The influence of risk perception on tourism behaviour

SNSF Corona Research Conference 21-23 March 2023

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Research questions

1) How can a social psychological model be formulated to explain (preventive) travel behaviour during the pandemic?
2) Which social psychological factors influence behavioural intentions to implement NPIs while travelling?
3) Which social psychological factors influence behavioural intentions of travelling during the pandemic?
4) How do different NPIs influence the social psychological factors and travel intentions?
5) How can the social psychological factors be addressed by pointers of interventions to increase the acceptance of NPIs while travelling?

Swiss National Science Foundation

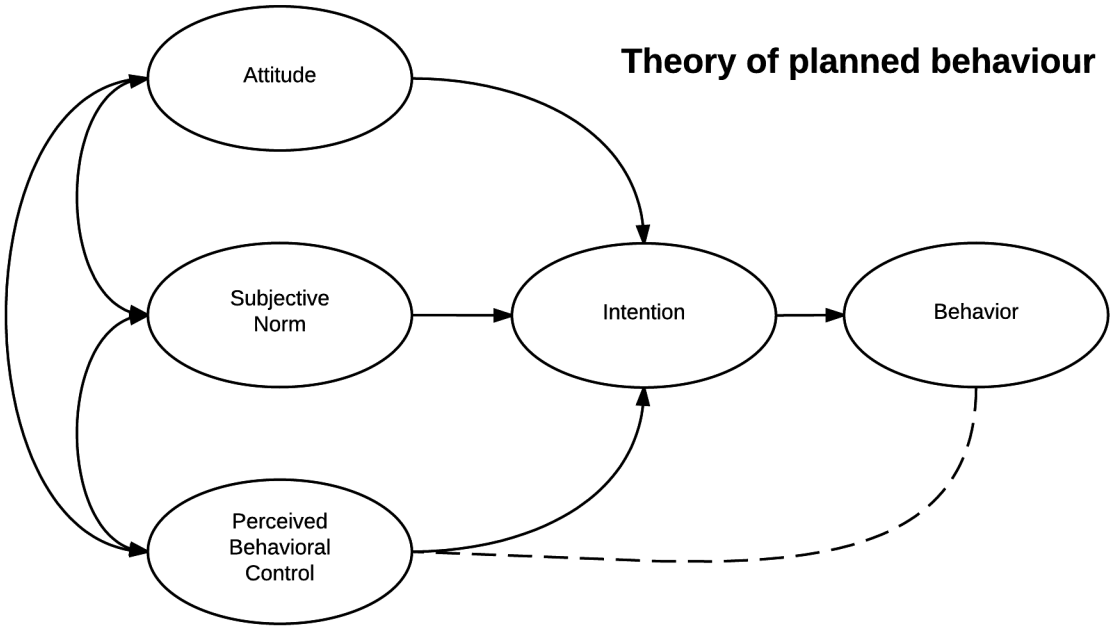
78 NRP Covid-19 National Research Programme

HSLU Hochschule Luzern

Research question

1) How can a social psychological model be formulated to explain (preventive) travel behaviour during the pandemic?

The Theory of Planned Behavior (Ajzen, 1991)



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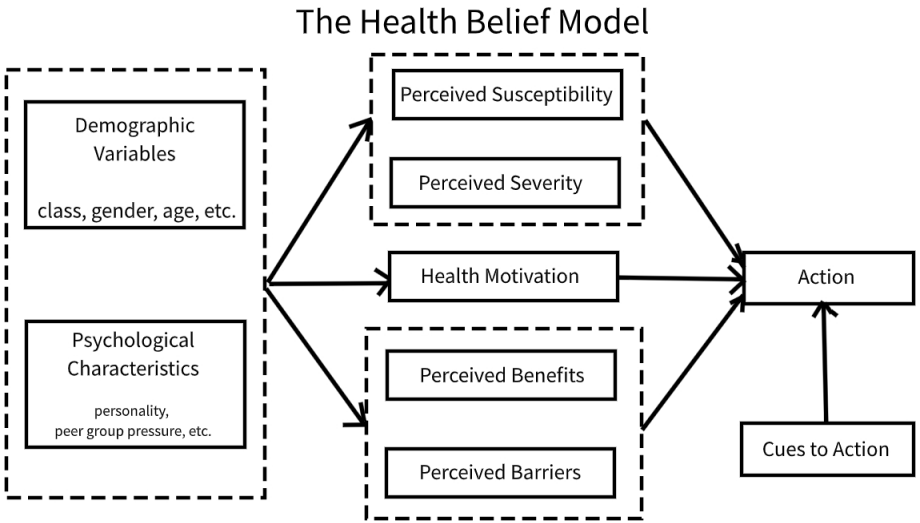
The Health Belief Model (Rosenstock, 1979)



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Domain-Specific Risk-Taking Scale (Blais & Weber, 2006)

A Appendix

A.1 Domain-Specific Risk-Taking (Adult) Scale — RT scale

For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation. Provide a rating from *Extremely Unlikely* to *Extremely Likely*, using the following scale: [Scales are shown in Table A.]

1. Admitting that your tastes are different from those of a friend. (S)
2. Going camping in the wilderness. (R)
3. Betting a day's income at the horse races. (F)
4. Investing 10% of your annual income in a moderate growth mutual fund. (F)
5. Drinking heavily at a social function. (H/S)
6. Taking some questionable deductions on your income tax return. (E)
7. Disagreeing with an authority figure on a major issue. (S)
8. Betting a day's income at a high-stake poker game. (F)
9. Having an affair with a married man/woman. (E)
10. Passing off somebody else's work as your own. (E)
11. Going down a ski run that is beyond your ability. (R)
12. Investing 5% of your annual income in a very speculative stock. (F)

Source. Blais & Weber (2006)

Sampling procedure

Stratified random sampling

Sampling procedure

Random stratified sample of the **Swiss Federal Statistical Office** (**FSO**) according to the stratification characteristics language region, and gender.

Field time: March 9, 2021 – April 30. 2021

Table: Analysis of the sample response rate

	n	%
Gross sample	4,530	100
Non-sampling relevant losses (moved, deceased, wrong address, etc.)	164	4
Net *sample*	4,366	100
Response online	390	9
Response by pen and paper	1,293	30
Response total	1,683	39

Source: own survey data

Table: Analysis of the response rate differentiated by language and gender, age groups and education level

		sample [%]	Swiss census [%]
Language	**Sex**		
German	male	33	36
	female	35	36
French	male	12	12
	female	15	21
Italian	male	2	2
	female	3	2
Age Groups (years)	18-30	11	19
	31-55	38	44
	56-65	21	16
	65+	28	21
Education	Compulsory and vocational training	47	46
	Grammar school	8	9
	Higher education	20	15
	Tertiary education	25	30

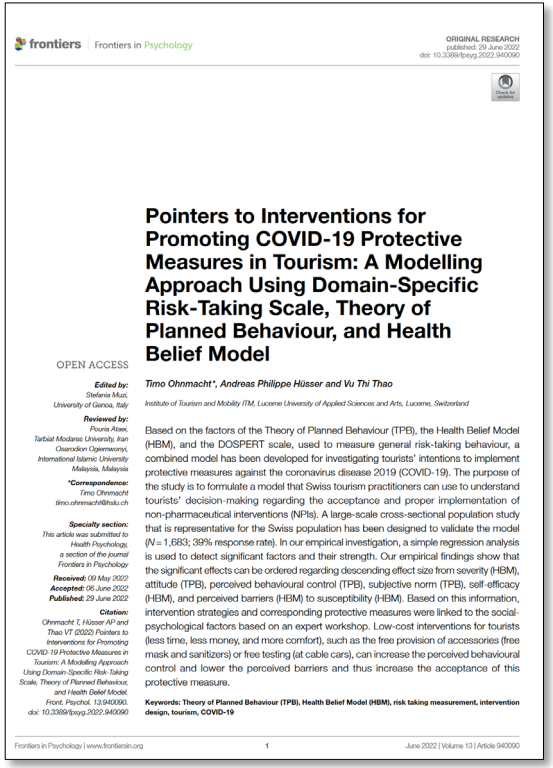
Source: own data compared with FSO census for 2021

Research question

2) Which social psychological factors influence behavioural intentions to implement NPIs while travelling?

Which social psychological factors influence behavioural intentions to implement NPIs while travelling?

