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台灣與紐西蘭震災整備模式之跨文化比較

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中　華　民　國　99 年 12 月　31　日

Introduction

Countries such as Taiwan and New Zealand have long histories of societal development in areas that expose populations to earthquake risk. A key component of a risk management strategy involves proactively encouraging community members' to prepare in ways that increase their capacity to cope with, adapt to and recover from the consequences of earthquake activity. Given that earthquakes strike without warning, the effectiveness of adaptive and coping efforts will be a function of the degree to which the necessary knowledge, resources and competencies are organized in advance and can be used promptly and effectively should the need arise.

If cross-cultural applicability can be demonstrated, it would provide opportunities for collaborative learning and provide access to a wider range of potential earthquake risk management options. Cross-cultural comparison, and the analysis of similarities and differences in predictors of earthquake preparedness is also of theoretical interest from the point of view of identifying the degree to which the processes that underpin how people respond to hazard threats are culturally equivalent. If it can be demonstrated that people, irrespective of their location or culture respond to earthquake threats in similar ways, this model will be available to assist disaster readiness and response planning irrespective of the location or population that is the focus of attention.

To examine this issue, it is essential to accommodate cultural (e.g., collectivist versus individualist) differences and their implications for the equivalence of constructs being examined (Brislin, 2000; Diener & Suh, 2000; Norenzayan & Heine, 2005; Poortinga, 1997). The social and psychological bases of beliefs and actions differ substantially across cultures. For example, in individualist cultures like New Zealand, people act consistently across situations in accordance with a self-concept that is relatively independent of social situation and in which achieving personal goals is a prominent objective. If collective action occurs, it reflects personal choice regarding levels of collaboration and cooperation rather than a cultural predisposition. In contrast, in collectivist cultures like Taiwan, actions are underpinned by culturally-embedded beliefs that are reflected in shared purpose and activity involving alignment with social norms, achieving collective goals, and engaging in activities related to future goals that emphasize social relations (Diener & Suh, 2000; Jang & LaMendola, 2006; Triandis, 1995). In light of these differences, the first question concerns whether grounds for expecting that construct or model equivalence exists in the first place (Brislin, 2000).

In western populations, the potential for the social context to influence on risk perception and people's risk management choices in cultures that are essentially individualistic in nature has been recognized. Faced with uncertainty, people turn to others who share their interests and values to help them reduce uncertainty and decide how to manage their risk (Earle, 2004; Lion et al., 2002; Paton, 2008). Family and members of the communities with whom people interact regularly are prominent sources of this assistance. There are thus grounds for anticipating that collaboration with other community members will influence risk management outcomes in members of individualist cultures. At the same time, individualist traits are being recognized for their potential to influence risk management choices in members of collectivist cultures (Bajek, Matsuda, & Okada, 2008; Child, 2008; Nakano, 2005; Tatsuki, 2000). Consequently, there are grounds for proceeding to examine the equivalence of models of hazard preparedness.

The model that was examined for cross cultural equivalence in this project (Paton, 2008) was developed to examine how person-, community- and societal-level factors interact to

predict whether or not people adopt measures capable of increasing their adaptive capacity or resilience to deal with earthquake hazard consequences. It thus provides a sound basis for comparing the relative contributions of personal and collective processes to earthquake preparedness.

Variables

The theoretical foundation for the model being examined (Paton, 2008) argues that behavioral intentions precede the adoption of actual behavior. Intention has proven to be a good indicator and actual behavior (Paton et al., 2005) and thus represents an appropriate focus for this analysis. The decision to use intentions as the dependent variable is also made to accommodate several other issues.

Intentions also represent a more appropriate means for conducting cross-cultural analyses and for comparing communities that differ in several respects. Intentions provide a common denominator for comparing communities that differ with regard hazard-community characteristics that can affect what people have done. Intentions are less susceptible to bias from these influences than is actual behavior. Intentions thus provide a more robust basis for comparison. The ***intentions*** measure comprises items that assess people's intention to acquire hazard knowledge, increase actual preparedness, and to work with other people/civic agencies to develop knowledge and capability.

