Is Externality a Mediator of Experience–Behaviour and Information–Action Hypothesis in Disaster Preparedness?

Sasmita Mishra
Asian School of Business Management, India

Damodar Suar
Indian Institute of Technology, West Bengal, India

Douglas Paton
University of Tasmania, Australia

This study examines whether disaster experience and awareness, mediated by external locus of control, influence disaster preparedness behavior. Data were collected from 300 people in flood-prone and a further 300 in heat-wave affected areas in Orissa (a state situated in south-eastern part of India). Results reveal that prior experience of hazard events and knowledge of protective actions significantly facilitates flood and heat-wave preparedness. However, locus of control mediates this relationship. Disaster experienced and aware people characterised by having an external control were less prepared. External control partially mediates between experience–behaviour and information–action link. These findings suggest that the effects of personal experience and awareness on self-protective behaviour are weakened by external attribution.

Keywords: locus of control, disaster experience, disaster education, preparedness, Orissa/India

People can learn lessons about the need for and benefits of disaster preparedness from their personal experiences as well from formal (e.g., public education) and informal (e.g., discussion with other community members) sources. While early work on disaster preparedness argued for an important relationship between education and experience and disaster preparedness behaviour (Carter, 1979; Jackson, 1977), subsequent reviews (e.g., Sims & Bauman, 1983; Wenstein, 1989) revealed that personal experience and education do not always lead to the adoption of protective action. While explaining such findings, Sims and Bauman (1983) state 'Certainly people are educable and experience can teach … a body of psychological characteristics that are active in determining how any input will be interpreted and that consequently influence what impact that input will have on the actual behaviour'. In other words, people are predisposed with certain characteristics that influence experience–behaviour/preparedness and information–action/preparedness relationship. The task is to identify these characteristics and examine their role as predictors of preparedness.

Subsequently, several studies addressed themselves to identifying the psychological factors capable of playing an intervening role in this process. For example, people with optimistic bias are less likely to attend to information or act on warnings (Johnston, Bebbington, Houghton, & Paton, 1999). Similarly, self-efficacy influences people's receptivity to information and the likelihood of utilizing this knowledge to prepare for hazard consequences (Bishop, Paton, Syme, & Nancarrow, 2000; Lyons, 1991). Another important dispositional characteristic is sense of control. Sense of control mediates between experience and preparedness behaviour (Norris, Smith, & Kaniasty, 1999).

Address for correspondence: Sasmita Mishra, Asian School of Business Management, P.O. ASBM, Chandaka, Bhubaneswar-754012, Orissa, India. E-mail: sasmitamishra_iitkgp@yahoo.co.in

In the present study, the influence of a personality variable that taps into control beliefs (locus of control) on the experience–preparedness and education–preparedness relationships is examined. Locus of control, being a bipolar personality variable (external and internal), affects people's attributional style (Rotter, 1966). People characterised as having an internal locus of control tend to attribute the success, failure and outcomes in life to themselves. On the other hand, people having an external control orientation attribute the happenings in life to external forces such as fate, luck, and God. Since both the types of people have different orientations to interpreting the relationship between life events and personal outcomes, it can be hypothesised that people's prior experience of hazard activity may have differential impacts on their future preparedness (i.e., whether they take action to increase the likelihood of a positive outcome). Furthermore, their receptivity to hazard preparedness information may differ. This, in turn, may impact on their preparedness. Controversial findings (see Weinstein, 1989; Sims & Bauman, 1983 for review) and a dearth of studies in the Indian context justifies revisiting the issue of the experience–behaviour and information–action hypotheses in two different natural hazard situations.

