

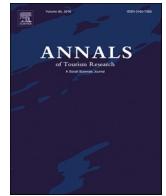


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Research article

Understanding the COVID-19 tourist psyche: The Evolutionary Tourism Paradigm

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Introduction

The impact of the Coronavirus pandemic on tourism and hospitality is unprecedented. In response, a large amount of descriptive research is being conducted on the immediate and short-term effects of the pandemic. Often, such research is simply confirming what is already known: that the pandemic is wrecking the tourism industry all over the globe. In many cases, such research is of limited use because it is merely mechanically reciting the numbers of a suffering industry. Specifically, these endeavors are prone to be a snapshot in time only, lacking in theoretical reasoning on what is happening, why it is happening, and how the pandemic may change tourism in the long run.

What is largely missing in the literature is theory-based research that sets out to investigate how tourism could be fundamentally different in a post-COVID-19 era. While the pandemic will reshuffle taken-for-granted determinants of tourism as we know it, a crucial shift is likely to occur in tourists' psyche: The pandemic will eventually fade and travel barriers will be lifted, yet some tourists' psyches will likely settle on a new equilibrium. While the full impact on the tourist psyche cannot be reliably be predicted at this point in time, its eventual implications for tourism may be of seismic proportions. Understanding the altered make-up of tourists' psyches will be a crucial success factor for both tourism researchers and businesses during and after the COVID-19 era. This research provides a novel theoretical frame that allows to formalize such changes, and is thus, in contrast to most existing research on the pandemic, not describing the status-quo but rather forward-looking. We thereby answer calls for COVID-19 tourism research that

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goes beyond “the obvious and purely descriptive,” and instead investigates “deeper underlying relationships” (Zenker & Kock, 2020, p. 1).

The current pandemic can constitute a paradigm shift in research on tourists' behavior and decision-making. What was previously taken for granted may not hold anymore in the COVID-19 era, urging researchers to critically reassess the underlying assumptions of the conventionally used theories, frameworks, and models. We postulate that the investigation of tourists' COVID-19 psyche and the paradigm shift in tourists' behavior demands that new theory-based mindsets are leveraged in tourism research. We suggest that the evolutionary psychology literature, which has recently been endorsed as a valuable and creative theoretical lens for future tourism research (Crouch, 2013; Kock, Josiassen, & Assaf, 2018), is well-positioned to facilitate the paradigm shift that is necessary to understand many of the emerging and future challenges facing tourism research. This is because the pandemic unsheathes and amplifies many deep-rooted human anxieties of contagious diseases, physical harm, and social isolation. All these factors are important research subjects, and evolutionary psychology explicitly studies these deep-rooted threats and offers a plethora of explanations of how they can impact human thinking, feeling, and behavior. Thus, if we want to understand, and not only describe, why tourists react to the pandemic and how it shapes their psyche, evolutionary psychology is a powerful lens through which to do so.

Researchers in the humanities, social sciences, and natural sciences are increasingly employing evolutionary theory, and evolutionary psychology in particular, to examine the foundations of human behavior. In recent years, these burgeoning efforts have yielded novel hypotheses and enabled researchers to tackle phenomena in business research areas such as marketing (Saad, 2017), tourism (Kock et al., 2018), and leadership (Bastardo & Van Vugt, 2019). The key notion of evolutionary psychology is that modern human beings have inherited psychological mechanisms that predispose them to act in ways that increased reproductive fitness in ancestral times. That means, evolutionary psychologists seek to explain human behavior through the adaptive function that the behavior might have served, or potentially still serves (Griskevicius & Kenrick, 2013). Despite mounting interest in and popularity of evolutionary psychology, knowledge of its unique epistemology and theoretical underpinnings is often limited in the social sciences, leaving interested researchers with no guidelines on how to apply it to their field of study.

In response to this, we develop the Evolutionary Tourism Paradigm, which makes use of the logic, epistemology, and theory of evolutionary psychology to advance tourism research and in particular to address those questions arising from the Coronavirus pandemic. This paradigm rests on three features: *evolutionary epistemology*, *fundamental evolutionary motives*, and *behavioral ecology*. We bring the Evolutionary Tourism Paradigm and its three features to life through the *ocean and islands model* that visualizes the epistemological and theoretical commitments of evolutionary psychology that sharply distinguish it from all other disciplinary streams used in tourism research. The ocean and islands model is a visualization intended to guide interested researchers through the use of evolutionary psychology in their own research endeavors. This guide is necessary for at least two reasons. First, researchers in the tourism domain typically do not receive any training in the theory of biology, specifically in the branches of evolution and ecology. Second, while principles of evolutionary theory seem intuitive at first sight, leveraging their potential requires mastery and a holistic understanding thereof. These two reasons suggest that a more rigorous training in key principles of evolutionary psychology can increase its usability in tourism research, consequently helping to advance the discipline.

In the following section, we develop the Evolutionary Tourism Paradigm and make it actionable via the ocean and islands model. We then turn to an empirical application of the model to generate both a broad and deep understanding of how the Coronavirus pandemic changes tourists' psyche. Specifically, drawing on research from evolutionary psychology on the behavioral immune system, we demonstrate across two studies how this pandemic impacts important tourism phenomena, such as tourist xenophobia (Kock, Josiassen, & Assaf, 2019).

The Evolutionary Tourism Paradigm

Applications of evolutionary psychology have to be grounded in a solid understanding of its epistemological and theoretical principles. The Evolutionary Tourism Paradigm is meant to facilitate the comprehension of what it means to take an evolutionary approach in the tourism discipline. Outlining the paradigm, we first explicate the three constituting features on which biology-based examinations in tourism shall rest and then explain the connections between them. As for the first feature, we provide a theory-based discussion of the epistemology of evolutionary psychology, which is fundamentally different from how tourism research has traditionally explained the world. The paradigm's second feature provides the theoretical backbone for the epistemology: The model of fundamental motives that underlie many behaviors. The third feature constitutes the behavioral ecology according to which socio-ecological factors in the environment activate certain motives.

