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## Factors affecting risk perception during terrorist attacks

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## ABSTRACT

The purpose of this study is to investigate the risk perception of a community when responding immediately after a terrorist attack in Iraq. Primary data has been collected through intensive interviews with 10 respondents, all of whom participated in responding to the 2010 four separate, sequential bombings of the Hilla Textile Company, to elicit the factors that could influence the risk perception of people. A storytelling data collection method was used to extract information and to examine how the communities perceive risks when responding to terrorist attacks despite the fact that they may be targeted by other sequential bombings.

Primary and secondary data analysis shows that a number of factors influence the risk perception of people. By considering the similarities and their key characteristics, these factors have been broadly divided into three main themes, namely, knowledge about the hazard, personality factors, and membership in a cultural group. The empirical evidence of the study is closely aligned with the Theory of Planned Behaviour (TPB). It shows that how attitudes, subjective norms and perceived behaviour control has influenced the behaviour of people when responding to such attacks. Accordingly, local government can use the findings of this study to improve their terrorism risk management.

## 1. Introduction

Disasters, man-made and natural, have a significant impact on communities. Disasters stemming from terrorist attacks have become a leading cause of concern in the world as they create significant losses and damage to humans, society and economy [1,2]. Countries around the world, over the past few decades, have had to come to terms with terrorism, with the most large-scale attacks and loss of life, for example, in the Bali bombings in Indonesia (2002, 2005), the September 11 attack in USA [2], the 7/7 London bombings (2005) and the Manchester Arena attack [3] in the UK, the Paris attacks (2015 and 2016), the Easter Sunday attack in Sri Lanka (2019), the suicide bomb attack on the Syrian Democratic Forces (2019), and the twin suicide bombings in central Baghdad, Iraq (2021). The Institute for Economics and Peace [4] observed a steady growth in terrorism since 2000, with over 48,000 terrorist incidents claiming over 107,000 lives and with a global economic impact equivalent to 13.4% of the world's GDP (US\$14.3 Trillion).

During these terrorist attacks, people help the victims despite knowing the danger to their lives, physically and psychologically. Studies have shown that this is because of the 'risk perception' of people regarding the hazard and the potential risk the hazard could bring. Risk perception is an assessment made by individuals, groups, or society regarding the potentially negative impacts of an identified source of danger [5,6]. According to Wachinger and Renn [7]; risk perception can be conceived as the process of collecting,

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selecting and interpreting signals about uncertain impacts of events, activities or technologies. It has been identified that the perception of risk has an enormous impact on behaviour, regardless of the objective conditions [8,9].

The seminal work of Kate [10] identified a number of factors that could affect the risk perception of people when subjected to a hazard. They include the nature of the hazard (its magnitude, duration, frequency and temporary spacing); previous experience regarding the hazard; personality factors (fate control, different views of nature, tolerance of dissonance-creating information). Further, Oliver-Smith and Hoffman [8] and Kulatunga [11] argue that the behaviour of people regarding a hazard does not always depend on the threat it could bring, but is embedded within the cultural factors of the people. Often, people tend to give priority to factors such as social values, religious beliefs, and traditions rather than to the potential danger from a hazard. Further, according to the Theory of Planned Behaviour (TPB), human behaviour is influenced by others, directed towards certain goals, and based on rational decisions [12]. TPB assumes people act after considering every option and make behavioural decisions based on careful consideration of available information [13]. In addition, the social identity approach is a key approach that has been used to understand the risk perception of people when helping victims during disasters and emergencies. Each social identity is associated with a particular set of norms, values, interests, and emotions that influence the risk perception of individuals [14].

Understanding the perceived risk regarding terrorism is important to comprehend how people respond to such threats which will ultimately affect public preparedness for, responses to and recovery from disasters [9,15]. In addition, a prediction of people's reaction to a threat can help public officials and researchers to develop proper communication and education strategies and provide guidance to crisis-response efforts and risk-communication prior to or after a serious impact [16,17]. This view is supported by Burns [18] and Hoorens [19] who state that more attention needs to be paid to why and how individuals may differ in their response and risk perception towards hazards.

Iraq is a country that is highly affected by terrorist attacks. Iraq has been a terrorist target since the US invasion in 2003, and it has been facing intensive terrorist attacks since that time. According to IEP [20] despite a fall in the number of deaths from terrorism overall, Iraq maintained its position as the second most impacted country by terrorism, for the second consecutive year. In Iraq, between 2009 and mid-2016, incidents caused by terrorism reached 272,785 incidents with different types of terrorist attacks, mainly because of the weakness of security and political instability as well as the war against the so-called Islamic State [21]. Such incidents caused 92,453 people to lose their lives and 301,962 suffering injuries between April 2004 and mid-2016. This huge number of killed and injured people due to terrorist attacks generates a vast challenge to responders while responding to these attacks [22]. Accordingly, this study investigates the 'risk perception' of a community when responding immediately after a terrorist attack in Iraq. The study is based on a terrorist attack carried out at the Hilla Textile Company in Iraq in 2010 with four separate, sequential bombings that killed more than 30 people.

The paper is structured as follows. First, the paper explores definitions of risk perception and factors that could affect the risk perception. This is followed with a discussion on the research methodology adopted. Next, a brief description to the case study is given followed by the findings of the study that emerged from the primary data given, analysed and discussed, in order to draw the final conclusions.

### 1.1. Defining risk perception

The research on risk perception is concerned with the way in which individuals differentiate and assess risks. Wachinger and Renn [7] define risk perception as the assessment of people on how the level of risks are perceived and understood based on their knowledge, experience, values, attitudes, and feelings. Slovic and Weber [6] argue that both beliefs and self-appraisal therefore shape the process of risk perception. Hoorens [19] explains risk perception as an assessment of likely outcomes, should a particular course of action be followed to address a certain risk.

In addition to the various definitions of risk perception, Slovic [15] points out that the instinctual judgements of risk made by individuals and groups take place in the presence of limited and unclear information. There is therefore considerable variation between individuals as assessments are made on the basis of varying levels of information and certainty, instinctive behaviours, and vested interests and configurations of power [23].

Risk perception itself, however, is a subjective judgement as to the likelihood of a particular negative consequence occurring and the extent to which this matters to those concerned [24]. The consensus therefore is that risk perception is a subjective phenomenon which is not concerned with actual risk. Nevertheless, it shapes how people will subsequently react to the risk [9,19,25,26].

### 1.2. Factors affecting risk perception

A number of factors influence the risk perception of people when responding to disasters. One such factor identified by several authors is the knowledge regarding the hazard [9,10,16,24,27]. According to Kates [10]; the severity of the hazard, and knowledge of the hazard in terms of magnitude, rate of recurrence and temporary spacing, could all influence the risk perception. The knowledge about the hazard could be acquired through education and training, based on the traditional knowledge conveyed from generation to generation as well as past experience [7,9,10,16,18,28,29]. Often the knowledge about the hazard could positively or negatively influence the behaviour of people when being subjected to disasters. Further, Ropeik [30] states that an individual is less likely to be afraid if a person feels as though she or he can control the outcome of a hazard.

Jenkin [16] asserts that knowledge regarding a hazard is also related to 'signal value'. Jenkin [16]; p. 9) claims that an event is high in signal value, "if its occurrence changes the perceived probability of future occurrences". Further, a new hazard is high in signal value due to lack of awareness/knowledge regarding the hazard whereas the familiarity of a hazard will have a low signal value. Similar to the views of Jenkin [16]; Barnett and Breakwell [31] propose that novel information can be considered as a key to intensify perceived risk, whereas confirmatory information has little influence on risk perception. Wachinger & Renn [7] view informational factors such

as source and level of information, media coverage, and involvement of experts in risk management all influence risk perception for people. Yet, the source and type of information has been identified as low influencing factors on risk perception [32] due to the differences in perceived trustworthiness of authorities in providing the information [7].

Studies show that, the experience of first responders in helping out during disasters and emergencies has led them to create a new type of social group among survivors. Drury et al. [14] state that within these ‘first responder survivor groups’, boundaries between individual differences erode because of the common experience and a shared fate, causing the emergence of disaster communities. Generally, people prepare for an immediate threat when there is a real risk. This helps endow people to control their perceived threat [33].

Based on Ferrari [34] views, the way people perceive the risk is deeply influenced by the emotions resulting from stress affecting our minds when facing a dangerous situation. Therefore, the first reactions are emotional when people are in a risky position or face a threat [35]. Despite the fact that emotions like fear and anger are caused by awareness or anticipation of danger, Lerner and Keltner [36] found that fear and anger have opposite effects on risk perception. Oppositely, Jenkin [16] found that perceived risk of crime is positively related to fear of crime. One of the characteristics that has been linked to lay perceptions of risk is the amount of anxiety associated with the hazard [28].

