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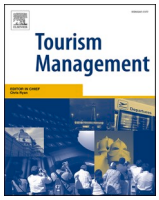
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A comparative study of eight COVID-19 protective measures and their impact on Swiss tourists' travel intentions

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ABSTRACT

A comparative vignette-based experimental survey design incorporating various socio-psychological factors, linked to the Theory of Planned Behavior (TPB), the Health Belief Model (HBM) and the Domain-Specific Risk-Taking scale (DOSPERT) was carried out to test variations in eight travel-related COVID-19 protective measures on Swiss tourists' travel intentions. Among the tested measures, vaccination passports, surgical masks and quarantining are those that stand out the most, with surgical masks having the greatest acceptance and willingness to adopt while traveling. Quarantining, on the other hand, appears to have a deterrent influence on travel intentions, and vaccination passports have the lowest perceived barriers during travel, but the highest perceived benefits in mitigating the spread of the infection. The discussion of individual differences has specific implications for tourism management against the background of our empirical findings.

Abstract.

1. Introduction

Given that many countries have lifted restrictions in connection with COVID-19 (e.g., Stokel-Walker, 2022), it is important to be prepared for future variants (Servick, 2022) and to have a strategy to support safe forms of tourism by understanding how tourists perceive and respond to the risk of COVID-19 (Han et al., 2022; Zheng et al., 2021). This also includes tourists' responses to non-pharmaceutical interventions (NPIs) (Kim et al., 2022; Lee et al., 2012). It is important to examine the acceptance and influence of specific protective measures both in general and on travel decisions specifically, since safety is a major concern and requirement of tourists when traveling (e.g., Chua et al., 2021; Sotomayor-Castillo et al., 2021; Zou & Meng, 2020).

In tourism research, a vast amount of literature has been produced regarding the impact of COVID-19 on tourists' behavior and decision-making. Most of these studies focus on how tourists' travel intentions, travel avoidance, or changes in travel behavior are related to their perceptions of risk and fears (e.g., Agyeiwaah et al., 2021; Abraham et al., 2020; Bae & Chang, 2021; Bratić et al., 2021; Golets et al., 2021; Morar et al., 2021; Wu & Lau, 2022; O'Connor & Assaker, 2022; Meng et al., 2021; Kim et al., 2021; Chua et al., 2021; da Silva Lopes et al., 2021; Neuburger & Egger, 2021). Many of these studies have extended the Theory of Planned Behavior (TPB) (e.g., Liu et al., 2021; Seong & Hong, 2021; Sujood & Bano, 2022; Wang et al., 2022), and most of them rely on various socio-psychological explanatory factors to extend this theory to explain tourists' travel intentions during and after COVID-19 (e.g., Li, Hai, & Coca-Stefaniak, 2021; Rahmafitria et al., 2021). These studies do this with many different conceptualizations and operationalizations of risk perceptions, which makes reproducibility more difficult. For example, Sánchez-Cañizares et al. (2021) conceptualized and operationalized perceived risk as travel avoidance under the current epidemiological situation. In another study, Bae and Chang (2021) extended the TPB to cognitive and affective risk perceptions, with cognitive risk perceptions being very similar to the perceived susceptibility of the Health Belief Model (HBM). Furthermore, other studies have extended the TPB with the HBM without incorporating all the variables of the latter (e.g., Huang et al., 2020).

In the fields of public health and social psychology, many studies reflect on attitudes towards and the adoption of specific NPIs (e.g., Kantor & Kantor, 2020; Lang et al., 2021; Shen et al., 2021; Xu et al., 2020), as well as on pharmaceutical interventions (PIs) like vaccines (e.g., Cascini et al., 2021; Seddig et al., 2022; Soveri et al., 2021). Among the few who have investigated NPIs in a tourism context, Lee et al. (2012), for example, showed that they had a positive effect on tourists' intentions to travel internationally during the 2009 H1N1 influenza pandemic. That is, potential tourists with a greater willingness to

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comply with NPIs (i.e., washing hands and covering the nose and mouth when sneezing) and a greater intention to inform themselves and take precautions while traveling showed a higher level of intentions to travel internationally (see also Das & Tiwari, 2021; Kement et al., 2022; Liu et al., 2021). Despite these well-founded studies, in combination with tourism, NPIs remain an understudied field (Castañeda-García et al., 2022; Chung et al., 2021; Kim et al., 2022). To the best of our knowledge, there is no work comparing and contrasting the various protective measures, including both NPIs and PIs.

The first research gap in the recent tourism research stream is that there is no unified theoretical framework that is being tested empirically. The second gap is that there is no integrative study investigating the effects of specific NPIs like quarantining or surgical masks, or of vaccination passports on tourists' acceptance of travel and travel intentions in one and the same study, although tourism researchers have pointed to the importance of NPIs for tourism generally and the recovery of tourism demand (see, for example, Castañeda-García et al., 2022; Chung et al., 2021; Kim et al., 2022).

The first research gap is addressed by our study in that it establishes a theoretical model that has already been validated for the Swiss population using random sampling (see Hüsser et al., 2023; Ohnmacht et al., 2022; Thao et al., 2022), and incorporating all the socio-psychological factors that are linked to the TPB (Ajzen, 1985, 1991), the HBM (Champion & Skinner, 2008; Rosenstock, 1974) and the Domain-Specific Risk-Taking scale (DOSPERT) (Blais & Weber, 2006; Weber et al., 2002). Including all variables in one model enables us to identify the contribution and isolated effect of each variable under the control of all the other variables based on theoretically well-established constructs.

To address the second gap in research, the aim of the present study is to explore the differences between eight protective measures regarding significant determinants of changes in health behavior in a tourism context, and well as individual differences within each protective measure that leads to travel intentions or the avoidance of travel under implementation of the specific travel-related protective measures, by using a vignette-based experimental survey design.

In the remainder of this paper, we provide a brief description of the theories used in this empirical research and include major findings from related literature on tourism behavior under the influence of a worldwide pandemic. This is followed by descriptions of the data and modelling approach, the results and a discussion section, the last of these sections setting out some implications for management.

2. Theoretical framework

Our theoretical framework is basically an approach to extending the TPB (eTPB; Bae & Chang, 2021; Liu et al., 2021). The theoretical justification is in agreement with Ajzen (2020, p. 317), who states that the TPB is "open to the inclusion of additional predictors". Moreover, these "additions should be conceptually independent of the theory's existing predictors, rather than be redundant with them" (Ajzen, 2020, p. 318). Former studies of eTPB did not include all dimensions of the HBM, nor use the DOSPERT scale to measure general individual risk dispositions in the domain of leisure and recreation (e.g., Bae & Chang, 2021; Farnham et al., 2018; Huang et al., 2020). A second drawback of the existing literature so far is that protective measures are investigated from a very generic perspective (e.g., Chung et al., 2021; Das & Tiwari, 2021; Lee et al., 2012). To address these shortcomings, we establish a holistic explanation framework that forms a feasible backbone layer for the formulation of managerial implications regarding specific protective measures. In fact, we use a theory-based, combined model that incorporates various socio-psychological factors based on the TPB (Ajzen, 1991), the HBM (Rosenstock, 1974) and the Domain-Specific Risk--Taking subscale in recreation and leisure time (DOSPERT) (Weber et al., 2002, see also Ohnmacht et al., 2022; Thao et al., 2022; Hüsser et al., 2023), which all serve to explain variables for touristic travel intentions. First, we present the theories and the scale briefly in the following sections and link them to the relevant literature in the research stream of tourism and risk perception. Second, we discuss in greater detail how these three theories are connected and provide a new theoretical contribution.

2.1. The Theory of Planned Behavior (TPB)

The TPB (Ajzen, 1985, 1991) is an extension of the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), which predicts human behavior under various situations. The theory postulates that behavioral beliefs about the positive and negative consequences of a behavior lead to unfavorable or favorable attitudes (construct **1** of our conceptual model) toward the behavior. Normative beliefs about the expectations of others close to the person lead to subjective norms **(2)** (i.e., social pressure) to engage in or refrain from the behavior. Beliefs about the perceived ability to control the behavior lead to the next construct perceived behavioral control **(3)**. Attitudes toward the behavior, subjective norm and perceived behavior control all predict behavioral intentions, which in turn are the main motivational predictor of behavior (Ajzen, 1991, 2002). Perceived behavioral control is defined as "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183) and is similar to self-efficacy (Bandura, 1977) in that both constructs emphasize the importance of perceived abilities to perform the behavior (Ajzen, 2002).

2.2. The Health Belief Model (HBM)

The HBM was initially proposed by Rosenstock (1974; see also Champion & Skinner, 2008) to predict the preventive health behavior of individuals. According to the model, the two main predictors that will motivate individuals to take health-related actions are the degree of perceived susceptibility **(4)** to contracting a disease and the perceived severity **(5)** (also referred to as the perceived seriousness) of the condition itself (Rosenstock, 1960). Perceived severity refers to one's beliefs about the seriousness of a condition or illness and includes not only medical severity (e.g., disability, death) but also all consequences for the family, social relations and work (Champion & Skinner, 2008; Rosenstock, 1960). Other predictors in the model are the perceived benefits **(6)** and impediments of taking available health-related actions that are perceived to be beneficial and effective in reducing the likelihood of contracting a disease and the perceived severity of contracting a negative condition or illness (Champion & Skinner, 2008; Rosenstock, 1966). Perceived barriers **(7)** refer to the negative aspects, such as the cost and inconvenience of taking the preventive action or measure: "An individual may believe that a given action will be effective in reducing the threat of disease, but at the same time see that action itself as being inconvenient, expensive, unpleasant, painful or upsetting" (Rosenstock, 1966, p. 7). Perceived barriers traditionally include different aspects of quality, such as financial costs, side effects and accessibility (Rosenstock et al., 1988). Another important predictor that has been proposed for inclusion in the model is self-efficacy **(8)** (Rosenstock et al., 1988), defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1998, p. 624; see also Bandura, 1997; Bandura, 1977). Self-efficacy has been shown to be an important determinant in initiating and maintaining sustainable change in health behavior (e.g., Champion & Skinner, 2008; Strecher et al., 1986).

In the tourism and recreation domain, the HBM has been successfully implemented to predict tourists' (preventive) health behavior (Bae & Chang, 2021; see also Huang et al., 2020; Donohoe et al., 2018). Cahyanto et al. (2016), for example, used the HBM to predict travel avoidance in the U.S. due to the Ebola outbreak. They found a positive relationship between perceived susceptibility and avoiding international travel, but no effect of perceived severity. Moreover, they found that tourists with higher self-efficacy in preventing Ebola were less likely

to avoid international travel. Another study by Chua et al. (2021) on travel avoidance due to the COVID-19 pandemic found that the perceived health risks – a second-order latent construct consisting of perceived susceptibility and severity to COVID-19 health risks, as well as psychological risks related to COVID-19 – had an influence on mental well-being, which in turn predicted short-term international travel avoidance.

2.3. Domain-Specific Risk-Taking scale (DOSPERT)

The Domain-Specific Risk-Taking scale **(9)** (DOSPERT; Weber et al., 2002; Blais & Weber, 2006) is a scale that measures risk-taking attitudes and risk perceptions in five domains, namely financial risks, health and safety risks, recreational risks, ethical risks and social risks. The scale has been validated among adult populations and translated into different languages (e.g., see Johnson et al., 2004; Weber et al., 2002; Hu & Xie, 2012; Farnham et al., 2018), showing a satisfactory to good reliability among all subscales overall (Shou & Olney, 2020). In the context of tourism, it has been shown that the health and safety subscale of the DOSPERT scale was significantly associated with risky health behavior during travel (Farnham et al., 2018).

2.4. Theoretical contribution and elaborations of the theories

The nine explanatory constructs stemming from TPB, HBM and DOSPERT are included in our theoretical framework within one model to compare eight COVID-19 protective measures regarding their effect on travel intentions (see Fig. 1).

From a theoretical and managerial standpoint, linking the two theories and the DOSPERT scale enables tourism-related risk perceptions to be analyzed from a multi-angle perspective (see Hüsser et al., 2023; Ohnmacht et al., 2022; Thao et al., 2022).

