Transportation Research Part F 53 (2018) 14–23

Contents lists available at ScienceDirect

Transportation Research Part F

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

Transport risk evaluations associated with past exposure to adverse security events in public transport

Trond Nordfjærn *, Torbjørn Rundmo

Norwegian University of Science and Technology, Department of Psychology, Dragvoll, 7491 Trondheim, Norway

ARTICLE INFO

Article history:
Received 15 July 2014
Received in revised form 13 June 2017
Accepted 23 December 2017

Keywords:
Risk perception
Experience
Worry
Public transport
Demand

ABSTRACT

The current study aims to examine differences in risk evaluations according to whether individuals have been exposed to adverse security events in transport during the last five years. In addition, a path model is tested where risk evaluations predict intentions to use public transport and use of such transport in these groups. The results are based on a survey conducted in a randomly obtained representative sample of the Norwegian urban public (n = 1043). The results showed that individuals who had been exposed to adverse security events in public transport reported substantially higher risk perception of experiencing security issues in such transport than those who were not exposed. Exposed individuals also reported higher probability judgements and more worry of experiencing injury in public transport. The path model showed that high probability judgements of experiencing injury in public transport were related to a lower intention of using such transport, whereas corresponding worry in the private motorized sector predicted a stronger intention to use public transport. Demand for risk mitigation in the public transport sector was found to be more relevant for intentions to use public transport than similar demands in the private motorized sector. The path model and coefficients were not found to differ significantly according to exposure to security events in public transport. The findings are discussed in relation to the role of negative risk experiences for risk evaluations in transport.

1. Introduction

The role of previous exposure to adverse security events in public transport (e.g. theft and harressment onboard metro, tram or bus or at a waiting point for these modes) for risk evaluations is insufficiently understood. More knowledge of how previous exposure influences concurrent risk evaluations in transport are important because risk evaluations could influence travel mode use behaviour (Roche-Cerasi, Rundmo, Sigurdson, & Moe, 2013; Rundmo, Nordfjærn, Iversen, Oltedal, & Jørgensen, 2011). Elevated risk evaluations in public transport could ultimately be a barrier for using public modes of transport and may be instrumental in promoting car use. It is therefore important to analyse associations between previous exposure to adverse security events and concurrent risk evaluations in order to increase use of public transport.

One of the more important constructs in risk research is risk perception (i.e. perceived probability that a negative event may occur times the perceived severity of consequences if such events occur) (Rundmo & Sjöberg, 1998; Sjöberg, 1999). The psychometric paradigm (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978) is an important approach within the domain of

* Corresponding author.
E-mail address: trond.nordfjarn@ntnu.no (T. Nordfjærn).

https://doi.org/10.1016/j.trf.2017.12.014
1369-8478/

risk perception. This tradition argues that characteristics of the hazards or risk sources determine individual risk perception. This approach to risk perception has received critique (see e.g. Sjöberg, Moen, & Rundmo, 2004), partly because risk perception was analysed on an aggregate level and no attempt was undertaken to explain why different groups and individuals report diverging levels of risk (e.g. Englander, Farago, & Slovic, 1986; Teigen, Brun, & Slovic, 1988). An alternative approach to risk perception is the social amplification of risk framework (Kaspersen et al., 1988), which emphasises the role of individual processing of risk stimuli. Here, personal negative experience with a risk source is considered important for risk perception. For instance, negative experiences with specific risk sources are assumed to increase the availability and retrieval potential of the source in memory and thereby causing risk perception to increase. This is in accord with the experience hypothesis which postulates that risk perception increases when the public experience more occurrences of specific risk events (Rogers, 1997).

An additional reason of increased risk perception due to previous exposure may be that the risk source becomes more personally relevant for the individual. This is strongly linked to the availability heuristic (Tversky & Kahneman, 1973) which argues that probability and consequence judgements may be influenced by the possibility to remember specific examples (i.e. prototypes) of events in which are relevant in the environment where the individual operates. However, the ease of retrieval may also be related to the time period between the negative risk experience and evaluation (Loftus, 1993), which is why the time period for exposure was delimited to five years in the current study.