Ohnmacht, T., Hüsser, A. P., & Thao, T. V. (2022). Pointers to interventions for promoting COVID-19 protective measures in tourism: A modelling approach using Domain-Specific Risk-Taking Scale, Theory of Planned Behaviour, and Health Belief Model. *Frontiers in Psychology, 13*, Article 940090. https://doi.org/10.3389/fpsyg.2022.940090



frontiers | Frontiers in Psychology

ORIGINAL RESEARCH
published: 29 June 2022
doi: 10.3389/fpsyg.2022.940090

Pointers to Interventions for Promoting COVID-19 Protective Measures in Tourism: A Modelling Approach Using Domain-Specific Risk-Taking Scale, Theory of Planned Behaviour, and Health Belief Model

OPEN ACCESS

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Based on the factors of the Theory of Planned Behaviour (TPB), the Health Belief Model (HBM), and the DOSPERT scale, used to measure general risk-taking behaviour, a combined model has been developed for investigating tourists' intentions to implement protective measures against the coronavirus disease 2019 (COVID-19). The purpose of the study is to formulate a model that Swiss tourism practitioners can use to understand tourists' decision-making regarding the acceptance and proper implementation of non-pharmaceutical interventions (NPIs). A large-scale cross-sectional population study that is representative for the Swiss population has been designed to validate the model ($N = 1,683$; 39% response rate). In our empirical investigation, a simple regression analysis is used to detect significant factors and their strength. Our empirical findings show that the significant effects can be ordered regarding descending effect size from severity (HBM), attitude (TPB), perceived behavioural control (TPB), subjective norm (TPB), self-efficacy (HBM), and perceived barriers (HBM) to susceptibility (HBM). Based on this information, intervention strategies and corresponding protective measures were linked to the social-psychological factors based on an expert workshop. Low-cost interventions for tourists (less time, less money, and more comfort), such as the free provision of accessories (free mask and sanitizers) or free testing (at cable cars), can increase the perceived behavioural control and lower the perceived barriers and thus increase the acceptance of this protective measure.

Keywords: Theory of Planned Behaviour (TPB), Health Belief Model (HBM), risk taking measurement, intervention design, tourism, COVID-19

Edited by:
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Specialty section:
This article was submitted to Health Psychology, a section of the journal Frontiers in Psychology

Received: 09 May 2022
Accepted: 06 June 2022
Published: 29 June 2022

Citation:
Ohnmacht T, Hüsser AP and Thao VT (2022) Pointers to Interventions for Promoting COVID-19 Protective Measures in Tourism: A Modelling Approach Using Domain-Specific Risk-Taking Scale, Theory of Planned Behaviour, and Health Belief Model. Front. Psychol. 13:940090. doi: 10.3389/fpsyg.2022.940090

Factorial validity and reliability of the constructs (I)

Table: Principal axis factor-analysis (Rotation: Promax ($\kappa = 4$) with Kaiser-Normalization)

Item	Question	RTB	SUS	SEV	BEN	BAR	SE	ATT	SNO	PBC	INT	*n*
rtb_1	Would you stay in a tent out in the wild, far removed from any town or campsite?	**-.634**	-.018	-.014	-.002	.043	.005	-.031	-.001	-.001	-.013	1,476
rtb_2	Would you join a whitewater rafting tour in fast-flowing rivers in the spring?	**-.789**	-.010	-.008	-.007	-.039	.024	-.014	-.002	.008	.039	1,476
rtb_3	Would you do risky sports (e.g., rock climbing, skydiving, etc.) regularly?	**-.771**	.022	.025	-.004	.016	.024	.012	-.015	-.019	-.021	1,476
sus_1	It's likely that I will be exposed to the coronavirus when travelling at this time.	-.070	**.693**	.007	.008	-.039	-.036	.026	.017	.033	-.041	1,476
sus_3	There is currently a high risk of infection from the coronavirus when travelling.	.041	**.879**	-.001	.008	-.007	.015	-.030	-.004	-.008	.047	1,476
sus_4	There is currently a high risk of passing on the coronavirus when travelling.	.015	**.835**	.027	-.048	.036	.054	.009	-.011	-.030	-.003	1,476
sus_5	There is currently a high risk of coming into contact with the coronavirus when travelling.	.022	**.950**	-.026	.016	.003	-.005	-.014	-.010	.005	.001	1,476
sev_1	Getting infected with the coronavirus would have severe consequences for my social life (friends, club, sport).	-.004	.042	**.622**	.016	-.035	-.011	.057	.027	.012	-.023	1,476
sev_2	Getting infected with the coronavirus would have severe consequences for my physical health.	.006	.041	**.763**	-.009	.017	.006	-.013	.050	.014	.052	1,476
sev_3	Getting infected with the coronavirus would have severe consequences for my mental wellbeing.	-.007	-.045	**.911**	-.028	-.030	-.001	.015	-.017	.003	-.010	1,476
sev_4	Getting infected with the coronavirus would have severe consequences for my mental ability to perform.	.002	-.010	**.827**	.009	.034	.008	-.049	-.033	-.030	.011	1,476
ben_3	The protective measures effectively contain the coronavirus when people travel.	.059	-.014	.074	**.822**	.010	.038	-.008	-.050	.003	-.030	1,476
ben_4	The protective measures reduce the risk of infection when people travel.	-.045	.050	.009	**.842**	.008	-.048	.049	.013	-.016	-.045	1,476
ben_5	The protective measures make me feel safe when I travel.	.028	-.057	-.064	**.739**	.026	.045	-.049	.010	-.048	.042	1,476
ben_6	By applying protective measures while travelling, I am behaving responsibly.	-.043	.010	-.051	**.471**	-.058	-.002	.018	.049	.103	.111	1,476
bar_1	For me, the costs (time, comfort, money) of applying protective measures when travelling are greater than the benefits.	.045	-.058	-.020	-.050	**-.764**	.065	-.034	.023	-.011	.048	1,476
bar_2	For me, the effort of applying protective measures when travelling is greater than the benefits.	.054	-.025	-.038	-.058	**-.792**	.059	-.009	-.004	-.031	.057	1,476
bar_3	The protection measures are disturbing when travelling.	-.054	.054	.025	.056	**-.658**	-.067	.032	-.041	.002	-.054	1,476
bar_4	The protection measures prevent pleasant travelling.	-.033	.047	.048	.048	**-.700**	-.044	-.005	.004	.050	-.067	1,476
se_1	With my behaviour, I can help to keep infection rates from increasing further during the pandemic.	.000	.031	-.031	-.011	-.023	**.657**	.085	.012	.060	.009	1,476
se_2	I can contribute to ending the pandemic soon.	.031	-.010	.073	-.015	.011	**.770**	.018	-.048	.032	-.058	1,476
se_3	I can help protect society from the coronavirus.	-.056	.012	-.044	.015	.005	**.844**	-.040	-.003	-.087	.014	1,476
se_4	Risk groups are best protected if I apply the measures.	-.019	-.004	.018	.058	-.034	**.579**	.027	.100	-.001	.015	1,476
att_npi_1	I find applying the coronavirus protective measures when travelling to be … bad - good	.035	.010	-.039	-.011	.040	.062	**.813**	-.018	-.003	-.047	1,476
att_npi_2	… useless - useful	-.007	-.010	-.007	.048	-.021	.014	**.871**	.028	-.001	-.046	1,476
att_npi_3	… not desirable - desirable	.005	.018	.007	-.058	.036	.039	**.702**	.010	-.031	.094	1,476
att_npi_4	… inappropriate - appropriate	-.033	.020	-.007	.007	.003	-.064	**.946**	.004	.008	-.020	1,476
att_npi_6	… unimportant - important	-.011	.021	.002	-.008	-.039	-.001	**.884**	.030	.005	.025	1,476
att_npi_7	… not worthwhile - worthwhile	.054	-.063	.029	.017	.035	.073	**.809**	-.035	-.017	-.033	1,476
att_npi_8	… unnecessary - necessary	-.013	.005	-.004	.000	-.041	-.057	**.920**	.035	-.017	.053	1,476
att_npi_9	… meaningless - meaningful	.004	-.012	.018	-.006	.010	-.022	**.922**	-.009	-.008	.008	1,476
sno_npi_2	Most people who are important to me are in favour of applying protective measures when travelling.	-.024	.043	.014	-.026	.024	-.044	.097	**.825**	-.003	.010	1,476
sno_npi_3	Most people who are important to me think that applying protective measures when travelling is a good idea.	-.013	.032	.006	.006	.030	-.037	.071	**.872**	-.015	-.010	1,476
sno_npi_4	Most people who are important to me think I should apply protective measures when travelling.	.016	-.019	-.002	.000	-.011	-.009	-.016	**.913**	-.006	.006	1,476
sno_npi_5	Most people who are important to me generally recommend applying protective measures when travelling.	-.009	-.012	-.026	.009	.004	-.010	.000	**.931**	-.009	.019	1,476
sno_npi_6	Most people who are important to me support me in applying protective measures when travelling.	.025	-.017	.006	-.004	-.012	.049	-.007	**.871**	.036	-.051	1,476
sno_npi_7	Most people who are important to me encourage me to apply protective measures when travelling.	.016	-.023	.011	.012	-.015	.051	-.063	**.891**	-.020	.003	1,476
pbc_npi_1	I am confident that I will apply protective measures when travelling.	-.002	.006	.008	.021	.006	.025	.143	.067	**.543**	.081	1,476
pbc_npi_2	I know how to apply protective measures correctly when travelling.	.045	.015	.017	.023	.002	-.021	-.056	-.003	**.789**	-.053	1,476
pbc_npi_3	I am able to apply protective measures correctly when travelling.	-.032	-.003	-.019	-.016	-.054	-.056	-.022	-.018	**.961**	-.023	1,476
pbc_npi_4	It's easy for me to apply protective measures when travelling.	.008	-.025	-.012	-.039	.128	.125	.022	-.006	**.489**	.072	1,476
int_v_npi_1	I will probably apply protective measures on my next trip, even though they are voluntary.	-.019	.003	-.005	-.008	.006	.002	.006	-.025	-.004	**.919**	1,476
int_v_npi_2	I will definitely apply protective measures on my next trip, even though they are voluntary.	.020	.003	.011	.002	.007	-.001	-.006	-.008	-.014	**.950**	1,476
int_v_npi_3	I firmly intend to apply protective measures on my next trip, even though they are voluntary.	.033	.009	.016	.022	.004	-.013	.006	.013	-.002	**.907**	1,476
int_v_npi_4	I am willing to apply protective measures on my next trip, even though they are voluntary.	-.035	-.014	.001	.015	-.010	-.010	.039	.014	-.006	**.938**	1,476

