

# Resource mobilization and contributing resources to a collective task by emergency responders: an experimental study on collaboration in crisis response

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## Abstract

**Purpose** – Twenty-first century crises reaffirm the need of faster mobilization of resources during crises. Without interorganizational collaboration and resource mobilization, organizing efficient response is not possible. Resource mobilization is an essential aspect of response. It ensures a faster and better response. Collaboration between teams of emergency responders may include commonly known boundary spanning activities such as resource sharing, information sharing and communication. The purpose of this paper is to contribute our knowledge of how to organize a better crisis response through collaboration. More precisely, what strategies work as drivers for emergency responder teams during collaboration in crisis scenarios.

**Design/methodology/approach** – Through design of experiments, using tabletop exercises and online surveys, this study investigates the drivers of collaboration during a crisis scenario. Participants of this study are decision makers and emergency responders from various public actors in crisis management from Sweden.

**Findings** – Collaboration is essential to manage cross-functional services in normal times, as well as meet the growing needs during crises. In absence of collaboration, boundary spanning activities such as sharing resources or information to provide any kind of service will not be possible. For teams to survive in fast-changing environment, they must be able to adapt to the changing demands accordingly. This paper demonstrates which factors are drivers for emergency responders to mobilize resources, especially during crises. It captures the tension between individual and collective goals in crisis response and highlights the drivers that affect decision-making during crises.

**Originality/value** – The novelty of the paper lies in its methodology using tabletop exercises, design of experiments as part of Six Sigma toolbox and online surveys in combination with weightage of agreements and disagreements and free text answers. Although scientific research so far has demonstrated the need for collaboration during crises, however, which factors act as drivers for emergency responders to collaborate, is lacking scientific evidence. Incentives for collaboration have not been studied enough. These can tell us which strategies can improve collaboration during crises. This research paper is a scientific contribution in that direction.

**Keywords** Collaboration, Crisis response, Individual goal, Collective goal, Goal conflict, Trade-off, Collective task, Resource contribution, Resource mobilization

**Paper type** Research paper

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## 1. Introduction

Modern day crises are transboundary in nature owing to their effects that are not limited to geographical, economic, social or functional boundaries (Ödlund, 2010). Examples from recent crises such as the outbreak of pandemic COVID-19, the Hurricane Katrina, the Indian Ocean tsunami, the terrorist attacks on 9/11 on twin towers of the World Trade Centre in Manhattan (USA), the bombings at the Brussels International Airport suggest that it is necessary for different stakeholder organizations such as critical care support, police, government authorities and fire and rescue services from various service domains to collaborate across organizational boundaries to respond to such crises. While it is common that these organizations work independently during “normal” times to achieve their own goal, complex crises demand them to work together to achieve their collective goal which is to organize an efficient response to the affected community. Considering our modern society which is gradually becoming crisis prone, it becomes essential for these organizations to collaborate, create mutual ties for similar future interaction in crisis response while simultaneously working with their individual goals and mandates (Ödlund, 2010; Ansell *et al.*, 2010; 't Hart *et al.*, 2001). Under this light, scholars such as Van Santen *et al.* (2009), Alberts and Hayes (2006) describe response to modern day crises as a network of actors that cooperate to achieve collective goals. However, recent studies on crisis response (Alberts and Hayes, 2006; Ödlund, 2010; Boersma *et al.*, 2014; Boin and McConnell, 2007; Helsloot, 2005) indicate that there is lack of collaboration among different organizations, information are most often not shared or optimally used, there are instances of goal conflicts which make fulfilment of collective goals a challenge.

This study is particularly interested to investigate collaboration between teams from different organization(s) in context of crisis response, especially the resource mobilization aspect of collaboration which involves resource contribution, goal conflicts and whether these teams of emergency responders achieve a balance in their individual goals and collective goal. Furthermore, the study investigates factors that influence to achieving the desired balance in individual and collective goal during goal conflicts. This knowledge is useful to facilitate collaboration between teams of emergency responders and can further be applicable in long-term crisis planning. It is set in the context of resource contribution by teams of first responder organizations during crisis response which offers an interesting premise for investigation. This is because, resource sharing is a boundary spanning activity which involves interactions between organizations and it is also one of the most commonly occurring interactions within and across organizations to manage cross-sectoral activities (Ödlund, 2010; Aldrich and Herker, 1977; Levina and Vaast, 2005; Friedman and Podolny, 1992; Fan *et al.*, 2019). As crisis response is a special context of collaboration between teams belonging to various organizations in an extreme environment, therefore extent of resource contribution and behavioural motivations of teams to contribute in collective task provide us with important insights on potential measures to organize an efficient crisis response. Organizations can find normative basis of training and simulations to improve and optimize decisions during crisis response.

The next section of the paper presents a review of literature, with theoretical background and rationale behind the drivers for collaboration. It is followed by the design and methodology of the paper. Here, the experimental scenarios, the set up for design of experiments (Doe) including practical considerations on validity, realism and representativeness are presented. It is followed by the findings from the Doe, the online surveys and qualitative answers from the participants. Discussions from results of Doe, surveys and qualitative answers are presented. A schematic diagram on interaction among the drivers of crisis response collaboration and choices of resource mobilization among emergency responders is also presented. The paper closes with conclusion, normative implication of the study and directions for future research.