According to Jenkin [16] intra-personal factors such as demographics and socio-psychological variables of individuals affect risk perception when responding to disasters. For example, gender, race, age, and profession are all linked with people’s perceptions of risk. Slovic [15]; Wachinger and Renn [7] and Dryhurst et al. [37] linked risk judgments to gender (women judge risk to be higher than men) and race (minorities judge risk as higher) based on their studies. Socio-psychological factors determine how people think about, influence, and relate to one another and how individual minds work in the actual, implied and imagined presence of others [38]. Paleo [33] ascertains that socio-physiology is an interplay between motivational factors (beliefs, wishes, desires) and cognitive factors (the way our mind works) in the presence of a stimuli. In this regard, Sugiura et al. [39]; identify personality factors such as leadership and altruism, which influence people to help each other; and etiquette, stubbornness, and emotional regulation, which impact on the support offered during emergency situations. Staub and Vollhardt [40] supported this view and added if someone has suffered violence, they might become more caring and helpful (more altruistic), born out of their suffering. Abrahms, Dau, and Moore [41] stated that the Paris attacks that killed 130 people on November 13, 2015, also elicited altruism for the local population.

Further, according to Slovic [15]; the risk perception of people is affected by worldviews and ideologies they hold regarding the

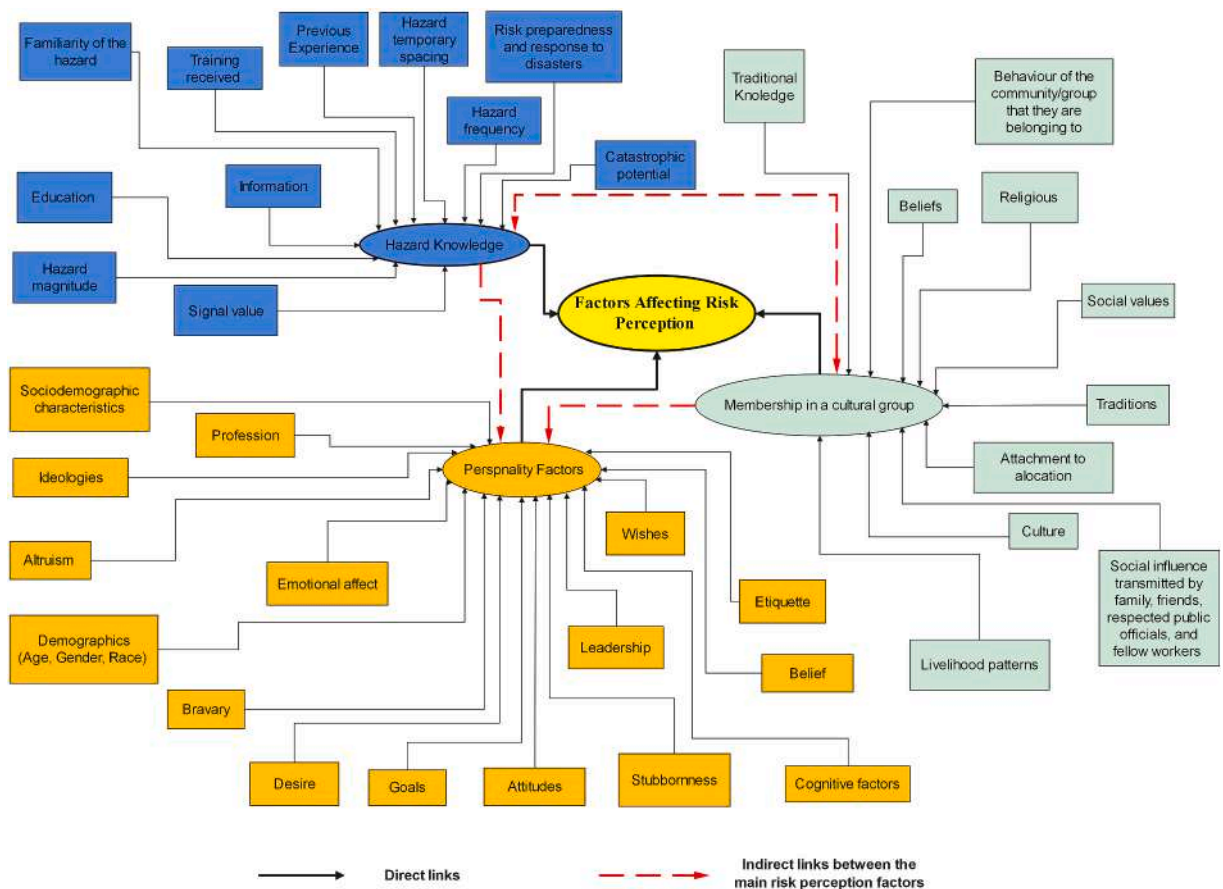


Fig. 1. Factors affecting risk perception.

environment in which they live. These worldviews and ideologies could be influenced by societal values, social influences transmitted by the family, friends and fellow workers [37].

Anthropologists show that behaviour of people when facing a hazard can be influenced by cultural factors, such as religious beliefs, social values, attachment to a location, and traditions. People, during a hazardous situation, not only assess the danger that they could face, but give a preference for these cultural factors [8,42,43]. Further, social learning and cultural adherence are closely tied to perceived risk and various kinds of risks might depend on whether one is socially participating and which groups one belongs to. Kulatunga [11] added that behaviour of the 'group' that people belong to influence the risk perception of people. Similarly, Short [27] indicated that social influence transmitted by family, friends, respected public officials, and fellow workers might affect individuals' risk perceptions which may form the rationale for certain behaviours. Moreover, a number of studies predict a strong correlation between an organization's values and culture and that organization's behaviour during the response phase [44].

In addition to the aforementioned factors, according to Sjöberg [45]; trust is often held to be of crucial importance for the understanding of risk perception. Ropeik [30] asserts that trust placed on the people who are informing of the risk, the authorities who are protecting the responders and the process determining the exposure to a risk, all influence the risk perception of people. Fatalism and denial have also been identified as factors that influence risk perception in people. The studies of [11]; Drabek (1986) and Auf der Heide [35] revealed how people accepted an incoming risk by considering it as an act of God, or as a result of fate which cannot be avoided.

Therefore, many factors have been identified by various scholars that are said to influence the risk perception in people. By considering the similarities and their key characteristics, these factors have been broadly divided into three main themes namely (refer to Fig. 1);

1. Knowledge about the hazard
2. Personality factors
3. Membership in a cultural group

The authors argue that, despite categorising these factors under the aforementioned three main groups, there can be interconnections between them; they are not mutually exclusive groups. For example, the knowledge regarding hazards could be transferred from generation to generation; hence membership in a particular cultural group could indirectly influence the 'knowledge about the hazard'. Similarly, the ideologies, worldviews, attitudes, wishes, desires, and leadership characteristics within the personality factors can change, evolving with the influence of membership in a cultural group. Further, the knowledge about a hazard could also influence some of the personality factors, such as attitudes, leadership, altruism, emotions, stubbornness etc when responding to disaster situations.

### 1.3. Influence of culture when helping terrorist victims

It can be argued that culture influences the way people respond when helping terrorist victims, as demonstrated by Helsloot and Ruitenbergh [46]; who outlined that people will probably react to disastrous events as their ancestors did. Despite the common belief that people will panic, research suggests most of them respond rationally. If a disaster is sudden with little time to prepare, as in a terrorist attack, people will react quickly and intuitively, enabling them to make an effective response. Unfortunately, erroneous myths regarding people's behaviour in an emergency, which have been invalidated by research, still shape how governments prepare for disasters [46]. Furthermore, communication among scientists and the public could be impeded, rather than helped, by the influence of established cultural systems [47–49]. Socio-cultural variables like gender, class, and race shape notions of vulnerability and perceptions of risk [50–52] all cited in Ref. [53]. Based on these dimensions, it becomes possible to predict who will suffer most during a disaster, especially given the outcomes of similar previous experiences [54].

### 1.4. Social dimensions of responses to terrorist attacks

Social psychology has provided much evidence explaining the behaviour of those who respond to disasters immediately. Such explanations are grounded in social psychological processes, mainly the roles played by norms and identities. The assumptions made by professional bodies are particularly important regarding such factors, as these drive policies concerning preparation, response, and subsequent recovery. Such assumptions subsequently shape how people behave as immediate responders [14]. However, responders' experiences should also be incorporated into training and guidance for emergencies to nurture collective psychosocial resilience. The latter is defined as how a common identity enables a particular cohort of survivors to demonstrate cohesion and togetherness, thereby organising and utilising joint support sources. Overall, our recommendations and the associated evidence will assist professionals in fostering resilience among the public, and enabling them to exhibit such behaviour during emergencies [14,33,55,56].

### 1.5. Theory of Planned Behaviour (TPB)

The TPB is an extension of an earlier model, the Theory of Reasoned Action (TRA) [57]. The TRA assumes that people's intentions to engage in a certain form of behaviour are shaped by their attitudes towards the behaviour and subjective norms, which are beliefs about the way other people will react to that behaviour [58]. The TPB extended the TRA by incorporating behavioural beliefs (about the consequences of actions), normative beliefs (about the typical expectations of others regarding the behaviour) and control beliefs (about the factors that may enable or obstruct engagement in the behaviour). Behavioural beliefs result in either a positive or negative attitude towards the behaviour; normative beliefs create perceived social pressure (subjective norms); and control beliefs underpin perceived self-efficacy or behavioural control (see Fig. 2). In addition, the perception of behavioural control moderates the influence of

both subjective norms and attitudes or intentions to engage in a behaviour [59].

