

Table 8. Fit indices of our model

Indices	P	GFI	AGFI	RMSEA	NFI	TLI
Evaluation criteria	P>0.05 (insignificant)	>0.90	>0.90	<0.05 (Good), <0.08 (Reasonable)	>0.90	>0.90
Values	0.580	0.921	0.901	0.071	0.913	0.979
Fitness	Good	Good	Good	Reasonable	Good	Good

4.2 Path analysis

According to the improved TPB model, the driving behaviors can be predicted based on the AB, SN, PBC and SI of the drivers. Here, the SEM is introduced to construct the improved TPB model. The SEM can effectively measure the contribution of each index to the entire model, identify the correlation between indices, and demonstrate the overall fitness of the model. The SEM-based path analysis map contains many kinds of symbols, where each rectangle is an observable variable/factor, each oval is a latent variable/factor, each one-way arrow is a one-way impact or effect, and each two-way arc is a correlation. The established model was verified on AMOS.

Based on the survey data, the values of all observable variables and some latent variables were obtained for our model. On this basis, an SEM-based path analysis map was plotted for the illegal driving behaviors of rural bus drivers. The survey data were normalized to fully disclose the correlation between variables.

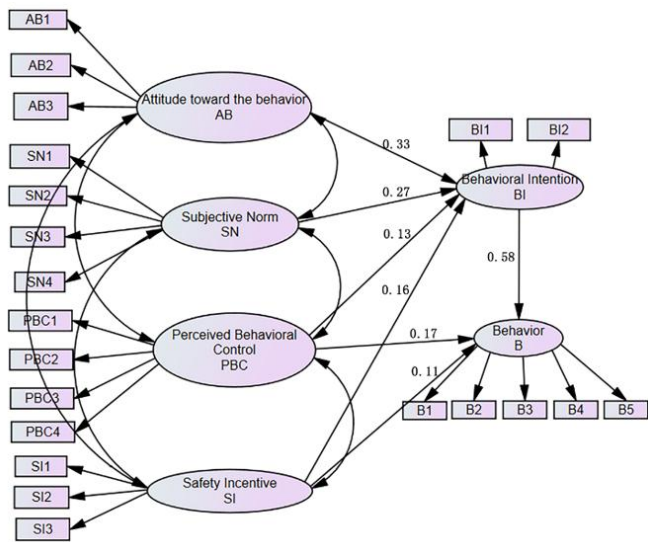


Figure 2. An SEM-based path analysis map for illegal driving behaviors of rural bus drivers

According to the improved TPB model, the BI and B can be respectively calculated by:

$$BI = 0.33AB + 0.27SN + 0.13PBC + 0.16SI$$

$$B = 0.58BI + 0.7PBC + 0.11SI$$

4.3 Discussion

(1) In the improved TPB model, the AB, SN, PBC and SI are obviously correlated with the BI, and the PBC and SI have direct or indirect impacts on the B.

(2) The most common illegal driving behaviors among rural bus drivers include distracted driving, illegal lane change, illegal parking, speeding, and failure to yield. Among them, illegal lane change, illegal parking and failure to yield are the

top three illegal driving behaviors among these drivers.

Further analysis shows that the drivers face high risks of illegal lane change, illegal parking and failure to yield, owing to the poor conditions and narrow width of bus roads in rural areas. To mitigate the risks, the road facilities for rural buses should be further improved, and the common illegal driving behaviors should be corrected in a timely manner.

(3) The AB is the leading influencing factor of the BI, with a path coefficient of 0.33. Thus, more importance should be attached to the AB of the driver. Overall, rural bus drivers have not fully recognized the dangers of illegal driving behaviors, and hold different attitudes to their own and others' illegal driving behaviors: they are very dissatisfied with others' illegal driving behaviors (I am dissatisfied with he/she who drives illegally), but indifferent to their own illegal driving behaviors (I feel uneasy or guilty when driving illegally; It is unavoidable to drive illegally on an occasional basis).