## 2. Theoretical background

Clearly by now it has been established that crisis collaboration is essential for effective management of crisis response. This section called theoretical background presents a review of literature on scientific research and summary of evidence on drivers of collective tasks. Furthermore, it reflects on the practical significance and rationale behind these drivers from scientific literature to draw similarities on how these drivers are relevant for crisis response scenarios.

Scholars such as Ben-Yoav and Pruitt (1984 a, b), Hatch and Cunliffe (2018), Patton and Balakrishnan (2010), Ekman (2012) found expectation of future cooperation and familiarity in contexts of negotiation and collaborative tasks to be two major factors among several others which affect decision making. Pramanik *et al.* (2015) in her study on collaborative behaviour of teams in multi stakeholder collaboration during crisis response also demonstrated that expectation of future cooperation and familiarity lead to moderating the effects of systematic favouring of teams towards their own, also called organizational ingroup bias. This empirical study is developed from the earlier work by Pramanik (2015) and a step forward from an earlier study by Pramanik *et al.* (2015). This study takes the next step by operationalizing extent of contribution in an experimental setting. It examines the effect of two variables, namely expectation of future cooperation (ECFI) and familiarity on extent of contribution between teams in collective task with a collective goal. *Extent of contribution* or EOC can be understood as a measure of collaborative behaviour of stakeholder organizations working towards the collective task of crisis response which is the collective goal. EOC is measured by the number of response teams that various crisis responder organizations choose to send to joint crisis operations as contribution from their own organization. The paper aims to investigate different factors that motivate or influence decisions on EOC in context of crisis cooperation.

### 2.1 *Extent of contribution (EOC): background and rationale*

Decision making in crisis management context has been compared to negotiation context due to several similarities commonly found in both. One of the primary similarities is that both the contexts demand actors or stakeholders to find balance in respective goals while trying to settle for win-win situations to make the most of the collaborative interaction. The key characteristics that bring crisis management closer to negotiation can be listed as follows: (Van Santen *et al.*, 2009; Rosenthal and Kouzmin, 1997).

- (1) The policy arena witness presence of multiple actors.
- (2) Actors have diverse goals which can also be at conflict.
- (3) No singular actor has overriding influence.

In other words, decision making in crisis management is subjected to variety of contexts and escalating situations that bear close resemblance to negotiation where decision making is based on trade-offs. This study treats EOC as an outcome of trade-off between collective goal and individual goal of decision makers from various stakeholder organizations capturing one of the most common situations of decision making in crisis management operations.

Previous research carried out to study factors affecting decision making in negotiation identified another factor called willingness to cooperate, which was found to facilitate collaborative behaviour among actors in negotiation (Mitkidis *et al.*, 2013). Findings indicated that when cooperation as an interaction is mutually perceived as beneficial and incurs more benefit than cost, it steers a positive attitude towards higher willingness to cooperate. The overall benefit as an outcome in such cases is then perceived to be greater than the aggregate contribution. Some authors have further argued that, if the cooperation is perceived to be beneficial in the long run, those involved might be willing to take some risks by delaying an

immediate benefit for a greater future prospect (Mitkidis *et al.*, 2013; West *et al.*, 2011; Gintis *et al.*, 2003; Östrom, 2000). This suggests the important aspect of risk taking for greater future prospect when partners in negotiation see a greater mutual benefit in cooperation. The present study also incorporates this aspect of risk taking in the operationalization of EOC. It operationalizes EOC in the following way. Crisis management involves various actors who are likely to be willing to contribute in a collective task, as it involves a joint benefit of fulfilment of goals. These goals can range from organizational goals such as successful missions that conform and consolidate the organizational values and mandates, presence in media or gaining popularity, etc. Regardless of these organizational goals, all the actors also benefit from this interaction by fulfilling the collective goal of responding efficiently to crisis affected community. They are likely to choose to cooperate with each other, if it does not involve greater costs for any than this overall joint benefit. Cooperation in crisis response context implies several boundary spanning activities such as sharing resource, equipment or information. This can also be described as collaborative activities across organizational borders. It can be summarized from the above description that one of the most common collaborative activities will be to determine the number of response units (indicating resource or equipment) to be sent as a contribution from respective organizations to the joint crisis management operation. Thus, EOC not only indicates the measure of collaborative behaviour of partner actor or organization in a collective task but also becomes the outcome between two different kinds of goals, namely organizational goal and collective goal. In fact, the outcome of EOC is a relative balance between both goals. It is reasonable to believe that relative strength of these goals shall also have an impact on EOC. Arguments on the advantage of choosing such a design of the task in the experimental study are presented in methods section.

