

Stress Factors Experienced by

Motor fleet organizations and commercial transportation facilities rely on motor vehicle drivers to transport freight while providing on-time deliveries, undamaged product and customer satisfaction. If the driver is dissatisfied with his/her job, a company's reputation, customer satisfaction and freight transportation orders may decline; on a larger scale, this may impact the competitive advantage of the motor fleet operation. This advantage can greatly influence the economics of a commercial transportation firm.

Kamp suggests that if an employee is found to experience an inordinate amount of stress (e.g., impossible deadlines, disagreements with supervisors, pressure to outperform), the stress factor will ultimately affect the organization's economics (e.g., increased workers' compensation claims, absenteeism, poor customer service, decreased driver retention rates) (32-36). The International Labor Organization, as stated in the *New York Times*, suggests that job stress expenditures cost employers more than \$200 billion a year (www.psycport.com/news/1999/09/01/medic/7299-0687-pat_nytimes.html). Therefore, it is essential to analyze stress experienced by the driver because s/he plays a key role in long-term economics of the organization. Further, the driver's job distress and well-being must be examined carefully in order to retain healthy drivers, and reduce occupational injuries and illnesses, job dissatisfaction and job "burnout."

Excessive stress in the workplace can have undesirable consequences on mental and physical health. Ten years ago, the National Institute for Occupational Safety and Health (NIOSH) identified

psychological disorders in the workplace as one of the 10 leading work-related diseases and injuries in the U.S. Through the National Occupational Research Agenda, NIOSH has continued to stress the importance of finding effective interventions to reduce stress in the workplace (www.cdc.gov/niosh/nornew1c.html).

According to 1998 occupational injury and illness data compiled by the Bureau of Labor Statistics (BLS), truck drivers, as compared to other occupations, experienced the largest number of injuries and illnesses with time away from work over the latest five years for which data is available (1992-1996). During this time, the number of injuries and illnesses declined for all occupations by about 20 percent, but the number *increased* by nearly five percent (up to 151,300) for truck drivers, with women accounting for 17.6 percent. According to the American Trucking Associations (ATA) approximately five percent of truck drivers are female (www.truckline.com/infocenter/info_packs/women.html)

Psychological stress contributes to injury and illness statistics of both genders. Stress factors involved with truck driving include irregular hours, long hours on the road, dangerous actions by other drivers and insufficient exercise (MacLennan 79-95). Management/supervisory/dispatcher concern for the drivers is another factor. Truck drivers are particularly vulnerable to psychological disorders since they experience higher levels of stress than those employed in other occupations; truck drivers are in the 91st percentile based on the Global Stress Index portion of the Symptom Checklist SCL-90 (Orris, et al 208).

