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Safety attitudes and behavioral intentions of municipal waste disposal drivers

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SAFETY ATTITUDES AND BEHAVIORAL INTENTIONS OF MUNICIPAL WASTE DISPOSAL DRIVERS

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ABSTRACT

The Theory of Planned Behavior was used to study factors useful for predicting Behavioral Intentions to commit unsafe acts while driving for commercial drivers working for municipal waste management operations centers. The Theory of Planned Behavior was found to be moderately effective in predicting behavioral intentions, particularly through the constructs of Attitude and Perceived Control. Driver perceptions of safety climate, self-assessed personal safety performance, risk aversion, and attitudes toward behavioral factors associated with engaging in risky behaviors while operating motor vehicles were studied. Risk aversion and driver perception of their own safety performance were also useful predictors of intention.

INTRODUCTION

Once a week, employees of the firm responsible for safely and efficiently removing your household waste stop at your house, dump your trash or recycling into their truck, and drive off. The same thing has happened all your life and you've probably thought little of it. Many frustrated drivers race around slow-moving or stopped refuse or recycling trucks every day, unaware that this action is one of the leading causes of death for waste management employees. Despite the common presence of municipal disposal equipment and people on our streets, it seems few have sought to understand the challenging environment in which they work.

Very little research in waste management driving safety exists in the academic literature. Most academic research is focused on the occupational hazards of employees who work in hazardous waste management or waste management facilities (e.g., Akbar-Khanzadeh & Regent, 1999; Betsinger, Brosseau, & Golden, 2000). Perhaps this trend is justified, but waste management drivers face a complex driving environment and more needs to be done to understand driving safety in this context.

Much reading on waste management driving safety is found in the trade magazines. Waste management companies understand the perils of driving a Waste Management Vehicle (WMV) and the grim consequences associated with

unsafe driving. The companies must take driving safety seriously; the consequences for poor safety management practices can be very high. Many companies hold regular safety meetings, require their drivers to view safety videos, and put drivers through rigorous initial and annual driver safety training. Companies even educate the public about how to drive around WMVs. Moreover, the National Solid Waste Management Association (NSWMA) launched a safety video campaign in 2007. The episodes of the "Be Safe, Be Proud" campaign were designed to increase focus on the critical role of supervisors in influencing safety (Kilduff, 2007).

The industry's initiatives to enhance driver safety are laudable. But how much do we really know about how the initiatives influence the safety attitudes and behaviors of waste management drivers? Companies must understand how to tailor their safety programs and practices to influence drivers' safety behaviors. In order to accomplish that task, companies must first understand the attitudes and behavioral intentions of their drivers. Simply put, companies must understand what makes their drivers tick.

Objective, rigorous attitudinal and behavioral research is difficult, particularly in the driver safety context. But research in other fields has provided the tools to assess drivers' personal attitudes and behavioral intentions. Organizational safety climate has been linked to employees' safety attitudes and behaviors (e.g., Zohar, 1980). Furthermore, the Theory of Planned Behavior (TPB) directly assesses attitudes and their influence on behavior. The TPB has even been tested in the professional driving context (Newman, Watson, & Murray, 2004). In addition, a driver's attitude toward risk avoidance in general, and confidence in their own safety skills may affect their decision making (Forward, 2006; Zuckerman, 2007). An investigation of these factors might contribute to an understanding of drivers' safety behaviors and can educate safety professionals on the next steps they must take to improve safety. The purpose of this study is to assess the influence of drivers' perceptions of safety climate, their propensity to avoid risk, their assessment of their own safety performance, and their attitudes on their intentions to commit unsafe driving actions.

CONCEPTUAL BACKGROUND AND HYPOTHESES

Safety climate is a sub-type of organizational climate that reveals the shared perceptions of organizational members concerning the organization's safety policies, procedures, and practices (Reichers & Schneider, 1990; Zohar, 1980). Studies have identified a direct relationship between safety climate and behavior (e.g., Mearns, Whitaker, & Flin, 2003; Zohar, 2000). In short, employees develop beliefs about the company's actions and communications related to safety and internalize attitudes concerning the consequences of unsafe behaviors. Those attitudes impact behavioral intentions and future behavior.