### *2.2 Expectation of future cooperation (ECFI): background and rationale*

ECFI is defined as the anticipation of working towards a collective goal with the other party later, where the goals can be both tangible and intangible (Ben-Yoav and Pruitt, 1984a, b). Decision making in negotiations is driven by higher joint benefit. Higher joint benefit is of interest because agreements that yield higher joint benefit are more likely to persist and to contribute to the relationship between parties and of larger collectives of which they are part of (Ben-Yoav and Pruitt, 1984b, p. 323). Following this, *ECFI was identified as a motivating factor to higher collective benefit* (Pramanik *et al.*, 2015). Findings from earlier research suggest that higher ECFI positively incline negotiators to exhibit higher problem-solving attitudes. In other words, negotiators have a higher concern for their own goals, and they also exhibit higher concerns towards the goals of others. This means they are not only more resistant to settle for compromises or in other words nonfulfillment of own goals, but they are also concerned about higher outcome of goals of others, which results in a problem-solving attitude and higher joint benefit (Ben-Yoav and Pruitt, 1984b; Hatch and Cunliffe, 2018; Patton and Balakrishnan, 2010). This resulted in better cooperation and motivated participants to make positive long-lasting impression on each other (Ben-Yoav and Pruitt, 1984b).

ECFI becomes highly relevant in the context of crisis management because the interaction among various stakeholder organizations is like negotiation. Considering the complexity of modern-day crises, response to which most often requires collaboration between different actors, investigating the effect of ECFI on collaborative behaviour of these actors becomes relevant and adds value to the knowledge of facilitating collaboration. Therefore, ECFI is used as one of the independent variables in the experimental study, to investigate the effect of ECFI on EOC.

### *2.3 Familiarity: background and rationale*

Like ECFI, familiarity was also reported to be another factor which had a positive impact on negotiation (Ben-Yoav and Pruitt, 1984a). Familiarity can be described as the degree of

interpersonal knowledge that individuals have regarding one another. It is defined by Rockett and Okhuysen (2002) and Okhuysen (2001) as “a construct that individuals acquire and use information about others to guide their interactions in group settings”. It is a degree of interpersonal knowledge to establish relationships among individuals which *affect the outcome of their interaction at individual as well as group levels*. Although familiarity is studied as a dyadic construct among two individuals, it is also a group-level phenomenon that affects group interaction, which can be organizational interaction. This indicates the relevance of familiarity in collaboration contexts, especially which involve teams of various actors from various organizations. Studies also suggest that number of prior interactions, amount of common knowledge shared and psychological variables such as beliefs, training, degree of friendship or relatedness, are associated with familiarity and have been found to affect cooperative interaction and collaboration (Ledyard, 1994; Östrom, 2000; Mitkidis *et al.*, 2013; Pramanik *et al.*, 2015). Some studies also report that, when those involved in cooperation have high mutual trust and familiarity, cooperation is regarded as beneficial in long run (Pramanik *et al.*, 2015; Mitkidis *et al.*, 2013; Östrom, 2000). Some empirical studies which mapped information flows in crisis management concluded strong correlation between improved trust and familiarity and improved communication networks (see for example Jones and George, 1998; Uhr and Johansson, 2007; Uhr and Johansson, 2008). Gulati (1995) also reported that familiarity breeds trust among organizations which is essential for long-term organizational relationships. This further suggests the relevance of familiarity in crisis management where several activities demand collaborative interaction between various actors.

In one of the recent empirical studies by Pramanik *et al.* (2015), the effect of familiarity on collaborative behaviour was tested in terms of organizational bias, which showed that greater familiarity results in significantly moderating the effects of organizational bias in a multi-organizational crisis management operation. This study takes the next step and tests the effect of familiarity on EOC. In other words, this is an indicator of collaborative behaviour which measures the effect of familiarity on the number of response units (amount of resource/equipment) actors in joint crisis management operation choose to send from their own organization. Thus, familiarity is operationalized as the second independent variable.

### 3. Method

#### 3.1 Experiment design

An experiment was designed to test the effects of independent variables ECFI and familiarity on the dependent variable EOC. The participants in the experiment were given the task of making decisions of contributing resources in a collective task of crisis response operation. More precisely, the participants had to decide on the number of response units they choose to send (ranging between 1 and 10) from their own organization to a joint crisis operation. They were also aware of the need to retain a certain number of response units which may be required for a second emergency that is likely to occur simultaneously. The second emergency that was designed was to be handled by one actor at a time, meaning it was an individual task for the actor involved. The participants were briefed that the response units once deployed to the collective task could not be brought back to tackle the individual task of the second emergency.

The nature of the task was organizationally generic, meaning that it was not related to any specific actor or organization for example police or fire and rescue services. The instruction and briefing of the participants had no mention of any specific actor or organization to maintain anonymity and prevent any bias. Instead, they were instructed that they belonged to Team Blue and the Blue units were part of their own organization, while Team Red with Red units belonged to the other organization with whom they collaborate during the collective task. Each participant had 10 Blue units that belonged to them and 10 Red units that belonged to the other actor. Participants could choose to send any number from 1 to 10 of

Blue units to the collective task. They had no information on how many Red units were available for the collective task, except that at least total number of 10 response units were required to tackle the collective task. This means that neither Team Blue nor Team Red could choose to send 0 response unit from their respective teams to the collective task.