The TPB and the HBM have in common that they emphasize the importance of expectations and beliefs in forming behavioral intentions and explaining behavior (Ajzen & Albarracín, 2007; Rosenstock et al., 1988). The theories provide a basis for combination to improve the understanding of behavioral intentions in a specific domain. From a theoretical standpoint the combination of the theories can be justified as follows:

As with many theories dealing with intentions and behavioral change, the TPB, the HBM and likewise in the field of social psychology the well-known Social Cognitive Theory (SCT; Bandura, 1997), which finds its way into the HBM with the construct of self-efficacy, emphasize the importance of expectations and beliefs in forming intentions and explaining behavior (see Ajzen & Albarracín, 2007; Rosenstock et al., 1988).

The TPB emphasizes the importance of behavioral beliefs, beliefs about significant others and control beliefs (Ajzen, 1991).

Similarly, the HBM points to the importance of the belief of being susceptible to a particular disease and the importance of the belief that a measure or action will reduce the risk at an acceptable cost, in predicting (preventive) health behavior (Rosenstock et al., 1988).

Bandura's Social Cognitive Theory (SCT), as captured by the construct of self-efficacy in the HBM, emphasizes the importance of the belief that one has the competence or ability to perform the behavior (the concept of self-efficacy or "efficacy expectations"), and the belief that performing the behavior will lead to the desired result ("outcome expectations") in predicting behavioral change (Bandura, 1977, p. 193; see also Ajzen & Albarracín, 2007; Rosenstock et al., 1988, p. 178).

From our theoretical standpoint, all three theories (TPP, HBM, SCT) are embedded in the expectancy-value model framework and can thus be combined to an eTPB (Ajzen, 2020; Ajzen & Albarracín, 2007; Rosenstock et al., 1988, p. 317). In this view, behavior "is a function of the subjective value of an outcome and of the subjective probability (or 'expectation') that a particular action will achieve that outcome" (Rosenstock et al., 1988, p. 176).

In addition, prior research has demonstrated a relationship between general risk-taking attitudes and risky health behavior in different domains (e.g., Dohmen et al., 2011; Farnham et al., 2018; Teye-Kwadjo, 2019). This is why we are linking the DOSPERT scale (Blais & Weber, 2006) with TPB and HBM and including it in our theoretical framework.

Our theoretical contribution is using nine socio-psychological factors in an integrated way to root pointers for interventions and their managerial implications within existing theories. Given that research has pointed out the important role of COVID-19-related risk perceptions in tourists' decision-making (e.g., Abraham et al., 2021), the extension of the TPB with the HBM and DOSPERT scale provides further insights into tourists' responses to perceived travel risks (e.g., Bae & Chang, 2021; Huang et al., 2020).

Within this research context, our established theory-based, combined model will be used for the empirical investigation of various NPIs and PIs in the domain of tourism. The eight different protective measures and their impact on infection incidence are discussed in more detail below.

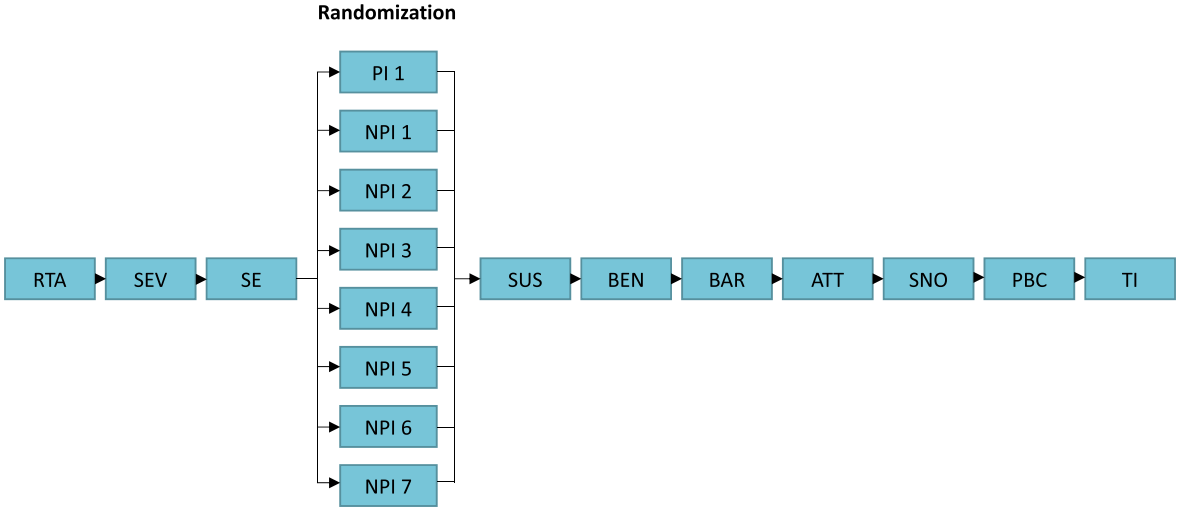


Fig. 1. Procedure of the vignette-based experimental survey design. RTA = Risk-taking attitudes in recreation and leisure time (DOSPERT), SEV = Severity COVID-19, SE = Self-efficacy, SUS = Susceptibility NPIs/PIs, BEN = Benefits NPIs/PIs, BAR = Barriers NPIs/PIs, ATT = Attitudes NPIs/PIs, PBC = Perceived behavioral control NPIs/PIs, TI = Travel Intentions NPIs/PIs.

3. Non-pharmaceutical interventions (NPIs) and pharmaceutical interventions (PIs)

We analyze eight different protective measures in the domain of tourism. Ensuring the well-being, safety and health of tourists is important in tourism management (Wang et al., 2019a; Castañeda-García et al., 2022). More recent literature has pointed to the importance of NPIs for the recovery of tourism, destinations and airlines since COVID-19 (e.g., Castañeda-García et al., 2022; Chung et al., 2021; Hall et al., 2020; Kim et al., 2022; Lee et al., 2012; Lee et al., 2022). NPIs are not only important in reducing the spread of pandemics through tourism and other forms of human mobility, but also because NPIs can overcome the psychological hurdles to traveling during a pandemic (Chung et al., 2021). It can be assumed that travel intentions are affected by compliance with various NPIs and PIs (Das & Tiwari, 2021; Kement et al., 2022; Lee et al., 2012; Liu et al., 2021), such as social distancing, quarantining, testing, or the correct wearing of face masks (World Health Organization (WHO), 2021a), as well as vaccination (Ram et al., 2022). For the purposes of this research, we examine eight leading protective measures that can be considered risk-reduction practices before, during and after traveling (World Health Organization (WHO), 2020a). Each of the travel-related measures is briefly discussed in the upcoming sections. Here too, we provide insights into recent literature that will be used for discussions with regard to our research findings.

3.1. Surgical masks (1) and FFP2 masks (2)

At the beginning of the pandemic, there was little evidence and only weak data to support the benefits of face masks for the general public (Brooks & Butler, 2021). In the meantime, however, a vast amount of evidence has emerged for the efficacy of face masks (for a systematic review, see Chu et al., 2020; Li, Liang, et al., 2021; Brooks & Butler, 2021). For example, one laboratory study showed that wearing a surgical mask significantly reduced exposure to coronavirus RNA in aerosols and was associated with a tendency towards the reduced detection of coronavirus RNA in respiratory droplets in exhaled breath and coughs (Leung et al., 2020). Another study by Mitze et al. (2020), using the synthetic control method, found that face masks reduced COVID-19 infections by between 15% and 75% in Germany within a period of 20 days after becoming mandatory in public transportation and shops. Similarly, Karaivanov et al. (2021) showed that wearing face masks is associated with a 25%–40% reduction in new cases of coronavirus. Furthermore, a natural experiment by Lyu and Wehby (2020) showed a 2% decrease in 21 days after fifteen states in the US introduced mandatory face masks in public facilities. A more recent study by Bagheri et al. (2021) found that the upper boundary of one-to-one infection falls significantly if face masks are worn. That is, the upper boundary of the infection rate is 90% after 30 min only if the susceptible person wears a face mask when speaking with an infectious person at a distance of 1.5 m. When the susceptible person wears an FFP2 mask, the upper boundary of infection drops to 20% after 1 h when speaking with an infectious person at a distance of 1.5 m. With both wearing a face mask, the upper boundary is below 30% after 1 h. With both wearing an FFP2 mask, the upper boundary of the infection risk drops to 0.4%. Similarly, Cheng et al. (2021) concluded that face masks (i.e., surgical masks and FFP2 or N95) are effective in reducing the probability of transmission, with further reductions in the probability of encountering virus particles when the wider community is wearing face masks, even surgical masks.

3.2. Government travel warnings (3)

Government travel warnings are a risk-communication intervention that falls into the category of travel restrictions (Chan et al., 2021, p. 8; Haug et al., 2020, p. 1305; Centers for Disease Control and Prevention (CDC), 2022). For example, the Centers for Disease Control and Prevention (CDC) published a continuously updated travel notice for international destinations, which were labelled in accordance with their risk levels. Haug et al. (2020) found that risk-communication strategies play a prominent role among NPIs. On a more granular level, Haug et al. (2020) found travel warnings, as well as other measures for active communication with the public (e.g., staying home, social distancing), to be among the most effective risk-communication strategies.

3.3. Rapid testing of inbound travelers at point of entry (4)

Testing all travelers upon arrival has been shown to be an effective screening strategy at borders (Burns et al., 2021; Dickens et al., 2020; Russell & Buckeridge, 2021). For example, a modelling study by Dickens et al. (2020) found that testing all travelers at the point of entry and preventing those who are positive from entering resulted in an average reduction of case importations of 77.2% compared to a no-screening strategy. A real-life study by Colavita et al. (2021) found that rapid antigen tests (RAT) are effective for early containment of the spread at points of entry where molecular testing (PCR) is not feasible or available.

3.4. Quarantine of inbound (5) and returning travelers (6)

Another travel-related measure is the mandatory quarantining of travelers arriving in or returning from high-risk countries (Al-Tawfiq et al., 2020; Ashcroft et al., 2021; Burns et al., 2021). The World Health Organization recommends a fourteen-day period of quarantine, where the length of the quarantine can be reconsidered in times of high incidence of the disease (World Health Organization (WHO), 2021b; 2022). A systematic review by Burns et al. (2021) concluded that longer periods of quarantine for travelers with simultaneously high compliance is likely to have a large impact on further transmissions. For example, a modelling study by Dickens et al. (2020) found that quarantining all inbound travelers for fourteen days reduced the importation of cases across countries by 91.5% compared to a no-screening strategy. A real-life observational study with genomic assessment by Aggarwal et al. (2022) investigated the effectiveness of a mandatory fourteen-day quarantine for travelers returning to the United Kingdom in the summer of 2020. They concluded that fourteen-day quarantines reduce the transmission of imported cases. However, this was mostly due to the deterrent effect of traveling to countries requiring the traveler to quarantine upon return. A longitudinal study conducted by Al-Tawfiq et al. (2020) showed that mandatory quarantine for returning travelers reduced rates of positive cases. While the period of quarantine for travelers during the pandemic varied between countries (Tu et al., 2021), many have implemented a fourteen-day period of quarantine upon arrival, including, for example, China, the United Kingdom and Portugal (Smirnov et al., 2022).

3.5. PCR test taken 72 h before travel (7)

Another strategy to mitigate the spread of the coronavirus is testing travelers prior to travel (World Health Organization (WHO), 2020b). For example, a modelling study by Johansson et al. (2021, p. 6) showed that testing three days before traveling reduced the transmission risk by 10–29%, with the highest reduction in transmission risk coming from testing on the day of travel (see also Blanford et al., 2022). The European Council, for example, suggested several travel measures be implemented, including entry requirements such as a RT-PCR and rapid antigen test taken a maximum of 72 h before departure (Blanford et al., 2022). Many countries, such as the US, UK and Germany, as well as Sweden, required a negative test upon entry (Grunér et al., 2022; Smirnov et al., 2022).

