Understanding the impact of risk perception in leisure tourism-related decisions and the role of attitudes and preferences

A dissertation presented by

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Submitted to the

Faculty of economics

Università della Svizzera Italiana

for the degree of

Ph.D. in Economics

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August 2016

Table of Contents

Introduction

This dissertation collects three research articles developed in the framework of tourism studies, in particular in the field of tourist behaviour. The thesis deals with topics regarding tourist risk perception, hazard-induced travel behaviour and the role of individual traits in decision making influenced by potential hazards.

The decision to make a leisure trip can be thought as a complex process characterized by several determinants. Among these, one can refer to the individual sphere of the decision maker which comprises socio-demographic characteristics, travel preferences, attitudes, social norms and other personality traits. All these aspects combined contribute, in a first step, to the evaluation of the travel alternatives and, eventually, to the final decision. When the risk represented by dangerous situations comes into play, the complexity of the decision-making process augments even further because cognitive processes are altered (Sönmez and Graefe, 1998b; Uriely *et al.*, 2007) and the elaboration of information useful to take decisions is influenced by the perceived potential danger for one's own safety (Alvarez & Asugman, 2006; Slevitch & Sharma, 2008).

Both the actual level of uncertainty of a situation and the individual perception of such an uncertainty lead tourists to take a decision concerning their travel programmes. There are individuals for whom facing sources of uncertainties or taking risks is an essential part of the travel experience (Adam, 2015) or others who voluntarily expose themselves to threats which, more or less concretely, can put life in danger (Uriely *et al.*, 2007) but in general one observes that tourists are risk averse, especially when it comes to life-threatening events. Typically, travellers facing a potential risky situation that may pose a threat to their own safety tend to exercise caution because security is a valuable attribute when travelling (Fuchs & Reichel, 2006) and individuals are generally influenced by the safety of location (Brunt *et al.*, 2000). In this sense, travellers consider the possibility to adopt a whole set of risk reduction strategies in order to deal with the potential risk at destination or may opt for more drastic alternatives like trip cancellation, trip postponing or change in the destination (Adam, 2015; Floyd *et al.*, 2003; Fuchs & Reichel, 2011). Such a decision depends on several aspects, concerning, on the one hand, the individual private sphere and, on the other, the specific situation under examination (Fuchs *et al.*, 2013). The concreteness of a danger and the way a traveller perceives a potential threat in a tourist context is a fundamental driver in taking a decision (Law, 2006; Kozak *et al.*, 2007); this can be conceived from a cost-benefit perspective in which the potential danger represents one of the costs of travelling (that can be amplified by individual perception) while pleasure, satisfaction and other positive effects granted from making the leisure trip represent the benefit (Morakabati & Kapuscinski, 2016).

Analysing individuals' demand for leisure trips to destinations which may be deemed as "dangerous" implies accounting for travellers' attitudes and preferences related to tourism behaviour (Morakabati & Kapuscinski, 2016; Williams & Balaz, 2013). In particular, analysis

of behaviour holds a fundamental role in terms of targeting specific marketing and communication strategies toward certain segments of individuals and shaping messages related to tourist attitudes (Dolnicar, 2005; Plog, 2002). In fact, travel hazards represent serious threats to the competitiveness of a destination, its image and placement in the tourist market (Ritchie, 2004). In this sense, recent and well known examples are the case of Egypt, a country living a tense political situation and a persistent terrorist menace that undermine its tourist appeal, the situation in South East Asia in the aftermath of the great tsunami in 2004 or the Ebola outburst in West Africa in 2014 that undermined African tourism despite the local dimension of the infection.

The forms and types of life-threatening hazards representing a potential danger to tourists' safety are manifold. In the domain of physical risk in tourism ("Possibility of physical danger, injury or sickness while on vacation", Roehl & Fesenmaier, 1992) it is possible to make several distinctions between single situations that may fall under a specific sub-category or another. For example, one may distinguish between human- and nature-induced travel hazards (Valencia & Crouch, 2008). In the first category one may include acts of terror (Fuchs *et al.*, 2013; Sönmez & Graefe, 1998b; Uriely *et al.*, 2007), political uprising (Fletcher & Morakabati, 2008; Neumayer, 2004; Saha & Yap, 2013), acts of crime (George, 2010, Schroeder & Pennington-Gray, 2014) and sanitary-related crises like epidemics (Carter, 1998; Cossens & Gin, 1995; Jonas *et al.*, 2011) while the second category basically refers to natural catastrophes (Lehto *et al.*, 2007; Matyas *et al.*, 2011; Park & Reisinger, 2010; Walters *et al.*, 2015). These broad categories may in turn collect a huge series of distinctive events, in particular when one considers the whole set of natural catastrophes or epidemics that have affected the industry of leisure travels. Independently of the categorisation of critical events and risky situations, it is crucial to understand and disentangle differences in individuals' perception and reaction to adverse events. Such events represent a source of anxiety, fear and worry (Reisinger & Mavondo, 2005) that may be intensified whether an individual is particularly sensitive to potential danger and this applies both in the case a future trip is being programmed or organised and, in particular, in the case the individual experiences the negative situation while on vacation. Heterogeneity in risk perception and related travel behaviour depends on individual and contextual factors, i.e. the type and intensity of risky events and the location (Jonas *et al.*, 2011; Pizam *et al.*, 2002) and assessing both individual and contextual dissimilarities is important for delineating the decision-making process and its outcome.

By considering an extensive analysis of the literature, several research gaps concerning the individual response to risk in a tourist context have emerged. For example, despite a multitude of tourist studies dealing with risk perception and risk-induced behaviour considers the influence of socio-economic determinants with the purpose to highlight the differences among individuals, it appears that the role that travel attitudes and preferences have in determining risk-influenced travel behaviour has been a much less explored topic. More specifically, scarce attention has been posed to the aspect of hazard-induced travel deterrence and the role that

tourist attitudes have on its determination. A second concern regards the contextualization of potential hazards in a specific situation in which an individual evaluates the opportunity to travel considering the risky factors along a series of other choice-influencing attributes. In particular, the literature has not addressed how individuals take their decisions and what the role of individual risk perception is in a choice framework characterised not only by a potential threat at destination but also by the classical attributes of a holiday (i.e. cost, length of stay and type of organization). Moreover, it appears that the dedicated literature has touched only marginally the theme of differentiation between hazards in a context of destination choice. This is particularly important if one considers a setting in which a number of potential, clearly distinguished life-threatening hazards, are present at the same destination. In other words, the literature has not fully addressed the distinction among different life-threatening events at one destination and the importance of hazards' peculiarities in the visitors' perception and related behaviour.

The present research aims at filling the aforementioned gaps. More specifically, the purpose of this work is threefold: 1) to analyse how travel attitudes and preferences influence travel deterrence induced by potential hazards at a tourist destination; 2) to investigate the role of risk perception in the individual decision making process in a leisure travel context characterised by both the classical features of a holiday and potential hazards; and 3) to disentangle the differences related to distinct typologies of dangerous situations in the perception of riskiness and its influence on travel decisions. The framework of the research is confined to negative events which in the tourism-and-risk literature are commonly comprised in the "physical risk" category (Roehl and Fesenmaier, 1992) and specific attention is paid to four types of hazards that may pose serious threat to tourist safety while on travel: terrorist acts, natural catastrophes, political uprising and epidemics

The adoption of advanced econometric techniques represents a common trait in the three articles. The specific purpose of dealing with psychological constructs led to carefully design empirical models aiming at considering such constructs in an effective and meaningful way. The main purpose of studying tourists' psychology is to understand how travel behaviour can be analysed and modelled acknowledging a series of traits, which are not the classical socio-demographic characteristics. Thus, the modelling framework adopted in this thesis specifically takes into account unobservable variables as determinants of the phenomenon under investigation and outlines their role in tourist behaviour. In the first article, an ordered logit model is developed while in the second and third article a discrete choice model is proposed. The analysis proposed in the last two articles, in fact, originated from a stated preference experiment. All the aforementioned models are integrated with a latent variable part, taking into account the influence of individual psychographic traits in a decision-making framework (Ben-Akiva *et al.*, 1998; Walker, 2001). Such an approach has captured the interest of a growing number of researchers from a wide number of study fields, and has become popular through a rich discussion concerning both its theoretical foundations and its methodological

developments. Recent noticeable examples are the works of Bahamonde-Birke and Hanappi (2016), Hess *et al.* (2015) and Hurtubia *et al.* (2014) in the context of sustainable transports, Walker and Li (2007) on the matter of choices concerning residential location, and Hess and Beharry-Borg (2012) in the field of environmental economics. In the framework of tourism studies, to the best of our knowledge the only example is proposed by Fleischer *et al.* (2012) who adopted a hybrid choice model to evaluate the role of fear of flying in travellers' decisions to make a leisure trip.

To pursue the research objectives, a structured questionnaire was handled to a sample of university students, natives of different countries but currently living and studying in Lugano, Switzerland. This heterogeneous sample, in which different national and cultural backgrounds are present, allowed to test for variations in individual risk-related behaviour and travel-risk perceptions. The choice of focusing on young people is driven both by the importance that such a segment has for modern tourism and by the need to restrict the research to a context in which personal travel experience is still limited and therefore the assessment of improbable hazardous events is less influenced by it. The proposed questionnaire aimed at collecting individual information regarding several aspects, ranging from experience of travels and dangerous situations to perception of hazardous events and details concerning travel attitudes and preferences.

Three original empirical articles are presented in this thesis and each article enters the dissertation as a separate chapter.

The first article, entitled "How attitudes and preferences influence young tourists' perception of hazards", explores the role that travel attitudes and personal characteristics have on individuals' hazard-induced travel deterrence. The article is based on a quantitative analysis of four models, each considering a set of determinants of travel deterrence. Among these, a series of latent variables capturing constructs such as attitudes toward international travel, social acceptability of travel decisions and preferences for different ways to live the tourist experience are included. Every model specifically considers a single life-threatening hazard, these being categorized as terrorism act, natural catastrophe, political uprisings and epidemics. The analysis of data originated from a set of psychographic variables apt to profile the respondents; the adoption of a principal component analysis allowed to determine three distinct attitudinal traits which are defined "social acceptance and safety", "exploration and destination culture" and "organization and comfort". Three sets of results emerged from the analysis of data. In first place, it is highlighted that the three attitudinal variables bear significant differences in influencing travel deterrence, and this is true among both attitudes and hazards. In second place, from the analysis it emerges that significant differences are referred to the socio-demographic variables as well. Finally, the integrated model approach allowed to put in relation the socio-demographic variables with the attitudinal constructs and one observes that the former represents an important determinant of the latter, apt to explain the formation of the unobservable traits. From the aforementioned results one can draw important suggestions

concerning tourism policies and marketing interventions. This sub-field of tourism research deserves serious attention considering the role that psychological aspects hold in travel and tourism theory and understanding what lies behind tourists' risk-related travel avoidance is fundamental for practitioners and policy makers in order to deal with the effects that potential hazards may have on tourism demand.

The second article is entitled "Acceptance of life-threatening hazards among young tourists: A stated choice experiment". This study contributes to the literature exploring destination choice modelling and does it integrating a series of potential threats that individuals may encounter during their trip in the choice framework. More specifically, the article considers the decision-making process of individuals' evaluating hypothetical travel alternatives characterized by potential hazards; such hazards are characterised by varying levels of alert. The geographical framework of the travel alternatives the individuals have to choose from is Southeast Asia (SEA); in fact, it represents, on the one hand, a tourist destination that has gained travellers' attention and interest in the last years and, on the other, a world region where the four hazards considered are all simultaneously present. The discrete choice model resulting from the stated preferences experiment is integrated with a latent variable, capturing the individual perception of SEA as a risky tourist destination. Such construct is the result of the aggregation of four psychographic variables concerning the perception of dangerousness of four life-threatening hazards in the SEA region. Results show that risk perception is an important determinant of behaviour, being a factor that positively influences the probability of opting-out from holiday destinations and choosing not to travel. Furthermore, the same evidence was observed for increasing levels of alert. An interesting finding regards the heterogeneity of responses in the sample: risk perception significantly differs between individuals and hence the decision making process is not uniform among the respondents, some of whom are less concerned by potential threats at destination (and hence more willing to travel) than the others.

The third article, entitled "Risk perception concerning different hazards. A stated choice model applied to travel decisions", directly stems from the second work. The purpose of this article is to assess and explain the heterogeneity in the perception of different types of hazards, modelling a series of latent constructs that capture hazard-specific risk perception. In fact, considering a single risk dimension that aggregates different negative events may result in a partial picture of the phenomenon under observation. This work shows how different situations affect individuals' consideration of holiday options in potentially dangerous destinations; like in the other articles, psychological traits have a central part in explaining the choice dynamics and risk perception changes with a set of individuals' characteristics. In terms of research design, this work is based on the same stated preferences experiment presented in the second article, hence the choice design is based on hypothetical travel destinations set in SEA. A discrete choice model is presented and the innovation it presents is represented by the integration of four latent variables, each capturing risk perception related to a specific life-threatening hazard. The study results contribute to the existing literature concerning the

evaluation of travel hazards and delivers new evidences in the examination of individual heterogeneity in risk rationalization in a tourism context. Important differences in individual consideration of critical situations emerged from data analysis. Perceptual traits (hazard-specific risk perception) represent a fundamental determinant in explaining choice dynamics and it is evident that individuals rank hazards in terms of risk perception and form their travel decisions consequently.

To conclude, the purpose of this thesis is to contribute to the current discussion on the matter of life-threatening hazards in a tourist context. The three articles propose a new way to consider the topic, in particular paying a specific attention to the role and construction of attitudinal variables and directly looking at the decision making process. The results of the articles making up the present thesis are relevant in terms of policy and managerial implications for destination marketing organisations, tourism operators and public authorities. Although the research is focused on the segment of young travellers and research conclusions cannot be generalised to a wider population, several causes for reflection can be delineated. Different insights and potential measures are proposed in order to deal with risk perception and travel avoidance in situations of uncertainty and potential threats to travellers' safety, highlighting the importance of disentangling and considering individual traits in order to delineate an effective approach to communication. The attention that must be paid to travel attitudes and preferences is crucial when defining the strategies aimed at dealing with critical situations or crises at destination that may harm visitors' safety; practitioners dedicated to the sector must bear in mind the role of risk perception heterogeneity, both among individuals and hazards in order to set precautionary and response measures when facing potential threats with the aim to maintain a proper level of competitiveness in the tourism market. Different communication strategies must be set according to the type(s) of hazard(s) a destination is dealing with and the level of dangerousness. Aggressive promotion concerning destination security must be aimed at those who are particularly vulnerable in their perception of travel hazards. In particular, in such situations the role of travel agencies is central in proposing a positive image of the destination and specific services that can help the travellers to feel more secure. On the other hand, individuals who are less sensitive can be targeted with less aggressive promotional messages, and marketing strategies should convey their attention towards the destination's attributes affined to their travel interests.

These considerations appear crucial in this particular historical moment when, on the one hand, the tourism market expands and evolves, always proposing new solutions to individuals longing for experiences far from their everyday life and, on the other, world travellers are solicited in terms of critical situations and uncertainty for one's safety, with particular reference to the raise of terrorism threat and political violence in certain world regions.

Finally, taking the above mentioned research outcomes as a point of departure, several plans for future research are outlined in the research articles, comprehending topics and aspects that are not touched in this thesis.

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Chapter 1. How attitudes and preferences influence young tourists' perception of hazards

Igor Sarman

Abstract

Tourist decisions represent a complicated system of factors, and interconnection between such factors is mediated by decision maker's characteristics and preferences, among the others. Attitudes are part of these characteristics influencing individuals' decisions and, in particular, they have an important role when the risk represented by dangerous situations arises in a tourist setting. The purpose of the present research is to assess the influence that attitudes and preferences have on individuals' travel deterrence in the presence of potential hazards. A model considering individual evaluation that four life-threatening situations may represent a traveling deterrent is proposed and a series of covariates capturing behavioral constructs are included as explanatory variables. Data was collected from a sample of University students who were submitted a structured survey. Results show that different tourist attitudes and preferences affect distinctly individuals' perception of different life-threatening events and their impact on travel deterrence. Understanding what lies behind tourists' risk-related travel avoidance is fundamental for practitioners and policy makers in order to deal with effects that potential life threatening events may have on tourism demand.

Keywords: travel attitudes, hazards, travel deterrence, ordered logit model, latent variables.

1.1 Introduction

The travel sector is increasingly challenged by events seriously threatening visitors' safety. Understanding the role of life-threatening events in travellers' decisions is crucial as an individual's mindset may change drastically when taking decisions concerning personal safety (Klar *et al.,* 2002), even if the hazard is "far" and "potential". Be they human- or natural-induced, catastrophic events have the potential to undermine the tourism sector in stricken destinations with long-lasting consequences (Fernando *et al.*, 2013) and spillover effects to other destinations may occur (Kozak *et al.*, 2007; Neumayer, 2004).

Analysing individuals' demand for leisure trips to destinations deemed dangerous implies accounting for travellers' attitudes and preferences related to tourism behaviour (Huan *et al.*, 2004). The possibility of encountering hazards during a trip may lead to travel abandonment (or travel avoidance if this happens in the preparation phase). In risk-related tourism literature, several aspects are analysed that refer directly to dangerous events and hence may affect travel deterrence: visitors' propensity to take certain risks while traveling (Lepp & Gibson, 2003), personal characteristics and cultural background (Kozak *et al.,* 2007; Seddighi *et al.*, 2001) and personality traits (Larsen *et al.,* 2009), concreteness of the hazard as well as individual's perception (Sarman *et al.,* 2015) and rationalization (Fuchs *et al.*, 2012), information search behaviour (Sharifpour *et al.*, 2014), measures adopted at destination to guarantee visitors' safety (Pennington-Gray *et al.*, 2014), perceived social acceptability of decision and influence of peers' opinion (Floyd *et al.,* 2004).

This study explores the role of travel attitudes and personal characteristics in individuals' hazard-induced travel deterrence, proposing a quantitative analysis based on survey data. A set of ordered logit models are proposed, integrating latent variables originated from a set of psychographic questions. This modelling framework relates personal characteristics to personality traits, characterizing the formation of travel attitudes. Three different attitudinal traits are observed: "social acceptance and safety", "exploration and destination culture" and "organization and comfort". In terms of life-threatening events, we have included terrorism acts, natural catastrophes, political uprising and epidemics, building four empirical models relating attitudinal and personal traits to travel deterrence induced by each hazard.