The Theory of Planned Behavior (TPB; Ajzen 1991) also links individual attitudes and behaviors. It provides a sound framework to study how an individual's personal beliefs, referent beliefs, and control beliefs about unsafe actions influence his or her behavior. While the TPB is cited as a complete theory of human behavior, other factors can influence a person's behavior. Two additional factors were considered in this study: a general aversion to risky behaviors and individual confidence in his or her ability to act safety. First, an individual's tendency to avoid risk in general may encourage that person to shy away from risky driving behavior. Finally, a person's attitudes about their ability to avoid an undesirable outcome (confidence in their ability to act safely) may influence whether or not they actually participate in a risky driving behavior.

The next section introduces the concepts identified above. Particularly, the safety climate-behavior relationship, TPB, risk avoidance, and self-assessed ability concepts are developed and discussed in the context of driving safety. The expected relationships are presented through proposed hypotheses.

Safety Climate and Behavior

Safety climate has been primarily researched in the manufacturing, energy production, and health care industries. Many definitions of safety climate have been proposed. However, most studies define safety climate as the shared perceptions of employees concerning organizational actions and procedures designed to eliminate or reduce injuries and accidents (Naveh, Katz-Navon, & Stern, 2005).

Empirical evidence for the safety climate-behavior relationship exists. High levels of safety climate, such as communication of safety issues to employees and displays of management's commitment to safety, reduce employee error and improve organizational safety (Mearns, Whitaker, & Flin, 2003; Wills, Watson, & Biggs, 2006; Zohar, 1980). Despite disagreement on the number of factors associated with safety climate, researchers generally agree that safety climate is best measured using employees' perceptions of management's attitudes and commitment to safety, the priority of safety within the organization (i.e., safety versus productivity), and the consistency with which safety is encouraged and practiced (Brown & Holmes, 1986; Diaz & Cabrera, 1997; Flin et al., 2000; Griffin & Neal, 2000; Mearns, Whitaker, & Flin, 2003; Naveh, Katz-Navon, & Stern, 2005; Zohar, 1980).

Waste management companies can enact policies and procedures that have a direct and positive impact on drivers' perceptions of safety climate. Safety climate perceptions inform drivers of desired driving behaviors and the consequences of non-compliance with desired behaviors. Thus, positive perceptions of carrier safety climate are expected to reduce the likelihood that drivers plan to engage in unsafe behaviors.

H_1: Drivers' perceptions of company safety climate are negatively related to behavioral intentions to commit unsafe driving actions.

The Theory of Planned Behavior and Driving Safety

Social scientists have long been interested in why people act the way they do in various situations, and the TPB (Ajzen, 1991) addresses the factors that influence those decisions. The TPB has become generally accepted as a powerful tool for understanding human behavior and is held by some to be a complete theory of human behavior (Conner & Armitage, 1998). The TPB has been used extensively to predict aberrant driving behaviors such as speeding (Elliot, Armitage, & Baughan, 2003; Elliot, Armitage, & Baughan, 2005; Forward, 2006; Newman, Watson, & Murray, 2004; Parker et al., 1992; Warner & Åberg, 2006) and reckless lane changing (Parker, Manstead, & Stradling, 1995). However, few studies have applied the TPB in a professional driving context (see Newman, Watson, & Murray, 2004 for one example).

Predicting behaviors in traffic safety is difficult. Some research applying the TPB to driving behaviors has used drivers' self-reported behavior (Elliot, Armitage, & Baughan, 2003) and actual behavior (Warner & Åberg, 2006). However, given the difficulty in assessing actual behavior, most studies assessed behavioral intentions (Elliot, Armitage, & Baughan, 2005; Forward, 2006; Newman, Watson, & Murray, 2004; Parker et al., 1992). The inherent critical assumption holds that drivers will ultimately perform those behaviors they express intent to perform.

Given this context, the basic TPB model holds that three main factors will determine a person's behavioral intent toward a given behavior: attitude, subjective norm, and perceived behavioral control. Behavioral intentions are indicated by the person's likelihood to perform a behavior (Fishbein & Ajzen, 1975). Attitudes are based on the perceived consequences of a behavior and the likelihood that performing the behavior will lead to those consequences. Subjective Norm refers to a person's generalized belief about whether important referent persons or groups think he or she should (or should not) perform the behavior (Ajzen & Fishbein, 1980). Perceived behavioral control consists of a person's perceptions of factors that facilitate or inhibit their ability to perform a behavior (Ajzen, 1991). In other words, perceived behavioral control refers to whether or not the person feels that he or she can personally control the behavior. The TPB is appropriate for studying traffic safety because some behaviors, even aberrant behaviors, are influenced by factors outside the drivers' direct control (Haglund & Åberg, 2000).