At the person-level, decision making commences with peoples' beliefs about the relationship between the hazard and the proposed protective measures. The construct of outcome expectancy is selected to examine this component of the process. Two outcome expectancy variables (Paton, 2008) are proposed. ***Negative outcome expectancy***, the belief that earthquake consequences are too catastrophic for personal action to make any difference to peoples' safety, predicts that people will not prepare. In contrast, if people believe that preparation can reduce risk and increase personal safety, they form ***positive outcome expectancy.*** If people have the necessary information and resources, positive outcome expectancy will predict preparing. If people need additional guidance to clarify the uncertainty associated with infrequent, complex earthquake hazards, they will look first to other community members and subsequently to civic agencies. Two variables, community participation and collective efficacy, are selected to examine community influences on people's risk management choices.

Faced with uncertainty, peoples' perception of risk and what they can do to manage their risk is influenced by information from others who share their interests and values (Earle, 2004; Lion et al., 2002; Paton, 2008; Paton & Bishop, 1996). Because participating in community activities provides access to information from people that share one's interests, values and expectations, information from this source can assist understanding one's circumstances and deciding what to do, a measure of ***community participation*** (Eng & Parker, 1994) is included in the model.

Collective efficacy, community members' ability to assess their capabilities and resource needs and formulate plans to use resources to confront challenging tasks (Bandura, 1997; Benight, 2004; Duncan et al., 2003; Zaccaro, Blair, Peterson & Zazanis, 1995), is identified as a means of assessing community members' ability to identify needs and formulate questions. It is assessed using a measure developed by Zaccaro et al., (1995). The process of identifying earthquake consequences and formulating plans to deal with these consequences can identify information and resource needs that cannot be met within existing community contexts. Consequently, whether or not people decide to prepare will be

influenced by the quality of the relationship between community members and expert sources.

Levels of risk acceptance and people's willingness to take responsibility for their own safety is increased, and decisions to take steps to actively manage their risk more likely, if people believe that their relationship with formal agencies is fair and empowering (e.g., agencies are perceived as trustworthy, as acting in the interest of community members) (Lion et al., 2002; Paton & Bishop, 1996). A measure developed by Speer and Peterson (2000) is used to assess ***empowerment***. When this relationship is not perceived as empowering, the consequence is a loss of trust in the agency (i.e., the source of information).

The importance of accommodating this issue in the model derives from the role that trust plays when people are called upon to deal with uncertainty (Earle & Cvetkovich, 1995; Siegrist & Cvetkovich, 2000). When planning how they might deal with earthquake hazards community members have to deal with considerable uncertainty. As uncertainty increases, so does the importance people attribute to their general ***trust*** beliefs about, and their past trust experiences with, the sources of information they turn to or have to rely on (Siegrist & Cvetkovich, 2000; Sjöberg, 1999). Thus, peoples' willingness to use information will be influenced by the degree to which they trust its source. It is the consistency between the needs and expectations generated by community members and the information and resources received from expert sources that help people construct more accurate estimates of risk, reduces uncertainty, and influences trust (Earle, 2004; Eng & Parker, 1994; Lion et al., 2002; Paton et al., 2006). A measure of trust taken from an earlier study of earthquake preparedness (Paton et al., 2005) is used here.

It is argued that trust will mediate the relationship between personal and social factors and intentions to prepare. The measure of intentions was derived from an earlier study of earthquake preparedness (Paton et al., 2005). It comprises items that assess people's intention to acquire hazard knowledge, increase actual preparedness, and to work with other people/civic agencies to develop knowledge and capability.

Hypotheses

The model proposes that people's decision to prepare reflects the outcome of a sequence of activities. The process commences with peoples' outcome expectancy beliefs. If people hold negative outcome expectancy beliefs, it is hypothesized that they will not prepare. If people hold positive outcome expectancy beliefs, they will either proceed to prepare, or, if lacking the information they require, proceed to work with others to articulate their needs and expectations. If these needs cannot be met within the community, it is hypothesized that whether people then prepare is a function of the degree to which community groups perceive themselves being empowered by these sources of information. This predicts levels of trust which, in turn, predicts intentions.

Sampling

Taking the conservative Taiwanese culture into consideration, a single-stage cluster sampling strategy was applied for the recruitment of participants. The population of Tung Shih was broken down into groups of cases, called clusters (Singleton & Straits, 1999). The clusters consist of four natural groupings: a.) schools, b.) religious groups, c.) civic agencies, and d.) community leaders. All levels of school principals, key persons at civic agencies and religious groups, as well as community leaders were contacted for the purpose of key informant recruitment.