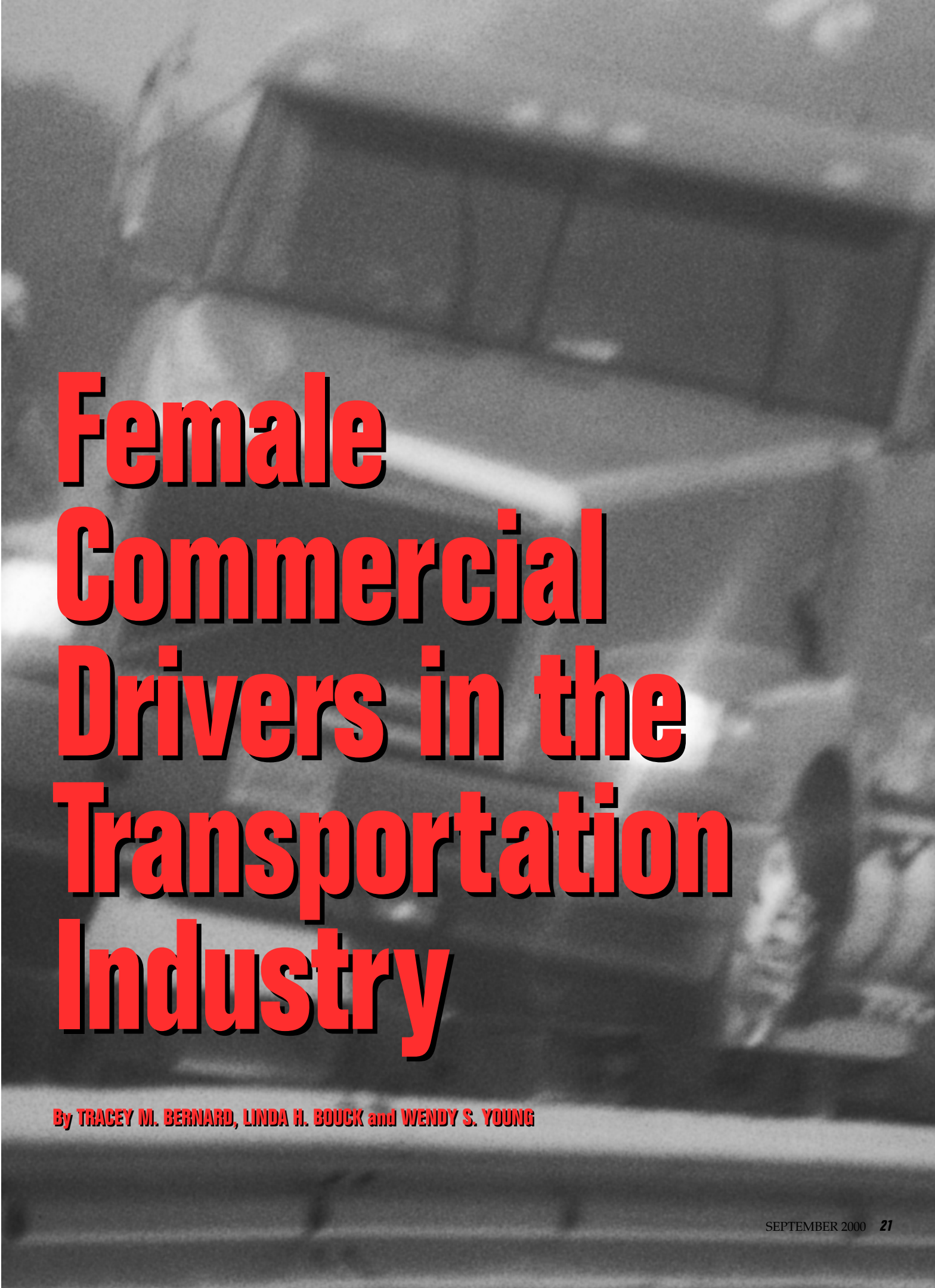
Pressure to meet delivery deadlines is also taxing. As a result, many drivers travel on little sleep. A *New England Journal of Medicine* study found that truck drivers

generally did not attain enough sleep to remain alert while driving (Milter, et al 755-761). This study also found that truck drivers typically sleep 4.78 hours per day—two hours less than what drivers in the study determined to be sufficient for job alertness (Milter, et al 755-761).

Citing data from the 1995 "Census of Fatal Occupational Injuries" and "Survey of Occupational Injuries and Illnesses," BLS reports that, based on fatality rates, the long-haul truck driving occupation ranked ninth on the list of America's most-dangerous occupations. When compared to the general working population, the fatality rate for occupational injuries is five times higher (Toscano 57).

Stress factors also include gender-related issues such as discrimination, limited job opportunities, and balancing multiple demands of work and home. In addition, female drivers may have fewer resources to deal with the problems. Female truck drivers "interact most frequently with male drivers, dock-hands [and] truckstop personnel" and "any discrimination or sexual harassment faced by women typically arises out of these interactional and institutional contexts" (Lembright and Riemer 464). Kissman found that in some male-dominated professions, males sexually harassed and patronized female co-workers as a means of maintaining social norm acceptance with other males in their job culture (139-149).

