

## **BUS DRIVERS' MENTAL CONDITIONS AND THEIR RELATION TO BUS PASSENGERS' ACCIDENTS WITH A FOCUS ON THE PSYCHOLOGICAL STRESS CONCEPT**

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The purpose of this study was to clarify the psychological factors of bus drivers' instability that were related to bus passengers' accidents according to the hypothesis model based on the stress concept of Lazarus and Folkman (1984). This research was carried out in 2006. Participants of the study were 39 Japanese male bus drivers. Their average age was 40.2 (SD:11.1). The average duration of employment was 4.5 (SD:6.1) years. A questionnaire was used that was composed of items concerning the frequency of bus passengers' accidents, performance of safe driving, job stressors, stress reaction and recognition from others. Based on the results, a model assuming that stress reaction caused by job stressors disturbed the bus driver's safe driving and was associated with passengers' accidents in the bus was verified to some degree. Especially, melancholy and tired feeling toward passengers showed a strong relation to the passengers' accidents in the bus. This suggested much room for intervention. Moreover, the recognition from others of their job was confirmed to act as a control factor of the stress reaction.

**Key words:** job stress; bus passengers' accidents; bus driver; car accident

### INTRODUCTION

Recently it has been reported that the death toll of motor vehicle accidents, including bus accidents, exceeds 6,000 persons a year in Japan. The frequency of bus accidents was fewer than that of passenger car accidents. However, the influence of the bus accidents is significant because the number of passengers is large. Moreover, it is also significant because these accidents involve passengers who are in a standing posture. Furthermore, if the effects on bus passengers of such events as sudden starts and abrupt halts are also taken into consideration, the injuries incurred in bus accidents are serious. Therefore, analyzing the causes of the bus accidents involving passengers is a matter of great urgency.

Many of the conventional studies aimed at proposing measures to prevent passengers' accidents on a bus have dealt with the development of safe buses, including maintenance procedures and safe riding methods of passengers (Horino and Mori, 1999; Kobayashi, 2002; Asoh et al., 2005; Mitsuishi et al., 2005; Yanagiya et al., 2006). However, there have been few studies focusing on psychological factors of bus drivers as causes of bus accidents. As a result, we can only guess about the psychological factors related to the mentality of people who get involved in car accidents frequently.

In Japanese traditional studies, the mental and physical functions significantly related to car accidents have mainly been clarified with respect to four aspects; those regarding physical functions, movement functions, intellectual faculty, and personality and temperament (Ohtsuka, 1970; Ohtsuka,

1973; Ohtsuka, 1974). Especially in regard to the psychological aspect, Ohtsuka (1974) reported strong egocentricity, intense mood swings, lack of cooperation, aggression, difficulty in self-control and strong nervousness as the personality and temperament features of people who caused car accidents frequently. Moreover, Ono (1961) also reported that nervousness, strong palindromic type and low intelligence were factors related to car accidents. Moreover, recent studies also reported drivers' personality as factors of car accidents. Patil et al. (2006) reported the young adults' personality characteristics of risk-taking, hostility, aggression, tolerance of deviance, and achievement expectations were related to their risky driving. Moreover, Karlberg et al. (1998) reported that car drivers' type-A behavior patterns were related to near-accidents of cars.

However, these features have been derived from the studies on general car drivers, and may be difficult to apply to bus drivers directly. Moreover, although these features have been shown to be highly related with car accidents, it is unclear as to whether they also have a meaningful relation to passengers' accidents in buses. Actually, bus driving is different from passenger car driving with respect to a number of points. For example, bus driving is a professional job responsible for many passengers' lives. Furthermore, bus drivers always need to show concern for passengers in spite of the fact that they must concentrate on the bus driving. This is because this job is part of the public service industry. Moreover, bus passengers' accidents are also different from car accidents. One of the differences is that bus passengers' accidents do not usually occur in situations involving a car crash. Hence, passengers' accidents occur in various situations, such as sudden starts, sharp curves, sudden stops and so on. These differences may indicate that when we approach the psychological factors of drivers related to passengers' accidents in buses, we should presuppose a different mechanism in comparison with general car accidents.

