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Knowledge of declared behaviour: effect of attitude and intention

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Abstract: Human behaviour is challenging to explain, and testing times like COVID-19 add another layer of complexity. Based on the theory of planned behaviour (TPB), the current paper traces a path model to understand how declared behaviour was impacted during the pandemic in Germany and Sweden. This study applies response time testing (RTT), which reduces the cognitive biases of self-reporting-based surveys. Results show that attitude and intentions form central elements impacting declared behaviour. Perceived threat has a high impact on declared behaviour, both directly and indirectly via attitude. Thus, political decision-makers need to take attitude into account when designing effective communication to influence behaviour.

Keywords: TPB; theory of planned behaviour; COVID-19; Germany; Sweden; attitude; intentions.

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Dorota Reykowska is a Psychologist, with 15 years of experience in marketing research. Currently responsible for leading the Research & Development department in NEUROHM. Cooperates with Universities all over the world working on developing Response Time (RT) methodology. Part of multiple international research teams (from e.g., USA, Singapore, Switzerland, India, Belgium, Portugal) working on RT projects and implementing iCode™ to scientific research. A participant and speaker on many conferences both scientific (e.g., ICORIA, NeuroPsychoEconomics), and industry (ARF, PTBRiO, Neuroconnections etc.). A co-author of publications in polish and international journals/books. Involved in the development of biometric methodology in marketing research and creation of the first polish neuromarketing project.

Rafal Ohme is a one of the world's pioneers in consumer neuroscience, Board Member of Neuromarketing Science and Business Association (2 terms), an organisation to integrate neuroscientists and practitioners from 34 + countries worldwide. He is a Professor of Psychology, Expert in Emotions, Communication and Brain Research. He teaches in South Africa at Stellenbosch University and in Poland at WSB University, was a Visiting Professor at Renmin University in Beijing, China. Member of Major Marketing, Psychological and Neuroscientific Associations, he publishes in top scientific journals. He wrote Mind Spa (2019), Emo Sapiens (2017), Unconscious Affect (2007), Subliminal Facial Information (2003), and trilogy Automaticity (2001, 2003, 2003).

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Joaquin Fernandez is Sociologist, Creator of the Marketing Intelligence Institute that holds his name. Over 30 years of experience in customer knowledge and in market research in Switzerland and abroad. Acknowledged for his unique approach that includes sociological studies, and mastery of advanced technologies in data analysis and consulting. He is also known for having conducted and elaborated the first barometer of Sustainable Development of Romands in 2010. He is currently Associate Professor at the School of Management of Fribourg and Geneva at the University of Applied Sciences and Arts of Western Switzerland. He is also an Associate Professor at CREA. In the past, his experience led him to be a lecturer and associate professor at the University of Geneva, University of Lausanne, the School of engineering of Changins, SAWI, IDE institute and the HEIG-VD, amongst others.

1 Introduction

Shortly after it was first reported from Wuhan, China, in December 2019, the novel Corona Virus disease (also called COVID–19) caused by the virus SARS-CoV-2 spread globally (Yu et al., 2020). The mobility of people in a highly connected world fuelled the rapid spread (Shaw et al., 2020). As of December 18, 2020 (4.31 pm CET), there were 73,996,237 globally confirmed coronavirus cases, and this figure included 1,663,474 deaths (WHO, 2020). Governments from various countries tried to contain the spread of the virus by educating and imposing health measures. Washing and sanitising hands, wearing masks, and social distancing became standard rules (OECD, 2020). Digitalisation allowed nations to set new standards such as offices at home for companies and online classes for schools and universities. Closing shops, restaurants, and bars complemented these measures. Finally, some governments even closed national borders and restricted movements within the country, curfews, lockdowns, etc. Trying to minimise physical contact and staying apart effectively combatted the spread of coronavirus (Deb et al., 2020), but effectiveness varied across countries (OECD, 2020).

Governments communicated these practices expecting people to adopt them as an obligation (not advice), with the notion that self-care is essential for good health (Zainuddin et al., 2013). It is interesting to note that although these practices have been advocated globally, their effectiveness in limiting the spread varies. According to John Hopkins University (2020), countries such as Australia, Japan, New Zealand, etc., show a much lower spread than countries such as US, India, Brazil, etc. (John Hopkins University, 2020). One of the reasons that might explain these differences is that successful implementation requires social cooperation. However, the policies framed by the government affect public opinion (Ebbinghaus and Naumann, 2017), leading to alteration in the attitudes of the people (Naumann et al., 2020).

Therefore, the current study explores people's behavioural responses toward the pandemic and their reaction to various initiatives that were taken to contain the spread of the disease. Ajzen (1991) extended the theory of reasoned action (Ajzen and Fishbein, 1980) to the theory of planned behaviour (TPB) due to the former's limitation in dealing with behaviour over which people have incomplete control. The TPB tries to understand the declared behaviour by looking at the attitude of the people, their understanding of the acceptance of their behaviour by peers (subjective norm), and the extent of control over their behaviour, i.e., perceived behavioural control (PBC) (Ajzen, 1991). This analysis method is appropriate for studying people's behaviour during testing times that came about as a result of the COVID-19 pandemic. It looks at people's behaviour which they do not entirely control. Therefore, the current paper uses the TPB to study declared behaviour of people towards COVID-19 in Germany and Sweden. Table 1 presents an overview of the coronavirus cases in the countries studied along with the mortality rates.

There is a broadly accepted understanding that automatic (95% of our decisions, Zaltman (2003) responses (Kahneman, 2011) drive human behaviour (to a large extent). Those responses find their origin in attitudes, the social context, and self-perception. Therefore, they show a substantial similarity with the TPB, which is also based on attitudes, subjective norms, and PBC. Classical TPB studies apply the Likert scale to collect data for the three dimensions. This method relies on self-reported data and is subject to cognitive biases (Marsden, 2011; Feld Scott and McGail, 2020).

Table 1 Corona virus cases in country's studied

Country	*Transmission classification*	*Population* (2019)*	*Confirmed cases***	*Cases as % of population*	*Deaths***	*Deaths as a % of population*
Germany	Cluster of cases	83,517,045	1,439,938	1.7	24,938	0.03
Sweden	Community transmission	10,036,379	357,466	3.6	7893	0.08

Source: **WHO, 2020; *Worldmeter population data – 2019

If we want to identify 'automatic' or, as Kahneman (2011) called them, System 1 responses, we need to apply an adequate methodology. This methodology should enable us to measure respondents' degree of conviction, which is a reliable predictor of automated responses. Therefore, the current TPB study applied response time testing (RTT) to collect the data. This validated neuroscientific methodology allows measuring the respondents' degree of conviction of response (Fazio et al., 1986).