Results highlight that attitudinal constructs affect individuals' perception of hazardous events and impact on travel deterrence. Travel attitudes do not have an equal effect on propensity to avoid traveling for different hazards. Results also show that individual characteristics influence the formation of travel attitudes.

1.2 Literature review

1.2.1 The role of psychological traits in risk-related literature

Tourism-related literature presents several examples of scholars analysing the interrelationship between travel attitudes and concepts related to life-threatening events. It is recognized that individuals rely on affective reactions in taking decisions (Burns *et al.*, 2011; Slovic *et al.*, 2002) and negative events shape individuals' perception of risky events (Västfjäll *et al.*, 2008). Roehl and Fesenmaier (1992) identified three tourist segments with different risk perception that can be associated to travel attitudes and these segments show different characteristics concerning the need to experience excitement and adventure during trips. Another well-known example of tourists' categorization linked to personality traits and risk perception is presented by Cohen (1972), who distinguished four separate classes of individuals based on their preferences for either novelty-seeking or staying in a safe environment. The same "tourist roles" were considered by Lepp and Gibson (2003) who analysed the influence of novelty- and familiarity-seeking attitudes on perceptions of a series of risks, either harmful or not. Sönmez and Graefe (1998a) tested the hypothesis that personality traits might influence terrorism risk-driven actions and travel decisions considering international travel attitudes, as well tourist personality types. In a study on gendered difference in young travellers, Carr (2001) acknowledged that the perception of varying levels of danger in determined situations and over time are to be attributed to individual personality rather than gender. Lepp and Gibson (2008) discussed concepts such as novelty seeking and familiarity, noticing that "…individuals differ in the degree to which they seek novelty and familiarity and this choice seems to be somewhat determined by underlying psychological qualities" (p.609). The authors found that attitudes related to novelty or familiarity seeking translate into different levels of perceived risk related to international tourism. "Personality traits" represents a rather generic terminology and different authors explored the role that disparate concepts of this play in relation to tourism and risk. For example, Lepp and Gibson (2008), Pizam *et al.* (2004) and Sharifpour *et al.* (2013) adopted the concept of "sensation seeking", relating it to tourists' risk perception and propensity to take risk. Valencia and Crouch (2008) explored the role of self-confidence, stating that this characteristic tends to "shape tourism consumer attitudes and reactions" (p.26). The authors proposed an empirical analysis and reported that an increasing level of self-confidence does not influence the decision to travel; interestingly, this applies with different magnitude to a wide range of critical situations spanning from natural- to human-caused events. Reisinger and Mavondo (2005) specifically considered the influence of personality on risk perception regarding, among others, terrorism and health issues, stating "…each tourist assesses risk differently depending on the need for familiarity and novelty. A tourist seeking familiarity is likely to perceive an alien environment as more risky than a tourist seeking novelty" (pp.214-215; also Lepp & Gibson, 2003). Moreover, the authors explored how risk perception affects travel anxiety and, subsequently, determined the implications of such a state of mind on travellers' perceived own safety and intentions to travel.

1.2.2 The topic of hazard-induced travel deterrence

Perceiving a destination as dangerous is obviously one of the main reasons that lead individuals to include it in their "inept" set and avoid it (Sönmez & Graefe, 1998a; Lawson & Thyne, 2001). As noted in Fuchs Pizam *et al.* (2012), visitors approaching a dangerous destination tend to "rationalize" their situation in order to reduce perceived risk. What these authors did not explore are the determinants of travellers' decision not to undertake the trip. A noticeable amount of works referring to hazard-induced travel avoidance can be found but few of these inquire the determinants of such a construct. Sönmez and Graefe (1998b) explored tourists' intention to avoid risky destinations and noticed that prior travel experience to a certain region tends to reduce travel avoidance for the same region: perceived risks are in general stronger predictors of avoiding regions rather than planning to visit them with significant differences among regions. Law (2006) investigated tourists' likelihood of changing travel plans if certain risks are present at a given destination and determined differences among visitors from different nationalities. Similarly, Kozak *et al.* (2007) related socio-demographics to the likelihood of changing travel plans if certain negative events have occurred in travellers' preferred/evoked destination. The authors found that tourists' personal characteristics matters while travel deterrence does not vary with respect to the evoked destination (it must be noticed that both Law (2006) and Kozak *et al.* (2007) made no distinction between the cases of infectious disease, terrorist attack and natural disaster). In the wake of September 11th 2001, Chen and Noriega (2004) ran a study among faculty staff and students in an America university and found a change in travel habits, especially in international travels. McKercher and Hui (2004) reported similar results: a sample of Hong Kong residents interviewed post-September 11th showed a higher uncertainty about traveling abroad and a higher tendency to delay or cancel travel plans than the pre-September 11th control group. Thapa *et al.* (2013) focused on the case of wildfires with the aim of exploring risk perception of individuals with different profiles and potential travel behaviour modifications. The authors determined a sort of "continuum" concerning tourists' profiles, placing on one side "cautious travellers" (prone to avoid traveling if the destination is not safe) and on the other the "courageous travellers" (willing to travel regardless of wildfire situations). Concerning the role of crisis preparedness certification, Pennington-Gray *et al.* (2014) explored the likelihood of traveling to certified destinations over noncertified ones finding that a majority of individuals were neutral regarding this choice. Matyas *et al.* (2011) explored tourists' evacuation decisions by adopting hurricane forecasts in Florida and highlight that the likelihood of evacuating did not match risk perception concerning potentially dangerous hurricane scenarios in the sense that the former was usually rated lower than the latter. Finally, Williams and Baláz (2013), adopting Cohen's (1972) classification of tourists, ran a set of linear regressions to analyze individuals' profiles with respect to deterrents to travel and competences to handle uncertain or risky situations. In addition, the authors considered travel deterrence induced by "general travel hazards" (considered generally manageable by the tourist) and "foreign country hazards" (seen

as less manageable) and according to results, “drifters” are less deterred by “general travel hazards” if compared to other tourist types, but no significant difference among tourist profiles was detected in the case of less manageable hazards. Moreover, travel experience reduces travel deterrence in the case of “general travel hazards” but not in the case of “foreign country hazards”.

As pointed out, the topic of travel deterrence is popular in risk-related literature; nonetheless, little attention is dedicated to the influence of psychological traits on hazard-induced travel deterrence. Larsen *et al.* (2009) developed a scale to measure tourist worries, relating it to other psychological correlates such as risk perception, risk acceptance and desire to travel. Despite the fact that the authors did not consider travel-specific habits and preferences, they determined a weak, negative correlation between tourist worry and desire to travel. Similarly, Lehto *et al.* (2007), considering the impact of a tsunami on travel intentions, noticed that, after such an event, a significant change occurred in individuals’ emotional correlates linked to negative feelings, and this fact, in turn, negatively influenced intention to travel to seaside destinations.

This research aims at enriching the ongoing discussion that relates tourists’ psychological traits and travel decisions in situations of danger. The final purpose is to explore to what extent a set of latent and observable determinants influence stated travel deterrence related to four distinct life-threatening events. This study represents a step forward in the analysis of such topics, addressing some issues that tourism literature has touched only marginally.

1.3 Modelling framework

Among the set of determinants that can influence hazard-induced travel deterrence, one can list both observable and unobservable constructs, with the latter, being unmeasurable, needing to be made manifest. The behavioural framework this work considers is represented in Figure 1.1. Individuals' observable characteristics are linked to their intended behaviour - travel deterrence - and attitudinal latent variables (LVs). Travel deterrence is a LV itself and therefore we must rely on an explicit manifestation of such a construct. The three attitudinal LVs are represented by a cause-effect relationship, i.e. are assumed to be influenced by a set of determinants and, at the same time, affect travel deterrence. In order to specify the attitudinal LVs we adopt a set of indicators assumed to be suitable to represent the unobservable constructs.

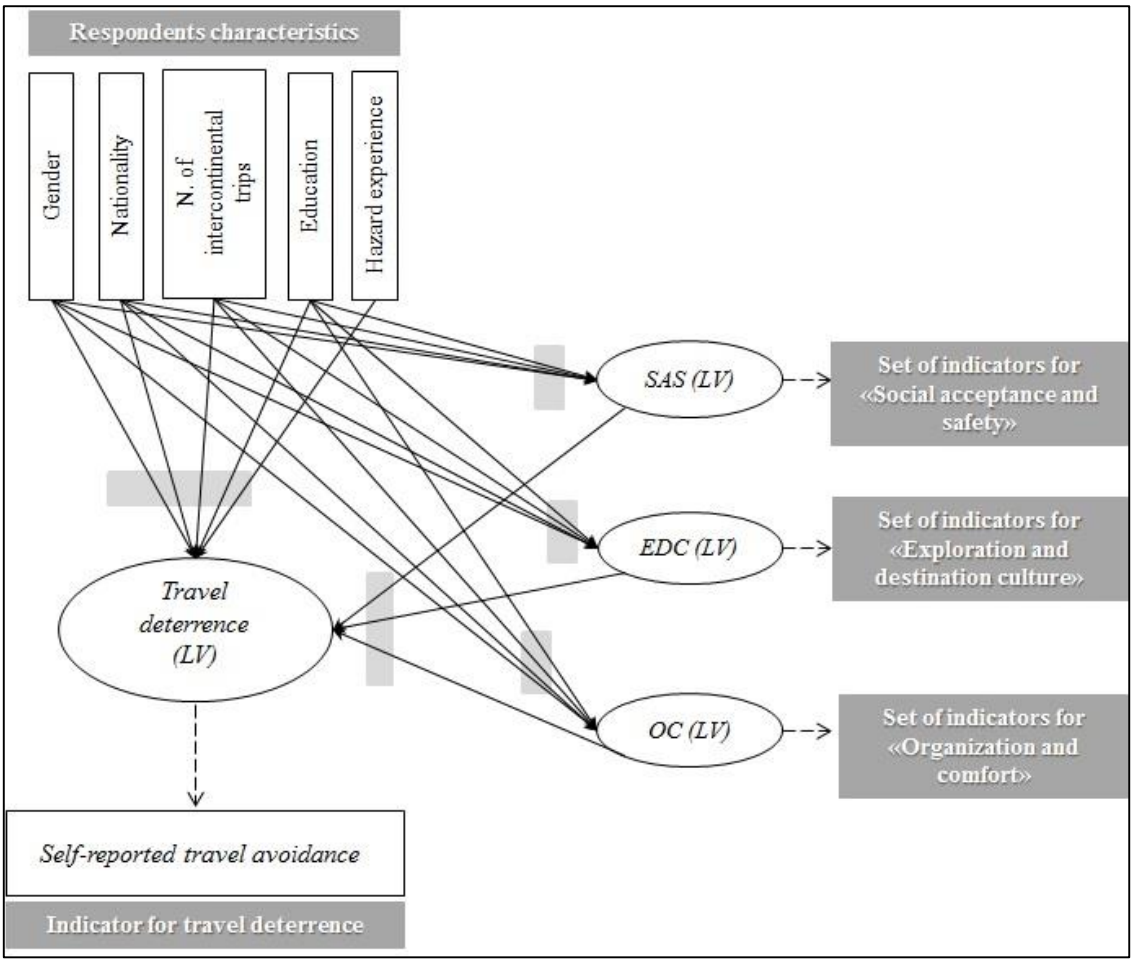

Figure 1.1 - Scheme of the integrated model

1.3.1 Specification of personality traits

Psychometric measures are adopted as manifestations of the LVs. These are based on a set of 27 questions regarding individuals' travel attitudes and preferences; Table 1.1 presents a detailed description of items and their distribution within four components obtained through a factor analysis. Data was explored using oblimin rotation to account for factor correlation

but this was particularly low and the factor composition resulted in being identical to the varimax case; hence, the latter procedure has been adopted. Based on a scree-plot, four factors (eigenvalues greater than 1.0) have been extracted considering only factor loadings above 0.45 (excluded factors are not listed) in order to ensure substantive values and parsimony in the number of estimation parameters. The four factor solution has resulted in being more reliable given a higher value of aggregate Cronbach's alpha (0.65) and offered a better interpretation of components. However, the fourth component was excluded from our final model given its extremely low reliability. Total variance explained by the relevant components is 32.5% and both the KMO measure and Bartlett's test show appropriate values.

The three traits determined by data analysis are referred to as "social acceptance and safety" (SAS), "exploration and destination culture" (EDC) and "organization and comfort" (OC). EDC and OC constructs resemble traits already observed by other authors, in particular Bello and Etzel (1985) - distinguishing between "commonplace" travellers and "novelty-experiencers" -, Plog (2002) - separating "venturers" from "dependables" -, Cohen (1972) and Lepp and Gibson (2008). We expect that such traits entail diverging effects on travel deterrence, with EDC reducing proneness to avoid traveling in the presence of risk, while OC having a positive effect on the decision not to travel. Regarding social acceptance related to risky tourist decisions (SAS), one notices that the field literature considered only marginally such a construct (Roehl & Fesenmaier, 1992; Sonmez & Graefe, 1998b). In the results section we propose a comprehensive discussion of these tourist traits and their effect on travel deterrence.

1.3.2 Model formalization

Given the nature of data, ordered logit modelling is implemented to pursue research objectives. This method is typically adopted when dealing with constructs having characteristics of discrete ordering because adoption of different methods would be considered conceptually wrong and lead to severe biases in estimates (Greene & Hensher, 2010). Ordered choice modelling is scarcely represented in tourism research if compared to other quantitative methods and other fields of study. Recent examples can be found in Hasegawa (2010) who analyse tourist satisfaction (described with a 5-point Likert scale) in the Hokkaido (Japan) area; Jonas *et al.* (2011) and Inversini & Masiero (2014) respectively represented as an ordered variable tourists' perception of health risk and hoteliers' perceived importance towards communication technologies.

Concerning integration of latent constructs in limited dependent variable models, there is a plethora of examples in discrete choice modeling literature. In the tourism field, we report recent works of Fleischer *et al.* (2012), dealing with fear of flying and its influence on travellers' flight itinerary choice and Sarman et al. (2015) investigating individuals' preferences relating to holiday alternatives characterized by hazardous situations. In general, inclusion of latent constructs is justified by the fact that choices are not influenced only by observable and structural factors and latent variables represent a fundamental integration that help

Table 1.1 - Factor analysis results

Factors and items	Loadings	% of variance	Cronbach alpha	Components descriptives	
Factor 1: social acceptance and safety				average	st.dev
People I know agreeing with my choices to travel influence my decisions to travel abroad *	0.73	11.91	0.731	4.1	1.7
People I know disagreeing with my choices to travel influence my decisions to travel abroad *	0.69			3.2	1.6
Negative experiences lived by other people influence my decisions to travel abroad *	0.68			4.5	1.7
Positive experiences lived by other people influence my decisions to travel abroad *	0.62			5.3	1.4
When I decide to spend holidays and have to choose between two foreign destinations, I prefer the safest one *	0.58			5.2	1.7
Factor 2: exploration and destination culture					
I prefer an active holiday rather than a passive one **	0.69	10.52	0.63	5.4	1.4
I prefer an unknown destination rather than a well-known one **	0.62			4.7	1.5
I prefer an itinerary trip rather than a one-place one **	0.57			4.8	1.4
I prefer a novel destination rather than a destination I already visited **	0.56			5.8	1.3
I prefer engaging in the host country's culture and meeting local people rather than avoiding it **	0.49			5.4	1.4
I prefer a backpacking holiday rather than a holiday with all daily comfort **	0.45			3.4	1.5
Factor 3: organization and comfort					
I prefer packaged tours rather than arranging the trip myself **	0.67	10.07	0.681	3.5	1.6
I prefer a well-planned holiday rather than a spontaneous one **	0.65			4.4	1.6
I prefer travelling with a knowledgeable guide rather than discovering the destination on my own **	0.61			3.7	1.6
I prefer engaging in safe activities rather than venturesome ones **	0.54			4.3	1.4
I prefer an expensive holiday rather than a cheap one **	0.53			3.6	1.6
Factor 4: ease of travel and company					
I absolutely feel at ease in spending holidays in my continent of origin *	0.56	6.68	0.38	5.6	1.4
I prefer traveling alone or with few close friends rather than spending holidays with unknown people **	0.57			5.5	1.6
I absolutely feel at ease in spending holidays in my country of origin *	0.49			5.3	1.8
Kaiser-Meyer-Olkin Measure of Sampling Adequacy:	0.724				
Bartlett's Test of Sphericity (significance):	1,443.96 (<0.001)				
Cronbach's alpha of total scale:	0.65				

** "The following sentences refer to your attitudes toward holidays and your behavior in terms of holiday destination choice. Please state how much you agree or disagree with each sentence (1-totally disagree / 4-neither disagree nor agree / 7-totally agree)"*

*** "The following sentences refer to your preferences on the type of holiday you usually like to take. Please state how much you agree or disagree with each sentence (1-totally disagree / 4-neither disagree nor agree / 7-totally agree)"*

characterize individuals' behaviour (Ben-Akiva *et al.*, 2002; Walker, 2001). To the best of the authors' knowledge, this study is the first example of ordered response modeling with attitudinal latent constructs in tourism literature.

Travel deterrence and LV models. We perform four distinct models, each pertaining to one hazard: terrorist act (TA), natural catastrophe (NC), political uprising (PU) and epidemic (EP). An ordered model postulates a latent phenomenon that cannot be directly observed and is thought to be represented in a continuous way on the real line. In our case, this phenomenon is individual travel deterrence induced by life-threatening hazards. This can be described as follows:

$$y_{j,i}^{*} = \beta_j' x_i + \varepsilon_{j,i} \tag{1.1}$$

in which i indicates the individual, $y_{j,i}^{*}$ represents individual's i travel deterrence connected to life-threatening hazard j (TA, NC, PU and EP), x_i is a set of covariates, β_j is a vector of hazard-specific parameters and $\varepsilon_{j,i}$ is iid-Logistic(0,1) distributed.

