accurately identify the age at which their state allows a child to ride in an automobile with only a lap and shoulder belt" (Business Wire, 2008).

"Children under 4′9″ tall should ride with a booster seat" (adcouncil.org, 2007), usually from age 4 to 8 (Glassbrenner and Ye 2007). Proper use of booster seats on a regular basis is an important precaution in reducing child passenger deaths and injuries during motor vehicle collision (CNW Group, 2008). "Seatbelts designed for adults can pose risk to children of abdominal and spinal-chord injuries" (Wall Street Journal, 2003). Booster seats are "used as a transition to safety belts by older kids who have clearly outgrown their convertible seat and are not quite ready for the vehicle belt system" (National Safety Belt Coalition, 2007). "A booster seat raises … child up so that the safety belt fits right – and can better protect … child. The

shoulder belt should cross the child's chest and rest snugly on the shoulder, and the lap belt should rest low across the pelvis or hip area – never across the stomach area" (nhtsa.dot.gov, 2007).

To save lives, catastrophic injuries, and economic fallout, there is a current need for a creative, adaptive, and ongoing program that solves the problems by raising awareness, interests, and the actual proper use of booster seats and seat belts. *Ollie's Seatbelt and Booster Seat Safety Program* was initiated in Tennessee on October 1, 2007 aiding over 57,184 children from 2,928 classrooms in 154 schools from K-4 representing 95 counties of Tennessee. The Tennessee Road Builders Association has developed a child seatbelt safety education character; the mascot –Ollie the Otter– has been developed for use in actual classroom presentations. Ollie Otter has already impacted over 13 percent of Tennessee's 1,156 elementary schools in its first year as of September 30, 2008 (Tennessee Roadbuilders Association 2008).

RESEARCH QUESTION

Parallel to *Ollie's Seatbelt and Booster Seat Safety Program*, a research stream has also been initiated. The research stream has four major questions to investigate and address:

(1) What motivates parents to buy and use booster seats for their children?
(2) What are the attitudes of parents toward buying a booster seat?
(3) What impact do situational factors such as state laws, peer pressure and cost of booster seat have on the purchase and use of booster seat?
(4) What are the demographic characteristics of parents who prefer to use booster seat versus those who do not?

The scope of the current paper includes only the first research question regarding the determinants of booster seat usage. In other words, what motivates parents to buy and use booster seats for their children? Specifically, what makes parents commit to using booster seats on a regular basis?

Surprisingly there is no theory based research available on parents' behaviors related to booster seat usage. Majority of research on booster seat usage was focused on medical aspects of the use of booster seats and research reporting drivers' behaviors use observation technique frequently. According to the authors' knowledge, there was only one research reporting the change of usage rates of booster seats following a community campaign (Ebel, Koepsell, Bennett, and Rivara, 2003).

In order to provide a framework for exploration of the research questions, a model was developed to illustrate the determinants of regular use of booster seats (Figure 1). The first construct in the model is cost of booster seat. It is presumed that the perceptions about the cost of booster seat will be detrimental to parents' willingness to purchase and regular use of it.

The next group of constructs in the model is related to attitudes of parents. Attitudes are also expected to have impact on regular use of booster seats. Informal one to one discussions with parents helped to identify four groups of attitudes: attitudes toward booster seat, attitude toward children, attitude toward children while driving, and attitude toward multi-tasking. As theoretically expected attitude toward booster seat will be influential on the parents' intentions about it. Attitude toward children construct has also impact on securing children to booster seats. Interestingly, the other two attitude constructs may have influence on the intentions. It seems like those who consider multi-tasking such as eating, drinking, or talking on the phone as natural part

of driving are more lax in using booster seat. Similarly, children's behavior during driving seems to result in the parents' varying implementation of booster seat restraints in special trips.

The last set of constructs comes from individual characteristics such as, demographics, risk aversion or risk attraction traits. It would not be a surprise to find risk aversion as a personality trait relate to propensity to secure a child on booster seat on every trip.