The Hazard Events

The state of Orissa in India is the locus of this study. Situated in the south-eastern part of India, Orissa is exposed to several weather-related hazards, including flood and heat wave. Floods frequently hit the coastal districts of Orissa. The worst recent floods in Orissa were in the years 2001 and 2003 (www.osdma.org, 2008). India faces other meteorological hazards, with heat waves representing another significant threat to life (Sinha Ray, Mukhopadhyay, & De, 1999). The states of Bihar, Orissa, Punjab, parts of Maharashtra and Uttar Pradesh are affected regularly by heat waves in the years succeeding El-Nino event (Deshmukhe, Ramamoorthy, & Sengupta, 2000). In Orissa, the worst heat-wave conditions are experienced every year from April to mid-June. In 1998, some 2,000 people died of heat stroke (www.osdma.org, 2008). While both hazards are weather-related, they differ in an important respect. Flood has a dramatic occurrence with vividness of visibility of losses. In contrast, heat waves are an invisible killer.

Experience–Behaviour Link

It is widely believed that personal experience with a hazard influences self-protective behaviour. To protect oneself in face of a powerful external threat, the individual can change behaviour according to the perception of risk and put efforts cognitively to minimise that risk (Janoff-Bulman & Frieze, 1983). Similarly, common sense would support the conjecture that having experience of disasters would increase the likelihood of people acknowledging their risk and being motivated to act to minimise or mitigate that risk. However, the effect of personal experience on preparedness behavior is not decisive. In a review on effect of personal experience on self-protective behavior, Weinstein (1989) concluded that the effect of past experience is quite weak: '… those who commit motor vehicle accidents do not increase the use of seat belts, prior experience to crimes appear to have significant but only modest effect on self-protective behaviour, and disasters do appear to lead to increased preparedness but only for a while'. He also points out that studies often fail to control other correlates of precautionary behaviour and have typically used only crude dichotomous measures of past experience. Further, Norris, Smith and Kaniasty (1999), using modified measures of experience and preparedness, revealed a positive relationship between hurricane exposure and preparedness behaviour (Norris, Smith, & Kaniasty, 1999).

Studies have also demonstrated individual differences in the disaster experience–behaviour relationships. Those who do not experience significant loss from a severe disaster can develop 'normalisation bias,' resulting in their subsequently perceiving a relatively lower risk to themselves from that hazard. Contrarily, exposure coupled with substantial loss can create fear and anxiety in relation to that hazard (Mileti & O'Brien, 1992). The affective components of disaster experience, like fear, anxiety and preoccupation, can facilitate taking protective action (Weinstein, Lyon, Rothman, & Cuite, 2000). However, the depression associated with repeated exposure diminishes motivation to adopt protective action and people can develop symptoms of 'learned helplessness' (Hanson, Noulles, & Bellovich, 1982). Such people fail to find out appropriate behaviour to cope with life-threatening events. Similarly, Paton, Smith and Johnston (2005) found that high levels of hazard-related anxiety can reduce the likelihood that people will prepare.

Learning appropriate coping strategies from an experience can influence future preparedness. As Taylor and Schneider (1989) argue 'discovering how the event could have been avoided may paradoxically contribute to a sense of mastery by providing, albeit retrospectively, a plan for dealing with the event should it occur again'. This implies that those who are able to mentally undo the event and ruminate and introspect will be more prepared for future events. However, with regard to the efficacy of this process, it is important to distinguish between the ways in which people 'mentally undo the event' (Macleod & Paton, 1999). The latter authors discuss how if 'mentally undoing the event' involves engaging in counterfactual thinking, preparing for future events is unlikely. In contrast, engaging in behavioural self-blame, as long as people can perceive how they might exercise control, can lead to future preparedness. That is, we would expect that this behaviour is more likely with those with an internal locus of control.

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Since internals are more likely to attribute the causes of things in themselves, they will be better able to analyse prior hazard experience. Such retrospection and introspection will help them find out the adaptive strategies and develop a plan for dealing with the event should it occur again. They will develop hazard instructiveness (Lindell & Prater, 1999) and will show more preparedness behaviour. Contrarily, externals, because of their external orientation, are less likely to engage in introspective analysis and will show less preparedness behavior. Since locus of control is a mechanism through which previous experience to disasters may influence future preparedness, it can be a possible intermediate variable mediating the influence of previous experience to disaster on their preparedness behaviour (see Baron & Kenny, 1986; Frazier, Tix, & Baron, 2004 for discussions on mediator and moderator variables). Accordingly, the first set of research questions is: (a) Does previous experience with flood and heat wave influence preparedness behavior?; and (b) Whether externality mediates the experience-behavior hypothesis.