Another problem may be that these previous studies dealt with the psychological factors almost stable in a person, such as ability, temperament and personality (Mori, 1967; Kasai, 1970; Makishita and Matsunaga, 2003). It is known that these factors are not changed easily. One of the reasons is that, especially in Japan, these studies were based on a view that drivers having these fixed features should be excluded as car drivers. However, we believe it is also an important view that every driver has a possibility of causing accidents due to unstable mental conditions, including mood or emotions which occur in a specific situation. Therefore, the measures to prevent accidents should be discussed after searching for psychological factors of instability that have a close relationship with car accidents and then by verifying the variable factors involved. Recently, Taylor and Dorn (2006) have tried to approach the professional drivers' road traffic accidents from the view point of instability factors of stress and some other psychological states (sleep, fatigue and alertness). Furthermore, Rey de Castro et al. (2004) also reported that fatigue and sleepiness among bus drivers were related to road accidents. Therefore, especially in bus drivers, job stress-related psychological conditions may be one of the most important factors to be considered.

Therefore, we focused on the psychological stress concept as an unstable individual factor of bus drivers that relates to passengers' accidents. We developed a hypothesis model to account for bus passengers' accidents associated with bus drivers' psychological factors, and the model was verified by examining the results of a questionnaire survey.

## METHODS

### *Study models*

A hypothesis model indicated in Figure 1 was developed to account for bus passengers' accidents related to bus drivers' psychological factors. The model was based on the psychological stress concept of Lazarus and Folkman (1984).

In this model, the job stressor causes the stress reaction. The degree of the stress reaction is affected by the cognitive appraisal and/or the coping that may intervene into relationships between stressors and the stress reaction. Furthermore, the stress reaction makes it impossible for the driver to

perform his or her job safely. Finally, the unsafe driving work causes the passengers' accidents in vehicles.

Therefore, the purpose of this study was to clarify the psychological factors of bus driver instability related to bus passengers' accidents according to the hypothesis model based on the stress concept of Lazarus and Folkman (1984). Specifically, this study verified some parts of the hypothesis model by means of the verification model shown in Figure 2. In this verification model, the influence of cognitive appraisal and coping is omitted. Moreover, this model employs a concept of recognition from others as one of the external control factors of the stress reaction. The stress concept by Lazarus and Folkman (1984) has indicated many intervention points for workers' job stress and/or work stress. We believe that verifying this model may also provide many those intervention points related to bus drivers' mental health conditions which could be applied to preventing bus passengers' accidents.

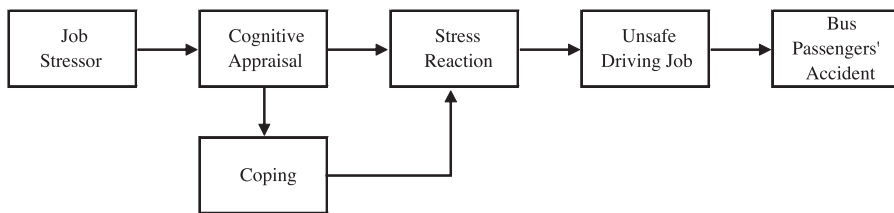


Fig. 1. Hypothesis model of this study. This model is based on the psychological stress model of Lazarus and Forkman (1984)

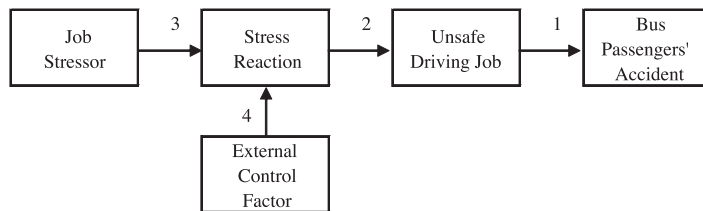


Fig. 2. Verification model of this study. Paths 1-5are numbered according to the order of performing analysis.

*Participants*

In this study, the questionnaire investigation concerning the mental health and job stress of bus drivers in Japan was carried out in 2006. Data were gathered from bus drivers working in Chiba Prefecture by applying a questionnaire. The response rate of the questionnaire was 100%. The total number of valid respondents was 39. The average age of participants was 40.2 (SD:11.1). The average duration of employment was 4.5 (SD:6.1) years.