METHOD

Items for the measurement instrument for this study were obtained from multiple sources. Items measuring intention toward booster seat were newly developed for this study. Five of the items related to attitude toward booster seat were adapted from Dabholkar (1994) and new items were added to this construct as well. Attitude toward risk aversion in driving was measured with items adapted from Donthu and Gilliland (1996). Attitude toward risk attraction items were obtained from Griffin, Babin and Attaway's (1996) work. New items were generated for attitude toward multi-tasking, attitude toward children, attitude toward children while driving, cost of booster seat constructs as well as demographics and personal characteristics.

The data for this study was collected with a mail survey. Research was designed to collect data as the booster seat and safety belt campaign move to new elementary school zones. Simultaneous public campaign and research design are a first among Tennessee public related no-profit campaigns. First, elementary school students from K-4 were educated about the importance of booster seat and seat belt usage, and then teachers in those schools were invited to help us contact the parents of their students. Several days later, teachers distributed surveys in envelopes to their students for their parents. The surveys were then directed to the parents of students who were exposed to the campaign. Once the surveys were returned to teachers in closed envelopes, teachers mailed them to the researchers. There were no incentives given to the parents. However, teachers received vouchers as token of appreciation for class supplies and a pizza party to their classes in the theme of Ollie's message "Wear seat belts everyday; under 4 feet 9- booster time" and use for classroom needs.

There were 52 packages sent to teachers in this first wave of research. 31 teachers decided to join the study. Among those 31 class rooms 422 parents voluntarily responded to the survey out of 1300 surveys sent (32.5% response rate). Missing value analysis indicated that there were 414 usable questionnaires. They represent only a small proportion of program reach; however the sample size provided a good opportunity to do preliminary analysis. The analysis of demographics indicated that majority of respondents were female (90.8 percent) (Table 1). Results may be skewed in terms of representing more of mothers' perspective. This was a limitation of this data set. Recognizing this limitation early in the research, fathers were encouraged to participate into the study in the next waves of data collection.

RESULTS

Respondent characteristics indicated that 48.2 percent were between 25 and 34 years old and 33.1 percent were between 35 and 44 years old. Majority of respondents were Caucasian (87.4 percent). 34.9 percent had high school diploma and 24.9% have some college experience as the highest level of education. 21.2 percent of respondents had less than $20,000 gross annual household income, 27 percent had income between $20,000 and $39,000, and 21.2% had income between $40,000 and $59,000 (=median). 75 percent of respondents were married having 2.3

vehicles on the average for transportation in the household. High truck ownership (51.6 percent) was reflecting the rural life styles of the respondents. Finally, on the average, there were 2.44 children living in their households. At least one (57.7 percent) and sometimes two (30.0 percent) of these children were between 5-9 years old. 29.6 percent stated that they have another child who is less than 5 years old in the household.

In order to evaluate reliability and validity of constructs, Cronbach's alpha and principal component analysis utilizing Quartimax rotations were used. The results of these analyses can be seen in Table 2. The Cronbach's alpha score of for constructs were greater than 0.70 that verified an adequate reliability. Furthermore, factor loadings of items on related constructs resulting from Quartimax rotation indicated validity of the constructs under study.

When we asked respondents whether they intended to secure their children every time they drive, the answer was affirmative (mean=6.36 out of 7 point Likert scale). The actual practice on the other hand showed that only 10-19 percent of children at the booster seat age had been restrained in booster seats (Adcouncil.org, 2007). It is important to identify what are the determinants of booster seat usage. A regression analysis was performed including intention to "secure your child into booster seat every time you drive" as the dependent variable. Predictor variables were selected with a stepwise regression analysis among the constructs of attitudes of respondents toward children, booster seat, risk aversion in driving, risk attraction in driving, children while driving, and multi-tasking while driving. As indicated in the conceptual framework, cost of booster seat and individual characteristics were also included in the predictor variables set.

The results of the regression analysis were provided on the Table 3. The overall model and each individual predictor variable were significant at alpha of 0.05 level. The overall R-square was 0.247. A check on collinearity statistics indicated that multi-collinearity was not an issue with VIF values around 1.000.

The most influential predictor of using booster seat regularly has belonged to attitude toward booster seat construct and related to how pleasant to use on the booster seat. This predictor has a positive impact on the regular use of booster seat. The second important variable (the number of children who are between 5-9 years old and live in the household) has a negative effect on the regular use of booster seat. The next two important predictors have come from attitude toward risk aversion in driving construct. They both have had positive impact. The last three predictors have had negative impact on the use of booster seat. They were related to attitude toward children while driving and cost of booster seat constructs.