Evolutionary epistemology

The central epistemological approach of evolutionary psychology (i.e., the manner in which knowledge is generated and answers are developed) is to explain human behavior by revealing its adaptive function (“which function did/does the behavior serve?”) and fundamental motive (“how does this function increase reproductive fitness?”). Grounded in the influential works of Ernst Mayr (1961) and Nobel Prize-winning ethologist Niko Tinbergen (1963), the evolutionary epistemology distinguishes between **proximate motives** (i.e., immediately obvious) and **ultimate motives** that cause behavior. Accordingly, this research stream, which also contributed considerably to the philosophy of research (Beatty, 1994), is labeled *causation*. A proximate motive of a behavior is a corresponding immediate stimulus, such as when the sight of a snake causes someone to frighten and flee. In contrast, an ultimate motive of a behavior is the evolutionary explanation that human beings fear snakes and flee because it increased the probability of survival in ancestral times. While both types of explanation are correct, only ultimate explanations identify the adaptive function that

the respective behavior has served for our ancestors, and might still serve. Thus, researchers examining proximate motives are interested in showing how something works, while researchers examining ultimate motives are interested in investigating why something exists. To this day, the overwhelming majority of studies in tourism research has focused on proximate motives to explain behavior, thereby neglecting ultimate motives (Kock et al., 2018).

Fundamental evolutionary motives

The second feature of the paradigm is the existence of fundamental, or ultimate, motives. While the epistemology of evolutionary psychology postulates to explain behavior through its underlying ultimate function, the fundamental motives framework is the theoretical substrate for this epistemology. In order to survive and procreate, our ancestors had to surmount various evolutionary challenges. Evolutionary psychology maintains that these evolutionary challenges have predisposed our ancestors to develop fundamental motivational systems that helped to solve each of these challenges. Thus, evolutionary psychology postulates that humans have not only inherited physiological characteristics, but also psychological mechanisms that manifest in various motives such as self-protection, disease avoidance, affiliation, status, mate acquisition, mate retention, and kin care (Griskevicius & Kenrick, 2013).

As an illustration of using the paradigm, we focus here on research to be conducted on the Coronavirus pandemic, and thus focus on disease avoidance as the most relevant fundamental motive. Yet, it is important to note that each motive provides a myriad of unique ultimate explanations to many human behaviors and can serve as the starting point for an evolutionary based investigation in tourism research. For example, as a rare application, Kim and Seo (2019) found a link between the activation of the mating motive and a preference for risky travel activities in men, arguing that risk-taking serves the adaptive function of increasing mating success. In addition, motives beyond those mentioned by Griskevicius and Kenrick (2013) exist and are likely to play important roles in tourists' behavior (see Kock et al., 2018 for an overview of the motives and their relevance for tourism research). For example, in a recent study, Nørfelt, Kock, and Josiassen (2019) suggest that the fundamental motive of exploration is a focal evolutionary driver of contemporary tourism activity. Based on existing evolutionary theory, the authors argue that the inclination to explore, the fascination with foreignness, and the experience of curiosity have played important roles in our ancestral past where survival was ensured by venturing into new territories and accessing new resources such as food, shelter, water, or mating partners.

Understanding tourism as a contemporary remnant of such an evolutionary motive is profoundly different from existing sociological accounts that explain tourism through social developments (e.g., Blackshaw, 2010), or psychological accounts that explain the existence of tourism through the mere fact that it is pleasant. Importantly, those explanations are also correct but they exist on a more proximate level. These examples illustrate that researchers who are familiar with evolutionary psychology can creatively spot motives that different tourism activities could be rooted in. Importantly, such an understanding does not only answer why something exists but allows for novel conceptual reasoning of causality, contingency, and interconnectedness.

Behavioral ecology

Scholars have argued for the relevancy of a macro-environmental perspective when studying behavior (Oishi, 2014). The third feature of the paradigm is therefore behavioral ecology. Behavioral ecology connects with the fundamental motives through the observation that each of the deeply ingrained motives is activated by different socio-ecological factors that draw an individual's attention to opportunities or threats mapped onto specific evolutionary challenges (Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Uskul & Oishi, 2020). Important socio-ecological factors include pathogen threats, population density, resource scarcity, unpredictability, and sex ratio (Sng, Neuberg, Varnum, & Kenrick, 2018). Behavioral ecology examines the adoption of different behaviors depending on such socio-ecological factors. This adoption process and resulting behavior is labeled phenotypic plasticity, according to which animals and humans with the same gene pool can adapt their behavior, physiology or morphology in response to different ecological conditions (Sng et al., 2018). The relevance of behavioral ecology for understanding the current pandemic rests on its notion (along with comprehensive empirical documentation) that pathogen threat and unpredictability are crucial socio-ecological factors that trigger different motives and thus result in phenotypic plasticities (Sng et al., 2018).

The ocean and islands model

In order to bring the three features to life (i.e., turning them into an actionable research paradigm), we develop the ocean and islands model that illustrates how evolution-infused research can be conducted. The model has four components: plasticities, proximate motives, ultimate motives, and the ecology. While the motives and ecology are the constituting features of the model, the epistemology is what keeps the model floating (Fig. 1). A unique characteristic of the model is that it has no predetermined starting point, but implies that an evolutionary research endeavor can start with each of the four components. Yet, in order to be theoretically sound and empirically executable, researchers have to identify all components and associative links between them in their own research endeavor. For reasons of simplicity, we start our first illustration with phenotypic plasticity. The phenotypic plasticity is the behavior (or other attitudinal phenomenon) that the attentive researcher can observe; similar to the palms of an island which one can easily spot when overlooking the ocean (see Kock, Assaf, & Tsionas, 2020 for a comprehensive discussion of the 'observe' strategy). Following the evolutionary epistemology, the researcher then inquires what gave cause to this observed phenotypic plasticity, or to maintain the metaphor of the island: If one spots a palm on the ocean, one would conclude that this palm stands on an island. Implicit in the label 'phenotypic plasticity', a behavior does not exist for its own right (i.e., sui generis), but serves an adaptive function that the researcher needs to formalize. Before applying the model, we first illustrate it on the phenomenon of sex tourism as the observed

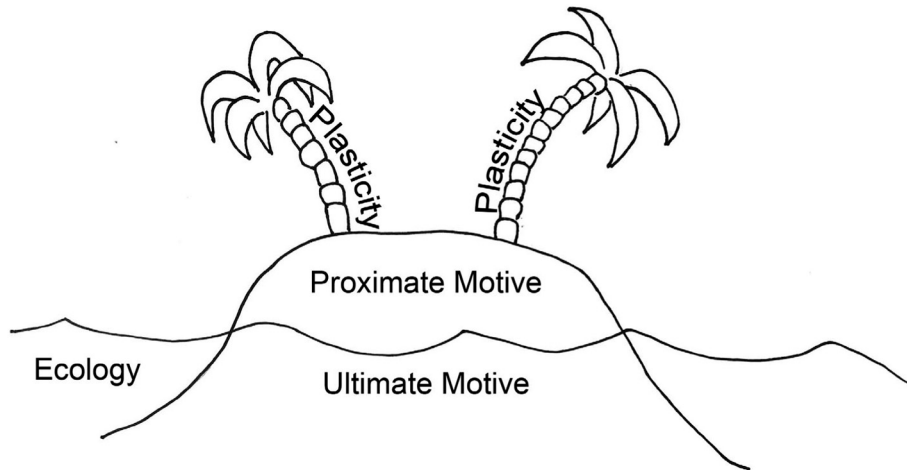


Fig. 1. The ocean and islands model of evolutionary research.

behavior (Kock, 2020).