3.6. Vaccination passport (8)

Another measure discussed in the literature and used in practice to ease restrictions is the requirement for the traveler to be fully vaccinated and to have a "vaccine passport" for travel and other purposes (e.g., Pavli & Maltezou, 2021; Sharun et al., 2021). The BNT162b2 (Pfizer Biontech) mRNA vaccine, for example, is efficient against the disease and severe illness, even against new variants, especially when three doses have been administered (e.g., Andrews et al., 2022; Barda et al., 2021; Leshem & Lopman, 2021; Thomas et al., 2021). At the same time, it is not entirely clear how vaccines impact transmissibility (Sharun et al., 2021; Lancet Microbe, 2021). Although research results suggest that vaccination offers protection against infection and thus reduces transmissibility in populations (Amit et al., 2021; Hall et al., 2021; Leshem & Lopman, 2021), newer studies point to the possibility of re-infections even among vaccinated individuals (e.g., Rahman et al., 2022). Many countries have implemented the use of "vaccination passports" in order to exempt fully vaccinated individuals from travel restrictions such as quarantine and testing requirements (Sharun et al., 2021).

4. Materials and methods

A comparative vignette-based experimental survey design has been carried out to assess variations between the eight protective measures presented above. This is a method for the detection of variations regarding the relevance of the influencing dimensions of our conceptual framework according to the specific protective measures. Each participant in our study was assigned to one out of eight protective measures. Thus, group comparisons are possible (between-subject design). Differences are examined regarding those of the model's influencing variables that are latent constructs (socio-psychological factors), as well as the model's outcome variable, which measures tourists' travel intentions during the pandemic with implementation of the specific NPIs/PIs.

A vignette was designed for each protective measure. Each vignette introduced a measure consisting of information about the measure and its field of application when traveling. All vignettes showed a picture of the corona protective measure, and the number of words describing the measure and its application when traveling was held constant across all vignettes (approximately eighty words per vignette). All the protective measures were in effect or the subject of public discourse among policy-makers and the media at the time of the survey (March 29, 2021 to April 9, 2021). Participants first answered the questions about their risk-taking attitudes **(1)** in recreation and leisure (DOSPERT), their perceived severity **(2)** of COVID-19 infection and their self-efficacy **(3)** regarding their protective behavior during the pandemic. After completing the questions on the three constructs, participants were randomly assigned to only one of the eight vignettes covering the protective measure. This enabled causal interpretations to be made for the eight different protective measures (McCollough et al., 2000; Sugathan & Ranjan, 2019; Zhang et al., 2021). The participants were then asked to answer all the following questions regarding the protective measure that had been presented to them in the vignettes. These were perceived susceptibility **(4)** under implementation of the specific measure when traveling; perceived benefits **(5)** of the specific measure when traveling; perceived barriers **(6)** of the specific measure when traveling; attitudes **(7)** towards the specific measure when traveling; subjective norm **(8)** of the specific measure when traveling; perceived behavioral control **(9)** of the specific measure when traveling; and travel intention under implementation of the specific measure (dependent variable). The procedure is depicted in Fig. 1.

4.1. Sampling and data collection

Data were collected between March 29 and April 9, 2021 by a leading Swiss market research company (www.link.ch) based on a representative sample of the Swiss population. The basis of the sample consisted of an internal panel with over 108,000 active members who use the internet at least once a week for private purposes. A total of 2018 participants were surveyed based on a computer-assisted web interview (CAWI). The sampling was based on the quota language region (German, French, Italian), gender and age group (18–39 years, 40–59 years, 60–79 years), with each proportion being representative of the Swiss population. Table 1 provides the demographic characteristics of the sample.

4.2. Measurement

The measurement scales are based on an extensive literature review and were pre-tested twice (n = 300 each) prior to the main study with a representative quota sample of the Swiss German population to ensure the factorial validity and reliability of the measurement scales. The data collection for the pre-test was carried out by a private market research company (www.respondi.com).

In the following, the measurement scales, descriptive statistics and Cronbach's Alpha will be reported for all ten constructs.

Risk-taking attitude is measured using three items of the DOSPERT recreational subscale on a 5-point Likert scale with 1 = *very unlikely* to 5 = *very likely* (Weber et al., 2002) ($M = 1.96$, $SD = 0.98$, $\alpha = 0.74$).

The items for the HBM and the TPB are taken from the relevant literature (e.g., Cahyanto et al., 2016; Lee et al., 2012; Montanaro & Bryan, 2014; Quine et al., 1998) and adapted to the present study.

Perceived susceptibility under implementation of the specific NPIs/PIs during travel is measured using four items on a 5-point Likert scale ranging from 1 = *fully disagree* to 5 = *fully agree* ($M = 3.05$, $SD = 1.09$, $\alpha = 0.91$). Perceived severity of COVID-19 infection ($M = 2.99$,

Table 1
Demographic profile of the respondents.

German-speaking Switzerland	Total
Men 18–39 years	294 (14.6%)
Men 40–59 years	296 (14.7%)
Men 60–79 years	191 (9.5%)
Women 18–39 years	236 (11.7%)
Women 40–59 years	267 (13.2%)
Women 60–79 years	157 (7.8%)
French-speaking Switzerland	Total
Men 18–39 years	108 (5.4%)
Men 40–59 years	88 (4.4%)
Men 60–79 years	44 (2.2%)
Women 18–39 years	86 (4.3%)
Women 40–59 years	99 (4.9%)
Women 60–79 years	45 (2.2%)
Italian-speaking Switzerland	Total
Men 18–39 years	15 (0.8%)
Men 40–59 years	24 (1.2%)
Men 60–79 years	14 (0.7%)
Women 18–39 years	22 (1.1%)
Women 40–59 years	17 (0.8%)
Women 60–79 years	15 (0.7%)
Education	Total
Compulsory school (low)	66 (3.3%)
Secondary level II (middle)	903 (44.7)%
Tertiary level (high)	1042 (51.6%)
No answer	7 (0.3%)
Household income	Total
Up to 6000 CHF	468 (23.2%)
6001–10,000 CHF	689 (34.1%)
More than 10,000 CHF	539 (26.7%)
No answer	322 (16.0%)

$SD = 0.97$, $\alpha = 0.81$), perceived benefits of the implementation of the specific NPIs/PI during travel ($M = 3.26$, $SD = 0.98$, $\alpha = 0.81$) and perceived barriers of implementing the specific NPIs/PIs during travel ($M = 3.03$, $SD = 1.23$, $\alpha = 0.81$) are measured using four items on 5-point Likert scales ranging from 1 = *fully disagree* to 5 = *fully agree*. Self-efficacy regarding one's behavior during the pandemic ($M = 3.84$, $SD = 0.98$, $\alpha = 0.86$) is also measured using four items on 5-point Likert scales ranging from 1 = *does not apply at all* to 5 = *applies fully*.

Attitudes toward implementation of the specific NPIs/PIs during travel ($M = 3.82$, $SD = 1.16$, $\alpha = 0.97$) are measured using eight semantic differentials forming a bipolar continuum with negative evaluations on the left (e.g., 1 = *bad*) and positive evaluations on the right (e.g., 5 = *good*), as described by Ajzen (1991, p. 193). The subjective norm of implementing the specific NPIs/PIs during travel is measured using six items ($M = 3.66$, $SD = 1.11$, $\alpha = 0.97$), perceived behavioral control of implementing the specific NPIs/PIs during travel with four items ($M = 3.99$, $SD = 0.98$, $\alpha = 0.85$), and travel intentions under implementation of the specific NPIs/PIs during travel with five items ($M = 2.68$, $SD = 1.39$, $\alpha = 0.95$), each measured on 5-point Likert scales from 1 = *does not apply at all* to 5 = *applies fully*.

Prior to computing mean indices for each construct, a factor analysis with *promax* rotation is performed using the "psych" package in R (Ravelle, 2021) to ensure factorial validity. The overall KMO (Kaiser-Meyer-Olkin criterion) to measure sampling adequacy (MSA) is 0.957, which is "marvelous" according to Kaiser (1974, p. 35). Bartlett's test of sphericity reaches significance, $\chi^2(1035) = 7{,}7062.18$, $p < .001$, indicating that the items are suitable for factor analysis. The Tucker Lewis Index (TLI) for factorial validity is 0.962, and the RMSEA index is 0.037 [0.036, 0.039], indicating a good model fit. All factor loadings and items are presented in the Appendix.

4.3. Statistical methods

Our statistical methods can detect differences regarding the perception of the influencing dimensions (e.g., subjective norm, barriers etc.) in connection with the protective measure which participants must evaluate in their vignettes (e.g., quarantine, masks etc.). In a first step we apply robust ANOVAs to analyze differences between the NPIs/PIs based on the survey design, followed by robust post-hoc tests (i.e., linear contrasts) to define the main effects of protective measures. In the second step, stepwise regression is performed to identify leading indicators to discuss individual differences within each measure that should be addressed by a specific intervention design. For all independent variables in the model the VIF is below the critical value of 10 (risk-taking attitudes: 1.067, susceptibility: 1.376, severity: 1.314, benefits: 1.690, barriers: 1.496, self-efficacy: 1.631, attitudes: 3.231, subjective norm: 2.370, perceived behavioral control: 1.802) (e.g., Belsley et al., 1980).

5. Results

5.1. Robust ANOVAs used to analyze differences between the NPIs/PIs based on the survey design

Within our analysis and statistical modelling mean indices are applied for the latent constructs. To compare the differences between the NPIs/PIs, robust one-way ANOVAs based on trimmed means (20% trimmed means) are performed using the "WRS2" package in R (Mair & Wilcox, 2020), with protective measures as an experimental factor and with the antecedents of the overall model as dependent variables. This method produces robust test statistics, does not require the assumptions of normality and homogeneity of variance to be met, and usually has higher statistical power (Field & Wilcox, 2017; Mair & Wilcox, 2020; Wilcox, 2017). Robust post-hoc tests (i.e., linear contrasts) are performed for the main effect of protective measures, with $\hat{\psi}$ (psihat) denoting the differences in trimmed means in pairwise comparisons and the corresponding confidence intervals. The 95% confidence intervals are adjusted for multiple testing (see Wilcox, 1986, for details). Table 2 shows the trimmed means, the trimmed standard errors and the robust test statistics for the relevant variables in the conceptual model of our theoretical framework.

5.1.1. Perceived susceptibility, differentiated by NPIs/PIs

Robust one-way ANOVA on trimmed means showed no main effect of protective measures, whereas the p-level is close to the 0.05 threshold, $F(7, 518.40) = 1.86$, $p = .07$, $\hat{\xi} = 0.11$; indicating that susceptibility during travel is perceived to be the same for all protective measures, including for the vaccination passport.

5.1.2. Perceived benefits, differentiated by NPIs/PIs

For the perceived benefits, robust one-way ANOVA on trimmed means yielded a main effect of protective measures with small to medium effect size, $F(7, 517.74) = 11.16$, $p < .001$, $\hat{\xi} = 0.23$. Robust post-hoc tests show that the perceived benefits during travel are significantly higher for vaccination passports compared to government travel warnings, $\hat{\psi} = 0.33$ [0.01, 0.65], PCR tests taken at maximum of 72 h before travel, $\hat{\psi} = 0.33$ [0.02, 0.64], 10-day quarantine of returning travelers from a high-risk area, $\hat{\psi} = 0.36$ [0.04, 0.68] or 14-day quarantine of inbound travelers, $\hat{\psi} = 0.43$ [0.09, 0.78]. However, there were no significant differences in the perceived benefits between vaccination passports, surgical masks, rapid testing at points of entry and FFP2 masks.

Surgical masks have been found to have higher perceived benefits during travel than government travel warnings, $\hat{\psi} = 0.39$ [0.14, 0.63], rapid testing at points of entry, $\hat{\psi} = 0.35$ [0.07, 0.62], PCR tests taken at maximum of 72 h before traveling, $\hat{\psi} = 0.38$ [0.16, 0.61], 10-day quarantine of returning travelers of high-risk areas, $\hat{\psi} = 0.42$ [0.17, 0.66] or 14-day quarantine of inbound travelers, $\hat{\psi} = 0.49$ [0.22, 0.76].