The assumption that previous negative experiences with risk elevate concurrent risk perception has also received empirical support. Milman, Jones, and Bach (1999) reported that tourists who had previously been exposed to crime reported an overall lower level of security and generally felt more unsafe on holiday than individuals who had not been previously exposed to crime. Barnett and Breakwell (2001) reported that negative experiences with various risk sources were associated with high risk judgements, particularly in terms of involuntary risks. Another study conducted among 915 employees at offshore platforms showed that individuals who had experienced a personal work-related injury reported more risk perception, a stronger dissatisfaction with safety and also more job stress than those who had not experienced a work-related injury (Rundmo, 1995). Knuth, Kehl, Hulse, and Schmidt (2014) showed that individuals in different countries reported more perceived risk for hazard events (e.g. fire, earthquakes and floods) when the individuals personally had experienced the risk sources in question. Hence, the assumption that negative risk experience and perception are related has received both theoretical and empirical support.

Previous work that examined associations between negative risk experiences/exposure and risk evaluations did not focus specifically on the transport domain. To our knowledge there are no studies which have investigated relations between experiences of adverse security events in public transport and transport risk evaluations. Findings from studies of hazards in high risk environments, such as offshore installations, nuclear industry and earthquake prone areas, are not necessarily generalizable to the transport domain. Nuclear and earthquake risks are novel and usually more catastrophic (i.e. influences many people simultaneously) than security risks in transport which are more likely to influence a delimited number of individuals, i.e. chronic risk (Rundmo, Nordfjærn et al., 2011).

A further limitation in previous work was that the studies solely focused on risk perception. Examinations of potential differences in additional risk evaluations were not integrated into the empirical framework. Two of the most central risk evaluations reported in the literature are transport-related worry (i.e. the level of concern that people experience when thinking about negative events in transport) and demand for risk mitigation (i.e. the demand from the public directed towards the authorities for introducing risk-reducing measures in private motorized and public transport) (Rundmo, Nordfjærn et al., 2011). It may be relevant to also include these risk evaluations because worry has been found to have an important role in risk evaluations and may also influence behavioural decisions. This is argued in the risk-as-feelings hypothesis (Loewenstein, Weber, Hsee, & Welch, 2001) which postulated that behaviours deriving from risk situations are partly caused by anticipated worry (i.e. worry deriving post cognition). Worry has also been found to be a strong predictor of other risk evaluations such as demand for risk mitigation (Rundmo & Nordfjærn, 2013). It is likely that individuals who have recently experienced an adverse security event in public transport may demand more risk mitigating activities in the public transport sector than those who have not been recently exposed. In the current study risk evaluations cover transport risk perception, transport-related worry and demand for risk mitigation in transport.

Risk evaluations are primarily interesting because they may influence behaviour (Rundmo, Nordfjærn et al., 2011). This is argued in theories such as the Protection Motivation Theory (Rogers, 1975) and the Health Belief Model (Rosenstock, 1974). Generally, these theories argue that people are risk-aversive such that they tend to avoid stimuli associated with elevated risk. In the transport domain this could imply that people who report the risk in public transport to be high may reduce their intention to use public transport and could seek out alternative private motorized transportation modes (e.g. their own car). Consequently, this study also focuses on the associations between risk evaluations, intentions to use public transport and public transportation mode use. A possibility is that the relevance of risk evaluations is more profound among people who have experienced adverse security issues in public transport due to their rather recent exposure to the hazard. This may cause stronger associations between risk evaluations, intentions to use public transportation and use of such modes among these individuals. Therefore, it is relevant to test differences in the associations between the exposed and non-exposed groups.

The current study will focus on specific security risk evaluations in public transport as well as risk evaluations of injuries in public and private motorized transport. This is because one could assume that injuries may occur when individuals are exposed to negative security events. For instance, an individual may be subjected to violence causing physical injury during