An observable variable (individuals' self-assessed travel deterrence relating to the risk of a particular hazard at a destination) is adopted to approximate travel deterrence. For every hazardous situation, we consider as a dependent variable the following question "Would the risk of [*hazard j*] deter you from traveling to a holiday destination?". This is a 7-point Likert scale variable ranging from "definitely no" to "definitely yes" with "neither no nor yes" being the center of the scale. We relate this observation ($y_{j,i}$) with the latent construct as follows:

$$\begin{aligned} y_{j,i} &= 1 \quad if \quad \mu_{0,j} < y_{j,i}^{*} < \mu_{1,j} \\ &\dots \\ y_{j,i} &= 7 \quad if \quad \mu_{6,j} < y_{j,i}^{*} < \mu_{7,j} \end{aligned} \tag{1.2}$$

The μ terms are defined "thresholds" and are set for estimation. For identification purposes we impose that $\mu_{k-1} < \mu_k$ $(k = 1, \dots, 7)$, $\mu_{0,j} = -\infty$ and $\mu_{7,j} = +\infty$. Probabilities associated with the observed outcome follows:

$$\begin{aligned} Prob[y_{j,i} = k \mid x_i] &= Prob[\mu_{j,k-1} < y_{j,i}^{*} < \mu_{j,k}] \\ &= Prob[\mu_{j,k-1} < \beta_j' x_i + \varepsilon_{j,i} < \mu_{j,k}] \\ &= Prob[\varepsilon_{j,i} < \mu_{j,k} - \beta_j' x_i] - Prob[\varepsilon_{j,i} < \mu_{j,k-1} - \beta_j' x_i] \\ &= \Lambda[\mu_{j,k} - \beta_j' x_i] - \Lambda[\mu_{j,k-1} - \beta_j' x_i] \end{aligned} \tag{1.3}$$

with $\Lambda(\varepsilon_{j,i})$ representing the cumulative function of the logistic distribution.

Expression $\beta_j' x_i$ collects the vector of β_j parameters of interest and the vector x_i grouping the variables used as covariates. The modeling covariates are:

- "gender", females being the reference case;
- "nationality", expressing whether the respondent is European or not;
- "trips", collecting the number of past intercontinental trips;
- "education", distinguishing Bachelor from Master students (the latter category is the reference);
- four dichotomous variables representing "yes / no" answers to the question "Please consider all you past international travel experiences: has [hazard j] ever caused interruption of your stay or at least negatively influenced it?";
- the three attitudinal latent variables.

A structural equation relates the single latent variable with its determinants. In particular:

$$LV_{a,i} = \Gamma_{a,i}' \bar{x}_i + \omega_{a,i} \tag{1.4}$$

expresses a LV as a function of explanatory variables in the vector $\bar{x}_i$, a set of LV-specific parameters $\Gamma_{a,i}$ and an iid error term $\omega_{a,i} \sim N(0, \sigma^2_{\omega_a})$. In this way, there are three structural equations, one for each LV, which are estimated simultaneously along with the travel deterrence equation (Walker, 2001). The determinants of the latent variables that are specified in the model are "gender", "nationality", "education" and "trips". Concerning "gender" we adopted a random parameter approach thus assigning a probability distribution to the parameter to capture heterogeneity among individuals.

Each LV is related to its respective indicators. There are five indicators for SAS and OC and six for EDC and we adopt an ordered logit structure in this case as well. For the specific indicator the measurement equation is:

$$I_{a,r,i} = \lambda_{a,r} * LV_{a,i} + \nu_{a,r,i} \tag{1.5}$$

where $r = 1, \ldots, 6$ identifies the indicator, $\lambda_{a,r}$ is an indicator- and LV-specific parameter to be estimated and $\nu_{a,r,i}$ is an iid standard logistic term. Thus, we have 5+6+5 measurement equations.

Given our reliance on LVs we adopted simulated maximum likelihood procedure to estimate the parameters.

1.4 Research design and sample description

Data analysed in this study refers to a structured survey submitted to a convenience sample of university students in Lugano, Switzerland. A total of 299 respondents participated to the study and 278 questionnaires were considered valid for analysis (sample description is reported in Table 1.2). The survey included questions regarding individuals' perception of specific risky situations, travel deterrence caused by potential hazards, psychographics concerning travel attitudes and preferences, past travel experiences as well as personal characteristics. A thorough description of the survey is presented in Sarman *et al.* (2015). Only some of the collected variables are considered in this work.

Table 1.2 - Descriptives of respondent's sample

Sample dimension:	278 respondents			
Gender:			***N. of intercontinental trips:***	
male	158	56.8%	average	3.4
female	120	43.2%	individuals with no trips	80 28.8%
Age (years):				
average	21.5		***Individuals affected by dangerous situations*:***	
s.d.	2.5		terrorist act	36 12.9%
Current educational level:			natural catastrophe	47 16.9%
bachelor	220	74.6%	political uprising	44 15.8%
master	58	19.7%	epidemics	26 9.4%
Nationality:				
CH	95	34.2%		
IT	142	51.1%		
Other EU (including Russia)	26	9.4%		
N. and S. America	3	1.1%		
Asia	10	3.6%		
Africa	2	0.7%		

* Survey question: *"Please consider all your past international travel experiences: have the following dangerous situations ever caused interruption of your stay or at least negatively influenced it?"*

1.5 Results and discussion

Table 1.3 reports detailed results for the four models. For the sake of compactness, we have only included coefficient estimates for equations 1.1 and 1.4, which are the ones measuring the cause-effect relationships on the variables of interest.

Table 1.3 - Integrated model results

Parameter	**coeff.**	**p-value**	**coeff.**	**p-value**	**coeff.**	**p-value**	**coeff.**	**p-value**
Ordered logit model parameters								
	terrorism		*natural catastrophe*		*political uprising*		*epidemics*	
β_female	0.573	0.03	0.492	0.05	0.518	0.04	-0.182	0.47
β_european	-0.056	0.93	-0.17	0.75	-0.209	0.7	-0.584	0.32
β_Master student	-0.647	0.05	-0.14	0.64	-0.239	0.45	-0.672	0.03
β_n. of trips	0.0392	0.16	-0.006	0.82	-0.009	0.74	-0.007	0.8
β_TA_experience	-0.11	0.75	0.175	0.61	-0.33	0.32	0.268	0.43
β_NC_experience	-0.394	0.24	-0.379	0.23	-0.168	0.61	-0.462	0.16
β_PU_experience	-0.539	0.11	-0.489	0.13	-0.003	0.99	-0.575	0.06
β_EP_experience	-0.649	0.11	0.358	0.38	-0.043	0.91	0.244	0.55
β_SAS	0.364	< 0.01	0.276	< 0.01	0.294	< 0.01	0.249	< 0.01
β_EDC	-0.269	0.02	-0.114	0.29	-0.305	0.01	-0.091	0.4
β_OC	0.416	0.02	0.27	0.1	0.0592	0.7	-0.082	0.59
Latent variables model parameters								
"Social acceptance and safety" equation								
τ_female	1.25	< 0.01	1.2	< 0.01	1.25	< 0.01	1.24	< 0.01
σ_female	1.07	< 0.01	1.14	< 0.01	1.1	< 0.01	1.08	< 0.01
τ_european	3.31	< 0.01	3.39	< 0.01	3.34	< 0.01	3.33	< 0.01
τ_n. of trips	-0.008	0.76	-0.013	0.64	-0.008	0.76	-0.009	0.76
τ_Master student	0.103	0.76	0.107	0.74	0.141	0.67	0.107	0.75
σ_ω	1.68	< 0.01	1.64	< 0.01	1.67	< 0.01	1.67	< 0.01
"Exploration and destination culture" equation								
τ_female	1.01	< 0.01	0.996	< 0.01	0.964	< 0.01	1.01	< 0.01
σ_female	0.848	0.05	0.909	< 0.01	1.03	< 0.01	0.848	0.05
τ_european	1.69	< 0.01	1.73	< 0.01	1.75	< 0.01	1.69	< 0.01
τ_n. of trips	0.0842	< 0.01	0.083	< 0.01	0.0811	< 0.01	0.0844	< 0.01
τ_Master student	0.671	0.01	0.676	0.01	0.682	0.01	0.676	0.01
σ_ω	1.29	< 0.01	1.29	< 0.01	1.25	< 0.01	1.29	< 0.01
"Organization and comfort" equation								
τ_female	0.334	0.02	0.357	0.01	0.322	0.03	0.336	0.02
σ_female	0.855	< 0.01	0.761	< 0.01	0.796	< 0.01	0.848	< 0.01
τ_european	1.28	< 0.01	1.17	< 0.01	1.29	< 0.01	1.28	< 0.01
τ_n. of trips	0.0283	0.06	0.0317	0.04	0.0306	0.05	0.0292	0.06
τ_Master student	0.379	0.04	0.377	0.04	0.389	0.04	0.387	0.04
σ_ω	0.783	< 0.01	0.811	< 0.01	0.805	< 0.01	0.785	< 0.01
Model statistics								
initial LL	-13,013.187		-13,090.194		-13,165.593		-12,978.289	
final LL	-7,996.708		-8,034.029		-8,026.185		-8,010.12	
n.of individuals	278		278		278		278	

1.5.1 Influence of attitudes on travel deterrence

Travel deterrence is influenced by different determinants and the role of attitudes is differentiated among the different types of life-threatening hazards. SAS has a positive influence on travel deterrence induced by all the hazardous events: social acceptance leads individuals to be more attentive to peers' opinions and it is reasonable to imagine that traveling to hazardous places is not positively considered, especially when opinions come from individuals close to one's person. It appears coherent that such an attitude determines a positive influence on travel deterrence. Sönmez and Graefe (1998b) found no significant effect of "social risk" (the risk of friends or relatives disapproving of one's travel choice) on plans to avoid traveling to various continents, and the same holds for Roehl and Fesenmaier (1992) who determined no relationship between social risk and leisure travel. Opposite evidences are presented by Floyd *et al.* (2004). It must be noticed that we found no study that directly relates social acceptance to travel intention/avoidance in a context of life-threatening hazards, although Floyd *et al.* (2004) ran their study in the aftermath of the events of September 11th.

Concerning EDC and OC, we observe a more varied pattern. EDC is found to negatively influence travel deterrence (higher EDC implies a lower probability of reporting high levels of deterrence) in the case of terrorism (-0.269) and political uprising (-0.305) while no effect has been found for natural catastrophes and epidemics. The negative sign is coherent with the idea that being more prone to exploration and novelty may be a sign of being less "worried" about certain negative events: interestingly, this is true only for human-induced events (with the exception of epidemics), while this doesn't hold for natural-induced hazards. This is in line with the findings of Valencia and Crouch (2008), who noticed that the effect of self-confidence on travel avoidance is weaker for natural events than for human-induced hazards. Williams and Baláz (2013) showed that independent travellers report lower travel deterrence induced by concerns of crime/terrorism and political unrest. At the same time, the authors found no significant differences between traveller profiles as far as natural disaster-led travel avoidance is concerned. The link between novelty-seeking propensity and risk perception is widely discussed in Lepp and Gibson (2003), who highlighted mixed evidence regarding the role of backpackers (who can be associated with what we defined as EDC). Our results could be partially compared to works considering the role of "sensation seeking" - even if our setting does not specifically consider such a trait. Sharifpour *et al.* (2013) reported that "sensation seeking influences the level of tolerance toward physical risk [...] and therefore higher sensation seekers are more willing to accept physical risk and visit the destination." (p.554). OC positively affects travel deterrence in the case of terrorism (0.416) and natural catastrophe (0.27), while there is no significant influence on political uprising- and epidemic-induced travel avoidance. Here the reasoning is the opposite of what expressed for EDC: the OC attitude appears to be more linked to "relaxation" and staying in "comfort zones", which intuitively implies being more concerned about potential threats. Pizam *et al.* (2004) determined that individuals showing attitudes similar to our OC generally tend to report lower levels of risk

taking and sensation seeking. Although not considering the case of hazard-induced travel deterrence, several pieces of literature report comparable results. Reisinger and Mavondo (2005), considering a sample of prevalently young individuals, determined results similar to ours concerning the effect of personality on terrorism risk perception, but also found no significant connection between lifestyle and perception of this hazard. Lepp and Gibson (2003) noticed that "organized mass tourists" and "independent mass tourists" are more concerned about health, political uprisings and terrorism if compared to more "adventurous" individuals (the authors did not account for natural hazards). We have noticed that while our result concerning terrorism-induced travel deterrence resemble what is present in other tourism studies, this is not the case for the other three hazards.

1.5.2 Influence of socio-demographics on travel deterrence

Estimates highlight significant differences between male and female individuals, with the latter expressing higher levels of travel deterrence in the case of terrorism (0.573), natural catastrophe (0.492) and political uprising (0.518) while the coefficient in the epidemics case is not significant. Regarding education, Master students' travel decisions are less influenced by the terrorism threat (-0.647) and epidemics (-0.672). Interestingly, no case significant effect is found for the number of intercontinental trips and nationality. Considering intercontinental trips as a proxy for travel experience, we notice that it does not affect travel deterrence. There are several works reporting contrasting findings: for example, Sönmez and Graefe (1998b) noticed a negative correlation between past experience and perceived risk for certain risky world regions. Similarly, Williams and Baláz (2013) found that experienced travellers' competences reduce the deterrence effects of travel hazards in general. Lepp and Gibson (2003) found that experienced travellers show a lower risk perception concerning terrorism and health-related issues (not necessarily epidemics; also Kozak *et al.*, 2007) but no significant influence of travel experience was determined on political instability risk perception. Floyd *et al.* (2004) reported that travel experience is the most significant predictor of travel intentions but, at the same time, it "…did not override safety concerns and social risk." (p.32). Concerning the effect of nationality, the results of Law (2006), Seddighi *et al.* (2001) and Reisinger and Mavondo (2006) contrast with ours. Law (2006) specifically accounted for travellers' likelihood of changing travel destination due to the occurrence of risks and determined that Asians show a significantly higher propensity to do so than their Western counterparts (note that the authors consider epidemics, natural disaster and terrorism without distinction). Seddighi *et al.* (2001) found evidence that cultural background (represented by the nationality of respondents) "plays a significant role on the way that various events of political instability are perceived by travel agents" (p. 187; the sample contains only European respondents). Finally, Reisinger and Mavondo (2006) highlighted a complex pattern concerning risk perception, anxiety and safety perception across national groups of young tourists, and such differences reflect on travel intentions reported by individuals.

The last aspect taken into account regards the individuals' experienced hazards. The only statistically significant (at 10% level) parameter is the coefficient related to the experience of political uprising in the case of epidemics-related travel deterrence (-0.575). The negative sign implies that people who stated that they were negatively influenced by political uprising during a past travel experience tend to express lower travel deterrence in the case of epidemics. Such evidence could be seen as a sort of "cross effect": having experienced a certain hazard seems to have an effect on perception of other hazards and induced travel deterrence (note that the survey question capturing such "experiences" was posed in a vague manner and hence it is difficult to clearly understand such a result). To the best of the authors' knowledge, no other study has highlighted such evidence of a "cross-effect". Matyas *et al.* (2011) reported that individuals with a previous hurricane experience perceive lower levels of risk and are less likely to evacuate in situations involving such an event. Interestingly, Seabra *et al.* (2013) observe that a tourist cluster concerned about multiple risks (in particular getting sick, experiencing accidents or being involved in political turmoil while on travel) had more experience with actual or attempted burglary, physical or psychological violence than other clusters. Also, the authors identified a tourist cluster reporting high levels of risk aversion with respect to multiple aspects (not only related to physical safety) despite not having experienced traumatic experiences. This topic certainly deserves a deeper analysis.

1.5.3 Influence of socio-demographics on LVs

Integrating LVs in the ordered logit model allows defining equations that represent LVs themselves. We have expressed the three constructs as functions of individuals' characteristics and observed that these differ in explaining the LVs. Concerning SAS, the estimated coefficients for gender are statistically significant: women are generally more sensitive to social acceptance related to their trip decisions than men. The σ parameter is also significant, identifying a source of heterogeneity; women show a wide range of responsiveness regarding SAS and, given that the magnitude of the standard deviation is similar to the mean of the coefficient, there are few women showing a lower level of sensitivity toward social acceptance than men. The nationality parameter is positive and significant: young European individuals show higher proneness to their peers' opinion. The parameters associated to the number of trips and Master education are not statistically different from zero. Finally, the parameter representing residual variance in the dependent variable is significant, capturing sources of heterogeneity that are not accounted for by the variables we considered.

Concerning EDC, all parameters are significant and positive, bearing similar meaning to what was expressed for SAS. It is interesting to observe two things: first, women tend to show higher values for such an attitude than men, which is something that does not have many counterfactuals in the literature (see for example Pizam & Fleischer, 2002; Pizam *et al.*, 2004 for results concerning sensation seeking). However, it must be noticed that the variance parameter is significant, implying heterogeneity in responses among women concerning EDC.

The second fact is that the more experienced travellers have a stronger attitude toward experiencing exploration and destination culture while on travel (Cohen, 1972).

All the specified parameters regarding OC are statistically significant: in a tourism context, female respondents are more prone to organized and comfortable trips than are males, and this is also true for Europeans rather than non-Europeans. Moreover, an increasing number of trips tends to positively influence the OC latent construct. In this sense, similarities between EDC and OC attitudes are reported by Bello and Etzel (1985) who found no significant differences in the number of trips per year between "commonplace" travellers and "novelty-experiencers". Finally, Master students reported higher levels of OC as compared to their Bachelor counterparts. What is interesting here is the amount of heterogeneity related to the gender variable, which is relatively large if compared to the magnitude of the mean parameter. Differently from the previous cases, even if in general women are more prone to OC there is a noticeable amount of female respondents associated with a negative parameter, hence showing a lower propensity for this type of attitude as compared to men.

It appears counterintuitive that two attitudes as diverse as EDC and OC show such similarities in terms of explanatory factors. However, we have tried to estimate correlation parameters among the LVs in order to determine whether some common or opposite patterns of variation were detectable, and these coefficients were not significant. As already mentioned, from a factor analysis with oblique rotation, the correlation between EDC and OC factors resulted as being negative but very close to zero and this may explain why the correlation parameter in the model was not significant. Such a lack of evidence may explain (at least partially) the communalities between the two constructs. Moreover, gender heterogeneity in the case of the OC attitude is particularly strong in comparison to the mean value of the sensitivity parameter hence showing completely different patterns of response among both men and women. This topic certainly deserves further examination.

1.6 Conclusions

This work has proposed an empirical examination relating hazard-induced travel deterrence to different tourist attitudes. Based on data collected among young individuals, we have built a series of ordered logit models integrated with latent variables to analyse the determinants of travel deterrence. Although we cannot claim to be representative in terms of sample segmentation, our work represents a step forward in the understanding of hazard-related tourist behaviour.

This work contributes to the research considering how travel attitudes and social acceptability influence hazard-induced travel behaviour. Evidence shows the impact of leisure travel attitudes on travel deterrence, in some cases confirming and in others contrasting results reported in literature. Our approach permits us to describe the determinants of the attitudinal constructs: different covariates characterize the latent variables and, in the case of gender, important sources of unobserved heterogeneity arise. This aspect certainly deserves further analysis.

