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Tourist risk perception and objective risk: an analysis of countries during the COVID-19 pandemic

Percepção de risco de turistas e risco objetivo: uma análise dos países durante a pandemia de COVID-19

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ABSTRACT

Perceptions of risk are not always in line with objective risk measures. According to the decision-making literature, this is due to affective evaluations laypeople do over hazards instead of a more deliberative judgement. Against this backdrop, this study investigates tourists' perceptions of risk in relation to the most affected countries by COVID-19, and compare it to their objective risk measures. Our findings suggest that people think in accordance with the denominator neglect effect while assessing risk of contamination, that is, they consider the total number of infected people and disregard its proportion in relation to the population. Also, news media consumption was found to be associated with distinguishing low-risk of contamination countries, but not top risky ones. These results shed light on biases in people's judgements that need to be taken into account by tourism managers, as the sector begins its recovery.

Keywords: Risk perception, COVID-19 pandemic, tourist behavior.

RESUMO

Percepções de risco nem sempre estão alinhadas com medidas objetivas de risco. De acordo com a literatura de tomada de decisão, isto se deve a avaliações afetivas que pessoas leigas fazem de perigos, ao invés de um julgamento mais deliberado. Sob este pano de fundo, o presente estudo investiga a percepção de risco de turistas em relação aos países mais afetados pela COVID-19, e a compara com suas medidas de risco objetivo. Nossos resultados sugerem que as pessoas pensam em conformidade com o efeito "*denominator neglect*", ou seja, levam em consideração apenas o número de casos totais da doença e desconsideram sua proporção na população, quando avaliam riscos de contágio. Além disto, descobriu-se que o consumo de mídias está associado à distinção entre países de risco baixo, mas não os de risco alto de contágio. Tais resultados evidenciam vieses nos julgamentos das pessoas que devem ser levados em conta por gestores no turismo, na medida em que o setor inicia sua recuperação.
Palavras-chave: Percepção de risco, COVID-19, Comportamento do turista.

INTRODUCTION

People's inability to travel, after local governments' prohibition in light of the COVID-19 pandemic, has postponed travel plans and made it hard to predict tourist behavior, even after the situation becomes under control. In fact, part of the industry's recovery will rely on how people will respond affectively, cognitively and behaviorally to a post-pandemic world (Hall, Scott & Gössling, 2020). The extent of media coverage on the topic has helped spread awareness on the severity of the situation but, at the same time, led to making the issue more salient in everyone's minds on a recurring basis (Chao, Xue, Liu, Yang & Hall, 2020).

According to the literature in decision-making, risk perception is highly dependent on affective evaluations of hazards (Slovic, Finucane, Peters & MacGregor, 2004) and, therefore, susceptible to subjective judgements that not always match with actual risks. Also, Zheng, Luo and Ritchie (2021) highlight the need to understand tourists' 'travel fear', an emotion that triggers protective behaviors, so it is paramount to unveil what kind of rationale people use to judge how risky the countries are over the course of an outbreak. As international tourism is reestablished worldwide, it is believed that tourist destinations that are successful at positioning themselves as providing safer

attractions and experiences will increase their competitiveness (Wang & Lopez, 2020).

Hence, the aim of the present paper is to compare people's subjective risk perception towards the countries initially most affected by the COVID-19 outbreak, and these countries' objective risk measures. In order to do so, the authors have carried out an online survey in two points in time, when respondents were asked to make pairwise comparisons of risk within a sample of countries. For both dates, in addition to measuring risk perception, the authors analyzed the reproduction number (R_t) of each country, their cumulative confirmed cases, and cumulative cases per million as objective measures of risk (Yuan, Li, Lv & Lu, 2020).

This approach allowed the authors to rank the riskiest countries in people's opinions and analyze occasional inconsistencies in relation to objective risk rankings. By collecting data in more than one day, it was also possible to capture how this dynamic evolves in the short run. Finally, it is also the purpose of this research note to gain insights on the degree to which media consumption may be associated with people's perceptions of risk in relation to countries, therefore, a correlation analysis was also carried out.

STUDY DESIGN

Given the restrictions imposed by social distancing recommendations at the time our data was collected, both our surveys were hosted online and distributed through the snowballing method. The authors used their personal and professional networks to collect respondents. This may be considered a non-probabilistic sampling strategy, which increases the feasibility of the study. However, just like other non-probabilistic methods, its results must be interpreted parsimoniously (Malhotra, 2012).

Measures

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Perceived Risk: The main variable of the study is perceived risk. There are several ways to measure it, especially in the tourism literature (Wolff, Larsen & Øgaard, 2019). Typically, papers that assess travelers' risk perception of infectious diseases use the Knowledge Attitude and Practices (KAP) survey method. This method is intended to understand respondents' degree of knowledge of symptoms, transmission, preventive actions, their attitudes and practices towards these actions (Sridhar, Régner, Brouqui & Gautret, 2016). Nevertheless, because the aim of the present study is to compare risk perceptions across multiple countries, the paired compared scale procedure was chosen.

