Demand for mitigating the risk of COVID-19 infection in public transport: the role of social trust and fatalistic beliefs

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Abstract

The rapid surge of COVID-19 cases worldwide drew attention to COVID-19 infection as a new source of risk in transport. The virus introduced a need for viral transmission mitigation as a major priority when selecting a mode of travel, and caused a significant drop in public transport use. The recovery of public transport use in the post-COVID period requires that the transport authorities favourably address the people's demand for mitigation of the risk of COVID-19 transmission in public transport. The present study aims to explore the role of risk perception, worry and priority of COVID-19 risk reduction along with fatalistic beliefs and public trust in authorities in explaining public demand for risk mitigation. The present study is among the first to investigate the role of fatalistic beliefs, social trust and risk perception for public transport and public demand for risk mitigation. The link between priority of infection prevention and demand for risk mitigation has also been less explored in public transport research. An online survey was conducted among university students in Iran between 19th April and 16th June 2020, during the first wave of the pandemic, when the country was a major epicentre of the disease. A total of 271 out of 370 respondents whose dominant mode on university travels was public transport were included in the analysis. Results of structural equation modelling confirmed the paradox of trust, indicating that social trust is negatively associated with perceived risk of COVID-19 infection, which in turn may lead people to place less importance on COVID-19 prevention as a priority in travel mode choice, and consequently demand less risk mitigation efforts to prevent COVID-19 infection in public transport. Dissimilar to trust, however, the results revealed no relationship between fatalistic beliefs and risk perception, but a significant direct effect of fatalistic beliefs on demand for risk mitigation. To reinforce public demand for mitigating the risk of COVID-19 in public transport, the study calls on policymakers to exploit public trust resources for more effective risk communication, through disseminating the gradually accumulating evidence-based information regarding the infectivity and the virulence of COVID-19 and the scientific risk of infection. The study also underlined the potential importance of considering fatalistic beliefs when developing effective risk communication policies and practices to enhance public support for COVID-19 risk mitigation in public transport.

Keywords: COVID-19; public transport; demand for risk mitigation; fatalism; social trust; risk perception

Introduction

The first confirmed cases of COVID-19 was reported in Wuhan China, 31st of December 2019 (Aknin et al. 2021). The transmission spread of the virus, however, was so fast that by the time of writing (28th of September 2021), COVID-19 had caused around 4.75 million deaths and over 232 million confirmed cases around the world (WHO 2021). Soon after the onset of the pandemic, respiratory droplets and contaminated surfaces were recognized to be the most important routes of transmission of the disease (WHO 2020a). Close contact (within 1 metre) with an infected person was concluded to cause respiratory droplets to reach the people around (WHO 2020b). Evidence at the beginning of the pandemic also confirmed that the respiratory secretions and droplets can remain on surfaces and objects for hours. Hence, the infection was also believed to be transmitted indirectly, when individuals touch virus-contaminated surfaces and then touch their mouths, noses, or eyes (WHO 2020b)[1].

In efforts to prevent the spread of COVID-19, urban public transport received immediate attention from the health authorities. The risk of viral transmission is believed to be high on public transport because of increased duration of possible exposure to infected people in enclosed overcrowded spaces of public transport, as well as inadequate ventilation, recirculation of contaminated air, and struggles in maintaining basic hygienic requirements (Zhen et al. 2020). There is strong evidence from many observations around the world that as a direct consequence of the high risk of the virus transmission in public transport, the use of public transport dramatically declined, not only due to a demand reduction but also for the requirements imposed by the health authorities to limit the capacity (Gkiotsalitis and Cats 2020). For instance, public transport in the Netherlands experienced a reduction of over 90% compared to the fall of 2019, which was the largest reduction in the number of trips among different modes of transport (de Haas, Faber, and Hamersma 2020). Similar observations from Germany also confirmed that compared to other modes of travel, public transport was hit the hardest by the COVID-19 pandemic (Eisenmann et al. 2021). Studies also reported drops of about 80%–90% in public transport use in major cities in China, Iran and the U.S due to the pandemic (UITP 2020).

Despite significant worldwide declines in public transport use and availability, authorities still required public transport agencies to be prepared and to continue services for essential workers and employers during the pandemic (Hendrickson and Rilett 2020). This required public transport agencies to take preventive measures to mitigate the risk of COVID-19 transmission. For instance, the World Health Organization recommended national and local governments, and transport providers to coordinate, facilitate and conduct thorough and frequent cleanings and disinfection of facilities, buses, trams and other public transport vehicles, stations and equipment such as elevators, escalators, handrails, seats, ticketing devices and other surfaces (WHO 2020c).

Interestingly it is argued that as a result of people's fear of infection in public crowded places, it is expected that public transport is unlikely to reach the pre-COVID demand levels for some considerable time (Vickerman 2021). For instance, observations of the mobility trends in Italy, Germany, Canada, and the US, Ciuffini, Tengattini, and Bigazzi (2021) have revealed that compared to private modes of transport, public transport use experienced a lower rate of recovery. It was concluded that despite a total increase in the overall travel demand over the course of the recovery, the percentage of public transport use across all trips has decreased compared to the pre-COVID baseline. The authors explained their observation in relation to people's perceived risk of getting infected in shared spaces with other passengers. It is reasonable to assume that persistence of the sense of the transmission threat would raise

[1] For this reason, deep cleaning practice was among significant protocols for disinfection in public transport at the time the survey in this study was conducted. However, COVID-19 transmission by fomites (inanimate surfaces or objects) received critiques later, for being based on test results that had little resemblance to real-life scenarios (Goldman 2020). The critics argued that dissimilar to real-life situations, the studies have placed a very large number of infectious virus particles on test surfaces.

public demand towards the authorities to mitigate the risk, and if such demand is not addressed, a full recovery of public transport demand is unlikely to occur post-COVID.

The previous research on risk mitigation in public transportation has traditionally been concerned with the risk of crashes. For instance, Rundmo and Moen (2006) argued that compared to private modes of transportation, demand for risk mitigation is expected to be greater for public transportation, because public transportation crashes may have more severe consequences compared to crashes in private transportation. In another study, Nordfjærn and Rundmo (2018) found that people's intention to use public transport is more strongly linked to demand for risk mitigation in the public transport sector than the private motorized sector. The daily accumulating evidence of the infectivity, pathogenicity and virulence of COVID-19 and the risk of getting infected by the virus, however, spurred the public's demand for mitigating COVID-19 transmission in public transport as a novel source of risk, which in turn could have strengthened political support for such mitigation in public transport. This is true because public demand for risk mitigation may be a prerequisite for organizational policies related to risk reduction (Rundmo and Moen 2006).

Previous literature also supports that risk perception (the degree to which an individual feels susceptible to a threat and a judgement of the severity of a threat) (Thompson 2014)) is an explanatory factor for an individual's demand for risk mitigation and policy risk decisions (see Sjoberg 1999; Rundmo 2001). The link between risk perception and demand for risk mitigation is of particular importance in transport, considering that it may affect mode use. For instance, higher perception of a certain risk in public transport (e.g. the risk of virus transmission) combined with higher demand for mitigating that risk may cause people to switch to alternative modes perceived to be safer (e.g. private cars), if their demand for risk mitigation is not met with countermeasures by the public transport authorities (Nordfjærn et al. 2021).