Note. N = 1,683. Missing cases were deleted listwise (n = 1,476), Kaiser-Meyer-Olkin = 0.948. Bartlett-Test (Sphericity): X^2 (990, N = 1476) = 53668.415, $p < .001$.
The ten factors together explain (in total) 67.517% of variance.

Ohnmacht, T., Hüsser, A. P., & Vu, T. (2023). Pointers to interventions for promoting COVID-19 protective measures in tourism: A modelling approach using Domain-Specific Risk-Taking Scale, Theory of Planned Behaviour, and Health Belief Model. *Frontiers in Psychology, 13*, Article 940090. https://doi.org/10.3389/fpsyg.2022.940090

Method: Principal axis factor-analysis

Rotation: Promax ($\kappa = 4$) with Kaiser-Normalization

N = 1,683. Missing cases were deleted listwise resulting in n = 1,476 cases

Kaiser-Meyer-Olkin = 0.948.

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The ten factors together explain (in total) 67.517% of variance.

Factorial validity and reliability of the constructs (II)

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Table: The dimensions of the explanatory model and an associated example item for each model

Construction	Example item	Number of items	Mean value (SD)	Cronbach's alpha
Risk behaviour	Would you stay in a tent out in the wild, far removed from any town or campsite? (1 = *very unlikely* to 5 = *very likely*)	3	1.91 (1.06)	.75
Perceived susceptibility	It's likely that I will be exposed to the coronavirus when travelling at this time. (1 = *do not agree at all* to 5 = *agree entirely*)	4	3.54 (1.10)	.90
Perceived severity	Getting infected with the coronavirus would have severe consequences for my physical health. (1 = *do not agree at all* to 5 = *agree entirely*)	4	3.27 (1.13)	.87
Perceived benefits NPI	The protective measures reduce the risk of infection when people travel. (1 = *do not agree at all* to 5 = *agree entirely*)	4	3.78 (.91)	.83
Perceived barriers NPI	For me, the effort of applying protective measures when travelling is greater than the benefits. (1 = *do not agree at all* to 5 = *agree entirely*)	4	2.98 (1.13)	.82
Self-efficacy	With my behaviour, I can help to keep infection rates from increasing further during the pandemic. (1 = *does not apply at all* to 5 = *applies entirely*)	4	4.02 (.90)	.82
Attitude NPI	I find applying the protective measures against the coronavirus when travelling (e.g., wearing masks, quarantining when entering a country, distancing, etc.) to be … (1 = *bad/etc.* to 5 = *good/etc.*)	8	4.27 (.90)	.96
Subjective norm NPI	Most people who are important to me support the idea of applying protective measures when travelling. (1 = *does not apply at all* to 5 = *applies entirely*)	6	4.15 (0.90)	.96
Perceived behavioural control NPI	It's easy for me to apply protective measures when travelling. (1 = *does not apply at all* to 5 = *applies entirely*)	4	4.42 (0.67)	.81
Intention to implement interventions against COVID-19	I firmly intend to apply protective measures on my next trip, even though they are voluntary. (1 = *does not apply at all* to 5 = *applies entirely*)	4	4.04 (1.11)	.97

Note: SD = standard deviation.

Results: Tourists' behavioural intentions to implement NPIs while travelling

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Table: Hierarchical Regression (OLS) with tourists' behavioural intentions to implement NPIs while travelling.

Effect	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	b	*Beta*	*p*	*b*	*Beta*	*p*	*b*	*Beta*	*p*	*b*	*Beta*	*p*
Intercept	3.442		<.001	1.690		<.001	-.053		.804	-.620		.035
Gender (0 = female)	-.137	-.062	.011	-.049	-.022	.291	-.006	-.003	.880	-.006	-.003	.895
Age (years)	.018	.263	<.001	.008	.126	<.001	.007	.103	<.001	.018	.264	<.001
Risk behaviour	-.155	-.147	<.001	-.068	-.064	.005	-.043	-.041	.055	-.039	-.037	.082
Perceived suspectibility				.184	.179	<.001	.080	.078	<.001	.082	.080	<.001
Perceived severity				.137	.138	<.001	.093	.094	<.001	.271	.273	<.001
Perceived benefits				.073	.059	.010	-.038	-.030	.160	-.038	-.030	.158
Perceived barriers				-.204	-.204	<.001	-.100	-.100	<.001	-.096	-.096	<.001
Self-efficacy				.318	.257	<.001	.141	.114	<.001	.139	.112	<.001
Attitude NPI							.297	.242	<.001	.291	.237	<.001
Subjective norm NPI							.167	.134	<.001	.167	.134	<.001
Perceived behavioural control NPI							.254	.150	<.001	.256	.152	<.001
Age * Perceived Severity										-.003	-.284	.005
R^2 corr.		.125			.369			.464			.466	
Model comparison		$F(3, 1560) = 75.278$, $p = <.001$			$F(8, 1555) = 115.344$, $p = <.001$			$F(11, 1552) = 123.969$, $p = <.001$			$F(12, 1551) = 114.789$, $p < .001$	
n (listwise based on Model 4)		1,564			1,564			1,564			1,564	

Note. *b* = coefficient estimate; *Beta* = standardized coefficient estimate; *p* = p-value; $R^2_{cor.}$ = corrected R^2. Listwise deletion of cases based on Model 4.