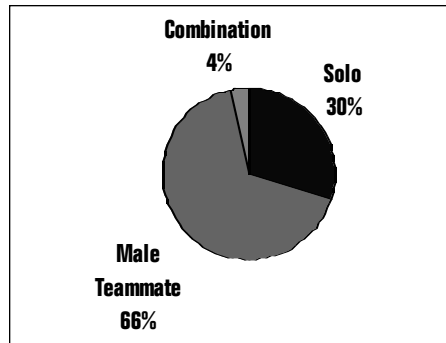
Evidence also suggests that low self-esteem, poor peer relationships, lack of social support from co-workers and/or supervisors are common sources of occupational stress (Horowitz, et al 29-35). For example, females employed in male-dominated professions often perceive themselves as "outsiders." This perception is compounded by the perception that females in nontraditional occupations are hired as a result of Equal Oppor-



Female Commercial Drivers in the Transportation Industry

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FIGURE 1
Driving With a Teammate or Solo



tunity Employment requirements, not because of their abilities.

To compensate for lack of acceptance and to prove their proficiency, females commonly work harder (Goldenhar and Sweeney 91-100). Since women who drive without a male partner are more vulnerable to sexual harassment and discrimination, having a male partner may guard against such harassment and provide a source of social support (Lembricht and Riemer 457-74). Furthermore, a commercial driver job-satisfaction study conducted by Griffin, et al reported that "loneliness/away from home too much" was a leading reason that drivers were [so dissatisfied with their jobs] that they left the commercial transportation industry (Hill, et al 2).

Professional drivers must also deal with other drivers who may engage in unsafe, aggressive driving behavior (e.g., tailgating, speeding, improper signaling and lane use) on interstates, in congested metropolitan areas, through road construction areas/detours and in all types of weather conditions. According to James, such behavior is no longer the extreme, but rather the norm in everyday driving experiences (www.aloha.net/~dyc/intro.html). National Highway Traffic Safety Administration (NHTSA) conducted a nationwide study to determine driver attitudes and unsafe driving behaviors in 1997; the findings revealed that 62 percent of respondents indicated that the behavior of another driver had been a threat in the last year (NHTSA 2). Further, Nerenberg considers road rage a psychological problem termed "road rage disorder" and treats it as a psychological disorder when meeting with his clients (www.roadragenerenberg.com/). Other stressors considered in this study were adverse weather conditions, handling of large commercial vehicles, physiological factors and other concerns likely to be encountered by over-the-road female drivers.

RESEARCH PROCEDURES

Initial directed interviews with a sample of former drivers were performed at a local commercial transportation facility in order to obtain background information unique to the industry. Based on these sessions and a literature review, a sample questionnaire was developed; it addressed stress factors—both physical and psychological—to which drivers are exposed.

After pilot testing, questionnaires were mailed to the female drivers' personal addresses in the organization's envelopes, along with an explanatory cover letter and postage-paid envelope. The questionnaire requested demographic information, such as class of license, education, age, driving experience and background information (e.g., health problems), before asking about job-related stressors.

The questionnaire comprised primarily multiple choice and Likert scale responses, with a few free-response questions. This generated two types of feedback: free responses to open-ended questions/comment areas and numerical responses on binary and Likert scales. Free responses were reviewed and tallied; numerical responses were coded and recorded in a database, then analyzed using the SAS statistical software package (SAS).

Frequency of responses to demographic questions and questions regarding hazard exposure and training were computed. On Likert scale responses, mean response and standard deviation were computed. A t-test was used to determine whether the overall response to each question was significantly positive (on the "agree" to "strongly agree" side of the Likert scale) or significantly negative (on the "disagree" to "strongly disagree" side of the scale).

RESULTS

The questionnaire was distributed in spring 1999 to 77 female long-haul drivers who worked for a local commercial transportation firm in Western Kentucky. Twenty-seven drivers returned completed surveys—a 35-percent response rate.

General Demographic Information

The majority of drivers (77 percent) were in their 30s and 40s. Some 18.5 percent had children under the age of 17 living at home for whom they are responsible, while 77.8 percent had no children living at home; the remaining 3.7 percent did not respond. Most (77 percent) indi-

cated they had graduated from high school and/or had some form of post-secondary education.

Commercial Driving Experience, Driving Characteristics & Physical Hazard Exposure

Sixty-three percent indicated that they had attended and graduated from a special driving school program and all held a "Class A" commercial driver's license (CDL) with a hazardous materials endorsement. Most (85 percent) had 10 or fewer years' commercial driving experience, with the largest group (30 percent) having only one to two years' experience. When asked how many days in a typical month they spend on the road and away from home, all reported that they are away from home for more than 15 days each month; 92 percent spend 21 or more days away each month.