DISCUSSION AND FUTURE RESEARCH

As results indicated, attitudes, individual factors and cost of the booster seat were found to be influential in regular use of booster seats for every child in the household. A research utilizing observation methodology (Apsler, Formica, Rosental and Robinson, 2003) showed that after parental education on the use of booster seats, the actual percentage of regular usage increased among 4-5 years olds, but not significantly among older children. Researchers also indicated poor conditions of the booster seats and did not expect them to be replaced soon. Some parents were confident about their children's' safety as they were restrained in adult safety belts. Gunn, Phillippi and Cooper (2007) found that racial differences in restraint use, black children 4-8 years of age were less likely to be restrained in booster seats. Ebel, Koepsell, Bennet and

Rivara (2003) found that gender and seat belt usage of driver correlated with booster seat usage in their observation study.

The predictor variables in the regression model supported the above mentioned observations and provided some explanation for the parents' behavior. The first predictor was about how pleasant it was to use booster seat, how easy it was to put in or take child away, how easy it was to transfer the seat from car to truck or to SUV. If the design features of the booster seat were flexible for multi-use situations, the likelihood of using the seat for every drive would increase.

As the number of children between 5 and 9 years old in the household increases, the likelihood of using booster seat decreases. This may be due to difficulty of buying multiple booster seats for every child in the household or multiple booster seats for every vehicle in the household. It may also be due to difficulty of fitting more than one booster seat in the back seat of a vehicle. Attitude toward risk aversion was found as an influential construct for the regular booster seat usage. Those parents who use their seat belts regularly and who pay attention to safety features of vehicle before they purchase have a tendency to use booster seats as well. This finding supports Ebel, Koepsell, Bennet and Rivara (2003) research findings.

Parents overwhelmingly declared that they try to protect their children from potential dangers (mean=6.843), however their attitude toward children while driving may negatively influence their regular use of booster seat in contrast to what they believe. If they forget to tell their children to buckle up, they also tend to forget to insist the regular use of booster seat. Some parents, as indicated by Apsler, Formica, Rosental and Robinson (2003) research as well, incorrectly believed that their children could sit responsibly in any seat they choose in the vehicle. Then, the parents most likely assumed that children were old enough and they tend to use adult seat belts for restraining rather than booster seats.

Finally, another negative influence about the regular use of booster seats was found to be the cost of booster seat. Parents believed that children grew so fast that, cost of booster seat exceeded its benefits. If they have two children within 5-9 age group, and they owned one booster seat, they may move older child earlier than advised to adult seat belts. This reasoning also confirmed by the observation of no children at 7-9 age range was riding on booster seats (Apsler, Formica, Rosental and Robinson, 2003).

Behavior modification can be defined as "the reinforcement of safe behavior by positive feedback" Saari (1994). Behavior modification techniques, for example, reduced accidents up to 80 percents as stated by Saari and Nasanen (1989) in Naari (1999). It would also be used in a future study to test the relationship between positive reinforcement and use of booster seats.

The results of the first wave of booster seat research stream were promising. Extra precautions were taken to ensure a more balanced sample on gender. New waves of research will follow this stream to learn parents' attitudes toward buying a booster seat. Next avenues of inquiry will include how situational factors such as state laws, peer pressure, as well as demographic characteristics of parents influence the regular use of booster seats for every child on a daily basis.