Accordingly, this study adopts the TPB model by considering risk perception and knowledge in enhancing the understanding of the people who respond during terrorist attacks. Zhu, Yao, Guo, and Wang [61] expressed that the adoption of the TPB model, that combines risk perception and knowledge, can provide a good explanation of people's perceived behaviour. Considering the way people perceive risks will influence their response and adopted behaviours. As a result, perception of risk greatly influences TPB conception [61]. Zhu et al. [61] show that risk perception is significantly positive in predicting attitude and behavioural intention.

## 2. Methodology

### 2.1. Methodological design

Risk perception is subjective and based on the characteristics of individuals and the way different people perceive it. Further, studying the risk perception when responding to terrorist attacks requires an in-depth understanding of social reality, through the attitudes and behaviours of individuals. Hence, the study takes the interpretivist philosophical stance.

An abductive research approach was used to investigate the risk perception phenomena of this study. Saunders, Lewis, and Thornhill [62] have defined abduction as a combination of the inductive and deductive research approaches which allows the elicitation of empirical results by referring back and forth between the theory and practice. The essential objective of the abductive approach leans to determining new outcomes through the understanding of the existing or new phenomena in an unprecedented way [63,64]. Therefore, the theoretical underpinning related to factors affecting risk perception were first deduced from secondary literature, which included books, journals, theses, conference proceedings, and websites. Following that, the identified factors were further explored through primary data collection within the context of Iraq. The primary data collection facilitated the emergence of new factors that were unique to the Iraqi context.

### 2.2. Study area

According to Yin [65] a single case study is suitable for a *critical, unusual, common, revelatory or longitudinal case*. This study falls within the 'unique case' context as its scenario consist of four separate, sequential bombings that happened at the Hilla Textile Company in Iraq. This attack was qualitatively different from those in the past. The terror attack in the Hilla Textile Company was selected because of its uniqueness in terms of the scenario: four sequential bombings – refer to Fig. 3, the timing, the number of people it targeted and the types of vehicles/targets (the terrorists used different kinds of bomb vehicles to plant the bombs). Further, the researchers got the rare opportunity of collecting information from a terrorist attack context in Iraq, which were generally not accessible. Therefore, the 2010 attack fits Yin's [65] definition of being unique.

The in-depth investigation of the single case study led the authors to obtain a full understanding of such unique phenomenon under exceptional circumstances. Consequently, the existing knowledge can be expanded through the investigation of such a unique case and the risk perception of an unstudied population similar to Hilla. The case study boundary was considered as the terrorist attack which occurred at the Hilla Textile Company. Risk perception when responding to the terrorist attack at the Hilla Textile Company was considered as the unit of analysis for the study. Primary data were collected from individuals who were involved in responding to this attack. Based on Baxter and Eyles [66]; it is possible that the experiences of a small sub-group may be common to a larger group because meanings can be reconstructed by a qualitative study when applying to the experiences of a small sub-group. These meanings are often shared by many individuals hence can be generalised to a wider context.

### 2.3. Data collection process

A storytelling data collection method was used to extract information and to examine how the people perceive risks when responding to terrorist attacks despite the fact that they may be targeted by other sequential bombings. Storytelling can be used as a research tool to extract information about public knowledge, behaviour and attitudes [67], hence it was suitable to gain insights into community risk perception. According to McCall et al. [67]; to examine public perceptions of the issues at stake, a storytelling approach can be used as an alternative to, or to complement, other conventional qualitative research methods. An understanding of behaviours might be improved by developing a potential storytelling intervention. Wilson [68] agreed with the aforementioned view and added: storytelling and stories can help the researchers to make sense of experiences and thoughts, interactions with each other

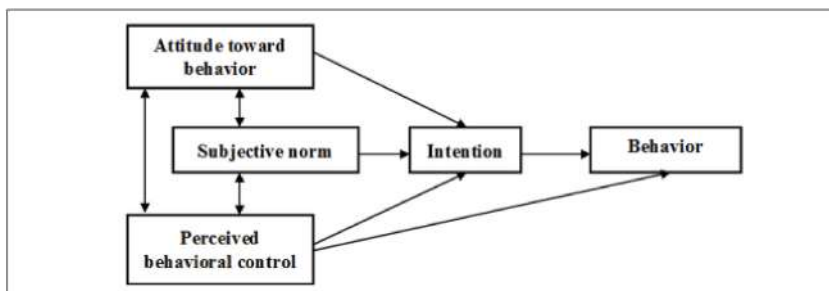


Fig. 2. Theory of planned behaviour – TPB [60].





Fig. 3. Location in Hilla textile company where the four bombs exploded at the time of shift change over, 2010.

and the environment, to formulate identities, beliefs and values. Accordingly, storytelling is a space to explore beliefs, ideas, morals, a space for debating, arguing and, eventually, for discriminating between lies and truth [68]. Within the context of this study, storytelling led to articulate and understand the risk perception of first responders when responding to terrorist attacks. Storytelling helped to elicit the actual experiences of the respondents and to gain distinctive insights into the behaviours and perceptions of responders and what factors underpinned their perception.

To increase robustness and acceptability of the findings, the findings were triangulated by the sources of data, namely official disaster responders and instantaneous volunteers. Additionally, primary data (gathered through story telling) and secondary data (which included existing information in archival records and documents) were also triangulated in order to get a fuller picture and an in-depth understanding of the issue under consideration.

#### 2.4. Respondents

This research gathered data from 10 respondents consisting of six disaster responders (denoted as R followed with a number) and four instantaneous volunteers (denoted as C and a number) who helped the injured people after the terrorist attack. In a qualitative study, it is important to consider the in-depth nature of the investigation, appropriateness of the respondents and how informative the sample was rather than the size of it [62,69]. In order to obtain rich and specialised data related to the research, a combination of purposive sampling and a snowballing sampling technique were used to select the respondents [62,70]. The respondents were approached through personal connections and personal referrals by people who were known to the researchers. The invitation letters and information sheets were sent to the respondent prior to the scheduling the data collection.

Table 1 illustrates the demographic factors of the 10 respondents. It also shows the differences in the level of formal training between the disaster responders and the instantaneous volunteers despite the fact that some of the instantaneous volunteers had previous military training. Formal training consisted of training courses and workshops conducted inside and outside of Iraq, in first aid, rescue, evacuation, and disaster medicine to train staff of the Civil Defence Directorate to perform the duties mandated.

Before starting the data collection, informed consent from the respondents was obtained, which clearly stated that their participation in the study was voluntarily and that they could withdraw from the study at any time. Before and during the data collection, a good rapport with the respondents was built so that they were in a position to open up and provide honest information. Each

Table 1  
Demographic factors for disaster responders to the Hilla textile company attack, 2010.

Respondents	Workplace	Sex	Code	Disaster Response Experience	Formal Training	Military Experience
<b>Official Disaster Responders</b>	Civil Defence Directorate	Male	R1	13	Continuous training and Workshops conducted inside and outside Iraq	7
			R2	14		5
			R3	14		/
			R4	14		/
			R5	27		3
			R6	15		10
<b>Instantaneous Volunteers</b>	Explosive Ordnance Disposal Department (EOD) Hilla Textile Company	Male	C1	/	/	5
			C2	/	/	6
			C3	/	/	/
			C4	/	/	/

storytelling took between 35 and 45 min, where feedback (extensive notes of respondents' respective stories) was obtained at the same time. The story telling was carried out in the Arabic language as the respondents were more comfortable with their local language.

When no new emerging themes evolve from the data collection and no new information is received, then the point of saturation had been achieved [62,70,71]. Accordingly, the authors ensured that they selected an appropriate sample for the data collection. A minimum sample size for a non-probability sample in a qualitative in-depth study ranges between 5 and 25 according to Saunders et al. [62].

### 2.5. Ethics

As sensitive data were gathered in the study relating to the terrorist attack, informed consent from the participants was obtained prior to collecting the data. In addition to stating that respondents could withdraw at any time, it was also made clear that the data gathered from the study would only be used for the purpose of this research. As the respondents could get emotional when telling their story, given the sensitive nature of the situations that they have undergone, the authors decided not to tape-record their stories. Under the given circumstances, it was felt that keeping a 'blue-print' of their emotions on record or capturing the nervousness of their voices would make them uncomfortable. Hence, with the purpose of making the atmosphere as relaxed as possible and showing respect to their feelings as a free flow of their ideas was more important, tape-recording was not carried out. The studies of Rapley [72]; Rutakunwa et al. [73] also have revealed that trust of the respondents can be obtained more when they are not tape-recorded. Instead, permission was taken to take comprehensive notes of their respective stories, together with direct quotes. Response anonymity was also guaranteed by using codes when reporting quotes in this research. The information collected from such people helped the researchers to have an insight into the risk perception of people at the scene of a terrorist attack, when there is the possibility of further atrocities.

### 2.6. Maintaining rigour in the study

The validity and reliability of the study outcome was maintained through a number of means, such as triangulation of the data set through multiple ways, in-depth coding, back translation, and member checking. They are discussed in detail below.

To interpret the first responders' experience of a terrorist attack and their willingness to help, and to ensure validity of the qualitative interviews, authors have accessed two different types of respondents: the disaster responders and the instantaneous volunteers, despite the difficulties in approaching them after more than ten years. Further, face-to-face interviews were also conducted with the respondents to capture the true picture of the situation that the respondents have undergone. According to Baxter and Eyles [74]; in-depth, face-to-face interviews are valuable for exploring the meaning of risk, since multiple meanings may be expressed through language. Baxter and Eyles [66] added that the reconstruction of meanings can be gained by concepts that emerged from conversations through narratives or stories.