Following the ocean and islands model, a traditional research approach would explain the observed behavior with what is directly observable. Accordingly, the researcher would conclude that sex tourism exists because people seek sexual pleasure. This is the proximate motive, and thus readily observable at the water surface (i.e., one can easily spot the palms, but also the island if looking carefully). The evolutionary paradigm now asks for the adaptive function and fundamental motive that gave cause to the observed proximate motive and the phenotypic plasticity. In our example, the fundamental motive that motivates sex tourism is mating, with the adaptive function of increasing reproductive fitness. Similar to the island underwater, the fundamental motive is what gives cause to the observable features, yet, it is not directly observable. In turn, the identification of this ultimate motive enables the researcher to theorize which ecological factor might give rise to the behavior of sex tourism. Like a person who focuses on the island to understand it, and not the ocean which is surrounding it, most researchers do not take into account the ecology in which the behavior takes place. However, the researcher who is well-versed in evolutionary psychology would suggest that the socio-ecological factor of sex ratio may give rise to sex tourism through the activation of the mating motive (Kock, 2020). Indeed, it is only this network of arguments that yields this hypothesis because the mating motive alone could not explain why people seek a mating partner abroad and not at home.

However, in some cases, the ultimate motive is not as easily detectable. Considering the burgeoning tourism phenomenon of sharing travel experiences on social media (i.e., the plasticity), proximate explanations would suggest that such behavior is a consequence of the digitalization (a socio-technological explanation), merely a pleasant activity (a cognitive psychological explanation), or a means to share experiences with peers at home (a socio-psychological explanation). While these explanations are certainly correct, they are proximate and neglect the adaptive functions of this behavior. Evolutionary psychology would explain this behavior as a means to address fundamental motives such as to conspicuously elevate one's status among peers, affiliate with others, or even attract a mating partner (indeed, research in progress of one of the authors indicates that travelers who are single post significantly more on social media). Such insights can be the starting point of intriguing examinations that would not be possible without evolutionary reasoning.

Once all four components of the ocean and islands model are formalized, the researcher may proceed to empirical testing. In addition to being an easy to understand guide to evolutionary psychological research endeavors, the ocean and islands model explicitly allows for two important considerations. First, it accommodates the possible existence of more than one island in the ocean. That is, one ecological factor can cause various islands and palms. As we will see now, the ecological factor of pathogen threat can give rise to various phenotypic plasticities, symbolized by palms. Second, the metaphor implies that the ocean is an amalgam of various elements (not just H₂O), and similarly, the ecology is based on various factors that the researcher can consider.

Applying the paradigm to understand the COVID-19 tourist psyche

Prior literature has noted the importance of tourists' tendency to avoid disease. Specifically, studies investigate the (perceived) health risks related to travel and how they influence tourism outcomes (Jonas, Mansfeld, Paz, & Potasman, 2011; Lepp & Gibson, 2003; Reisinger & Mavondo, 2005). Such studies are complemented by a smaller research stream that examines how tourists assess their vulnerability to disease and how they limit infection risk (Chien, Sharifpour, Ritchie, & Watson, 2017; Wang, Liu-Lastres, Ritchie, & Mills, 2019). A third literature stream investigates the effects of epidemics and pandemics on tourism, both in the form of economic analyses and analyses of tourist behavior (Kuo, Chen, Tseng, Ju, & Huang, 2008; Yang, Zhang, & Chen, 2020; Zhang, Hou, & Li, 2020). Fenichel, Kuminoff, and Chowell (2013) found that tourists performed self-protective behaviors (such as voluntarily missing flights) during the 2009 swine flu epidemic, and Cahyanto, Wiblishauser, Pennington-Gray, and Schroeder (2016) empirically linked antecedents, such as perceived susceptibility to Ebola, to travel avoidance.

While these findings indicate the importance of disease avoidance for understanding behavior, they remain on a proximate level. The COVID-19 pandemic is, however, likely to awaken deep-rooted, evolved mechanisms, which warrants analysis spanning both the proximate and ultimate level and the interplay between ecology, psychology, and behavior. As an exception to the general state of the literature, Kock, Josiassen, and Assaf (2019) briefly illustrated a link between disease avoidance, xenophobia, preference for travel-vaccination, and intention to try local food. We now go further in demonstrating how the Evolutionary Tourism Paradigm can be used to provide an ultimate-level perspective on tourists' reactions to the COVID-19 pandemic. In doing so, we also answer calls for tourism research on the link between the pandemic and outcomes such as ethnocentrism, xenophobia, and crowding perceptions (Zenker & Kock, 2020).

Applying the ocean and islands model, we formalize the COVID-19 outbreak as an ecological determinant, more specifically, as a pathogen threat that has significantly changed the global ecology. This conceptualization builds on literature that has identified pathogen threat as an important ecological dimension (Oishi, 2014; Sng et al., 2018). According to the concept of phenotypic plasticity, a change in the ecology along the pathogen dimension would likely lead to changes in tourist behaviors. While a link between a disease outbreak and tourism behaviors has been noted in prior tourism literature (Cahyanto et al., 2016), the ocean and islands model allows us to go one step further in conducting a *process study* (Oishi, 2014). That is, we explain why the ecology is linked to different behaviors through a psychological mediator: in this case, the fundamental motive of disease avoidance. We outline the theory behind this further in the following section.