2 Study of declared behaviour through theory of planned behaviour

The TPB postulates that PBC, attitude, and subjective norms are essential predictors for intentions to engage in behaviour and actual conduct (Ajzen and Madden, 1986; Ajzen, 1991). Since then, various studies rely on TBP such as online purchases (Pavlou and Fygenson, 2006); online food purchases during Covid times (Troise et al., 2020); HIV protection (Albarracin et al., 2000); cancer follow-up care (Baenziger et al., 2018); etc.

The declared behaviour studied in the light of the COVID-19 pandemic involves the following conduct: The individual will encourage others to follow the restrictions and guidelines, comply with the physical distancing recommendations, stay at home, disinfect groceries, mail, and deliveries before putting them away, and wash hands for 20 s whenever necessary.

2.1 Attitude

According to Ajzen, the attitude refers to the individual's evaluation of his behaviour's positive and negative consequences. It is a learned disposition to respond in a consistently favourable or unfavourable manner for a given object (Ajzen and Fishbein, 1980). Attitudes are based on cognitive beliefs (Bamberg et al., 2003), both conscious and unconscious (Britannica, 2021), and help understand and predict behaviour. Studies on 2003 SARS outbreak in China suggest association between panic emotions and attitude and knowledge of the people and could complicate the attempts to contain the spread of disease (Hung, 2003). Covid 19 study shows that 'positive attitude towards using protective measures is important to limit the spread of the disease' (Abdelhafiz et al., 2020). Therefore, the current paper explores the people's attitudes related to people's health in their country and whether they are anxious and worried about not meeting family and friends. In addition, it explores people's attitudes and gratitude toward their essential workers and healthcare professionals. Other items included in 'attitude' were feeling that the coronavirus is dangerous for their health and that the restrictions will

continue for about a month. Not being able to go out for grooming and beauty treatments, which makes people feel less sexy closes the list of variables studied to define and analyse the attitude.

Many researchers have argued that attitude refers to cognitive components and affective ones (Edwards, 1990; Trafimow and Sheeran, 1998; French et al., 2005). Attitude includes emotions and feelings (Bae, 2008; Arvola et al., 2008), which are more reliable to predict intention (Moons and De Pelsmacker, 2012). COVID-19 resulted in lockdowns and work-from-home situations, leading to various but strong emotions within the population. This study operationalises this emotional dimension. It measures its impact on attitude and behavioural intention through two statements: "Coronavirus will reveal the best in people", and "We will soon beat the coronavirus".

Threat avoidance studies show that when consumers perceive a threat, "they are motivated to actively avoid the threat by taking a safeguarding measure" (Liang and Xue, 2010). An individual's belief is formed by the information he or she disposes of, influenced by their culture, situational factors, and personal factors (Ajzen and Fishbein, 2005). The current paper, therefore, explores the various threats such as:

- job worries
- personal and country's financial situation
- availability of primary necessities
- increasing inequality in society
- threats to own health and health of children, older family members, education of children
- increase in break-ins and thefts
- family tensions
- domestic violence
- divorce rates
- the negative impact of living in isolation on personal wellbeing
- restrictions would continue for a few months.

The various hypotheses proposed are:

H1. Attitude positively influences behavioural intention towards coronavirus.

H2. Attitude positively influences declared behaviour towards coronavirus.

It is interesting to note that various studies have added new factors that impact behaviour apart from the ones described by Ajzen (1991). Those factors include perceived innovativeness (Yang, 2005), ease of use (McCloskey, 2006), utilitarian and hedonic motivations (Chakraborty and Soodan, 2019; Zhang et al., 2019), culture (Gredig et al., 2007), policy compliance (Sommestad et al., 2019), and contextual factors (Troise et al., 2020). Anticipated emotions are studied to be 'parallel predictors' along with TPB as they account for the 'judged consequences of goal achievement' (Perugini and Bagozzi, 2001, p.83). That is, individuals have goals and they study the consequences of its achievement/not achievement and the subsequent emotions arising from this outcome and

this influences their purchase decision (Carver and Scheier, 1998) along with TPB (Perugini and Bagozzi, 2001; De Pelsmaeker et al., 2017).

According to the protection motivation theory (PMT), individuals take protective action when faced with perceived threats (both actual and potential) (Rogers, 1983) and perceived threats are found to effect adoption intention (Kim and Kyung, 2023; Rana et al., 2019). Thus, for the current study, additional variables have also been considered, namely: – perceived threats and anticipated positive emotions. During the early days of the pandemic, when the mortality rate was high and people felt threatened by the virus, emotions ran high. Thus the hypotheses studied are:

H3. Positive anticipated emotions related to COVID-19 positively influence attitude toward coronavirus.

H4. Positive anticipated emotions related to COVID-19 positively influence declared behaviour towards the coronavirus.

H5. Perceived threats related to COVID-19 positively influence attitudes toward the coronavirus.

H6. Perceived threats related to COVID-19 positively influence declared behaviour toward the coronavirus.

2.2 Subjective norm

The subjective norm is the belief of what other people will think when an individual engages in a particular behaviour and assesses the social pressure not to perform or perform the behaviour (Conner and Norman, 2005). Subjective norm is found to influence behaviour intention (Nugroho et al., 2018) and the influence of subjective norm on intention varies across countries as it is influenced by power distance (Hassan et al., 2016). Thus the need to study this in light of the two countries being studied.

To prevent the spread of the pandemic, public behaviour like wearing masks, social distancing, etc., was a norm. The norms therefore studied are:

- slowing the spread of COVID-19 is more important than the economy
- whether people will comply with the restrictions or not.

The current paper explores the effect of subjective norms on the behavioural intention towards coronavirus with the following hypotheses:

H7. Subjective norms positively influence behavioural intentions towards the coronavirus.

H8. Subjective norms positively influence declared behaviour towards the coronavirus.

2.3 Perceived behavioural control (PBC)

The perception of ease or difficulty of performance of a behaviour is the PBC and forms an essential component of TPB. This perception is strongly influenced by factors related to the individual such as individual deficiencies, skills, etc., and the external or collective factors such as opportunities, barriers, dependence on others, etc. (Ajzen, 1991, Armitage

and Conner, 2010). PBC is found to influence intention and actual behaviour (Al Ziadat, 2015; De Groot and Steg, 2007; Rhodes and Courneya, 2005). The role of PBC is essential since, sometimes, there was an overload of contradicting information on traditional news channels and social media. Governments played a central role in trying to control the situation and making appropriate medical assistance available. This paper explores the construct by studying whether the respondents felt:

- that they would get appropriate medical help
- the media were exaggerating the situation or providing reliable information
- they are satisfied with the government for handling the crisis
- the government disclosed real numbers related to infections and deaths.