It is expected that as drivers' attitudes and subjective norms reflect acceptance of unsafe driving actions, the more likely it will be that drivers will make an unsafe decision (or commit an unsafe act). Furthermore, the harder it is to avoid the unsafe behavior, the more likely it will be for drivers to perform the behavior. Conversely, if the behavior is unacceptable to both the individual and others, and the person believes they can control the activity, then generally there will be no intent to commit the action.

H_2: Drivers' attitudes, subjective norms, and perceptions of behavioral control towards unsafe driving actions are related (positively, positively, and negatively respectively) to behavioral intentions to commit those actions.

Risk Aversion and Self-Assessed Safety Performance

Two additional factors were considered in this study: a general aversion to risky behaviors and individual confidence in his or her ability to act safety. These were new factors tested for their interaction with the more traditional Climate and TPB model constructs. First, Zuckerman (2007) purported that high sensation seekers are more likely to engage in risky driving behaviors than low sensation seekers. Therefore, an individual's tendency to avoid risk in general may encourage that person to shy away from risky driving behavior. Items related to this factor were included in this study in an attempt to account for individual personal characteristics outside of the effects of the other TPB factors. In other words, it is anticipated that when a personality characteristic like risk aversion is accounted for, the explanatory power of the TPB model would be improved. It is anticipated that for less risk tolerant/more risk averse drivers, the intent to commit unsafe acts would be lower.

Finally, a person's attitudes about their ability to avoid an undesirable outcome (confidence in their ability to act safely) may influence whether or not they actually participate in a risky driving behavior. Forward (2006) found that drivers with confidence in their own driving abilities were able to withstand external pressure to commit risky driving behaviors. Therefore, this factor was added in support of our understanding of the role of safety training programs on the TPB. It is anticipated that increased safety training might improve an individuals' self perceived skill at operating safely, even under adverse conditions. A factor was created using items attempting to measure a drivers' perception of how safely they were able to act, when compared to "typical" drivers. It is proposed that if a driver has a higher level of self-

assessed safety performance, they would be less likely to intend to commit unsafe acts.

H3: Drivers' risk aversion and safety assessment are negatively related to behavioral intentions to commit unsafe acts.

METHOD

The participants in this study were WMV drivers from a small southwestern U.S. waste management company. The company operates out of four locations in the region and participants for the study were employees that operated out of three of the locations. The participants were attending company-mandated safety meetings composed of a general safety awareness discussion. In this context the drivers were given a 15 minute presentation on adverse weather/holiday hazards and then administered the survey immediately afterward. Of 103 potential respondents, 99 drivers volunteered to complete the survey (96% response rate). All data collected was kept strictly anonymous and confidential.

Demographics

Demographic information consists of drivers' personal characteristics and experience. As previously mentioned, 99 drivers completed the survey. Relevant respondent demographics are presented in Table 1. Approximately 63% of the drivers are from Location 1, a large metropolitan pick up and consolidation point. The other 37% are from Locations 2 (slightly smaller metropolitan pickup and consolidation) and 3 (primarily residential pick up). Most of the drivers classify themselves as fleet drivers or owner-operators (65% and 14%, respectively). A number of drivers did not list their classification (15%). All respondents are male (100%) and most are married (71%), with a large proportion of the respondents between the ages of 26-50 (approximately 85%). The majority of the drivers travel between 0-75,000 miles per year (74%). Most drivers are paid by-the-hour (62%) or as a percentage of revenue (15%). Finally, most drivers have not been involved in a safety event in the last year (60%). The other 40% of drivers have been involved in a "Safety Event" (accident or received some kind of violation) in the last year. This could be characterized as a "high risk" environment.