Disease avoidance and the behavioral immune system

Dying from a contagious disease constituted a major threat for our ancestors. Consequently, a disease avoidance motive evolved (Griskevicius & Kenrick, 2013). Disease avoidance is based on the idea of a behavioral immune system, which is complementary to the physiological immune system, and aims to preemptively prevent individuals from contracting diseases (Griskevicius & Kenrick, 2013; Schaller & Park, 2011). The disease avoidance motive is triggered by cues that could signal a pathogen threat (Tybur & Lieberman, 2016), such as coughing, sneezing, dirtiness, foul smells, deformity or all kinds of pathogen-transmitting objects (e.g., feces, blood, rotten food). The activation of this motive is signaled to the individual through the experience of the emotion disgust, and it predisposes people to engage in a wide variety of disease-avoidance behaviors (Griskevicius & Kenrick, 2013).

The behavioral immune system has consequences for cognition, affect, and behaviors, and has been used to explain a wide range of phenomena at both the individual- and group-level. For example, the behavioral immune system has been linked to an increased prejudice toward people with physical disabilities, overweight people, and the elderly because atypical morphology and movement is (falsely) interpreted as the presence of pathogens (Schaller & Neuberg, 2012). However, the behavioral immune system is not only occupied with the appearance of others, but is also linked to an increased concern for one's own physical appearance due to the potential of being stigmatized by others (Ackerman, Tybur, & Mortensen, 2018). Furthermore, the behavioral immune system has implications for personality traits and values. Indeed, regions historically characterized by a high degree of pathogen threat tend to score lower on extraversion, sociosexuality, and openness to experience (Schaller & Murray, 2008). Similarly, pathogen threat has been linked to increased conformity, political conservatism, strong family ties, and religiosity (Beall, Hofer, & Schaller, 2016; Fincher & Thornhill, 2012; Murray & Schaller, 2012).

Like other evolutionarily shaped adaptations, the behavioral immune system is not perfect in its ability to detect and respond to threats as it is prone to overgeneralizing and false positive errors. Error management theory explains this phenomenon by noting that the direction of a bias depends on the relative costs of false positive to false negative errors (Haselton, Nettle, & Murray, 2016). In the case of the behavioral immune system, the cost of contracting an infectious disease has usually been much higher than the cost of avoiding something or someone that poses no threat, meaning that a tendency toward false positive errors would be adaptive (Haselton et al., 2016). This bias is particularly strong when the benefits of avoiding disease clearly outweigh the costs, such as when a person is, or feels, particularly vulnerable to disease (Faulkner, Schaller, Park, & Duncan, 2004; Schaller & Park, 2011). Unsurprisingly, this may be the case during regional or global disease outbreaks (Kim, Sherman, & Updegraff, 2016).

Based on the above considerations, we argue that it is highly relevant to study the effects of tourists' behavioral immune system in relation to the COVID-19 pandemic. In line with previous literature (Duncan, Schaller, & Park, 2009; Kim et al., 2016), we specifically examine the construct of perceived COVID-19 infectability as a proxy for the activation of the behavioral immune system. In doing so, we link a dimension of the ecology (the pathogen threat posed by COVID-19) to different behaviors (phenotypic plasticities or 'palms') through a psychological mechanism. We test perceived COVID-19 infectability in two complementary studies including outcomes derived from evolutionary psychology such as crowding perceptions, xenophobia, and ethnocentrism (Study 1) and more traditional tourism constructs and psychological antecedents (Study 2).

Crowding perceptions

Previous evolutionary-based research has noted that perceptions of and attitudes toward crowding vary depending on which fundamental motive is activated. For example, the affiliation motive has been linked to a preference for crowded retail spaces as a way of getting closer to others (Thomas & Saenger, 2019), while the activation of the behavioral immune system increases people's perceptions of crowding and the feeling of negative affect toward such environments (Wang & Ackerman, 2019). The latter finding has been explained as an adaptive way of avoiding disease as the risk of contracting a disease is higher in crowded environments (Wang & Ackerman, 2019). Indeed, depictions of a crowded space have even been used as part of measuring disgust sensitivity (Curtis, de Barra, & Aunger, 2011). Prior literature has investigated tourists' perceptions of crowding and demonstrated how

crowding perceptions impact tourist experiences (Lee & Graefe, 2003; Li, Zhang, Nian, & Zhang, 2017). However, due to the relative absence of evolutionary research in tourism, disease avoidance has yet to be investigated as an important determinant of tourists' crowding perceptions. We examine the association between these constructs in Study 1.

Xenophobia

In today's globalized world, xenophobia is maladaptive and detrimental, however, in ancestral environments, avoiding contact with out-group members served several functions (Schaller & Neuberg, 2012). Specifically, xenophobia serves the function of disease avoidance: Out-group members could have carried diseases the in-group had not built immunity against (Faulkner et al., 2004). Many studies have empirically found links between the behavioral immune system and xenophobia, documenting that negative attitudes toward out-groups are predicted by perceived vulnerability to disease and disease risk perceptions (Faulkner et al., 2004; Kim et al., 2016; Prati & Pietrantonio, 2016). Unsurprisingly, such effects are then particularly relevant during major disease outbreaks: During the 2014 Ebola outbreak, the higher American respondents' perceived vulnerability to the disease was, the more xenophobic their responses were (Kim et al., 2016), and a link between Ebola risk perceptions and prejudice toward African immigrants was found among an Italian sample (Prati & Pietrantonio, 2016).

While some tourism scholars have hinted at xenophobic responses in the wake of the COVID-19 pandemic, they provide rather proximate explanations for the tendency, such as biased media coverage (Wen, Aston, Liu, & Ying, 2020). In contrast, Kock, Josiassen, and Assaf (2019), p. 156, explain the role of xenophobia through the fundamental motive of disease avoidance. Tourist xenophobia is defined as "a tourist's perceptual discomfort and anxiety associated with strangers encountered at foreign destinations" and the researchers demonstrate its association with outcomes such as preference for travel vaccination, willingness to travel to foreign destinations, and intention to book travel insurance. We develop their line of thinking further in Study 1 by examining the relationship between perceived COVID-19 infectability and tourist xenophobia.