The study of the PBC is also essential because studies that tested emotions in the TPB model showed PBC becoming non-significant (Londoño-Roldan et al., 2017). Since the current study explores emotions as well, it would be interesting to note whether PBC significantly influences behavioural intentions and declared behaviour or not.

Thus, the current study proposes the following hypotheses:

H9. Perceived behavioural control positively influences behavioural intentions towards coronavirus.

H10. Perceived behavioural control positively influences declared behaviour towards coronavirus.

2.4 Intentions

The intention is the central construct in the TPB model. It captures motivational factors influencing the behaviour and the degree of willingness to try and put effort into performing the behaviour (Conner and Norman, 2005). According to the TPB, intention directly influences behaviour. The more significant the intention, the higher the likelihood of executing the behaviour (Steinmetz et al., 2011). The intentions studied are if respondents:

- will help other people vulnerable to the coronavirus
- would like to be vaccinated once the vaccine is ready
- perceive the impact of COVID-19 on their eating and exercising habits.

Thus, the hypothesis is:

H11. Behavioural intentions toward COVID-19 positively impact the declared behaviour towards coronavirus.

3 About the study

The current research draws exclusivity from using a reliable neuroscientific technology such as RTT. This approach allows to gauge and understand the declarative response

and the level of conviction of responses, which is a reliable predictor of behaviour (Bassili and Brown, 2005). Fazio et al. (1986) has shown that correlations between attitudes and behaviour are much higher among people showing a faster reaction time when expressing their opinions. Therefore, the response latency time or RTT is a simple but valuable tool for understanding unconscious processes (Bassili, 1996) and revealing hidden, automatic, and emotional reactions. Our survey used iCode™ industry-recognised RTT technology created by Neurohm (Ohme et al., 2020). iCode™ iCode Smart Test is a web-based platform that, apart from declarations, captures true attitudes which are free from conformity, social and cognitive biases, or wishful thinking. The test is embedded with algorithms that estimate how much people hesitate when they express their opinion in a survey. Higher confidence, expressed by shorter reaction time, indicates a well-established, internalised attitude, not just wishful thinking, and is more likely to drive behaviour.

4 Why RTT suits studying theory of planned behaviour

Variables of TPB result from the cognitive processing of beliefs every time a decision is made (Bamberg et al., 2003). According to Britannica (2021), cognition "includes all conscious and unconscious processes by which knowledge is accumulated, such as perceiving, recognising, conceiving, and reasoning". Therefore, the quality of data collected is an important determinant (Savage and Vickers, 2009; Sayogo and Pardo, 2013; Wang and Strong, 1996) of the research quality (Adams, 2020). A literature review shows several studies focused on biases in the data collected by self-reported or declarative surveys (Bernard et al., 1980; Marin, 2004; Feld Scott and McGail, 2020). Thus, a gap can exist between what the respondents deeply believe and what they declare (Butts, 2003). According to Armitage and Conner, 2010, the self-report biases are a weakness of the TPB. In his meta-analytic research study based on the TPB, performed over two decades, Ajzen (2011) found that past behaviour (i.e., memory) affects future behaviour. RTT allows us to measure the quality of association available in people's memory and is a perfect fit for this type of study. Hence studying the TPB with the help of RTT helps enhance the accuracy of the results.

4.1 Procedure

The study was performed online in April 2020, using the iCode™ platform. Participants were recruited by a professional polling company (*Syno.com*). A representative sample for age and gender was collected in Germany and Sweden, with $n > 1000$ in each country (see Table 2).

The test focused on gathering people's opinions on the COVID-19 pandemic. The participant's task was to evaluate if they agreed with the presented statements. The statements covered the emotional (fears), behavioural (following guidelines and lifestyle changes), and cognitive aspects (such as predictions, evaluations of government actions) in dealing with the pandemic (the complete list of statements is attached). The RTT-based test was executed online on a computer screen. The participants expressed their opinions on forty-four statements, appearing only once and in random order.

The RTT application showed the statements individually, and participants had to choose between yes, hard tell, no (Figure 1). We recorded participants' declarative responses and the time needed to answer (RT- response time).

Table 2 Number of respondents and demographic split per country

	Total	*Gender*		*Age*		
	n	*Females*	*Males*	*18–35*	*36–49*	*50+*
GERMANY sample	1017	49%	51%	27%	24%	50%
GERMANY population*	~60.5 mln	51%	49%	29%	24%	47%
SWEDEN sample	1006	50.4%	49.6%	30%	20%	49%
SWEDEN population**	~7.3 mln	49%	51%	33%	25%	42%

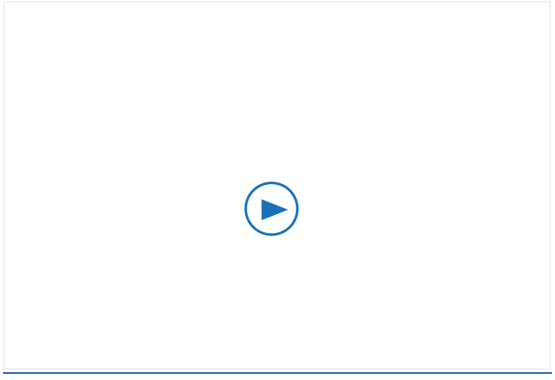
*German data for 18–75 y.o for year 2020 from https://www.destatis.de/**Swedish data for 18–75 y.o for year 2020 from https://scb.se/en/

Figure 1 Screen from the main part of the test (see online version for colours)

Combining declarative answers with RT provides a continuous scale that makes the data more reliable by solving the problems of information loss and enabling advanced statistical analysis (Treiblmaier and Filzmoser, 2011). Additionally, this type of scale eliminates the problem of extreme response styles, which is a tendency of individuals to either choose or avoid extreme answer points (Batchelor and Miao, 2016). This problem has been extensively studied in cross-cultural research showing that the tendency may cause significant interpretation problems (Clarke, 2000; Hui and Triandis, 1989; Johnson et al., 2005).

The software imposes a control screen (Advanced Button) to ensure that the mouse's position does not bias the registered reaction time (RT) for yes and no answers. This Advanced Button screen appeared between all the test screens. After answering each statement, the respondents faced a whiteboard with a blue button in the middle (Figure 2). The task of the respondents was to click on this blue button. This procedure ensured that the distance to both yes and no buttons was the same each time.

Figure 2 Advanced button screen (see online version for colours)



4.2 Data preparation

The first step of data preparation consisted in eliminating low-quality answers by removing very fast (given randomly) and prolonged answers (suggesting distraction from the test). Answers below 500 ms were treated as too fast and above 10,000 ms as too slow (Karylowski and Mroziński, 2017). This procedure eliminated 4.35% of answers from the German sample and 3.91% from the Swedish sample.