In this technique, subjects are presented with two objects at a time, and are then asked to choose either one according to a given criteria. This allows us to obtain a rank of the countries most perceived as risky, as well as individual pairs of comparisons (Malhotra, 2012). The adoption of this procedure is based on Pachur, Hertwig & Steinmann (2012), who carried out paired comparisons with different types of cancer, in order to identify the ones perceived to be riskier. Therefore, in the first part of the questionnaire, respondents were asked to make pairwise comparisons of a pool of 5 countries and were given 3 alternatives to the question: "Which of the two countries below presents a greater risk of contamination among its population for the new coronavirus today in your opinion? ( ) Country A ( ), Country B ( ), Both equally".

Objective Risk: When studying the risk of a disease it is important to determine what is the goal of the investigation, so as to select the recommended objective measure. A typical metric in epidemiology is the case-fatality ratio (CFR), which is obtained by dividing the cumulative deaths by the cumulative cases of a disease (Mizumoto & Chowell, 2020). We are not using such metric in the present study because it focusses on chances of death instead of chances of contamination. Because we asked respondents their

perception on the risk of contamination, we analyzed metrics of transmissibility to provide comparability to our primary data.

The basic reproduction number, or R_0, is 'defined as the expected number of secondary cases produced by a typical primary case in an entirely susceptible population' (Wallinga & Teunis, 2004, p. 510). Yuan et al. (2020) argue that over the course of an epidemy, the R_t, or the real-time reproduction number is more adequate to evaluate the transmissibility of a disease. Unlike R_0, R_t takes into account the immunity acquired by the population from past exposures and vaccination, as well as deliberate interventions, (like lockdown policies, social distancing practices, among others) in the assessment of the risk of transmission. An R_t of 2, for example, means that 1 infected individual will cause 2 other infections in a given population.

We collected country-specific data through the Harvard Chan School of Public Health (2020) platform on the new COVID-19, developed by the Xihong Lin's Group in the Department of Biostatistics. This allowed us to obtain the cumulative cases, cumulative cases per million and the real-time reproduction number (R_t) of each country in the analysis.

Media Usage: In a pandemic context, online, broadcast and print media play a significant role in making people better informed, however, it may also bias people's judgements. Therefore, the study will examine whether the frequency with which respondents watch and read the news may be associated with risk perceptions related to the countries.

This measure follows Wormwood, Lin, Lynn, Barrett & Quigley (2019) media usage scale, which asks participants to state the media sources they have used in the past seven days, and the frequency with which they have used them. Each source is measured by a 5-point scale, where 1 = "Only once", 2 = "A few times", 3 = "Most days", 4 = "Every day", 5 = "Multiple times per day". The eight sources included in the final questionnaire (Rede Globo, Globo News, Band, Record, G1.com, O Globo, Estado de São Paulo and Folha de São Paulo) have been chosen after a pre-test identified the most used ones in Brazil.

RESULTS

In the first survey, from April 24th through 26th (T1), 112 respondents took part and in the second one, which was held from May 24th through 26th of 2020 (T2), 155 people participated. All respondents originated from Brazil and were above 18 years old. For each data collection of the questionnaire, we stablished the previous day as the cut-out day for obtaining the reference objective measures. Also, for each day we chose the top 4 western countries in total cases to take part in our analysis. We included China because it is considered the country where the virus was first reported, this way, it provides a base reference both for risk perception and objective risk.

We now focus on the ranking of the countries perceived as riskiest by respondents in the surveys. Note that the 5 countries in T1 and T2 allowed 10 pairwise risk comparisons per data collection period. We then ranked in descending order the count of countries most assigned as riskier in each period. Because we wanted a rank of risk perception, all votes for "Both equally" risky were eliminated from the analysis. Table 1, summarizes the descriptive results of our study.

Table 1: Perceived Risk

T1 - April 23rd 2020				T2 - May 23rd 2020			
Rank	Country	Total (N = 112)	%	Rank	Country	Total (N = 155)	%
1	USA	399	36,7%	1	USA	482	42,5%
2	Spain	254	23,4%	2	UK	242	21,3%
3	Italy	215	19,8%	3	Spain	204	18,0%
4	France	159	14,6%	4	Italy	175	15,4%
5	China	59	5,4%	5	China	99	8,7%
Total pairwise comparisons (excl. "Both equally")		1086	100%			1202	100%

Source: The authors

Chi-square statistics show that the USA was perceived to be way riskier than all other countries both in April ($\chi^2 = 289.25$, 4, N = 1086, $p < 0.001$) and May

(χ^2 = 349.29, 4, N = 1202, p < 0.001). Also, pairwise analysis show statistical difference for risk perception between the USA and each country both in April (China χ^2 = 72.32; France χ^2 = 87.3; Italy χ^2 = 56.22; Spain χ^2 = 68.18; 1, N = 112, p < 0.001) and in May (China χ^2 = 97.96; Italy χ^2 = 82.61; Spain χ^2 = 85.12; UK χ^2 = 90.15, 1, N = 155, p < 0.001).