*Questionnaire*

The questionnaire used in this study was composed of items concerning the frequency of bus passengers' accidents, performance of safe driving, job stressors, stress reaction and recognition from others.

(1) Items regarding the frequency of bus passengers' accidents: Two aspects of "incident" and "accident" were adopted as items regarding the frequency of bus passengers' accidents. The term "incident" referred to the frequency of experiences in which the driver felt a crisis regarding the fall of a passenger. Respondents to this item evaluated how often they felt an incident had occurred according to a 5-point Likert scale ("not at all" 1-5 "frequently"). The term "accident" referred to the frequency of the actual fall of a passenger. Respondents to the "accident" item evaluated how often they had caused passengers' accidents according to a 5-point Likert scale ("not at all" 1-5 "frequent-

ly”).

(2) Items regarding safe driving as a job: Two aspects of the concern for safe driving (concern for driving) and conforming conditions for safety (confirming safe conditions) were asked as items related to performing a safe driving job as a bus driver. The “concern for driving” item was evaluated as the degree to which they were concerned about the four situations of “time until start,” “stepping on the brakes,” “starting speed” and “closing a door,” according to a 5-point Likert scale (“not concerned at all” 1–5 “concerned very much”). The score of “concern for driving” was calculated from the total of the points relating to these four situations. The “confirming safe conditions” item was evaluated as the degree to which they conformed their driving behavior to safe conditions in the seven situations of “time just after start,” “time just before stop,” “curve,” “uphill,” “downhill,” “railroad crossing,” and “rough road,” according to a 5-point Likert scale (“not conformed at all” 1–5 “conformed very much”). The score of “conforming job” was calculated as the total of the points relating to these seven situations.

(3) Four items of self-rating depression scale (SDS): This study focused on depression symptoms as one of the stress reactions which may disturb a bus driver’s safe driving. We adopted some items of a self-rating depression scale (SDS) developed by Zung (1965). It is known that melancholy related to car accidents (Ohtsuka, 1973), and that sleepiness and fatigue related to bus accidents (Rey de Castro et al., 2004). Furthermore, Kishida (1990) reported that mental conditions such as “irritation,” “fatigue,” “impatience” and “sleepiness” related to the risk of cycling accidents. Therefore, this study selected “melancholy,” “fatigue,” “irritation” and “trouble with sleep” from among the SDS items as bus drivers’ psychological factors. Respondents evaluated each item according to a 4-point Likert scale, following the study of Zung (1965) (“not at all” 1–4 “very much”).

(4) Items of the “tired feeling toward passengers”: This study focused on depersonalization, one of the subordinate concepts of the burnout syndrome, as one of the stress reactions that could disturb a bus driver’s safe driving. The burnout syndrome’s depersonalization would mean that the service providers’ heartless and impersonal emotion or behavior toward the people receiving their care or service (Kubo and Tao, 1991). This symptom is caused under situations of chronic stress. Moreover, it was proved that the burnout syndrome had a close relationship with medical accidents among nurses (Kitaoka-Higashiguchi, 2005). Therefore, a possibility that the bus drivers experiencing this symptom were more likely to cause accidents frequently was considered, and we adopted three items reflecting a specific view toward other people from among the items concerning “depersonalization”, which was one of the subscales of the burnout inventory developed by Kubo and Tao (1992). This burnout inventory was based on the Maslach Burnout Inventory (MBI) (Maslach and Jackson, 1981). Furthermore, the word “patient” was changed to the word “passenger” in the three items. As a result, the following three items were adopted; “I feel I treat some passengers as if they were impersonal ‘objects’ (Q1),” “I’ve become more callous toward people since I took this job (Q2),” and “I don’t really care what happens to some passengers (Q3).” From the overall meaning of these items, we decided that the phrase “tired feeling toward passengers” was more appropriate to the phenomena represented by these items than the word “depersonalization”. Therefore, this study adopted the phrase “tired feeling toward passengers” instead of “depersonalization” as a stress reaction item. Respondents of each item used a 5-point Likert scale (“not at all” 1–5 “always like that”). The score of the “tired feeling toward passengers” was calculated from the total points of the three items’.