Based on the expectancy-value approach, risk perception is concerned with cognitive processes underlying the evaluation of the probability of a risk event to occur and the potential severity of its consequences (Sjöberg, Moen, and Rundmo 2004). The risk-as-feelings approach, however, places focus on the role of emotions, such as worry and concern (Kinateder et al. 2015). It is argued that the consequence component of risk perception is the dimension of risk perception in which lay people put a stronger emphasis. A potential explanation is that the perceived consequences of risk is more related to affect, such as worry and concern, and thus previous authors have emphasized that compared to probability assessments of risk, risk consequences and worry are stronger predictors of demand for risk mitigation (see e.g. Sjoberg 1999). For instance, studying risk perception and demand for risk mitigation in transport, Rundmo and Moen (2006) found that while probability assessment was an insignificant predictor of demand for risk mitigation in transport (including public transport), worry was a stronger and more significant predictor compared to consequences. The study also showed that worry mediated the effects of both consequences and probability on demand for risk mitigation in public transport. In contrast to the above findings, recent literature has implicated that dissimilar to worry, risk perception may not be a strong predictor of demand for risk mitigation in transport (Rundmo and Nordfjærn 2017).

In addition to cognitive probability and consequence assessments of risk and emotional responses such as worry, it may be argued that demand for risk mitigation in a specific transport sector (e.g. public transport) may also be relevant for individuals' priority of safety when choosing transport modes from that particular sector (Rundmo and Nordfjærn 2013). In a broader sense, transport priorities (such as priority of safety) are transport qualities that people perceive to be of particular significance when choosing a travel mode. For instance, Şimşekoğlu, Nordfjærn, and Rundmo (2015) argued that priority of safety and security were positively associated with people's intention to use public transportation in Norway. Priority of safety may act as a mediator between worry and demand for risk mitigation. For

instance, Rundmo and Nordfjærn (2013) showed that the indirect effect of worry on demand for risk mitigation in transport through priority of safety was stronger than the direct effect.

Trust in authorities' risk handling influences people's transportation behaviour. For instance, in a large Norwegian population-based sample, Rundmo et al. (2011) found that those who trusted the authorities' risk handling abilities most often used public transport. In explaining this finding, the authors argued that in the case of lower levels of trust people prefer to use transportation modes that are perceived to be under their own control (i.e. private modes).

Trust in authorities' risk handling influences risk perception. This assumption has received extensive support from previous studies of different risk domains, from nuclear power energy (Ryu, Kim, and Kim 2018) to genetically modified food (Lu, Xie, and Xiong 2015), and natural hazards (Han et al. 2017). Although such a relationship has received less empirical support in the transportation domain, the general finding in most studies in other fields of research is that the higher levels of trust in experts and institutions are associated with lower levels of perceived risk. The relationship between trust and risk perception, however, pertains to the individual's knowledge about the risk source, as well as the type of risk and the way the trust is measured (Siegrist 2021). Since people may not have sufficient knowledge about certain sources of risk, in dealing with hazards they have usually no other way than to rely on trust to reduce the complexities that they are faced with (Siegrist, Gutscher, and Earle 2005). For instance, in the lack of robust and trustworthy information about a certain risk, people may rely on institutions that are assumed to be responsible for regulating and decreasing hazards related to that source of risk. From this perspective, social trust is an important factor when explaining risk perception.

In the lack of reliable information required to analyze causal relations under complex situations such as risk occurrence, people may also want to rely on their beliefs, which may not necessarily be scientifically true or justifiable, but may also play a definite role in shaping behaviour. Among such beliefs are fatalistic beliefs, based on which individuals tend to believe that they have no control over health risks and that occurrences are mainly predetermined by fate, luck and chance (Ngueutsa and Kouabenan 2017). Such beliefs are contrary to the control beliefs which are important components in psychological theories such as the theory of planned behaviour, the health belief model, and other social cognition theories. These theories have been extensively used to explain protection intention and behaviour. In these theories control beliefs refer to the degree of control an individual perceive to have over resources and opportunities required to perform a health behaviour (Ajzen and Madden 1986).

Fatalistic and control beliefs are analogous to respectively external and internal locus of control, in Rotter's (1966) social learning theory, where perception of control is derived from expectations that are formed internally or externally. According to the theory, while those with a higher internal locus of control tend to believe that the life outcomes are predicted by own efforts, the external locus of control is concerned with the belief that the occurrence of positive or negative events is determined by other people or circumstances.

Previous research has investigated the relationship between fatalism and risk-taking behaviour. It is prudent to maintain that higher levels of fatalism are associated with taking less precaution when encountering hazardous situations. For instance, Niederdeppe and Levy (2007) argued that people holding fatalistic beliefs about cancer prevention may be at higher risk of cancer, because of their weaker tendency to engage in various prevention behaviours. The deleterious effects of fatalism on risky behaviours have been supported in the traffic safety research domain. For example, examining a sample of road users in Turkey, Nordfjærn, Şimşekoğlu, and Rundmo (2012) showed that fatalism was the most important predictor of risky driving behaviour. The positive link between fatalism and risky behaviour has also been documented in more general domains such as healthy eating (Welch and Ellis 2018).

However, there are other studies that do not support the significant relationship between fatalism and health behaviour (e.g. Romo et al. 2018).

In addition to a direct relationship between fatalism and risky behaviour, previous studies have also considered an indirect relationship through risk perception. While the premise that fatalistic beliefs reflect uncertainty and fear may suggest a positive correlation between fatalistic beliefs and risk perception (McQueen et al. 2008), the existing literature does not provide unanimous evidence about the relationship between fatalism and risk perception. It has been shown that fatalistic beliefs can negatively influence risk perception by engendering a feeling of being invulnerable and giving the illusion of protection (Kouabenan 2009). In a dissimilar way, You, Ji, and Han (2013) considering a sample of commercial airline pilots concluded that while pilots with a higher internal locus of control considered themselves more at risk than others, external locus of control was found associated with a lower level of risk perception. To explain, they noted the difference in respondents' vigilance between the internal and external locus of control groups, to attend to pertinent cues and ignore irrelevant signals when processing information (Gregory and Nelson 1978). As another example to show the inconsistency, Ngueutsa and Kouabenan (2017) noted the negative mediating role of traffic risk perception in the relationship between fatalistic beliefs and reported safe behaviours. However, in contrast to the findings by Ngueutsa and Kouabenan (2017), Teye-Kwadjo (2019) found a positive relationship and attributed it to sample characteristics and measurement issues. In another study, Elias and Shiftan (2012) noted that people with more fatalistic beliefs had a higher intention to use public transport. In explaining this observation they pointed to the higher levels of risk in car use compared to public transport.

Research aims and contribution

Using a sample of Iranian university students, the present study aimed to investigate the factors underlying the demand for COVID-19 transmission risk reduction in public transport. According to the theoretical backgrounds outlined above, in the absence of reliable evidence about the disease during the acute COVID-19 outbreak with relatively high rates of morbidity and mortality, fatalistic beliefs and trust in experts both play key roles in shaping the way people perceive the risk of COVID-19 infection when using public transport. Risk perception and consequent affects may associate with people's demand for reduction of the risk of COVID-19 transmission among public transport users. In addition to this indirect relationship, demand for reduction of transmission risk in public transport was hypothesised to be directly linked to fatalism, as well as to trust in experts. Furthermore, we hypothesised that the users' priorities of COVID-19 preventive measures in public transport mediate the relationship between worry of getting infected with COVID-19 and demand for COVID-19 risk reduction. Based on the above explanation, Figure 1 illustrates the theoretical framework underlying the study.