Assessing how individuals shape risk perception is fundamental from a policy and marketing standpoint, and it is crucial to understand what makes visitors feel (or not) cautious or anxious in potentially risky situations. This is particularly important for realities in which the tourism sector has a strategic importance for economy and social life but have to face the menace deriving from fragile (human- and/or nature-related) situations, which obviously have a negative impact on tourism flows. In order to make visitors feel reassured and safe and minimize the effects of negative events, marketing and communication campaigns targeted at sensible consumers should appeal to their attitudes and preferences toward international travel (Sharifpour *et al.*, 2013). As clearly pointed out by Plog (2002, p.247): "…the psychology of an individual plays a more important role in determining interest in leisure travel than household income, the measure by which most travel suppliers today target their high prospects for marketing campaign. The two variables together can make advertising and promotion campaigns more effective and efficient." Our results may be helpful in anticipating individuals' intentions regarding the opportunity to travel to destinations deemed dangerous or characterized by certain levels of riskiness. Different ways of promoting a destination should be targeted to different segments of consumers as well as considering the different crises they may encounter (Lepp & Gibson, 2003, 2008; Reisinger & Mavondo, 2005). For a destination experiencing a potential terrorist threat, a double marketing strategy would be recommended: a first one aiming at "reassuring" individuals seeking high levels of organization and comfort (who tend to avoid travelling to risky destinations), for example focusing on the role of tourist agencies and guides (Williams & Baláz, 2013). A second strategy could promote aspects related to destination exploration and mingling with local culture in order to capture segments with an accentuated "explorative" attitude. One further example is the case of epidemics. This represents an interesting case since the only construct affecting (positively) travel deterrence is "social acceptance and safety" while no other attitude-related effect was determined. In this

case, the marketing message should be aimed at "breaking" the (negative) influence that relatives/friends have on an individual's decision and make this feel more "free" from the weight of others' opinions.

Regarding future research, it would be interesting to consider further aspects pertaining to psychological traits, some of which may not necessarily be travel-related. One may consider general rationalization of risk and uncertainty in everyday life, an aspect that could help to better profile individuals. In fact, an everyday approach to (harmless) uncertainties may help to explain individual tendency to worry and take precautionary behaviours (Klar *et al.,* 2002; Seabra *et al.,* 2013; Västfjäll *et al.,* 2008). One further point regards tourists' information-seeking behaviour as well as media coverage of negative events (Sharifpour *et al.,* 2014). Moreover, the classification of life-threatening hazards presented in this work is rather broad. One may suppose that specific situations (e.g. earthquakes or floods in the domain of natural catastrophes or, if considering epidemics, different diseases which may be more or less pandemic) may influence visitors' behaviour differently (Roehl & Fesenmaier, 1992; Sönmez & Graefe, 1998b; Thapa *et al.,* 2013) or be perceived differently by distinct individuals (Seddighi *et al.,* 2001). One further point that deserves attention regards the role of specific destinations. It would be interesting to evaluate how individuals respond if attitudes, risk perception and travel deterrence are referred to destinations that may be deemed as more or less dangerous or that suffered more or less recent negative events (Fuchs *et al.,* 2012; Larsen *et al.,* 2009; Law, 2006; Sönmez & Graefe, 1998b; Thapa *et al*., 2013). Country image, risk perception and travel intentions go hand in hand in the tourist's mind and cannot be separated in designing policies and marketing campaigns (Kozak *et al.,* 2007; Lawson & Thyne, 2001; Lehto *et al.,* 2010; Lepp & Gibson, 2003; Lepp *et al.,* 2011). To conclude, it is necessary to stress that for a greater generalization and detail of results, it is essential to expand respondents' sample, both numerically and in terms of individuals' heterogeneity. For example, as shown by Larsen *et al.* (2009), it appears crucial to disentangle responses and behaviour reported by actual tourists and people at home.

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Chapter 2. Acceptance of life-threatening hazards among young tourists: a stated choice experiment

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Published in the Journal of Travel Research (December 9, 2015, doi: 10.1177/0047287515612595)

Abstract

This work analyzes the impact of potential life-threatening events at destination on the decision to undertake a leisure trip, and points out the trade-offs between such events and the attributes of a trip. Life-threatening events are a phenomenon of contemporary tourism. Even though, if they do happen, such improbable events have massive consequences, they seem to be implicitly accepted and taken into account by tourists visiting potentially risky destinations. To evaluate the acceptance of such life-threatening events, we apply a stated choice experiment and adopt an Integrated Choice and Latent Variable model. Our research framework considers four types of hazards – terrorist acts, political insurrections, natural catastrophes, and epidemics – focusing on Southeast Asia. A questionnaire was administered to university students currently living and studying in Switzerland. Results show how different hazards, their potential magnitude, and respondents' risk perception influence decisions.

Keywords: risk perception, life-threatening events, stated choice experiment, hybrid choice models, Southeast Asia.

2.1 Introduction

The topic of risk is attracting more and more attention in tourism research. Many theoretical and empirical studies have looked into it, reflecting on an eventual negative impact on tourists' satisfaction and on the decision of whether and where to travel. Individuals' behaviour under potential risks, and what steps they take to avoid them are, for example, treated in Mitchell and Vassos (1997) and Fuchs and Reichel (2011).

Research also focuses on different contexts, such as a variety of destinations (Sönmez & Graefe, 1998a; Carter, 1998) or one specific destination (George, 2010; Fuchs & Reichel, 2011); different travel situations (Mitchell & Vassos, 1997) and different types of risk (Roehl & Fesenmaier, 1992; Reisinger & Mavondo, 2005; Law, 2006; Kozak *et al.*, 2007). The literature in the field also addresses specific tourist roles (Lepp & Gibson, 2003; Reichel, Fuchs & Uriely, 2007; Lepp & Gibson, 2008; Hunter-Jones *et al.*, 2008; Jonas *et al.*, 2011), as well as the issue of information seeking and processing (Alvarez & Asugman, 2006; Slevitch & Sharma, 2008; Sharifpour *et al.*, 2014).

In general, research papers discussing dangerous situations and leisure tourism either look at the big picture, considering aggregate data (Fletcher & Morakabati, 2008; Page *et al.*, 2012; Saha & Yap, 2014) or focus on the preferences and/or behaviour of single individuals with respect to risky situations. For example, Uriley *et al.* (2007) and Fuchs *et al.*, (2013) based their work on the behaviour of tourists traveling to dangerous destinations, while Williams and Baláz (2013) analyzed the importance of particular risks as a deterrent to travelling.

The present research considers some of these topics and incorporates them in a classic choice-modeling framework, performing a stated destination choice experiment. This can be relevant for at least two reasons. First, we feel that time is overdue to apply such a widely used approach to travel behaviour and transport mode choice – and to a more limited extent to destination choice (Morley, 1994; Yan *et al.*, 2007; Huybers, 2003; Huybers, 2005) – dealing with hypothetical decisions involving risk. Secondly, travelers' decisions on the presence of life-threatening events, when tourists can also decide not to undertake a specific trip, represent situations that can easily be modeled using a choice experiment permitting to estimate risk-related behavioural parameters. This paper brings together two avenues of research, namely risk analysis in tourism and stated choice modeling. The first work that attempted to incorporate these two approaches is a paper by Araña and León (2008), who explained the effect of terrorism on leisure travel decisions running pre- and post-event experiments. In the present paper, the approach is different and novel in the sense that the risk of hazardous events is included in the choice model, directly measuring responses of people when having to make a choice in risky situations.

The goal of this research is to assess the influence that socio-demographics and travel-risk perception have on the decision to travel. The paper is concerned with the interaction between the risk construct and the characteristics of travelers; moreover, it investigates the relationship

between individual risk perception and different attributes characterizing a leisure trip, including the potential hazards affecting the holiday itself.

To reach our research objectives we administered a structured questionnaire to a sample of university students in Lugano, Switzerland. Part of the process was a stated choice experiment, and the analysis was integrated with attitudinal questions, implementing an Integrated Choice and Latent Variable model, a special case of the Hybrid Choice Models (HCM) family. This methodology adopts the classical discrete choice framework and simultaneously tests the influence of latent constructs on the decision process.

The remainder of this paper is organized as follows: Section 2 contains a review of the literature covering the themes of risk in tourism, destination choice modeling in tourism, and hybrid choice modeling. After introducing the conceptual framework of the research, Section 3 presents the HCM methodology and the research design. Section 4 recapitulates the analysis undertaken, discusses the results obtained and draws some preliminary conclusions concerning our student sample. A brief summary and outlook on future research concludes the work.

2.2 Literature review

2.2.1 The topic of physical risk in tourism literature

Literature reports several types of vacation-related risks, typically defined as equipment, financial, physical, psychological, satisfaction, social and time risk (Roehl & Fesenmaier, 1992).

This research focuses on physical risk (Sharifpour *et al.*, 2014) and, in particular, on four categories of events that have attracted rising interest over the last few years: terrorist attacks, outbreaks of diseases/epidemics, natural disasters and political unrest. These represent hazards, i.e. life-threatening events for which no a-priori objective probabilities exist, neither for their occurrence nor for the casualties that they can generate.

It makes sense that "the introduction of risk into touristic decisions has the potential to disrupt routine decision-making" (Sönmez & Graefe, 1998b, p.120), especially when personal safety is concerned. Several authors discussed how extreme events affect the safety of tourists and analyzed the impact of actual or hypothetical disasters on individuals' travel intentions and habits (McKercher & Hui, 2003; Valencia & Crouch, 2008; Fuchs & Reichel, 2011). Others looked at attitudes towards and perceptions of security measures (Chen & Noriega, 2003; Rittichainuwat, 2013; Pennington-Gray *et al.*, 2014; Cahyanto & Pennington-Gray, 2015). Tourists' response to disasters (either natural- or human-induced) in turn affects the sector's management practices to deal with catastrophic events. Sönmez *et al.* (1999) and Faulkner (2001) discussed the matter, from a theoretical perspective, providing models for tourism disaster management, while authors like Henderson (2003), Prideaux (2003) and Issa and Altinay (2006) considered the matter focusing on concrete cases.

Concerning tourists' perception and/or reactions to life-threatening events, the literature distinguishes between single hazard-focused research and papers considering differences between various types of risk.

Jonas et al. (2011), an example of the first group, focused on health risk perception among low risk-taking tourists. Likewise, Cossens and Gin (1994) and Carter (1998) considered the link between health-risk perception and specific destinations. Terrorism risk perception in a leisure-travel decision context is the subject of different studies (Sönmez, 1998; Sönmez & Graefe, 1998b; Fuchs *et al.,* 2013). Looking at political turmoil and tourism, Bhattarai, Conway and Shrestha (2005) reflected on the relation between adventure tourism in Nepal and the country's political instability. Neumayer (2004) empirically estimated the impact of various forms of political violence on tourism, while Alvarez and Campo (2014) considered how political incidents damage the image of a destination, which in turn affects visitors' intentions.

Finally, looking at natural disasters, Thapa *et al.* (2013) considered the case of wildfires and related tourist behaviour, pointing out how different segments of the tourist market (conscious travelers, cautious travelers and courageous travelers) perceive risk, which will therefore

influence their future travel behaviour. Park and Reisinger (2010) analyzed the way individuals perceive the influence of a large number of natural disasters on international travel.

Several authors analyzed specific physical risk factors and their differences. In particular, Valencia and Crouch (2008) made a clear distinction between human-induced and natural disasters, pointing out different individual perceptions of and reactions to different adverse events. Fuchs and Reichel (2006) reported a close link between overall risk perception and human-induced risk factors (terrorism, criminality, political unrest) while a weak correlation exists with natural disasters and sanitary risk factors. Saha and Yap (2014) analyzed in detail the combined effect of political instability and terrorist attacks, stressing that their interaction affects tourism demand differently depending, on whether the threat is high or low.

One further point addressed in the literature is the role of socio-demographic traits. To name only a few, Park and Reisinger (2010) found significant differences within a varied sample of respondents in terms of perception of natural hazards, and these differences refer to the nationality, gender and economic profile of the respondents. The evidence found on gender differences and risk perception is inconclusive. In particular, Azim (2009), on the likelihood of changing travel plans in the event of terrorist attack risks, reported that women are more likely to cancel a travel program or change destination. Sönmez and Graefe (1998a), George (2010) as well as Lepp and Gibson (2003) found no connection between gender and tourists' perception of crime-related risk, while Qi, Gibson, and Zhang (2009) revealed differences between men and women, the latter being more sensitive to higher violence risk (including terrorism). On health risk, Qi *et al.* (2009) noticed that men are more concerned about it (although the difference is statistically not significant) while Lepp and Gibson (2003) found that women are more concerned about health (also, Jonas *et al.*, 2011) and strange food risk. In Kozak *et al.*, (2007) men and older people are found to be more reluctant to change travel plans when a destination is perceived to be risky.

2.2.2 Discrete choice modeling in tourism literature

Compared to other quantitative methods applied to tourism demand analysis, applications of discrete choice methodology to analyze tourism-related decisions are relatively scarce and this is particularly true for destination choice. Two possible reasons for this are the complexity of choice structure and the definition of choice sets. The first difficulty arises from the fact that tourists themselves contribute considerably to the production of the experience, combining transport and hospitality services with attractions and tourism services at the destination according to their preferences. In other words, one single vector of characteristics hardly represents a destination. The definition of the choice set represents the second challenge because tourists can allocate varying travel budgets over different periods to destinations across the planet. Moreover, in theory they could re-plan their decision continuously. This problem was resolved the moment stated choice experiments were performed. An early theoretical paper by Woodside and Lysonski (1989) laid the conceptual foundations for

analyzing destination choice as a second-phase choice from an awareness set initially identified as a function of experience, socioeconomics, lifestyle, values, etc. Um and Crompton (1990) modeled the decision of the tourist as a two-stage process leading the individual from an awareness set to an evoked set first, and subsequently from the evoked set to a choice, concluding that attitudes played a key role in both steps. Morley (1994) performed a choice experiment for one origin (Kuala Lumpur) and eight competing city destinations. The design comprised only prices combined with socioeconomic variables in the estimation in order to demonstrate the strength of stated choice experiments and discrete choice analysis for tourism demand modeling. More holiday destination-related choice experiments were performed by Huybers (2003), Huybers (2005) and Crouch and Louvière (2004). More recent tourism-related applications of stated choice modeling looked at skiers and their responses to potential strategies for coping with the effects of climate change in Austrian and Finnish resorts (Landauer *et al.*, 2012); at individual preferences for flight itinerary attributes, and the role of fear of traveling (Fleischer *et al.*, 2012); and at preferences in terms of travel destination, length of stay, accommodation types, and other vacation-related features under high travel cost conditions (van Cranenburgh *et al.*, 2014). Further examples are provided by Nicolau and Masiero (2013), who carried out a discrete choice experiment on the combination of different types of tourism activities and specifically accounted for price sensitivity; by Lacher *et al.* (2014), who adopted a mixed logit model to account for consumer preferences for heritage and cultural elements in coastal destinations; by Brau *et al.* (2009), who evaluated foreign and national visitors' responses to hypothetical interventions in the tourism offer in a famous Italian destination; and by Yan *et al.* (2007), who performed experiments related to nature-based destinations in Southern China using a picture-supported approach.

2.2.3 Hybrid choice modeling

The present work applies a technique to account for psychological latent constructs (psychographics), such as attitudes and perceptions, in a stated choice experiment. In the field of discrete choices, there have been numerous efforts to incorporate concepts highlighted by the literature in psychology and to investigate in-depth how these affect decision-making. We can identify at least three different methods applied to model psychographics in discrete choice analysis. A first one opts for direct inclusion of the psychological indices into the utility function, and examples are the papers Green (1984), and Harris and Keane (1998). Another approach (Harris & Keane, 1998) consists in developing choice models by inferring latent attributes of the alternatives and individual preferences from data and, at a later stage, using perceptual indicators to interpret latent variables (LVs). Nowadays, a more general and efficient technique is Hybrid Choice Modeling. This family of models may incorporate Non-Random Utility Models, which include in particular the addition of flexible disturbances, the explicit modeling of psychological factors and the inclusion of latent segmentation of the population (Ben-Akiva, *et al.* 2002; Raveau, *et al.* 2010). Walker (2001) proposed a detailed description of those methodologies, which, in her words, close the gap between the simplistic

behavioural representation in discrete choice models and the complexity of actual behavioural processes. Examples include the works of Ben-Akiva *et al.* (1998), Morikawa *et al.* (2002) as well as Bolduc and Alvarez-Daziano (2009).

The main feature of the hybrid choice modeling approach is the ability to understand how individuals' choices are influenced by latent constructs and how these interact with observable and measurable variables. Glerum et al. (2013) implemented a HCM in order to evaluate and forecast the demand for electric vehicles, including constructs like pro-leasing attitude and pro-convenience attitude in their analysis. Analyzing route choice behaviour, Prato *et al.* (2012) considered elements such as memory, habits, familiarity, spatial ability and time saving skills. One non-transportation related example may be found in Palma *et al.* (2013), who captured preferences for wine consumption and focus on regular consumers' attitudes and perceptions related to wine sophistication, the role of beverages in social cohesion and price-quality association. In all the aforementioned cases, the authors concluded that psychological LVs alongside more "traditional" variables help improve the understanding of the issue at stake, especially in the analysis of the heterogeneity of preferences. See Alvarez-Daziano and Bolduc (2013) and Hurtubia *et al.* (2014) for more recent examples of HCM applications.

The present research develops several ideas from the strands of literature presented so far and adopts a new approach to analyze tourists' reactions to life-threatening events. Concentrating on the most frequently analyzed physical risks and applying a discrete choice experiment, this work uses latent attitudinal constructs to capture the influence of risk perception on destination choice. By introducing both risk perception (as "felt" by respondents) and risk scenarios for different hazards as separate determinants of choice behaviour, one can distinguish between the impact of perceived and real risk. Concerning the modeling of destination choice, we apply the idea of an awareness set in a simplified form for destinations within a greater geographical region, i.e. Southeast Asia (SEA).

This research is conceptually guided by questions such as: when planning a holiday, how do tourists perceive the potential risks represented by different types of life-threatening events that could occur at the destination? How does this perception influence their travel decision? Further, how does tourists' choice behaviour vary on an increasing scale of risk levels? To what extent is risk-related behaviour influenced by trip attributes such as length of stay, cost and organization? In other words, what are the trade-offs and the interactions between trip riskiness and other trip attributes? How do personal characteristics, past travel experience and attitude to risk impact on the choice between different risky leisure trips?

The modeling approach presented specifically deals with these aspects.