For the questionnaire part, a total of 15 key informants from schools, religious groups, local communities, and civic agencies helped with questionnaire distribution and collection. More than 1,200 questionnaires were distributed and 1,023 were completed, including 295 from the community group, 263 from the civic agency group, 250 from the religious groups, and 215 from the school group (Table 1).

Table 1. Demographics of Questionnaire Respondents

	Community	**Agency**	**School**	**Religious Groups**	**All**
Male	96	58	80	56	290
Female	198	205	170	159	732
The average number of years lived in the area	36.81	32.19	27.05	34.09	32.67
Average household size	4.92	4.7	4.46	4.16	4.59
Average age	47.11	46.08	43.6	50.15	46.63

For the in-depth interview part, some 50 questionnaire respondents indicated their willingness to participate in the face-to-face interview to explain their answers in details. Twelve of them were interviewed by the PI (Table 2).

Table 2. Characteristics of the In-depth Interview Participant

Group	**ID**	**Gender**	**Age**	**Marital Status**	**Family Structure**	**Brief background of Participants**
Religious Groups	A01	F	46	single	Staying with mother	921 survivor, polio survivor
Religious Groups	A02	M	54	divorced	3-generation under one roof	921 survivor, Poor hand function due to illness
Civic Agency	A03	F	55	married	Nuclear family	921 survivor
School	A04	F	47	married	Nuclear family	
Civic Agency	A05	M	60	married	Nuclear family	921 survivor
Community	A06	M	55	married	Nuclear family	921 survivor
Community	A07	M	58	married	Stepfamily	921 survivor, lost wife and daughter to the disaster, severely injured
Community	A08	F	46	married	Nuclear family	921 survivor
Civic Agency	A09	M	52	married	Nuclear family	921 survivor
Religious Groups	A10	F	50	divorced	Single-mother with 2 grown sons	921 survivor, sight impairment, low-income
School	A11	M	55	married	Nuclear family	921 survivor
Religious Groups	A12	M	50+	married	Nuclear family	921 survivor, community leader

Data Collection

Because the initial survey is in English, the first step is to translate it into Chinese. For this, the procedure recommended for conducting cross cultural research by Brislin et al. (1973) and Brislin (1986) was used. First, the English version of the items was translated into Chinese by Prof. Wang who is an expert in risk management. Next, this version was translated back into English by Miss Chen who is an experienced English teacher. The original version and the version that has been translated back into English were compared, examined for meaning errors, and corrections made as required. Finally, the original and translated version were pre-tested by 2 retired junior high school teachers who were unfamiliar with the instrument to provide a final measure of equivalence between the English and Chinese versions.

The finalized Chinese survey was distributed to residents of Tung Shih. When completing the survey, 12 respondents were invited to be interviewed to gain a better understanding of the community processes and competencies that underpin people's decisions to prepare in ways that increase their earthquake resilience (Strauss & Corbin, 1998). Means-end chain theory was employed to guide the interview process. Data was elicited using the laddering methodology described by Pieters, Baumgartner, and Allen (1995) and Grunert and Grunert (1995). It elicited participants' reasons for wanting, or not wanting to practice disaster preparedness. It involved assessing levels of preparedness, and then inviting people to indicate their overall evaluation of hazard preparedness. The degree of positivity or negativity towards hazard preparation was then defined as either somewhat or strongly positive or negative.

Once this initial evaluation was elicited, participants were first asked to provide personal reasons for their expressed views on preparedness and its predictors. Interactive criteria recommended by Reynolds and Gutman (1988) were used in this regard. These reasons were mental constructions made within the context of community member's experiences, norms and expectations. Participants were then asked to justify the explanation in terms of its personal and community relevance and so on until the participant could give no further justification. This procedure was repeated for each of the remaining stated reasons elicited originally in defense of the participant's evaluations of hazard preparedness.

Data Analysis

Pearson product-moment correlation was conducted to examine intercorrelations between dependent variable, INTENTION, and independent variables, Negative Outcome Expectancy (NOE), Positive Outcome Expectancy (POE), Community Participation (CommPart), Collective Efficacy (COLL.EFF), Empowerment (EMP), and Trust (Table 3) in 4 groups (community, civic agency, religious group, and school). The results show that those variables are highly correlated.