Results: Tourists' behavioural intentions to implement NPIs while travelling

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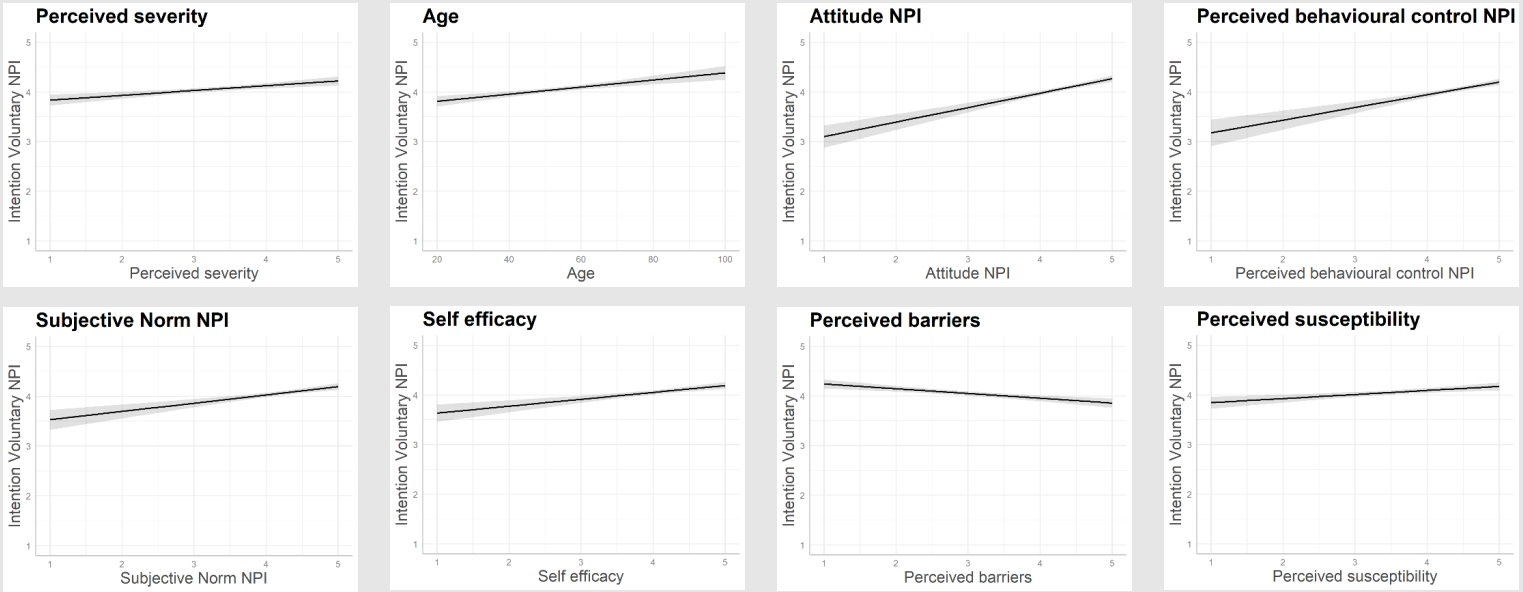

Which social psychological factors influence behavioural intentions to implement NPIs while traveling?

Hüsser, A. P., Ohnmacht, T., & Thao, T. V. (2023). Tourists' preventive travel behaviour during COVID-19: The mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling. *Current Issues in Tourism*, 1-15. https://doi.org/10.1080/13683500.2022.2162373

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https://doi.org/10.1080/13683500.2022.2162373

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Tourists' preventive travel behaviour during COVID-19: the mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling

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ABSTRACT
Previous studies that extended the Theory of Planned Behaviour (TPB) with the Health Belief Model (HBM) did not integrate all constructs. To address this research gap, we combined those two theories and the subscale on Domain-Specific Risk-Taking (DOSPERT) to predict tourists' willingness to apply NPIs against COVID-19 while travelling. The proposed hypotheses on the mediating role of attitudes were tested using structural equation modelling based on a random sampling of the Swiss population ($n = 1683$). The results indicate that attitudes are the strongest predictor of behavioural intentions to apply NPIs while travelling. Attitude also acts as a mediator between health beliefs and the willingness to apply protective measures voluntary for the next tourism trip. The results permit some managerial implications to be suggested for supporting preventive travel behaviour.

ARTICLE HISTORY
Received 1 October 2022
Accepted 19 December 2022

KEYWORDS
Health belief model; tourist's preventive travel behaviour; DOSPERT; non-pharmaceutical interventions (NPIs); COVID-19; theory of planned behaviour

Introduction

To promote safe travel during a pandemic, it is crucial to understand how tourists cope with coronavirus disease (COVID-19)-related risks (Zheng et al., 2021). Yet, the COVID-19 outbreak has prompted a vast amount of literature in tourism studies on how COVID-19-related risk perceptions and perceived travel risks influence travel intentions and avoidance (e.g. Abraham et al., 2021; Agyeiwaah et al., 2021; Neuburger & Egger, 2021). Various studies have extended the Theory of Planned Behaviour (eTPB; Bae & Chang, 2021) with COVID-19-related risk perceptions to predict tourists' travel behaviour during and after COVID-19 (for example Liu et al., 2021b; Pahrudin et al., 2021; Rahmafitria et al., 2021; Sánchez-Cañizares et al., 2021). One drawback of these eTPB-studies is that they rely on different concepts and theories of risk. Thus, different operationalizations of the risk construct can be found across the relevant literature, which makes joint basic research difficult.

Another stream of literature stresses the importance of non-pharmaceutical interventions (NPIs) and its relation to tourism (for example Castañeda-García et al., 2022; Kim et al., 2022a). A number of these studies focus on individual tourists' trust in NPIs and their adoption of NPIs prior to and during travel and its impact on tourism behaviour (Chung et al., 2021; Das & Tiwari, 2021; Lee et al., 2012). Bae and Chang (2021) as well as Kim et al. (2022a) have used tourists' perceptions of and willingness to adopt NPIs before and during travel as an independent variable in predicting travel intentions. But only a few studies use behavioural intentions to apply NPIs while travelling as a dependent variable in order to increase travel safety.

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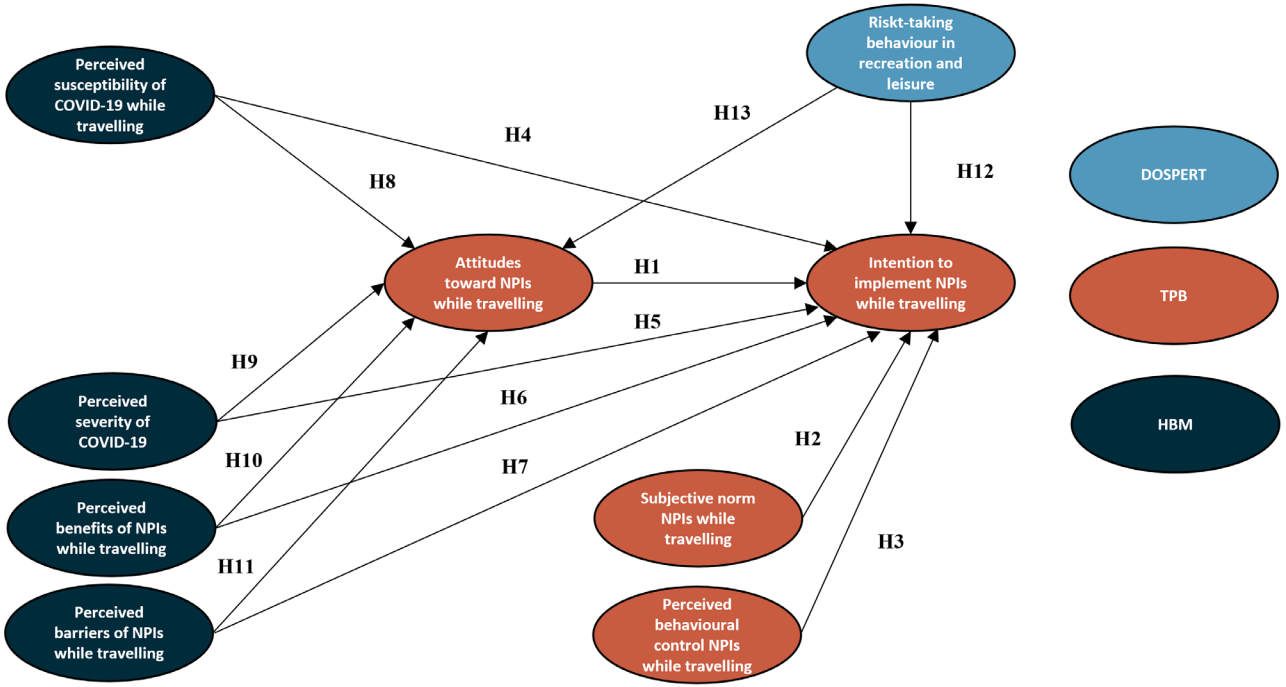
This article has been corrected with minor changes. These changes do not impact the academic content of the article.