TABLE 1
SAMPLE PERSONAL CHARACTERISTICS (N=99)

Age (years)	
21-25	1.0
26-35	29.3
36-50	55.6
51-60	13.1
61 or older	0.0
Unknown	1.0
Marital Status	
Married	70.7
Divorced	10.1
Single	16.2
Widowed	1.0
Unknown	2.0
Safety Event	**Percent**
None	59.6
Preventable accident	19.2
Non-preventable accident	11.1
Traffic violation	5.1
Out-of-service inspection	2.0
Other	3.0
Experience	
Late career stage (> 10 yrs)	54.5
Mid-career stage (> 2 yrs, ≤?	34.3
10yrs)	10.1
Early career stage (≤? 2 yrs)	1.0
Unknown	
Company time	
Extended (> 5 years)	23.2
Average (> 1 year, ≤? 5 years)	38.4
New (≤? 1 year)	35.4
Unknown	3.0

The drivers exhibit a broad range of experience ranging from 0.33 to 40 years with an average experience level of 13.6 years. Company tenure ranges from "just started" to 14 years with an average of 3.6 years with the company. The majority of the drivers are in the mid to late stages of their careers (i.e., > 10 years of experience) and the company seems to employ very few inexperienced drivers (i.e., ≤ 2 years). Additionally, the drivers are relatively new to the company. Approximately 74% of the drivers have worked for the company for five years or less.

Measures

Safety climate and TPB scales were adapted from previous literature (i.e. Zohar and Luria, 2005; Ajzen, 1991, 2002) and developed for the specific needs of this study. Surveys were pilot-tested with both safety professionals and a small group of drivers from a different company before being used in this study. Respondents voluntarily completed the survey and were given token incentives (i.e., pens and notepads) for participating.

Drivers' perceptions of organizational safety climate were measured using a 10-item, 7-point (*disagree* to *agree*) scale adapted from Zohar and Luria (2005). Based on relevance to the occupational context, six items were removed from the original 16 item instrument. The TPB constructs were measured with respect to unsafe driving actions using 5-item, 7-point scales, anchored by *totally unacceptable* to *fairly acceptable* (Drivers' Attitudes and Subjective Norms), *easy to avoid* to *hard to avoid* (Perceived Control), and *very unlikely* to *very likely* (Behavioral Intentions) based on Ajzen (2002).

Unsafe driving actions were identified in the Large Truck Crash Causation (LTCC) Study (USDOT, 2006) and consisted of the most common driver actions or behavioral outcomes that contributed to truck-caused accidents. Semantic differential scales were adapted to minimize socially desirable responding.

Risk Aversion was measured using a 5-item, 7-point scale based on willingness to get involved in non-specific risky situations. The (safety) Self-Assessment construct asked drivers to compare their personal safety performance to the average commercial driver against a 7-point scale. These were new constructs tested for their interaction with the more traditional Climate and TPB model constructs.

RESULTS

Results are presented in two sections. First, reliability analyses and correlations between constructs are shown. The second section includes the regression analyses used to explore the relationships between the attitudinal or perceptual constructs (as independent variables) and the behavioral intent construct as the dependent variable. These results provide company safety management with some statistical evidence of the influences on drivers' behavioral intentions to commit unsafe driving actions.

Reliability and Correlation Analyses

Construct validity was performed using Factor Analysis and measured with the Cronbach's Alpha. Some items were removed from the proposed constructs after pilot testing and a reassessment of face validity by the researchers (see Appendix A, Survey Instrument). One item was removed from the Climate scale (regularity of safety awareness events). All items remained in the self-assessed safety performance items SA1-SA5, and risk avoidance items RA1-RA5, as these were new constructs to be investigated by the research in an exploratory fashion. One item was dropped from all TPB constructs (use of over the counter medications). This item was originally included due to its presence in the LTCC study. However, as the remaining factors

(speeding, performing a prohibited maneuver, and performing an improper lane change) were all volitional driving actions and the use of medication was not a volitional driving action, it was dropped for relevance. The items related to following too closely were not reliable enough to include in the analysis. It is proposed that for the type of congested metropolitan driving performed by the WMV drivers, this act was not as relevant as it would be for long-haul drivers.

Factor Analysis was used to assess the reliability of the constructs. The Climate variables C1-C9 were found to be reliable measures of safety climate and were included in the climate factor. All five items were found to be reliably related for both Self Assessed safety performance and Risk Avoidance. The TPB factors of Attitude (A1, 3, 4), Subjective Norm (SN1, 3, 4), Perceived Control (PC1, 3, 4), and Behavioral Intentions (BI1, 3, 4) were all found to be reliable overall measures.