The next step eliminated individual differences in reaction and speed of execution. Response time data measured in milliseconds were standardised using z-scores of log (latency), creating an Std-RT score, with the $M = 0$ and SD = 1.

The final step was to create an RTC index, a measure that combines explicit answers with response time results. For this, the following formula has been used:

For explicit *Yes* answers (RTC values in the range from 0 to 2):

$$RTC = [1 - (Std\text{-}RT/2)]$$

For explicit *No* answers (RTC values in the range from –2 to 0):

$$RTC = [(Std\text{-}RT/2) - 1]$$

Std-RT values above 2 and below –2 were truncated and given the value 2 or –2, respectively. Hard to Tell answers were coded as 0.

Further data analyses were performed using the RTC scores where the range from –2, –1, 0, +1, +2 was taken and was more precise due to the use of RTT.

5 Measurement and the structural model

5.1 Germany

5.1.1 Measurement items for Germany

Smart PLS (Ringle et al., 2015) was used to run the PLS-SEM path-weighing scheme to evaluate the reliability and validity of the outer model's constructs measures. Table 2 summarises the results of the model. The factor loadings and composite reliability allowed testing the convergent validity. The first essential element is the verification of

the unidimensionality of the blocks. Since this is a reflective case, the blocks must be one-dimensional. Table 3 shows that the composite reliability is above the recommended 0.6 benchmark (Bagozzi and Yi, 1988) except for positive anticipated emotions and subjective norms. For some of the variables, the factor loadings were less than the acceptable value of 0.7 (Hair et al., 2016), but these constructs were retained since the composite reliability was applicable. Finally, the first eigenvalue is much greater than the second in all cases except for the subjective norm. Thus, this indicates the correctness of the specifications of the outer model, which measures the internal consistency.

Table 3 Measurement items of the constructs for Germany

Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Attitude	AA_YES_A20	I am worried about the health of people in my country	0.74	0.71	0.26
	AA_YES_A26	I am anxious about not being able to meet with friends	0.51		
	AA_YES_A27	I am worried about not being able to meet with my family	0.44		
	AA_YES_A31	I am grateful to our essential workers	0.42		
	AA_YES_A32	I am grateful to our healthcare professionals	0.5		
	AA_YES_A36	Coronavirus is dangerous for my health	0.66		
	AA_YES_A50	The restrictions caused by COVID-19 will continue for about a month	0.40		
	AA_YES_A53	I feel less sexy	0.16		
Declared behaviour	CD_YES_A01	I actively encourage others to follow the restrictions and guidelines	0.67	0.712	0.3
	CD_YES_A02	I comply with the recommendations for physical distancing	0.54		
	CD_YES_A03	I comply with the restrictions to stay home	0.64		
	CD_YES_A04	I disinfect groceries before putting them away	0.47		
	CD_YES_A05	I disinfect mail and deliveries before opening them	0.37		
	CD_YES_A06	I wash hands for 20 s when necessary	0.54		
Positive anticipated emotions	EAP_YES_A45	COVID-19 reveals the best in people	0.94	0.36	0.46
	EAP_YES_A47	I believe we will beat COVID-19 soon	–0.17		

Table 3 Measurement items of the constructs for Germany (continued)

Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Intentions	I_YES_A07	I would like to help people who are more vulnerable to COVID-19	0.74	0.68	0.35
	I_YES_A35	When a COVID-19 vaccine is available I'd like to be vaccinated	0.56		
	RP_YES_A08	Since COVID-19 I eat more healthy	0.49		
	RP_YES_A11	Since COVID-19 I exercise at home more	0.57		
Perceived behavioural Control (collective)	EP_YES_A37	Media exaggerate the situation with COVID-19	–0.47	0.63	0.41
	EP_YES_A38	Media provide reliable information about the pandemic	0.71		
	EP_YES_A40	I am satisfied with how my government is handling this crisis	0.75		
	EP_YES_A43	In case of a coronavirus infection I will get appropriate medical help	0.58		
	EP_YES_A44	The government discloses real numbers of coronavirus infections and deaths	0.65		
Perceived threats	MP_YES_A12	I am worried about my financial situation	0.45	0.8	0.2
	MP_YES_A13	I am worried about my job situation	0.44		
	MP_YES_A14	I am worried that our country will run out of money	0.45		
	MP_YES_A15	I am worried that there will not be enough basic necessities in the stores	0.36		
	MP_YES_A16	The COVID-19 outbreak will make society more unequal	0.34		
	MP_YES_A17	I am worried about my own health	0.64		
	MP_YES_A18	I am worried about the health of my children	0.50		
	MP_YES_A19	I am worried about the health of my older family members	0.55		
	MP_YES_A21	I worry that there will be an increase in break-ins and thefts	0.34		

Table 3 Measurement items of the constructs for Germany (continued)

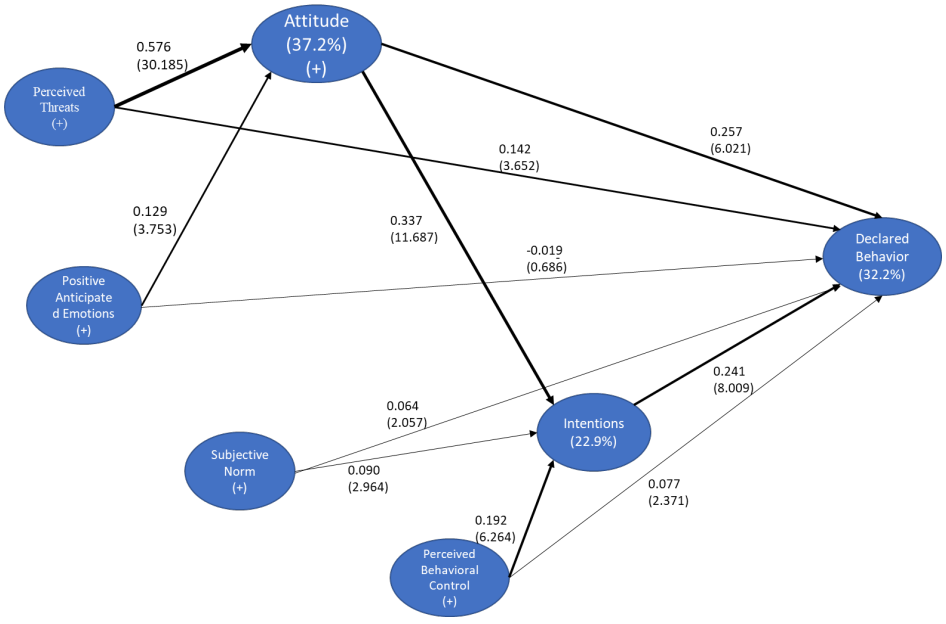
Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Perceived threats	MP_YES_A22	I am worried about my children s education	0.47		
	MP_YES_A23	Being together all the time increases family tensions	0.42		
	MP_YES_A24	COVID-19 increases domestic violence	0.38		
	MP_YES_A25	COVID-19 will increase divorce rates	0.37		
	MP_YES_A28	I worry how living in isolation will affect me	0.55		
	MP_YES_A29	Living in isolation negatively impacts my wellbeing	0.44		
	MP_YES_A33	My chance of getting COVID-19 is high	0.45		
	MP_YES_A49	The restrictions caused by COVID-19 will continue at least until the fall	0.23		
Subjective norm	SN_YES_A34	Slowing the spread of COVID-19 is more important than the economy	0.96	0.31	0.51
	SN_YES_A48	People will stop following the restrictions soon	–0.29		