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FIGURE 1
CONCEPTUAL MODEL

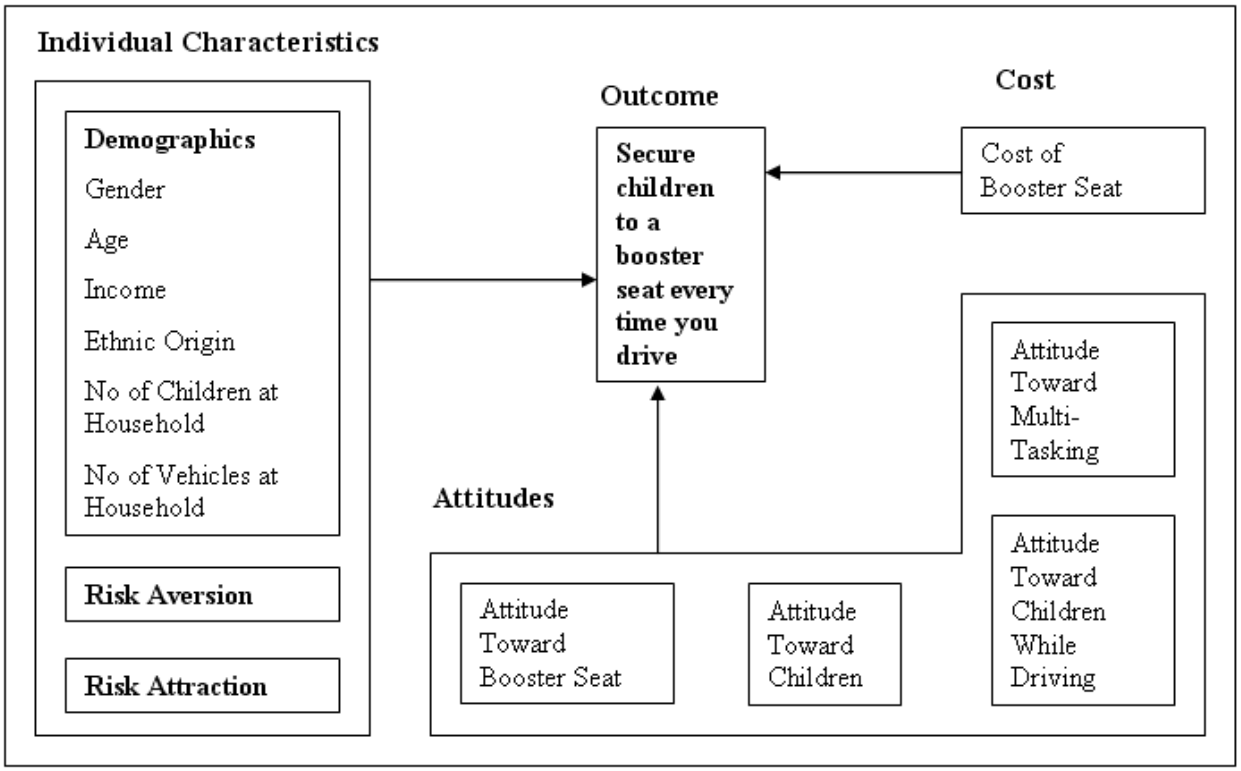

TABLE 1
DEMOGRAPHICS

Gender	**Female**						**Male**					
(%)	90.8						9.2					
Number of Vehicles in the household	Mean = 2.3											
	Car (%)		**Mini Van (%)**		**SUV (%)**		**Truck (%)**					
None	37.3		73.1		66.3		38.5					
1	51.6		25.3		27.4		51.6					
2	9.1		1.2		5.6		7.5					
3	2.0		0.0		0.8		2.4					
Age	**18-24**		**25-34**		**35-44**		**45-54**		**55-64**		**65-74**	
(%)	4.4		48.2		33.1		7.6		5.2		1.6	
Ethnic Origin	**AF/AM**		**Asian/AM**		**Native/AM**		**Hispanic**		**Caucasian**		**Other**	
(%)	4.4		0.4		2.4		2.8		87.4		1.6	
Highest level of Education	**Some High School**		**High School Diploma**		**Some College**		**Associate Degree**		**Bachelors Degree**		**Masters Degree**	**Doctoral Degree**
(%)	9.6		34.9		24.9		6.4		12.4		6.0	0.4
Gross Annual Household Income (x1000 USD)	**<20**		**20-39**		**40-59**		**60-79**		**80-99**		**100-120**	**>120**
(%)	21.2		27.0		21.2		19.9		6.2		1.8	2.7
Number of Children in Household	Mean = 2.44		**< 5 Years old (%)**		**5-9 Years old (%)**		**10-17 Years Old (%)**					
(%)	**None**		62.8		8.30		54.5					
	One		29.6		57.7		32.8					
	Two		7.10		30.0		10.3					
	Three		0.40		3.20		1.20					
	> Three		0.00		0.80		1.20					
Marital Status	**Single**		**Married**		**Separated**		**Divorced**		**Widowed**		**Other**	
(%)	12.3		75.9		2.8		6.7		1.6		0.8	