Education–Behaviour Link

The general assumption is that providing the public with information about hazard activity results in better preparedness (Smith, 1993). However, the findings are inconsistent (Sims & Bauman, 1983). The nature of the educational program and the nature of behaviour to be modified are important factors determining success of an educational program. An educational program in the form of a television campaign has differential impact on behaviour than a mailed brochure. Moreover, certain behaviour compared to others is more resistant to change. For example, it is comparatively easy to change diet and exercise through educational campaign than driving habits (Sims & Bauman, 1983). In addition, which medium is effective to disseminate and adopt hazard related education is inconclusive (Sorensen, 1983). The contents and mode of presentation of educational or awareness programs further influence their impact. The presentation of disaster damage images heightens interest and captures attention of general audience (Scanlon, Luukko, & Morton, 1978). However, such 'fear appeals' may lead to purposeful rejection of information (Janis & Feshback, 1957). Similarly, Lopes (1992) finds that the presentation of disaster damage image creates avoidance and denial to the effects of disaster and inhibits action. He suggests that display of correct behaviour along with the images might be effective in yielding preparedness behaviour.

Avoidance of information is also influenced by the traits that people possess permanently (Rokeach, 1960). Irrespective of the severity of the hazard and contents of disaster education, recent studies have failed to find any link between levels of awareness and degree of community readiness (Ballantyne, Paton, Johnston, Kozuch, & Daly, 2000; Johnston, Bebbington, Lai, Houghton, & Paton, 1999; Lindell & Whitney 2000). It is because public education programs that focus on hazard information and activities to promote safety may increase awareness but the actual adoption of risk reduction behaviour is influenced by how people interpret and think about disasters (Paton, Smith, & Johnston, 2000).

According to Bandura (1986) if one feels that outcomes in life are determined by factors external to self, then searching for information is relatively futile and in that situation avoiding information may become a more attractive response to threat. Earlier studies also revealed that those who feel in control of their own destinies (internal locus of control), purchase flood insurance or plan effective defences against the threat of tornado. Those who feel that other forces, such as God, fate or luck control their lives (external locus of control) are those who fail to purchase flood insurance or fail to anticipate defences against the tornado threat (Bauman & Sims, 1972, 1978). Logically put, since externals (those who attribute the happenings in life to external forces such as fate, luck, and God) avoid information, they are more likely to fail to prepare for future disasters. Hence, locus of control is a generative mechanism which influences how and why disaster education influences preparedness. It is an intermediate variable that may mediate the influence of disaster education on preparedness (see Baron & Kenny, 1986; Frazier, Tix, & Baron, 2004 for discussions on mediator and moderator variable). Hence, the second set of research questions is: (a) Does awareness about the hazard influence flood and heat-wave preparedness? (b) Whether externality mediates the information-action link?

Conceptually mediators are such variables that explain 'how' and 'why' the focal independent variable influences the focal dependent variable (Baron & Kenny, 1986). The operational definition of mediation suggests: (a) a significant correlation between the independent variable (experience and education) and the dependent variable (preparedness behaviour), (b) significant relationships between the mediator (locus of control) and both the independent and dependent variables, and (c) a weak or insignificant relationship between the independent and dependent variables when the mediator is included (Baron & Kenny, 1986).

Earlier evidence suggests that age and family type influence disaster preparedness behaviour (Mishra & Suar, 2004). Hence, the research questions will be answered by controlling the confounding effects of age and family type on disaster preparedness.