Proposed research model

Hüsser, A. P., Ohnmacht, T., & Thao, T. V. (2023). Tourists' preventive travel behaviour during COVID-19: The mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling. *Current Issues in Tourism*, 1-15. https://doi.org/10.1080/13683500.2022.2162373



Results: Estimates predicting intentions and attitudes

Hüsser, A. P., Ohnmacht, T., & Thao, T. V. (2023). Tourists' preventive travel behaviour during COVID-19: The mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling. *Current Issues in Tourism*, 1-15. https://doi.org/10.1080/13683500.2022.2162373

Paths coefficients	Standardized Coefficient	Hypothesis Supported
Estimates predicting intentions		
Hypothesis 1: Attitudes NPIs → Behavioural Intention NPIs	0.317***	**Yes**
Hypothesis 2: Subjective norm NPIs → Behavioural Intention NPIs	0.162***	**Yes**
Hypothesis 3: Behavioural control NPIs → Behavioural Intention NPIs	0.178***	**Yes**
Hypothesis 4: Susceptibility COVID-19 → Behavioural Intention NPIs	0.052	**No**
Hypothesis 5: Severity COVID-19 → Behavioural Intention NPIs	0.156***	**Yes**
Hypothesis 6: Benefits NPIs → Behavioural Intention NPIs	-0.031	**No**
Hypothesis 7: Barriers NPIs → Behavioural Intention NPIs	-0.055*	**Yes**
Hypothesis 12: Risk-taking behaviour → Behavioural Intention NPIs	-0.088**	**Yes**
Estimates predicting attitudes		
Hypothesis 8: Susceptibility COVID-19 → Attitudes NPIs	0.304***	**Yes**
Hypothesis 9: Severity COVID-19 → Attitudes NPIs	0.197***	**Yes**
Hypothesis 10: Benefits NPIs → Attitudes NPIs	0.256***	**Yes**
Hypothesis 11: Barriers NPIs → Attitudes NPIs	-0.254***	**Yes**
Hypothesis 13: Risk-taking-behaviour → Attitudes NPIs	-0.094**	**Yes**

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Results: Total and indirect effects on behavioural intentions

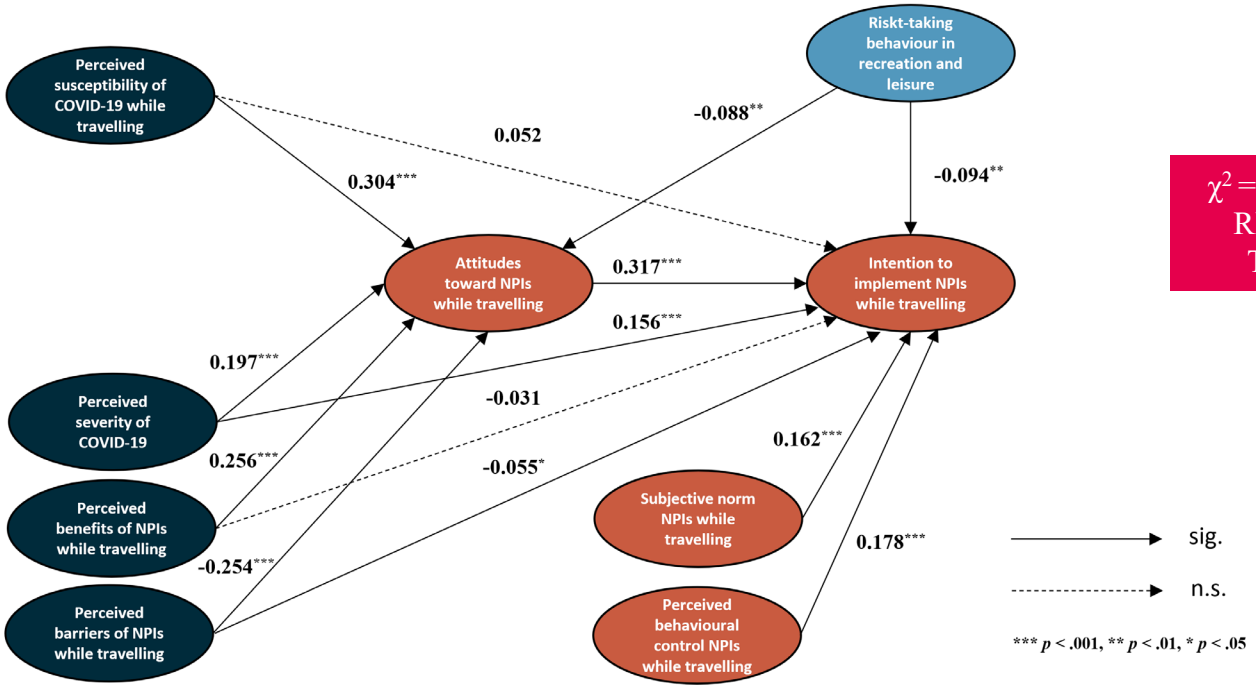
Hüsser, A. P., Ohnmacht, T., & Thao, T. V. (2023). Tourists' preventive travel behaviour during COVID-19: The mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling. *Current Issues in Tourism*, 1-15. https://doi.org/10.1080/13683500.2022.2162373

Constructs	Total effect	Indirect effect	Hypothesis supported
Hypothesis 14: Susceptibility COVID-19	0.148^{***}	0.096^{***}	**Yes**
Hypothesis 15: Severity COVID-19	0.218^{***}	0.063^{***}	**Yes**
Hypothesis 16: Benefits NPIs	0.050	0.081^{***}	**Yes**
Hypothesis 17: Barriers NPIs	-0.136^{***}	-0.081^{***}	**Yes**
Hypothesis 18: Risk-taking-behaviour	-0.118^{***}	-0.030^{**}	**Yes**

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Results: Hypothesis testing

Hüsser, A. P., Ohnmacht, T., & Thao, T. V. (2023). Tourists' preventive travel behaviour during COVID-19: The mediating role of attitudes towards applying non-pharmaceutical interventions (NPIs) while travelling. *Current Issues in Tourism*, 1-15. https://doi.org/10.1080/13683500.2022.2162373



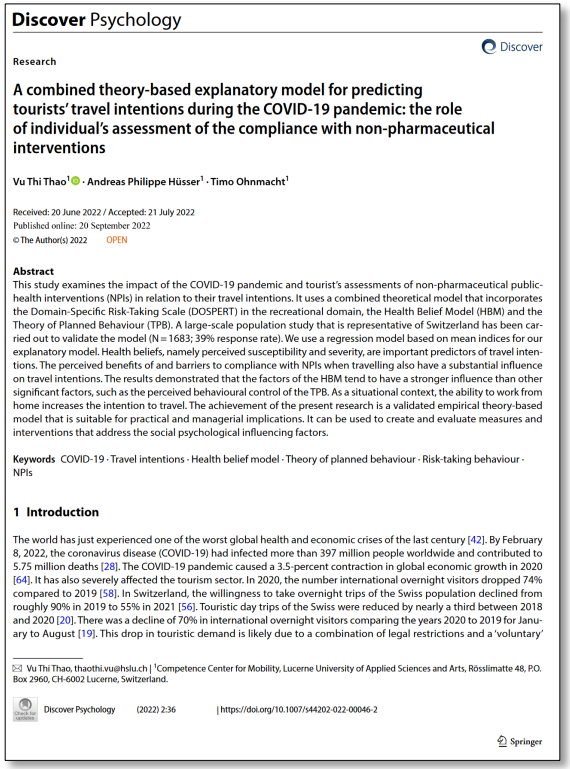
$\chi^2 = 1145.130$, df = 316, $p < 0.001$,
RMSEA = 0.044, CFI = 0.971,
TLI = 0.965, SRMR = 0.059

Research question

3) Which social psychological factors influence behavioural intentions of travelling during the pandemic?

Which social psychological factors influence behavioural intentions of travelling during the pandemic?

Thao, V. T., Hüsser, A. P., & Ohnmacht, T. (2022). A combined theory-based explanatory model for predicting tourists' travel intentions during the COVID-19 pandemic: The role of individual's assessment of the compliance with non-pharmaceutical interventions. *Discover Psychology, 2*(36). https://doi.org/10.1007/s44202-022-00046-2



Discover Psychology

Discover

Research

A combined theory-based explanatory model for predicting tourists' travel intentions during the COVID-19 pandemic: the role of individual's assessment of the compliance with non-pharmaceutical interventions

Vu Thi Thao[1] · Andreas Philippe Hüsser[1] · Timo Ohnmacht[1]

Received: 20 June 2022 / Accepted: 21 July 2022
Published online: 20 September 2022

Abstract
This study examines the impact of the COVID-19 pandemic and tourist's assessments of non-pharmaceutical public-health interventions (NPIs) in relation to their travel intentions. It uses a combined theoretical model that incorporates the Domain-Specific Risk-Taking Scale (DOSPERT) in the recreational domain, the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB). A large-scale population study that is representative of Switzerland has been carried out to validate the model (N = 1683; 39% response rate). We use a regression model based on mean indices for our explanatory model. Health beliefs, namely perceived susceptibility and severity, are important predictors of travel intentions. The perceived benefits of and barriers to compliance with NPIs when travelling also have a substantial influence on travel intentions. The results demonstrated that the factors of the HBM tend to have a stronger influence than other significant factors, such as the perceived behavioural control of the TPB. As a situational context, the ability to work from home increases the intention to travel. The achievement of the present research is a validated empirical theory-based model that is suitable for practical and managerial implications. It can be used to create and evaluate measures and interventions that address the social psychological influencing factors.