Ethnocentrism

Following a similar logic as with xenophobia, pathogen threat has also been linked to increased in-group favorability. That is, when a pathogen threat is present, it becomes more attractive to interact with in-group members, as it poses less health risks and in-group members may provide support in cases where an individual has contracted a disease (Navarrete & Fessler, 2006). In support of this theory, scholars have found a link between perceived vulnerability to disease and ethnocentrism (Navarrete & Fessler, 2006). Ethnocentrism has even been found to be particularly strong during the first trimester of pregnancy, where the mother and fetus are particularly vulnerable to pathogens (Navarrete, Fessler, & Eng, 2007). At a regional scale, researchers have also found a correlation between collectivism (of which ethnocentrism is said to be a specific manifestation) and the prevalence of pathogens (Fincher, Thornhill, Murray, & Schaller, 2008). While ethnocentrism has received little attention in a tourism context, it has important implications for tourism behaviors. Indeed, Kock, Josiassen, Assaf, Karpen, and Farrelly (2019, pp. 427-28) found a link between tourism ethnocentrism (defined as "an individual's prescriptive beliefs and felt moral obligation to support the domestic tourism economy") and willingness to engage in domestic tourism and support for tourism development. However, the potential association between pathogen threat and tourism ethnocentrism has yet to be examined.

Study 1

The objective of Study 1 is to examine whether the COVID-19 pandemic is associated with important tourism phenomena that we identified through an evolutionary lens. Based on the Evolutionary Tourism Paradigm and, more specifically, the theory on disease avoidance (ultimate motive) presented above, this study tests whether a higher pathogen threat (ecology) relates to tourists' crowding perceptions and increased levels of xenophobia and ethnocentrism (phenotypic plasticities). The nomological networks tested in Study 1 and 2 are complementary, and visualized and theoretically connected in Fig. 2. While the studies are theoretically connected, the data collection was divided in two to limit potential problems of respondent fatigue.

Participants and procedure

To test the relationships, we recruited American participants through the crowdsourcing platform MTurk. We chose U.S. respondents because the U.S. is a very important tourism outbound market: It is the second-biggest spender (144 USD billion) after China (277 USD billion) on international tourism, and growing faster than China (UNWTO, 2019). MTurk data has been reported to be of good quality by prior studies (Goodman & Paolacci, 2017; Kees, Berry, Burton, & Sheehan, 2017; Ramsey, Thompson, McKenzie, & Rosenbaum, 2016). However, like any data collection method, collecting data from MTurk has certain limitations, such as participant non-naivety, issues of self-selection, and issues with participants not paying attention or engaging in biasing response behaviors (Hauser, Paolacci, & Chandler, 2019). To mitigate the risk of the latter, we used an instructional manipulation check ("Please select 'agree' as answer here") (Paas, Dolnicar, & Karlsson, 2018). The use of such check questions can effectively detect and alleviate biasing response behavior. We obtained the data in the first week of May 2020.

In alignment with previous literature (Boley, Jordan, Kline, & Knollenberg, 2018; Kock, Josiassen, & Assaf, 2019), we aimed to reach people who, at least hypothetically, consider or engage in travelling. Such a stratification is useful because not every potential respondent is willing or able to travel. This may be due to psychological reasons (e.g., psychological impairment, inertia, or

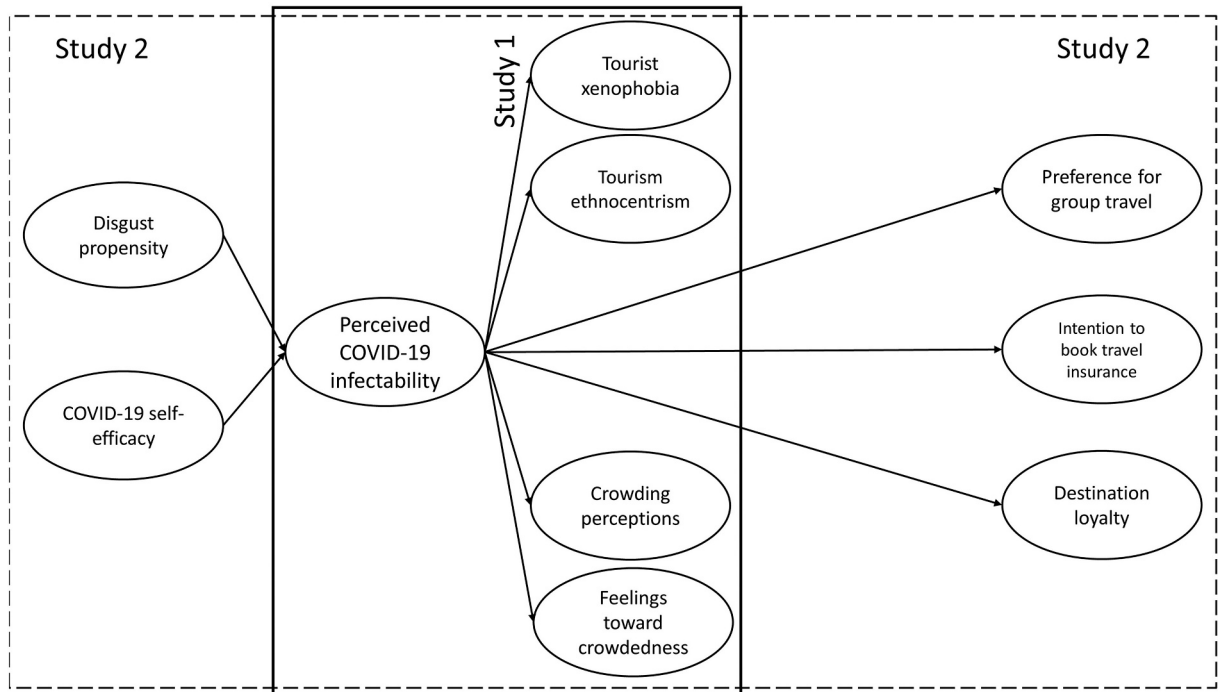


Fig. 2. Nomological model of Study 1 and 2.

agoraphobia), physical impairment (e.g., a disease or a disability), private responsibilities (e.g., looking after a family member), or financial constraints. Importantly, this stratification is not theoretically linked to this study but merely helps to filter out individuals who are barred from travel. To this end, we put three restrictions on the types of participants to recruit: 1) they had to be 18 or older, 2) they had to have a household income of above \$30,000 USD per year, and 3) they had to have travelled distances of over 70 miles in the past two years. While this stratification cannot ensure that all participants have required means and abilities to travel, it filters out those who are barred from travel per se, while retaining those who can travel on a smaller budget. We collected 540 completed questionnaires. Another 43 respondents were removed from the sample because they failed the instructional manipulation check (i.e., 7.3%). See Table 1 for sample characteristics.