Smart PLS was used to run the path analysis. However, a collinearity assessment on the five constructs before testing the hypothesis was conducted. All the VIF values were below the tolerance value of 5, thus showing no multicollinearity (Hair et al., 2011). The bootstrap method with 300 iterations was applied, and statistically significant path coefficients and coefficient of determination (R2 value) values were derived. The path coefficients with their significance levels are shown in Figure 3.

5.1.2 Structural model

For the model to show its predictive capability, the strength of each path in the structural model was determined by the R2 value for each dependent variable: attitude, intention, and declared behaviour (Briones-Peñalver et al., 2018). Analysis shows that this value was over 0.1 for all the dependent variables (Falk and Miller, 1992), which established the model's predictive capability. To check the predictive relevance Q2, a blindfolding test was run, and all the values appeared to be > 0 (see Table 4), thereby showing the predictive relevance of the model. Thus overall, the model is significant for predicting the constructs. Furthermore, the SRMR value was 0.077, below the border value (0.10), showing a good model fit (Hair et al., 2016; Fornell and Larcker, 1981).

Figure 3 Extended TPB Model for behaviour towards COVID-19 in Germany (see online version for colours)



The values mentioned for the path are beta values and t values are in parenthesis. R^2 values are mentioned with the construct.

Table 4 Extended TPB model's predictive capability for Germany

	R2	*Q2*
Attitude	0.37	0.09
Intention	0.23	0.09
Declared behaviour	0.32	0.07

5.1.3 Mediation analysis

Mediation analysis was performed (at 97.5% confidence interval) to assess the effect of perceived threats and positive anticipated emotions on consumer's attitudes towards COVID-19. For perceived threats, it was found that total effect ($\beta = 0.337$, $t = 12.314$, $p = 0$) and direct effect ($\beta = 0.142$, $t = 3.652$, $p = 0$) on declared behaviour, along with the indirect effect ($\beta = 0.047$, $t = 6.645$, $p = 0$) via attitude and intention and indirect effect ($\beta = 0.148$, $t = 5.699$, $p = 0$) via attitude is significant thus showing partial mediation. It was found that positive anticipated emotions' direct effect on declared behaviour ($\beta = –0.019$, $t = 0.686$, $p = 0.493$) is insignificant; the indirect effect ($\beta = 0.010$, $t = 3.281$, $p = 0.001$) via attitude and intention and indirect effect ($\beta = 0.033$, $t = 2.982$, $p = 0.003$) via attitude on declared behaviour is significant in showing complete mediation.

It was found that PBC direct effect on consumer's declared behaviour ($\beta = 0.077$, $t = 2.371$ $p = 0.018$) is significant; the indirect effect ($\beta = 0.046$, $t = 4.733$, $p = 0$) through intentions is also significant showing partial mediation.

The subjective norm's direct effect on consumer's declared behaviour ($\beta = 0.064$, $t = 2.057$, $p = 0.04$) is significant; the indirect effect ($\beta = 0.022$, $t = 2.718$, $p = 0.007$) through intentions is also significant thus showing partial mediation.

5.2 For Sweden

5.2.1 Measurement items for Sweden

Swedish data was run on a similar pattern and used the results to assess the reliability and validity of the outer model's constructs measures. Table 5 summarises the results of the model. The convergent validity was tested through the factor loadings and composite reliability. The table shows that the composite reliability is above the recommended 0.6 benchmark (Bagozzi and Yi, 1988). For some of the variables, the factor loadings were less than the acceptable value of 0.7 (Hair et al., 2016), but these constructs were retained since the composite reliability was acceptable. Finally, the first eigenvalue is much greater than the second in all cases. This indicates the correctness of the specifications of the outer model, which measures the internal consistency.

Table 5 Measurement items of the constructs – Sweden

Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Attitude	AA_YES_A20	I am worried about the health of people in my country	0.67	0.7	0.25
	AA_YES_A26	I am anxious about not being able to meet with friends	0.66		
	AA_YES_A27	I am worried about not being able to meet with my family	0.70		
	AA_YES_A31	I am grateful to our essential workers	0.28		
	AA_YES_A32	I am grateful to our healthcare professionals	0.24		
	AA_YES_A36	Coronavirus is dangerous for my health	0.48		
	AA_YES_A50	The restrictions caused by COVID–19 will continue for about a month	0.34		
	AA_YES_A53	I feel less sexy	0.37		
Declared behaviour	CD_YES_A01	I actively encourage others to follow the restrictions and guidelines	0.66	0.712	0.3
	CD_YES_A02	I comply with the recommendations for physical distancing	0.42		
	CD_YES_A03	I comply with the restrictions to stay home	0.54		
	CD_YES_A04	I disinfect groceries before putting them away	0.59		

Table 5 Measurement items of the constructs – Sweden (continued)

Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Declared behaviour	CD_YES_A05	I disinfect mail and deliveries before opening them	0.56		
	CD_YES_A06	I wash hands for 20 s when necessary	0.45		
Positive anticipated emotions	EAP_YES_A45	COVID–19 reveals the best in people	0.95	0.72	0.58
	EAP_YES_A47	I believe we will beat COVID–19 soon	0.51		
Intentions	I_YES_A07	I would like to help people who are more vulnerable to COVID–19	0.58	0.67	0.35
	I_YES_A35	When a COVID–19 vaccine is available I d like to be vaccinated	0.44		
	RP_YES_A08	Since COVID–19 I eat more healthy	0.63		
	RP_YES_A11	Since COVID–19 I exercise at home more	0.68		
Perceived behavioural Control (collective)	EP_YES_A37	Media exaggerate the situation with COVID–19	0.23	0.73	0.37
	EP_YES_A38	Media provide reliable information about the pandemic	0.68		
	EP_YES_A40	I am satisfied with how my government is handling this crisis	0.57		
	EP_YES_A43	In case of a coronavirus infection I will get appropriate medical help	0.75		
	EP_YES_A44	The government discloses real numbers of coronavirus infections and deaths	0.69		
Perceived threats	MP_YES_A12	I am worried about my financial situation	0.49	0.8	0.2
	MP_YES_A13	I am worried about my job situation	0.44		
	MP_YES_A14	I am worried that our country will run out of money	0.45		
	MP_YES_A15	I am worried that there will not be enough basic necessities in the stores	0.49		