Sixty-six percent indicated that they drive with a male teammate, while 30 percent drive solo (Figure 1). For four percent, the pattern varies; at times, they drive alone, at times with a male. Data show that participants have not teamed up with other female drivers.

Drivers were also asked (using a scale from 1 indicating "never" to 5 indicating "always") to indicate how often they are exposed to physical hazards. As Table 1 shows, drivers are frequently exposed to noise, vibration, diesel fuel exhaust and temperature (hot or cold) extremes, yet rarely exposed to hazardous chemicals.

Perceived Safety Climate

To assess safety climate, participants were asked to identify their level of agreement with the statement, "Employers, supervisors and managers work together to ensure the safest possible working conditions." They were also asked about management's priority in protecting drivers, vehicle/product and the driving public by identifying their level of agreement with the statement, "Protection of drivers (or vehicle/product or driving public) is a high priority with your management."

Figure 2 presents responses to these questions in the form of level of agreement. Overall, drivers perceived their company's safety climate in a positive light. They agreed that all levels—from employers to management—work together to ensure safe working conditions (mean=67, $p<0.05$). They also agreed that management places a high priority on driver pro-

TABLE 1**Reported Frequency of Exposure to Physical Hazards**

PHYSICAL HAZARD EXPOSURE	MEAN	SD	SIGNIFICANCE
In a typical month, how often are you exposed to noise?	4.03	1.06	p<0.001
In a typical month, how often are you exposed to vibration?	4.15	0.95	p<0.001
In a typical month, how often are you exposed to hazardous chemicals?	2.59	0.75	p<0.01
In a typical month, how often are you exposed to diesel fuel exhaust?	3.70	1.32	p<0.05
In a typical month, how often are you exposed to temperature (hot or cold) extremes?	3.56	0.93	p<0.01

tection (mean=3.52, p<0.05), the vehicle/product (mean=4.44, p<0.001) and the public (mean=3.89, p<0.001), and that management expects all of the company's drivers to follow good safety practices (mean=4.11, p<0.001). Participants also agreed that the Qualcomm computer provided by their employer makes communication more efficient and safer (mean=4.44, p<0.001). Regarding personal safety, they found truckstop parking lots stressful (mean=3.48, p<0.05).

Job Control & Job Demands

On the issue of control over their jobs, respondents liked the fact that they set their own daily schedule and pace (mean=3.59, p<0.05); however, participants noted that they have no control over delivery assignments (mean=2.41, p<0.05). This conflict—control over some aspects of the job, little control over others—may have resulted in the neutral response (mean=3.18, p>0.05); that is, drivers neither agreed nor disagreed that they have control over their work.

When asked about job demands (Table 2), drivers report that their greatest concern is delivering their load on schedule (mean=4.15, p<0.001). They often feel pressed for time (mean=3.96, p<0.001) and drive between midnight and 4 a.m. (mean=3.89, p<0.01). When asked about stress related to specific job demands, participants reported that driving in bad weather to make a delivery (mean=4.37, p<0.001) and dealing with aggressive drivers (mean=3.67, p<0.01) are stressful, while not getting sufficient undisturbed rest (mean=3.44, p>0.05), driving at night (mean=2.78, p>0.05) and backing their trailer up to a loading dock (mean=2.85, p>0.05) only contribute some stress.