EOC was operationalized by measuring the number of Blue units each participant chooses to send (from 1 to 10) to the collective task, keeping in mind the need to retain several Blue units which may be required in case of the probable second emergency occurring simultaneously. The interpretation of the numbers is straightforward. Higher the number of units sent, higher was the EOC. The effects of familiarity and ECFI were investigated by changing whether the participants had knowledge about the other organization (Red units) or not, and whether future cooperation with the other organization (Red units) was expected or not, respectively.

This nature of task in the experiment design demands participants to assess the relative strength between different goals, namely joint and individual and then arrive at the critical decision. Therefore, the EOC which is the number of response units a participant chooses to send is an indicator of the actual contribution to the collective goal. The word contribution denotes *individual accord to a joint cause*, which this study investigates more closely in the form of a quantitative measure. This further explains the choice of term EOC for the experimental study.

### 3.2 Experiment setting

The experiment was performed online or offline where the participants received identical instructions. The author conducted the experiments and acted as the observer. Online participants were connected to the observer by phone or Skype, while they took the experiment, to ensure that the time limit was adhered to and that there was minimal external disturbance. Participants were forwarded electronic links as soon as they were connected to the observer with no prior briefing or instruction.

Offline experiments were conducted in classroom setting and the responses were recorded on paper. The observer, i.e. the author, had the task to ensure that there was no interaction between the participants, except questions related to understanding of the instructions and briefing could be addressed to the observer. Attention was paid to ensure online and offline experiment settings were identical. The reason behind conducting the experiment both online or offline was to ensure availability of enough number of participants and the possibility to include participants from a variety of organizations.

### 3.3 Participants

A total of 111 participants took part in the experiment. All of them completed the task and results provided by them are included below. Out of 111, a total of 67 participants took the experiment offline and 44 of them took it online. The participants were field professionals from different public actors or organizations that are the first responders to any crises affecting Swedish communities. They belonged to the Swedish police, the fire and rescue service (Räddningstjänsten), the Swedish Civil Contingencies Agency (MSB) and the Swedish Armed Forces (Forsvarsmakten). Participants came from different hierarchical levels, with a range of domestic and international crisis response experience and were a mixed group of female and male officers. All participants had undergone training in their respective organizations to respond in joint crisis operations. The sample selected can thus be regarded as inclusive and representative.

About 19 were recruited from the police, 34 from the fire and rescue services, 21 from the military and 37 from the MSB. The mean age was 38.8 years. Participants worked in their current organization for an average of 9.3 years with an average experience of 10.8 years as crisis responders.



### 3.4 Procedure

A fully crossed, 2 familiarity (yes/no)  $\times$  2 ECFI (yes/no), within subject design [1] leading to four different experimental conditions, denoted Scenarios A, B, C and D is used. Table 1 summarizes the independent variables and words used to explain the variables in the four scenarios.

Each participant was exposed to all four experimental conditions or scenarios, one at a time in a randomized order to minimize learning effects. During the entire experiment the participants were open to ask questions related to the understanding of instructions. During debriefing, the participants who took the experiment offline, had the opportunity to comment on the experiment which included the tasks given and the extent to which they felt the experiment reflected their real-life experience. Similarly, the individuals participating in the online mode of the experiment had the opportunity to comment on these issues during a brief interview of 15 min on completion of their online experiment. All participants were asked to motivate their decisions in the first scenario in free-text answers. Seven of the 111 participants asked questions related to the understanding of the instructions, which indicates that the instructions to the participants were clear. All participants were given 30 min each to complete the experiment.

The second part of the experiment consisted of a survey with two Likert scale questions to all 111 participants who took the experiment, on completion of the first part. The questions were generic in nature in context of crisis cooperation across organizational borders and did not limit to the experiment setting in specific. The motivation behind including the Likert scale questions was to capture the general understanding and perception among crisis responders of the two independent variables called ECFI and familiarity as constructs in crisis cooperation decision making. An appeal to the participants was made with similar written instructions that their response to these Likert scale questions should be based on collaboration in crisis management and joint crisis response efforts in general. The participants were instructed to indicate their level of agreement on 7-point Likert scale, with 7 indicating strongly agree, 1 indicating strongly disagree and 0 indicating cannot say. The Likert scale response is indicated as Likert 1 and Likert 2 referring to the constructs ECFI and familiarity respectively in rest of the text.