Method

Sample

The flood preparedness data were collected from flood-prone areas declared by Government of Orissa — Khurda, Puri, Cuttack, Bhadrak, Balasore, Jagatsighpur,

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Table 1
Sample Profile

Variables	Flood preparedness	Heat-wave preparedness
Age		
18–35 (%)	64.3	75.0
36–55	28.3	17.0
56 +	7.3	8.0
Sex		
Male (%)	69.3	56.0
Female	30.7	44.0
Family type[1]		
Nuclear (%)	29.7	47.3
Joint	49.0	44.3
Extended	21.3	8.3
Caste[2]		
High (general) caste (%)	57.3	70.3
Low caste	42.7	29.7
Education		
Literate (%)	72.0	96.3
Illiterate	28.0	3.7
Housing		
Own (%)	98.0	34.3
Rented	2.0	64.7
Annual family income (in Rs)		
Low: ≤ 5000 (%)	48.3	14.3
Middle: 5,001–20,000	37.0	28.3
High: 20,001 +	14.7	57.3

Note: [1] Nuclear family refers to the family consisting of father, mother, and their children, Joint families consist of two to three generations living under one roof and in extended families people from many generations stay together.

[2] Scheduled castes are listed in the Constitution of India and are untouchables in the traditional Hindu caste system. There are also other (socially, educationally, and economically) backward castes identified by the Mandal Commission in 1980. The contrasting groups constitute the general/higher castes.

and Kendrapara districts (www.osdma.org). For heat-wave preparedness, the residents of Bhubaneswar and Titlagarh participated, as the places were susceptible to high mercury levels in every summer season and were affected by heat waves in the recent past. Before the onset of disaster seasons, data were collected in the month of July from flood prone areas and in the month of April from heat-wave affected areas. Adult members who were 18 years of age or above were included in the sample. One member was surveyed from each household. For illiterate respondents, the literate family member/community member read the questionnaire and listed the replies.[1]

With the consent of participants, 600 questionnaires were distributed in each disaster context. The purpose of the study was briefed to each respondent. Respondents were assured confidentiality of their answers and were told that their responses would be used for research purpose only. The questionnaires were collected personally after a fortnight. When 300 respondents (50%) in each disaster context returned the completed questionnaires, further collection was stopped.

The respondents from both flood and heat-wave areas were predominantly males and literate; most of them were in economically productive age groups, from high (general) castes and from nuclear and joint families. In flood samples, almost half of the surveyed families were from low-income groups and were in their own houses. Contrarily, the heat-wave samples were taken from the cities, and therefore, more than half of the families had high incomes and were in rented houses (Table 1).

Measures

The survey instrument was comprised of demographic and socioeconomic measures such as age, sex, education, caste, family types and income, and measures of preparedness, experience, education and locus. Items in the inventory/scale were translated into vernacular Oriya language and were translated back to English to ensure the validity of Oriya translation by dual-language experts. The questionnaires were in vernacular language.

Preparedness. The preparedness items were 25 each for flood and heat wave. Three experts in disaster research judged the items. Twenty items on each preparedness measure agreed by them were retained for the final study.

Flood preparedness. A 20-item scale was prepared in the pattern of Mulilis-Lippa Earthquake Preparedness Scale (Mulilis, Duval, & Lippa, 1990). The scale items were culled from all standard suggestions appearing in flood preparedness brochures and web pages (Bharat Jnana Bijnana Samiti, Orissa, 2001; OSDMA & UNDP, 2003; www.osdma.org). The scale measured the extent to which a person was prepared for floods and how difficult the person perceived preparing for floods. Sample instructions and items include, 'Do you keep the following things ready before flood season?': 'Make the radio sets fully serviceable'; 'Keep torch lights and candles ready'; and 'Do you know any shelter house nearby?' Respondents were asked to indicate the extent of preparedness with regard to each item in the scale by checking either *Yes* (score = 3), *Unsure* (score = 2), or *No* (score = 1). Each item score correlated positively and very significantly with the total item score. The correlation ranged from as low as 0.25, $p < .001$ to as high as 0.64. Thus, the items had high internal consistency. Respondents were asked to rate the difficulty of preparing for each item on a 5-point scale ranging from *Not at all difficult* (score = 1) to *Extremely difficult* (score = 5). The total score of difficulty had high negative correlation with total score of preparedness ($r = –0.76$, $p < .001$). When people faced or experienced more difficulty in preparing for flood, they were less prepared. This implied high convergent validity for the scale. The face validity was very high because the items were drawn