(5) Items regarding job stressors: This study utilized ten job stressor items which were thought to be experienced by bus drivers in their daily work. The ten job stressors were “lack of worth doing the job,” “declining feeling of aptitude for the job,” “bad environment in a bus,” “bad environment in a company,” “trouble in human relations,” “difficulty of taking rest or holidays,” “inappropriate salary or promotion,” “punctuality of timetable,” “low evaluation from company” and “complaints from passengers.” Respondents to each of the ten items used a 5-point Likert scale (“not applicable at all” 1–5 “very much applicable”).

(6) Items regarding recognition from others: This study focused on recognition from others as an external control factor related to stress reaction. The item concerning recognition from others evaluat-

ed the degree to which they felt recognition to their job from their “boss,” “coworkers,” “passengers,” “family” and “friends,” using a 5-point Likert scale (“not recognized at all” 1–5 “recognized very much”).

#### *Procedures of the questionnaire survey*

The investigation was carried out only for bus drivers who gave consent to this study after hearing the explanation of the purpose of this study. The investigation was conducted for two weeks in February, 2006. Participants replied to the questionnaire individually in a lounge during their recess or standby time within work hours.

#### *Procedures of the analysis*

The analysis of this study was carried out using the statistics software SPSS12.0. In consideration of the small number of sample, this study used only correlation analysis. Analysis was performed with respect to the five steps of the verification model (Figure 2). First, the direct relation between frequency of bus passengers' accidents and all other variables was examined by the correlation analysis. Especially, this analysis focused on the relation between the bus driver's performance of a safe job and the frequency of bus passengers' accidents (Figure 2: path 1). Next, other relations were examined according to the verification model (Figure 2: paths 2-4).

## RESULTS

### *I. Verifying the relation between the frequency of bus passengers' accidents and all other variables*

Correlation analysis was carried out in order to verify how much a safe driving job was related to other process variables directly. The results are shown in Table 1. The “incident” showed significant correlations with “confirming safe conditions,” “melancholy,” “tired feeling toward passengers,” recognition from “coworker” and “passenger.” Furthermore, although a significant correlation was not confirmed, the “incident” had a tendency to be correlated with “trouble with sleep,” “bad environment in a company” and recognition from “boss.” Moreover, “accidents” showed significant correlations with “concern for driving” and a correlation tendency to “lack of worth of the job” and “declining feeling of aptitude for the job.”

These results demonstrate that some variables have direct relations with the frequency of bus passengers' accidents, regardless of the process in the verification model. Especially, the relation between the bus driver's performance of a safe job and the frequency of bus passengers' accidents (path 1) was supported by the results of this analysis.

### *II. Verifying the relation between safe driving and stress reaction*

Correlation analysis was carried out between safe driving and stress reaction in order to clarify the psychological conditions that could disturb a safe driving job. The results are shown in Table 2. Significantly negative correlations were confirmed between “fatigue” and “concern for driving.” Moreover, “tired feeling toward passengers” showed a significantly negative correlation with “concern for driving” and “confirming safe conditions.” Although a significant correlation was not confirmed, “melancholy”, “irritation”, and “trouble with sleep” were negatively correlated with “concern for driving.” These results supported the relation between safe driving and stress reaction (path 2).

### *III. Verifying the relation between job stressors and stress reaction*

Correlation analysis was carried out between job stressors and stress reaction in order to clarify what kinds of job stressors had an influence on the stress reaction as a disturbing factor of performing a safe driving job. The results of this analysis are shown in Table 3. The following positive correlations were confirmed. “Melancholy” showed a positive correlation with “complaints from passengers.” “Fatigue” showed positive correlations with “trouble in human relations” and “complaints

Table 1. Correlations between bus passengers' accidents and other process variables.