### 3.5 Results from the experiment

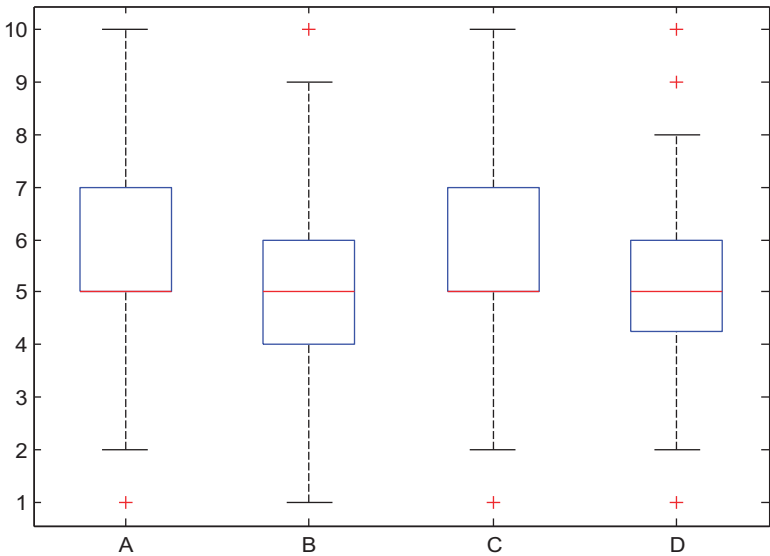
Numbers of response units sent by each participant in each experimental condition or scenario are absolute values represented by  $n_A$ ,  $n_B$ ,  $n_C$  and  $n_D$ . These absolute values indicate EOC. Mean values for all 111 participants are calculated in each scenario and  $N_{\text{meanA}}$ ,  $N_{\text{meanB}}$ ,  $N_{\text{meanC}}$  and  $N_{\text{meanD}}$  were calculated to be able to measure EOC for each scenario. Figure 1 represents the box plot for  $n_A$ ,  $n_B$ ,  $n_C$  and  $n_D$ .

The top and bottom of the boxes indicate the 25th and 75th percentiles of the number of units sent ( $N$ ). The central red line indicates the median value and the whiskers show the interval covering all values not considering outliers [6]. The outliers (only six values) are indicated by red crosses. The median value of  $N$  was 5 for all scenarios. The mean values represented by  $N_{\text{meanA}}$ ,  $N_{\text{meanB}}$ ,  $N_{\text{meanC}}$  and  $N_{\text{meanD}}$  for the corresponding scenarios were 5.64,

Scenario	Familiarity	ECFI
A	No [2]	No [3]
B	Yes [4]	No
C	No	Yes [5]
D	Yes	Yes

**Table 1.**  
Scenarios generated by  
the two independent  
variables

Figure 1.  
Box plot for different  
scenarios



5.04, 5.83 and 5.25 respectively. It is observed that the median values are almost identical for all scenarios and the  $N_{\text{mean}}$  are located close to each other. The box plot represents the overall spread of the  $N$  values which are indicators of EOC.

Other statistical tests were performed to be able to find the effect of independent variables on EOC and how strong it is. The goodness of fit test also known as the Anderson and Darling test (1952) was performed to test the normality of  $N$ . The test showed a non-normal distribution ( $\alpha = 0.05$ ) and therefore, non-parametric tests were chosen to analyse the results, as the underlying assumption of using parametric tests is that the distribution is normal. Friedman test was performed to detect whether there exists a statistically significant difference between various experimental conditions (Zimmerman and Zumbo, 1993). The  $p$  value 0.003,  $<0.05$ , and chi square approximation  $\chi^2(3, N = 111) = 33.771$ , indicate high statistically significant difference. This shows that the possibility of having no difference between the experimental conditions can be disregarded. Wilcoxon signed rank test was performed to compare the differences between experimental conditions in further detail. Since the test assumes pairwise comparison between two scenarios at a time, the four scenarios gave rise to six pairs. Table 2 presents the  $p$  values, the signed ranks or  $W$  values from the Wilcoxon signed rank tests and the measures of  $A_{12}$  values from the paired tests.  $A_{12}$  values are measures

Table 2.  
 $p$  values,  $W$  values and  
 $A_{12}$  values between  
different pairs of  
scenarios

Scenarios	$p$ -value	$W$ -value	$A_{12}$ value
A – B	0.0002	1,516	0.6486
A – C	0.1950	422.5	0.4909
A – D	0.0574	1,523	0.6126
B – C	0.0031	430.5	0.3333
B – D	0.2798	383.5	0.4774
C – D	0.0003	1686.5	0.8018



of stochastic superiority which is used to report the effect size (Delaney and Vargha, 2002). The values indicate the probability of a randomly selected participant in the first experimental condition with a greater  $N_\delta$  value than the second. For example in scenario AB,  $A_{12}$  value 0.64 can be interpreted as, the probability of a randomly selected participant in Scenario A to have a higher  $N_\delta$  value than a randomly selected participant in Scenario B is 64%.

Table 2 shows high statistically significant difference by comparing the  $p$  values,  $<0.05$ , between scenarios AB, BC and CD. Scenario AD shows a statistical significance close to 0.05. Similarly, while comparing effect size between scenarios, a high effect size [7],  $> = 0.71$  for scenario CD and a medium effect size which is  $\geq 0.64$  for scenario AB, are found. Scenario AD exhibits a value close to the medium effect size. This shows a stronger effect of familiarity ( $F$ ) on EOC as the variable changes from low (no) to high (yes), while no such effect of ECFI on EOC is found, when a similar change occurs for ECFI in various scenarios.