2.3 Methodology and research design

Consumption decisions involving risk are obviously not confined to tourism. Coherently with the common perception about this construct, let us consider risk as a "bad" attribute that contributes to determining destination related decisions, and which has to be compensated by positive attribute(s) of available alternatives. Real risk in a specific destination (the true situation of danger) and perceived risk (the situation as sensed by people) usually diverge for the most disparate reasons (media communication, personal culture and attitudes, etc.) and both are considered to be determinants of destination choice. Real risk is represented by scenarios indicating the level of alert characterizing a certain hazard that may occur at the destination; while perceived risk is considered as the perceived "concreteness" of this hazard. In particular, with HCM the above-mentioned perceived "concreteness" of a hazard translates into a perception-driven process influencing the destination choice.

Given that tourists' decisions and risky events are the main conceptual constructs our research concentrates on, these elements must be contextualized in a precise framework.

Thus, this study is based on the following three elements:

- physical risk, linked to events that may lead to injuries or even death. The main interest lies in such extreme events for which risk evaluation cannot be supported by precise statistics on casualties or effective degree of danger, but has to be expressed using scenarios describing the risk stemming from potentially dangerous situations.
- the greater region of SEA, being both a geographic area that comprises all these negative events and the location of specific and well-known tourist destinations;
- young tourists as the segment under consideration, because they represent key actors in contemporary tourism. Previous interest in the topic of risk perception among young people may be found in Carr (2001), Lepp and Gibson (2003) and Pizam *et al.* (2004).

These elements come together in a HCM that simultaneously captures the effects of perceived and real risk on tourists' destination choice.

2.3.1 Behavioural framework and model specification

Figure 2.1 shows the HCM implemented. Ovals represent unobservable variables, while rectangular boxes refer to observable variables. Observable explanatory variables are connected to LVs - individual utility and the risk-related latent construct - through solid arrows representing structural equations (i.e. a cause-effect relationship), while the indicators are linked to the LVs by dashed arrows standing for measurement equations (i.e. manifestations of latent constructs). This means that there is a double cause-effect relationship: 1) between trip attributes (length of trip, cost, trip organization, risk factor, level of alert), risk-related LV (individual risk perception concerning SEA as a holiday destination, with respect to different hazards) and utility; 2) between decision makers' characteristics (e.g. age, gender, education, continent of residence) and the psychological construct. Furthermore, as usual for this kind of

specification, choices in the stated preference SP experiment are treated as manifestations of the utility maximization process; in the same way, risk perception indicators are manifestations of the risk-related LV.

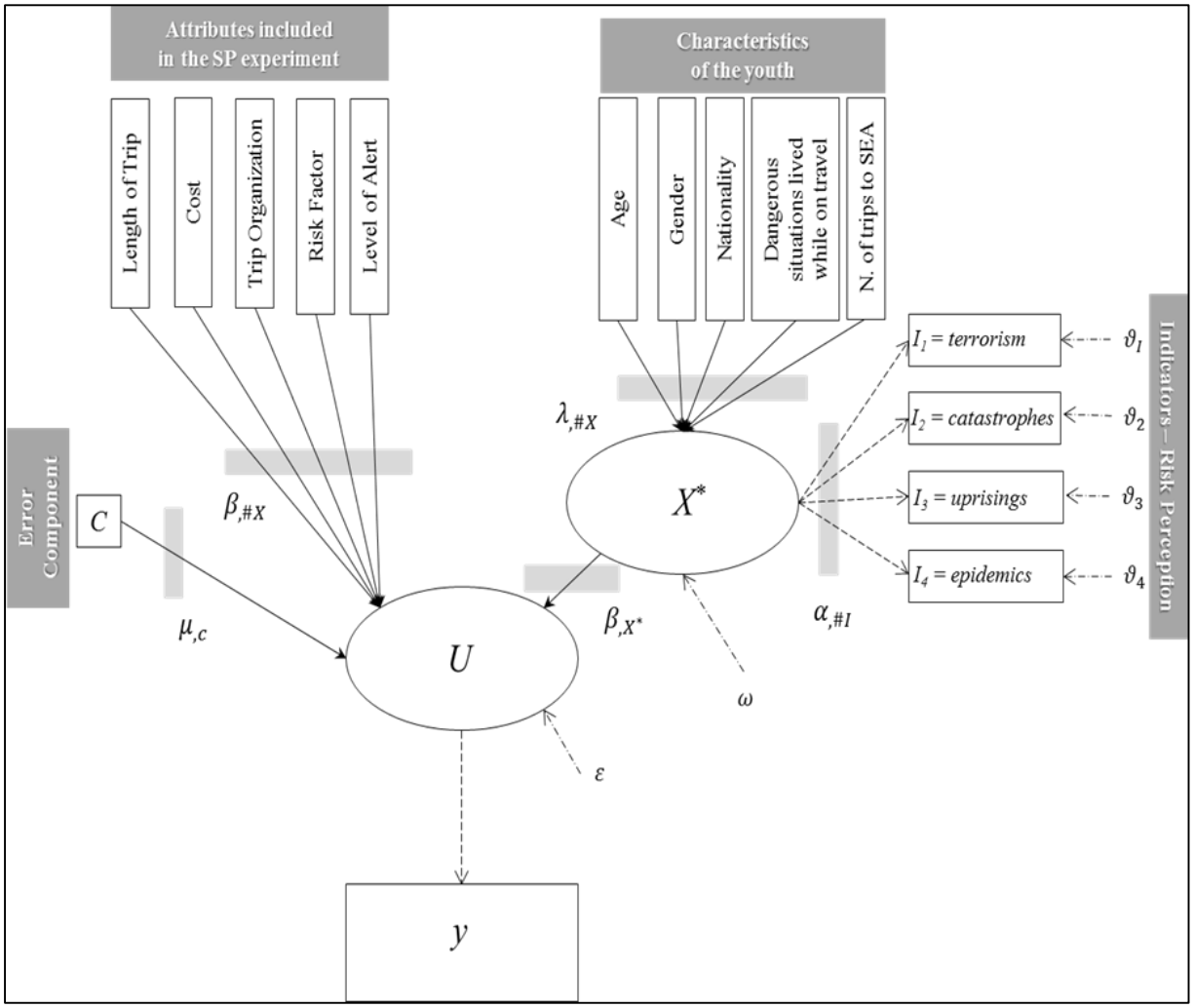

Figure 2.1 - Path diagram for the Hybrid Choice Model

The model combines a discrete choice model and a LV model. In the specification presented, each part is distinguishable:

- the structural choice model, linking utility functions with alternatives' attributes;
- the choice measurement model, which assumes a utility maximization process;
- the risk perception structural model, linking the LV with individuals' characteristics;

the risk perception measurement model, which links the risk-related LV with the indicators.

Defining:

i. X_n: a vector of observable variables, including both individual n characteristics and alternative i attributes;
ii. X_n^*: the psychological LV;

iii. I_n: indicators of X_n^*;

iv. U_{int}: the utility function of alternative i (being alternative A, B or "do not travel") for individual n in the choice scenario t and U_n is a vector of utilities;

v. y_{itn}: the SP indicator (equal to 1 if alternative i is chosen in the choice task t by individual n and 0 otherwise) and y_n as vector of SP indicators;

vi. $\alpha, b, \beta, \lambda$: unknown parameters where β indicates a random variable with mean zero and variance sigma (e.g. random parameters);

vii. $\omega, \varepsilon, \vartheta$: random disturbance terms;

the equations of our integrated model follow.

Structural equations. In the LV part of the model the following determinants represent observed exogenous variables: gender, age, nationality (distinguishing Europeans from non-Europeans), number of trips to SEA in lifetime and the eventuality that a dangerous situation caused interruption or negatively influenced a respondent's trip in the past. These are postulated to be significant in the risk perception context:

$$\begin{aligned} X_n^* = \lambda_{constant} + \ & age_n\lambda_{age} + gender_n\lambda_{gender} + europe_n\lambda_{europe} + \\ & SEAtrips_n\lambda_{SE} + terrorism_n\lambda_{terrorism} + catastrophe_n\lambda_{catastrophe} + \\ & uprising_n\lambda_{uprising} + epidemics_n\lambda_{epidemics} + \omega_n \end{aligned} \tag{2.1}$$

with $\omega_n \sim N(0, \sigma_\omega)$.

For the choice model, a Mixed Logit (Train, 2009) was adopted because it allows considering taste heterogeneity. The utility functions for the stated choice experiment are as follows:

$$\begin{aligned} U_{A\,nt} &= b'X_{A_{nt}} + \beta'X_{A_{nt}} + b_{LV}X_n^* + \varepsilon_{A_{nt}} \\ U_{B\,nt} &= b'X_{B_{nt}} + \beta'X_{B_{nt}} + b_{LV}X_n^* + \varepsilon_{B_{nt}} \\ U_{NoChoice_{nt}} &= ASC_{NoChoice} + b_{NoChoice_{LV}}X_n^* + \varepsilon_{Nochoice_{nt}} \end{aligned} \tag{2.2}$$

where X_j^r represents the set of attributes considered in the design of the experiment and ε_{jnt} being an i.i.d. Gumbel-distributed random terms over choice task, respondents and alternatives. In the estimated model, the LV producing individual heterogeneity is introduced in the mean of the random parameter related to the risk level attribute, referred to as "level of alert" (for further details see Hensher *et al.*, 2005).

An interaction between the mean estimate of the random parameter and a chosen variable is added. The marginal utility of the attribute "level of alert" is:

$$\beta_{LevelAlert_n} = \beta_{LevelAlertMean} + b_{LV}X_n^* + \sigma_{\nu_n}. \tag{2.2}$$

This formulation enables us to test the psychological constructs related to the perception of likelihood of hazards as a possible source of preference heterogeneity.

Measurement equations. Regarding the risk-related LV model, four equations are present, each representing a survey question, and they contain a constant term and the LV on the right-hand side:

$$I_{rn} = constant_r + X_n^* \alpha_r + \vartheta_{rn} \tag{2.3}$$

with $r = 1, \dots, 4$ and $\vartheta_n \sim N(0, \Sigma_\vartheta)$. The indicators used as manifestations of the LV considered are:

- I_1 = *Terrorist acts represent a concrete risk to tourist safety in SEA countries;*
- I_2 = *Natural catastrophes represent a concrete risk to tourist safety in SEA countries;*
- I_3 = *Political uprisings represent a concrete risk to tourist safety in SEA countries;*
- I_4 = *Epidemics represent a concrete risk to tourist safety in SEA countries.*

The four variables are measured on a 7-point Likert scale (1-totally disagree; 4-neither disagree nor agree; 7-totally agree).

Model estimation. The classical assumption at the base of the choice model is the utility maximization process:

$$y_{nt} = \left\{1, if \;\; U_{nt} \; = \max_i (U_{int}) \; ; \; 0, \;\; otherwise\right\} \tag{2.5}$$

in which the subscript t indicates the panel structure of the SP experiment.

Finally, the likelihood function of our model is given by the following integral:

$$f(y_n, I_r | X_n, X_n^*; \alpha, b, \lambda, \sigma_\omega, \Sigma_\vartheta) =$$

$$\int \int_{X^*} \frac{exp(U_i)}{\sum_{j=1}^{3} exp(U_j)} * \prod_{r=1}^{4} \frac{1}{\sigma_{\vartheta_r}} \phi \left[\frac{I_{rn} - X_n^* \alpha_r}{\sigma_{\vartheta_r}}\right] * \frac{1}{\sigma_\omega} \phi \left[\frac{X_n^* - X_n \lambda}{\sigma_\omega}\right] dbdX^* \tag{2.6}$$

in which ϕ is the standard normal density function, σ_{ϑ_r} and σ_ω are the standard deviations of the error terms of ϑ_r and ω respectively.

2.3.2 Research design and sample description

Data for this research was collected adopting a paper-and-pencil questionnaire, administered to university students in Lugano, Switzerland. A number of 299 questionnaires were collected in total, only one of which was considered invalid and hence discarded.

Before collecting the final data a pilot version of the questionnaire was administered to two focus groups (a group of PhD students in economics and a class of the Master in International

Tourism) in order to evaluate the appropriateness of the questionnaire and highlight critical points.

The questionnaire. The introduction to the survey briefly explained the purpose of the study and presented a map of SEA. The main part consisted of six different sections, each containing questions different in nature:

the first section of the questionnaire contained the discrete choice experiment (more in the next sub-section);

- the second section ("International travel experiences") included an item designed to collect the number of past intercontinental trips experienced by respondents;
- the third section ("Dangerous situations") included three items all of which were expressed in terms of 4 different dangerous situations (terrorist act, natural catastrophe, political uprising and epidemic). The first item was designed to assess if the respondents had ever experienced the above situations during their travel experiences (yes/no) while the second and the third item (both measured on a 7-point Likert scale) were included to assess the respondents' behaviour when confronted with such dangerous events;
- the fourth section ("Southeast Asia") had multiple purposes: to collect data on respondents' past travel experiences (number of trips) in different countries within the region, to state the likelihood of a leisure trip to SEA in the following 12 months (described by a 7-point Likert scale: 1-very unlikely; 4-neither unlikely nor likely; 7-very likely) and to assess the risk perception of the region as a whole in terms of the 4 risk types considered (also described by a 7-point Likert scale);
- the fifth section ("Travel attitudes") was divided into two questions (both measured on a 7-point Likert scale: 1-totally disagree; 4-neither disagree nor agree, 7-totally agree) containing 27 items in total, the objective of which was to evaluate the attitudes that the respondents showed towards leisure travel and their way of spending holidays;
- the last section included questions on socio-economic details to describe the respondents.

The choice experiment. The first part of the survey was devoted to the stated preference choice experiment and introduced by a written explanation of all the various aspects characterizing the task and a careful illustration of critical points.

Every respondent faced 12 choice scenarios, each with three alternatives: the first two represented by holidays in two different, hypothetical SEA countries (country A and country B) and a "do not travel" option. Respondents had to examine all the attributes characterizing the alternatives and choose one option.

Attributes (and respective levels) characterizing the first two choice options were as follows (in order):

- length of trip: 10 days / 16 days;
- cost of the trip: CHF1,500 / CHF2,000 / CHF2,500;
- trip organization: do it yourself / only hotel and flight booking by agency / pre-planned full-package by agency;
- risk factor: terrorist act / natural catastrophe / political uprising / epidemic;
- level of alert: low / medium / high.

The length of trip attribute included the flight, while the cost referred to the total expenditure for a standard economy-class ticket from a Swiss airport and a 4-star hotel.

Concerning the last attribute, we decided to write three clear sentences defining every single level:

- "low" refers to a situation in which tourists usually apply certain measures of precaution that go beyond the standard ones;
- "medium" refers to a situation in which tourists will take specific measures of precaution;
- "high" refers to a situation in which tourists will reconsider their decision to travel.

We derived such definitions from various sources of information (mainly Foreign Offices' web sites), in which risks for travellers planning a trip are described in different ways.

The respondents were instructed to carefully read such definitions as these were supposed to be "evaluated and made public by an independent, recognized international organization whose activity is to evaluate risk profiles for countries and world regions" (as reported in the survey). An example of a choice scenario is reported in Figure 2.2.

	Country A	Country B	Do not travel
Length of trip	10 days	10 days	
Cost (flight + accomodation)	CHF 2,000	CHF 2,000	
Trip organization	"Do it yourself"	Pre-planned full-package by agency	
Risk factor	Terrorist act	Epidemics	
Level of alert	Low	Medium	
Choice:	○	○	○

Figure 2.2 - Example of choice scenario

With regard to the design of the choice scenarios (Rose & Bliemer, 2008; ChoiceMetrics, 2014), we adopted an efficient D-error design. Since to the best of our knowledge such an experiment has never been tested before, the prior values were defined after the pilot studies previously reported. Preliminary estimates were used to reshape the efficient design with different prior values and obtain the definitive version, adopted to collect the data used for the analysis.

Respondents sample. The sample of respondents consists of 298 individuals, 57.0% male and 43.0% female students; the average age is around 22 and bachelor students represent 80% of the sample. More than 90% of the respondents are European (33.6% Swiss and 51.0% Italian) and less than 6% of observations regard students from North and South America, Asia and Africa. Among the young students we interviewed, a quota of 6.4% visited SEA at least once and 11.7% more than once.

Table 2.1 - Sample descriptives

Sample dimension:	298 respondents				
Gender:			***Country where raised:***		
male	170	57.0%	CH	113	37.9%
female	128	43.0%	IT	144	48.3%
			Other EU (including Russia)	21	7.0%
Age:			N. and S. America	3	1.0%
average	21.5 y.o.		Asia	9	3.0%
s.d.	2.5		Africa	3	1.0%
			Missing data	5	1.7%
Current educational level:					
Bachelor	237	79.5%	***Number of trips to SE Asia:***		
Master	61	20.5%	0 trips	244	81.9%
			1 trip	19	6.4%
Nationality:			more than 1 trip	35	11.7%
CH	100	33.6%			
IT	152	51.0%			
Other EU (including Russia)	29	9.7%			
N. and S. America	4	1.3%			
Asia	11	3.7%			
Africa	2	0.7%			

2.4 Results and discussion

Using the PythonBIOGEME-2.2 software (Bierlaire, 2003; Bierlaire, 2008), we implemented the Maximum Simulated Likelihood estimator (an in-depth analysis of the MSL estimators is provided by Train 2009). By construction, the MSL estimation technique replaces the multidimensional non-closed integral with a smooth simulator. For our model, we considered different numbers of Halton draws: 500, 750, 1000 and finally 2500, being limited by computational time. The model needed 70 iterations in order to converge and the adjusted pseudo rho squared (an overall measure of model fit) is 0.351, which is acceptable for this class of models.

We specified an error component in the equation of the third choice alternative ("do not travel" option): the sigma parameter, presented among the preliminary results of our model in Table 2.2, is highly significant and means that there is a source of heteroskedasticity and correlation in the error terms of the model. Overall, estimation of the model provided very interesting evidence, turning out coefficients that mostly represented intuitive results.

Next, we report the results for the different components of the choice model. Concerning the specification of the attributes, cost, length and level of alert are introduced as continuous variables, while organization type and risk type are defined as effect-coded variables, holding as reference cases "pre-planned full-package by agency" and "epidemic", respectively.

Alternative specific constants. In the parameter estimation process one ASC was considered for the "no choice" alternative. The coefficient is negative and highly significant (-4.4) meaning that, overall, respondents were more prone to choose a trip rather than the "do not travel" option. Concerning risk, the coefficient capturing interaction among the no-choice ASC and the LV measuring risk perception is significant and positive (0.534): this implies that the probability to choose the 3rd alternative increases as perception of the riskiness of SEA as a holiday destination increases.