Social Support & Discrimination Issues

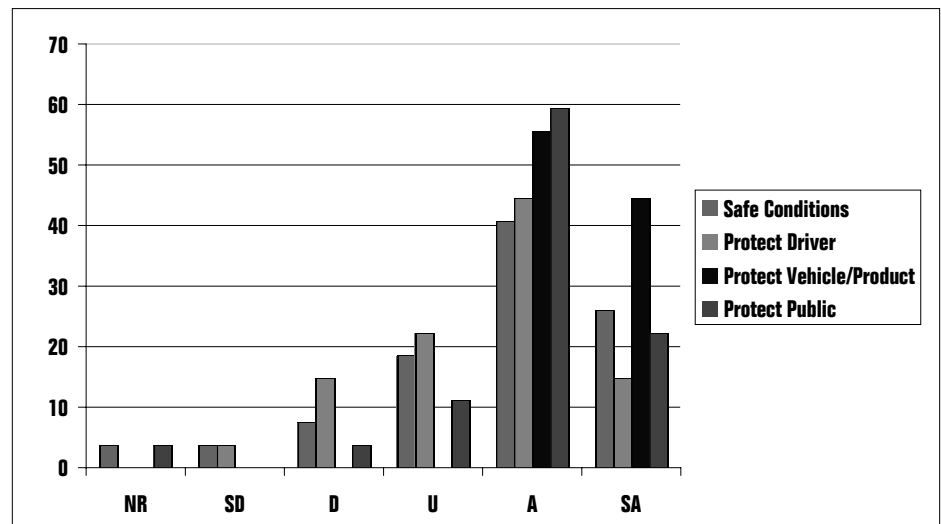
Respondents were neutral/undecided with regard to whether their employer takes steps to make jobs easier (mean=3.15, p>0.05). When needing help to handle family-related problems while on the road, only 11.1 percent relied on driver services or the fleet manager; 3.7 percent have used the national hotline. Otherwise, participants rely on family members (81.5 percent) and friends (7.4 percent). Drivers were neutral/undecided with regard to stress experienced due to being away from their family and friends for long durations (mean=3.41, p>0.05).

When comparing themselves to male

drivers, participants were neutral/undecided as to whether they had to work harder to prove themselves on the job (mean=3.07, p>0.05) and whether they were treated differently (mean=3.37, p>0.05). On the positive side, participants indicated that they believe they can seek help from other drivers if they experience trailer problems while on the road (mean=3.52, p<0.05). Those surveyed also perceived that they received pay equal to male drivers with similar qualifications and experience (mean=4.07, p<0.001).

Physical Health Problems & Stress Symptoms

Drivers were asked to identify physical health problems they had experienced as a long-haul driver from a list of potential problems. Approximately 18.5 percent of those surveyed experienced no serious physical problems. As Figure 3 shows, the remainder reported various health problems, including muscle strains in the legs, arms and back, and stomach, bladder and hearing loss problems. The "other problems" category included digestion problems, menstruation concerns, muscle spasms, kidney stones and vision problems.

FIGURE 2**Safety Climate as Perceived by Drivers**

To assess psychological stress, drivers were asked how often they experience the following symptoms in a typical month: feeling tense or frustrated; difficulty sleeping; overwhelming fatigue; and headaches. As Figure 4 shows, on average, participants experience these symptoms sometimes. Only the feeling of tenseness/frustration was reported significantly often (mean=3.33, p<0.05).

Driver Employee Training Issues

Drivers were asked to respond to three training issues. They felt they had been sufficiently trained to use all required equipment (mean=4.11, p<0.001) and that hours of service regulations were not confusing (mean=1.96, p<0.001). Participants were also asked to indicate what topics they would like to see addressed in employee training. A list of eight potential topics was provided, as was an open comment area for driver-suggested topics. As shown in Table 3, topics requested by more than half of the respondents (in order of preference) are: stress-reduction techniques, physical exercise techniques, fatigue-prevention techniques and self-defense techniques.

TABLE 2
Perceived Job Demands

JOB DEMANDS	MEAN	SD	SIGNIFICANCE
My greatest concern is delivering the product on schedule.	4.15	0.86	p<0.001
I often feel time pressure on the job.	3.96	1.12	p<0.001
Often I am driving between 12-midnight to 4:00 a.m.	3.89	1.25	p<0.01
On the job, how stressful is not getting enough undisturbed rest?	3.44	1.15	NS
How stressful is night driving?	2.78	1.08	NS
How stressful is driving in bad weather?	4.37	1.04	p<0.001
How stressful is dealing with aggressive drivers?	3.67	1.11	p<0.01
How stressful is backing up to a loading dock?	2.85	1.14	NS