Process of the verification model	Variables in each process	Bus passengers' accidents	
		Incident	Accident
Safe driving job	Concern for driving	-0.21	-0.46**
	Confirming safe conditions	-0.37*	0.03
Stress reaction	Melancholy	0.54***	-0.01
	Fatigue	0.23	-0.09
	Irritation	0.26	0.00
	Trouble with sleep	0.28†	-0.08
	Tired feeling toward passengers	0.42**	0.09
Job stressors	Lack of worth doing the Job	-0.17	0.31†
	Declining feeling of aptitude for the job	-0.08	0.30†
	Bad environment in a bus	0.00	0.04
	Bad environment in a company	0.30†	-0.03
	Trouble in human relations	0.05	-0.14
	Difficulty of taking rest or holidays	0.03	0.04
	Inappropriate salary or promotion	-0.13	0.02
	Punctuality of timetable	0.22	0.02
	Low evaluation from the company	0.12	0.13
	Complaints from passengers	0.27	0.12
Recognition from others	Boss	-0.30†	-0.18
	Coworkers	-0.42**	-0.12
	Passengers	-0.35*	-0.16
	Family	-0.04	-0.13
	Friends	-0.07	-0.10

†p<0.1, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table 2. Correlation between performing a safe driving job and stress reaction.

	Melancholy	Fatigue	Irritation	Trouble with sleep	Tired feeling toward passengers
Concern for driving	-0.29†	-0.34*	-0.26	-0.22	-0.34*
Confirming safe conditions	-0.11	-0.12	-0.05	-0.15	-0.44**

†p<0.1, \*p<0.05, \*\*p<0.01

from passengers.” “Irritation” showed positive correlations with “lack of worth doing the job,” “declining feeling of aptitude for the job,” and “complaints from passengers.” “Trouble with sleep” showed positive correlations with “punctuality of timetable” and “complaints from passengers.” “Tired feeling toward passengers” was positively correlated with “lack of worth doing the job,” “declining feeling of aptitude for the job” and “complaints from passengers.” These results supported the relation between job stressors and stress reaction (path 3).

#### IV. Verifying the relation between recognition from others and stress reaction

Correlation analysis was carried out between the recognition from others and stress reaction in order to clarify the way in which recognition of a bus driver's job has influence as a control factor on the stress reaction, which has been confirmed as a disturbing factor in regards to performing a safe

Table 3. Correlation between job stressors and stress reaction.

	Melancholy	Fatigue	Irritation	Trouble with sleep	Tired feeling toward passengers
Lack of worth doing the Job	0.17	0.08	0.36*	0.08	0.40*
Declining feeling of aptitude for the job	0.17	0.05	0.31†	-0.04	0.38*
Bad environment in a bus	0.00	-0.22	0.09	-0.09	0.11
Bad environment in a company	0.03	0.12	-0.06	0.10	0.00
Trouble in human relations	0.20	0.28†	0.16	0.26	0.07
Difficulty of taking rest or holidays	0.11	0.27	0.13	0.10	0.02
Inappropriate salary or promotion	-0.03	-0.02	0.15	0.15	0.18
Punctuality of timetable	0.14	0.18	0.13	0.42**	0.13
Low evaluation from the company	0.10	-0.09	-0.07	0.04	-0.13
Complaints from passengers	0.38*	0.43**	0.32*	0.38*	0.24

†p&lt;0.1, \*p&lt;0.05, \*\*p&lt;0.01

Table 4. Correlation between recognition from others and stress reaction.

	Melancholy	Fatigue	Irritation	Trouble with sleep	Tired feeling toward passengers
Boss	-0.40*	-0.39*	-0.21	-0.24	-0.10
Coworkers	-0.29†	-0.18	-0.13	-0.09	-0.12
Passengers	-0.29†	-0.34*	-0.27	-0.19	-0.35*
Family	-0.08	-0.07	-0.11	-0.04	-0.26
Friends	-0.17	0.03	-0.25	-0.14	-0.31*

†p&lt;0.1, \*p&lt;0.05, \*\*p&lt;0.01

driving job. The results of this analysis are shown in Table 4. As the results, following negative correlations were confirmed. "Melancholy" showed negative correlations with "recognition from boss," "coworkers," and "passengers." "Fatigue" was negatively correlated with "recognition from boss" and "passengers." "Irritation" tended to be negatively correlated with "recognition from boss," "passengers," and "friends." "Trouble with sleep" also tended to be negatively correlated with "recognition from boss." "Tired Feeling toward passengers" showed negative correlations with recognition from "passengers" and "friends." These results supported the relation between recognition from others and stress reaction (path 4).