Perceived benefits for FFP2 masks during travel are perceived to be higher than government travel warnings, $\hat{\psi} = 0.38$ [0.12, 0.65], rapid testing at points of entry, $\hat{\psi} = 0.34$ [0.05, 0.63], PCR tests taken at a maximum of 72 h before travel, $\hat{\psi} = 0.38$ [0.14, 0.63], 10-day quarantine of returning travelers of high-risk areas, $\hat{\psi} = 0.41$ [0.15, 0.68] or 14-day quarantine of inbound travelers, $\hat{\psi} = 0.49$ [0.20, 0.78]. The trimmed means and trimmed standard errors for the protective measures on perceived benefits are depicted in Fig. 2.

5.1.3. Perceived barriers, differentiated by NPIs/PIs

There was a main effect of protective measures with medium-to-large effect size on perceived barriers, $F(7, 518.37) = 44.97$, $p < .001$, $\hat{\xi} = 0.42$. Post-hoc testing showed that perceived barriers during travel are lower for vaccination passports compared to government travel warnings, $\hat{\psi} = -0.60$ [−1.02, −0.17), rapid testing at points of entry, $\hat{\psi} = -0.51$ [−0.95, −0.06], FFP2 masks, $\hat{\psi} = -0.60$ [−1.03, −0.16], 10-day quarantine of returning travelers of high-risk areas, $\hat{\psi} = -1.12$ [−1.56, −0.68] or 14-day quarantine of inbound travelers, $\hat{\psi} = -1.91$ [−1.56, −0.68]. There were no differences between vaccination passport and surgical masks, nor between vaccination passport and PCR tests.

Fourteen-day quarantine of inbound travelers is perceived to have higher barriers during travel compared to the vaccination passport, $\hat{\psi} = 1.91$ [1.48, 2.34], surgical masks, $\hat{\psi} = 1.52$ [1.15, 1.88], government travel warnings, $\hat{\psi} = 1.31$ [0.94, 1.68], rapid testing at points of entry, $\hat{\psi} = 1.40$ [1.01, 1.79], PCR tests taken at a maximum of 72 h before travel, $\hat{\psi} = 1.64$ [1.27, 2.01], FFP2 masks, $\hat{\psi} = 1.32$ [0.93, 1.70] or 10-day quarantine of returning travelers from a high-risk area, $\hat{\psi} = 0.79$ [0.40, 1.18].

Ten-day quarantine of returning travelers from a high-risk area is also perceived to have higher barriers compared to the vaccination passport, $\hat{\psi} = 1.12$ [0.68, 1.56], surgical masks, $\hat{\psi} = 0.73$ [0.35, 1.10], government travel warnings, $\hat{\psi} = 0.52$ [0.14, 0.90], rapid testing at

Table 2
Trimmed means, trimmed standard errors, robust F-statistics and robust effect sizes.

Construct	Trimmed cell means by protective measure								F	$\hat{\xi}$
	VP ($n = 254$)	SM ($n = 252$)	TW ($n = 252$)	RT ($n = 252$)	FFP2 ($n = 252$)	PCR ($n = 252$)	10dQ ($n = 252$)	14dQ ($n = 252$)		
SUS	2.82 (0.08)	3.11 (0.07)	3.15 (0.08)	3.02 (0.08)	3.00 (0.08)	3.13 (0.07)	3.06 (0.08)	3.00 (0.08)	1.86	.11
BEN	3.53 (0.09)	3.59 (0.05)	3.20 (0.06)	3.24 (0.07)	3.59 (0.06)	3.20 (0.05)	3.17 (0.06)	3.10 (0.07)	11.16***	.23
BAR	2.35 (0.11)	2.74 (0.08)	2.95 (0.08)	2.86 (0.09)	2.95 (0.09)	2.62 (0.08)	3.47 (0.09)	4.26 (0.09)	44.97***	.42
ATT	4.00 (0.11)	4.32 (0.08)	4.24 (0.08)	3.93 (0.09)	4.12 (0.08)	4.06 (0.09)	4.06 (0.09)	3.65 (0.10)	5.26***	.17
SNO	3.71 (0.10)	4.22 (0.08)	3.94 (0.08)	3.57 (0.07)	3.81 (0.07)	3.78 (0.08)	3.84 (0.08)	3.41 (0.08)	9.82***	.21
PBC	3.91 (0.09)	4.59 (0.05)	4.26 (0.06)	4.10 (0.07)	4.39 (0.06)	4.16 (0.07)	4.17 (0.05)	3.63 (0.08)	18.03***	.28
TI	2.63 (0.14)	3.40 (0.11)	2.81 (0.12)	2.78 (0.11)	2.72 (0.10)	2.80 (0.13)	2.11 (0.10)	1.28 (0.05)	75.48***	.34

Notes: ***$p < .001$. VP = Vaccination passport, SM = Surgical masks, TW = Travel warnings, RT = Rapid testing at points of entry, FFP2 = FFP2 masks, PCR = PCR tests before traveling, 10dQ = 10-day quarantine of returning travelers of high-risk areas, 14dQ = 14-day quarantine of inbound travelers. SUS = Susceptibility NPIs/PIs, BEN = Benefits NPIs/PIs, BAR = Barriers NPIs/PIs, ATT = Attitudes NPIs/PIs, PBC = Perceived behavioral control NPIs/PIs, TI = Travel intentions NPIs/PIs.

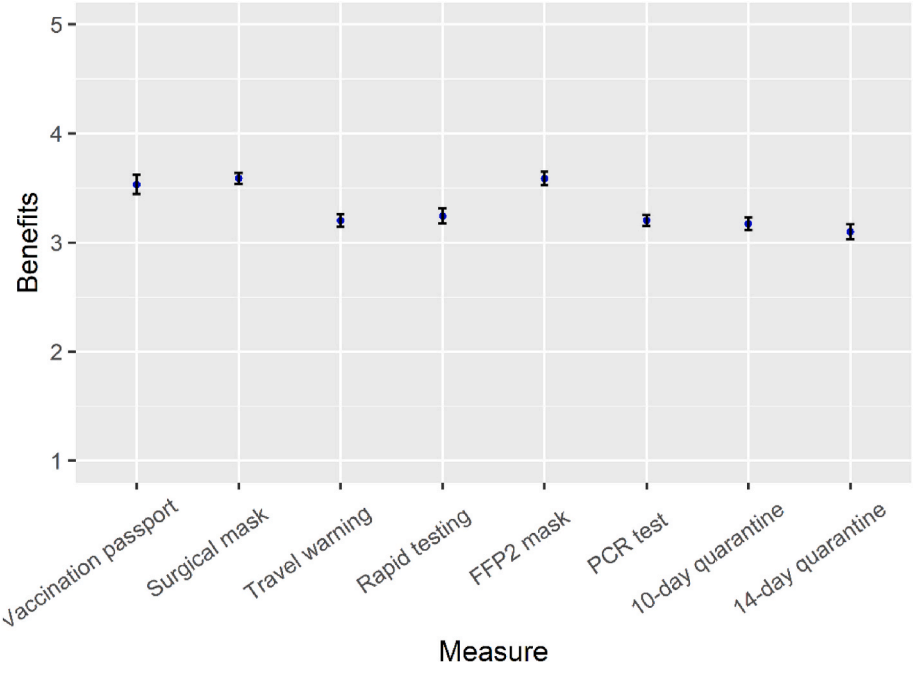


Fig. 2. Perceived benefits of the specific NPIs/PIs during travel.

points of entry, $\hat{\psi} = 0.61$ [0.21, 1.02], PCR tests taken at a maximum of 72 h before travel, $\hat{\psi} = 0.85$ [0.47, 1.23] or FFP2 masks, $\hat{\psi} = 0.52$ [0.13, 0.92] (see Fig. 3).

5.1.4. Attitude, differentiated by NPIs/PIs

There was a significant main effect of protective measures with a small effect size on attitudes towards NPIs/PIs during travel, $F(7, 518.27) = 5.26$, $p < .001$, $\hat{\xi} = 0.17$. Fourteen-day quarantine of inbound travelers has lower attitudes compared to surgical masks, $\hat{\psi} = -0.68$ [−1.07, −0.29], government travel warnings, $\hat{\psi} = -0.59$ [−0.99, −0.19], FFP2 masks, $\hat{\psi} = -0.47$ [−0.87, −0.08] or PCR tests taken a maximum of 72 h before travel, $\hat{\psi} = -0.44$ [−0.84, −0.03]. No significant differences emerged between 14-day quarantine of inbound travelers and 10-day quarantine of returning travelers from high-risk areas, vaccination passport or rapid testing at points of entry (see Fig. 4).

5.1.5. Subjective norm, differentiated by NPIs/PIs

The ANOVA yielded a significant main effect of protective measures with small to medium effect size on subjective norm of NPIs/PIs during travel, $F(7, 518.40) = 9.82$, $p < .001$, $\hat{\xi} = 0.21$. Post-hoc testing showed that subjective norm is significantly higher for surgical masks compared to the vaccination passport, $\hat{\psi} = 0.50$ [0.12, 0.89], rapid testing at points of entry, $\hat{\psi} = 0.64$ [0.32, 0.97], FFP2 masks, $\hat{\psi} = 0.40$ [0.07, 0.73], PCR tests taken a maximum of 72 h before travel, $\hat{\psi} = 0.43$ [0.10, 0.77], 10-day quarantine of returning travelers from high-risk areas, $\hat{\psi} = 0.38$ [0.03, 0.73] or 14-day quarantine of inbound travelers, $\hat{\psi} = 0.81$ [0.47, 1.15]. However, there was no significant difference in subjective norm between surgical masks and government travel warnings (see Fig. 5).

5.1.6. Perceived behavioral control, differentiated by NPIs/PIs

There was a significant main effect of protective measures with a medium effect size on perceived behavioral control when using NPIs/PI during travel, $F(7, 517.47) = 18.03$, $p < .001$, $\hat{\xi} = 0.28$. Post-hoc tests showed that perceived behavioral control during travel is higher with surgical masks compared to the vaccination passport, $\hat{\psi} = 0.69$ [0.36, 1.01], government travel warnings, $\hat{\psi} = 0.34$ [0.09, 0.59], rapid testing at points of entry, $\hat{\psi} = 0.50$ [0.22, 0.77], PCR tests taken at a maximum of 72 h before travel, $\hat{\psi} = 0.43$ [0.16, 0.70], 10-day quarantine of returning travelers from high-risk areas, $\hat{\psi} = 0.42$ [0.19, 0.65]or 14-day quarantine of inbound travelers, $\hat{\psi} = 0.96$ [0.66, 1.26]. No difference in perceived behavioral control emerged between surgical masks and FFP2 masks.

Moreover, perceived behavioral control during travel is significantly lower for 14-day quarantine of inbound travelers compared to surgical masks, $\hat{\psi} = -0.96$ [−1.26, −0.66], government travel warnings, $\hat{\psi} = -0.62$ [−0.94, −0.31], rapid testing at points of entry, $\hat{\psi} = -0.46$

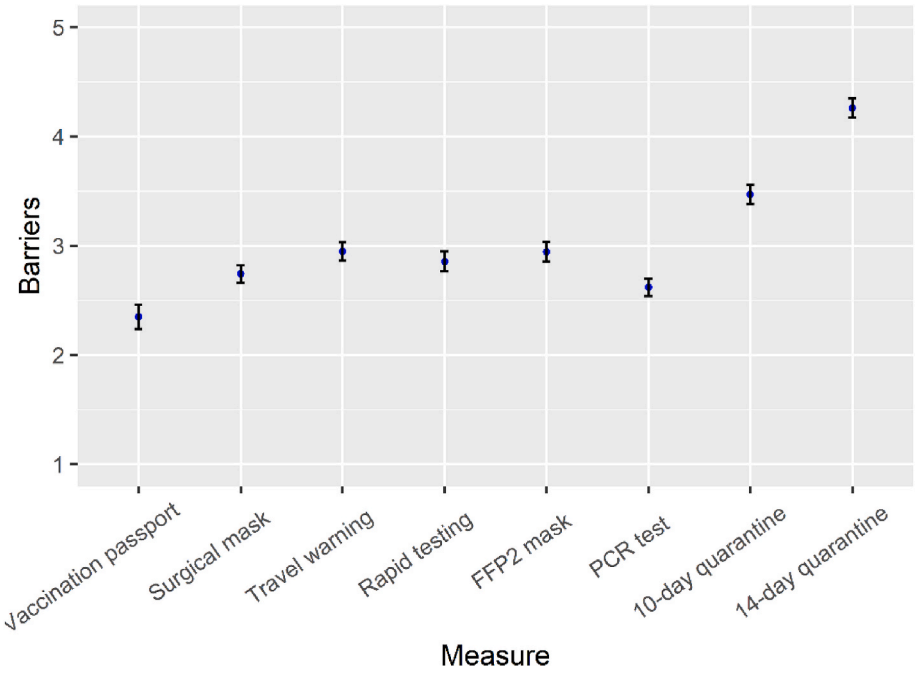


Fig. 3. Perceived barriers of the specific NPIs/PIs during travel.