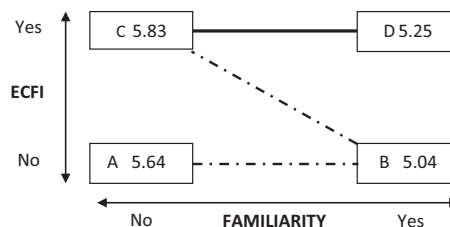
Figure 2 represents the change in scenarios in terms of the independent variables, familiarity and ECFI with respect to the mean values of the number of units sent by all participants in various scenarios ( $N_{\text{mean}}$ ).  $N_{\text{mean}}$  values for each scenario are given in the boxes. Presence of lines between scenarios indicates statistically significant difference between scenarios. The continuous lines represent the high effect size between the scenarios while the dash dotted lines represent a medium effect size. No line represents low effect size ( $> = 0.56$ ) and no statistical significant difference.

Figure 2 indicates the following:

- (1) When familiarity changes from no to yes, a decrease in the  $N_{\text{mean}}$  is seen from A ( $N_{\text{meanA}}$  5.64) to B ( $N_{\text{meanB}}$  5.04). Similarly, there is a decrease from C ( $N_{\text{meanC}}$  5.83) to D ( $N_{\text{meanD}}$  5.25). This suggests that higher the familiarity, lower the number of units sent ( $N$ ). Since  $N$  represents measure of EOC, it can be said that, higher the familiarity, lower is the EOC.

The figure also shows that the difference between scenarios A to B and C to D is statistically significant when familiarity changes from no to yes. C to D shows a high effect size, while a medium effect size is seen in A to B. This clearly indicates that higher impact of familiarity on EOC than ECFI.

- (2) When ECFI changes from no to yes, in scenario A to C and B to D, an increase in number of units sent is observed. Higher values for  $N_{\text{meanC}}$  5.83 compared to  $N_{\text{meanA}}$  5.64 and  $N_{\text{meanD}}$  5.25 compared to  $N_{\text{meanB}}$  5.04 are found. However, this difference between A to C or B to D, when ECFI changes from no to yes, is not statistically significant, which is indicated by absence of lines between scenarios. Nevertheless, the general tendency is, higher the ECFI, higher are the number of units sent ( $N$ ), in other words, higher the ECFI, higher the EOC.



**Figure 2.**  
 $N_{\text{mean}}$  and the effect  
size between different  
scenarios

**Table 3.**  
 $\delta$  between different  
scenarios and  
percentage

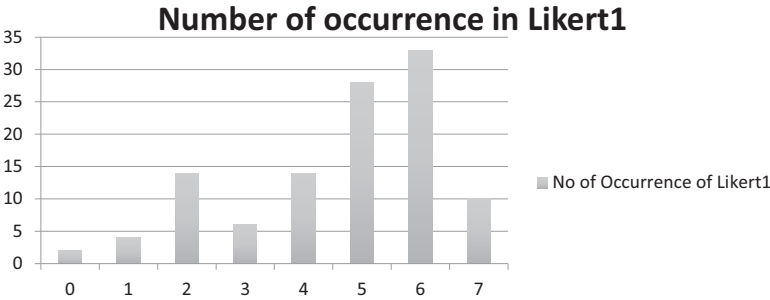
Table 3 represents the  $\delta$ , which is the relative difference of EOC between different scenarios. It captures the distribution of response from participants in various experimental conditions.

3.6 Results from survey: Likert scale

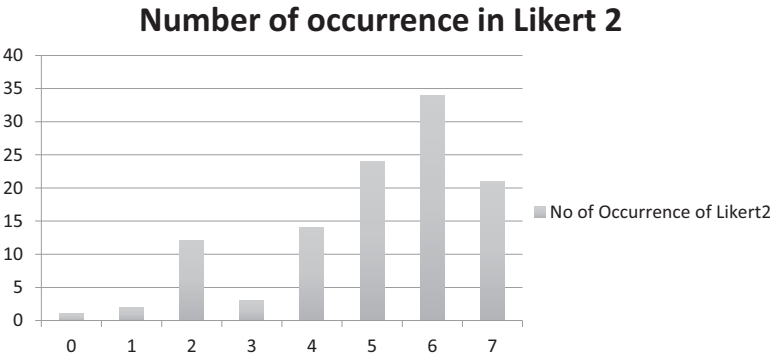
A survey using Likert scale response was the second part of the experiment. Figures 3 and 4 represent the distribution of Likert scale survey response. Both figures have similar distributions with a very high percentage of participants choosing Likert points 5, 6 and 7, with a maximum percentage at Likert point 6, indicating higher level of agreement. The figures indicate that the participants believe ECFI and familiarity to be motivating factors that makes them willing to contribute to a joint crisis response across organizational borders. This means, although EOC has a higher effect of familiarity than ECFI, nevertheless, both ECFI and familiarity are perceived to be equally significant as two

	AB	CD	AC	BD	AB	CD	AC	BD
					Percentage			
0	48	44	65	68	43.24	39.64	58.56	61.26
>0	15	21	24	24	13.51	18.92	21.62	21.62
<0	48	46	22	19	43.24	41.44	19.82	17.12
Total	111	111	111	111	100	100	100	100

**Figure 3.**  
Distribution of  
response to ECFI as a  
motivation to  
contribute in crisis  
cooperation



**Figure 4.**  
Distribution of  
response to familiarity  
as a motivation to  
contribute in crisis  
cooperation



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essential motivating factors to contribute to a joint crisis response across organizational borders by crisis responders.