Measures

We adopted the ethnocentrism and xenophobia measures and adapted the remaining measures. Adaptation was necessary because the original scales were either designed for a different context (and not the Coronavirus pandemic) or consisted of more facets than

Table 1
Sample characteristics.

Sample	Study 1: Evolutionary outcomes	Study 2: Behavioral outcomes and antecedents
Sample size	540	420
Age (%)		
18–25 years	13.9	16.4
26–39 years	54.1	52.5
40–55 years	25.1	24.0
> 55 years	6.9	6.9
Gender (%)		
Female	36.9	44.5
Male	63.1	55.5
Education (%)		
Finished a master's degree or higher	21.5	17.6
Finished a bachelor's degree	60.9	55.7
Enrolled at university	6.9	9.8
Finished secondary school	10.2	15.0
Finished primary school	0.6	1.9

Table 2
Constructs and their parameters used in Study 1.

Construct/Items	Factor loadings	Composite reliability	Average variance extracted
Perceived COVID-19 Infectability (adapted from Ackerman et al., 2018)			
1. If an illness like Corona is 'going around', I will get it.	0.81	0.93	0.72
2. My past experiences make me believe I am likely to get sick if anyone around me is sick already.	0.80		
3. I think I'm one of those who will have more severe symptoms if I get Corona.	0.87		
4. In general, I am more likely than the people around me to catch an infectious disease.	0.86		
5. If I get Corona, it may hit me harder than others.	0.89		
Tourist Xenophobia (Kock, Josiassen, & Assaf, 2019)			
If I travelled to a foreign country,			
1. ...I doubt that the locals would be welcoming to tourists like me.	0.80	0.93	0.69
2. ...I would not feel comfortable in the culture.	0.85		
3. ...I would probably feel uneasy to engage with locals there.	0.85		
4. ...There would be many misunderstandings between me and the locals there.	0.81		
5. ...I would be suspicious toward the locals I encounter there.	0.82		
6. ...I would be worried that the locals would meet me with reservation.	0.87		
Tourism Ethnocentrism (Kock, Josiassen, Assaf, Karpen, & Farrelly, 2019)			
1. Americans should support the American economy by travelling to holiday destinations in the US.	0.76	0.90	0.65
2. Americans should feel a duty to book a national holiday.	0.77		
3. Everyone should support the American economy by spending their holiday in the US.	0.84		
4. It comes down to all Americans to spend their holiday in the US and support the country.	0.86		
5. Americans should spend their holiday in the US because this secures jobs in the American tourism industry.	0.86		
Crowding Perceptions (Wang & Ackerman, 2019)			
1. How likely are the people on the picture to bump into or brush against each other?	0.60		
2. How crowded do you think the scene is?	0.77		
Feelings toward Crowdedness (Wang & Ackerman, 2019)			
1. How would you feel in this scene?			

what we intended to capture. The adaptation of scales was executed in two steps. First, two authors rephrased and deleted items while ensuring face and content validity vis-a-vis the definition and conceptual frame of the respective construct. Employing this judgemental criterion is crucial because adapted scales may potentially alter the theoretical meaning of the measure; a problem that is not detectable by statistical criteria only (Wieland, Kock, & Josiassen, 2018). Second, we assessed the statistical parameters of each item and its respective scale through both exploratory and confirmatory factor analyses, verifying that the adapted scale is both reliable and valid (Table 2). Drawing on existing measures also required the adoption of the 7-point ordinal answer format of the original scales. While no single optimal survey format exists, ordinal scales can be prone to different types of response bias and impair both the data analysis and construct validity. Thus, alternative answer formats (Dolnicar, 2013) should be considered when a new scale is developed or substantially amended.

We captured the perception of a pathogen threat related to the Coronavirus pandemic by adapting the perceived infectability measure from Ackerman et al. (2018), which is a subscale of the perceived vulnerability to disease measure (Duncan et al., 2009). This measure has been confirmed in various seminal disease-related studies as a proxy for a perceived pathogen threat, and thus activation of the behavioral immune system. We adopted the measures of tourist xenophobia (Kock, Josiassen, & Assaf, 2019) and tourism ethnocentrism (Kock et al., 2019). In a pre-study, we had also included tourism xenophilia (Nørfelt et al., 2019) but decided to drop it due to the high shared covariance with xenophobia. We also dropped the variable support for tourism development because it had been tested together with tourism ethnocentrism before (Kock et al., 2019).

We adapted the crowding perceptions measure of Wang and Ackerman (2019) by showing respondents a picture of a crowded touristic situation for 5 s. Respondents were instructed to pay attention and memorize the picture. After the 5 s, they were asked to remember how many people were in the scene, followed by two questions measured on 7-point ordinal scales: 'How likely are the people on the picture to bump into or brush against each other?' (very unlikely/very likely) and 'How crowded do you think the scene is?' (empty/very crowded). Further, we measured respondents' feelings toward crowdedness with the third question: 'How would you feel in this scene?' (very uncomfortable/very comfortable) (Wang & Ackerman, 2019). As a control, we asked respondents how much they visualized themselves in the scene. Lastly, we recorded respondents' age, gender, education, and perceived own health. While we tested an indoor setting in this study (restaurant), future research on understanding crowding perceptions in the context of the pandemic is advised to examine potential differences between indoor and outdoor crowds.

All measures met the key assumptions of multivariate normality (see Table A in the supplementary data). Discriminant validity between all measures was established through both the Fornell-Larcker criterion and the heterotrait-monotrait ratio criterion. Assessing the correlations between each pair of constructs further corroborated the discriminant validity. For example, for tourist xenophobia and tourism ethnocentrism, the pairwise correlation was 0.422. Table 2 further displays the scales' respective items and psychometric parameters.

Table 3
Structural model results of Study 1 and Study 2.