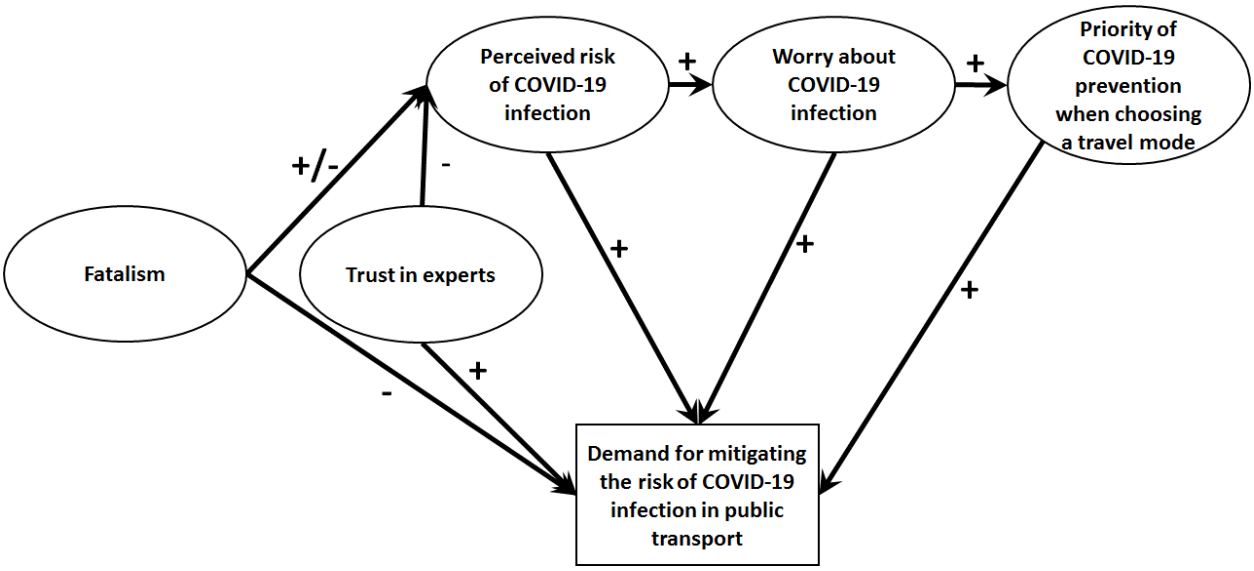

Fig 1. The conceptual model framework of the study (+ : hypothesised positive association, - : hypothesised negative association, +/- : No directional hypothesis postulated)

Perception of safety and security and demand for risk mitigation in the public transport sector have been subjects of several previous studies (Rundmo and Moen 2006; Rundmo et al. 2011; Rundmo and Nordfjærn 2013; Rundmo and Nordfjærn 2017; Rundmo and Nordfjærn 2019). However, to the best of our knowledge, the literature in transport behaviour research lacks empirical studies to assess the association between people's fatalistic beliefs and their trust in authorities' risk handling and their risk perception and demand for risk mitigation. In addition, the link between priority of safety and demand for risk mitigation in the transport sector has been subject of little investigation.

The rapid surge of COVID-19 cases worldwide since the time it was first reported, however, drew attention to the COVID-19 infection as a new source of risk in public transport, which may affect the public's demand for mitigating the risk of COVID-19 infection, as well as their transport behaviour. As explained, in the absence of scientifically accurate information about the ways of COVID-19 infection transmission and prevention during the first waves of the pandemic, the role of fatalistic beliefs and trust was critical in formation of passengers' risk perception and their demand for mitigating the risk of virus transmission. Therefore the present study is among the first to explore the relationship between fatalistic beliefs, trust in authorities and priority of safety (COVID-19 prevention) and risk perception and demand for COVID-19 risk reduction in the public transport sector.

The present study could be of particular interest for cultural, organizational and epidemiological reasons. From a cultural point of view, the cultural theory of risk (Douglas and Wildavsky 1983) considers that the socially defined cultural biases or worldviews form the sources of differences between individuals' risk perception. From this perspective, previous studies have found a link between fatalistic beliefs and religion (Ruiu 2013). Hence, in religious countries like Iran, fatalism might demonstrate a link with individuals' risk perception and their demand for risk mitigation, as well as their risk behaviour. On the other hand, from an institutional standpoint, recent studies in Iran reported a low level of public trust regarding healthcare systems in general (Tabrizi et al. 2016) and during the COVID-19 epidemic, specifically (Vardanjani et al. 2020). From an epidemiological perspective, Iran was among the global epicentres of the coronavirus in the region and internationally at the time of data collection (Sawaya et al. 2020).

Methods

Sampling procedure

With around 15 thousand students in 15 faculties, Kharazmi University is among the largest universities in Iran. Before the COVID-19 pandemic outbreak, public transport (including subway, bus, and shared taxi/vans) was the primary mode of transport for the students to reach the major university campuses in Tehran and Karaj. However, following confirmation of the first infected case of COVID-19 in Iran on the19th of February, 2020 (Abbasi-Oshaghi, Mirzaei, and Khodadadi 2020), the spread of the disease was so rapid that the officials decided to shut down all the universities and colleges throughout the country right after diagnosis of the disease, to control the infection. At the time of writing, most of the Iranian universities are still locked down, and almost all educational centres are teaching their classes online.

We conducted an online survey to collect data from students at Kharazmi University. The logic was that Iran became one of the global epicentres of the coronavirus almost right after the pandemic hit the country (Sawaya et al. 2020). In addition, since major campuses of the university has been well accessible by bus and subway for more than 20 years, public transport has traditionally been a major mode of travel for the students at the University.

The university was shut down and we had no access to students' information at the time of data collection. we conducted a convenience sampling through an online survey to collect data. The survey started on 19th April 2020, when a temporary decline was observed in the number of daily deaths from the outbreak and ended on 16th June 2020 when COVID-19 infection deaths was on the rise to the second peak of the outbreak.

The survey was anonymous, but to increase the response rate, we explained in the invitation letter that all participants completing the survey would have their names entered into a draw for six gift cards. Entrance into the lottery required the participants to enter their contact details at the start of the survey. This process, however, was completely voluntary. In other words, there was a possibility that the respondents complete the survey without entering their names and contact details into records. The participants were assured that the information obtained would remain private and confidential. They were also reminded that there were no right or wrong answers to the questions and that the data would only be used for research purposes. The web-based system hosting the survey helped the authors to prevent any missing data, by disabling submission of incomplete data. In this way, it was required that the respondents completed all questions before being able to submit their responses.

The survey link was posted at major online student forums and social media, where many students were members. We also asked professors and educational staff to share the survey link with students after their online lectures. In addition, we adopted a snowballing approach by asking the respondents to share the questionnaire link with their acquaintances, friends and social network who were also students at Kharazmi University. This method of recruiting data has been used in previous literature (Fallah Zavareh, Mohamadi Hezaveh, and Nordfjærn 2018).

