Transportation Research Part F 42 (2016) 125–139

Contents lists available at ScienceDirect

Transportation Research Part F

journal homepage: www.elsevier.com/locate/trf

What factors determine metro passengers' risky riding behavior? An approach based on an extended theory of planned behavior

Xin Wan [a], Paul M. Schonfeld [b], Qiming Li [c,*]

[a] Institute of Engineering Management, Hohai University, Nanjing, JS 211100, PR China
[b] Department of Civil and Environmental Engineering, University of Maryland, College Park, MD 20742, USA
[c] Department of Construction and Real Estate, School of Civil Engineering, Southeast University, Nanjing, JS 210096, PR China

ARTICLE INFO

Article history:
Received 22 August 2015
Received in revised form 29 June 2016
Accepted 3 July 2016
Available online 3 October 2016

Keywords:
Theory of planned behavior
Metro passengers
Risky riding
Beliefs
Interventions

ABSTRACT

In China metro interruptions and casualties are largely attributable to incidents involving passengers. The present study examined metro passengers' motivations to ride in potentially risky ways by focusing on belief-based measures of the theory of planned behavior (TPB), supplemented with several variables expected to be predictive. A survey based on this extended TPB, operationalized with respect to last-second riding, pushy riding and door-forcing scenarios, was conducted on a sample of regular passengers ($N = 576$, 576 and 571, respectively). In support of the TPB, after controlling for the effects of passengers' characteristics, the behavioral, normative and control beliefs accounted for a significant part of the variance in intentions to ride dangerously as depicted in the scenarios, with behavioral beliefs and control beliefs being consistently predictive across the behaviors. The inclusion of moral norms, past behavior, perceived risk and self-identity resulted in a significant increment in explained variance for each intention investigated, with past behavior being consistently predictive while moral norms and perceived risk showing significance in some scenarios and self-identity being consistently insignificant across the behaviors. Further, an extensive set of belief targets for metro safety interventions were identified by selecting those beliefs that differed most between those who intended to commit risky riding and those who did not. Theoretical and practical implications of the findings are discussed from the perspective of reducing passengers' risky riding tendencies.
© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Metros (known as "Rapid Transit"), which are an efficient and environmentally friendly passenger transportation mode can be very valuable for mobility in urban areas. However, metro train operation is more vulnerable to the performance of passengers than other passenger transportation modes, such as bus and railway (Wan, Li, & Yuan, 2014; Wan, Yuan, & Li, 2015). This occurs because (1) metro train running automatically in accordance with a strict time and route schedule is apt to be disturbed by passenger violations or errors and (2) the interaction between passenger and vehicle in a metro (e.g., boarding and alighting activity) is more frequent within a same operation duration if compared with bus or railway. In China passenger-involved accidents are becoming a major metro safety issue due to the combined effects of crowded

* Corresponding author. Fax: +86 25 83793251.
E-mail address: lqming_cmre@163.com (Q. Li).

http://dx.doi.org/10.1016/j.trf.2016.07.005
1369-8478/© 2016 Elsevier Ltd. All rights reserved.

riding conditions, weak risk awareness of the public and lack of compliance with riding rules (Wan, Li, Yuan, & Schonfeld, 2015). As numerous metro lines are in service and more are expected soon, ensuring a safe and reliable metro service in terms of reducing passengers' risky riding behavior is a new challenge of great significance for metro operators and policy makers.

A case statistics from 235 metro incidents that were collected via Internet from 2003 to 2014 indicated that 128 cases (54%) resulted from aberrant riding behaviors. Fig. 1 shows the categories of these passenger-involved cases and, on a related point, the time distribution of a specific behavioral category. The categorization indicates that committing suicide (33%), unsafe action related to boarding and alighting (26%), conflict or horseplay (12%) and mental or physical abnormality (11%) accounted for the major patterns of aberrant riding behaviors in metro practice. Such incidents resulted in a total of 25 deaths and 64 injuries and at least an 18 min average train delay, according to a conservative estimate for which delay times in most cases were difficult to gauge. These figures reflect that passengers' aberrances or violations contribute substantially to metro casualties and delays in China. On the other hand, the interviews conducted by the authors in some major cities of China showed that, out of the 40 interviewees who were regular metro riders, 27 thought that their behavior would not affect metro operations significantly or at all, while 26 thought that riding metro was safe or very safe for them. These figures to some extent suggest the weak risk awareness of the riders regarding both their personal safety and their effects on normal operation while taking metros.