Table 5 Measurement items of the constructs – Sweden (continued)

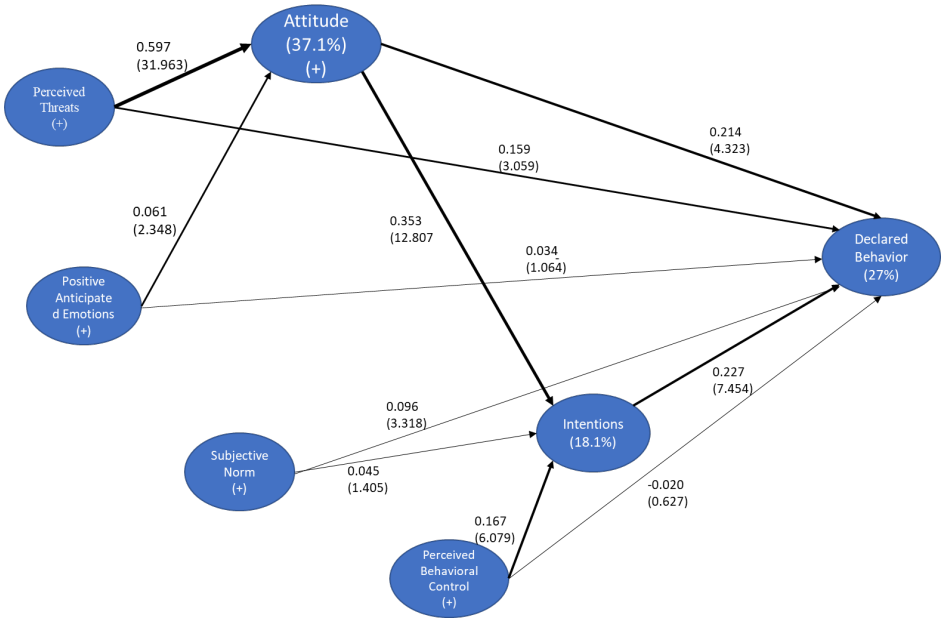
Latent variables	*Variable*	*Question*	*Factor loading*	*Composite reliability*	*Average variance extracted*
Perceived threats	MP_YES_A16	The COVID–19 outbreak will make society more unequal	0.46		
	MP_YES_A17	I am worried about my own health	0.59		
	MP_YES_A18	I am worried about the health of my children	0.45		
	MP_YES_A19	I am worried about the health of my older family members	0.44		
	MP_YES_A21	I worry that there will be an increase in break-ins and thefts	0.43		
	MP_YES_A22	I am worried about my children s education	0.48		
	MP_YES_A23	Being together all the time increases family tensions	0.35		
	MP_YES_A24	COVID–19 increases domestic violence	0.26		
	MP_YES_A25	COVID–19 will increase divorce rates	0.29		
	MP_YES_A28	I worry how living in isolation will affect me	0.64		
	MP_YES_A29	Living in isolation negatively impacts my wellbeing	0.45		
	MP_YES_A33	My chance of getting COVID–19 is high	0.33		
	MP_YES_A49	The restrictions caused by COVID–19 will continue at least until the fall	0.29		
Subjective Norm	SN_YES_A34	Slowing the spread of COVID–19 is more important than the economy	0.97	0.62	0.51
	SN_YES_A48	People will stop following the restrictions soon	0.29		

Smart PLS was used to run the path analysis. However, a collinearity assessment on the five constructs was conducted before testing the hypothesis. All the VIF values were below the tolerance value of 5, thus showing no multicollinearity (Hair et al., 2011). A bootstrap method with 300 iterations was conducted, and statistically significant path coefficients and coefficient of determination (R2 value) values were derived (see Table 6). Figure 4 shows the path coefficients with their significance levels.

Table 6 Model's predictive capability for Sweden

	R2	*Q2*
Attitude	0.37	0.88
Intention	0.18	0.074
Declared behaviour	0.27	0.059

Figure 4 Path model for Sweden (see online version for colours)



The values mentioned for the path are beta values and *t* values are in parenthesis. R^2 values are mentioned with the construct.

5.2.2 Structural model

For the model to show predictive capability, the strength of each path in the structural model was determined by the R2 value for each dependent variable: attitude, intention, and declared behaviour (Briones-Peñalver et al., 2018). This value was over 0.1 for all the dependent variables (Falk and Miller, 1992), which showed the model's predictive capability. Checking the predictive relevance further, Q2 was calculated by running a blindfolding test. All the values were found to be >0, thereby showing the predictive relevance of the model. Thus overall, the model was significant for predicting the constructs. Furthermore, the SRMR value was 0.077, below the required value (of 0.10), showing a good model fit (Hair et al., 2016).

5.2.3 Mediation analysis

Mediation analysis was performed (at 97.5% confidence interval) to assess the effect of perceived threats and positive anticipated emotions on consumer's attitudes towards COVID-19. For perceived threats, it was found that total effect ($\beta = 0.335$, $t = 10.231$, $p = 0$) and direct effect ($\beta = 0.159$, $t = 3.059$ $p = 0.002$) on declared behaviour, along with the indirect effect ($\beta = 0.048$, $t = 6.163$, $p = 0$) via attitude and intention and indirect effect ($\beta = 0.148$, $t = 5.699$, $p = 0$) via attitude is significant thus showing partial mediation.

It was found that positive anticipated emotions' direct effect on declared behaviour ($\beta = 0.034$, $t = 1.064$, $p = 0.287$) is insignificant; the indirect effect ($\beta = 0.005$, $t = 2.142$, $p = 0.032$) via attitude and intention and indirect effect ($\beta = 0.013$, $t = 2.109$, $p = 0.035$) via attitude on declared behaviour is significant thus showing complete mediation. It was found that PBC direct effect on consumer's declared behaviour ($\beta = –0.02$, $t = 0.627$ $p = 0.531$) is insignificant; the indirect effect ($\beta = 0.038$, $t = 4.822$, $p = 0$) through intentions is significant thus showing complete mediation.

