

Spontaneous Activation of Schemata under Stress Getting control over earthquake threat^a

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Problem and Theoretical Approach.

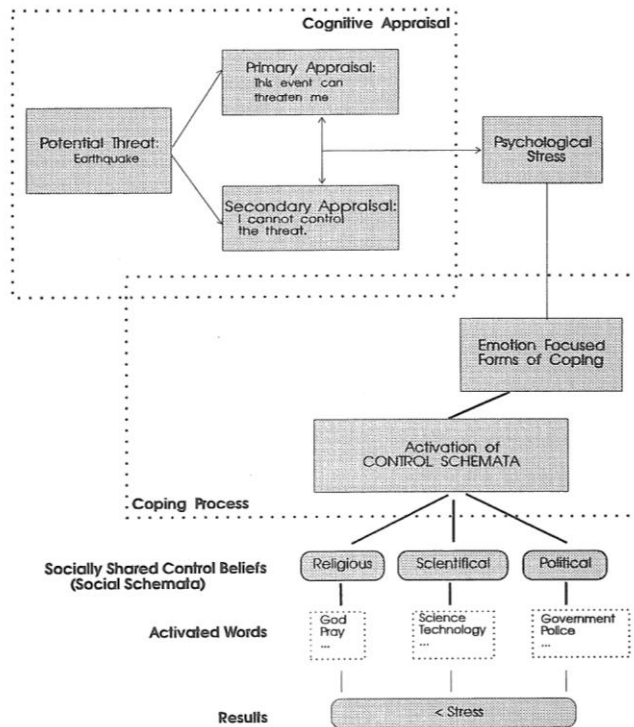
The idea that a sense of control or mastery is an essential part of psychological wellbeing has been widely accepted. But research has repeatedly found that perceptions of control go far beyond our actual capabilities to master the environment, and they are extended to situations where no objective control is exerted (e.g., Langer, 1975). Contrarily to objectivistic views of mental health, beliefs of control over uncontrollable events have been found to positively relate to wellbeing (Taylor, 1983; Taylor & Brown, 1988). Within this kind of approach, coping with earthquake threat is an interesting topic to study because it deals with coping with a highly destructive and uncontrollable event. As a matter of fact:

1. Earthquake hazard is the most threatening natural hazard that Portuguese population has to face.
2. Although seismic phenomena are well characterised by the geophysical sciences, it is still impossible to accurately predict the occurrence of such a destructive event.
3. According to our previous research, people perceive seismic risk both as a highly uncontrollable risk and a risk that affects themselves. Nevertheless, other studies on the Portuguese population show that the common citizen is not informed about what to do in case of an earthquake.

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Figure 1.
Graphical representation of the theoretical model used.



In Lazarus and Folkman's (1984) model of stress, the possibility of an earthquake, being perceived as personally threatening (primary appraisal) and uncontrollable (secondary appraisal), corresponds to a «stressor», leading to psychological and physiological stress responses. As there is nothing to do to prevent the earthquake to happen, according to the same model people will engage in emotion focused coping strategies to deal with the unpleasant feelings the threat imposes on them.

Research on systematic exposition to hazards has shown that people who live in hazard prone environments develop some cognitive adjustments to deal with danger and uncertainty (e.g., Kates, Burton and White, 1978). In line with those results, we have shown in a field study (Lima, 1991) that people who move to an environment with higher levels of seismic risk present stronger control beliefs over the earthquakes than those who remained in lower seismic risk areas. Those control beliefs are a kind of vicarious secondary control (Rothbaum *et. al.*, 1982), whereby people rely on some more powerful agent to restore their sense of control

over the environment. In our research, although subjects perceived earthquakes as externally determined, they could still keep some control over the phenomenon, using three types of socially produced control beliefs:

Religious Control. If God is considered as the ultimate determiner of earthquakes, believers can start a serie of actions in order to influence God's Will (to pray, to make a promise) and to prevent a disaster.

Scientific-Technical Control. If earthquakes are considered as natural phenomena and Science is seen as efficient to deal with nature, we can suppose that the confidence on science and technology is another form of restoring the control over an uncertain situation.

Political Control. If there is political trust, if people believe that their government has efficient plans to deal with a disaster, they can restore their sense of mastering over the environment.

In line with those results, this poster presents an experimental study that tries to show that: *When earthquake threat is made salient, people will spontaneously activate control schemata to cope with the threat.* This hypothesis will be tested in three studies, each one dealing with a specific kind of control beliefs: Religious, Scientific and Political.

Method

Subjects.