Sample characteristics

We received a total of 370 completely filled forms, out of which for 271 (73.24%) respondents public transport was the dominant mode of travel during the normal days before the university was shut down due to the COVID-19 pandemic. We entered this subsample into the analysis comprising of 108 (39.9%) male and 163 (60.1%) female respondents, for which the primary travel mode was bus for 51 (18.8%), subway for 178 (65.7%), and shared taxi/van for 42 (15.5%) respondents. The mean age of the respondents in the subsample was 21.9 years (Min = 19, Max = 39, SD = 3.07). Almost all cases (90.4%) had to travel to the university for three days a week or more, in an ordinary week before the university shut down.

Questionnaire

The questionnaire used in this study consisted of several instruments designed for a comprehensive study. In this section, we only explain the parts that were relevant to the aims of the present study (see Appendix

I for the questionnaire). All the instruments used in this study have been adopted from previous studies. A group of Iranian language experts who were familiar with Iranian culture translated the questionnaire from the original documents into Farsi. To ensure the clarity and language fluency, we, however, pilot tested the instruments and made improvements where required before publishing the questionnaire online.

The questionnaire started by asking the respondents' gender and age. We also asked them to specify the number of days a week they travelled to the university according to their class schedule, as well as their most frequent mode of travel before the university shut down.

Based on the expectancy-value approach risk perception consists of a two-factor structure covering the probability assessment of the risk occurrence and the potential severity of consequences of the risk. Respondents' perception of risk of getting infected by COVID-19 using public transport was measured considering only the probability dimension. We asked the respondents to evaluate how probable they thought it was that they personally would be infected with Coronavirus when using different modes of public transport (including subway, bus, and shared taxi), regardless of their dominant mode of travel. A five-point Likert scale (from 1: very low probability to 5: very high probability) was used for measurement. We did not include the severity dimension of the risk perception, because the severity of the COVID-19 disease is relevant to virulence and pathogenicity of the virus itself, irrespective of the travel mode the respondents may use.

The respondents' worry was also measured on a five-point Likert scale (1: a little worried, to 5: very worried) by asking the respondents how worried they become when thinking about the risk of getting infected by the Coronavirus when they travel to campus by any of the means of public transport (including subway, bus and shared taxi) regardless of their dominant mode of travel. For both risk probability and severity assessment similar instruments have previously been used in other studies in Iran (Fallah Zavareh et al. 2020; Mehdizadeh and Ermagun 2020).

Fatalistic beliefs were measured by the instrument validated by McIlroy et al. (2020). The instrument was a short version (including 19 items) of a 30-item questionnaire that was originally adopted by Esparza, Wiebe, and Quiñones (2015). McIlroy et al. (2020) validated the instrument using data from different countries with cultural and geographic variations. The items loaded on a four-factor structure including general fatalism (e.g. if bad things happen, it is because they were meant to happen), internality (e.g. what happens to me in the future mostly depends on me), divine control (e.g. everything that happens to a person was planned by God) and luck (e.g. when good things happen to people, it is because of good luck). The five items related to divine control were removed from the questionnaire in the present study due to the sensitivity of religious issues in Iran. The remaining 14 items were scored using a five-point Likert scale (1: strongly disagree, to 5: strongly agree).

Trust was measured by asking the respondents how much confidence they had in the abilities of public transport agencies to take effective preventive measures to reduce the risk of Coronavirus infection. The public transport agencies included the metro operation company, bus operating companies, and taxi operation companies. Trust in these authorities was measured separately, using a five-point Likert scale from 1: not confident at all, to 5: very confident. A similar measure has been used by Rundmo et al. (2011) in the domain of the risk of crashes and public transport.

Punctuality, safety and security, travel cost, travel time, comfort, and availability of the travel modes are among the different aspects related to selection of travel mode. The instrument to measure the importance of such transport priorities has been previously used by Rundmo, Sigurdson, and Roche-Cerasi (2011) and Şimşekoğlu, Nordfjærn, and Rundmo (2015). The instrument has also been widely used in Iran (see e.g. Mehdizadeh et al. 2017). After the COVID-19 pandemic crisis, health consideration appears to be a new relevant priority in public transport mode use. To measure the COVID-19 prevention priority in selecting public modes of travel similar to the previous instrument, we added two new aspects of transport

into the previous instrument, including the possibility of social distancing and regular disinfection of transport facilities (e.g. seats onboard, waiting points, etc.). We asked the respondents to specify the importance of each aspect when they choose a mode of travel on university trips, supposing that the university reopens next week. The responses were scored on a five-point Likert scale from 1: not important at all to 5: very important.

Finally, to measure the respondents' demand for mitigating the risk of COVID-19 infection in public transport, we asked them to evaluate how important they thought it was that the authorities in the transport sector take measures to reduce the risk of Coronavirus infection in public transport. Responses were scored on a five-point Likert scale from 1: not important at all to 5: very important. This instrument was directly adopted from Rundmo and Nordfjærn (2013).

Statistical procedures

We conducted principal component analysis (PCA) with varimax rotation to identify the dimensional structure of the respondents' fatalistic beliefs. We estimated item loadings on the extracted dimensions. A cut-off point of .4 and eigenvalues greater than 1 were used to identify the dimensionality of the data, as suggested by Hair (2010). Item loadings over .3, .4, and .5 have been considered significant, more important, and very significant, respectively (Hair 2010). We also reported the Kaiser-Meyer-Olkin measure of sampling adequacy to determine the suitability of the data for a PCA analysis.

For each component of the fatalistic beliefs, we reported Cronbach's alphas as the coefficient of internal reliability. Average corrected item-total correlations were also calculated. Cronbach's alpha and average corrected item-total correlations were also measured for other latent variables including perceived risk of and worry about COVID-19 infection at public transport, trust in public transport agencies, and priority of COVID-19 prevention when using a travel mode.

For the fatalistic beliefs, we also confirmed the dimensionality of the instrument using confirmatory factor analysis (CFA). The discrepancy between the observed and the predicted covariance matrices was estimated using the Chi-Square statistic. We also reported the degree of freedom (DF), comparative fit index (CFI; a measure of the difference between the hypothesised model and the null model), and the root mean squared error of approximation (RMSEA; representing the degree to which the model fits the population covariance matrix while controlling for the degree of freedom and sample size).

We conducted a structural equation model (SEM) to test the hypothesised framework of Figure 1. In this model, the demand for mitigating the risk of COVID-19 infection in public transport was considered as an observed variable, since the instrument consisted of only one item. Other variables were entered as latent variables, where indicators were used for identifying those variables. The model fit was evaluated using various fit indices including Chi-Square, CFI, RMSEA. Standardized regression weights (path coefficients) were estimated for the structural relations. Furthermore, for each exogenous variable, we reported the squared multiple correlation as a measure of explained variance.