Estimated relationship	Coefficient (p-value)	
	Study 1	Study 2
Perceived COVID-19 Infectability → Tourist Xenophobia	0.67 (0.000)	
Perceived COVID-19 Infectability → Tourism Ethnocentrism	0.42 (0.000)	
Perceived COVID-19 Infectability → Crowding Perceptions	0.35 (0.000)	
Perceived COVID-19 Infectability → Feelings toward Crowdedness	−0.25 (0.000)	
Perceived COVID-19 Infectability → Preference for group travel		0.52 (0.000)
Perceived COVID-19 Infectability → Intention to book travel insurance		0.41 (0.000)
Perceived COVID-19 Infectability → Destination loyalty		0.17 (0.000)
Disgust propensity → Perceived COVID-19 Infectability		0.29 (0.000)
COVID-19 self-efficacy → Perceived COVID-19 Infectability		−0.29 (0.000)

Results

We estimated a structural model through a covariance-based structural equation modelling approach in AMOS 26. The model fit was good ($\chi^2/df = 3.120$; CFI = 0.955; NNFI = 0.948; RMSEA = 0.063; SRMR = 0.0812), indicating that the data fit the model well. The results (Table 3) provide strong support for our evolutionary approach, demonstrating the benefits of working within the Evolutionary Tourism Paradigm to explain more distant and less obvious tourism phenomena. Specifically, perceived COVID-19 infectability relates positively to crowding perceptions (0.35, $p < .000$), xenophobia (0.67, $p < .000$) and ethnocentrism (0.42, $p < .000$). Further, perceived infectability relates negatively to respondents' anticipated comfort with being in the crowded situation (-0.25 , $p < .000$). We found no significant results with the demographic correlates or perceived own health.

Study 2

Study 1 empirically demonstrated that the pathogen threat induced by the COVID-19 pandemic has considerable associations with important phenomena in tourism that would not have been investigated without an evolutionary lens. To complement these insights, in Study 2, we set out to empirically examine how a pathogen threat (ecology), as related to disease avoidance (ultimate motive), is associated with tourists' travel-related predispositions (phenotypic plasticities) as well as investigate the psychological roots of the pathogen threat. For this investigation, we draw on theory of disease avoidance from evolutionary psychology (e.g., Tybur, Lieberman, & Griskevicius, 2009) and its prior application in tourism (e.g., Kock, Josiassen, & Assaf, 2019) as well as other disease-related tourism literature (Cahyanto et al., 2016). The nomological network is shown in Fig. 2.

Participants and procedure

For Study 2, we obtained the data in the second half of April 2020. We followed a similar data collection approach as in Study 1, thus we recruited American participants through the crowdsourcing platform MTurk. We also included the same instructional manipulation check as in Study 1. We collected 420 completed questionnaires and another 15 respondents were excluded due to failing the instructional manipulation check. The sample characteristics are provided in Table 1.

Measures

In order to identify those tourists who might be particularly prone to a pathogen threat, we captured respondents' disgust propensity. Disgust propensity is a frequently used concept in evolutionary psychology that can explain individual differences in reactions toward disgust-eliciting cues (e.g., Tybur et al., 2009). We adapted the disgust propensity scale from Tybur et al. (2009). Further, we measured tourists' COVID-19 self-efficacy by adapting the scale from Cahyanto et al. (2016). This measure captures tourists' perceived self-efficacy in taking cognitive and behavioral actions that mitigate the probability of contracting COVID-19. We used the same two-step adaptation procedure as in Study 1. In the same questionnaire, we also included the variable prevention focus but dropped it in the analysis due to its high covariance with the other two antecedents. In addition, we included the same perceived infectability measure as well as the same demographic variables as in Study 1.

We further included a set of travel-related predispositions that evolutionary psychology and tourism research hint may be behavioral consequences of the Coronavirus threat: destination loyalty, intention to book travel insurance, group travel preference, vaccination intent, intention to engage with locals, and domestic travel intent. We would expect all these travel-related intentions to decrease, directly or psychologically, travel-related risks and should therefore relate positively to a perceived Coronavirus threat (except intention to engage with locals). As such, they serve as adaptive phenotypic plasticities in an ecology that poses pathogen threats. For reasons of parsimony, we refer the reader to Kock, Josiassen, and Assaf (2019) and Kock et al. (2019) for detailed discussions on these variables, their risk-mitigating functions, and relation to xenophobia and ethnocentrism. We decided to exclude from the analysis travel vaccination, domestic travel intent, and intent to engage with locals for external validity reasons. As for vaccination intent, due to the course of the dynamic development of the pandemic, we could not ensure that participants would

Table 4
Constructs and their parameters used in Study 2.

Construct/Items	Factor loadings	Composite reliability	Average variance extracted
Perceived COVID-19 Infectability (adapted from Ackerman et al., 2018)		0.92	0.69
1. If an illness like Corona is 'going around', I will get it.	0.80		
2. My past experiences make me believe I am likely to get sick if anyone around me is sick already.	0.81		
3. I think I'm one of those who will have more severe symptoms if I get Corona.	0.90		
4. In general, I am more likely than the people around me to catch an infectious disease.	0.79		
5. If I get Corona, it may hit me harder than others.	0.86		
Disgust Propensity (adapted from Tybur et al., 2009)		0.86	0.50
Please indicate to what extent you would feel disgusted in the situations described below.			
1. Standing close to a person who has body odor.	0.77		
2. Shaking hands with a stranger who has sweaty palms.	0.72		
3. Stepping on dog poop.	0.72		
4. Seeing some mold on old leftovers in your refrigerator.	0.70		
5. Sitting next to someone who has red sores on their arm.	0.71		
6. Seeing a cockroach run across the floor.	0.61		
COVID-19 self-efficacy (adapted from Cahyanto et al., 2016)		0.77	0.57
1. I am confident that I can understand health instructions about Corona prevention.	0.80		
2. I am confident that I am able to take action to prevent contracting Corona.	0.76		
3. I am able to identify the symptoms of Corona.	0.70		
4. I know what to do if I suspect I am exposed to COVID-19.	0.74		
Preference for group travel (adapted from Kock, Josiassen, & Assaf, 2019)			
1. For my next holiday, I prefer travelling in an organized tour.			
Intention to book travel insurance (adapted from Kock, Josiassen, & Assaf, 2019)			
1. For your next holiday, how likely is it that you would book a travel insurance?			
Destination loyalty (newly developed)			
1. For my holiday, I will travel somewhere I have been before.			

actually view the vaccination as a travel vaccination (and not a COVID-19 vaccination which was not existent when data was collected). As for domestic travel, we could not ensure that participants would actually consider a foreign travel as an alternative because travel restrictions were in place when data was collected. Similarly, we could not ensure that respondents would consider the locals to be foreign. This research employs behavioral intention measures because actual travel behavior could not be meaningfully measured during the pandemic. This constitutes an inevitable limitation but we do not expect severe impairments of the validity of our results because the intentions we capture are not subject to social desirability. Table 4 presents the items used in the final model, and, for the multi-item measures, also the respective psychometric parameters. Correlations between all constructs are included in the supplementary data (Table C).