It was found that subjective norm's direct effect on consumer's declared behaviour ($\beta = 0.096$, $t = 3.318$, $p = 0.001$) is significant; the indirect effect ($\beta = 0.01$, $t = 1.384$, $p = 0.167$) through intentions is significant (at 87%) thus showing partial mediation.

6 Findings

It is interesting to comment on the cross-country differences. An interesting finding is that attitudes seem to have a more significant impact on Germany's declared behaviour than the intention. This result is interesting as, in the literature, the intention is the central element that influences declared behaviour the most. The study of respondent attitude in Germany shows that the highest loading is their worry about people's health in their country, and respondents in Sweden are more worried about not being able to meet with their family. Respondents in Sweden show a higher positive anticipated emotion regarding beating COVID-19, and the factors studied account for 58% of the variance extracted; it is 46% for Germany. This result is in line with an earlier study, which showed that people in Sweden showed positive emotions toward the government's stand on developing herd immunity compared to other Nordic countries (Imran et al., 2020).

The perception of threat by respondents in Germany showed that they were more worried about their health, followed by concern for the health of older family members and bothering about how living in isolation might affect them. This finding is in line with another study that shows Germany's respondents were facing anxiety, stress, and depression and spending many hours thinking about COVID-19 daily (Petzold et al., 2020). Respondents in Sweden were most worried about how living in isolation would affect them, followed by worrying about their health. This perception of threat implies that mutual trust exists between the government and citizens, with the former (that is, the government) provides information that the latter can rely on, make informed decisions (on the basis of the information shared), and act responsibly (Petridou, 2020). Since people felt that information their governments shared was correct, they did not perceive

any threat, and they were more confident while facing the pandemic. The subjective norm showed similar behaviour representation for respondents from both countries, with the highest loading factor also being the same–that is slowing the spread of the virus was more important than the economy. However, respondents in Germany felt that people would continue following restrictions, while respondents in Sweden felt the opposite: people would stop following restrictions in the near future. This difference is in line with Hofstede's cultural analysis model, which shows that Germany is higher on uncertainty avoidance than Sweden, with an uncertainty avoidance index (UAI) score of 65 compared to a UAI score of 29 in Sweden (Hofstede, 2021). They also have a more long-term orientation (LTO) (LTO score of 83) compared to Sweden (LTO score of 53).

Perceived behavioural control (PBC) shows that respondents in Germany have more trust in the media, and in Sweden, respondents felt that the media was exaggerating the situation. The highest loading for PBC in Germany is for the variable that media provides reliable information about the pandemic. In Sweden, respondents were more confident about getting appropriate medical help if they got infected. This difference is interesting to note as the respondents in Germany were more satisfied with the government's handling of the crisis. It is important to note that the Swedish Public Health Agency recommended behaviour that people should follow, and while bars and restaurants were legally closed, individual freedom was primarily not regulated. Many businesses, shops, and schools were open during the pandemic (Renström and Bäck, 2021), thus accounting for low PBC. While there were positive sentiments related to these closing and opening measures among the citizens, some people felt that the government should have exerted more control and ensured a lockdown to contain the spread of the disease (Imran et al., 2020). Overall, all the factors explained 41% of the behaviour in Germany and 37% in Sweden.

As far as behavioural intentions are concerned, respondents in Germany show the highest loading for willingness to help people more vulnerable to COVID-19, and respondents in Sweden show the highest loading because ever since COVID-19, they exercise at home more.

The declared behaviour of respondents from both countries shows that they actively encourage others to follow the restrictions and guidelines as shared by the government.

Path analysis shows that attitude has a similar loading for both countries. Perceived threats directly impact declared behaviour and also impact behaviour through mediation tvia attitude and attitude and intention. Positive anticipated emotions show complete mediation through attitude and impact behaviour through attitude and intention, but are more impactful in Germany's case.

In Germany (23%), the subjective norm and the PBC impact the intentions stronger than in Sweden (18%). For Germany, PBC shows partial mediation, thereby impacting behaviour through intentions and directly, whereas in the case of Sweden, there is complete mediation, meaning PBC impacts behaviour only through intentions. This result contradicts other studies that also tested emotions in TPB and finds that PBC becomes non-significant (Londoño-Roldan et al., 2017). We found that subjective norms impact behaviour directly and indirectly through intentions in the case of Germany and only directly in the case of Sweden (see Figures 5 and 6 for the final path model for Germany and Sweden, respectively).

Figure 5 Path model outcome for Germany (see online version for colours)

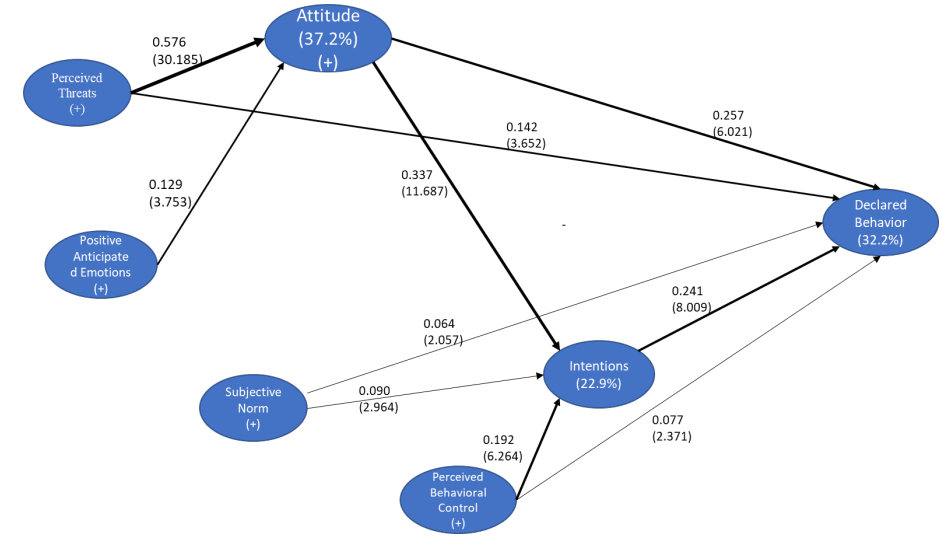
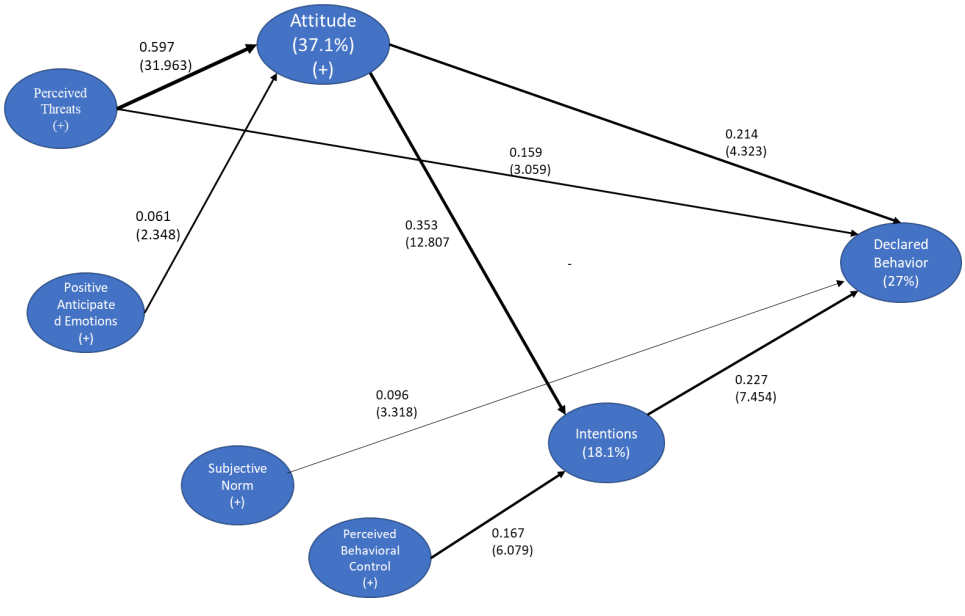