Results

Descriptive statistics

Mean and standard deviation of items of fatalistic beliefs, perceived risk of COVID-19 infection at public transport, worry about COVID-19 infection at public transport, trust in public transport agencies, the priority of Covid-19 prevention when choosing a travel mode, and demand for mitigation of the risk of COVID-19 transmission in public transport are reported in Table 1. As shown, the respondents did not report strong fatalistic tendencies. However, for all modes of public transport, the respondents evaluated the probability of getting infected in COVID-19 to be very high. They also reported that they were highly worried about getting the disease when using different modes of public transport. Compared to shared vans and taxis, the respondents perceived themselves to be at relatively more risk of infection and reported to be more worried when travelling on subway or bus, presumably because there is usually a

higher odds of encountering many passengers in subway and bus compared to smaller shared vehicles like shared taxis and vans.

Table 1 also shows that the possibility of social distancing and regular disinfection of transport facilities are very important aspects to the respondents when they choose a mode of travel. The respondents also urgently demanded the transport sector officials to mitigate the risk of infection in public transport, although very interestingly they reported relatively lower levels of trust in the authorities' abilities to take effective preventive measures to reduce the risk of infection.

388 Table 1. Descriptive Statistics of the items related to the variables used in the model

Items	Mean	Std. Deviation
Fatalistic beliefs (To what extent do you agree or disagree with these statements in general? (1: strongly disagree ~ 5: strongly agree))		
1. If bad things happen, it is because they were meant to happen	2.27	1.010
2. Life is very unpredictable, and there is nothing one can do to change the future	2.18	1.035
3. If something bad is going to happen to me, it will happen to me no matter what I do	2.04	.957
4. There is no sense in planning a lot; if something good is going to happen, it will	1.97	1.009
5. People die when it is their time to die and there is not much that can be done about it	2.85	1.266
6. I have learned that what is going to happen will happen	2.55	1.147
7. What happens to me in the future mostly depends on me	4.01	1.056
8. My life is determined by my own actions	3.98	1.083
9. I feel that when good things happen, they happen as a result of my own efforts	3.94	.985
10. When good things happen to people, it is because of good luck	2.61	.960
11. When I get what I want, it's usually because I am lucky	2.53	.954
12. The really good things that happen to me are mostly because of luck	2.25	.929
13. Some people are simply born lucky	2.62	1.082
14. How successful people are in their jobs is related to how lucky they are	2.53	1.081
Perceived risk of COVID-19 infection at public transport (How probable do you think is that you personally would be infected with Coronavirus when using the following modes (1: very low probability ~ 5: very high probability))		
Bus	4.35	.872
Subway	4.56	.795
Shared Taxi/Van	3.97	.964
Worry about COVID-19 infection at public transport (How worried do you become when thinking about the risk of getting infected when using the following modes of travel (1: a little worried, ~ 5: very worried))		
Bus	4.37	.948
Subway	4.46	.926
Shared Taxi/Van	4.08	1.010
Priority of COVID-19 prevention (Suppose that the university reopens next week. How important are the following aspects when you choose a transport mode on university travels (1: not important at all ~ 5: very important))		
Possibility of social distancing	4.09	1.145
Regular disinfection of transport facilities (e.g. seats onboard, waiting point, etc.)	4.11	1.207
Trust in public transport agencies (How much confidence do you have in the following authorities' abilities to take effective preventive measures to reduce the risk of Coronavirus infection (1: not confident at all ~ 5: very confident))		
Bus operation companies	2.44	1.188
Metro operation company	2.56	1.225
Shared Taxi operation companies	2.39	1.162
Demand for mitigating the risk of COVID-19 infection at public transport How important do you think it is that the authorities take measures to reduce the risk of Coronavirus infection when you use the following mode? (1: not important at all ~ 5: very important)		

public transport (Bus, Subway, shared Taxi/Van)	4.46	.881

Dimensionality of fatalistic beliefs

Results of the PCA analysis of the respondents' fatalistic beliefs are shown in Figure 2. The result of the KMO indicated that the sample met the requirements for PCA. A cut-off point of .4 was used to retain the items in the scale. As displayed in Table 2, the remaining loading factors were very significant. As suggested by the PCA analysis, luck, general fatalism, and Internality, respectively explained 25.7, 25.6, and 19.0 percent of the total variance in the data examined.

Table 2. Principal component analysis of fatalistic beliefs (KMO = 0.852)

	Components		
	Luck	General fatalism	Internality
10. When good things happen to people, it is because of good luck	.838		
14. How successful people are in their jobs is related to how lucky they are	.818		
11. When I get what I want, it's usually because I am lucky	.790		
12. The really good things that happen to me are mostly because of luck	.785		
13. Some people are simply born lucky	.771		
6. I have learned that what is going to happen will happen		.822	
3. If something bad is going to happen to me, it will happen to me no matter what I do		.771	
1. If bad things happen, it is because they were meant to happen		.769	
4. There is no sense in planning a lot; if something good is going to happen, it will		.713	
5. People die when it is their time to die and there is not much that can be done about it		.705	
2. Life is very unpredictable, and there is nothing one can do to change the future		.685	
8. My life is determined by my own actions			.933
7. What happens to me in the future mostly depends on me			.933
9. I feel that when good things happen, they happen as a result of my own efforts			.893

We used CFA analysis including covariances between the three components of luck, general fatalism, and Internality to confirm the dimensionality underlying the respondents' fatalistic beliefs. For each component, we included the related indicators resulted from the PCA. To enhance the fit of the model, the modification indices indicated covariance between the error terms for items five and six, 10 and 12, and also 13 and 14. Results of a CFA analysis of the respondents' fatalistic beliefs indicated an adequate fit of data into the three dimensions Chi-Square=148.051, DF=71, Chi-Square/DF=2.085, CFI=0.966, RMSEA=.063, (CI90%=.049, .078).

Reliability of the latent variables

Internal reliability and average corrected item-total correlations for the scales used in the study are shown in Table 3. The Cronbach's Alpha values for all the scales used in the analysis were interpreted to have either good (above .8) or excellent (above .9) reliability as suggested by George and Mallery (2003). The average corrected item-total correlation values were also greater than .4 which has been considered as a satisfactory threshold (Gliem and Gliem 2003).

Table 3. Internal reliability and average corrected item-total correlations for the scales used in the study

Dimension	Number of factors	Number of items	Cronbach's Alpha	Average Corrected Item-Total Correlation
Fatalism	3			
General fatalism		6	.866	.671
Luck		5	.886	.728
Internality		3	.915	.831
Perceived risk of COVID-19 infection	1	3	.837	.704
Worry about COVID-19 infection	1	3	.911	.823
Trust in public transport agencies	1	3	.942	.880
Priorities of COVID-19 prevention when choosing a travel mode	1	2	.943	.893

Prediction of demand for mitigating the risk of COVID-19 infection in public transport

Figure 2 shows the results of the SEM model estimation, based on the hypothetical framework specified in Figure 1. The figure shows the standardized regression weights of the relationship between the variables. For brevity and a clear presentation of the model, indicators and their error terms are omitted from the figure. However, the figure depicts e and R^2 for the endogenous variables which represent the error variance and squared multiple correlation (explained variance), respectively.

The data showed a close fit between the data and the model framework Chi-Square=729.636, DF=283, Chi-Square/DF=2.578, CFI=.911, RMSEA=.076, (CI90%=.070, .083). Results showed that 20.9 percent of the variability in demand for mitigating the risk of COVID-19 infection at public transport can be explained through the proposed framework. The analysis confirmed a direct relationship between fatalism and demand for COVID-19 risk mitigation in public transport. However, trust in public transport agencies was shown to be indirectly associated with the demand, through mediating factors of perceived risk of COVID-19 infection, worry and priority of COVID-19 prevention when choosing a travel mode.