The metrics used to assess reliability are listed on Table 2, with the Cronbach's Alpha in the diagonal where each factor is crossed with itself. Values greater than 0.70 are generally considered reliable (Nunnally, 1978). All of our factors were considered to be reliable, ranging from a low of 0.78 up to a high of 0.92 for the factors. The validity of the exploratory constructs Risk Aversion and Self Assessed safety performance were both found to be internally reliable.

Results of the correlation analysis are also presented in Table 2. Correlations that were significant at the 0.10 level or better are indicated in bold; those better than the 0.01 level are bold and indicated with an asterisk.

TABLE 2
CORRELATIONS FOR KEY CONSTRUCTS

Variables	C	SA	RA	ATT	SN	PC	BI
Climate (C)	(.92)						
Self Assessment (SA)	**0.58***	(.89)					
Risk Avoidance (RA)	**0.38***	**0.71***	(.78)				
Attitude (ATT)	-0.05	-0.11	**-0.18**	(.84)			
Subjective Norm (SN)	**-0.17**	-0.16	**-0.18**	**0.58***	(.92)		
Perceived Behavioral Control (PC)	-0.01	-0.06	-0.11	**0.43***	**0.49***	(.89)	
Behavioral Intentions (BI)	-0.06	**-0.24***	**-0.29***	**0.49***	**0.45***	**0.53***	(.89)

***Correlation is significant at the .01 level (2-tailed)**
Correlation is significant at the .10 level (2-tailed)

Safety climate, self-assessed safety performance, and risk avoidance are highly and significantly related to each other. This finding implies that drivers who rate themselves as safer than other drivers are also likely to rate the company's safety climate higher. Those drivers who tend to avoid risk in general are also more likely to rate the company's safety climate higher. Finally, drivers who rate themselves as safer than others are also more likely to be risk averse.

Strong and significant relationships exist among the TPB variables. Attitude, subjective norm, and perceived behavioral control are all positively related to behavioral intentions. This finding is as expected. That is, drivers who find unsafe actions more acceptable are likely to have higher intentions to perform those actions. Drivers who believe their friends, family, and co-workers find certain unsafe actions more acceptable are likely to have higher intentions to commit those actions. Finally, the less control drivers perceived they have over performing unsafe actions, the higher their intentions to commit those actions. These findings will be discussed again in the regression analysis.

Finally, self-assessed safety performance and risk avoidance have a significant inverse relationship with behavioral intentions. In other words, drivers who assess their safety performance as higher than others have lower intentions to commit unsafe actions. Similarly, drivers who are risk averse have lower intentions to commit unsafe actions. Drivers' perceptions of company safety climate are not related to behavioral intentions.

Regression Analysis

Correlation analysis was followed by regression analysis. The results are presented in Tables 3 and 4. The Stepwise Regression procedure was used first for all of the factors of interest used in the study (C, SA, RA, ATT, SN, and PC; Table 3). The technique was then applied to the Climate and TPB factors only (C, ATT, SN, and PC; Table 4). In both cases the factors were used to predict Behavioral Intention (BI). The inclusion threshold was set at a significance level of 0.10 or better.

When looking at all the factors, a few findings were noteworthy (Table 3). Overall, the model was very reliable (F Significance) and powerful (adjusted R^2). In contrast with the results of the correlation analysis, self-assessed safety performance and subjective norm were found to provide little additional power in predicting Behavioral Intention. Climate was not found to be significant in either the correlation analysis or the regression analysis.

In contrast, perceived behavioral control, attitude, and risk aversion constructs have a significant influence on behavioral intentions. Drivers who perceived various unsafe driving actions as more acceptable were more likely to commit those actions in the future. Furthermore, the harder it was for drivers to control whether or not they performed unsafe driving actions, the higher their intentions to commit those actions in the future. Those drivers who were generally more risk averse (uncomfortable with risky situations) were also less likely to consider performing the unsafe acts.