## DISCUSSION

### *Stress reaction closely related to bus passengers' accidents*

Fundamentally, the results of this study supported the verification model. These results confirmed the relation between job stress and bus passengers' accidents, similar to the findings of Taylor and Dorn (2006) that showed the relation between the stress and drivers' road traffic accidents. This means that performing a safe driving job is difficult for bus drivers who feel stress reactions caused by job stressors. Furthermore, such a driving job has a relation to passengers' accidents in the bus. A detailed consideration is given below.

According to the correlation between the safe driving job and passengers' accidents in the bus, it is suggested that the bus driver's safe driving job has a direct influence on the prevention of the pas-

sengers' accidents. This means that bus drivers play important roles in preventing passengers' accidents. Therefore, clarifying the bus drivers' psychological conditions that may disturb their safe driving job is important for preventing the passengers' accidents in buses.

It was found that depression symptoms (melancholy, fatigue, irritation, trouble with sleep) and tired feeling toward passengers were related to an unsafe driving job. Especially, melancholy and tired feeling toward passengers showed a meaningful relation to bus passengers' accidents directly. One of the remarkable results was that bus drivers' depression symptoms were related to unsafe driving job and bus passengers' accidents. The studies on traffic accidents study show that driving under the conditions of fatigue and sleepiness leads to road traffic accidents (Rey de Castro et al., 2004; Taylor and Dorn, 2006). Moreover, according to Yoshida et al. (2004), depression symptoms lead to medical accidents because they reduce the nurses' powers of concentration, understanding and sense and cause physical fatigue. Furthermore, Jones et al. (1988) found the relation between high stress levels of nurses and the frequency of medical accidents. Similarly, in the case of bus drivers, depression symptoms may disturb their safe driving job and lead to bus passengers' accidents.

Another remarkable result was that among these psychological conditions, tired feeling toward people showed comparatively strong correlations with the variables studied as a disturbing factor of the safe driving job. Yoshida et al. (2004) reported that nurses' depression symptoms reduced the concern for work, patients and diseases and led to medical accidents. Therefore, it is considered that the tired feeling toward passengers is also related to bus passengers' accidents, in a similar way as depression symptoms do.

These results suggest the relevance of the concept of "depersonalization" which is one of the subscales of the burnout inventory (Maslach and Jackson, 1981). In the studies on medical accidents, it was assumed that nurses' burnout led to medical accidents as shown by Kitaoka-Higashiguchi (2005). This symptom implies the lack of concern and hospitality for the passengers. The driving job under such a condition may be dangerous for passengers, disturbing the provision of a safe driving service and leading to bus passengers' accidents.

The present study provided evidence that bus drivers' psychological factors are related to unsafe driving and passengers' accidents. As previous studies have pointed out, drivers who have some personality and temperament problems are not suitable to serve as bus drivers (Ono, 1961; Ohtsuka, 1970; Ohtsuka, 1973; Ohtsuka, 1974; Karlberg et al., 1998; Patil et al., 2006). However, the results of this study indicated that bus passengers' accidents depended not only on such stable personality factors but also on variable stress conditions which can be observed for every personality type. Therefore, it is suggested that the stress management of bus drivers is one of the effective approaches for companies to prevent bus passengers' accidents. It is also suggested that clarifying the variable factors of these stress reaction is meaningful for constructing a useful stress management program for all bus drivers.

#### *Variable factors of stress reaction and interventional methods*

What is the effective interventional method for companies to deal with these stress reactions relating to passengers' accidents in their business? This can be considered by taking into account the relations between variable factors of job stressors and the recognition from others and stress reaction. Although generalization of the results of this study is difficult because of the small sample, the following proposals may be suggested as measures to prevent bus passengers' accidents.