FIGURE 3
Percent Experiencing Physical Health Problems

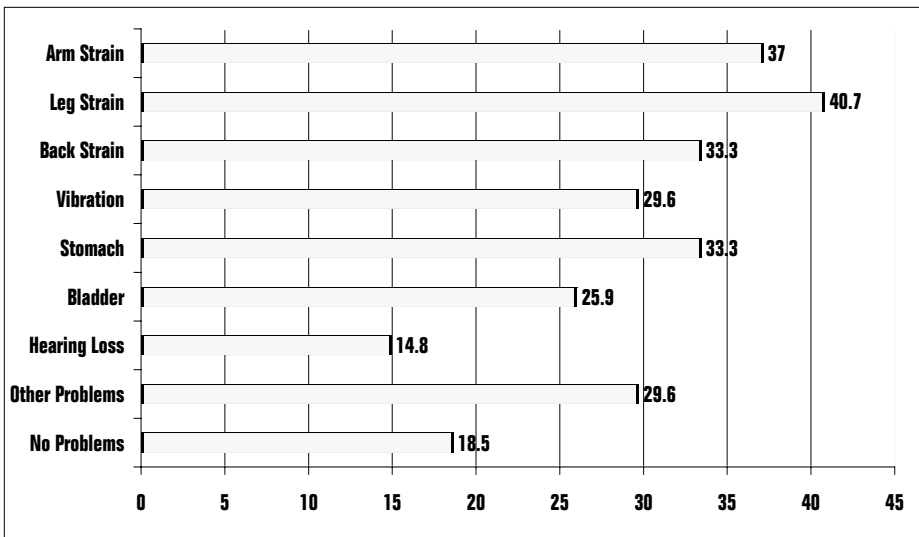
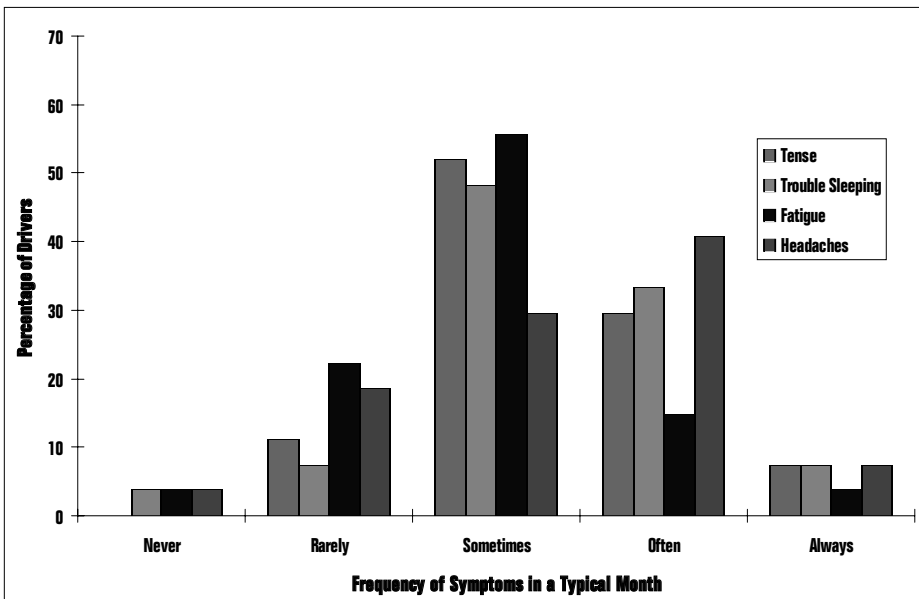


FIGURE 4
Frequency of Reported Psychological & Physiological Problems



Job Satisfaction

Respondents were undecided/neutral both in overall job satisfaction (mean=3.41, p>0.05) and their intention to continue driving in the long-term (mean=2.92, p>0.05). As indicated by the lack of statistical significance, participants were also ambivalent (neither agreeing nor disagreeing) whether they would encourage a female relative or friend to drive professionally (mean=2.85, p>0.05), although the trend indicated they would not encourage other females to drive.