Keywords COVID-19 · Travel intentions · Health belief model · Theory of planned behaviour · Risk-taking behaviour · NPIs

1 Introduction

The world has just experienced one of the worst global health and economic crises of the last century [42]. By February 8, 2022, the coronavirus disease (COVID-19) had infected more than 397 million people worldwide and contributed to 5.75 million deaths [28]. The COVID-19 pandemic caused a 3.5-percent contraction in global economic growth in 2020 [64]. It has also severely affected the tourism sector. In 2020, the number international overnight visitors dropped 74% compared to 2019 [58]. In Switzerland, the willingness to take overnight trips of the Swiss population declined from roughly 90% in 2019 to 55% in 2021 [56]. Touristic day trips of the Swiss were reduced by nearly a third between 2018 and 2020 [20]. There was a decline of 70% in international overnight visitors comparing the years 2020 to 2019 for January to August [19]. This drop in touristic demand is likely due to a combination of legal restrictions and a 'voluntary'

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Results: Tourists' travel intentions during the COVID-19 pandemic

Thao, V. T., Hüsser, A. P., & Ohnmacht, T. (2022). A combined theory-based explanatory model for predicting tourists' travel intentions during the COVID-19 pandemic: The role of individual's assessment of the compliance with non-pharmaceutical interventions. *Discover Psychology, 2*(36). https://doi.org/10.1007/s44202-022-00046-2

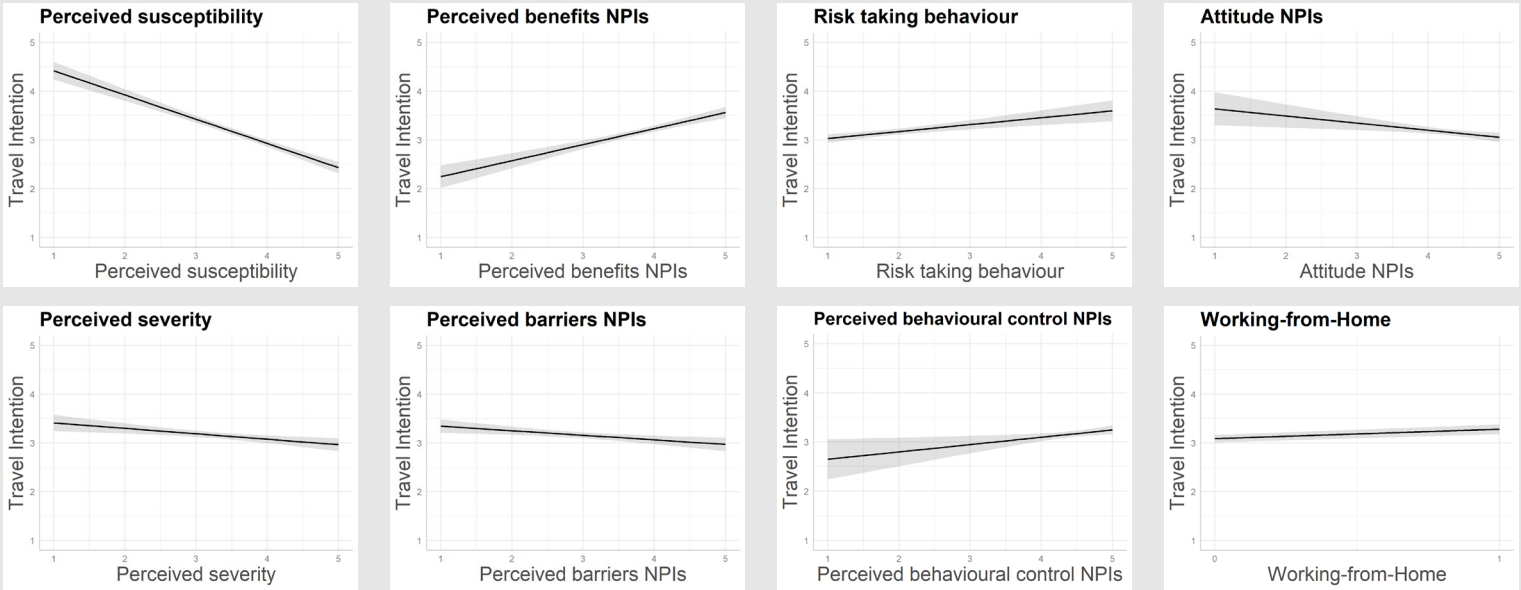
Table: OLS Regression with general travel intentions as dependent variable

Variable	*b*	*S.E.*	95% CI		*Beta*	*T*	*p*
			LL	*UL*			
Constant	3.987	.324	3.351	4.622	-	12.299	<.001
Risk-taking behaviour	.142	.034	.075	.208	.102	4.179	<.001
Perceived susceptibility	-.497	.034	-.564	-.429	-.370	-14.488	<.001
Perceived severity	-.112	.035	-.180	-.043	-.086	-3.205	.001
Perceived benefits NPIs	.329	.041	.249	.409	.202	8.033	<.001
Perceived barriers NPIs	-.093	.031	-.155	-.032	-.071	-2.972	.003
Self-efficacy	-.028	.043	-.113	.057	-.017	-.643	.520
Attitude NPIs	-.147	.052	-.249	-.044	-.091	-2.815	.005
Subjective norm NPIs	.045	.048	-.048	.138	.028	.946	.344
Perceived behavioural control NPIs	.149	.060	.032	.266	.067	2.496	.013
Working from home (ref: no)	.192	.065	.064	.320	.064	2.936	.003
Age	-.003	.002	-.007	.001	-.035	-1.380	.168
Gender (ref: female)	.079	.065	-.049	.206	.027	1.208	.227
$R^2_{korr.}$	.277						

Note: n = 1,568 (listwise case deletion); b = non-standardized coefficients; *SE* = standard errors; CI = confidence interval (95%); *LL* = lower limit; *UL* = upper limit; Beta (β) = standardized coefficients; T = t-Value, p = p-value; $F(12, 1555) = 51.064$, $p < .001$.

Results: Tourists' travel intentions during the COVID-19 pandemic

Thao, V. T., Hüsser, A. P., & Ohnmacht, T. (2022). A combined theory-based explanatory model for predicting tourists' travel intentions during the COVID-19 pandemic: The role of individual's assessment of the compliance with non-pharmaceutical interventions. *Discover Psychology, 2*(36). https://doi.org/10.1007/s44202-022-00046-2



Research question

4) How do different NPIs influence the social psychological factors and travel intentions?

How do different NPIs influence the social psychological factors and travel intentions?

Hüsser, A. P., & Ohnmacht, T. (2023). A comparative study of eight COVID-19 protective measures and their impact on Swiss tourists' travel intentions. *Tourism Management, 97*, Article 104734. https://doi.org/10.1016/j.tourman.2023.104734

Tourism Management 97 (2023) 104734

Contents lists available at ScienceDirect

Tourism Management

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

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

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ARTICLE INFO

Keywords:
Risk-taking attitudes (DOSPERT)
The health belief model (HBM)
The theory of planned behavior (TPB)
COVID-19
Vaccination passport
Surgical masks
Quarantine
Tourism behavior