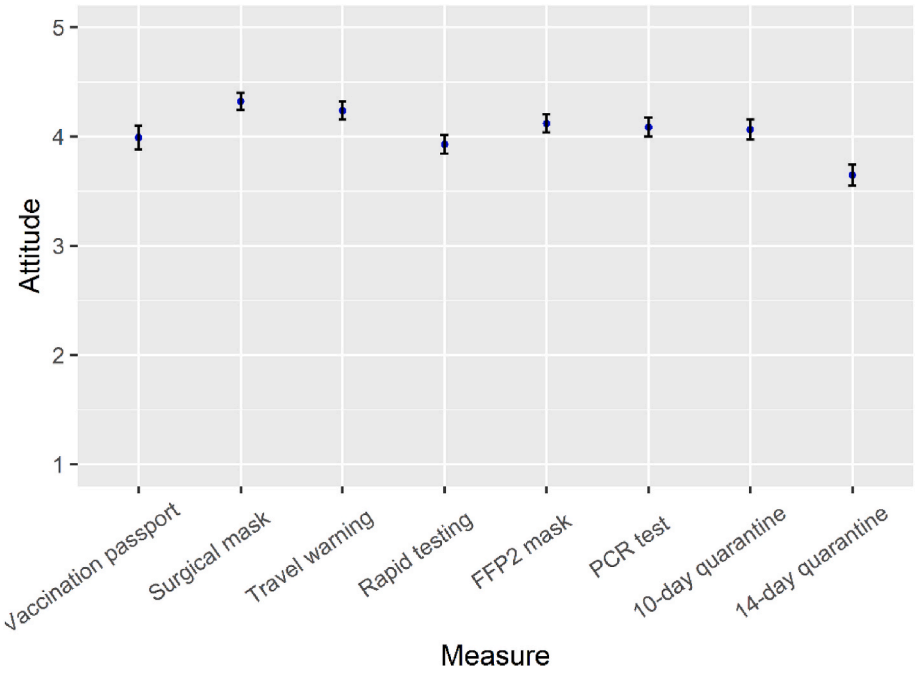


Fig. 4. Attitudes towards specific NPIs/PIs during travel.

[−0.80, −0.13], FFP2 masks, $\widehat{\psi} = -0.76$ [−1.08, −0.44], PCR tests taken a maximum of 72 h before travel, $\widehat{\psi} = -0.53$ [−0.86, −0.20] or 10-day quarantine of returning travelers of high-risk areas, $\widehat{\psi} = -0.54$ [−0.84, −0.24], but not significantly lower compared to the vaccination passport, $\widehat{\psi} = -0.27$ [−0.65, 0.10] (see Fig. 6).

5.1.7. Travel intentions, differentiated by NPIs/PIs

ANOVA yielded a main effect of protective measures with medium effect size on travel intentions under implementation of the NPIs/PIs, $F(7, 512.42) = 75.48$, $p < .001$, $\widehat{\xi} = 0.34$. Intention to travel is higher for implementation of surgical masks compared to the vaccination passport, $\widehat{\psi} = 0.77$ [0.23, 1.31], government travel warnings, $\widehat{\psi} = 0.59$ [0.10, 1.09], rapid testing at points of entry, $\widehat{\psi} = 0.62$ [0.15, 1.09], FFP2 masks, $\widehat{\psi} = 0.68$ [0.23, 1.13], PCR tests taken a maximum of 72 h before travel, $\widehat{\psi} = 0.61$ [0.08, 1.13], 10-day quarantine of returning travelers of high-risk areas, $\widehat{\psi} = 1.29$ [0.84, 1.74] or 14-day quarantine of inbound travelers, $\widehat{\psi} = 2.13$ [1.76, 2.49].

Travel intention is lower for implementation of 14-day quarantine on inbound travelers compared to the vaccination passport, $\widehat{\psi} = -1.35$ [−1.81, −0.90], surgical masks, $\widehat{\psi} = -2.13$ [−2.49, −1.76], government travel warnings, $\widehat{\psi} = -1.53$ [−1.94, −1.12], rapid testing at points of entry, $\widehat{\psi} = -1.50$ [−1.88, −1.13], FFP2 masks, $\widehat{\psi} = -1.45$ [−1.80,

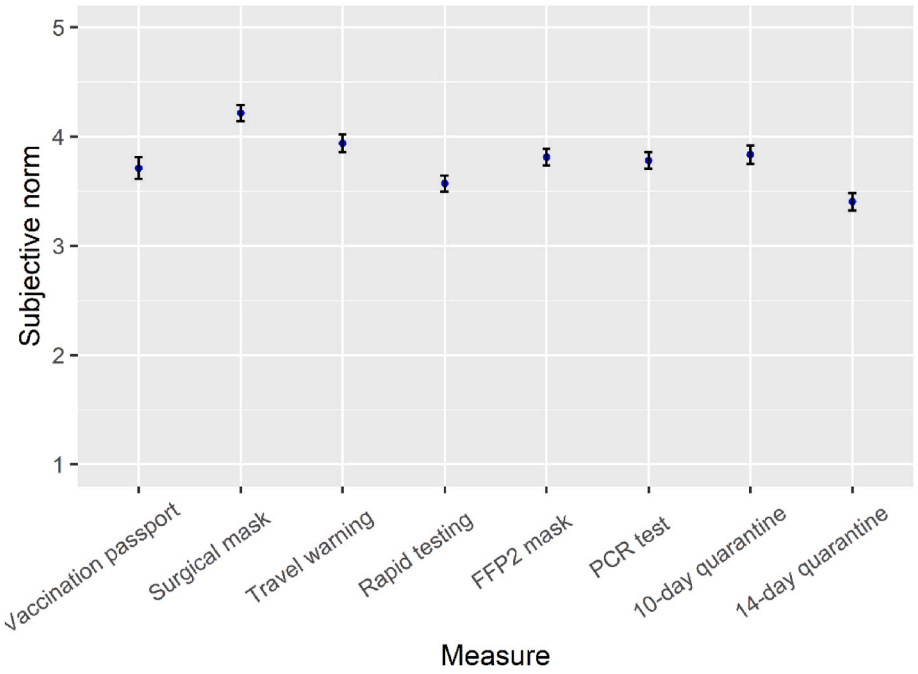


Fig. 5. Subjective norm of the specific NPIs/PIs during travel.

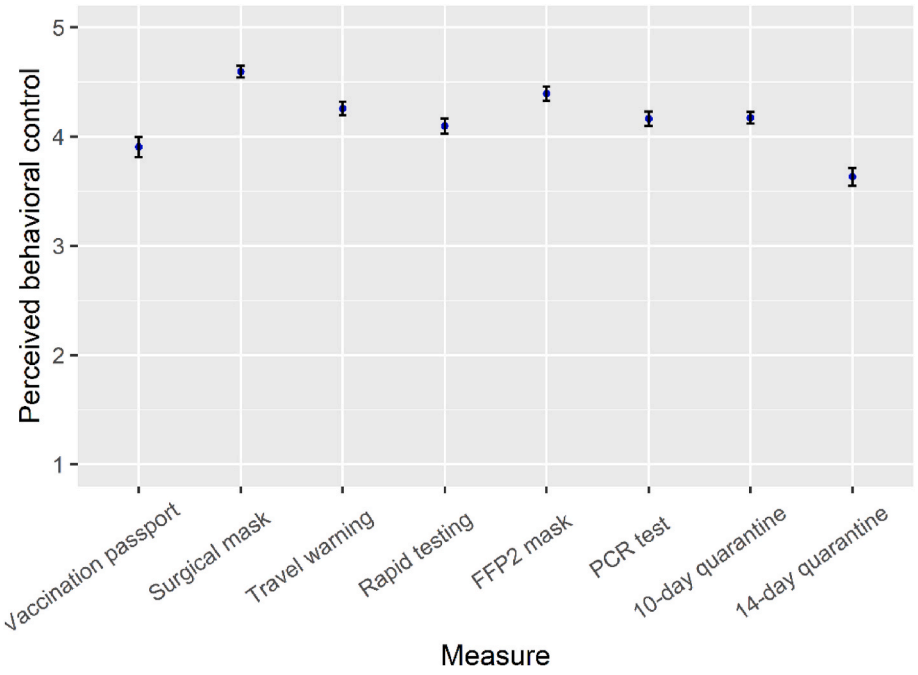


Fig. 6. Perceived behavioral control for the specific NPIs/PIs during travel.

−1.09], PCR tests taken a maximum of 72 h before travel, $\widehat{\psi} = -1.52$ [−1.96, −1.07]or 10-day quarantine of returning travelers from high-risk areas, $\widehat{\psi} = -0.83$ [−1.18, −0.49].

Intention to travel under implementation of 10-day quarantine of returning travelers from high-risk areas is also lower compared to surgical masks, $\widehat{\psi} = -1.29$ [−1.74, −0.84], government travel warnings, $\widehat{\psi} = -0.70$ [−1.18, −0.21], rapid testing at points of entry, $\widehat{\psi} = -0.67$ [−1.12, −0.21], FFP2 masks, $\widehat{\psi} = -0.61$ [−1.05, −0.17] or PCR tests taken a maximum of 72 h before travel, $\widehat{\psi} = -0.68$ [−1.20, −0.17], but not significantly lower compared to the vaccination passport, $\widehat{\psi} = -0.52$ [−1.04, 0.00] (see Fig. 7).

5.2. Regression analysis for individual differences within each measure

To be able to compare individual differences between each measure that leads to higher travel intentions, multiple regression analysis is performed using SPSS version 28.01.1 first for the whole sample ($N = 2018$) and second for all protective measures separately ($n = 252$ to 254). In a third step, we performed stepwise linear regression (method = forward and backward) separately for each protective measure in order to determine the most important variables. In particular, stepwise regression is a procedure that is often used in tourism research for comparative purposes by determining the most important

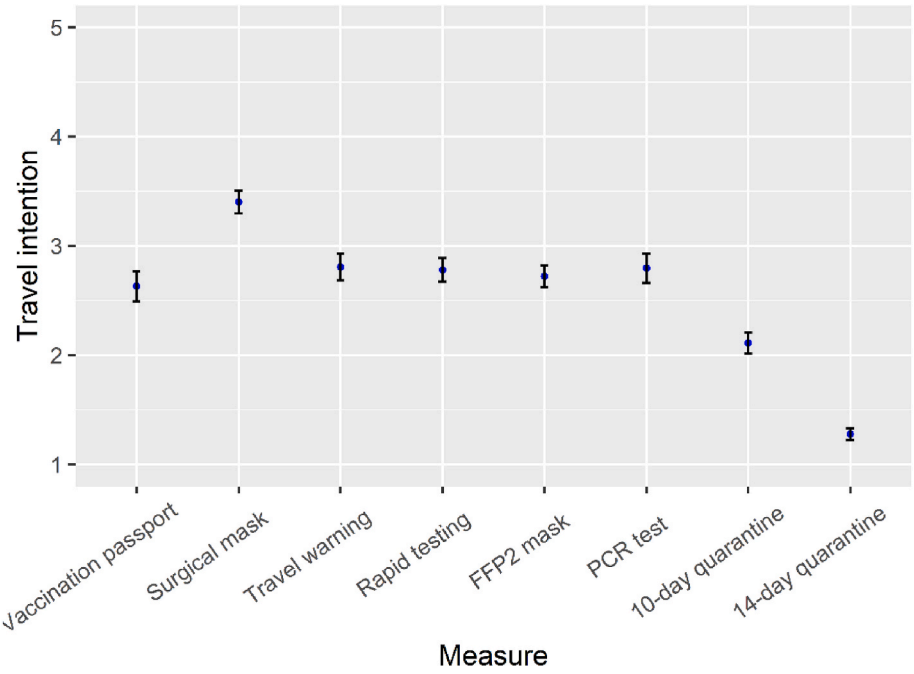


Fig. 7. Travel intention under implementation of the specific NPIs/PIs.

influencing variables (e.g., Andereck & Vogt, 2000; Dortyol et al., 2014).