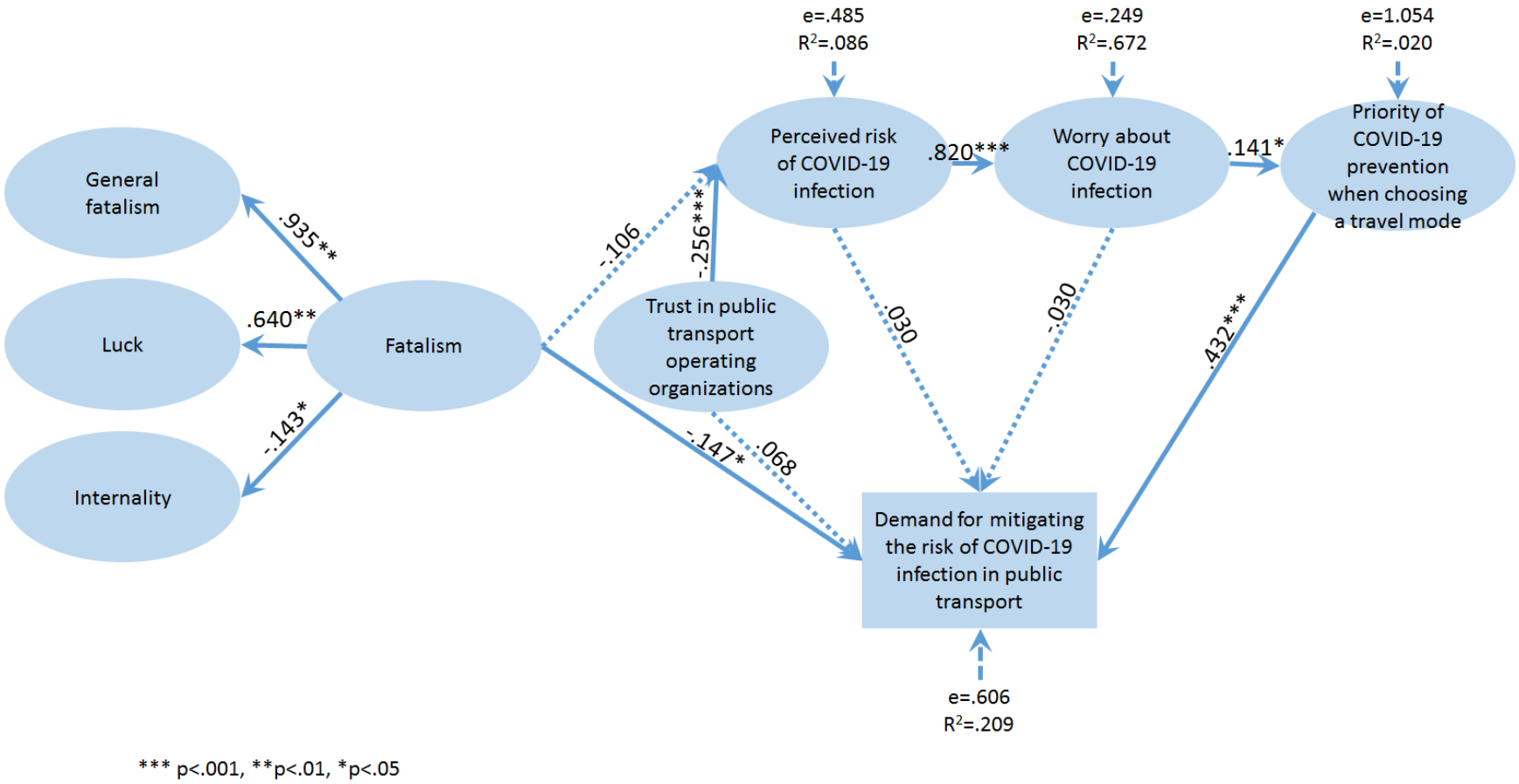

Figure 2. Results of structural equation modeling (Chi-Square=729.636, DF=283, Chi-Square/DF=2.578, CFI=.911, RMSEA=.076, (CI90%=.070, .083), *** p<.001, **p<.01, *p<.05, Dashed arrows indicate insignificant relationships p>.05)

Discussion

The present study investigated the role of fatalism and trust in experts (as two major information sources in which people tend to rely when dealing with novel risk sources and the complexities underlying risk management) in shaping people's COVID-19 risk perception and their demand for mitigating the risk of disease infection in public transport. Risk perception was also hypothesised to be related to demand for risk mitigation directly, or indirectly, through worry about infection in public transport and the priority of infection prevention when choosing a travel mode. In line with these hypotheses the study found that while fatalistic beliefs were directly related to more demand for mitigation of the disease risk in public transport, trust in public transport authorities was indirectly related to demand of risk mitigation through risk perception which could explain worry of disease transmission and priority of COVID-19 prevention when using a travel mode.

Users' preferences and priorities are underlying motives and barriers for using a certain mode of transport (e.g. public transport). To increase public transport use it is essential that both the quality and quantity of the public transport services are tailored to meet the preferences and priorities of current and potential future users (Beirão and Sarsfield Cabral 2007). For instance, Eboli and Mazzulla (2012) argued that service availability, service reliability, comfort, cleanliness, safety and security, information, customer care and environmental impacts are the aspects objectively characterizing bus services. However, travel behaviour is not essentially influenced by only objective service levels, but also psychological factors such as perceptions, attitudes and habits (Beirão and Sarsfield Cabral 2007).

At the onset of COVID-19, the disease infection turned to be a substantial and novel source of risk at public transport, with unknown effects on people's responses. The infectivity of the virus was substantial to the extent where pandemic-related risk perception and worries turned out to be a big concern, and consequently a priority of avoiding virus transmission was introduced to the people's dominant preferences when choosing a mode of travel (Abdullah et al. 2020). The present study found that the respondents perceived a relatively high risk of COVID-19 virus infection, reported high levels of worries when using public transport, and put avoidance of virus transmission as a top priority when selecting a mode of travel. They also imposed a high demand on the authorities to mitigate the risk of COVID-19 infection in public transport.

Demand for risk mitigation is important for public transport usage for different reasons. First, in the case the impact of a certain risk is perceived to be high and the public demand for risk mitigation remains unaddressed by the relevant authorities, people may tend to use other alternatives which are perceived to be of less risk (e.g. private car). Second, a higher demand for risk mitigation may be a prerequisite of effective organizational policies related to risk reduction.

In much of the previous literature examining the link between risk perception, worry, priority of risk reduction, and demand for risk mitigation in public transport, the major sources of risk addressed include road crashes and security problems (see e.g. Nordfjærn and Rundmo 2018). This study is among the first to shed light on people's perceptions of the infection risk and priorities of prevention, in line with fatalistic beliefs and their trust in public transport agencies when using public transport at the start of the COVID-19 pandemic. The study also contributed to the understanding of how these variables are associated with the public's demand for COVID-19 risk mitigation in public transport. Interestingly, the study has been conducted in Iran, a country where has been a major epicentre of the disease in the region and worldwide at the time of data collection.