Melancholy and fatigue were related not only to the complaints from passengers but also to troubles with human relations. This means that the problems with respect to human relations in their jobs increased the incidence of depression and fatigue. Furthermore, this stressor was more serious for those bus drivers who were poor at human relations and isolated in their company because such people have difficulties to consult with other persons in their company. Moreover, the recognition from the people in the workplace such as the boss, coworkers and passengers has an influence as a control factor to these symptoms. The problem of human relations is thus considered as one of the main stressors, as found in the case of other occupations (Ivancevich and Matteson, 1980; Cox et al., 2000;



Kitaoka-Higashiguchi and Kanagawa, 2003). Therefore, it is suggested that each company should take some measures in order to build good human relations within the company. For example, group discussions among the people in the company may be effective. In addition, difficulty of taking rest or holidays was found to relate to fatigue. Therefore, it can be said that securing sufficient resting time is also an important measure to prevent bus passengers' accidents.

The tired feeling toward passengers was related to the lack of sense of worth of the job and to the feeling of declining the aptitude for it. Furthermore, these job stressors were associated with the tendency toward the bus passengers' accidents. Namely, the bus drivers exposed to these stressors showed low motivation to perform their jobs. As mentioned above, it is difficult that drivers working under these conditions can provide high quality service to the passengers with concern for them. The results of this study indicated that it is not an effective approach to have people at work deal with these symptoms. That is why the recognition from the boss and coworkers does not affect the stress reaction as a control factor. These results may imply that feelings of dislike toward the people of the company are also related. Therefore, any approaches from people of the company cannot be expected to modify this symptom effectively.

On the other hand, the recognition from the family and friends is expected to modify this symptom. Therefore, the company can try to deal with this symptom by indirect interventions in their private time. For example, it may be an effective measure to keep drivers with high levels of tired feeling toward passengers away from work. This is because working under this symptom has been shown to be unsafe according to its high correlation with passengers' accidents in the bus. Moreover, the improved private time with the family or friends may become an opportunity to promote their feeling of recognition from them. Furthermore, innovating a reward system may be one of effective approaches. The company can provide them with the opportunity that their job performance may be praised by the family or friends. Bringing about a positive evaluation relating to their job in the company by dealing with private time may promote recognition from the family and friends. On the other hand, their motivation for the job may be increased by the reward system itself.

One of the most remarkable results of this study is the finding that a passenger's behavior is an important factor which deeply affects a bus driver's mental stability. As the conflict with patients is one of the main job stressors among the nurses, this study similarly confirmed that complaints from passengers would have a strong influence on bus drivers' stress reactions and the bus passengers' accidents (Kitaoka-Higashiguchi and Kanagawa, 2003). Furthermore, the recognition from passengers also has an influence as a control factor on these stress reactions, except for the trouble with sleep. In many cases, the bus driver is the object upon whom passengers can directly throw their dissatisfaction about the bus service. The company should not assume that the bus driver is responsible for all the passengers' complaints. It is an important stance for the company that they confer with the bus drivers about their problems and make efforts to improve them. Moreover, one of the effective measures is to make sure that bus drivers exchange greetings with the passengers at the time they get on and off the bus. It is important to make efforts to build good human relations with passengers in a short time frame in order to reduce the passengers' dissatisfaction, aggression and complaints.

## CONCLUSION

This study clarified the psychological stress factors of bus drivers' instability related to the bus passengers' accidents through the examination of the verification model used. Especially, melancholy and tired feeling toward passengers were found to have a comparatively strong relation to the passengers' accidents in the bus and there is much room for intervention. Moreover, the recognition from others of their job was shown to be a control factor of the stress reactions. It is suggested that these results have proved the contribution of psychological studies concerning bus drivers' mental health in order to prevent passengers' accidents.

However, it is difficult to establish that the verification model of this study was confirmed com-

pletely. The small sample is the greatest constraint of the study that cannot be disregarded. Therefore, it will be important to carry out the same study with a large sample in the future. Moreover, we should focus not only on the depersonalization related to the burnout syndrome or the tired feeling toward people but also on the unreality feelings or depersonalization defined in the field of psychiatry as stress reactions. These symptoms correspond to the approximate concept of the tired feeling toward others. The strong influence of these symptoms on the bus passengers' accidents is assumed from the finding that the tired feeling toward passengers was closely related to passengers' accidents. If this feeling has a strong influence on the passengers' accidents in busses, we should also give much more consideration to these symptoms.

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