The coding of the interview transcripts were carried out in three stages: open coding, axial coding and selective coding [62]. By using open coding, each line of the transcript has been scrutinised and coded. Next, the axial coding was performed by capturing the main themes in the data. After that, by refining the codes, the most compelling and clearly emergent topics were highlighted, for selective coding.

Direct paper transcription was used to text answers and any other comments. After that, paper transcription, which was in Arabic, was translated to the English language for analysis purposes. In order to increase the validity and reliability of the data, a back translation technique was conducted [75] to translate the content of interviews in Arabic and English. Such a process is achieved by taking the translated version of document and having an independent translator, with no prior knowledge of the original content. With translating it back into the original language, any errors, ambiguities or confusion can be identified and an insight into the final target language translation can be gained.

Member checking of the data is also carried out to ensure what is being reported is a true account of the respondents. A qualitative study of this nature raises issues related to the positionality of the researchers. As discussed by Greenbank [76]; May and Perry [77]; the researchers' views about a particular circumstance could influence the design, execution and interpretation of the data. Further, the data collection was carried out by a native researcher based in Iraq who has witnessed terrorist attacks for more than fifteen years. The cultural and situational context has also been familiar to the said author. The two other researchers are also aware of terrorist attacks but do not come from the same cultural background nor are familiar with some of the root causes leading to risk perception when responding to terrorist attacks. Considering these conditions, it is acknowledged that there could be certain interpretations from the researchers themselves for the interpretation of the findings. As the study falls within the interpretivist stance, this fact is acknowledged from the philosophical perspective as well [62]. However, the involvement of multiple researchers in designing, executing and interpreting the data lead to minimise any biases and/or positioning the research towards a single point of view. Further, the use of direct quotes from respondents provides a true reflection of the respondents' views whether the findings are derived/based on official disaster responders and instantaneous volunteers or primary and secondary data. Hence, for the study under consideration, positionality of researchers could influence qualitative work evaluation which might consequently strengthen the findings.

## 3. Data analysis

### 3.1. Case study background

This study focuses on a terrorist attack at the Hilla Textile Company, which is a government organisation in the centre of Babylon, Iraq. Hilla is the capital of the province of Babylon, which lies 100 km south of Baghdad, the capital of Iraq. This attack targeted the company workers who intended to leave their workplace at the end of the working day on 10<sup>th</sup> May 2010. This attack was made up of

four separate, sequential bombings, planted in buses and cars that were parked outside the gates of the company at the time of shift change over, causing more than 30 deaths and hundreds being injured. The attack was initiated as a sequential bombing beginning with two car bombs at 1:30 p.m., which exploded at the same time as targeting the worker's buses causing the burning of three buses with the workers inside. These two car bombs were followed by a third explosion targeting the responders who arrived at the scene which made casualty numbers rise further. After that, when all the agencies who are responsible to respond to such attacks arrived at the scene, in addition to one of the Parliament members and press, a fourth bomb exploded targeting more victims. Immediately after the first two car bombs and before the responders arrived at the scene, some workers tried to help and rescue the victims despite the fact that they knew they may be targeted by other suicide bombers or other explosions, which is sadly likely to happen in terrorist attacks in Iraq.

### 3.2. Results

The primary data revealed that personality factors of the Iraqi people have governed their behaviour to help the victims. R3 mentioned that people have made exceptional efforts to help the victims even by risking their own lives. R3 gave an example to further elaborate this "... our colleagues used their bodies as a protective shield to protect the innocent people when they were attacked with suicide bombers. They knew they would even lose their lives". The majority of the respondents stated that willingness to help the victims is at the centre of the Iraqi people, hence even during the difficult times, people wanted to save the lives of the victims. Further, some of the respondents mentioned that such attacks are part of their lives, thus making them "used to such situations".

Assisting victims during terrorist activities is typically a complex problem with dire consequences. R2, R5, R6, and C2 pointed out that bravery and altruism of the Iraqi people have influenced the way that they help and assist the evacuation of the victims from the emergency area. R5 confirmed this point and added "iconic people in our religion taught us how to be courageous and strive to help people, no matter what the impact would be on our lives". R1 agreed with this point and added: "the Arab nobility, magnanimity and humanity inherited from our fathers and grandparents and the way we were raised helped us a lot in helping the victims". Further, the majority of the respondents had the same opinion regarding the influence of humanity on the behaviour of people when they attempt to help the victims. R2 explained that the most influencing motivating factor is humanity, saying "Humanity comes first and then the Iraqi ways, in addition to courage, and ethics". R4 opined that "our religion pushes me towards the best in honesty and loyalty and save the lives and property of people". Therefore, loyalty to people and nation is a positive feature that encourages people to react without hesitation in facing all types of emergencies.

Primary data also showed that religious factors have a high impact on motivating people to help victims when the attacks happened, despite the fact that there could be subsequent bomb attacks which could harm the lives of the people who were helping. All the respondents agree that Islamic religion pushes people to save the lives and property of victims through its directive via Quranic Text, Prophet Muhammad's Speech. R2 supported this view and believes that "my religion encourages me to save lives of the people". R3 attributed the willingness in helping victims to the fear of God, stating that "... the most important thing is fear of God and his courage to save more lives". R1, R2, and C1 went on to add a Quranic text about the importance of reviving the soul as in Surat Al-Ma'idah, verse 32, "(32) Because of that, we decreed upon the Children of Israel that whoever kills a soul unless for a soul or for corruption [done] in the land - it is as if he had slain mankind entirely. And whoever saves one - it is as if he had saved mankind entirely. And our messengers had certainly come to them with clear proof. Then indeed many of them, [even] after that, throughout the land, were transgressors". R4, R6, on the other hand, highlighted Prophet Muhammad's Speech which praise the people who have mastered their job "May God have mercy on a person who did a job and mastered it". Moreover, R5 put emphasis on the honourable biography of the iconic people in Islamic religion, Prophet Muhammad, his cousins Ali, and his grandson Hussein and its effective role in enhancing disaster response performance. Such biographies of religious leaders have a great influence on people to be chivalrous, courageous, and giving. R5 briefly explained that "through their very well-known honourable biography in braveness, they taught us how to have courage and strive to help people, no matter what the outcome is". R6 acknowledged "Prophet Muhammad's path of constantly urging to help others, especially those in need, without thinking of what you can get in return guided us when helping these victims."

The aftermath of the incident was such that people from different religious sects, working together, side by side to help victims regardless of their sects, beliefs or religion. This was explained by C3 as "Islamic religion encourages the equality between people and humanity". Adding to that, R6 mentioned that "we are a team composed of several religious sects including Sunni/Shia/Christian. We never think that this factor affects the way we work together."

In terms of social influencing factors, all of the respondents stressed the effective role of upbringing in the Iraqi people with humanity. R4 added that "we have been raised from generation to generation in such a way that is necessary in our work as it planted the spirit of cooperation among people in addition to the magnanimity and chivalry in our dealings". R3 gave an important reason for helping people: "The love of the job or the love of human work both drives me to excel in the performance of my duty". C1 also touched on this point in saying "I can't leave the scene without giving a hand because I love humanitarian work". R6, on the other hand, presented another point; "the individual and social relations among the team members have a significant role in stimulating the work" as they encourage each other to do the best they can and forget the risk of sequential bombing. This subsequently raises morale between the team. R4 and R6 raise a different point that motivates them in their work "Even though it is my duty, but when I see people thanking me and praising me, it motivates me to work more and forget all the risks" commented R4. R3 also mentioned that such recognition given by authority motivates them to continuously engage in responding during terrorist attacks.

The primary data indicated that, in the context of situational factors, when attacks happen, disaster responders are usually going to the scene outside of their official working hours or during their vacations. R2 asserts this point stating that "we often catch up with our duty without any order or direction, as soon as we hear an explosion". Despite the fact that rushing to the scene without wearing their



official uniform might make them vulnerable to different kinds of risks, they prefer being at the scene as soon as possible, because a minute of delay might cause loss of lives. R6 gave an example to further elaborate this: "I remember one of our colleagues left his family at the time of his vacation and entered the site of the bombing and got killed in the second serial bombing leaving behind a family of five people". C2 explained that "once I left my belongings exposed to looting and joined the rescue teams". This huge sacrifice of lives and properties is given not only from disaster responders but from communities who refuse to leave without helping the victims.

Within the context of social values, the primary data display that social values have a notable effect on communities' bravery and quick reactions when responding to terrorist attacks. Most of the respondents emphasised their 'beliefs' due to its role in persuading people to help victims at the terrorist attack. R3 touched on this point saying: "beliefs have helped me a lot in my performance". Not only beliefs but also social norms have a significant role in promoting communities to help people, especially women and vulnerable people, as mentioned by R1. Communities acquire moral and human values from their families and society. Consequently, the morals of people are shaped according to the type of civilization or society in which they are born or brought up in. In Iraqi society, they are encouraged to regulate individual and community behaviour under any circumstances. C1 briefly explained "because of the human and moral values that we were brought up in, helping people became our target under any circumstances". Agreeing with this, R5 stated that on the traditions of our Eastern society because of its effective role in shaping the personalities of human beings and urging them to increase interconnectedness between members of the same society and adhering to the basic rules of society, such as preserving women and providing assistance for those in need in difficult times. C3 touched on this point in saying "... I will help people even there is another explosion, especially the women, due to the traditions of our Eastern society, which recommends protecting women". Moreover, R1, R3, and R4 attributed the willingness of communities to stay at the scene and helping victims to "respect duty towards Iraq and my society so I have to perform my duty to the fullest" R1. R4 supported this point and believes that "the most important thing is to complete my duty in the best way possible".