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 will-ingness 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 implica-tions 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 (Hao 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; Soto-mayor-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 operation-alizations of risk perceptions, which makes reproducibility more diffi-cult. 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 suscepti-bility 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., Hsiang 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., Gaschi 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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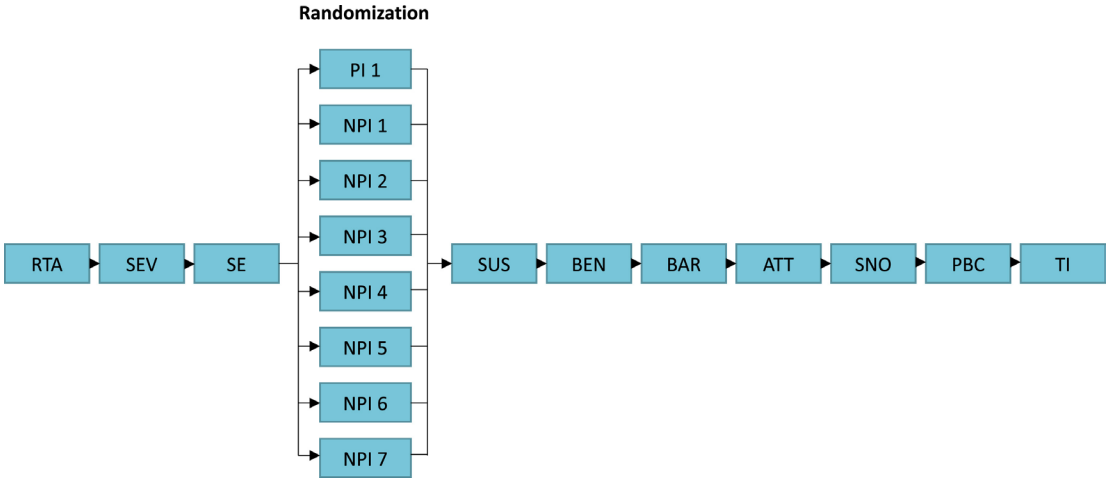
https://doi.org/10.1016/j.tourman.2023.104734
Received 26 April 2022; Received in revised form 16 January 2023; Accepted 23 January 2023
Available online 25 January 2023

Experimental survey design

LINK

	CAWI
Population	18–79-year-old language-assimilated population in Switzerland who use the internet at least once a week for private purposes.
Sampling basis	LINK Internet panel, actively recruited by telephone with currently over 108,000 active members
Sampling	Proportional, quotas by language region, gender, and age (15-39/40-59/60-79)
Number of interviews	2,018
Survey languages	D/F/I

Field time: March 29, 2021 – April 9, 2021



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.

Experiment survey design

	Modeling studies / Systematic reviews / Observational studies / Field experiments
Vaccination (passport) (PI)	Pavli & Maltezou (2021); Sharun et al. (2021); The Lancet Microbe (2021); Andrews et al. (2022); Thomas et al. (2021); Barda et al. (2021); Leshem & Lopman (2021); Amit et al. (2021); Hall et al. (2021); Rahman et al. (2022)
Surgical masks (NPI 1) **FFP2 masks (NPI 2)**	Greenhalgh et al. (2020); Brooks & Butler (2021); Huynh (2020); Wong et al. (2020); Chu et al. (2929); Li et al. (2020); Leung et al. (2020); Mitze et al. (2020); Karaivanov et al. (2021); Lyu & Wehbvy (2020); Bagheri et al. (2921); Cheng et al. (2021)
Rapid testing of incoming travelers at points of entry (NPI 3)	Dickens et al. (2020); Burns et al. (2021); Russell & Buckeridge (2021); Colavita et al. (2021)
Governmental travel warnings (NPI 4)	Chan et al. (2021); Haug et al. (2020)
PCR test taken at maximum of 72 hours before travel (NPI 5)	Johansson et al. (2021); Blanford et al. (2022); Grunér et al. (2922); Smirnov et al. (2022)
10-day quarantine of returning travelers from high-risk areas (NPI 6) **14-day quarantine of incoming travelers at arrival (NPI 7)**	Ashcroft et al. (2021); Burns et al. (2021); Al-Tawfiq et al. (2020); Dickens et al. (2020); Aggarwal et al. (2022); Tu et al. (2921); Smirnov et al. (2922); Benhima & Billon (2021)

Results: Robust ANOVAs (20% trimmed means)

Hüsser, A. P., & Ohnmacht, T. (2023). A comparative study of eight COVID-19 protective measures and their impact on Swiss tourists' travel intentions. *Tourism Management, 97*, Article 104734. https://doi.org/10.1016/j.tourman.2023.104734

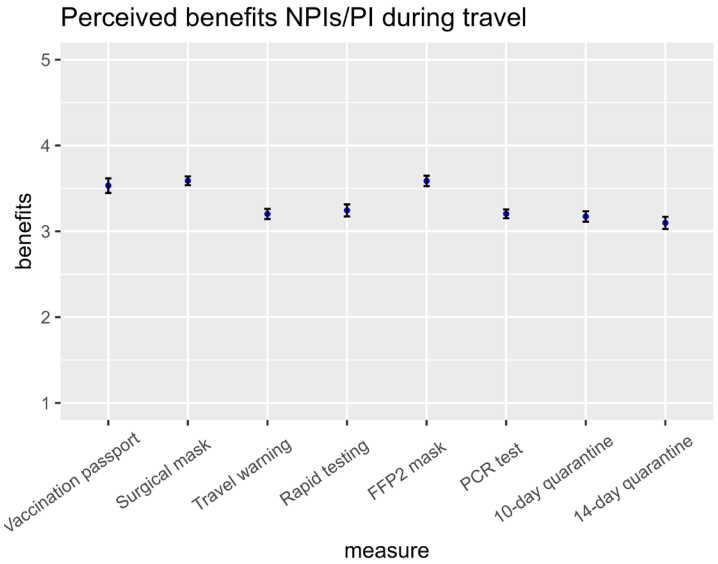
Table: Trimmed means, trimmed standard errors and robust *F*-statistics

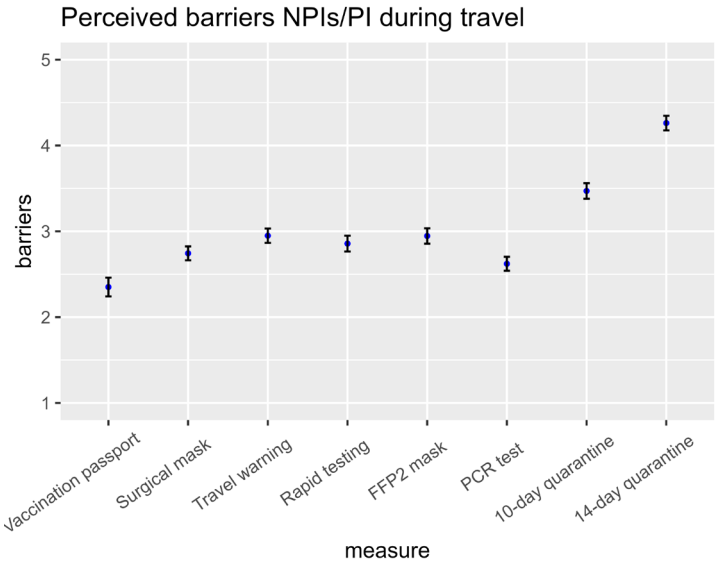
	Trimmed cell means by protective measure								*F*	ξ
Construct	VP (n = 254)	SM (n = 252)	TW (n = 252)	RT (n = 252)	FFP2 (n = 252)	PCR (n = 252)	10dQ (n = 252)	14dQ (n = 252)		
SUS NPIs/PI	2.82 (0.08)	3.11 (0.07)	3.15 (0.08)	3.02 (0.08)	3.00 (0.08)	3.13 (0.07)	3.06 (0.08)	3.00 (0.08)	1.86	.11
BEN NPIs/PI	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 NPIs/PI	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 NPIs/PI	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 NPIs/PI	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 NPIs/PI	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 NPIs/PI	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

Note. *** $p < .001$. 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, 10dQ = 14-day quarantine on inbound travelers.