Table 3 summarizes the results of the full model for the whole sample and the full models for each protective measure, as well as the corresponding stepwise models.

5.2.1. Overall model

As can be inferred from the overall model ($R^2_{corr.} = 0.227$, $p < .001$), tourists with higher risk-taking attitudes in recreation have a higher intention to travel during the COVID-19 pandemic ($\beta = 0.106$, $p < .001$), regardless of the type of protective measure to be implemented. The greater the perceived efficiency of NPIs/PIs in mitigating the spread (i.e., perceived benefits), the higher the willingness to travel under implementation of NPIs/PIs ($\beta = 0.265$, $p < .001$). The perceived severity of COVID-19 has positive effect on travel intentions under implementation of NPIs/PIs. Tourists who are more vulnerable seem to have higher protective motivations and thus higher intentions to travel under implementation of NPIs/PIs ($\beta = 0.047$, $p < .05$). The perceived susceptibility of contracting COVID-19 while traveling ($\beta = -0.177$, $p < .001$), the perceived barriers of NPIs/PIs while traveling ($\beta = -0.256$, $p < .001$), and attitudes toward implementation of NPIs/PIs while traveling ($\beta = -0.114$, $p < .001$) seem to act as crucial variables when it comes to travel avoidance, with the perceived barriers of NPIs/PIs while traveling having the strongest impact on travel avoidance. Based on the stepwise regression approach, individual differences in the protective measures with regard to the socio-psychological factors can be concluded from Table 4. Table 4 summarizes the most important variables for each protective measure and their direction of influence on tourists' travel intentions.

5.2.2. Rank 1: perceived benefits

The perceived benefits of NPIs/PIs during travel have a positive effect on travel intentions under implementation of NPIs/PIs, with the strongest effect under implementation of the vaccination passport ($\beta = 0.460$, $p < .001$), followed by surgical masks ($\beta = 0.408$, $p < .001$), rapid testing at points of entry ($\beta = 0.378$, $p < .001$), PCR tests taken a maximum of 72 h before travel ($\beta = 0.344$, $p < .001$), 14-day quarantine of inbound travelers ($\beta = 0.267$, $p < .001$), FFP2 masks ($\beta = 0.244$, $p < .001$) and government travel warnings ($\beta = 0.202$, $p < .01$). However, no effect emerged on 10-day quarantine of returning travelers from high-risk areas.

5.2.3. Rank 2: perceived barriers and perceived susceptibility

The second most important variables to emerge from the stepwise regressions analysis are both perceived barriers of NPIs/PIs and perceived susceptibility of getting COVID-19 while traveling.

The perceived barriers of implementing NPIs/PIs during travel has a negative effect on travel intentions, with the perceived barriers having the strongest negative effect on travel intentions under implementation of 14-day quarantine of inbound travelers ($\beta = -0.366$, $p < .001$), followed by surgical masks ($\beta = -0.248$, $p < .001$), FFP2 masks ($\beta = -0.233$ $p < .001$), 10-day quarantine of returning travelers from high-risk areas ($\beta = -0.186$, $p < .01$) and government travel warnings ($\beta = -0.119$, $p < .05$).

The perceived susceptibility of contracting COVID-19 has a negative effect on travel intentions. The strongest negative effect is observed for government travel warnings ($\beta = -0.348$, $p < .001$), followed by rapid testing at points of entry ($\beta = -0.312$, $p < .001$), PCR tests taken a maximum of 72 h before travel ($\beta = -0.221$, $p < .001$), 10-day quarantine of returning travelers from high-risk areas ($\beta = -0.197$, $p < .01$) and FFP2 masks ($\beta = -0.155$, $p < .01$).

5.2.4. Rank 3: risk-taking attitudes and attitudes towards NPIs/PIs while traveling

The third most important variables to emerge from the regression analysis are risk-taking attitudes (DOSPERT) and attitudes (TPB) towards the NPIs/PIs while traveling. Risk-taking attitudes in recreation have a positive effect on travel intentions under implementation of government travel warnings ($\beta = 0.180$, $p < .01$), rapid testing at points of entry ($\beta = 0.157$, $p < .01$) and FFP2 masks ($\beta = 0.141$, $p < .05$), indicating that tourists with higher risk-taking attitudes in recreation are more willing to take the risk of traveling to destinations with higher incidences and are more willing to take the risk of being tested positive at points of entries, but at the same time are also more willing to take protective measures while traveling to protect themselves and others from contracting COVID-19 by wearing FFP2 masks.

Attitudes towards NPIs/PIs while traveling have a negative effect on travel intentions. Attitudes towards surgical masks while traveling have the strongest negative effect on travel intentions under implementation

Table 3
Regression analysis.

	Independent variables	Full model			Stepwise model		
		Beta	t-value	p-value	Beta	t-value	p-value
Total (N = 2018)							
	Risk-taking attitudes	.106	5.231	<.001	–	–	–
	Susceptibility NPIs/PIs	−.177	−7.723	<.001	–	–	–
	Severity COVID-19	.047	2.100	.036	–	–	–
	Benefits NPIs/PIs	.265	10.429	<.001	–	–	–
	Barriers NPIs/PIs	−.256	−10.687	<.001	–	–	–
	Self-efficacy	−.018	−.719	.472	–	–	–
	Attitude NPIs/PIs	−.114	−3.243	.001	–	–	–
	Subjective norm NPIs/PIs	.084	2.784	.005	–	–	–
	Perceived behavioral control NPIs/PIs	.048	1.825	.068	–	–	–
Model fit	R2corr. = .227, F(9, 2008) = 66.788, p < .001						
Vaccination passport (n = 254)							
	Risk-taking attitudes	.046	.859	.391			
	Susceptibility NPIs/PIs	−.087	−1.538	.125			
	Severity COVID-19	−.042	−.674	.501			
	Benefits NPIs/PIs	.379	4.396	<.001	.460	6.790	<.001
	Barriers NPIs/PIs	−.017	−.220	.826			
	Self-efficacy	−.042	−.635	.526			
	Attitude NPIs/PIs	.162	1.307	.192			
	Subjective norm NPIs/PIs	.138	1.402	.162	.175	2.588	.010
	Perceived behavioral control NPIs/PIs	.014	.166	.869			
Model fit	R2corr. = .345, F(9, 244) = 15.775, p < .001				R2corr. = .344, F(2, 251) = 67.209, p < .001		
Surgical mask (n = 252)							
	Risk-taking attitudes	.082	1.477	.141			
	Susceptibility NPIs/PIs	−.163	−2.529	.012			
	Severity COVID-19	.148	2.392	.018			
	Benefits NPIs/PIs	.330	4.455	<.001	.408	6.070	<.001
	Barriers NPIs/PIs	−.218	−3.202	.002	−.248	−3.710	<.001
	Self-efficacy	.066	.962	.337			
	Attitude NPIs/PIs	−.364	−3.999	<.001	−.345	−4.546	<.001
	Subjective norm NPIs/PIs	.016	.208	.835			
	Perceived behavioral control NPIs/PIs	.210	2.987	.003	.186	2.743	.007
Model fit	R2corr. = .265, F(9, 242) = 11.053, p < .001				R2corr. = .242, F(4, 247) = 21.082, p < .001		
Travel warning (n = 252)							
	Risk-taking attitudes	.166	2.709	.007	.180	3.015	.003
	Susceptibility NPIs/PIs	−.309	−4.408	<.001	−.348	−5.687	<.001
	Severity COVID-19	.153	2.249	.025	.133	2.059	.041
	Benefits NPIs/PIs	.237	3.447	<.001	.202	3.306	.001
	Barriers NPIs/PIs	−.160	−2.374	.018	−.119	−2.011	.045
	Self-efficacy	−.012	−.151	.880			
	Attitude NPIs/PIs	−.114	−1.137	.257			
	Subjective norm NPIs	.052	.604	.547			
	Perceived behavioral control NPIs/PIs	−.047	−.650	.516			
Model fit	R2corr. = .184, F(9, 242) = 7.305, p < .001				R2corr. = .190, F(5, 246) = 12.801, p < .001		
Rapid testing (n = 252)							
	Risk-taking attitudes	.173	3.108	.002	.157	2.851	.005
	Susceptibility NPIs/PIs	−.334	−5.362	<.001	−.312	−5.417	<.001
	Severity COVID-19	.123	1.935	.054	.149	2.503	.013
	Benefits NPIs/PIs	.310	4.457	<.001	.378	6.843	<.001
	Barriers NPIs/PIs	−.074	−.984	.326			
	Self-efficacy	−.075	−1.042	.298			
	Attitude NPIs/PIs	.097	.993	.322			
	Subjective norm NPIs/PIs	.067	.794	.428			
	Perceived behavioral control NPIs/PIs	−.034	−.472	.638			
Model fit	R2corr. = .272, F(9, 242) = 11.404, p < .001				R2corr. = .268, F(4, 247) = 24.003, p < .001		
FFP2 mask (n = 252)							
	Risk-taking attitudes	.138	2.410	.017	.141	2.482	.014
	Susceptibility NPIs/PIs	−.168	−2.349	.020	−.155	−2.695	.008
	Severity COVID-19	−.033	−.516	.606			
	Benefits NPIs/PIs	.214	2.641	.009	.244	3.810	<.001
	Barriers NPIs/PIs	−.215	−2.894	.004	−.233	−3.655	<.001
	Self-efficacy	−.010	−.142	.888			
	Attitude NPIs/PIs	−.001	−.010	.992			
	Subjective norm NPIs/PIs	.151	1.745	.082			
	Perceived behavioral control NPIs/PIs	−.055	−.646	.519			
Model fit	R2corr. = .199, F(9, 242) = 7.946, p < .001				R2corr. = .204, F(4, 247) = 17.041, p < .001		
PCR test (n = 252)							
	Risk-taking attitudes	.131	2.191	.029			
	Susceptibility NPIs/PIs	−.236	−3.505	<.001	−.221	−3.836	<.001
	Severity COVID-19	.011	.178	.859			

(*continued on next page*)

Table 3 (*continued*)

	Independent variables	Full model			Stepwise model		
		Beta	t-value	p-value	Beta	t-value	p-value
	Benefits NPIs/PIs	.327	4.483	<.001	.344	5.973	<.001
	Barriers NPIs/PIs	−.149	−2.037	.043			
	Self-efficacy	.015	.186	.853			
	Attitude NPIs/PIs	.014	.141	.888			
	Subjective norm NPIs/PIs	.098	1.180	.239			
	Perceived behavioral control NPIs/PIs	−.174	−2.379	.018			
Model fit	R2corr. = .198, F(9, 242) = 7.889, p < .001				R2corr. = .179, F(2, 249) = 28.350, p < .001		
10-day quarantine of returning travelers of high-risk areas (n = 252)							
	Risk-taking attitudes	.092	1.449	.148			
	Susceptibility NPIs/PIs	−.178	−2.532	.012	−.197	−2.967	.003
	Severity COVID-19	.038	.556	.579			
	Benefits NPIs/PIs	.111	1.529	.128			
	Barriers NPIs/PIs	−.185	−2.688	.008	−.186	−2.722	.007
	Self-efficacy	.190	2.490	.013	.234	3.331	<.001
	Attitude NPIs/PIs	−.217	−2.069	.040	−.169	−2.167	.031
	Subjective norm NPIs/PIs	.044	.455	.649			
	Perceived behavioral control NPIs/PIs	−.021	−.284	.777			
Model fit	R2corr. = .088, F(9, 242) = 3.703, p < .001				R2corr. = .088, F(4, 247) = 7.046, p < .001		
14-day quarantine of inbound travelers (n = 252)							
	Risk-taking attitudes	.100	1.647	.101			
	Susceptibility NPIs/PIs	.035	.477	.633			
	Severity COVID-19	−.011	−.165	.869			
	Benefits NPIs/PIs	.261	3.731	<.001	.267	4.006	<.001
	Barriers NPIs/PIs	−.363	−5.775	<.001	−.366	−6.006	<.001
	Self-efficacy	.079	1.110	.268			
	Attitude NPIs/PIs	−.279	−2.908	.004	−.266	−3.873	<.001
	Subjective norm NPIs/PIs	−.101	−1.282	.201			
	Perceived behavioral control NPIs/PIs	.099	1.349	.178			
Model fit	R2corr. = .179, F(9, 242) = 7.068, p < .001				R2corr. = .176, F(3, 248) = 18.816, p < .001		

Table 4
Summary of the most important variables for each protective measure.