When only the climate and TPB factors were looked at, the results were a little different (Table 4). This model was also very reliable (F Significance) and powerful (adjusted R^2; slightly less than the "full" model). Contrary to expectations, drivers' subjective norms (how people close to them felt about the drivers performing unsafe actions) did not have a significant effect on behavioral intentions. One plausible explanation is that most drivers are not regularly subject to the perceptions of close friends and family while driving professionally. The results may be different when driving their personal vehicle. Furthermore, professional drivers make numerous split second decisions, and do not have the time to think about the

TABLE 3
HIERARCHICAL REGRESSION ANALYSIS FOR KEY CONSTRUCTS (ALL VARIABLES)

Variable	Behavioral Intent		
		Sig	Std Error
Intercept	3.020	.001	.852
Perceived Control	.418	.000	.098
Attitude	.308	.002	.096
Risk Aversion	-.308	.022	.132
F Significance (reliability)	.000		
Adjusted R^2 (strength)	.375		

Entered those factors that were statistically significant at 0.10 or better

TABLE 4
HIERARCHICAL REGRESSION ANALYSIS FOR KEY CONSTRUCTS (TPB VARIABLES)

Variable	Behavioral Intent		
	β	Sig	Std Error
Intercept	1.223	.001	.368
Perceived Control	.426	.000	.100
Attitude	.341	.001	.097
F Significance (reliability)	.000		
Adjusted R^2 (strength)	.346		

Entered those factors that were statistically significant at 0.10 or better

Table 4
(continued)

Please tell us how much you disagree or agree with the following statements:

Top management in this company...	**Disagree**						**Agree**
Reacts quickly to solve the problem when told about a safety issue.	1	2	3	4	5	6	7
Provides all the equipment needed to do the job safely.	1	2	3	4	5	6	7
Is strict about driving safely even when deliveries fall behind schedule.	1	2	3	4	5	6	7
Quickly corrects any safety issue (even if it's costly).	1	2	3	4	5	6	7
Provides detailed safety reports to employees (e.g., accidents, violations)	1	2	3	4	5	6	7
Invests a lot of time and money in safety training for drivers.	1	2	3	4	5	6	7
Listens carefully to employees' ideas about improving safety.	1	2	3	4	5	6	7
Considers safety when setting delivery windows and schedules.	1	2	3	4	5	6	7
Provides employees with a lot of information on safety issues.	1	2	3	4	5	6	7
Regularly holds safety-awareness events (e.g., presentations, ceremonies).	1	2	3	4	5	6	7

Compared to the average commercial driver on the road, I . . .	**Disagree**						**Agree**
Have a much better safety record.	1	2	3	4	5	6	7
Strictly follow all company safety policies and recommendations.	1	2	3	4	5	6	7
Set the example for others to follow in terms of safe practices.	1	2	3	4	5	6	7
Abide by all Federal, State, and Local safety regulations.	1	2	3	4	5	6	7
Have a much better track record for inspections and enforcement compliance.	1	2	3	4	5	6	7

Compared to the average commercial driver on the road, I . . .	**Disagree**						**Agree**
Am very cautious and approach risks carefully.	1	2	3	4	5	6	7
Tend to "sit things out" rather than take any chances.	1	2	3	4	5	6	7
Avoid putting myself in stressful situations.	1	2	3	4	5	6	7
Generally think things through quite a bit before acting.	1	2	3	4	5	6	7
Don't like to get involved in new situations.	1	2	3	4	5	6	7

Please give us your reaction to the following issues:

How acceptable is it *to you personally* to perform the following actions while driving commercially:	**Totally Acceptable**						**Fairly Acceptable**
Exceed the posted speed limit in "built up" areas	1	2	3	4	5	6	7
Follow too closely	1	2	3	4	5	6	7
Perform a prohibited maneuver (U-Turn, rolling stop, etc.)	1	2	3	4	5	6	7
Perform an improper lane change	1	2	3	4	5	6	7
Use over the counter medication with a "Do not operate heavy equipment" warning	1	2	3	4	5	6	7

Table 4
(continued)