Results: Robust post-hoc tests (linear contrasts)

Hüsser, A. P., & Ohnmacht, T. (2023). A comparative study of eight COVID-19 protective measures and their impact on Swiss tourists' travel intentions. *Tourism Management, 97*, Article 104734. https://doi.org/10.1016/j.tourman.2023.104734





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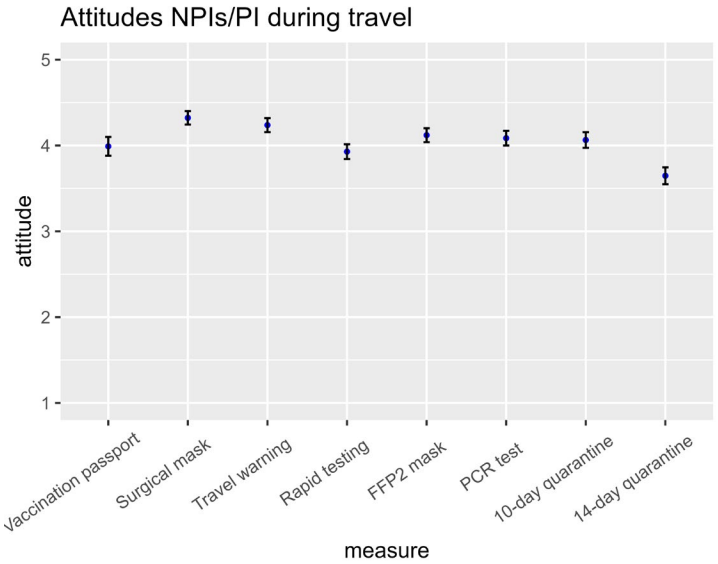

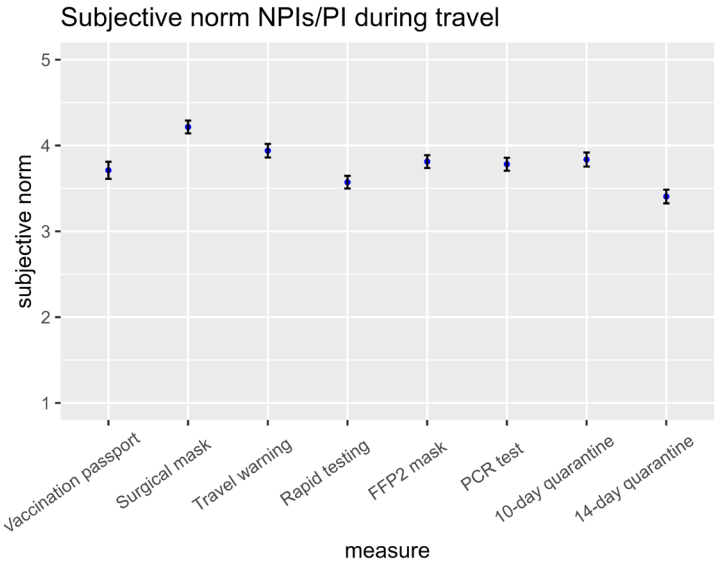

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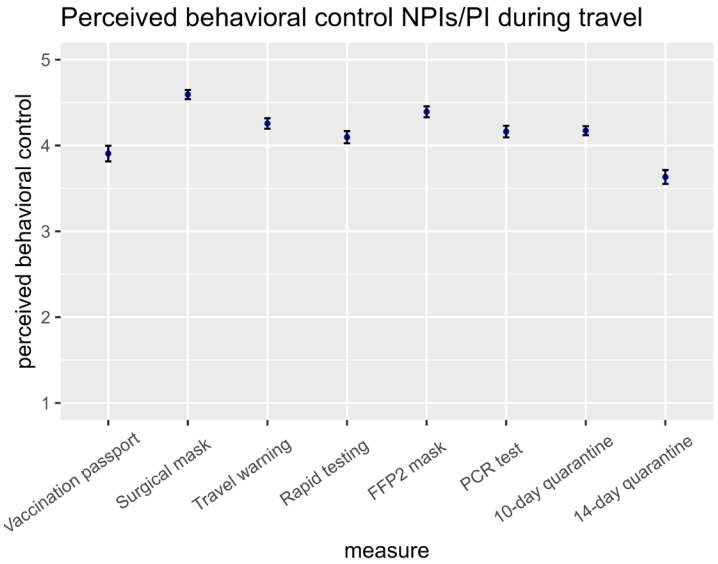
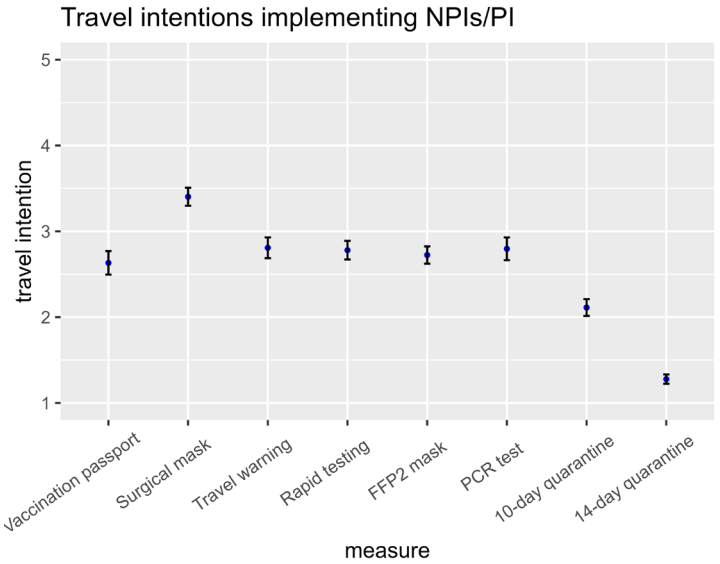




Results: Stepwise regression (method: forward and backward)

Hüsser, A. P., & Ohnmacht, T. (2023). A comparative study of eight COVID-19 protective measures and their impact on Swiss tourists' travel intentions. *Tourism Management, 97*, Article 104734. https://doi.org/10.1016/j.tourman.2023.104734

	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.

Research question

5) How can the social psychological factors be addressed by pointers of interventions to increase the acceptance of NPIs while travelling?

Intervention design (I)

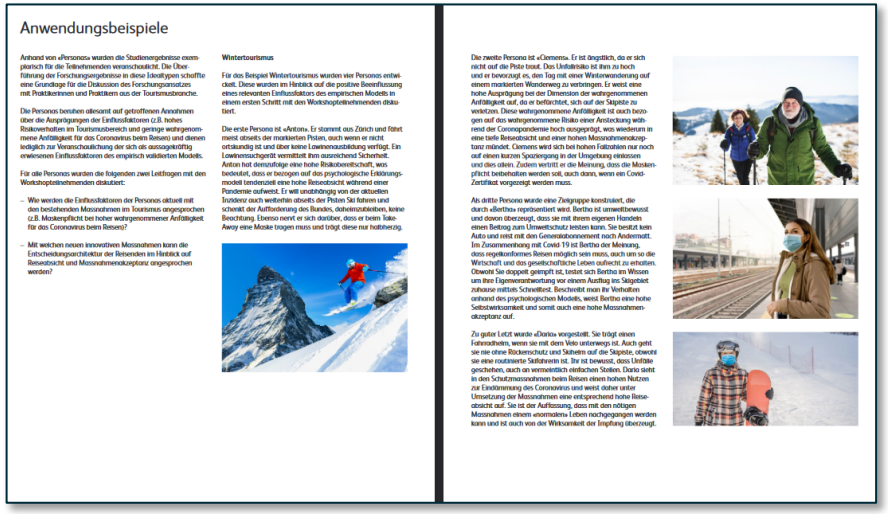
Bridging the gap between science and practice: Co-creation workshop to formulate intervention strategies for the acceptance of NPIs and Influences on intention to travel

25 October 2021

SWISS TOURISM FEDERATION, EuroAirport Basel-Mulhouse-Freiburg, Ship company for Lake Lucerne, Federal Office of Transport (BAV), Aargau Tourism AG …

Intervention design (II)

«The first stage involves the development and evaluation of a psychosocial model of the putative determinants of a particular health behavior. This may be a hybrid model that draws constructs from existing theories and models, and it may also integrate constructs from related areas of scholarship. The second stage involves translation of the psychosocial model into a multicomponent intervention to encourage behavior adoption. Here, each model construct is transformed into a component of the intervention and becomes a candidate mechanism by which the intervention may bring about behavior change." (Aiken, 2011, p. 612)



Source: Oberholzer et al. (2022)

Intervention strategies	Examples of measures	Influencing dimensions	Intention to implement NPIs
Regulatory and control instruments, digital infrastructures	Quarantine at arrival, entry only with booster vaccination, case isolation, virtual queue systems, circuit breaker	Perceived susceptibility (HBM)	Increased acceptance and proper implementation of non-pharmaceutical interventions (NPIs) while travelling
Ease-of-use (services, assistance)	Provision of support by touristic hosts, testcenter at airports	Perceived barriers (HBM)	
Declarative knowledge	Mass media campaigns: Travel is safe under the following conditions...	Attitude (TPB)	
Normative persuasion role models	Prominent people set an example of safe travel (social media, influencer)	Subjective norm (TPB)	
Low cost interventions (time, money, comfort)	Provision of accessories (free masks, sanitiser), free of charge-testing	Perceived behavioural control (PBC)	

Source: Ohnmacht et al. (2022)

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