TABLE 2
RELIABILITY AND VALIDITY CHECKS

Construct	Items	Factor Loading After Quartimax Rotation	Alpha
Intention Toward Booster Seat	Look for information about booster seats	0.82	0.90
	Spend your time to find a really good booster seat	0.94	
	Compare the benefits of different booster seat brands	0.93	
	Buy a booster seat for each child in your household	0.56	
	Secure your child into booster seat every time you drive	0.53	
	Discuss the importance of using booster seat with a friend	0.66	
	Recommend that your friends use a booster seat for their children.	0.63	
Attitude Toward Booster Seat	Bad - Good	0.82	0.95
	Unpleasant - Pleasant	0.83	
	Harmful - Beneficial	0.92	
	Unfavorable - Favorable	0.94	
	Unappealing - Appealing	0.87	
	Inappropriate - Appropriate	0.98	
	Foolish - Wise	0.92	
	Unsafe - Safe	0.84	
Attitude Toward Children	Children are enjoyment of life.	0.91	0.79
	I care about well being of my children	0.71	
	I feel good about my children.	0.68	
	I try to protect my children from potential dangers.	0.49	
Attitude Toward Children While Driving (R)	It is not always necessary to wear a seat belt for a short errand.	0.52	0.70
	Regardless of their age, my children can responsibly sit any seat they choose in the car.	0.49	
	I can do anything to stop my children whining in the car even let them get out of the booster seat.	0.61	
	Sometimes, I forget to tell my children to buckle up.	0.55	
	When I am driving really slowly in a rural road, it is not necessary to put my child in his/her booster seat.	0.51	
Attitude Toward Multi-Tasking While Driving	Police should ticket those who drive while talking on cell phone.	0.69	0.80
	Eating while driving is dangerous.	0.80	
	Drinking beverages while driving is dangerous.	0.77	
Attitude Toward Risk Attraction in Driving (R)	Fast driving would make driving more pleasant.	0.35	0.71
	I would like to drive a race car.	0.54	
	I sometimes do things I know are dangerous just for fun.	0.86	
	Taking risks can be fun.	0.72	
	I never hesitate to overtake those who drive very slowly.	0.38	
Attitude Toward Risk Aversion in Driving	I give the right of the way to an aggressive driver, if he or she endangers my safety.	0.48	0.71
	I always buckle up.	0.67	
	I would rather be safe than sorry.	0.70	
	I always avoid risky moves in traffic.	0.53	
	I pay attention to safety features while buying a car.	0.46	

(R): Reverse coded items

TABLE 3
REGRESSION RESULTS: INFLUENCE OF INDIVIDUAL CHARACTERISTICS AND ATTITUDES ON COMMITMENT TO USE BOOSTER SEAT ON REGULAR BASIS

Dependent Variable		Secure your child into booster seat every time you drive		
Model Fit		F-Value= 18.93	P-value=0.000	
Overall R^2		0.247		
Scale		7-Point Likert Scale (1 = Strongly Disagree … 7 = Strongly Agree)		
Predictor Variables		**β**	**t**	**p-value**
	(Constant)	3.537	8.409	.000
Attitude Toward Booster Seat	Unpleasant - Pleasant	.223	5.143	.000
Demographics	How many children live in your household: 5 TO 9	-.194	-2.410	.016
Attitude Toward Risk Aversion in Driving	I pay attention to safety features while buying a car.	.177	3.764	.000
Attitude Toward Risk Aversion in Driving	I always buckle up.	.174	3.840	.000
Attitude Toward Children While Driving	Sometimes, I forget to tell my children to buckle up.	-.082	-2.335	.020
Attitude Toward Children While Driving	Regardless of their age, my children can responsibly sit any seat they choose in the car.	-.066	-1.974	.049
Cost of Booster Seat	Children grow so fast that, cost of booster seat exceeds the benefits.	-.063	-2.017	.000

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