Finally, participants were asked what might encourage more women to enter and remain in the professional driving occupation; a list of options was provided as was a comment area for suggestions. Table 4 lists, by frequency, the percentage of drivers who indicated that they thought the listed methods would be effective in encouraging more women to enter the occupation. Overall, 22.2 percent would not encourage women to become professional drivers. According to respondents, the most-effective "recruiting" techniques are to improve the image of the occupation (77.8 percent) and improve safety at rest areas and truck stops (59.3 percent).

DISCUSSION

As compared to the Lembright and Riemer data, more women appear to be driving solo today. In the current sample, 66 percent of females drive with a male co-driver, none with a female co-driver, and 30 percent drive solo (the remaining four percent drive both solo and with a male). In 1982, Lembright and Riemer found that 80 percent of female drivers drove with a teammate, 96 percent with males and 1 percent with females, while 20 percent drove solo (461). The 10-percent increase in solo driving may indicate that more women are taking on the challenge today; however, the perception that women cannot drive persists.

Most participants in this study indicated that they spend 21 to 25 days away from home each month, which is comparable to Perser's finding that the average time between visits home is three to four weeks (32). This is significant, since Schulz reported that loneliness and time away from home were commonly cited reasons for drivers leaving their jobs (25-26).

Within the company studied, it appears a concerted effort is being made to provide a safe work climate. For the most part, participants agreed that employers, supervisors and managers team to ensure the safest possible work conditions and that new hires are expected to comply with safe practices from the start of employment.

Participants also agreed that protecting drivers, vehicle/product and the public is a management priority. How-

ever, the responses indicate that drivers believe management places a higher priority on vehicle/product, followed by the driving public, then drivers. This is significant since Schulz also reported that drivers felt management was not interested in them as human beings, only as part of the bottom line (25-26).

These responses show that the safety climate within management's control has been effective; however, personal safety issues outside of management's control fared less well. Overall, participants reported that truck stops and rest areas were unsafe and caused them stress. One driver indicated that there was a need for "more lights and 24-hour attendants at rest areas." Another indicated that she feels safe at truck stops when with her husband, but would be "very afraid" to stop alone.

With regard to assistance handling family problems, 81.5 percent indicated they relied on family members. Although the company provides a national hotline for emergency situations, only 3.7 percent have used it, a finding which suggests that participants prefer to deal with their problems themselves rather than rely on company-sponsored support.

In general, on the issue of job control, drivers indicated that they do not have control over delivery assignments, but are able to set their own daily schedule and pace. However, drivers report that they are concerned with deliveries and often feel pressured to accomplish deliveries on schedule; consequently, many drive between midnight and 4 a.m. This finding confirms what Milner, et al reported with regard to pressure to meet delivery deadlines and the fact that these deadlines often result in truck drivers attaining little sleep (755-61).

According to respondents, the most stressful job demand was driving in poor weather conditions. Aggressive drivers are another stress factor cited, reconfirming James' finding that aggressive driving is becoming more common (www.aloha.net/~dyc/intro.html). Although accidents that occur while backing up to a loading dock are a frequent, costly occurrence for the driving organization, drivers did not perceive this area as a significantly stressful concern.

Although respondents appeared to be satisfied with training on vehicles/equipment and hours of service regulations, they indicated that training in stress reduction, physical exercise, fatigue prevention and self-defense techniques would be useful. These recommendations were reinforced by driver comments about the need for physical exercise during a trip and the need for self-defense techniques due to unsafe rest areas.

Responses to questions about discrimination (e.g., feeling a need to work harder to prove themselves; being treated

TABLE 3
Recommended Training Topics

TOPIC OF TRAINING	PERCENT WHO WOULD LIKE TO RECEIVE TRAINING
Stress reduction techniques	70.4
Physical exercise techniques	59.3
Driver fatigue prevention	51.9
Self-defense techniques	51.9
Dealing with aggressive drivers	40.7
Health issues	40.7
Harassment issues on the road	33.3
Additional hours of service	11.1

TABLE 4
Ways to Attract More Females to the Driving Profession

METHODS TO ATTRACT MORE WOMEN TO DRIVE PROFESSIONALLY	PERCENT WHO THOUGHT THE TECHNIQUE WOULD ATTRACT MORE WOMEN
Improve image of the occupation	77.8
Safer truck stops/rest areas	59.3
Other	33.3
Longer driving school programs	33.3
Increase automatic equipment	29.6
Would not recommend occupation	22.2
Automate hours of service system	11.1

differently than males; feeling they can ask other drivers for help; believing they are given pay equal to males) indicate that participants do not feel females are being discriminated against. In fact, one respondent said driving "is the only job [which] she has had that pays men and women the same wage."