The gap between "reality" and "cognition" provides us with the evidence that examining what motivational factors are important in modifying passengers' risky riding behaviors might contribute to reducing the risk of passenger-involved incidents by promoting safer behaviors. Since the previous investigation suggested that metro passenger violations are most often intentional process with the hope to board or alight the train earlier or faster (Wan, Li, et al., 2015), the Theory of Planned Behavior (TPB; Ajzen, 1985), which has been applied in the transport area, should provide a useful approach to explore the cognitive determinants of committing or avoiding risky riding in this context. In the following section, we will briefly review the TPB and its application in explaining behaviors, especially for traffic violation behaviors.

1.1. The theory of planned behavior

The TPB proposes a rational decision-making model which posits that people's intention to behave in a particular manner is the proxy for actual behavior (Ajzen, 1985, 1991). Behavioral intention (overall motivation to engage in a behavior) is, in turn, determined independently by attitudes toward the behavior, subjective norms and perceived behavioral control (PBC). Specifically, attitudes that describe an individual's positive and negative evaluation about engaging in the behavior are determined by beliefs about the likely outcomes, weighted by evaluation of these outcomes (behavioral beliefs); subjective norms that refer to the perceived social pressure to engage in the behavior are determined by beliefs about the expectations of others, weighted by motivation to comply with these expectations (normative beliefs); PBC that describe the perceptions regarding the ease or difficulty of engaging in the behavior are based on beliefs about frequency of factors that may facilitate or inhibit the behavior, weighted by the perceived power of these factors (control beliefs). Given enough actual control over the behavior, the intention would be carried out once an opportunity appears; otherwise, under the condition of incomplete control, PBC as a proxy for actual control together with intention are direct predictors of the behavior (Ajzen, 1991).

Support for the TPB comes from meta-analytical studies on a wide range of social behaviors (Ajzen, 1991; Armitage & Conner, 2001; Conner & Sparks, 2005; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; McEachan, Conner, Taylor, & Lawton, 2011) and more relevantly from numerous studies on road users' behaviors such as driving, road crossing and motorcyclists' riding behavior. Within the road safety domain, some studies used direct measures of the three TPB factors (i.e., global measures of attitudes, subjective norms and PBC) (Elliott et al., 2003; Forward, 2009; Parker, Lajunen, &

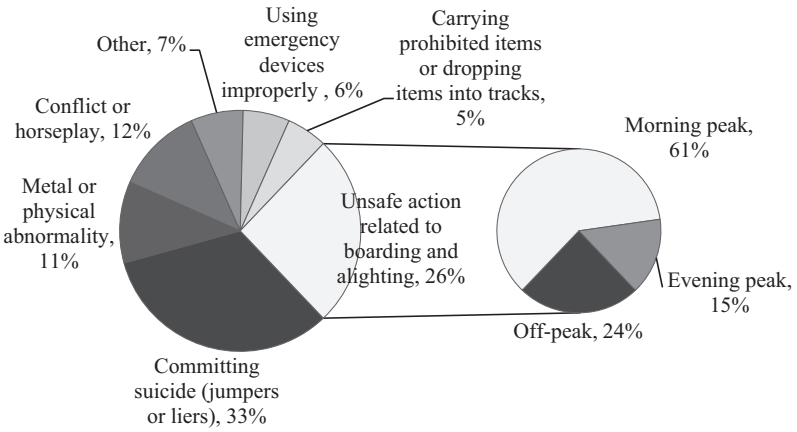

Fig. 1. Categories of passenger-involved incidents from 2003 to 2014 with the time distribution for one major category.

Download English Version:

https://daneshyari.com/en/article/5037363

Download Persian Version:

https://daneshyari.com/article/5037363

Daneshyari.com