Cost and length of the trip. For these attributes, the model reports expected evidence. For "cost" a negative and significant coefficient (-0.0007) is found, meaning that, all else being equal, the cheaper the trip the higher the individual's utility and, hence, the higher the probability to choose one of the first two options. "Length of the trip" has a positive and significant impact on the decision making process (0.102 – the longer the trip the better). An interesting aspect regarding the trip length is its interaction with the risk level attribute, which will be discussed later.

Type of organization. Regarding the influence of trip organization, a clear aversion to the "do-it-yourself" option (-0.402) was found. The coefficient for "only travel and hotel" is not significant and since "pre-planned full-package by agency" is the reference level, one concludes that the sample overall reports no difference in preferences regarding the two latter forms of trip organization. To test an eventual moderating effect of professionally organized trips on the perception of risk, an interaction between the organization type and risk attributes was

Table 2.2 - Hybrid choice model results

Choice model parameters

Parameter	Value	Std. err.	p-value	
Alternative specific constant and interaction with latent variable				
Alt. NoChoice	-4.4	0.635	< 0.01	***
Alt. NoChoice*latent variable	0.534	0.174	< 0.01	***
Cost				
Cost	-0.0007	0.000157	< 0.01	***
Length				
Length	0.102	0.0291	< 0.01	***
Organization type - "Pre-planned full-package by agency" as base level				
Do-it-yourself	-0.402	0.116	< 0.01	***
Only travel and hotel	0.0961	0.102	0.34	
Risk type (random parameters) - "Epidemic" as base level				
Terrorism_mean	-0.791	0.182	< 0.01	***
Terrorism_sd	1.7	0.152	< 0.01	***
Catastrophe_mean	-0.215	0.161	0.18	
Catastrophe_sd	1.42	0.178	< 0.01	***
PoliticalUprising_mean	0.817	0.15	< 0.01	***
PoliticalUprising_sd	1.53	0.16	< 0.01	***
Risk level (random parameter) and interactions				
Risk level_mean	-0.966	0.14	< 0.01	***
Risk level_sd	0.501	0.0455	< 0.01	***
Risk level*latent variable	-0.12	0.0482	0.01	***
Risk level*length *(shorter trips)*	0.242	0.0627	< 0.01	***
Risk level*length*gender *(females)*	-0.116	0.0526	0.03	***

Latent variable equations parameters

Parameter	Value	Std. err.	p-value	
Latent variable structural equation				
Mean	2.99	0.549	< 0.01	***
Age	-0.0132	0.0254	0.6	
Gender	1.02	0.366	0.01	***
European*gender *(females)*	-1.02	0.359	< 0.01	***
Terrorism in past trip	0.0939	0.228	0.68	
Natural catastrophe in past trip	-0.0397	0.173	0.82	
Political uprising in past trip	0.197	0.187	0.29	
Epidemic in past trip	-0.575	0.248	0.02	***
N. of SEA travels	-0.0508	0.0345	0.14	*
Error term st. dev.	0.944	0.0889	< 0.01	***
Latent variable measurement equation				
Terrorism	1 (fixed)			
Natural catastrophes	0.8	0.115	< 0.01	***
Political uprising	1.01	0.113	< 0.01	***
Epidemic	1.03	0.135	< 0.01	***
Error component sigma parameter				
EC sigma parameter	1.16	0.141	< 0.01	***

Model statistics	
Number of Halton draws:	2,500
Number of parameters:	38
Number of observations	3,570
Number of iterations:	70
Adj. Rho squared:	0.351

Legend:
*** = p-value < 0.05*
** = p-value < 0.10*
* = p-value < 0.15*

examined; however, the interaction coefficients (not presented in the table) did not turn out to be significant for our sample of respondents. In this regard, in a recent paper Williams and Baláz (2013) found that such an association is somewhat significant. In fact, the authors pointed out that "package tourists and small package tourists were most likely to be deterred by tourism-related hazards" (p. 217), in particular crime and terrorism, while "explorers [those who arrange their trip completely by themselves, AN] were more likely to be concerned about natural disasters" (p.217). Cavlek (2002) presented theoretical considerations on the matter acknowledging that "tour operators always try to diminish the safety and security hazards their clients could face. […] As such, they influence the way a particular destination is viewed, because their practice affects the attitude of potential tourists." (p.495). This aspect deserves further exploration in the future.

Risk type. All the coefficients are specified as random coefficients, meaning that these capture heterogeneity in the responses given by individuals (the "_mean" parameters presented in Table 2 have to be interpreted with respect to the reference level "epidemic"). Estimation shows a clear ordering of the "preferences" towards risk in the mean effect: "terrorism" has the highest disutility (-0.791) followed by "catastrophe", the marginal disutility of which does not statistically differ from the reference level; "political uprising" has the least adverse effect (0.817). Applying a conceptually different analysis, Jonas *et al.* (2011) reported a different "ranking" of tourists' general perception of such hazards (the authors include also crime-induced risk perception which is ranked first, followed by health risk, natural disasters, terror attacks and political instability). Kozak *et al.* (2007) presented similar evidence for Asia as well as for destinations on other continents. Finally, Valencia and Crouch (2008) pointed out different reactions to bombing and hurricanes (with no concrete reference to a destination), showing that individuals are more prone to go ahead with the visit in the first case rather than in the latter. Discrepancy of results suggests that the definition of hazards and their geographical distribution are central to an effective analysis of risk perception and individuals' behaviour. However, it is worth pointing out that in our sample of respondents the estimation of standard deviations shows a great amount of heterogeneity in the responses, implying a completely different ordering of "risk preferences" between participants. A similar result was highlighted by Thapa *et al.* (2013) who, considering the case of wildfires, noticed that different "…types of traveller profiles appear to form a pattern with respect to their perceived levels of risk based on risk types" (p.290). This represents an important result in the sense that the order of "risk aversion priorities" towards single hazards is not constant among individuals and this aspect must be assessed in future research concerning destination hazards.

Level of alert. The "risk level" coefficient (estimated as a random parameter) has an expected negative sign for the mean effect (-0.966). Intuitively, higher risk leads to a lower probability of choosing a destination. However, the marginal disutility derived from different risk levels varies significantly among the respondents as indicated by the standard deviation (0.501). It is interesting to note that, even though we test for the interaction between risk level and

individual risk perception (measured by the LV), the marginal disutility derived from different risk levels still varies among the respondents. This means that, given a certain amount of individual risk perception, many uncontrolled factors affect the way people process the information regarding the given risk level at the destination. The LV measuring the perception of SEA riskiness confirms that a higher perception of risk at destination reduces the probability of visiting it. In other words, a higher risk perception of the SEA region (as a holiday destination) means an even higher marginal disutility associated to the risk level (and hence a lower probability to choose the destination as a holiday site), creating a sort of "augmenting effect".

Two interactions regarding "risk level" were tested, both concerning the trip length (more specifically, we allowed the "risk level" attribute to interact with the shortest "trip length", 10 days). The positive coefficient of the first interaction (0.242) implies that the disutility associated with a certain risk level decreases when the respondent chooses a shorter holiday. Thus, given a certain risk level at destination, a shorter duration of the trip implies a higher probability to choose to travel. Interestingly, the second interaction (-0.116) implies that this effect holds for female students as well but with an attenuated magnitude. This result is particularly interesting and to the best of authors' knowledge, no research has highlighted this aspect so far.

Latent variable and socio-economic determinants. The role of socio-economic determinants was investigated at the level of LV. Some trials were performed to include such covariates directly in the choice model but no significant result was found (apart from the evidence that the length of the trip attenuates the negative impact of risk level on utility more for males than for females). The LV structural equation comprises, to begin with, age and gender, the latter interacting with the nationality variable. In the sample, the age variable did not explain the different perception of the SEA region as a risky destination while gender resulted in a significant parameter estimate (1.02). The positive sign implies that, in general, female respondents have a higher risk perception of SEA compared to male, ceteris paribus. Interestingly, the interaction between gender and the European nationality of respondents resulted in a negative coefficient estimate (-1.02). If this parameter and the coefficient concerning solely the gender variable are summed up, one obtains a result equal to zero, meaning that European female respondents are as concerned about risk in SEA as their male counterparts. Results regarding gender can be added to the mixed evidence in literature comparing, for example, Carr (2001) – regarding young tourists - Lepp and Gibson (2003) and Qi *et al.* (2009). With regard to nationality, the model could not determine a generalized result and this contrasts with evidence by Law (2006) and Reisinger and Mavondo (2005) who found significant differences in this sense (although in two different frameworks). Considering the number of trips to SEA, the parameter turned out to be barely significant at 15%, and negative (-0.0508), implying that the higher the number of visits to SEA, the lower the concerns regarding its riskiness. This result confirms those found by several authors. In particular,

Sharifpour *et al.* (2014) noticed that prior visits to a destination (in their case three Middle Eastern Region countries) specifically reduce physical risk perception while Thapa *et al.* (2013) pointed out more varied results, noticing that different degrees of risk perception (and therefore travel behaviour) with respect to wildfires are present even among the repeating visitors segment.

Concerning the experiencing of dangerous situations, only the epidemic case yielded statistically significant results (-0.575). The interpretation is similar to the previous one: those who experienced a negative epidemic-related situation during a trip seem to be less concerned about potentially risky situations in SEA. Finally, a significant standard deviation (0.944) implies that risk perception varies in the sample of respondents regardless of the covariates we specified.

The second part of results concerning the LV regards the four measurement equations. Estimates for the different load factors are reported (alphas and sigmas specified in section 3 are not reported but they all resulted in being statistically significant): the parameter assigned to the terrorism indicator is imposed being equal to 1 for specification purposes, whereas the three remaining parameters are all statistically significant and positive as expected. A higher risk perception implies a higher propensity to perceive the different hazards as a concrete risk to tourist safety in SEA.

2.5 Conclusions and outlook

The present work explored the role of potential life-threatening events in the decision to travel for leisure, and analyzed the relationship between different attributes characterizing a holiday trip set to a risky destination, focusing on socio-demographic variables and personality traits.

In the framework of risky destinations' assessment, the decision to travel tends to be reinforced or weakened by the personal evaluation of risk of the individual travelers. In a similar context, Fleischer *et al.* (2012), who analyzed fear of flying, confirmed the importance of incorporating emotional factors to represent choice processes.

One remarkable result of the present study regards a noticeable variability in the sample: even though the average respondent tends to "rank" different risk types, different people evaluating the same hazards show diverse sensibilities and these are reflected in individual choice patterns. A further interesting point concerns the degrees of risk: as expected, the higher the level of alert, the lower the probability to choose a trip. Nevertheless, it is also true that aversion to traveling is mitigated in the case of shorter trips. Regarding the LV, findings show that, on the one hand, risk perception directly and negatively influences the decision to travel and, on the other, affects how people perceive the level of alert. Finally, the specification of the LV resulted in new evidence of gender differences in risk perception among young travelers and corroborated results already present in the literature regarding the impact that travel experience has on such a construct.

This paper aimed to study the element of risk in tourism by applying a discrete-choice methodology as one of the few examples in the field. Given the characteristics of our sample, our results are not generalizable to a wider population. Nonetheless, this work represents a further step towards a behavioural analysis of risk in the tourism literature. Hopefully, the results reported in this paper may contribute to the ongoing discussion, enriching it and helping to embark upon new paths.

A wider and more diversified sample would certainly help us gather new evidence and draw sounder conclusions. Our plan for the future is to expand the sample of students to obtain more results for this segment and, at the same time, administer the survey to a non-student segment of respondents (more heterogeneous and possibly more experienced) to achieve a greater generalization in the results and gather new evidence on the role of socio-demographic characteristics.

One major advance in our understanding of the topic could be the element of information gathering and processing during the holiday start-up phase. This was considered, in particular, by Fuchs and Reichel (2011) and Sharipfour *et al.* (2014) when they analyzed the behaviour of tourists in travel decisions and risk-reduction strategies. Therefore, including this subject in our conceptual framework defined in a choice modeling setting could help us enrich the model presented so far.

Concerning the communication aspect, an interesting way to analyze how tourists perceive risky events is by adopting images (e.g., Yan *et al.,* 2007) as opposed to words to express both the type of hazardous event and its level of severity. In particular, the difference between the verbal form and visual representation to convey a message of hazard is certainly an interesting topic of research. More generally, as far as experimental design is concerned, it would be important to test different formulations regarding choice attributes and specific hazardous situations in order to determine how individuals respond to different stimuli.

As already mentioned, although the present sample indicates a clear ranking of the "average preferences" for different hazards, responses have been rather heterogeneous. The present work examines merely the different perceptions of risk. One further stage could be towards greater specification and a closer inspection of the constructs in terms of the heterogeneous perception of the different hazards as well as the level of risk at destination. From this point of view, one possibility might be to define and implement hazard-specific LVs.

Furthermore, as far as physical risk factors are concerned, a different specification would take us beyond the general categorization used so far and test how different specific situations (eventually grouped together under the risk categories of terrorism, natural catastrophe, political uprising, and epidemic) affect the choice decision process. Moreover, this work does not consider the frequency of negative events, which is an important factor in explaining tourists' risk perception and behaviour (Pizam & Fleischer, 2002; McKercher & Hui, 2003; Saha & Yap, 2014).

Within a behavioural framework, one argument regards Prospect Theory (Kahneman & Tversky, 1979) which is a valuable asset to understand individual behaviour in risky situations. This argument is also reflected in discrete choice modeling (Masiero & Hensher, 2010). The research design proposed in our study prevented us from properly taking Prospect Theory into account, a theory that deserves an accurate treatment in future research.

If we now zero in on tourism as such, starting from the present approach focused on hypothetical unlabeled choices, future research and discussions may concentrate on the link between individual preferences for real holiday destination(s) / holiday type(s) on the one hand, and individual risk perception / concrete risk at destination on the other. In particular, this could be examined within the framework of concrete holiday destinations, in which case one further element of interest may be destination image, as recently assessed by Alvarez and Campo (2014), and how this is affected by the presence of hazards.

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Chapter 3. Risk perception concerning different hazards. A stated choice model applied to travel decisions

Igor Sarman

Abstract

Several studies in the tourism field consider risk perception concerning dangerous events, analysing related tourist behaviour. Although literature considers specific events and situations, a focus on realization of different hazards in the same context is lacking. This paper examines how perception of distinct, potential hazards influences the decision to travel, capturing how individuals perceive the possibility of four dangerous events in a leisure travel context. An established methodology is adopted to analyse the role that psychological traits have on travel decisions. Results show a sort of hazard ranking in the sense that individual perception related to different dangerous events impact differently on likelihood to travel.

Keywords: leisure destination choice, risk perception, differences in hazards, stated preferences, hybrid choice model.

3.1 Introduction

Tourism literature has frequently touched on topics of risk perception and fear concerning events that may pose serious threats to travellers' safety. Generally, tourists visit safe places and rate the safety factor high in their preferences regarding destination choice (Brunt *et al.*, 2000); consequently, destinations must deal with such a demand (Kozak *et al.*, 2007). Several scholars have pointed out the effects of hazardous events on tourism demand and individual risk perception (Fletcher & Morakabati, 2008; Larsen *et al.*, 2011; Brun *et al.*, 2011). Despite the growing number of studies considering such a matter, research tends to focus on visitors' intended behaviour and reactions concerning specific events (Wolff & Larsen, 2014; Walters *et al.*, 2015) and does not analyse the behaviour of individuals facing the possibility of encountering different, potentially dangerous situations when travelling.

In terms of tourism policy and marketing campaigns, it is crucial to understand how specific segments react to different risks that may affect their decisions and the way holidays are approached (Lepp & Gibson, 2003; Fletcher & Morakabati, 2008; Rittichainuwat & Chakraborty, 2009; Park & Reisinger, 2010; Saha & Yap, 2014). In this context, constructs like perceptions, attitudes, emotions and motivations are particularly relevant (Taylor, 2006; Walters *et al.*, 2015; Morakabati & Kapuscinski, 2016). As for every attribute characterising a destination, one may suppose that tourists' have "preferences" concerning hazardous situations; individuals would tend to show a stronger aversion to certain situations more than others. This said, it appears fundamental to distinguish between different types of hazard when analysing traveller behaviour, because these may evoke different levels of repulsion in the tourists' perception.

This research builds upon a previous research of Sarman *et al.* (2015) considering risk perception and destination choice. One of the conclusions of the paper considered the necessity to explore individuals' heterogeneity in perception of dangerous situations. This paper assesses the differences in perception of life-threatening events considering a specific segment of individuals in a given destination choice setting. The focus and originality of the paper lies in the exploration of how hazards distinguished from one another entail different reactions in destination choice, hypothesising that different dangerous situations distinctly affect leisure-related decisions. The role that the construct of hazard-specific risk perception has on tourist behaviour is not directly observable and hence it is treated as a latent determinant. An experimental setting is adopted to analyse choices of young individuals when they face the hypothetical decision to travel to a destination characterised by different potential hazards. We rely on stated choice methodology (Crouch & Louviere, 2001) and adopt a hybrid choice modelling framework (Ben-Akiva *et al.*, 2002) to capture the influence of hazard-specific risk perception on destination choice. Concerning life-threatening hazards, we consider terrorist acts, natural catastrophes, political uprisings and epidemics, the hypothetical destination choice being set in Southeast Asia. Data was collected from a convenience sample of university

students in Lugano (Switzerland), thus focusing the analysis on risk perception considering a well-defined segment of individuals.

3.2 Literature review

Roehl and Fesenmaier (1992) were among the first scholars in tourism to categorize a multitude of disparate events in distinct types of risk, among which the possibilities of physical danger, injury or sickness while on vacation are listed. Several authors have adopted such categorisation and events as terrorist acts, natural catastrophes, political uprisings and epidemics as being associated with physical risk (Jonas *et al.*, 2010) although some authors make distinctions between the events we have described (Park & Reisinger, 2010; Seabra *et al.*, 2013) considering them as separate types of risk.