480 students participated in these studies, which ran on two phases. On the First Phase, all subjects answered a questionnaire containing a control over the earthquake beliefs scale (Lima, 1991, see Table 1, p. 60) and a trait anxiety scale (STAI-Y2, Spielberger et al., 1983). The second part of the experiment took place a month later. On this Second Phase 79 subjects (St₁:N=24; St₂:N=28; St₃:N=27) were selected, according to (i) their anxiety levels: low trait anxiety subjects; and (ii) strength of control beliefs: either very high (schematic subjects) or very low aschematic subjects) on each of the three types of control beliefs).

Manipulated variable.

The independent manipulated variable in this study was «earthquake threat». In each of the three studies, subjects were randomly assigned to either the experimental or the control conditions.

In the experimental condition (Threat) subjects were told that they would participate in a study concerning the responses to an emergency situation. They were trained in the experimental task until they fully understood it, and they were asked to watch a 3 minutes video/film about earthquakes. Immediately afterwards, the experimental task took place.

Table 1.
Factor analysis of the control over earthquake beliefs scale.

	<i>Fact1</i> <i>Religious</i> <i>Control</i>	<i>Fact2</i> <i>Scientifical</i> <i>Control</i>	<i>Fact3</i> <i>Political</i> <i>Control</i>
The only thing we can do to prevent an earthquake is to pray	.801	.035	.059
The consequences of an earthquake are only known by God	.709	-.052	-.044
There is nothing we can do to prevent the consequences of an earthquake	.554	-.160	.050
Earthquakes have unnatural origins	.394	-.307	-.002
Control Governmental agencies can establish safer building standards in order to prevent catastrophic collapses	-.133	-.701	-.058
Civil engineers know how to built safe houses	-.243	.661	-.012
Science can predict the occurrence of earthquakes	-.149	.540	.328
Earthquakes are natural phenomena, just like the rain or the wind	-.049	.431	-.269
The authorities have efficient emergency plans	.204	.041	.758
Our government would not know what to do if there was a strong earthquake here in Lisbon	.191	.083	-.725
Explained variance (%)	26.9	15.5	15.0

In the control conditions, subjects rehearsed the experimental task and afterwards they performed it.

Experimental task.

The task employed was a word location test (Cambor *et al.*, 1988; Stward *et al.*, 1991). Subjects were asked to press a key (left or right) as quickly as possible in response to the location of a target word. The target word was presented either above or bellow a fixation point, indicated by

« ————— X ————— »

in the center of a computer monitor. Target words were presented for 500 msec-onds, with a 1.5 seconds interval between trials. Reaction times (RTs) were recorded. Each subject practised on a series of 10 neutral words. The experimental task consisted of 52 words, including 26 schema related words (i.e., «God» for religion schematic subjects; «engineering» for the science schematic subjects and «government» for the politic schematic subjects) and 26 neutral words paired on length and frequency with the others.

Results.

Study 1. Religious schema.

A three way ANOVA (with repeated measures on the last factor) was performed on the mean RTs : Experimental condition (control vs. threat) x Group (schematic vs. aschematic) x Valence (schema related word vs. neutral word). Results show that all subjects respond quicker to neutral than religious words, except schematic subjects under threat. In that situation, religious subjects respond quicker to the schema related words than to the neutral words (Table 2 and Figure 2). This result, compatible with our predictions, allows us to say that in a condition of earthquake threat, religious subjects spontaneously activate their control beliefs in order to restore their sense of control over the environment. Separate ANOVAS performed on neutral and schema related words confirm this result: while there is no significant effect for the neutral words (Exp.Cond. $F(1,20)=.088$, $p>.70$; Group $F(1,20)=.883$, $p>.30$; Interaction $F(1,20)=.378$, $p>.70$), there is a significant interaction in the case of religious words (Interaction $F(1,20)=5.44$, $p<.03$; Exp. Cond. $F(1,20)=.422$, $p>.50$; Group $F(1,20)=.895$, $p>.30$).

Study 2. Scientific-Technical schema.

A three way ANOVA (with a repeated measure on the last factor) was performed on the mean RTs : Experimental condition (control vs. threat) x Group (schematic vs. aschematic) x Valence (schema related word vs. neutral word). Contrarily to our predictions, no significant effects were found. Separate ANOVAs performed on neutral and schema related words do not show any significant effects either (Table 3 and Figure 3).

Table 2.
Study 1. Religious control: variance analysis.

Between subjects effects				
<i>Source of variation</i>	DF	MS	<i>F</i>	<i>p</i>
Within Cells	20	.02		
Group(G)	1	.02	.02	1.04.319
Exp. Condition (EC)	1	.00	.00.967	
G x EC	1	.04	2.04	.168
Within subjects effects				
<i>Source of variation</i>	DF	MS	<i>F</i>	<i>p</i>
Within Cells	20	.00		
Valence (V)	1	.01	.01	5.60.028
G x V	1	.00	.01	.931
EC x V	1	.00	1.31	.267
G x EC x V	02	6.59	.018	

Table 3.
Study 2. Scientific control: variance analysis.