The primary data confirmed that despite the psychological breakdowns and emotional impacts the responding people could have, they insisted on continuing their work and helping others. Some of the communities got hysteria and suffered psychological breakdowns, especially when they lost their loved ones at the scene. In this regard, R4 mentioned that, "when I get back from any terrorist attack and when I see the brutality of the attack, I feel myself being under high pressure, which I cannot easily get rid of, unless I isolate myself in a room and start to cry for about 15 min". R3 further added that "I have full conviction that we may be subjected to physical or psychological damage or are likely to lose our lives as well when helping the victims ... yet; I want to be at the scene and help the victims".

Because of the longstanding conflict and numerous wars in Iraq, people gained military training. Such training has a positive impact on disaster responders and communities on their willingness to help. R1 commented that "I have a previous military training that helped me a lot in my work ... therefore, I was very active to volunteer to help the victims". Further, R6 commented that "We expect any scenario to occur and we are aware of these scenarios because of our rich or accumulated previous experience". Further, one of the respondents mentioned how the knowledge and experience passed from generations helped him to help the victims during the difficult times. "Knowledge that I inherited from generation to generation improved my human sense of people this led me to help the victims of the attack in a successful manner".

The study further revealed how knowledge about the hazard and previous experience have helped them to be cautious when helping the victims. R3 mentioned that his brother was killed in a previous sequential bombing. Therefore, he mentioned that he is very cautious when performing his duties in these types of attacks. Moreover, awareness of the potential risk of further attacks stimulates responders to speed up the evacuation process as well as to be more cautious of the risk of sequential bombing. R2, R3, R4, R6, and C4 agreed with this view stating that "certainly this knowledge helps me to evacuate the area quickly and my response to the incident has been promoted with more caution, conscious thinking and vigilance" R2. R4 went on to add "it makes me more cautious in saving more lives and speed up the evacuation of people".

One of the interesting findings derived from the study is that, despite the knowledge regarding possible life threats and other issues they could encounter, people volunteering to help the victims. "...this is the nature of my work and I am used to face these risks ... facing these risks has become normal for me" commented R1. Some of the respondents mentioned that even though they have been injured in previous incidents; they were not reluctant to help the victims. "I was injured in my head in a previous sequential attack" stated R2 "...however, I was willingly helping the victims .... I think it was do to do with our culture".

Interestingly, primary data related to trust factors showed that despite the fact that Iraq consists of different tribes, different religions, and different sectors within the same religion, Iraqi people still have a full trust of disaster responders and people willing to help. Sometimes, one response team can be composed of several religious sects including Sunni/Shia/Christian but they act in the same way that they would respond during a disaster to help victims from any sect or tribe or religion. R5 confirmed this point stating: "We respond to any human being regardless of gender, tribe or religion". R1 had the same opinion, saying "Tribalism or sectarianism has no impact on my trust in my colleagues or on my work". R3 agreed with the aforementioned views and gives an interesting example "There is no effect of any race, gender, tribe or religion on my method of rescue. One day, I lifted the body of a terrorist without identifying who he is".

By synthesising the aforementioned factors, they were categorised as (a) Personality Factors, (b) Hazard Knowledge and (c) Membership in a cultural group as indicated in Fig. 4.

### 3.3. Discussion

The primary data revealed how different factors have influenced the risk perception of Iraqi people when responding to a terrorist attack. The section below provides a detailed discussion on these factors.

The study revealed how the knowledge about the hazard has sharpened the risk perception of the Iraqi people when helping the



other members.

Within the context of natural hazards, studies have shown that previous negative experience of getting affected has influenced people to 'stay away' from the natural disaster and take precautionary measures to avoid risk of losing life [81,82]. In opposition to this, the findings of this study revealed that the risk perception of people was formed when responding to terrorist attacks in helping the victims. Authors argue that, the urge of helping the victims despite various threats to their lives could be as a result of the social values of the Iraqi people and their personality factors such as emotions, leadership and altruism. In fact, the findings highlighted that the previous negative impacts regarding the terrorist attacks such as losing their loved one motivated the respondents when helping the victims. Therefore, it can be argued that the perceived risk during a natural hazard is different to perceived risk during terrorist attacks.

It was evident that responders evacuate any human being regardless of their gender, tribe or religion despite the fact that Iraq consists of different tribes, religions, and sectors within the same religion. In some cases, one response team can be composed of several religious sects including Sunni/Shia/Christian but they act the same way that they would respond during a disaster to help victims from any sect or tribe or religion. Therefore, Iraqi people still have a trust regarding the official disaster responders and the volunteers who helped. Subsequently, such trust might positively affect the risk perceptions of victims. Jenkin [16] agreed with this view stating that it is vital that agencies and persons responsible for initiatives such as evacuating, communicating, sheltering, educating during terrorist attacks maintain trust with the public, as a lack of credibility in such initiatives will have minimal effects on public risk perceptions.

Empirical evidence clearly indicated how emotions drive the risk perception of people. Despite the fact that some of the respondents got injured during previous attacks, they were still actively involved in the evacuate and help victims. Therefore, it is evident that emotions of the people are influenced from their past negative experience of losing loved ones and getting themselves injured which has an impact on the risk perception of the responders and makes their behaviour more positive to help the victims as much as possible. Auf der Heide [35] states that terrorism is considered as a difficult kind of a risk to predict and prevent, thus it creates a greater emotional impact. According to Kinateder, Kuligowski, Reneke, and Peacock [83]; emotional states in the course of a fire emergency revealed that high arousal and state of anxiety increase the perceived risk and makes them more active in helping the victims. From the current context of responding to the COVID pandemic, it was evident how the risk perception of healthcare workers was driven by the emotions [84].

Similar to the emotions of the responders, the empirical evidence also indicated that fear and anger at the scene of the terrorist incident also influenced the risk perception of the responders. Lawrence et al. [82] state that people are more likely to be motivated when facing fear or anxiety due to a hazard. This is because, at the presence of a stimuli, the cognitive process in the mind influences and motivates personality factors such as desires, emotions, wishes and feelings. Furthermore, Ferrari [34] added that the ways we perceive the risk, when facing a dangerous situation, are deeply influenced by the stress affecting our minds, because such a dangerous situation triggers a host of feelings, which in turn influences directly our risk perception.

The study also showed how fatalism and denial has influenced the risk perception. As Iraqi people have been facing terrorist attacks for more than ten years, they are used to facing these risks. Therefore, facing these risks has become normal for them because they consider such risks as a part of their lives. According to Kates [10] fate control is one of the factors that could directly affect the people's risk perception when exposing to a hazard. Similarly, Auf der Heide [35] stated that people living in high-risk areas accept the threat more philosophically. Further, events such as the ISIS atrocities or 9/11 which were once considered improbable have become a reality. Therefore, such attacks might hold less of a shock now than they used to. This is because people have adapted to the probability of a recurrence of events which may have looked implausible a few decades ago. Based on Tur-Sinai [85] the longer the terror attacks continue, the more the community accepts the likelihood that it will be in this situation for the long term.

The study also revealed that 'social values' acquired through culture, religion and 'social recognition' have influenced the risk perception of people when responding to disasters. This was particularly evident in how the iconic personalities in the Islamic religion, and Iraqi history/culture have inspired the attitudes and perceptions when helping the victims. In Iraq, the culture of the community is such that they can't leave people who need help without helping under any circumstances, which is referred to here as Iraqi Jealousy (there is no direct translation in English). These characteristics of the Iraqi society have effectively affected the response of the respondents in times of disaster and shaped their humanitarian ethos. Qasim et al. [78] support this view and believe that risk acceptance and risk perceptions have their origin in the cultural and social values in the society. Moreover (Kulatunga [11,43]), noted that cultural aspects such as values, beliefs, and behaviour of the group/community that they are belonging to can influence the risk perception of people.

The study also showed how individual and social relations among the team members have influenced the risk perception. By encouraging each other, morale between the team members can rise, which might make them more cautious or make them forget the risk of sequential bombing. Therefore, such relationships and teamwork style have a significant role in stimulating the response actions and to do their best in helping victims. Similarly, Kinateder et al. [83] mentioned that, during a fire emergency, perceived risk in occupant groups was higher than occupants who are alone. Further, Trumbo and McComas [86] agree with this view stating that occupants who grouped together during the evacuation from WTC 1 on September 11, 2001, reported higher perceived risk.

One of the interesting outcomes of the empirical evidence is how closely the outcomes of the study are aligned with the Theory of Planned Behaviour (TPB). Within the TPB, there are three main components influencing people's behaviour: attitudes, subjective norms and perceived behavioural control [87,88]. The three key categories of risk perception derived from the study, namely personality factors, membership in a cultural group and knowledge about the hazard are closely aligned with the three main components of TPB; attitudes, subjective norms and perceived behaviour control respectively as indicated in Fig. 5.