Results showed that people's higher confidence in the abilities of the public transport agencies to take effective preventive measures to reduce the risk of COVID-19 infection was negatively associated with

the perceived probability of getting infected with Coronavirus when using public transport. In other words, people may underestimate the risk of COVID-19 infection in public transport, when they trust the public authorities to fulfil their duties of care to public transport users. The study found no indication that risk perception is a significant predictor of people's willingness to act on COVID-19 relief in public transport. However, the study found that a weak perception of COVID-19 infection risk was strongly related to less worry about COVID-19 infection in public transport, which in turn (and in line with previous literature such as Nordfjærn et al. (2021)) may lead people to place less importance on COVID-19 infection as a priority when choosing public transport and consequently demand less risk mitigation efforts to prevent COVID-19 infection in public transport. Interestingly, this finding could be conflicting with the fact that public trust in government is key to policy acceptance and support, particularly during pandemic times. A similar paradox of trust has also been observed by Wong and Jensen (2020) where they observed that in spite of a high level of public trust in the government low levels of the perceived risk of COVID-19 resulted in low general compliance with the government's risk management measures. This may be still a valid observation for other risk sources such as natural hazards. For instance, Wachinger et al. (2013) argued that trust in management performance may lessen the perception of flood likelihood and magnitude which in turn reduces people's willingness and preparedness actions.

The study has been conducted in Iran which is a religious country. Nonetheless, and in contrast to the studies that have found a link between religion and fatalistic beliefs (e.g. Ruiu (2013)), fatalism was not found to be a dominant mindset in the sample. This finding could be attributed to the fact that the sample was established among university students. High education and knowledge may be correlated and hence, the respondents may express lower levels of fatalistic beliefs (Elias and Shiftan 2012). Analysis of the fatalistic beliefs, however, confirmed the dimensionality of the scale validated by McIlroy et al. (2020).

Dissimilar to trust in public transportation agencies that appeared to be directly associated with perception of the risk of COVID-19 infection in public transport, the study showed that fatalistic beliefs are not linked to risk perception. An insignificant relationship between fatalistic beliefs and risk perception has been supported by previous studies (see e.g. Turner (2021)). However, dissimilar to trust in public transport agencies, the current study found that higher fatalistic beliefs were directly associated with less demand for risk mitigation. This finding must be interpreted in the context that the sample was obtained among university students where they scored relatively high on internality and lower in luck and general fatalism. Nonetheless, the lower levels of general fatalism and luck and higher levels of internality were shown to still be associated with lower levels of demand for risk mitigation in public transport. Interestingly, the findings are in line with a recent study suggesting that internality and luck are respectively positively and negatively associated with people's adherence to COVID-19 sanitary protocols (Nordfjaern, Mehdizadeh, and Fallah Zavareh 2021).

Limitations of the study

The present study was conducted among a sample of university students, testing the hypothetical framework of the study. Nevertheless, the results should be cautiously interpreted because of the likely differences between the sample and the general population in attributes such as age, education, marital status, employment status, level of income, etc. Such differences may account for further differences in fatalism, risk perception and trust between the sample and the general population.

Since the time when the COVID-19 outbreak was officially declared in Iran, almost all the universities shut down and online classes replaced conventional teaching. For this reason, an online survey was decided to be used in the current study. Sampling bias and external validity of data are potential concerns associated with online web-based surveys (Braithwaite et al. 2003). In the present study it was not

possible to calculate a response rate and the representativeness of the sample is unknown. Despite these limitations online sampling is still a widely used method in transportation research.

Data were collected during the first wave of the pandemic in Iran. Future studies are needed to monitor gradual changes in the importance of COVID-19 concerns in public transport, priorities for taking preventive measures, and people's demand for infection risk reduction in public transport, during the next waves or in the aftermath. For instance, the strengths of different associations between the variables in this study may alter during the course of COVID-19 normalisation process and in the aftermath, particularly due to COVID-19 measures such as mass vaccination. That is also true as a result of likely lowered levels of risk perception due to people's gradual learning of how to avoid the disease by adhering to personal preventive measures.

The underlying assumption in this study was that the sample size was adequate for the statistical procedures undertaken. In generalisation of the findings, it is, however, noted that different user segments within the sample (according to socio-economic variables, cultural factors and transport use) may manifest different perceptions, beliefs and priorities. Particularly, the sample included relatively more female respondents than male respondents. This may be an issue when generalising the findings, since females tend to judge involuntary risks as being more likely and having a greater impact than males (Brown, Largey, and McMullan 2021). Compared to males, females also tend to express less optimism (Fallah Zavareh, Mohamadi Hezaveh, and Nordfjærn 2018) as well as different levels of fatalism. Examining the robustness of the results in different user segments is out of the scope of the present study and could be subject of further research.

Finally, it is noted that generalisation of the findings to other socio-cultural contexts should be undertaken cautiously, as the results may be influenced by the specific contextual situations and cultural environments in which the data were obtained. While the present study showed a relatively low level of trust in public transport agencies, respondents from other countries may demonstrate lower or higher levels of trust in public transport. The citizens' level of trust in the public sector is deeply rooted in a broader system of trust culture which is composed of social rules, norms and values (Sobiech 2016). Similarly, communities' cultural differences in fatalistic beliefs might result in different levels of risk perception (Şimşekoğlu et al. 2013; Nordfjærn et al. 2014).

Conclusions

The recovery of the decline in public transportation use due to COVID-19 requires the authorities to address people's demand for mitigation of the risk of disease transmission in public transport. The present study underlined the role of trust in authorities' risk handling and fatalistic beliefs on people's demand for risk reduction.

Trust in authorities (particularly during crises such as the COVID-19 pandemic) is a prerequisite to build social integration and to ensure that preventive and health advices from the authorities will be considered by the people. Nevertheless, trust may also have a deteriorating effect on the way people perceive the risk. Such undermining effects stem from the fact that due to the unknown nature and complexities of COVID-19 as a novel source of risk, along with the absence of reliable information especially at the onset of the pandemic, people's reliance on experts and institutions may cause them to underestimate the risk of infection at public transport, which in turn may result in a lowered priority of COVID-19 prevention in public transport when selecting a mode of transport, and consequently lead to less demand for risk mitigation.

The current study demonstrated that people's confidence that the authorities are able to take effective preventive measures to reduce the risk of Coronavirus in public transport was relatively weak. The study also found that higher trust in public transport authorities was associated with lower risk perception. This finding, however, does not prescribe a lowered trust in authorities with the aim to increase risk perception for increased demand for risk mitigation in public transport. Rather, both risk perception and trust in authorities are key elements (and should be elevated) to increase people's compliance with health policies and protective protocols, and hence could be considered in effective risk communication strategies. Promotion of risk reduction behaviours through risk communication programmes, targeted to change people's perceptions of risk, requires that people trust the authorities' competencies in the first place.