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from the guidelines published by government and non-governmental organizations. Reliability coefficients on the current sample were high for preparedness items (Cronbach alpha = 0.80) and perceived difficulty (Cronbach alpha = 0.76) measures.

Heat-wave preparedness. Another 20-item scale was also prepared in the same pattern (Mulilis, Duval, & Lippa, 1990) for heat-wave preparedness. Sample instructions and items include, 'Do you keep the following things ready before summer season?' 'Fridge or mud pot to store cold water'; 'Hang *seetal pati* (specially made curtain) to prevent your house from heat'; and 'Do you listen to the government heat-wave warning?' The scale items were culled from authentic sources and had high face validity. The highest item to total correlation was 0.61 and the lowest was 0.33, $p < .001$. When people perceived more difficulty for the measures of heat wave, they were less prepared (r = -0.79, $p < .000$). This entailed the convergent validity. The reliability on the current sample was high for heat-wave preparedness (Cronbach alpha = 0.75) and perceived difficulty (Cronbach alpha = 0.76) measures.

Flood and heat wave experience/exposure. The severity of exposure to flood was measured as a count of nine major flood related stressors: (1) perceived threat to life, (2) injury to oneself or another household member, (3) household property loss/ crop loss, (4) narrowly escaped from being washed away, (5) seen the nearby village being washed away, (6) death of relatives in flood, (7) witnessing someone being injured/dead, (8) heard of someone in your town or village who was injured or died in flood, and (9) house damaged fully/partially. Heat-wave experience severity was measured as count of seven major heat-wave related stressors: (1) perceived threat to life, (2) injury to oneself or another household member, (3) narrowly escaped a sunstroke, (4) death of relatives in heat wave, (5) witness of someone being injured/ dead, (6) remained sick for 3/ 4 days, and (7) heard of someone in your town or village who was injured or died in heat wave. Experiencing the stressor was considered as '1' or else '0'. The score on flood experience/ exposure ranged from 0 to 9 and on heat wave from 0 to 7. The item total correlation in case of flood was as high as 0.64 and as low as 0.46, $p < .001$ (Cronbach alpha = 0.73). The item score to total score correlation in case of heat wave ranged from 0.24, $p < .001$ to 0.40 (Cronbach alpha = 0.70). High score indicated more experience/exposure of the disaster.

Flood and heat-wave education. Seven items measured flood education. They were: (1) 'Have you seen any flood hazard zone maps for your district or state?' (2) 'Do you know what your state's flood warning system is?' (3) 'Do you know what to do after getting flood warning?' (4) 'Do you know what the danger signal of a dam is?' (5) 'Do you know the diseases and other risk involved during and after flood?' (6) 'Do you know what precautions to follow to avoid those risks?' (7) 'Do you know about the importance of trees in flood prevention?' Another set of seven items measured heat-wave education. They were: (1) 'Do you know what to do after getting heat-wave warning?' (2) 'Do you know what precautions you should adopt in order to escape from heat stroke?' (3) 'Do you know what precautions to be adopted to save children/old people/pets from heat stroke?' (4) 'Do you know what the risk behaviours in heat-wave period are?' (5) 'Do you know what the symptoms of heat stroke are?' (6) 'Do you know what to do when a person faints because of heat stroke?' (7) 'Do you know about the importance of trees in heat-wave prevention?' The items were culled from the education provided by Orissa Disaster Mitigation Authority in different periods (OSDMA & UNDP, 2003). The affirmative reply to the above question was coded as '1' or else '0'. The item to total correlation for flood education ranged from as high as 0.74 to as low as 0.41, $p < .001$ (Cronbach alpha = 0.78) and for the heat-wave education from highest 0.72 to lowest 0.44, $p < .001$ (Cronbach alpha = 0.73). High scores on all items indicated more disaster education.