Accordingly, it can be seen that the key categories of risk perception; knowledge about the hazard, personality factors and

membership in a cultural group have influenced the intension of the respondents of helping the victims that have been ultimately demonstrated through their behaviour. According to Kinateder et al. [83]; perceived behavioural control of TPB influences the risk perception and influences people to take a decision. This was evident from the findings of the study as well. For example, when the respondents have knowledge about the terrorist attack through past experience and are trained during their military training, they felt more confident in helping the victims. According to TPB, the greater the extent to which a behaviour is perceived as favourable, and the stronger the subjective norms and perceived behavioural control, the more likely it is that a person intends to perform a particular behaviour in question [89–91]. This fact corroborates with the findings of the study as indicated in Fig. 6 below.

The subjective norms rooted within the Iraqi culture and religion together with the values of the Iraqi society, personality factors such as attitudes, emotions, altruism and desire of helping the victims and the knowledge about the hazard such as military training and offering help during past terrorist attacks also have strongly influenced the ‘intention’ to help, which ultimately demonstrated through their proactive ‘behaviour’ of helping the victims.

**4. Conclusions**

This study offers a valuable methodology to explore the concept of risk perception of people at the scene of a terrorist attack in Iraq, when there is a possibility of further atrocities. The study categorised the risk perception factors into three main groups, namely knowledge about the hazard, personality factors and membership in a cultural group. An interconnection between these groups such as ‘knowledge regarding the hazard’ and ‘membership in a cultural group’ and ‘personality factors’ and ‘knowledge about a hazard’ were established, meaning that the groups are not presented as mutually exclusive.

The research showed that negative consequences that could happen to the victims of the terrorist attack influenced the responding people and motivated them when helping the victims. In this regard, the respondents risk their own lives and psychological damage that it could cause them due to the urge of saving the lives of victims. Such proactive behaviour to help victims signifies how social-psychological factors within an individual’s personality influence and motivate them to volunteer in the presence of critical situations. In another aspect, this indicates how ‘personality factors’ (‘emotions’, ‘altruism’ and ‘bravery’) take precedence over ‘hazard knowledge’ and the negative implications that could happen due to assisting the victims. The study also established that the personality factors of individuals could be influenced by the ‘membership in a cultural group’ especially the social values.

The study also identified a clear difference between the risk perception of natural disasters and terrorist attacks. During a natural disaster situation, knowledge about the hazard influences the need to evacuate and take precautionary measures to avoid risk of lives. However, in a terrorist attack situation, despite the knowledge regarding the hazard, people risk their lives to help the victims.

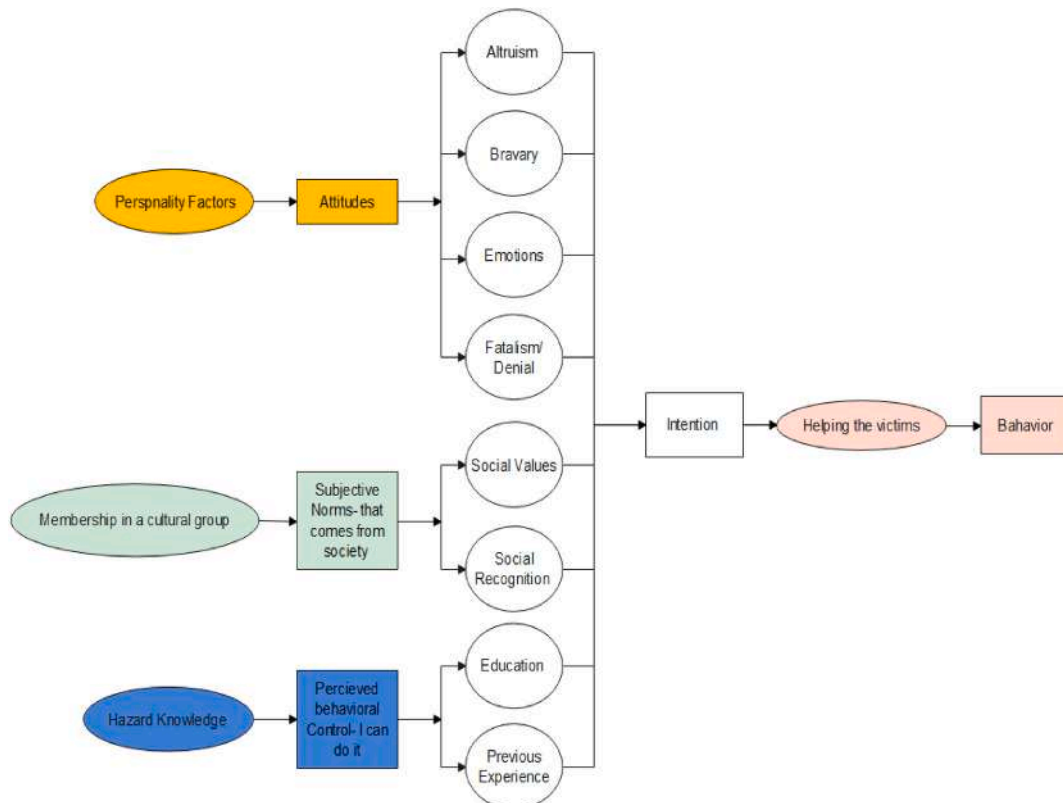


Fig. 5. Theory of planned behaviour linked to the key components of risk perception during terrorist attacks in Iraq.



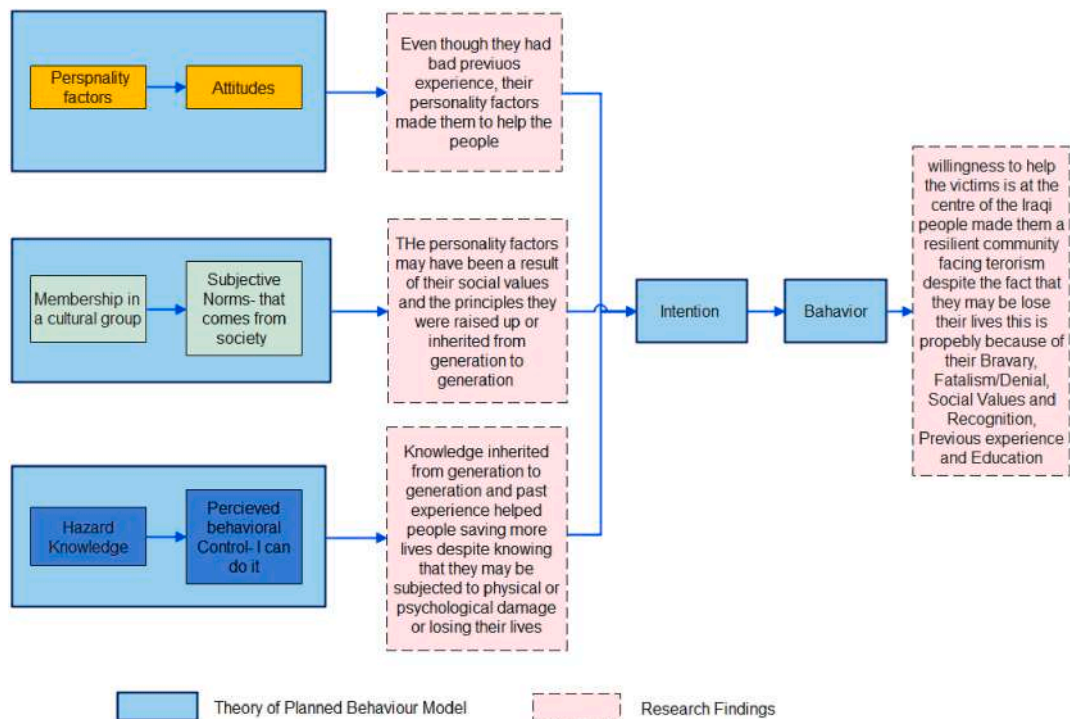


Fig. 6. Research findings aligned with the theory of planned behaviour.

The findings of the study closely aligned with the TPB indicating how the attitudes, subjective norms and perceived behaviour control factors of disaster responders have influenced the risk perception that was ultimately influenced the 'intention to help' and demonstrated through their behaviour in helping the affected people.

This study supports the view that Iraq, and particularly Hilla, is a resilient community which in the face of terror, their habitants stand together to support each other and use their knowledge, past experience, and cultural values to express their resilience to terrorism.