In more pragmatic terms, it is necessary that the authorities design and implement effective risk communication programmes related to their efforts in implementing protective measures in public transport (such as social distancing). . Cultivating trust in the authorities is a necessity in every effective risk communication program. At the onset of the COVID-19 pandemic, a lack of evidence-based, objective information about the disease infection and how to prevent it in public transport was a barrier to trust building. This barrier could be overcome by other trust building substituents including enhancing transparency of the authorities during decision making and practice, and formation of the belief that the authorities have good intentions and aim to elevate public health. However, more recent risk communication programmes can benefit from the progressive accumulation of scientific evidence regarding the pathogenicity and virulence of the disease to make a scientific estimation of the risk of infection in public transport as a trust building endeavour. Such evidence-based information prevents other sources such as rumours, speculation, or misinformation to shape the considerations of the public. However, caution is required that the trust-building initiatives do not give the audiences the false impression that the infectivity and virulence of COVID-19 have been reduced as a result of conducting preventive measures in public transport by the authorities, but it is also the individuals' social responsibility to adhere to various health protocols and requirements when using public transport. Particularly, the authorities may exploit public trust resources for more effective risk communication, as people with higher levels of social trust may rely more on the information they are provided by the responsible organizations and this may elicit more fear of COVID-19 infection in public transport.

While strong beliefs in luck and general fatalism showed to undermine or decline the public demand for COVID-19 risk mitigation (as a driver of effective organizational performance in risk management policies and procedures in public transport), internality beliefs were shown to reinforce people's demand for mitigating the risk of COVID-19 in public transport. This is also a concern in developing effective risk communication programmes, because in the lack of reliable information communicated and with a weak trust in the authorities people may tend to rely on other sources of information such as fatalistic beliefs. Therefore, from a practical standpoint, fatalistic beliefs are crucial in effective risk communication practices designed to enhance public support for COVID-19 risk mitigation in public transport. In these efforts people could be sensitised to understand that it is not about fate, chance or luck that could enable the practitioners to systematically control the spread of COVID-19 in public transport, but rather about implementation of policies and programmes with proven effectiveness, and that public support of risk mitigation policies reinforces the implementation of such effective risk reduction measures.

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APPENDIX I (Questionnaire)

1- General Information

1-1- Gender (Male☐, Female☐)

1-2- Year of birth: …..

1-3- Education level ((Bachelor student☐, Master student☐, Doctorate student☐, Other☐)

1-4- How many days a week do you travel to university in an ordinary week, according to your class schedule? (None☐, One☐, Two☐, Three☐, four☐, five☐, six☐)

2- The way I usually travel

2-1- Which one was the most frequent mode of travel the last time you ordinarily commuted to the campus, before the Coronavirus outbreak? (In the case you used multiple modes, select the one you spent more time in).

Bus☐ Subway☐ Taxi/Van ☐
Your own/your family Private Car☐ Your own/ your family Motorcycle☐ Bicycle☐
Walking☐ Carpooling with friends☐ Carpooling with family☐
Others☐

3- My risk assessment

3-1- How probable do you think is that you personally would be infected with Coronavirus when using the following means of transport?

Travel mode	Probability Level				
	very low probability	low probability	neither/nor	High probability	very high probability
Walking	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐
Private Car	☐	☐	☐	☐	☐
Motorcycle	☐	☐	☐	☐	☐
Bus	☐	☐	☐	☐	☐
Subway	☐	☐	☐	☐	☐
Shared Van/Taxi	☐	☐	☐	☐	☐

3-2- How worried do you become when thinking about the risk of getting infected by the Coronavirus when you travel to campus by any of the following modes of transport? (Please provide an answer for all modes)

Travel mode	Worry Level				
	1 (A little worried)	2	3 (neither/nor)	4	5 (Very worried)
Walking	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐
Private Car	☐	☐	☐	☐	☐
Motorcycle	☐	☐	☐	☐	☐
Bus	☐	☐	☐	☐	☐
Subway	☐	☐	☐	☐	☐
Van/Taxi	☐	☐	☐	☐	☐

4- What is important when using transport?

4-1- Suppose that the university reopens next week. How important are the following aspects when you choose a transport mode on university travels? (In the case you use multiple modes, consider the mode on which you spend more time).

Aspects	**Not important at all**	**Little important**	**neither/nor**	**Important**	**Very important**
1. Little delay	☐	☐	☐	☐	☐
2. Travel costs	☐	☐	☐	☐	☐
3. Travel comfort	☐	☐	☐	☐	☐
4. Good availability to the transportation mode (short distance)	☐	☐	☐	☐	☐
5. Fast transport	☐	☐	☐	☐	☐
6. Safety towards accidents	☐	☐	☐	☐	☐
7. Security against thefts	☐	☐	☐	☐	☐
8. Environmentally friendly transport	☐	☐	☐	☐	☐
9. Available seats	☐	☐	☐	☐	☐
10. Physical activity/exercise	☐	☐	☐	☐	☐
11. Possibility of social distancing	☐	☐	☐	☐	☐
12. Regular disinfection of transport facilities (e.g. seats onboard, waiting point etc.)	☐	☐	☐	☐	☐

5- About authorities

5-1- How important do you think it is that the authorities take measures to reduce the risk of Coronavirus infection when you use:

Travel mode	Importance Level				
	1 (Not important all)	2	3 (Neither/Nor)	4	5 (Very important)
Public transport (Bus, Subway, Van, Taxi)	☐	☐	☐	☐	☐
Private means of transport (Private car, Motorcycle, Moped)	☐	☐	☐	☐	☐

5-2- How much confidence do you have in the following authorities' abilities to take effective preventive measures to reduce the risk of Coronavirus infection?

Travel mode	Confidence Level				
	1 (Not confident at all)	2	3 (Neither/Nor)	4	5 (Very confident)
Bus operation companies	☐	☐	☐	☐	☐
Metro operation company	☐	☐	☐	☐	☐
Taxi operation companies	☐	☐	☐	☐	☐
Road authorities	☐	☐	☐	☐	☐
Politicians/policymakers	☐	☐	☐	☐	☐

6- Fatalistic beliefs

6-1- To what extent do you agree or disagree with these statements in general?

Statements	Strongly Disagree	Disagree	Neither/Nor	Agree	Strongly Agree
1. If bad things happen, it is because they were meant to happen	☐	☐	☐	☐	☐
2. Life is very unpredictable, and there is nothing one can do to change the future	☐	☐	☐	☐	☐
3. If something bad is going to happen to me, it will happen to me no matter what I do	☐	☐	☐	☐	☐
4. There is no sense in planning a lot; if something good is going to happen, it will	☐	☐	☐	☐	☐
5. People die when it is their time to die and there is not much that can be done about it	☐	☐	☐	☐	☐
6. I have learned that what is going to happen will happen	☐	☐	☐	☐	☐
7. What happens to me in the future mostly depends on me	☐	☐	☐	☐	☐
8. My life is determined by my own actions	☐	☐	☐	☐	☐
9. I feel that when good things happen, they happen as a result of my own efforts	☐	☐	☐	☐	☐
10. When good things happen to people, it is because of good luck	☐	☐	☐	☐	☐
11. When I get what I want, it's usually because I am lucky	☐	☐	☐	☐	☐
12. The really good things that happen to me are mostly because of luck	☐	☐	☐	☐	☐
13. Some people are simply born lucky	☐	☐	☐	☐	☐
14. How successful people are in their jobs is related to how lucky they are	☐	☐	☐	☐	☐