Results

All items met the assumptions of multivariate normality (Table B in the supplementary data). The estimated model fits the data reasonably well: ($\chi^2/df = 4.423$; CFI = 0.878; NNFI = 0.9859; RMSEA = 0.090; SRMR = 0.0653). The results document that a perceived pathogen threat relates to tourists' travel-related predispositions (Table 3). Specifically, perceived infectability of the pandemic relates positively to group travel (0.52, $p < .000$), intention to book travel insurance (0.41, $p < .000$), and destination loyalty (0.17, $p < .000$). Further, we find that disgust propensity relates positively to perceived infectability (0.29, $p < .000$), while COVID-19 self-efficacy relates negatively to perceived infectability (-0.29 , $p < .000$), thereby confirming our conceptualization.

Conclusion

The Coronavirus pandemic has revived people's existential anxieties by reminding them of their physical and economic vulnerability. It is during these times that our deeply-rooted evolutionary protection mechanisms are activated. These mechanisms, and the behavioral immune system in particular, have been shaped over thousands of years in our ancestral past. Once activated, they are likely to override culturally learned and socially constructed paradigms in our contemporary lives. The current pandemic is a testament to this, and understanding its consequences for tourism research without considering an evolutionary lens results in an incomplete picture at best.

Evolutionary psychology bears significant potential to enhance our understanding of the impact of the Coronavirus pandemic on tourists' psyche, as well as on various other tourism phenomena. The present paper conceptually develops and empirically documents the considerable untapped potential of evolutionary psychology for understanding the tourists' psyche in the COVID-19 era. This is achieved by drawing researchers' attention to the principles of evolutionary psychology, which we tailor into a tourism research paradigm, visualized through the proposed ocean and islands model. By doing so, we hope to spur an infusion of biological epistemology and theorization into tourism research, encouraging researchers to begin exploring the evolutionary roots of tourist

behavior. Almost every behavior includes an evolutionary explanation, and by analyzing this explanation, we can better understand the effects of the Coronavirus pandemic on the tourists' psyche, as well as tackle other modern-day problems in tourism.

A key strength of evolutionary psychology and our paradigm is that it allows researchers to conceptually and empirically connect seemingly standalone phenomena to generate new knowledge. Instead of examining only proximate motives that provide narrow explanations in one constraint area, evolutionary psychology can highlight parallels between seemingly unrelated phenomena by tracing them back to fundamental motives. This perspective allows for tracing various behaviors back to a common ultimate motive, such as the motive of disease avoidance. Our research demonstrates this conceptual strength; in two consecutive studies, we document that taking an evolutionary perspective yields novel insights and creative explanations that would not have been generated without it. Specifically, we found that the psychological concepts of ethnocentrism, xenophobia, and crowdedness perceptions relate to perceived COVID-19 infectability (Study 1). Importantly, only the evolutionary reasoning paved the way to test these relationships because each of these phenomena provides a different way to cognitively or conatively adapt to and counter the pathogen threat. For example, xenophobia is a direct evolutionary means to minimize the risk of contagion.

In addition, the behavioral phenomena of group travel preference, travel insurance, and destination loyalty (Study 2) provide the tourist with a feeling of security that lowers travel-related risk perceptions. Understanding that these, at first sight unrelated, phenomena relate to each other contributes to a deeper understanding of the relationship between the pandemic and tourists' psyche. Based on these results, we urge future research to build on our endeavors to unveil more phenotypic plasticities (i.e., 'spotting more islands and palms in the ocean'). The fundamental motive of affiliation could, for example, be used to investigate how the social isolation of the COVID-19 pandemic affects tourists' psyche.

Another strength of evolutionary psychology is its meta-level: Evolutionary psychology is not a single theory but a rich interdisciplinary network of countless theories (i.e., it is a meta-theory). Evolutionary psychology is therefore not a narrow field of research, but a way of thinking about and making sense of observed psychological phenomena. This constituent factor reshapes how evidence is reasoned in evolutionary psychology because it requires researchers to always ensure the logical alignment of the different types of explanations in both theory and results and across all examined phenomena. By paying attention to this logical alignment, an evolutionary perspective counteracts the emergence of isolated research areas, and thus helps to prevent the academic insulation of tourism research, and more broadly, the social sciences.

A further strength of evolutionary psychology is that its theoretical foundations rest on complementary evidence from various disciplines, such as biology, psychology, genetics, and anthropology (Saad, 2017). This multi-disciplinary ethos also yields unique epistemological frameworks for developing new explanations for human behavior, as well as promoting methodological pluralism, because many hypotheses are best tested through the use of experimental study designs. This focus on experimental testing can also help to address recent calls for more experimental designs (Viglia & Dolnicar, 2020). Further, the fundamental motives are universal and thus applicable across cultures. However, it is important to emphasize that almost all behaviors include both an evolutionary and cultural explanation, thus we suggest a nature *and* nurture approach rather than a dogmatic nature vs. nurture approach.

Importantly, while an evolutionary approach is powerful in identifying new phenomena and tackling these phenomena through new approaches, it is not a justification for the observed behavior. Although evolutionary psychology offers an explanation for why people may become more xenophobic, it does not imply that xenophobia or other social problems are inevitable and should be accepted. Insight from evolutionary psychology may even be used to limit such tendencies (Griskevicius, Cantú, & Van Vugt, 2012). As an example, cues of invulnerability to disease (Schaller, Park, & Faulkner, 2003) may be used to situationally lower perceived COVID-19 infectability and tourist xenophobia in places where interaction between residents and tourists is frequent.

There is a long-standing divide with "soft" or social sciences on one side and "hard" or natural sciences (such as evolution and ecology) on the other side. While scholars in both domains study behavior, their epistemologies and theories are only rarely applied across disciplinary borders. The current pandemic highlights that new research perspectives may be needed to more holistically understand the complex effects and intertwined consequences for applied fields such as tourism. This pandemic urges us to consider that the time is right to join forces by building bridges between the social and natural sciences. This research provides conceptual and empirical evidence of the usefulness of the Evolutionary Tourism Paradigm to inform research specifically on this pandemic and, more broadly, on tourism.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.annals.2020.103053>.

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