	BEN	BAR	SUS	RTA	ATT	SEV	SE	SNO	PBC	Sum of effects
Travel warning (n = 252)	+	-	-	+		+				**5**
Rapid testing (n = 252)	+		-	+		+				**4**
FFP2 mask (n = 252)	+	-	-	+						**4**
10-day quarantine (n = 252)		-	-		-		+			**4**
Surgical mask (n = 252)	+	-			-				+	**4**
14-day quarantine (n = 252)	+	-			-					**3**
Vaccination passport (n = 254)	+							+		**2**
PCR test (n = 252)	+		-							**2**
Sum of effects	**7**	**5**	**5**	**3**	**3**	**2**	**1**	**1**	**1**	-
Rank	**1**	**2**		**3**		**4**	**5**			-

Notes. N = 2018. RTA = Risk-Taking attitudes in recreation time (DOSPERT), SUS = Susceptibility NPIs/PIs, SEV = Severity COVID-19, BEN = Benefits NPIs/PIs, BAR = Barriers NPIs/PIs, SE = Self-efficacy, ATT = Attitudes NPIs/PIs, SNO = Subjective norm NPIs/PIs, PBC = Perceived behavioral control NPIs/PIs.

of surgical masks ($\beta = -0.345$, $p < .001$). Attitudes towards 14-day quarantining for inbound travelers has the second strongest negative effect on travel intentions under implementation of 14-day quarantine ($\beta = -0.266$, $p < .001$), and attitudes toward 10-day quarantine of returning travelers from high-risk areas has the third strongest negative effect on travel intentions under implementation of 10-day quarantine ($\beta = -0.169$, $p < .05$).

Most probably, this indicates that supportive attitudes towards surgical masks, 14-day quarantine of inbound travelers and supportive attitudes toward the quarantining of returning travelers from high-risk areas are less likely to lead to travel under implementation of these measures. This might seem counter-intuitive at first sight, but a high supportive attitude towards these protective measures may indicate a risk-averse group of tourists with a reduction in travel intentions under the given protective measure.

5.2.5. Rank 4: perceived severity

The perceived severity of COVID-19 has a positive effect on travel intentions under implementation of rapid testing at points of entry ($\beta = 0.149$, $p < .05$), followed by government travel warnings ($\beta = 0.133$, $p < .05$).

Tourists who feel more vulnerable to COVID-19 are more likely to travel when incoming tourists are tested at borders.

Regarding government travel warnings, the positive effect most probably points to travel avoidance. That is, the willingness to travel under implementation of travel warnings (i.e., not visiting countries that are high-risk areas due to high incidence of the disease) is higher for tourists where there is a higher perceived severity of COVID-19.

5.2.6. Rank 5: self-efficacy, subjective norm, and perceived behavior control

Self-efficacy in being able to contribute to ending the pandemic has a positive effect on travel intentions under implementation of 10-day quarantine when returning from high-risk areas ($\beta = 0.234$, $p < 001$), but has no predictive value on travel intentions under implementation of other NPIs/PIs, indicating that quarantining after returning from a high-risk area needs a greater amount of self-efficacy to implement compared to other measures.

Subjective norms of NPIs/PIs have only a significant positive effect on travel intentions under implementation of vaccination passports ($\beta = 0.175$, $p < .05$). This points to the importance of significant others when it comes to vaccination in general and vaccination passports when traveling.

The perceived behavioral control of NPIs/PIs has only a positive effect on travel intentions under implementation of surgical masks ($\beta = 0.186$, $p < .01$). This indicates that having high perceived knowledge and high perceived ability to (correctly) use face masks increases acceptance of this protective measure while traveling.

6. Discussion

The aim of the present study is to compare eight different corona protective measures and their relationship to travel intentions under implementation of these measures.

In summary, we can conclude that attitudes toward all protective measures are supportive, that all measures have high levels of approval by significant others (subjective norm) and that all measures are perceived to be beneficial in reducing the spread of COVID-19 during travel, since all trimmed means lie above the middle of the scale of 3. This is consistent with descriptive survey-based studies of attitudes and risk perceptions (e.g., da Silva Lopes et al., 2021; Kantor & Kantor, 2020).

Our results shows that all measures enjoy a high level of acceptance while traveling, with travel intentions being highest for surgical masks and the lowest for 10-day quarantine of returning travelers from high-risk areas and 14-day quarantine of inbound travelers. The ANOVA results shows that the perceived benefits of the NPIs/PIs while traveling are highest for the vaccination passport, as well as for FFP2 and surgical masks. The ANOVA results point to the perceived barriers being the highest for 14-day quarantine of inbound travelers and 10-day quarantine of returning travelers from high-risk areas compared to all other measures. The perceived barriers have the strongest negative impact on travel intentions when it comes to 14-day quarantine of inbound travelers.

On a theoretical level, we found that HBM variables were more important than TPB variables in predicting tourists' willingness to travel under implementation of NPIs/PIs. Higher risk-taking attitudes to leisure (DOSPERT) are associated with higher travel intentions during the pandemic.

Moreover, the present comparative study shows that the protective measures differ significantly when comparing the protective measures on the HBM and TPB variables (ANOVA results), but they also differ regarding the most important leading indicators (regression results). It can be inferred from the stepwise models that the perceived benefits of NPIs/PIs during travel are the most important predictor of travel intentions. The perceived benefits of protective measures are the most crucial determinant of travel intentions for almost all protective measures. The strongest positive impact occurs under implementation of the vaccination passport.

Both perceived barriers and the perceived susceptibility of contracting COVID-19 while traveling is a significant predictor of travel avoidance under implementation of most of the protective measures. For barriers, the strongest negative impact occurs under implementation of 14-day quarantining for inbound travelers. For susceptibility the strongest effect is in visiting destinations for which travel warnings has been given.

These overall findings have implications for tourism management.

6.1. Implications of study for tourism management

According to Aiken (2011), a two-step approach is needed to characterize interventions in health behavior. The first step is the advancement and evaluation of a socio-psychological model to determine the relevant factors influencing health behavior. In a second step, the socio-psychological model is used for interventions that lead to a desired adoption and thus to a change in behavior, with interventions being evaluated in a vignette-based experimental survey design. Thus far, these steps have been undertaken within this research endeavor and in this paper. The implications for management are discussed in the following sections.

Susceptibility has a negative effect on travel intentions for most of the protective measures, with the strongest negative effect being on travel intentions under implementation of rapid testing at points of entry. Given that the ANOVA results reveal no significant differences in perceived susceptibility between the different protective measures, it can be concluded that perceived susceptibility is a major determinant of travel avoidance, irrespective of any precautions that are taken during travel or at destinations. This is not surprising, as exposure risks increase with distance traveled, choice of transportation and crossing geographical areas with different prevalence (Boehme et al., 2021). With regard to increasing travel distance, we suggest that measures should be more trustworthy to maintain interest in touristic travel. Moreover, since the perceived benefits are the main predictor of travel intentions, destination managers and public health authorities should communicate the benefits associated with NPIs/PIs better.

When it comes to specific protective measures, surgical masks, quarantining and vaccination passports are those that stand out the most. Surgical masks have high perceived benefits in reducing the spread of COVID-19 while traveling, low perceived barriers of implementation during travel, the highest supportive attitudes, the highest support of significant others, the highest perceived behavioral control and consequently the highest travel intentions. The high supportive attitudes and the high support of significant others points to a high level of acceptance of this measure during travel. Perceived behavioral control is the highest for surgical masks, with a significant positive effect on travel intentions. It appears there is ample knowledge and ability in wearing face masks correctly. It is therefore recommended to encourage people to wear face masks when traveling, since they are proved to be effective, especially when used widely, and given that many people are now familiar with the practice (Bagheri et al., 2021; Lyu & Wehby, 2020). In agreement with the low-cost hypothesis of behavior change according to Diekmann and Preisendörfer (2003), we argue that masks in all their forms are an easy-to-implement measure that should be maintained and applied in touristic practices even in times with low infection rates.

On the other hand, 10-day quarantine of returning travelers from high-risk areas and 14-day quarantine of inbound travelers are associated with the lowest travel intentions compared to all other measures, with the perceived barriers being perceived as highest compared to all other measures, and with a strong negative effect of perceived barriers on travel intentions. However, it is noteworthy that supportive attitudes, the support of significant others and behavioral control over implementation are perceived to be positive for both 10-day quarantine of returning travelers and 14-day quarantine of inbound travelers. To prevent people from traveling if the epidemiological situation worsens, it is therefore recommended to reintroduce quarantine. Quarantine is not only effective in reducing the spread of COVID-19 (e.g., Haug et al., 2020), but it has an additional deterrent effect as well (Aggarwal et al., 2022), which is also supported by our data. We suggest that this measure is the most suitable if there is a need to slow down tourism rapidly due to high infection rates or a new emerging variant. However, it must be pointed out that quarantine is associated with high economic and social costs (Ashcroft et al., 2021).

Regarding the vaccination passport, this is perceived to have high benefits in reducing the spread of COVID-19 while traveling, high supportive attitudes to its implementation during travel, the high support of significant others and high perceived behavioral control, with perceived benefits having the strongest effects on travel intentions compared to all other measures. Furthermore, subjective norms (i.e., support of significant others) play a significant role when it comes to vaccination, which is consistent with prior research, showing that the intention to be

vaccinated depends not only on beliefs about vaccine effectiveness, but also on significant others who approve of and encourage using vaccines (i.e., injunctive norms) (Baeza-Rivera et al., 2021). Surprisingly, travel intentions under implementation of the vaccination passport are not significantly higher compared to other protective measures. This could mainly be due to the public discourse in Switzerland about the appropriateness of this measure, since the unvaccinated would be excluded from social activities such as travel. This result coincides with other studies, showing that vaccination intentions in the early phase are negatively associated with travel intentions (Gursoy et al., 2021) or that being vaccinated has no impact on travel internationally or domestically (Ram et al., 2022). However, it is noteworthy that there is a strong justification for vaccination passports once everyone has access to vaccination, since it creates safe environments for travel (e.g., Sharun et al., 2021). Against the background of our other findings regarding NPIs, we suggest that PI measures (e.g., vaccination) should be necessarily flanked with NPIs in the field of tourism, especially if social distancing cannot be applied with crowded touristic attractions, or travel in planes, trains and tour buses.

All significant effects stem from the socio-psychological dimensions. We did not detect any significant influences for socio-demographics. In the context of implications for management, it becomes obvious that risk perception in the context of travel safety during a pandemic is a deliberative cognitive process that is independent of age, gender and income. Based on our dialogue with tourism practitioners (Oberholzer et al., 2022), we found that traditional target group models in the tourism industry mainly include dimensions such as source markets, travel motives, mode of transportation (MoT), age, gender, income and life stage of the traveler in order to develop tourism offers. However, since the coronavirus pandemic, different influencing factors for travel decisions must be considered. Thinking in these new categories of socio-psychological dimensions should be adopted in the industry in the near future. However, such psychological models are to a great extent new to practitioners and mostly unknown in practical applications. The results of this study serve as a new basis of evaluation of the target groups from a socio-psychological perspective, which practitioners must anticipate.