Locus of control. Seven items were taken from the Rotter's locus of control scale (Rotter, 1966). This shorter version of the scale has been used to measure locus of control in disaster studies in Indian context (Suar, Mandal, & Khuntia, 2002) and yielded good reliability. Each item of the scale contained a pair of statements, one indicating external (coded as '1') and the other indicating internal (coded as '0') orientation. When the scores on the item were factor analyzed, one usable factor loaded on six items (items 2, 11, 13, 15, 18, and 21) was extracted that explained 50.39 % of total variance (Cronbach alpha = 0.74) in flood sample and 50.03% of total variance (Cronbach alpha = 0.80) in heat-wave sample. High scores represented more externality.

Results

Descriptive statistics and correlations of variables used in the study are given below (Table 2). The reported age, experience, education, external control, and preparedness data were in metric scale and family types were treated as dummy variables (presence of a family type = 1, otherwise = 0). The correlation matrix indicated that people of old age, from joint families, having more disaster experience and education were more prepared for the flood. However, more external control decreased flood preparedness. In case of heat-wave preparedness, people from extended families, having more disaster experience and education were more prepared. As earlier, externality decreased heat-wave preparedness. In the heat-wave context, people from nuclear families were less prepared for the disaster.

As age and family were found to influence preparedness behaviour (Mishra & Suar, 2004), these variables were controlled in the first step of an hierarchical regres-

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Table 2

Descriptive Statistics of and Intercorrelation Between Studied Variables

Variables	1	2	3	4	5	6	7	8	9
1. Age	1.00	–.03	.03	–.00	.10	.11	.01	.15**	–.16**
2. Nuclear family	.01	1.00	–.64***	–.34***	–.01	–.05	–.09	–.01	.07
3. Joint family	.00	–.85***	1.00	–.51***	.04	.22***	.08	.23***	–.26***
4. Extended family	–.01	–.29***	–.27***	1.00	–.06	–.22***	.01	–.27***	.24***
5. Experience	.10	–.13*	.08	.09	1.00	.17**	–.18**	.26***	–.15*
6. Education	.16**	–.02	.01	.03	.14*	1.00	–.15*	.50***	–.33***
7. External control	.05	–.02	.05	–.04	–.26***	–.23***	1.00	–.21***	.15**
8. Preparedness	.04	–.13*	.03	.19**	.34***	.33***	–.29***	1.00	–.76***
9. Difficulty	–.11	.03	.08	–.19**	–.26***	–.35***	.25***	–.78***	1.00
Flood									
M	33.96	.30	.49	.21	5.80	4.06	2.49	42.46	53.62
SD	14.04	.46	.50	.41	2.24	2.14	2.09	8.31	13.46
Heat wave									
M	31.02	.47	.44	.08	2.74	6.03	2.99	51.00	35.14
SD	11.30	.50	.50	.28	1.94	1.47	2.10	6.15	9.73

Note: The correlations above the diagonal are in the context of flood and below the diagonal are in the context of heat wave.
*$p < .05$. ** $p < .01$. ***$p < .001$.

sion. As mentioned earlier, family types were dummy variables with joint family as the reference group in the flood context. Results revealed more aged people were more prepared for the flood and extended families were less prepared for flood than the joint families. In the case of heat-wave preparedness, age did not predict preparedness. With nuclear family as the reference group, the extended families were found to be more prepared than the nuclear ones.

Experience of and education about flood facilitated preparedness in the second step partialled out the effects of age and family type on preparedness. More experienced and knowledgeable inhabitants were more prepared for the flood. In the third step, when age, family type and experience were controlled, people's externality inhibited flood preparedness (Table 3).