Psychologically, indifference is an emotional factor in disregard of harmful consequences. Indifferent drivers tend to drive illegally repeatedly, pushing up the likelihood of accidents. Therefore, publicity and education should be provided to guide the drivers to nurture a correct driving attitude. On the one hand, warning education should be implemented to correct the attitude of the drivers toward illegal driving behaviors, enabling them to grasp the correlations between illegal driving and accidents and to avoid illegal driving behaviors. On the other hand, the drivers should be taught to treat others' illegal driving behaviors correctly. If he/she witnessed others' illegal driving behaviors, the driver should report or supervise the behaviors through reasonable channels, rather than lost himself/herself in road rage.

(4) The SN has a great influence on the BI, with a path coefficient of 0.27. According to our survey and the relevant literature, illegal behaviors are not acceptable by the public, and are subjected to social pressure. The illegal driving behaviors are significantly restricted by passengers. In the course of driving, passengers can sense the driver's operations, and correct the wrong operations in time. The illegal driving behaviors are also restricted by families. A good family environment helps the driver to foster good driving behaviors. The illegal driving behaviors are slightly affected by friends. To reduce and eliminate illegal driving behavior, it is necessary to improve traffic safety through family education, friend counselling, and passenger supervision.

(5) The PBC has an important impact on the BI, with a path coefficient of 0.13. This means the intention toward illegal behaviors partially depends on the ability of self-control. The statement "It is easy to drive illegally without being caught" had the highest rating among the four PBC indices, because the traffic management in rural areas is too weak to fully monitor the illegal driving behaviors. The other three statements received relatively high ratings. The main reason lies in the long-term fixed route for each bus, which causes job burnout and carelessness to drivers, making them overconfident.

Therefore, it is necessary to monitor the whole driving process through technical means like video monitoring, and

then timely correct the illegal driving behaviors. Moreover, the bus enterprise can rotate the drivers of different lines by a certain period. The drivers will be less fatigued in the changing environment.

(6) The SI, the additional variable, has a major impact on the BI, with a path coefficient of 0.17, and also a major impact on the B of drivers. Therefore, the inclusion of the SI could enhance the explanatory and persuasive powers of the TPB model. The drivers have a strong sense of honor and take an aversion to penalties. The SI system must be perfected to strictly regulate their behaviors. According to the principle of safe behavior incentivization, the incentives should fully consider the needs of drivers, and adopt suitable penalty and competition mechanism. Meanwhile, the efficiency of supervision should be improved, and the employees should be encouraged to compete with each other, making the SI more effective.

(7) There are direct correlations between the PBC, SI and B. With the growth of illegal behaviors, the self-control ability will be weakened, and the binding force of the SI will decrease. Then, the SI will bypass the BI and directly acts on the B.

The BI has a significant positive impact on the B, with a path coefficient of 0.58. Thus, it is the direct impactor of driving behaviors. In future, the transport department should take two measures to manage rural bus drivers: reducing illegal behaviors by suppressing the BI, and promoting safe behaviors by improving the safety awareness.

5. CONCLUSIONS

To promote the safety management of rural buses, this paper innovatively introduced the SI index to improve the classic TPB model, and verified the improved TPB model for the illegal driving behaviors of rural bus drivers. Besides, the influence mechanisms of the AB, SN, PBC and SI on illegal driving behaviors were analyzed in details, and the correlations were quantified between internal and external variables. Empirical analysis shows that the improved TPB model can effectively identify the factors affecting the illegal driving behaviors of rural bus drivers; the addition of the external variable SI perfects the TPB model, enhancing its explanatory power. To enhance safety management, the rural bus enterprises should improve the SI system, integrate rules and regulations on safety behavior with the code of conduct for drivers, and help them to establish correct safety evaluation criteria. Based on the influencing factors, the future research will explore the correlations of the SI with different types of drivers.

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