## 4. Discussion

### 4.1 *The effect of familiarity on EOC*

The findings from the current study indicate that there is a strong effect of familiarity on EOC. From earlier empirical studies conducted, it is also observed that familiarity, as a motivating factor not only influences higher negotiation outcomes but also influences EOC in collective task of crisis management in a positive manner. Results from the first part of the experiment suggested that higher familiarity leads to lower EOC although the survey results from the Likert scale response, the qualitative answers and the distribution of EOC across different scenarios indicate that familiarity is perceived as a motivating factor by actors in collaboration and that they consider familiarity to be an important determinant to decide the EOC. However, the aspect of decreasing number of response units, or in other words, lower EOC in case of higher familiarity is interesting and needs to be discussed carefully.

Qualitative answers from the participants in the surveys in combination with Likert scale response suggest that majority of the participants connected trust with familiarity. Trust is defined by [Mayer et al. \(1995\)](#) as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to control or monitor the other party” (p. 712). They further argue that risk taking or the willingness to become vulnerable is an outcome of trust which is different from willingness to take risks. This means, as an outcome of trust, it is enough to be willing to become vulnerable. Willingness to take risks is in fact going a step further and may not always necessarily be an outcome of trust ([Schoorman et al., 1996, 2007](#)). Trust has also been described as a pragmatic strategy to reduce uncertainty ([Meyerson et al., 1996](#)). Scholars argue that as humans we tend to avoid uncertainty if we can, so we prefer familiar over unfamiliar ([Maslow, 1942](#); [Curley et al., 1986](#); [DeWees and Lerner, 2018](#); [Luhmann, 2000](#); [Ladbury and Hinsz, 2009](#)). Familiarity also breeds trust ([Gulati, 1995](#); [Gefen, 2000](#)). This suggests that trust and familiarity are closely linked, and it is common to choose a familiar one over unfamiliar to avoid uncertainty. This means that the familiar one is also considered to be trustworthy and capable to fulfil the collective goal and collective task.

This provides an explanation behind lower EOC with higher familiarity. For the participants in the experimental setting, familiarity with the other organization meant prior knowledge about their capability, equipment and resources, which established trust. By placing trust on the capability of the other organization to be able to contribute to the collective task, the participants were able to decrease the uncertainty involved in fulfilling the collective goal. At the same time, higher trust on the other organization enables participants to retain the minimum number of response units that may be required to tackle the second emergency, which is their individual goal. Furthermore, the minimum number of response units required in the collective task provides a good indicator for the participants to find the relative balance between the joint and individual goal to finally choose lower EOC in case of high familiarity. Thus, although the participants choose lower EOC, higher familiarity enables them to decrease uncertainty in fulfilling both the joint and the individual goals simultaneously. It must be noted that in absence of familiarity, participants choose to send more units to the collective task, which although fulfils the collective goal but puts the individual goal at stake. In other words, absence of familiarity puts participants in a more uncertain situation, where either of the two goals, joint or individual goal could be fulfilled but not both. The participants compromise with their individual goal when they choose higher

EOC in absence of familiarity which creates an uncertainty towards fulfilment of their individual goal.

#### 4.2 *The effect of ECFI on EOC*

The definition and description of ECFI concurs that it is an anticipation of working with another party towards a collective goal for future benefit, tangible or intangible. It is to be noted that the variable is therefore limited to an expectation at a later period. Spearman analyses between EOC and willingness to contribute were carried out in the study, which revealed an absence of a perfect correlation between the two.

This means, in the experimental setting, ECFI provides no additional clues on what outcomes to expect from the collaboration, which creates a perceived environmental uncertainty for the participants (Duncan, 1972; Packard *et al.*, 2017). We also know the human tendency of avoiding uncertainty to the extent possible (Ellis and Shpeilberg, 2003). From these concepts, there seems to be some explanation on the effect of ECFI on EOC. It is difficult for the participants to be willing to become vulnerable based on an anticipation, in absence of prior knowledge or information. On the other hand, higher level of trust and familiarity on the partner(s) in a collective task to achieve collective goal makes the participants willing to take risk. This judgement about capability of the partner(s) in a collective task stems from prior knowledge about the partner organization, their role, mandate, past interaction and reputation. The qualitative answers provided by the participants concur with this. This explains the absence of statistically significant effect of ECFI on EOC.

#### 4.3 *EOC and Likert scale survey response*

Although the results from the experiment suggest no statistically significant effect of ECFI on EOC, nevertheless, results from the Likert scale survey demonstrate that both ECFI and familiarity are perceived to be equally significant drivers for EOC. These results may seem contradictory at first, however, not so surprising if the connection between EOC, i.e. EOC, willingness to contribute and perceived risk, is understood.