In the main, this study provided insights into a unique case (with four sequential bombs, the precise timing of the bombs, the targeted people, and the type of bombing methods used), with direct access to an inimitable population which is not generally reachable for investigation. The findings derived under these exceptional circumstances make the outcomes of the study original and are of significance to both theory and practice. Therefore, local government and communities can be helped in improving their terrorism risk management by using the findings of this study. Accordingly, this study has important implications for terrorism risk management, and other similar public emergencies in the future.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### References

- [1] M. Abrahams, L.A. Dau, E.M. Moore, Terrorism and corporate social responsibility: testing the impact of attacks on CSR behavior, *J. Int. Business Pol.* 2 (3) (2019) 237–257, <https://doi.org/10.1057/s42214-019-00029-6>.
- [2] I. Ajzen, From intentions to actions: a theory of planned behavior, in: J. Kuhl, J. Beckmann (Eds.), *Action Control*, Springer, Berlin, Heidelberg, 1985, pp. 11–39.
- [3] I. Ajzen, The theory of planned behavior, *Organ. Behav. Hum. Decis. Process.* 50 (2) (1991) 179–211.
- [4] I. Ajzen, The theory of planned behavior: frequently asked questions, *Human Behaviour Emerging Technol.* 2 (4) (2020) 314–324, <https://doi.org/10.1002/hbe2.195>.
- [5] H. Al-Dahash, Evaluation of Disaster Response Management in Iraq Resulting from Terrorism (PhD), The University of Salford, Salford, UK, 2017.
- [6] H. Al-Dahash, M. Thayaparan, U. Kulatunga, Challenges during disaster response planning resulting from war operations and terrorism in Iraq, in: Paper Presented at the 12th International Conference of the International Institute for Infrastructure Resilience and Reconstruction (IIIRR), August 5-7, 2016, Kandy, Sri Lanka, 2016.



- [7] G.W. Allport, The historical background of social psychology, in: D.T. Gilbert, S.T. Fiske, G. Lindzey (Eds.), *The Handbook of Social Psychology*, Oxford University Press, Oxford, 1998.
- [8] Y. Arafat, M.I.M. Ibrahim, *The Use of Measurements and Health Behavioral Models to Improve Medication Adherence Social and Administrative Aspects of Pharmacy in Low-and Middle-Income Countries*, Elsevier, 2018, pp. 53–69.
- [9] E. Auf der Heide, *Disaster Response: Principles of Preparation and Coordination*, CV Mosby Company, Canada, 1989.
- [10] T. Aven, O. Renn, *Risk Management and Governance*, Springer, New York, USA, 2010.
- [11] J. Barnett, G.M. Breakwell, The social amplification of risk and the hazard sequence: the October 1995 oral contraceptive pill scare, *Health Risk Soc.* 5 (3) (2003) 301–313.
- [12] T. Barrett, Y. Feng, Evaluation of food safety curriculum effectiveness: a longitudinal study of high-school-aged youths' knowledge retention, risk-perception, and perceived behavioral control, *Food Control* 121 (2021) 107587, <https://doi.org/10.1016/j.foodcont.2020.107587>.
- [13] J. Baxter, J. Eyles, Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis, *Trans. Inst. Br. Geogr.* 22 (4) (1997) 505–525, <https://doi.org/10.1111/j.0020-2754.1997.00505.x>.
- [14] J. Baxter, J. Eyles, The utility of in-depth interviews for studying the meaning of environmental risk, *Prof. Geogr.* 51 (2) (1999) 307–320, <https://doi.org/10.1111/0033-0124.00167>.
- [15] W.J. Burns, *Understanding Terrorism Risk Perception and Improving Risk Communication*, CREATE, Los Angeles, USA, 2010.
- [16] T. Cai, Z. Liu, *Global Studies*, vol. 1, Globalization and Globality. London, UK: Routledge, 2020.
- [17] A. Chudzicka-Czupala, D. Grabowski, A.L. Mello, J. Kuntz, D.V. Zaharia, N. Hapon, D. Börü, Application of the theory of planned behavior in academic cheating research—cross-cultural comparison, *Ethics Behav.* 26 (8) (2016) 638–659, <https://doi.org/10.1080/10508422.2015.1112745>.
- [18] J.W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative*, fourth ed., Pearson Education, 2012.
- [19] S.L. Cutter, J. Tiefenbacher, W.D. Solecki, En-gendered fears: femininity and technological risk perception, in: S.L. Cutter (Ed.), *Hazards Vulnerability and Environmental Justice*, Routledge, London, UK, 2006, pp. 205–220.
- [20] K.D. Derickson, The racial politics of neoliberal regulation in post-Katrina Mississippi, *Ann. Assoc. Am. Geogr.* 104 (4) (2014) 889–902, <https://doi.org/10.1080/00045608.2014.912542>.
- [21] J. Drury, H. Carter, C. Cocking, E. Ntontis, S. Tekin Guven, R. Amlôt, Facilitating collective psychosocial resilience in the public in emergencies: twelve recommendations based on the social identity approach, *Front. Public Health* 7 (141) (2019) 1–21, <https://doi.org/10.3389/fpubh.2019.00141>.
- [22] S. Dryhurst, C.R. Schneider, J. Kerr, A.L. Freeman, G. Recchia, A.M. Van Der Bles, S. Van Der Linden, Risk perceptions of COVID-19 around the world, *J. Risk Res.* 23 (7–8) (2020) 994–1006, <https://doi.org/10.1080/13669877.2020.1758193>.
- [23] A. Dubois, L.-E. Gadde, Systematic combining: an abductive approach to case research, *J. Bus. Res.* 55 (2002) 553–560.
- [24] M. Ferrari, *Risk Perception, Culture, and Legal Change: a Comparative Study on Food Safety in the Wake of the Mad Cow Crisis*, Routledge, New York, USA, 2016.
- [25] M. Fishbein, I. Ajzen, *Belief, Attitude, Intention, and Behavior: an Introduction to Theory and Research*, Addison-Wesley Publishing Company, Inc, USA, 1975.
- [26] P. Greenbank, The role of values in educational research: the case for reflexivity, *Br. Educ. Res. J.* 29 (6) (2003) 791–801.
- [27] T. Grothmann, F. Reusswig, People at risk of flooding: why some residents take precautionary action while others do not, *Nat. Hazards* 38 (1–2) (2006) 101–120.
- [28] J.E. Hale, R.E. Dulek, D.P. Hale, Crisis response communication challenges building theory from qualitative data, *J. Bus. Commun.* 42 (2) (2005) 112–134.
- [29] C. Heitz, S. Spaeter, A.-V. Auzet, S. Glatron, Local stakeholders' perception of muddy flood risk and implications for management approaches: a case study in Alsace (France), *Land Use Pol.* 26 (2) (2009) 443–451.
- [30] I. Hellsloot, A. Ruitenber, Citizen response to disasters: a survey of literature and some practical implications, *J. Contingencies Crisis Manag.* 12 (3) (2004) 98–111.
- [31] V. Hoorens, Risk perception, in: K. Sweeney, M. Robbins (Eds.), *The Wiley Encyclopedia of Health Psychology*, vol. II, Wiley, Hoboken, NJ, USA, 2017.
- [32] G. Hurdsfield, *Community Resilience and Visual Art: Responses to the Manchester Arena Attack*, MMU Psychology Journal (Dissertations), Manchester, UK, 2018, pp. 1–38 (Unpublished).
- [33] IEP, *Global Terrorism Index*, Institute for Economics and Peace, New York, 2014.
- [34] IEP, *Global Terrorism Index*, Institute for Economics and Peace, New York, 2020.
- [35] C.M. Jenkin, Risk perception and terrorism: applying the psychometric paradigm, *Homel. Secur. Aff.* 2 (2) (2006) 1–14.
- [36] J. Jogle, U. Kulatunga, G. Yates, G. Wedawatta, Culture and the psychological impacts of natural disasters: implications for disaster management and disaster mental health, *Built Human Environ. Rev.* 7 (1) (2014) 1–10.
- [37] M.P.H. Kan, L.R. Fabrigar, Theory of planned behavior, in: V. Z.-H, T. S (Eds.), *Encyclopedia of Personality and Individual Differences*, Springer International Publishing, Cham, Switzerland, 2017.
- [38] R.W. Kates, Natural hazard in human ecological perspective: hypotheses and models, *Econ. Geogr.* 47 (3) (1971) 438–451.
- [39] M. Khosravi, Perceived risk of COVID-19 pandemic: the role of public worry and trust, *Electronic J. General Med.* 17 (4) (2020), em203.
- [40] M.T. Kinatader, E.D. Kuligowski, P.A. Reneke, R.D. Peacock, Risk perception in fire evacuation behavior revisited: definitions, related concepts, and empirical evidence, *Fire Sci. Rev.* 4 (1) (2015) 1–26.
- [41] E. Klinenberg, *Dying Alone. Heat Wave: A Social autopsy of Disaster in Chicago*, Chicago University of Chicago Press, 2015.
- [42] G. Kovács, K.M. Spens, Abductive reasoning in logistics research, *Int. J. Phys. Distrib. Logist. Manag.* 35 (2) (2005) 132–144.
- [43] U. Kulatunga, Impact of culture towards disaster risk reduction, *Int. J. Strat. Property Manag.* (4) (2010) 304–313.
- [44] U. Kulatunga, Influence of culture towards disaster risk: the case of Barguna, Bangladesh, in: Paper Presented at the the Annual International Conference on Building Resilience , 19th – 21st July 2011, Heritance Kandalama, Sri Lanka, 2011.
- [45] R. Kumar, *Research Methodology - a Step-by-step Guide for Beginners*, third ed., Sage, London, 2011.
- [46] J. Lawrence, D. Quade, J. Becker, Integrating the effects of flood experience on risk perception with responses to changing climate risk, *Nat. Hazards* 74 (3) (2014) 1773–1794.
- [47] J.S. Lerner, D. Keltner, Fear, anger, and risk, *J. Pers. Soc. Psychol.* 81 (1) (2001) 146–159.
- [48] D. Liu, Y. Li, X. Shen, Y. Xie, Y. Zhang, Flood risk perception of rural households in western mountainous regions of Henan Province, China, *Int. J. Disaster Risk Reduc.* 27 (2018) 155–160.
- [49] T. May, B. Perry, *Reflexivity: the Essential Guide*, London Sage, 2017.
- [50] B. McCall, L. Shallcross, M. Wilson, C. Fuller, A. Hayward, Storytelling as a research tool and intervention around public health perceptions and behaviour: a protocol for a systematic narrative review, *BMJ Open* 9 (2019) 1–12, <https://doi.org/10.1136/bmjopen-2019-030597>, e030597.
- [51] F. Messner, V. Meyer, Flood Damage, Vulnerability and Risk Perception—Challenges for Flood Damage Research Flood Risk Management: Hazards, Vulnerability and Mitigation Measures, Springer, 2006, pp. 149–167.
- [52] W.L. Neuman, *Social Research Methods*, sixth ed., London Pearson, 2005.
- [53] A. Oliver-Smith, S.M. Hoffman, *The angry Earth: Disaster in anthropological Perspective*, Routledge, New York, 1999.
- [54] U.F. Paleo, *Risk Governance*, Springer, London, 2015.
- [55] K. Patrick Keenan, Creating spaces of public insecurity in times of terror: the implications of code/space for urban vulnerability analyses, *Environ. Plan. C: Pol. Space* 37 (1) (2019) 81–101, <https://doi.org/10.1177/2399654418776660>.
- [56] J.M. Pennings, A. Smidts, Assessing the construct validity of risk attitude, *Manag. Sci.* 46 (10) (2000) 1337–1348.
- [57] J.M. Pennings, A. Smidts, The shape of utility functions and organizational behavior, *Manag. Sci.* 49 (9) (2003) 1251–1263.
- [58] S. Qasim, M. Qasim, R.P. Shrestha, A.N. Khan, Socio-economic determinants of landslide risk perception in Murree hills of Pakistan, *AIMS Environ. Sci.* 5 (5) (2018) 305.