Moving on to the objective risk analysis, in table 2, the USA had the top reproduction number in T1 and, in T2, it remained relatively high in the rank. Spain, in turn, was placed in 3rd in T1 according to its R_t and in T2 it escalated to the top. When we contrast respondents' risk perceptions in table 1 and the objective risk measures of table 2, we notice that neither the countries' reproduction number nor their cumulative cases per million inhabitants are good proxies of people's perceptions of risk.

R_t ranking in T1 had an overall good fit (despite Spain and Italy being misplaced). However, in T2, Spain had the highest reproduction number, whereas it was perceived as the 3rd riskiest by respondents in table 1, and the UK had the 4th R_t, but was perceived as the 2nd riskiest. The cumulative cases per million ranking was no better match. When comparing this measure to people's risk perception, we notice that only France and China match in April, and only the USA and China match in May. In fact, what we realize is that the rank of risk perception portrayed in table 1 is the same rank observed in the cumulative cases only column. We will elaborate further on that in the conclusion section.

Table 2: Objective Risk Measures

T1 – April 23rd 2020							T2 – May 23rd 2020						
Rank	R_t		Cum. Cases/Million		Cumulative Cases		Rank	R_t		Cum. Cases/Million		Cumulative Cases	
1	USA	0.99	Spain	4,508	USA	1,019,339	1	Spain	1.08	USA	5,249	USA	1,729,279
2	Italy	0.84	Italy	3,333	Spain	210,773	2	USA	0.93	Spain	5,088	UK	252,473
3	Spain	0.66	USA	3,094	Italy	201,505	3	Italy	0.77	Italy	3,833	Spain	237,906
4	France	0.63	France	2,568	France	167,605	4	UK	0.74	UK	3,719	Italy	231,732
5	China	0.3	China	60	China	83,940	5	China	0	China	60	China	84,106

Source: Harvard Chan School of Public Health (2020)

Next, we calculated respondents' media usage index (MUI) in each point in time, which is the overall average of the channels most used by them. We then carried out a Pearson's correlation analysis between MUI and the ten pairwise risk comparisons of countries in T1 and T2.

Table 3: Pearson's Correlation of MUI and Pairwise Comparisons of Risk Perception

T1 – April 23rd 2020			T2 – May 23rd 2020		
Country A	Country B	MUI (r^2)	Country A	Country B	MUI (r^2)
Italy	China	-0.21*	Italy	China	-0.23*
USA	China	-0.20*	USA	China	-0.17*
Spain	China	-0.27*	Spain	China	-0.25*
France	China	n.s.	UK	China	-0.19*
USA	Spain	n.s.	USA	Spain	n.s.
Spain	France	n.s.	Spain	UK	n.s.
Italy	USA	n.s.	Italy	USA	n.s.
Italy	Spain	n.s.	Italy	Spain	n.s.
France	USA	n.s.	UK	USA	n.s.
France	Italy	n.s.	UK	Italy	n.s.

* $p < 0.05$,
n.s. = non significant

Source: The authors

Table 3 shows that overall, MUI correlated negatively with risk perception about China, except in pairwise comparison with France in T1, which did not show statistical significance. The negative correlation means that the more exposed to media during that period, the less people perceived China to be the riskier one in paired comparisons with other countries (considering Country A coded as "0" and Country B coded as "1"). Interestingly, the same pattern was not observed for paired comparisons between countries that did not include China.

CONCLUSIONS

According to the literature in risk perception, our results are consistent with the denominator neglect effect, when the odds of a hazardous event are judged predominantly by their absolute values, instead of relative ones (Slovic et al., 2004). This helps explain why the USA, which had 1,019,339 confirmed

infected people in T1 (over four times more than Spain) and 1,729,279 in T2 (over six times more than the UK) was perceived as the riskiest in most cases. Indeed, the rationale of considering the total confirmed cases is what seems to have governed respondents' judgements. When comparing the rank of cumulative confirmed cases in table 2, we can notice that the same sequence was found in table 1 in the risk perception rank.

Furthermore, the analysis of the relationship between media usage and risk perception showed a significant correlation just in the case of China, which is the country least perceived as risky. This finding is consistent with the social amplification of risk theory, which claims that mass media may help amplify or minimize risk perception towards hazards (Rossmann, Meyer & Schulz, 2018). Having been the first country where the disease was reported, China seems to have been effectively portrayed as a less hazardous country in the media, during the time this study was carried out, in relation to others where the virus had started to spread at a later point.

The fact that media usage was not associated with the upper countries in the risk perception measure reveals that, in a pandemic context, the communication conveyed by typical news outlets is insufficient to make people discriminate differing levels of risk, after a certain threshold is reached. In terms of managerial implications, this may be detrimental for countries that have managed to control the spread of the virus in their destinations more effectively than others, despite having equivalent absolute cases.

By shedding light on the fact that people rely more on absolute confirmed cases to evaluate risk of contamination, instead of other objective measures during a pandemic, our paper provides an important subsidy upon which to plan a crisis recovery plan. Therefore, as travel flows are restored, Destination Marketing Organizations (DMOs) ought to put forward a marketing strategy that focus on communicating which actions have been put into practice in order to provide safer travels and stays at their destinations.

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