Terrorism acts certainly remain impressed in tourists' minds and probably are those affecting feelings and emotions of travellers to the greatest extent, implying a particularly complicated recovery process for affected destinations (Sönmez *et al.*, 1999; Taylor, 2006). This is due to the political and ideological meaning of acts of terrorism and because in many situations they are precisely targeted against tourists. As stated by Sönmez *et al.* (1999) "while a natural disaster can impede the flow of tourism, terrorism risk tends to intimidate the travelling public more severely…" (pg.13). Acts of terrorism are generally characterised by severity and frequency. Pizam and Fleischer (2002) analysed these two factors considering the case of a sensitive destination and noticed that the frequency of terrorist acts is the main contribution to persuading tourists not to visit a place. Larsen *et al.* (2011) and Brun *et al.* (2011) proposed a comparison of tourists' perceptions before and after terrorist events: they highlighted an increase in travellers' concerns towards terrorism following notorious terrorist acts, in particular an increased perceived risk pertaining to certain destinations. Wolff and Larsen (2014) presented a very specific case-study regarding the Oslo/Utoya (Norway) terrorist act in June 2011 and showed that the event of a terrorist attack did not lead to an increase in risk perception shortly after the event regarding terrorism in Nordic countries, for neither Nordic nor international travellers. The comparison of results reported by Larsen *et al.* (2011) and Wolff and Larsen (2014) outlines the role assumed by the destination in tourists' perceptions and evaluation of risk. On this matter, Fuchs *et al.* (2012) explored the factors affecting risk perception of tourists entering Egyptian Sinai, hence having already decided to expose themselves to risk. A particular finding concerned visitors' rationalisations of the risk of terrorism and the comparison of the level of danger of the destination and the areas where tourists usually live (also Uriely *et al.*, 2007).

Dedicated literature often regards terrorism and political instability together and this is because they are often closely related and individuals refer to them with little or no distinction (Dolnicar, 2005). Saha and Yap (2013) considered the joint effect of political instability and terrorism on tourism demand and analysed the level of interaction existing between these two types of events. Results showed that political turmoil has a much larger effect on tourism demand than does terrorism. Moreover, the interaction between political instability and terrorism showed that for the latter the effect on tourism demand is ambiguous. The authors noticed that "…even if a country has lesser than average terrorist threat, political instability

attracts less international tourists. However, if a country has less political risk, terrorist-related events do not cause a decline in tourist arrivals possibly because of speedy recovery from such events…" (p.517). Fletcher and Morakabati (2008), considering two distinct examples (Fiji and Kenya), concluded that a one-off terrorist act has fewer lasting effects on tourism demand levels than those produced by political instability. Concentrating on acts of sedition, Seddighi *et al.*, (2001) detailed different impacts that travel agents' cultural background has on the perception of several political instability-related events, disentangling specific behaviours resulting from the occurrence of different critical situations. In fact, the authors noticed that "each type of political instability is perceived to have different impact from the other types" (p. 189).

Concerning natural catastrophes and their relation with tourism and leisure travels, numerous articles have recently appeared following well known disasters that affected several tourism industries around the world. Several authors focused on the effects of natural catastrophes on visitors' risk perception and visit intention, delineating tourists' socio-psychological traits and differences among individuals. In the specific context of Florida (USA) Thapa *et al.* (2013) considered the case of wildfires and tourists' risk perception and reactionary behaviours while Matyas *et al.* (2011) analysed the impact of hurricane threats on tourists' evacuation decisions. Lehto *et al.* (2007) adopted an approach related to environmental psychology to capture individuals' emotions and behavioural intentions to visit a seaside destination following a tsunami. Considering a heterogeneous sample of individuals, Park and Reisinger (2010) proposed an empirical analysis based on a wide spectrum of natural disasters in order to evaluate the perceived influence of these on international travel, and determined significant differences with respect to several socio-demographic and economic variables. Similarly, Walters *et al.* (2015) noticed that factors positively influencing the willingness to visit a flood-stricken destination are a personal connection with the affected area and repeat visiting, which resulted in altruism and curiosity in potential visitors. At the same time, the main factors that led individuals to avoid visiting the destination were the perception of bad weather and the insecurity of the place.

The topic of epidemics or sanitary risk is usually considered from the tourism supply-side point of view and scholars tend to measure the effects on the tourism system as a whole (Henderson & Ng, 2004) while the analysis concerning the demand side is less present in the literature. Cossens and Gin (1995) and Carter (1998) were among the first researchers to consider the relation between tourism and health risks. The general observation made by these scholars is that epidemics and other health-related risks are often perceived as spreading to large geographical areas and are seldom considered as being bounded to specific destinations. Jonas *et al.* (2010) noticed that "…while the impact of security situations on risk perceptions and travel behavior is quite evident, the influence of existing health risks on destination choice and travel behavior is not so obvious" (p.89). The authors proposed a comprehensive study

delineating behavioural patterns of low-health-risk-taking individuals with respect to different types of sanitary-related situations representing a risk for tourists.

The bulk of studies in the field has tended to focus on one hazard at a time, often considering very specific cases that had great public resonance. What is lacking is a comprehensive framework in which different hazards in the same set of destinations are considered, with specific attention to their repercussions on destination choice. Kozak *et al.* (2007) considered the cases of epidemics, natural catastrophes and terrorism, outlining the differences in terms of tourists' perceptions and reactions in a set in which individuals had to choose a preferred destination. Seabra *et al.* (2013) outlined a segmentation of tourists' patterns of perceived risks and highlighted differences in the perception of disparate hazards, among which terrorism and turmoil are listed. Lepp and Gibson (2003) examined the effect of tourist role and other individual characteristics on risk perception, considering risks of health, terrorism and political instability. Both Seabra *et al.* (2013) and Lepp and Gibson (2003) referred their results generically to international trips with no focus on destination evaluation and choice. Considering the case of Thailand, Rittichainuwat and Chakraborty (2009) focused on first-timers and repeat travellers' concerns regarding terrorism and diseases. In certain cases, the discussion specifically focused on the comparison between human- and naturally-caused disasters. Fletcher and Morakabati (2008) noticed that "Even major natural disasters, such as earthquakes, hurricanes and floods, do not tend to have the magnitude of impact as that associated with political instability, with high media coverage and its direct input into tourists' perception the number of tourists and their expenditure can be seriously affected." (p.538). Moreover, Valencia and Crouch (2008) highlighted that "Consumers may therefore react differently towards natural disasters compared to human-caused negative events. In a number of instances, tourists have been targets of violence. […] In comparison, natural disasters do not discriminate in terms of targeting a particular group of people." (p.26; a similar discussion was anticipated by Sönmez *et al.*, 1999). Still, the authors highlighted how self-confidence partially explains the influence that dangerous situations have on the decision to travel. Self-confidence is found to influence the perception of single events in different ways, ranging from no impact in the case of volcanic eruptions, earthquakes and kidnapping to a highly significant influence in the case of high levels of AIDS, dangerous diseases, poor health infrastructure and major transport accident risks.

3.3 Rationale of the paper

In this article, we propose a structured approach to simultaneously consider four different types of hazard. We set our analysis in a destination choice framework and consider a specific macro-region, Southeast Asia (SEA), as the focal point of investigation. Such a conceptualisation appears important because, as pointed out by Sarman *et al.* (2015), referring to single hazards implies outlining a varied set of tourist responses and behaviours. Whereas in Sarman *et al.* (2015) the authors concentrated on a single dimension of risk perception, in this case we move our attention to the differences between risks and the associated individual perceptions, deriving important implications for the comprehension of the phenomenon. We mix the analysis of tourists' processing of optional destinations (where the main characteristic of these is represented by a set of attributes) with the analysis of individual hazard-specific risk perception and hazard-induced behaviour. In particular, we consider the set of hazards as choice attributes, i.e. as determinants of travel choice behaviour in order to capture what the individual's preferences are and to what extent an individual is more or less likely to accept a certain dangerous situation, with a certain level of risk, rather than another.

This study aims to explain (a) how individuals distinguish between different life-threatening hazards when making the decision to travel to holiday destinations in which such events are present and (b) how hazard-specific risk perception influences the choice. The motivation for analysing a psychological trait such as risk perception lies in the fact that behavioural differences are usually influenced not only by observable characteristics but also by some unobservable components (Lepp & Gibson, 2003; Walters *et al.*, 2015; Sarman *et al.,* 2015). We account for the presence of risky events (terrorist acts, natural catastrophes, political uprisings and epidemics) for which no probability equivalent exists, in a framework (leisure travel) where attitudes and perceptions play a central role in determining individuals' preferences and hence are helpful in designing policy implications and interventions.

We consider the case of SEA because it is an area in which all the potential life-threatening events we are referring to are in a certain way likely to happen and we postulate that in such an "unstable" environment heterogeneity in risk perceptions and tourist decisions can be associated to the different views that individuals may have (Uriely *et al.*, 2007; Fuchs *et al.*, 2012). This said, it is important to note that we did not design specific destinations in the area of analysis (for example, the individual countries) in order not to confound an individual's choice of a certain travel option with the image of and preference for a specific destination; we aimed at considering the impact of risk perception in a broader geographical context which is "prone to" certain events.

3.4 Data and method

3.4.1 Data collection and survey description

A sample of students at the University of Lugano, Switzerland, was recruited and asked to complete a structured questionnaire. Collected data mainly regarded aspects concerning respondents' experience of travels and dangerous situations as well as perception of hazardous events in general and more specifically in SEA (a comprehensive description of the survey can be found in Sarman *et al.*, 2015). Descriptive statistics of the sample and the variables relevant for the analysis are presented in Tables 3.1 and 3.2. A total of 299 interviews were collected and a sample of 295 individuals was retained for analysis.

Table 3.1. Socio-demographic descriptives

Sample dimension:	295 respondents				
Gender:			***Number of trips to SE Asia:***		
male	168	57%	0 trips	241	82%
female	127	43%	1 trip	19	6%
			more than 1 trip	35	12%
Age:					
mean	22 y.o.		***Individuals affected by dangerous situations*:***		
s.d.	2.5		terrorist act	38	13%
			natural catastrophe	52	18%
Current educational level:			political uprising	45	15%
bachelor	234	79%	epidemics	28	9%
master	61	21%			
Nationality:					
CH	99	34%			
IT	150	51%			
Other EU (including Russia)	29	10%			
N. and S. America	4	1%			
Asia	11	4%			
Africa	2	1%			

* Survey question: *"Please consider all your past international travel experiences: have the following dangerous situations ever caused interruption of your stay or at least negatively influenced it?"*

A stated choice experiment was the first task proposed in the questionnaire (a recent, comprehensive example is proposed by Masiero *et al.*, 2015). Participants were presented with two options to travel to (hypothetical) holiday destinations set in SEA and the option not to travel. The first two alternatives are characterised by different attributes, each with a certain number of levels. Every individual was presented with 12 different choice scenarios and they had to choose one option per scenario considering their own preferences.

Table 3.2. Descriptives of hazard-induced risk perception, travel deterrence and worry

	average	std. dev.	median
"(hazard) represents a concrete risk to tourist safety in SouthEast Asian countries" (1 - totally agree / 7 - totally disagree)			
terrorist act	3.7	1.5	4
natural catastrophe	4.9	1.4	5
political uprising	4.1	1.4	4
epidemics	4.8	1.5	5
"Would the risk of the following situations deter you from traveling to a holiday destination?" (1 - definitely no / 7 - definitely yes)			
terrorist act	5.2	1.7	6
natural catastrophe	4.9	1.7	5
political uprising	4.4	1.6	5
epidemics	5.3	1.8	6
"How much would you be worried for your personal safety if in the destination you are spending your holidays one of the following situations should happen?" (1 - very calm / 7 - very worried)			
terrorist act	5.7	1.5	6
natural catastrophe	5.5	1.4	6
political uprising	4.7	1.5	5
epidemics	5.8	1.3	6

Choice attributes and respective levels characterising the scenarios are:

- Length of trip: 10 or 16 days (includes flight from a Swiss airport)
- Cost of trip: 1,500, 2,000 or 2,500CHF (includes flight with a standard economy-class ticket and an overnight stay at a 4-star hotel overnight. 1 Euro ≈ 1.20 Swiss Francs at the time of data collection)
- Trip organisation: do-it-yourself, only hotel and flight booking by agency or pre-planned full-package by agency
- Risk factor: terrorist act, natural catastrophe, political uprising or epidemic
- Level of alert: low, medium or high.

Concerning level of alert, levels were specified as follows:

- Low, referring to a situation in which tourists usually apply certain measures of precaution that go beyond the standard ones;
- Medium, referring to a situation in which tourists will take specific measures of precaution;
- High, referring to a situation in which tourists will reconsider their decision to travel.

These sentences were presented in the survey introduction and respondents were instructed to consider such pieces of information as "evaluated and made public by an independent, recognized international organisation whose activity is to evaluate risk profiles for countries and world regions".

3.4.2 Model formulation

Experiment-based stated preferences data are here analysed adopting a hybrid choice model. This methodology generates latent variables to capture constructs difficult to observe and measure, like hazard-specific risk perception. Adopting the classical discrete choice framework and integrating latent constructs into it, we simultaneously assess the significance and impact of event-specific risk perception on the decision process and the formation of risk perception constructs themselves. There are several examples of discrete choice modelling applied to the tourism field. To name a few, Huybers (2003) adopted such techniques to analyse domestic tourism destination choice while, more recently, Huertas-Garcia *et al.* (2014) proposed a conjoint analysis on the role of hotel attributes on tourists' choices and Hasan-Basri and Karim (2016) adopted choice experiments to analyse benefit transfer in recreational parks. Concerning hybrid choice modeling, only few examples can be found in tourism literature to date (Fleischer *et al.*, 2012; Sarman *et al.*, 2015).

Adopting variables pertaining to respondents' socio-demographics, past experiences and hazard evaluation, we formulate four equations for different latent variables, one per each hazard type, and integrate them into the choice model. Figure 3.1 graphically describes the model and the mathematical formulation follows.

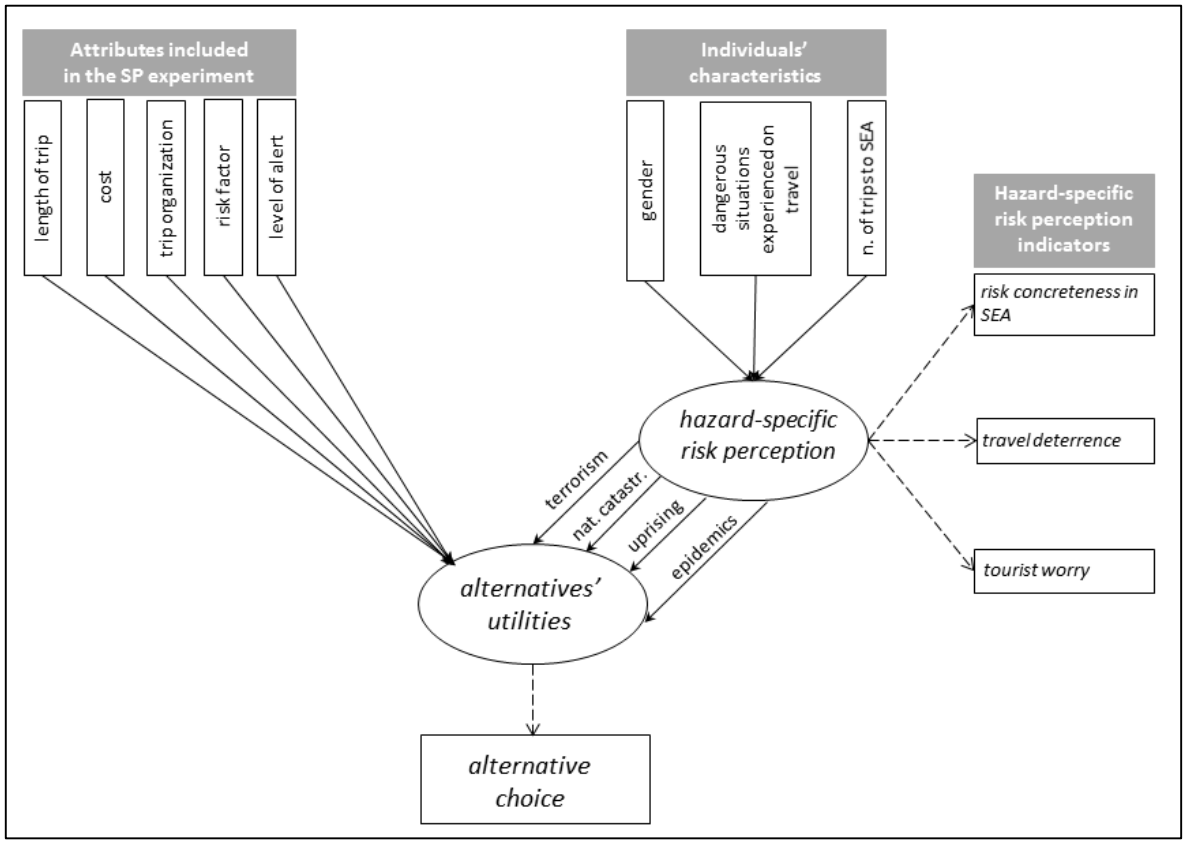

Figure 3.1. - Path diagram for the ICLV model

The hybrid choice model we present is structured as two sets of equations. The first concerns the discrete choices and represents individuals' choices among the three alternatives. The second set denotes the model for the four latent variables capturing hazard-specific risk perception. These two sets of equations are eventually integrated together and used to simultaneously estimate parameters of interest.

The discrete choice model. The choice model part is based on the experiment design and includes both the choice attributes and the hazard-specific latent variables. Utility functions U for the three choice alternatives (countryA, countryB, NoChoice) are as follows:

$$\begin{aligned} U_{A,n,t} &= \beta' * X_{A,n,t} + \varepsilon_{A,n,t} \\ U_{B,n,t} &= \beta' * X_{B,n,t} + \varepsilon_{B,n,t} \\ U_{NoChoice,n,t} &= \beta' * X_{NoChoice,n,t} + \varepsilon_{NoChoice,n,t} \end{aligned} \tag{4.1}$$

with *n* indicating the observed individuals, *t* the choice task and ε_j ($j = A, B, NoChoice$) assumed to be an i.i.d. Gumbel-distributed error terms.