Overall, on average, responses indicated that little discrimination is present (although several drivers reported that they had experienced some discrimination and harassment). In reviewing respondent statements, it appears management strives to treat men and women equally. Discrimination and harassment were instead societal/cultural issues—in other words, desk clerks, waitresses and attendants at truck stops treated female drivers differently.

Each stressor discussed has been linked to and/or shown to impact workers' psychological and physical health, as well as their level of job satisfaction. Drivers indicated that in a typical month they suffer from various physical problems—the most-common being leg, arm and back strains, as well as stomach problems. In a typical month, drivers also experienced symptoms of stress: feeling tense, frustrated and fatigued; having sleeping problems; and suffering headaches.

Overall, respondents were somewhat satisfied with their jobs, but generally indicated that they would not continue driving until their retirement and would not encourage other females to drive. About

25.9 percent strongly agreed and 33.3 percent agreed that they were satisfied with their job. While the drivers in this study receive equal pay and feel somewhat satisfied, they had not yet decided to make a concerted effort to encourage other women to enter the occupation.

CONCLUSIONS

Based on data analysis, the following conclusions were drawn:

1) Previous researchers had indicated that time away from home and separation from family and friends were significant stressors to long-haul truck drivers. This study found that these factors were not significantly stressful to the sampled drivers. This lack of significance may be linked to the fact that most participants drove with a male teammate—often their spouse or significant other.

In addition, the sample population was older, with most respondents in their 40s and having no children under the age of 17 living at home. As a result, the female driver and her companion often comprised the nucleus of their current family; thus, there was little to be separated from at home.

2) Current theory suggests that aggressive driving is a stressful factor in over-the-road driving. Survey data support this fact; however, this issue was not perceived to be a high-priority training topic. It is known that "aggressive driving" is included in the facility's new-hire training curriculum; therefore, the material

may not have been a high priority because it was previously addressed.

3) Training topics identified as high priority were: stress-reduction techniques, physical exercise techniques, self-defense techniques and driver fatigue prevention. Stress reduction and physical exercise techniques may help address physical health problems that drivers reported experiencing on a regular basis. As a followup, the researchers will provide the facility with materials and resources for potential use in the training curriculum, along with a list of relevant websites for drivers to access on the road or from remote locations.

4) With regard to a safe work climate, respondents agreed that management was striving to ensure the safest possible work conditions through organizational procedures and effective training. However, although management was controlling working conditions within the organization, several external factors beyond management's control were cited as stressful; these included unclean facilities, poor service at restaurants and fear of poorly lit parking lots and rest areas.

5) In the category of job demands, driving in bad weather was identified as the most significant stressor. The second-highest perceived job demand was the need to make deliveries on schedule. To meet this need, respondents drove regardless of adverse weather conditions and often between midnight and 4 a.m., a time that NHTSA has identified as a period with increased risk for alcohol- and fatigue-related accidents (www.nhtsa.dot.gov/people/perform/human/drowsy2/drdrvrep.htm). While fatigue was considered a condition of work rather than a stress factor, drivers indicated a desire for training in methods to minimize its effects.

6) Finally, while respondents indicated they were somewhat satisfied with their jobs, they were somewhat negative with regard to recommending the profession to other females. Study respondents also suggested that a) improving the image of the driving profession and b) increased safety at truck stops and rest areas were the best means to attract more females to the profession.

LIMITATIONS & RECOMMENDATIONS

Two primary limitations of this preliminary study must be noted. 1) Only employees of one medium-size Midwestern commercial transportation facility were surveyed; as a result, the results cannot be generalized on a national basis. 2) Researchers were allowed only one mailing opportunity to survey participants; this had the potential to considerably impact the response rate and results. Based on this preliminary study, a larger-scale study involving a national survey of commercial transportation companies is recommended. ■

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