In the heat-wave sample, when the confounding effects of age and family type were controlled in the second step of regression analysis, similarly more experienced and educated people were found to be more prepared. In the third step when the effects of age, family type, experience and education were partialled out, externality reduced heat-wave preparedness. All these effects were significant with significant change in R^2. These findings provided affirmative replies to the first question in each set of questions. While experience and education facilitated preparedness behaviour in both flood and heat-wave context, externality inhibited the preparedness.

Further results confirmed that externality partially mediated the relationship between experience and preparedness behaviour as well as disaster education and preparedness behaviour in both the flood and heat-wave contexts. First, in accordance with the assumptions of partial mediator (Baron & Kenny, 1986), disaster experience and education (independent variables), and locus of control (mediator) related to flood and heat-wave preparedness behaviour (dependent variables). Second, the independent variables significantly related to the mediator (see Table 2). Third, the relationships between the independent variables and the dependent variables became weaker when the mediator was introduced in the regression equation (see Table 3).

Discussion

This study tested whether disaster exposure and awareness, mediated by external control, influenced preparedness behaviour in flood and heat wave. When the confounding effects of age and family type on preparedness behaviour are controlled, disaster experience and education have facilitated flood and heat-wave preparedness. Externality has not only reduced preparedness behaviour but also has weakened the experience-preparedness and awareness-preparedness link. People having disaster experience and education of protective action are less prepared when they have external attributions to happenings in life.

The study of experience-behaviour hypothesis has suffered from methodological problems and remained indecisive until Norris, Smith and Kaniasty (1999) concluded that the effects of experience on hurricane preparedness are lasting, pervasive, and substantial. The strengths of their study are (a) the study of an event of historical significance, (b) capturing severities of exposure, and (c) using a context-relevant inventory to assess precautionary behaviour. Accordingly, the present study has adopted measures of experience that includes severities of exposure and context-relevant preparedness scale in the pattern of widely accepted Mulilis and Lippa (Mulilis,

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Table 3

Disaster Experience, Education, and Locus of Control Predicting Preparedness Behavior

DV	IV	B[a]	SE	β	R^2	F[b]	R^2 change	F change
Flood preparedness								
Step 1								
	Age	0.09	0.03	.15**	0.11	11.78***		
	Nuclear family	–1.93	1.06	–0.11				
	Extended family	–6.22	1.18	–.31***				
Step 2								
	Experience	0.87	0.2	.23***	0.16	14.08***	0.05	18.85***
Step 3								
	Experience	0.74	0.2	.20***	0.19	13.99***	0.03	11.62***
	External control	–0.73	0.21	–.18***				
Step 2								
	Education	1.75	0.2	.45***	0.29	30.65***	0.19	78.05***
Step 3								
	Education	1.65	0.2	.42***	0.32	27.10***	0.03	9.41**
	External control	–0.6	0.2	–.15**				
Heat wave preparedness								
Step 1								
	Age	0.03	0.03	0.05	0.04	4.46**		
	Joint family	1.00	0.73	0.08				
	Extended family	4.65	1.31	.21***				
Step 2								
	Experience	1.01	0.17	.32***	0.14	12.14***	0.1	33.69***
Step 3								
	Experience	0.82	0.18	.26***	0.19	13.58***	0.05	16.75***
	External control	–0.66	0.16	–.22***				
Step 2								
	Education	1.36	0.23	.32***	0.14	12.53***	0.1	35.21***
Step 3								
	Education	1.13	0.23	.27***	0.19	14.17***	0.05	17.87***
	External control	–0.67	0.16	–.23***				

Note: [a] B = beta, SE = Standard error of beta, β = standardised beta.

[b] In the first step, F value is against 2, 297 df, in the second step against 3, 296 df, and in the third step against 5, 294 df

* $p < .05$. ** $p < .01$.*** $p < .001$.

Duval, & Lippa, 1990) earthquake-preparedness scale. Moreover, the research questions are answered in the context of two natural disasters, where people have successive experiences of each disaster.