The expression $\beta' * X_{n,t}$ appearing for alternatives A and B (subscript omitted) contains the choice attributes and the term capturing the influence of the LVs on the respective utility functions. This can be expressed as follows:

$$\begin{aligned} \beta' * X_{n,t} = {} & b_{len} * len_{n,t} + b_{len\_gend} * len_{n,t} * gend_n \\ & + b_{cos} * cos_{n,t} \\ & + b_{diy} * diy_{n,t} + b_{haf} * haf_{n,t} \\ & + b_{ter} * ter_{n,t} + b_{ter\_LV} * ter_{n,t} * ter_n^* \\ & + b_{cat} * cat_{n,t} + b_{cat\_LV} * cat_{n,t} * cat_n^* \\ & + b_{upr} * upr_{n,t} + b_{upr\_LV} * upr_{n,t} * upr_n^* \\ & + b_{epi\_LV} * epi_{n,t} * epi_n^* \\ & + b_{lev\_med} * lev\_med_{n,t} + b_{lev\_hig} * lev\_hig_{n,t} \end{aligned} \tag{3.2}$$

with:

- *b*s are parameters to be estimated;
- *len* is the length of the trip; the model we propose contains an interaction term between trip length and the individual's gender (*gend*);
- *cos* is the cost of the trip (in Swiss Francs - including standard economic-class flight and 4-star hotel as accommodation);

- *diy* is the organisation type do-it-yourself and *haf* is only hotel and flight booked by agency (pre-planned full-package by agency is the reference case);
- *ter, cat, upr* represent the risk factors terrorism, natural catastrophe and political uprising at the destination (epidemics as reference case). The starred terms denote the hazard-specific latent variables capturing risk perception (details following): with our approach, we model how the eventuality of a negative event happening at the destination is perceived by the individual and how this in turn impacts on choice decisions. Moreover, the interaction terms allow us to capture how the individual's danger realisation is influenced by his/her own risk perception;
- *lev* is the level of alert. Three levels are present and the lowest one acts as a reference case against which we compare the impact of the last two on individual utility.

The expression for the NoChoice alternative utility exclusively consists of a constant term and an additional error component, which is normally distributed with mean zero and standard deviation σ_{EC} (to be estimated):

$$\beta' * X_{NoChoice,n,t} = b_{const\_NoChoice} + error\_component_n \tag{3.3}$$

The role of the error component is to capture a source of additional variance that characterises the individual decision of choosing the 3rd option.

The classical assumption at the base of the choice model is the utility maximization process:

$$y_{i,n,t} = \left\{1 \;\; if \;\; U_{i,n,t} = \max_j \left(U_{j,n,t}\right);\; 0 \; otherwise\right\} \tag{3.5}$$

with $y_{i,n,t}$ indicating individual's n chosen alternative i in scenario t. Given the above model structure and assumptions on the error terms, the probability can be written as follows:

$$P\left(y_{i,n,t} = 1 | X_{n,t}, \beta'\right) = \frac{e^{\beta' * X_{i,n,t}}}{\sum_j e^{\beta' * X_{j,n,t}}}. \tag{3.6}$$

The latent variable model. The modelling of hazard-specific latent variables considers, on the one hand, the equations containing the variables characterising the LVs themselves and, on the other, the relations connecting the LVs with the indicators represented by survey hazard-related questions.

With h_n^* (h = *ter, nat, upr, epi*) we designate the unobserved, hazard-specific risk perception. We build a model to explain such latent variables relying on individuals' characteristics:

$$h_n^* = \Lambda_h' * K_{h,n} + \omega_{h,n} = \lambda_{mean,h} + \lambda_{gend,h} * gend_n + \lambda_{europ,h} * europ_n + \lambda_{SEAtrips,h} * SEAtrips_n + \lambda_{exper,h} * exper_{h,n} + \omega_h \quad (3.7)$$

with:

- λs are parameters to be estimated;
- *gend* indicates the individual's gender (female being the reference case);
- *europ* indicates whether the individual is European;
- *SEAtrips* indicates the number of trips an individual made to SEA in his/her lifetime;
- *exper* refers to the eventuality that the individual directly or indirectly experienced a dangerous situation in previous travel experiences (yes or no);
- $\omega_h \sim N(0, \sigma_h)$, σ_h being a parameter to be estimated.

It must be pointed out that individuals' age was collected with the survey but was excluded from the final model given its extremely low variation.

Concerning the indicators, the model considers four sets of equations (one for every hazard) and every set is made up of three equations (one for each indicator). Generic indicator r for hazard h ($I_{r,h}$) is represented as function of LV:

$$I_{r,h,n} = \alpha_{r,h} * h_n^* + v_{r,h,n} \quad (3.8)$$

with r denoting the indicator, $\alpha_{r,h}$ being a parameter to be estimated and $v_{r,h,n} \sim N(0, \mu_{r,h})$, $\mu_{r,h}$ being a parameter to be estimated. Although indicators I are expressed in 7-point Likert scales we did not adopt an ordered logit approach to represent them but rather we suppose the error term v to be normally distributed. This allows us to reduce the number of parameters to estimate. The indicators used as manifestations of the latent variables are represented by survey questions described in Table 3.2.

The integrated discrete choice and latent variable equations were estimated by adopting a maximum simulated likelihood method (for a comprehensive discussion on integration of latent variables in discrete choice models and the maximum simulated likelihood method, see Walker, 2001).

3.5 Findings and discussion

We only illustrate the estimates for the structural equations' parameters while results regarding measurement equations are not reported for the sake of compactness (all parameters resulted in being statistically significant).

Table 3.3. - Model results

Choice model parameters

Parameter	Value	Std.err.	p-value	
"Do not travel" utility equation				
const_NoChoice	-12.3	1.13	< 0.01	***
σ_EC	1.32	0.0967	< 0.01	***
"Country A" & "Country B" utility equations				
b len	0.00503	0.02	0.8	
b len _ gend	0.0423	0.0131	< 0.01	***
b cos	-0.00084	0.00015	< 0.01	***
b diy	-0.376	0.107	< 0.01	***
b haf	0.127	0.102	0.22	
b ter	-2.23	1.28	0.08	*
b ter _ LV	-1.55	0.159	< 0.01	***
b nat	1.15	1.28	0.37	
b nat _ LV	-2.19	0.214	< 0.01	***
b upr	-2.86	1.1	0.01	**
b upr _ LV	-1.31	0.135	< 0.01	***
b epi _ LV	-1.81	0.205	< 0.01	***
b lev_med	-2.19	0.158	< 0.01	***
b lev_hig	-3.81	0.16	< 0.01	***

Latent variable model parameters

Parameter	Value	Std.err.	p-value	
"Terrorism" equation				
λ mean,ter	4.68	0.289	< 0.01	***
λ gend,ter	0.649	0.129	< 0.01	***
λ europ,ter	0.307	0.277	0.27	
λ SEAtrips,ter	0.0077	0.0273	0.78	
λ exper,ter	-0.297	0.181	0.1	*
σ ter	0.949	0.0702	< 0.01	***
"Natural catastrophe" equation				
λ mean,cat	4.75	0.242	< 0.01	***
λ gend,cat	0.511	0.113	< 0.01	***
λ europ,cat	-0.0303	0.227	0.89	
λ SEAtrips,cat	-0.0219	0.0235	0.35	
λ exper,cat	-0.0783	0.142	0.58	
σ cat	0.859	0.0595	< 0.01	***
"Political uprising" equation				
λ mean,upr	4.5	0.287	< 0.01	***
λ gend,upr	0.344	0.133	0.01	**
λ europ,upr	-0.267	0.271	0.32	
λ SEAtrips,upr	0.0015	0.03	0.96	
λ exper,upr	0.249	0.193	0.2	
σ upr	1.04	0.0622	< 0.01	***
"Epidemics" equation				
λ mean,epi	5.49	0.282	< 0.01	***
λ gend,epi	0.326	0.118	0.01	**
λ europ,epi	-0.289	0.266	0.28	
λ SEAtrips,epi	-0.0501	0.0238	0.04	**
λ exper,epi	-0.249	0.188	0.19	
σ epi	0.884	0.0669	< 0.01	***

Model statistics:	
Number of Halton draws:	5,000
Number of parameters:	60
Number of individuals	295
Number of observations	3,534
Number of iterations:	146
Choice model adjusted Rho squared:	0.17

Legend:

**** = p-value < 0.01*

*** = 0.01 ≤ p-value < 0.05*

** = 0.05 ≤ p-value ≤ 0.1*

Choice model results. The constant term for the opt-out alternative is negative (-12.3) and highly significant meaning that, all else being equal, respondents prefer one of the first two options. The error component is highly significant (1.32), implying a source of heterogeneity in individual preferences (for the no-choice option) which is not directly observed. Concerning the utility functions of the first two alternatives, we notice that the length of trip does not significantly affect individual choice. Nonetheless, interacting such an attribute with the gender variable results in a positive and significant estimate (0.0423), meaning that, for female respondents, the longer the trip the higher the utility of travelling, ceteris paribus. The cost parameter is negative and significant (-0.00084), bearing an intuitive meaning: a higher trip cost leads to a decreasing utility and hence a lower probability of choosing one of the first two alternatives. An important aspect regards the organisation of the trip, which is preferably delegated to an agency rather than managed by the traveller. In fact, the do-it-yourself parameter is negative and significant (-0.376) meaning that it is less preferred than the reference category pre-planned full-package by agency; similarly, the only hotel and flight booking by agency parameter is not statistically different from zero, hence this level can be associated to the reference one. It is interesting to note that young individuals, who are generally considered prone to a DIY attitude in travelling, refuse (or better, tend to rank last in their preferences) such an alternative in a context where instability and uncertainty represent a critical choice factor. Yet, Reichel *et al.* (2007) pointed out clear differences among young backpackers in perceiving and judging travel concerns among which natural disasters and terrorism are listed.

Concerning the specific effect of hazardous events and the related risk perception latent variables, a hazard ranking emerges from results that can be associated to the specific context of SEA. In particular, omitting the contribution of the latent variables (the interactions between risk type and associated latent variables) one notices that the effect of political uprising is the strongest among the four hazards (-2.86) along with terrorism acts (-2.23). On the contrary, the lowest impact is identically attributed to natural catastrophes (no significant parameter) and epidemics (reference level). Such results imply that the two former life-threatening events increase the probability of choosing the opt-out alternative more than the latter, *ceteris paribus*. Valencia and Crouch (2008) pointed out how, in the hypothesis of travelling to a disaster-hit destination, individuals are more prone to "go ahead with the trip as planned" in the case of a bomb blast (human-induced disaster) than the case of a hurricane and flooding (natural disaster). Our results contrast to what is reported by these authors, though it must be observed that we refer to situations in which a life-threatening event is potential; moreover, Valencia and Crouch (2008) did not refer to any specific destination. In our case it appears that situations linked to terrorism and the like are perceived as more unstable and uncertain when announced as "potential" (with different degrees of risk) if compared to epidemics and natural catastrophes, probably more "manageable" by individuals and authorities. For the sake of completeness, we also observe that Valencia and Crouch

(2008) considered the impact that self-confidence has on travel decision making when one has to "potentially cope with the significant possibility" of dangerous situations: from their results, there is no clear predominance concerning the major impact of self-confidence on situations concerning human-induced or natural disasters. A further point is made by Jonas *et al.* (2011) who observed that low-health-risk-taking individuals planning to take a trip to developing countries are more concerned about sanitary-related issues, followed by natural disasters, terrorism and political instability.

Estimation of interaction parameters gives further interesting results. First, all the coefficients are highly significant and negative (terrorism -1.55; natural catastrophes -2.19; political uprisings -1.31; epidemics -1.81): individual utility, and hence probability to choose one of the trips, are negatively affected by increasing levels of risk perception and this is true irrespective the type of hazard. The interaction parameters between terrorism and political uprising and the respective LVs are not statistically different. Coherent with the previous result, it seems that there is no difference between these two types of negative events and this may be due to the area is perceived, probably seen as unstable from the political point of view. On the comparison between terrorism and political uprising, Fletcher and Morakabati (2008) concluded that the effects of terrorist acts on tourism seem to be less lasting than those of political turmoil. Similar conclusions are reported by Saha and Yap (2014) who observed that "…the effects of terrorism on tourism are less severe compared to political instability effects." (p.518). Finally, Seabra *et al.* (2013) observed a specific cluster of tourists particularly concerned about turmoil and terrorism while not showing the same preoccupation for other forms of risk. In our case, the latent variable bearing the greatest effect is the natural catastrophe risk perception, and this could mean that the seriousness of natural-induced hazardous events may be perceived as being higher if compared to acts of terrorism or uprisings. It must be observed that Park and Reisinger (2010) considered an accurate list of natural disasters and clearly pointed out the differences existing in the perception of such events among tourists with different profiles, while in our case we generically consider a natural catastrophe with no further specification.

Finally, the model determines two highly significant and negative coefficients for the medium and high level of risk (-2.19 and -3.81, respectively). Once again, estimated parameters are coherent with common sense: considering the low level as reference, one notices that the higher the degree of risk at destination the lower the utility of the first two alternatives and hence the probability to travel.

Latent variable models results. Gender-related parameters are positive and statistically significant in all four cases, meaning that female respondents reported higher levels of risk perception on average than did males, and this is true for each hazard type. Evidence in the literature is mixed: according to Lepp and Gibson (2003), gender is a source of heterogeneity in risk perception with males showing lower levels of such a construct for health but not for terrorism or political instability. Jonas *et al.* (2010) found that there is no difference between

male and female visitors with respect to perceived risk of infectious disease and other forms of potentially injurious travel risk types. Park and Reisinger (2010) noticed that women are more negatively influenced by terrorism and natural disasters than are men but no difference was determined for political or health risk. The nationality of respondents has no effect on the determination of risk perception, irrespective of the hazard. The literature presents several studies focusing on such an aspect (Seddighi *et al.*, 2001; Kozak *et al.*, 2007) and no common conclusion has been outlined yet (refer to Seabra et al., 2013 for a discussion). Concerning the effect of prior visitation to SEA, mixed results emerge: we observe that an increasing number of trips to SEA negatively influences risk perception only for epidemics (-0.0501) while no significant effect is determined for other hazards. Our results confirm what was found by Rittichainuwat and Chakaborty (2009), indicating that first-timers perceive significantly higher disease-related risk than do repeat travellers (but such a difference does not stand for terrorism). The authors, analysing the case of Thailand, ascribe such greater perception to a lack of familiarity and a less realistic vision of first timers. Moreover, our results partially resemble what was proposed by Sharifpour *et al.* (2014) and Sarman *et al.* (2015) whose works confirm that an increasing number of visits to a specific destination is reflected in a lower physical risk perception. However, these studies analysed physical risk perception aggregating different negative events and thus not distinguishing the effect of prior visits on hazard-specific realisation. We show that separately accounting for the four negative situations allows us to observe that prior visitation mitigates risk perception only in the case of epidemics. Matyas *et al.* (2011) reported similar conclusions considering the impact of hurricanes on tourists' decisions.

Concerning individual experience of dangerous situations, it is shown that having experienced negative events during past travel occasions results in significantly mitigating risk perception in the case of terrorist acts, while no significant coefficients were found for natural catastrophes, political uprisings and epidemics. Limitations from this point of view lie in the fact that the question posed to the sample was rather generic, considering neither the temporal dimension (how far in the past the experience is) nor the magnitude dimension (how dangerous the respondent perceived the experience). Contrary to our findings, Seabra *et al.* (2013) reported that individuals showing a high concern about terrorism and turmoil are "those who had been exposed to damage site shortly after a terrorist attack" (p.507).

To conclude, estimates regarding the error components' standard deviation are also presented: these are all statistically different from zero, implying that individual characteristics adopted for analysis only partially explain the risk perception constructs.

3.6 Conclusions

This article has presented a discrete choice model integrated with latent variables to analyse how risk perception concerning different life-threatening hazards influences individual decision to travel to a tourist destination. Our purpose was to understand how individuals rationalise the possible occurrence of four hazardous events in a leisure travel context, highlighting potential differences in individual perception of each event and the respective influence on choice. For each event, we have considered individual risk perception, analysing the differences both in such a construct and in the way it leads the individuals to take a decision. Consequently, we can have a better comprehension of the impact of risk perception and its reflection on choices related to leisure trips.

Results have shown significant differences in individual consideration of critical situations and perceptual traits carry a noticeable weight in explaining choice dynamics. The main consequence is that processing of holiday options in potentially dangerous destinations is influenced to different extents by various life-threatening events. Therefore, it appears crucial to distinguish between events since indistinctly considering different types of hazard could imply misleading conclusions.

The restricted and demographically homogeneous respondent sample prevents us from drawing conclusions which can be generalised to a broader class of travellers. Nonetheless, we feel that some policy indications can be given by considering our results. For certain destinations, determining how individuals react to uncertain and potentially dangerous situations is extremely important, and understanding the role of individuals' risk perception is crucial. Empirical evidence helps clarify the image perceived by tourists of a potentially dangerous destination and practitioners may shape suitable communication policies in order to attract tourists in response to potential incidents at the destination, adopting different strategies to deal with diverse situations and consumers (Seabra *et al.*, 2013; Seddighi *et al.*, 2001; Taylor, 2006). For example, dealing with the consequences on tourism demand caused by the risk of turmoil or terrorist attack should lead to very persuasive marketing campaigns apt at ameliorating individual perception and interventions on prices and services offered should also be proposed. This is true in the case of epidemics or natural crises as well but, in these cases, the situation appears less severely perceived by individuals and hence destination managers could adopt less drastic interventions. Further, a full comprehension of such dynamics may be useful to authorities in charge of releasing alert messages, which have to balance the actual risk at destination, the sensibility and cognition individuals show with respect to diverse hazards and the role of media in conveying messages and images (Taylor, 2006; Fletcher and Morakabati, 2008). Moreover, our work is focused on the pre-trip choice phase but, for example, the presented analysis may be useful in setting up reception practices dedicated to visitors at the destination, considering the different feelings tourists show towards the presence or insurgence of distinct, potentially dangerous situations.

To conclude, some limitations affecting our work must be remarked upon and these can be dealt with in future research efforts. First of all, our results are likely to be destination-specific, i.e. concerning the specific case of SEA as a tourist destination. In fact, the tourist literature points out that not all destinations are characterised by the same risk dimensions (Sharifpour *et al.*, 2014). In this sense, it would be interesting to consider the reflection that an event in a specific destination has on neighbouring destinations similarly to what was proposed by Wolff and Larsen (2014) concerning the Oslo and Nordic countries case. Secondly, although young tourists represent an important market segment in tourism demand, a more varied sample of individuals would be appropriate in future research in order to obtain more comprehensive evidences. Third, our work focused on four events, which are broadly defined and lack specific details. It is likely that a greater specification of dangerous situations (Seddighi *et al.*, 2001; Park and Reisinger, 2010) could lead to a more precise analysis pertaining to hazard-influenced attitudes, decision-making and related policy implications. Fourth, the experiment we have presented included only some attributes that describe trip options. A different set of trip characteristics or the design of other tourist situations (Pizam *et al.*, 2004) could be useful to capture further details in individual decision-making when affected by situations of potential risk. Finally, it appears crucial to consider what the trade-off is between negative dimensions of a tourist choice - like the risk of encountering a dangerous situation at destination - and positive aspects - the various benefits that an individual seeks while on vacation (Morakabati & Kapuscinski, 2016); this aspect can be suitably analysed by adopting discrete choice modeling.

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