6.2. Limitations

The present study has some important limitations. First, the sampling procedure employed in this study is a quota sampling and is thus non-probabilistic. Although quota sampling improves the representativeness of the strata used in the population, it is not as accurate as random sampling (Sharma, 2017). Furthermore, the present results are only representative of the Swiss population and cannot be generalized to other populations. Although the underlying nature of the relationship may not change across populations, other populations could vary in the importance of the variables studied. Second, it is noteworthy that the present study is a cross-sectional study and is exploratory in nature. The study was conducted in March and April 2021. Since then, much progress has been made with vaccination, allowing more or less restriction-free travel (e.g., Han et al., 2022). It is therefore plausible to assume that some perceptions will have shifted. For example, the perceived severity of contracting COVID-19 will most likely have attenuated to some degree in the meantime. Even though the strength of some relationships may have changed over time because of the emergence of different factors, it is not likely that the direction of the relationship or its significance has changed. For example, the perceived barriers of NPIs/PIs to protective measures are still hypothesized to have an inhibiting influence on travel intentions. Furthermore, current behavior during the pandemic was not surveyed, as this would have required a longitudinal design. Given the rapidly changing regulatory environment, this would not have been very effective. For example, even if individuals have the behavioral intention to wear masks during travel when required, it is unlikely that most individuals will continue to do so if the mask requirements are lifted. A further limitation is the replicability of the results. Since the present study is exploratory in nature, it would be difficult to replicate exactly the same results for each protective measure.

Credit author statement

Andreas Hüsser and Timo Ohnmacht: Conceptualization, Methodology, Investigation, Writing **Andreas Hüsser**: Writing, Original draft preparation, Editing, Software, Data curation, Visualization. **Timo Ohnmacht**: Writing, Supervision, Reviewing.

Impact statement

In order to maintain tourist activities and to stem further losses of the tourism industry in the event of a worsening of the current epidemiological situation or the emergence of a new viral variant, knowledge of the acceptance and adoption of non-pharmaceutical interventions and the vaccination passport is needed for rapid and adequate action that is also accepted and understood by tourists. Tourist behavior can be better understood when it is known how different measures influence key determinants of adoption of protective measures when traveling. This becomes even more important as the outlook of the economic situation remains fragile against the backdrop of the emergence of new variants, unprecedented monetary policies, and rising inflation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix

Exploratory factor analysis with promax rotation.

Item	Question										
	Risk-taking attitudes	**RTA**	**SUS**	**SEV**	**BEN**	**BAR**	**SE**	**ATT**	**SNO**	**PBC**	**TI**
rtb_1	Would you stay in a tent out in the wild, far removed from any town or campsite?	**0.62**	0.03	−0.01	−0.03	0.00	−0.01	−0.01	−0.02	0.03	0.00
rtb_2	Would you join a white water rafting tour in fast-flowing rivers in the spring?	**0.74**	−0.01	0.00	0.05	0.03	0.02	−0.01	0.00	0.00	0.04
rtb_3	Would you do risky sports (e.g., rock climbing, skydiving, etc.) regularly?	**0.73**	−0.03	0.01	−0.02	−0.03	0.01	0.03	0.02	−0.04	−0.03
Perceived susceptibility NPIs/PIs											
sus_npi_1	Implementing the presented corona protection measure, it's likely that I will be exposed to the coronavirus when traveling at this time.	0.05	**0.80**	0.03	0.02	−0.02	−0.03	−0.04	0.00	−0.01	0.00
sus_npi_3	Implementing the presented corona protection measure, there is currently a high risk of infection from the coronavirus when traveling.	−0.04	**0.90**	−0.02	0.00	0.04	0.00	0.02	−0.01	−0.01	0.01
sus_npi_4	Implementing the presented corona protection measure, there is currently a high risk of passing on the coronavirus when traveling.	−0.04	**0.82**	−0.01	−0.03	0.00	0.04	−0.01	0.01	−0.02	0.00
sus_npi_5	Implementing the presented corona protection measure, there is currently a high risk of coming into contact with the coronavirus when traveling.	0.02	**0.91**	−0.01	0.01	0.00	−0.02	0.02	−0.01	−0.01	0.00
Perceived severity COVID-19											
sev_1	Getting infected with the coronavirus would have severe consequences for my social life (friends, club, sport).	0.02	0.01	**0.57**	0.04	0.04	−0.01	−0.05	0.00	0.04	0.02
sev_2	Getting infected with the coronavirus would have severe consequences for my physical health.	0.00	0.02	**0.68**	−0.03	−0.02	0.04	0.11	0.00	0.00	−0.01
sev_3	Getting infected with the coronavirus would have severe consequences for my mental well-being.	−0.01	−0.05	**0.87**	−0.01	−0.01	−0.03	−0.01	0.00	−0.02	−0.02
sev_4	Getting infected with the coronavirus would have severe consequences for my mental ability to perform.	−0.01	0.01	**0.79**	−0.03	−0.03	0.00	−0.02	0.00	−0.06	0.00
Perceived benefits NPIs/PIs											
ben_npi_3	The presented corona protection measure effectively contains the coronavirus when people travel.	0.00	−0.03	0.00	**0.75**	0.02	0.02	0.13	−0.06	−0.02	−0.05
ben_npi_4	The presented corona protection measure reduces the risk of infection when people travel.	0.02	0.06	−0.01	**0.86**	−0.01	−0.04	−0.02	−0.02	−0.03	−0.05
ben_npi_5	The presented corona protection measure makes me feel safe when I travel.	−0.02	−0.05	0.00	**0.78**	−0.07	−0.02	−0.09	0.03	−0.05	0.07
ben_npi_6	By applying the presented corona protection measure while traveling, I am behaving responsibly.	0.00	0.01	0.01	**0.58**	0.09	0.05	0.08	0.07	0.09	0.02
Perceived barriers NPIs/PIs											
bar_npi_1	For me, the costs (time, comfort, money) of applying the presented corona protection measure when traveling are greater than the benefits.	0.02	−0.01	0.03	−0.08	**0.73**	0.04	0.00	−0.05	−0.01	−0.05
bar_npi_2	For me, the effort of applying the presented corona protection measure when traveling is greater than the benefits.	−0.02	−0.01	−0.03	−0.10	**0.74**	0.08	−0.02	−0.01	−0.01	−0.03
bar_npi_3	The presented corona protection measure is disturbing when traveling.	−0.03	0.01	0.00	0.07	**0.86**	−0.06	−0.06	0.01	0.07	0.04
bar_npi_4	The presented corona protection measure prevents pleasant traveling.	0.02	0.03	−0.01	0.07	**0.89**	−0.06	0.03	0.04	0.01	0.03
Self-efficacy											
se_1	With my behavior, I can help to keep infection rates from increasing further during the pandemic.	0.01	0.00	−0.03	−0.01	0.02	**0.85**	0.03	0.00	0.00	0.01
se_2	I can contribute to ending the pandemic soon.	−0.03	0.01	0.02	−0.03	0.00	**0.76**	0.01	−0.04	0.04	0.01
se_3	I can help protect society from the coronavirus.	0.04	−0.03	−0.02	−0.02	−0.04	**0.84**	−0.08	0.01	−0.02	0.01
se_4	Risk groups are best protected if I apply the measures.	−0.02	0.03	0.04	0.09	−0.01	**0.58**	0.11	0.05	−0.05	−0.03
Attitude NPIs/PIs											
att_npi_1	I find applying the presented corona protection measure when traveling to be … bad - good	−0.01	−0.03	−0.02	−0.01	−0.03	−0.03	**0.90**	0.03	0.00	0.01
att_npi_2	… useless - useful	0.02	−0.01	−0.01	0.09	0.02	0.02	**0.87**	−0.03	0.00	−0.02
att_npi_3	… not desirable - desirable	−0.02	0.03	0.01	−0.06	−0.11	0.00	**0.71**	0.09	−0.02	0.01
att_npi_4	… inappropriate - appropriate	0.00	−0.01	−0.02	−0.04	−0.02	−0.01	**0.89**	0.04	0.02	0.02
att_npi_6	… unimportant - important	0.02	0.03	0.03	−0.01	0.04	0.02	**0.87**	0.03	−0.01	−0.01
att_npi_7	… not worthwhile - worthwhile	−0.02	−0.04	−0.01	0.04	−0.08	−0.01	**0.82**	−0.04	0.00	0.01
att_npi_8	… unnecessary - necessary	0.02	0.05	0.01	−0.04	0.07	0.00	**0.93**	0.04	−0.02	0.00
att_npi_9	… meaningless - meaningful	0.00	−0.02	−0.01	0.02	0.03	−0.03	**0.96**	0.00	−0.01	0.01
Subjective norm NPIs/PIs											
sno_npi_2	Most people who are important to me are in favor of applying the presented corona protection measure when traveling.	0.00	0.00	−0.01	0.00	−0.02	−0.01	0.07	**0.86**	0.01	−0.02
sno_npi_3	Most people who are important to me think that applying the presented corona protection measure when traveling is a good idea.	−0.02	−0.01	0.00	0.03	−0.01	−0.03	0.07	**0.87**	−0.01	−0.01
sno_npi_4	Most people who are important to me think I should apply the presented corona protection measure when traveling.	0.00	0.02	0.00	−0.02	0.01	−0.01	0.02	**0.90**	0.03	0.00
sno_npi_5	Most people who are important to me generally recommend applying the presented corona protection measure when traveling.	0.01	0.00	0.01	−0.03	0.00	−0.01	0.04	**0.93**	−0.03	−0.02

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(*continued*)

Item	Question										
sno_npi_6	Most people who are important to me support me in applying the presented corona protection measure when traveling.	0.01	−0.02	−0.02	0.00	0.01	0.03	0.00	**0.87**	0.00	0.02
sno_npi_7	Most people who are important to me encourage me to apply the presented corona protection measure when traveling.	0.00	−0.01	0.01	0.00	0.01	0.02	−0.04	**0.95**	−0.04	0.00
Perceived behavioral control NPIs/PIs											
pbc_npi_1	I am confident that I will apply the presented corona protection measure when traveling.	−0.01	0.01	0.05	0.03	0.01	0.03	0.16	0.16	**0.54**	0.05
pbc_npi_2	I know how to apply the presented corona protection measure correctly when traveling.	−0.03	−0.06	−0.02	−0.02	0.07	0.00	0.01	0.00	**0.80**	−0.04
pbc_npi_3	I am able to apply the presented corona protection measure correctly when traveling.	0.03	0.00	−0.01	−0.03	0.06	−0.01	−0.03	−0.03	**0.97**	0.00
pbc_npi_4	It's easy for me to apply the presented corona protection measure when traveling.	0.01	0.07	0.00	0.01	−0.26	0.01	−0.02	−0.01	**0.59**	0.01
Travel intention NPIs/PIs											
ti_npi_1	Implementing the presented corona protection measure, I will definitely take a holiday trip in 2021.	0.01	−0.05	−0.02	−0.02	0.03	0.00	−0.01	0.01	−0.02	**0.90**
ti_npi_2	Implementing the presented corona protection measure, my intention to take a holiday trip in 2021 is strong.	−0.04	0.01	0.03	−0.04	0.02	0.03	0.02	−0.02	0.01	**0.88**
ti_npi_3	Implementing the presented corona protection measure, I am willing to go on a holiday trip in 2021.	0.02	0.02	−0.02	0.06	−0.09	0.00	−0.01	−0.03	0.00	**0.85**
ti_npi_4	Implementing the presented corona protection measure, I plan to take a holiday trip in 2021.	0.00	0.00	0.01	−0.03	0.02	−0.01	0.01	0.00	−0.02	**0.94**
ti_npi_5	Implementing the presented corona protection measure, I endeavor to take a holiday trip in 2021.	0.01	0.02	0.00	0.01	0.03	0.00	0.02	0.02	−0.03	**0.90**

Note. Kaiser-Meyer-Olkin (KMO) = 0.96. Bartlett's test of sphericity: $\chi^2(1035) = 77062.18$, $p < .001$. TLI = 0.962. RMSEA = 0.037 [0.036, 0.039]. RTA = Risk-taking attitudes in recreation (DOSPERT), SUS = Susceptibility NPIs/PIs, SEV = Severity COVID-19, BEN = Benefits NPIs/PIs, BAR = Barriers NPIs/PIs, SE = Self-efficacy, ATT = Attitudes NPIs/PIs, SNO = Subjective norm NPIs/PIs, PBC = Perceived behavioral control NPIs/PIs, TI = Travel intention NPIs/PIs.

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