- [59] T. Rapley, Interviews, in: C. Seale, G. Gobo, J.F. Gubrium, D. Silverman (Eds.), *Qualitative Research Practice*, SAGE Publications Ltd, London, 2004, pp. 16–34, <https://doi.org/10.4135/9781848608191>.
- [60] S. Rayner, R. Cantor, How fair is safe enough? The cultural approach to societal technology choice 1, *Risk Anal.* 7 (1) (1987) 3–9.
- [61] S. Rayner, R. Cantor, *Cultural Theory: an alternative to the Psychometric Paradigm*, Earthscan Publications Ltd, London, UK, 1998.
- [62] O. Renn, A. Klinke, M. Van Asselt, Coping with complexity, uncertainty and ambiguity in risk governance: a synthesis, *Ambio* 40 (2) (2011) 231–246, <https://doi.org/10.1007/s13280-010-0134-0>.
- [63] A.A. Ridzuan, U.A.U. Zahar, N.A.M. Noor, Association of evacuation dimensions towards risk perception of the Malaysian students who studied at Jakarta, Medan, and Aceh in Indonesia, *Malaysian J. Geosci.* 1 (1) (2017) 7–12.
- [64] D. Ropeik, Understanding factors of risk perception, *Nieman Rep.* 56 (4) (2002) 52.
- [65] D.A. Russo, J. Stochl, M. Painter, G.F. Shelley, P.B. Jones, J. Perez, Use of the Theory of Planned Behaviour to assess factors influencing the identification of students at clinical high-risk for psychosis in 16+ Education, *BMC Health Serv. Res.* 15 (411) (2015) 1–11, <https://doi.org/10.1186/s12913-015-1074-y>.
- [66] R. Rutakumwa, J.O. Mugisha, S. Bernays, E. Kabunga, G. Tumwekwase, M. Mbonye, J. Seeley, Conducting in-depth interviews with and without voice recorders: a comparative analysis, *Qual. Res.* 20 (5) (2020) 565–581, <https://doi.org/10.1177/1468794119884806>.
- [67] S. Ryan, A. Carr, Applying the biopsychosocial model to the management of rheumatic disease, in: K. Dziedzic, A. Hammond (Eds.), *Rheumatology*, Churchill Livingstone: Elsevier, 2010, pp. 63–75.
- [68] M. Sandberg, M. Conner, Anticipated regret as an additional predictor in the theory of planned behaviour: a meta-analysis, *Br. J. Soc. Psychol.* 47 (4) (2008) 589–606, <https://doi.org/10.1348/014466607X258704>.
- [69] M. Saunders, P. Lewis, A. Thornhill, *Research Methods for Business Students*, eighth ed., Pearson education, New York, 2019.
- [70] R. Schouten, M.V. Callahan, S. Bryant, Community response to disaster: the role of the workplace, *Harv. Rev. Psychiatr.* 12 (4) (2004) 229–237.
- [71] S. Shapira, L. Aharonson-Daniel, Y. Bar-Dayana, Anticipated behavioral response patterns to an earthquake: the role of personal and household characteristics, risk perception, previous experience and preparedness, *Int. J. Disaster Risk Reduc.* 31 (2018) 1–8.
- [72] J.F. Short, The social fabric at risk: toward the social transformation of risk analysis, *Am. Socio. Rev.* 49 (6) (1984) 711–725.
- [73] L. Sjöberg, Limits of knowledge and the limited importance of trust, *Risk Anal.* 21 (1) (2001) 189–198, <https://doi.org/10.1111/0272-4332.211101>.
- [74] L. Sjöberg, B.-E. Moen, T. Rundmo, *Explaining Risk Perception. An Evaluation of the Psychometric Paradigm in Risk Perception Research*. Trondheim, Norway, vol. 84, Rotunde publikasjon Rotunde, 2004.
- [75] P. Slovic, Perception of risk, *Science* 236 (4799) (1987) 280–285.
- [76] P. Slovic, *The Perception of Risk*, Earthscan Publications, London, 2000.
- [77] P. Slovic, Perception of risk from asteroid impact, in: P.T. Bobrowsky, H. Rickman (Eds.), *Comet/Asteroid Impacts and Human Society*, Springer, Berlin, Heidelberg, 2007, pp. 369–382.
- [78] P. Slovic, E.U. Weber, Perception of risk posed by extreme events, in: J.S. Applegate, J.M. Gabba, J.G. Laitos, N.M. Sachs (Eds.), *Regulation of Toxic Substances and Hazardous Waste*, second ed., Thomson Reuters/Foundation Press, New York, USA, 2011.
- [79] N. Smith, There's no such thing as a natural disaster, *Understanding Katrina: Perspect Soc. Sci.* 11 (2006) 1–7.
- [80] E. Staub, J. Vollhardt, Altruism born of suffering: the roots of caring and helping after victimization and other trauma, *Am. J. Orthopsychiatry* 78 (3) (2008) 267–280, <https://doi.org/10.1037/a0014223>.
- [81] M. Sugiura, R. Nouchi, A. Honda, S. Sato, T. Abe, F. Imamura, Survival-oriented personality factors are associated with various types of social support in an emergency disaster situation, *PLoS One* 15 (2) (2020), e0228875, <https://doi.org/10.1371/journal.pone.0228875>.
- [82] W.N. Suter, *Introduction to Educational Research: A Critical Thinking Approach*, second ed., Sage, London, 2012.
- [83] P. Taylor-Gooby, J.O. Zinn, Current directions in risk research: new developments in psychology and sociology, *Risk Anal.* 26 (2) (2006) 397–411, <https://doi.org/10.1111/j.1539-6924.2006.00746.x>.
- [84] C.W. Trumbo, K.A. McComas, The function of credibility in information processing for risk perception, *Risk Anal.: Int. J.* 23 (2) (2003) 343–353.
- [85] A. Tur-Sinai, Adaptation patterns and consumer behavior as a dependency on terror, *Mind Soc.* 13 (2) (2014) 257–269.
- [86] G. Wachinger, O. Renn, *Risk Perception and Natural Hazards, D3.1, DIALOGIK Non-Profit Institute for Communication and Cooperative Research*, Stuttgart, 2010, Version 3.
- [87] D.A. Waldman, A. Carmeli, M.Y. Halevi, Beyond the red tape: how victims of terrorism perceive and react to organizational responses to their suffering, *J. Organ. Behav.* 32 (7) (2011) 938–954.
- [88] D.M. West, M. Orr, Race, gender, and communications in natural disasters, *Pol. Stud. J.* 35 (4) (2007) 569–586, <https://doi.org/10.1111/j.1541-0072.2007.00237.x>.
- [89] M. Wilson, Some thoughts on storytelling, science, and dealing with a post-truth world, *Storytell. Self, Soc.* 13 (1) (2018) 120–137.
- [90] R.K. Yin, *Case Study Research: Design and Methods*, Sage, London, 2014.
- [91] W. Zhu, N. Yao, Q. Guo, F. Wang, Public risk perception and willingness to mitigate climate change: city smog as an example, *Environ. Geochem. Health* 42 (3) (2020) 881–893, <https://doi.org/10.1007/s10653-019-00355-x>.