Between subjects effects				
<i>Source of variation</i>	GL	MQ	<i>F</i>	<i>p</i>
Within Cells	24	.03		
Group (G)	1	.00	.04	.852
Exp. Condition (EC)	1	.01	.22	.641
G x EC	1	.02	.69	.415
Within subjects effects				
<i>Source of variation</i>	GL	MS	<i>F</i>	<i>p</i>
Within Cells	24	.00		
Valence (V)	1	.00	.13	.719
G x V	1	.00	.24	.627
EC x V	1	.01	1.72	.202
G x EC x V	1.01	2.59	.121	

Table 4.
Study 3. Political control: variance analysis

Between subjects effects				
<i>Source of variation</i>	GL	MQ	<i>F</i>	<i>p</i>
Within Cells	23	.04		
Group (G)	1	.04	.96	.338
Exp. Condition (EC)	1	.01	.20	.656
G x EC	1	.06	1.51	.232
Within subjects effects				
<i>Source of variation</i>	GL	MS	<i>F</i>	<i>p</i>
Within Cells	23	.01		
Valence (V)	100	.06	.805	
G x V		.00	.18	.675
EC x V	1	.00	.10	.752
G x EC x V	1	.02	1.79	.194

Study 3. Political schema.

The same kind of ANOVA was performed on RTs related to this kind of schema. The pattern of results is very similar to the first study, though the results only approach the significance level. Separate 2 (Group) x 2 (Experimental Condition) ANOVAS were performed for each type of word (Table 4 and Figure 4).

For schema related words, only the interaction effect approaches the significance levels (Interaction $F(1,23)=2.97$, $p<.09$; Exp. Cond. $F(1,23)=.237$, $p>.60$; Group $F(1,23)=.387$, $p>.50$). For neutral words there are no significant effects (Exp.cond. $F(1,23)=.055$, $p>.80$; Group $F(1,23)=1.065$, $p>.30$; Interaction $F(1,23)=.233$, $p>.60$).

These results tend to show that only schematic subjects under stress preferentially process schema related words, in order to regain the sense of control over the threat.

Conclusions.

Our results show that two kinds of control schemata are activated by subjects in an earthquake threat condition: religious and political control schemata. We could find no evidence for the activation of the scientific schema in the same situation.

These kind of control schemata, as we argued elsewhere (Lima, 1990), are cognitive products of interactive social groups, who, for a long time, have managed to cope with stress in a earthquake prone area. The individual activation of these kind of cognitive structure in a threat situation is, on our view, an example of both the impact of social factors on individual cognition and the motivationally driven cognitive processing.

Figure 2.
Study 1. Means profile.

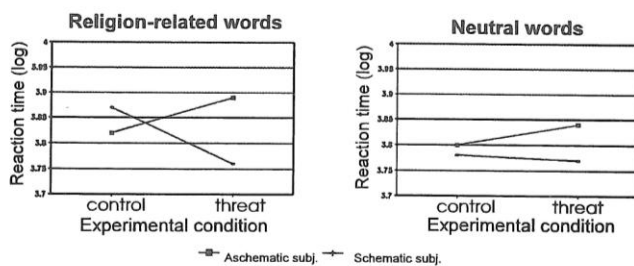


Figure 3.
Study 2: means profile. Scientific control over earthquake threat.

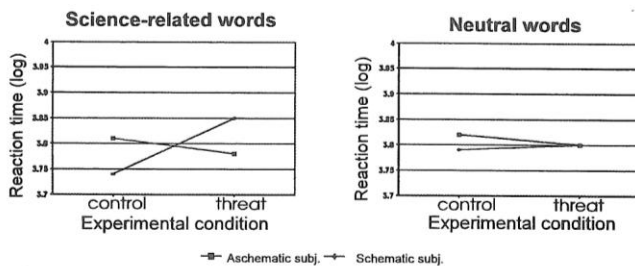
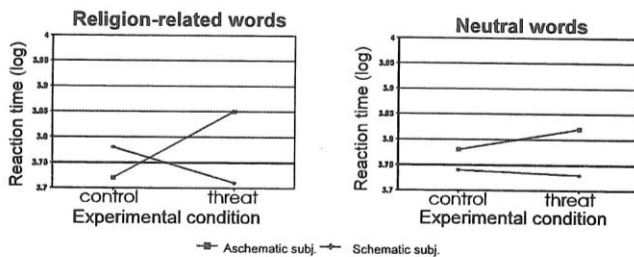


Figure 4.
Study 3: means profile. Scientific control over earthquake threat.



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