*4.3.1 Connections between EOC, willingness to contribute and perceived risk.* While EOC can be regarded as decision outcome, willingness to contribute in this study is the actual behaviour. In organizational psychology discourse, behaviour is described as a socio-psychological construct, often resulting in institutionalized behaviour which is concurred by norms, beliefs and values, that can be further identified within a social group or an institution (Weller and Quarantelli, 1973; Randall *et al.*, 2011). Based on the above description, willingness to contribute is the behaviour that is clearly driven by organizational values, norms, beliefs and reputation. On the other hand, EOC is the consequence manifested by the behaviour or in other words, it is operationalization of the behaviour. It is important to note that this operationalization of behaviour can be non-normative as well, due to other cognitive factors such as perceived risk that determine how an individual decides or acts in a scenario. Perceived risk has a cognitive mechanism that requires much deeper empirical research. It can be an interesting future research direction to know on what role perceived risk plays in risk scenarios and how it works in decision making.

In earlier studies (Kaplan, 2008; Pramanik *et al.*, 2015) it has been illustrated that component of risk bears a stronger influence on decision making. Considering that, in the present study, the participants connect familiarity with getting rid of uncertainty to achieve both collective and individual goals. Therefore, they perceive familiarity to be more significant while deciding on EOC. The design of the task in the current study is an outcome of the relative strength of the two goals, namely collective and individual. The participants

try to find a balance between individual and collective goal, while cognitively deciding on the higher risk of failing to meet either of the goals.

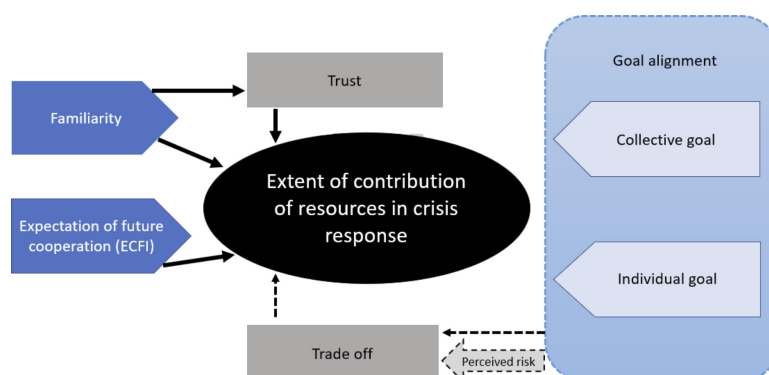
## 5. Conclusion

Resource mobilization is an essential pillar of crisis response (Aveni, 1978; Reilly, 1993). Considering no single team of emergency responder, more precisely, no single organization can meet the growing needs of crisis response because of the extreme conditions that arise, interorganizational collaboration is the only alternative to mobilize resources. Although, mobilizing resources to the cause of collective goal of crisis response may appear natural or obvious, nonetheless, is more complex. The complexity arises due to the number of responders that must be involved, their affiliation to their respective organization, clash in different ways of working, organizational cultures and values. Without the knowledge or deeper understanding of the teams of emergency responders, their respective organizational affiliation, set of values and ways of working, the whole crisis response effort is likely to suffer roadblocks leading to inefficient response to crises.

The current study offers empirical evidence on this critical pillar of crisis response called resource mobilization. It captures the drivers of resource mobilization in crisis response. It establishes that trust, familiarity, willingness to contribute and expectation of future cooperation are essential drivers for emergency responders to contribute resources during crisis response. During resource mobilization in crisis response scenarios, there is a likely trade-off to achieve either individual or collective goal. In such scenarios, the willingness to contribute and EOC of resources are driven not only by expectation of future cooperation, i.e. ECFI, trust and familiarity but also by individual perceptions of risk to meet either the collective or individual goals.

Figure 5 captures this in a schematic diagram showing the drivers of extent of resource contribution in crisis response. This enlightens us about the important role played by risk perception while making critical choices and trade-offs in uncertainties. In other words, in absence of willingness to contribute, no contribution of resources is possible to meet the collective goal of crisis response. Consequently, if there is no resource contribution, collaboration is not possible either.

Regarding normative implications of this study on crisis management and practice, ECFI and familiarity can both be considered as strong drivers that facilitate resource mobilization among teams of emergency responders to meet their collective goal of crisis



**Figure 5.**  
Schematic diagram of  
drivers towards  
resource contribution  
in crisis response

response. The rationale behind decisions of resource contribution and compromise of collective goals stems from lack of organizational knowledge about other team members, their culture, response capability and lack of overall familiarity with other organizations or team members. Therefore, to avoid such sub-optimal outcomes of crisis response, long-term commitment between organizations needs to be created. This shall increase trust and familiarity between organizations, which will enable teams to plan their resources better.

### Notes

1. Within subject design is an experiment design in which every single participant is exposed to every single treatment including control. Each participant thus serves as her/his own control.
2. "...do not know about Red Team's equipment, training or ability..."
3. "...do not expect to be involved in joint efforts with Red Team in the future..."
4. "...do know about Red Team's equipment, training and ability..."
5. "...do expect to be involved in joint efforts with Red Team in the future..."
6. Outliers are values larger than  $q_3 + 1.5 \times (q_3 - q_1)$  and smaller than  $q_1 - 1.5 \times (q_3 - q_1)$ , where  $q_1$  is the 25th percentile and  $q_3$  the 75th percentile.
7. Delaney and Vargha (2002) suggest that a  $A_{12}$ -value of 0.56 corresponds to a small effect size, 0.64 to medium and 0.71 to high.

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