Supporting the experience–behaviour hypothesis, the evidence suggests that prior hazard experience resulted in increased flood and heat-wave preparedness. Each flood teaches a new lesson to people of flood-prone areas of Orissa. Being poor enough not to be able to find an alternative place to reside, most have developed their own coping mechanisms to cope with recurring flooding. People in heat-wave affected areas had one severe experience in the year 1998 and each year the mercury level in that area rises very high. Exposure to that disaster and the likelihood of such impacts in future might have reduced optimistic bias (Weinstein, Lyon, Rothman, & Cuite, 2000) and made people more prepared for the heat wave.

With external attribution, people have failed to anticipate defences against the flood and heat-wave threat (Bauman & Sims, 1972, 1978) and hence, are less prepared. Being externally controlled, they have thought that agencies like NGOs, government and in the last case, God, will save them and there is no need to be prepared for in advance. Thus, external locus of control is risk factor (Wheaton, 1982) that has inhibited preparedness.

Contradicting earlier findings (Baker, 1980; Fleisher, 1972; Lindell & Whitney, 2000; Paton et al., 2005; Paton & Johnston, 2001; Sims & Bauman, 1983), disaster education has enhanced preparedness in both contexts. As people had multiple experiences of the disasters and there was possibility of future impacts, people found disaster education

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programs useful and assimilated the information provided to them, which resulted in enhanced preparedness. It is also possible that cultural characteristics may have influenced this observation. India's score on the cultural dimension of Power Distance (77) is almost twice that of the United States (40). High scores on this dimension reflect a tendency to defer to authorities and to comply with their instructions. While this possibility must remain tentative until more work is undertaken, this possibility is supported by the fact that information on disaster preparedness is disseminated from credible sources (government and NGOs with strong local links). The credibility attributed to information in this context may have influenced the hazard and mitigation cognitions of people in flood and heat-wave affected areas and facilitated their preparedness for future disasters.

The mediating role of externality in both flood and heat-wave preparedness indicates that although people with disaster experience and awareness are more prepared, their external control has inhibited such preparedness. The effects of external control are so potent that it has partially reduced the effects of experience on disaster preparedness. Those having external control have learned little from their past experiences. They have thought that they could do little against impending disasters. They have indulged in pleasing God by various offerings and prayers to get rid of such catastrophes (as revealed from the conversation with local people). Hence, their preparedness for future is reduced. The findings also implied that hazard information and experience is influenced by 'how' and 'what' people think (Sims & Bauman, 1983). People who are externally controlled think that any action they learn is of no use as things are controlled by external forces. Hence, disaster education and experience have limited impact on externally controlled people.

In accordance with Lewin's (1951) force-field analysis, two forces have acted on the people of flood-prone and heat-wave affected areas. The inducing forces are experience of and education about the disaster and the inhibiting forces are external control for disaster preparedness. The inhibiting forces are not so strong in strength to nullify the impacts of inducing forces. But, definitely the forces have acted upon them and thereby reduced the strength of experience and awareness facilitating preparedness.

The respondents were studied just before the onset of respective disasters. Confirming the earlier findings on positive impacts experience and education on disaster preparedness, it has further gathered evidence that external control is a risk factor that decreases the impacts of education and experience. The consistent findings across two disasters add evidence to the existing knowledge.

Recent work on disaster planning has emphasised community resilience building as a fundamental element of risk management (Paton, 2006; Paton et al., 2008). The conceptualisation behind this approach is that communities are capable of drawing upon internal resources and competencies to manage the demands, challenges and changes encountered. Identification of the factors that promote resilience and growth and intervention strategies that facilitate resilience and growth, have become of utmost importance. Based on our findings, it can be suggested that disaster education programs inclusive of hazard information and behavioural act should additionally incorporate information to change the attributional style. The internal attribution is a resilient factor that boosts the input received from experience and education. Providing training to people to control their lives and destinies based on experiences and own resources in the aftermath of a disaster will make them better prepared for the disaster.

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