Figure 6 Path model outcome for Sweden (see online version for colours)



Overall, the study of the impact of all the variables on declared behaviour showed a more significant influence for Germany (32%) compared to Sweden (27%). Table 7 provides the summary of all hypotheses.

Table 7 Summary of hypotheses (see online version for colours)

Hypothesis No.	*Relationship*	*Country*	*Original Sample*	*Sample Mean*	*Std. Deviation*	*T Statistics*	*P Value*	*Support*
H1	Attitude → Intention	Germany	0.337	0.338	0.029	11.687	**0.000**	Supported
		Sweden	0.353	0.355	0.028	12.807	0	Supported
H2	Attitude → Declared Behaviour	Germany	0.257	0.255	0.043	6.021	**0.000**	Supported
		Sweden	0.214	0.213	0.049	4.323	0	Supported
H3	Positive Anticipated Emotions → Attitude	Germany	0.129	0.128	0.034	3.753	**0.000**	Supported
		Sweden	0.061	0.064	0.026	2.348	0.019	Supported
H4	Positive Anticipated Emotions → Declared Behaviour	Germany	–0.019	–0.018	0.028	0.686	**0.493**	Not Supported
		Sweden	0.034	0.035	0.032	1.064	0.287	Not Supported
H5	Perceived Threats → Attitude	Germany	0.576	0.580	0.019	30.185	**0.000**	Supported
		Sweden	0.597	0.602	0.019	31.963	0	Supported
H6	Perceived Threats → Declared Behaviour	Germany	0.142	0.145	0.039	3.652	**0.000**	Supported
		Sweden	0.159	0.164	0.052	3.059	0.002	Supported
H7	Subjective Norm → Intentions	Germany	0.090	0.091	0.030	2.964	**0.003**	Supported
		Sweden	0.045	0.045	0.032	1.405	0.16	Not Supported
H8	Subjective Norm → Declared Behaviour	Germany	0.064	0.064	0.031	2.057	**0.040**	Supported
		Sweden	0.096	0.098	0.029	3.318	0.001	Supported
H9	Perceived Behavioural Control → Intentions	Germany	0.192	0.194	0.031	6.264	**0.000**	Supported
		Sweden	0.167	0.171	0.027	6.079	0	Supported
H10	Perceived Behavioural Control → Declared Behaviour	Germany	0.077	0.077	0.032	2.371	**0.018**	Supported
		Sweden	–0.02	–0.016	0.032	0.627	0.531	Not Supported
H11	Intentions → Declared Behaviour	Germany	0.241	0.241	0.030	8.009	**0.000**	Supported
		Sweden	0.227	0.226	0.03	7.454	0	Supported

7 Conclusion and recommendation

The current study shows that perceived threats have a high impact on declared behaviour directly and indirectly, knowing that they also impact attitude and also attitude and intention on declared behaviour. Additionally, anticipated positive emotions in both countries impact behaviour through attitude and also through attitude and intention.

Interestingly, the results of this study show that attitude is one of the most significant elements of declared behaviour and intentions, whereas the TPB model identifies only intention as the central element. Here, this study can argue that attitudes can be considered central for intentions, not more. Whereas RTT allows measuring the accessibility of attitudes, it is possible to go beyond mere declarations and to adapt the communication on the population's attitudes to see where the strength and gaps are in people's attitudes and to understand them to propose solutions that make sense; signification creates action (Blumer, 1998; Poupart, 2011). Moreover, identifying that attitude has one of the most significant influences on declared behaviour and, by extension, on the behaviour itself, opens up new opportunities for managing a crisis period, such as the COVID-19 pandemic. It needs to be understood that information combined with attitude leads to behaviour. The attitude should be considered and used as leverage when designing effective communication to influence people's behaviour. This approach leads to understanding the attitude of a population and assessing how these attitudes can, in turn, influence behaviour. This knowledge gives political decision-makers the leverage to adapt their communication policies taking into account their population's perception of the situation; this consideration will lead to less speculation among the population. This conclusion aligns with the earlier finding that governments should launch information campaigns to prepare people for the subsequent wave of the current pandemic or subsequent pandemics (Naumann et al., 2020). Since information in the report can elicit different emotional reactions and can also lead to citizens' support for various political actions (Renström and Bäck, 2021), governments need to phrase their communication well.

Studies show that how the media cover the pandemic makes people anxious (Fischhoff et al., 2005; Covello, 2003). Media coverage affected PBC by the people and affected declared behaviour directly; media coverage also affected declared behaviour by mediating through intentions as in the case of Sweden. Perceived threats impact behaviour directly and through attitude, and threatening news related to health and/or safety leads to cognitive, emotional, and behavioural responses (Fischhoff et al., 2005; Covello, 2003). Since citizens in Germany were more distressed and depressed due to the pandemic, their government needs to manage how news related to the pandemic is covered along with communicating about acceptance of these negative emotions and the need for a healthy lifestyle (Petzold et al., 2020). People need to be anxious to take advice seriously (Harper et al., 2021), and they need to feel optimistic enough to feel that their actions will make a difference (Petersen, 2020). Therefore, it is essential to tread this emotional line so that various stakeholders can effectively communicate effective ways to manage the pandemic.

8 Limitations of the study

The study is based on RTT and the current study and only retained the confident answers on the basis of the speed of response. The aim was to show that RTT enables capturing of only confident responses while being non-intrusive.

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