How acceptable is it to *people close to you* (family, friends, coworkers) that you perform the following actions while driving commercially:	**Totally Unacceptable**						**Fairly Acceptable**
Exceed the posted speed limit in "built up" areas	1	2	3	4	5	6	7
Follow too closely	1	2	3	4	5	6	7
Perform a prohibited maneuver (U-Turn, rolling stop, etc.)	1	2	3	4	5	6	7
Perform an improper lane change	1	2	3	4	5	6	7
Use over the counter medication with a "Do not operate heavy equipment" warning	1	2	3	4	5	6	7
How easy or hard is it for *you* to *control* whether or not you perform the following actions while driving commercially (easy to avoid/hard to avoid):	**Very Easy**						**Very Hard**
Exceed the posted speed limit in "built up" areas	1	2	3	4	5	6	7
Follow too closely	1	2	3	4	5	6	7
Perform a prohibited maneuver (U-Turn, rolling stop, etc.)	1	2	3	4	5	6	7
Perform an improper lane change	1	2	3	4	5	6	7
Use over the counter medication with a "Do not operate heavy equipment" warning	1	2	3	4	5	6	7
How likely is it that you will perform any of the following actions, at least once or twice in the next month or so, while driving commercially:	**Very Likely**						**Very Unlikely**
Exceed the posted speed limit in "built up" areas	1	2	3	4	5	6	7
Follow too closely	1	2	3	4	5	6	7
Perform a prohibited maneuver (U-Turn, rolling stop, etc.)	1	2	3	4	5	6	7
Perform an improper lane change	1	2	3	4	5	6	7
Use over the counter medication with a "Do not operate heavy equipment" warning	1	2	3	4	5	6	7

perceptions of close friends and family. After the event has happened, this would affect their assessment of the role of those opinions on their own attitudes. Finally, some drivers might think that anything other than people's acceptance of their driving behavior is an indication of people's distrust of the driver to make good decisions. Thus, the driver dismisses others' opinions unless the opinions fit the driver's attitudes (Forward, 2006).

Also surprising was the lack of effect from the climate variable. Apparently, the drivers' perception of the company safety climate did not correspond closely to their expressed behavioral intention. This was also supported by the correlation analysis discussed earlier. The most common explanation would be that if the climate variable were excessively "noisy" (a wide variation between answers on the climate items for each driver) it would fail to be accepted by the model due to reliability. However, the reliability score of 0.92 (from Table 2) would rule that explanation out. It could be that the drivers had strong (reliably consistent) opinions about the company safety climate, their opinions were not associated with their likelihood to commit an unsafe act.

In other words, their intentions were "indifferent" to how they perceived the safety climate.

MANAGERIAL IMPLICATIONS

This study provides important managerial implications. The findings suggest that, in this context, carrier management should focus on influencing drivers' attitudes towards and perceived control over unsafe driving actions. Also, screening of drivers for risk aversion may be helpful in this regard as well. However, studies have found that it is difficult to change attitudes because they are deeply rooted. Perhaps drivers' perceptions of the value of various safety practices may be used to inform management of potential courses of action to influence attitudes and perceived control.

Training and company support have traditionally been considered important influences of safe driving habits. Results from previous studies have indicated that effective training events may be a key to influencing drivers' attitudes. These events, however, must solicit consistent, active involvement from participants in classroom or interactive computer-based settings (Elliot, Armitage, & Baughn, 2005). Various types and venues of training coupled with a training partnership between drivers and carrier management may be a key to influence drivers' attitudes towards safety (Mejza et al., 2003). This study found no support for a direct link between safety climate perceptions and behavioral intent; however, evidence suggests that climate may have an indirect effect on behavioral intentions by influencing self-assessed safety skills and risk aversion.

More specifically, training can be used to relay the potential consequences of safe and unsafe actions. It seems that company management does a great job conveying safety information to drivers. However, operational policies may counteract the effect of the information as was indicated in drivers' perceptions of safety climate. In other words, drivers might view the consequences of unsafe actions (i.e., speeding) as related to gains rather than losses. Safety training programs that focus on the positive consequences of safe behavior are likely to influence drivers' attitudes towards safety and, in turn, behavioral intentions (Forward, 2006).

Overall, more research is needed to determine which practices have the most effect on attitudes, perceived control, and behavioral intentions. This study is a good first step to identifying attitudes and perceived behavioral control as important influences of drivers' behavioral intentions to commit unsafe acts. Narrowing down the most important influences will get to the heart of the safety issue and management will ultimately be able to understand focus on the appropriate influencing factors. Also, the contribution of the new attitudinal constructs of risk aversion and self-assessed safety performance merit further investigation. Future research should also consider a broader sample of drivers working in different occupational contexts, as well as a larger number of participants.

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