A series of four-step hierarchical regression analyses were conducted to examine the contributions of predictor variables: 1.) NOE and POE, 2.) CommPart and COLL.EFF, 3) EMP, 4.) Trust to the INTENTION score (see Tables 4). AMOS 7 was also employed to test the model as a whole and assess how well the data fit the hypothesized model (Goodness-of-Fit) (see Figures 1-3).

Table 3. Intercorrelations Between INTENTION and Other Factors - All Cases

	1	2	3	4	5	6	7
1. NOE	-	-.249**	-.285**	-.149**	-.138**	-.115**	-.142**
2. POE		-	.302**	.128**	.158**	.171**	.157**
3. INTENTION			-	.348**	.278**	.200**	.334**
4. CommPart				-	.437**	.248**	.554**
5. COLL.EFF					-	.501**	.568**
6. EMP						-	.507**
7. Trust							-
Mean	2.04	4.00	2.13	2.30	2.71	2.57	2.46
SD	0.67	0.94	0.50	0.59	0.85	0.85	0.77

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Summary of Hierarchical Regression Analysis for Variables Predicting INTENTION (N=1007).

Variables	B	SE B	β
Step 1			
NOE	- 0.16	0.02	- 0.22**
POE	0.13	0.02	0.25**
Step 2			
NOE	- 0.13	0.02	- 0.18**
POE	0.11	0.02	0.21**
CommPart	0.21	0.03	0.24**
COLL.EFF	0.07	0.02	0.12**
Step 3			
NOE	- 0.13	0.02	- 0.18**
POE	0.11	0.02	0.21**
CommPart	0.20	0.03	0.24**
COLL.EFF	0.06	0.02	0.10**
EMP	0.02	0.02	0.04
Step 4			
NOE	- 0.13	0.02	- 0.18**
POE	0.11	0.02	0.20**
CommPart	0.16	0.03	0.19**
COLL.EFF	0.04	0.02	0.06
EMP	0.00	0.02	0.00
Trust	0.09	0.03	0.13**

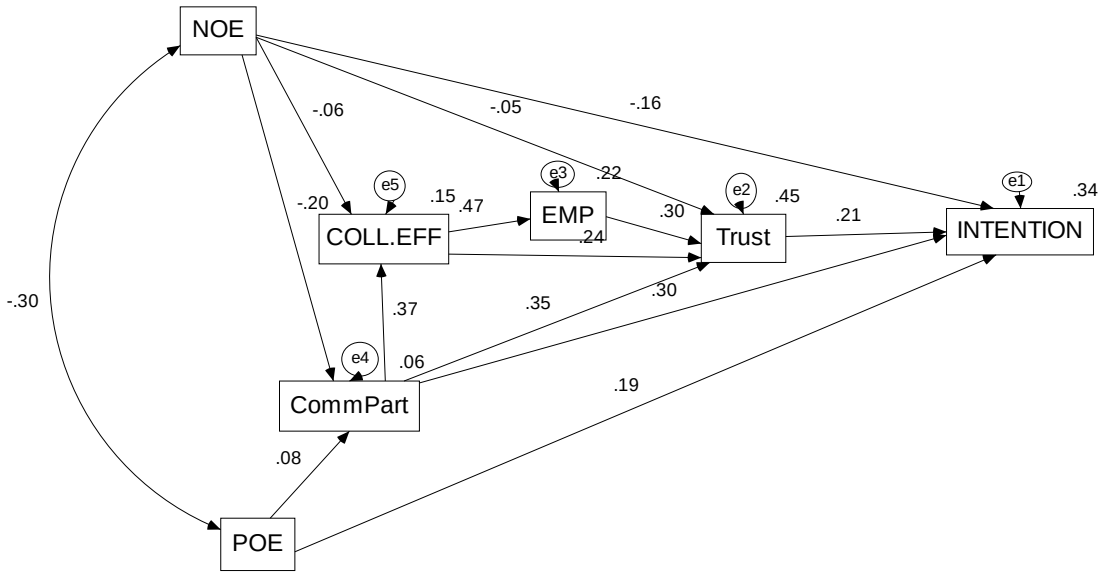
Note. Adjusted R^2= 0.14 for Step 1; Adjusted R^2= 0.23 for Step 2; Adjusted R^2= 0.23 for Step 3; Adjusted R^2= 0.23 for Step 4.

* Significant at 5% level.

** Significant at 1% level.

Figure 1.

Taiwan Earthquake Scenario (Religious Group)

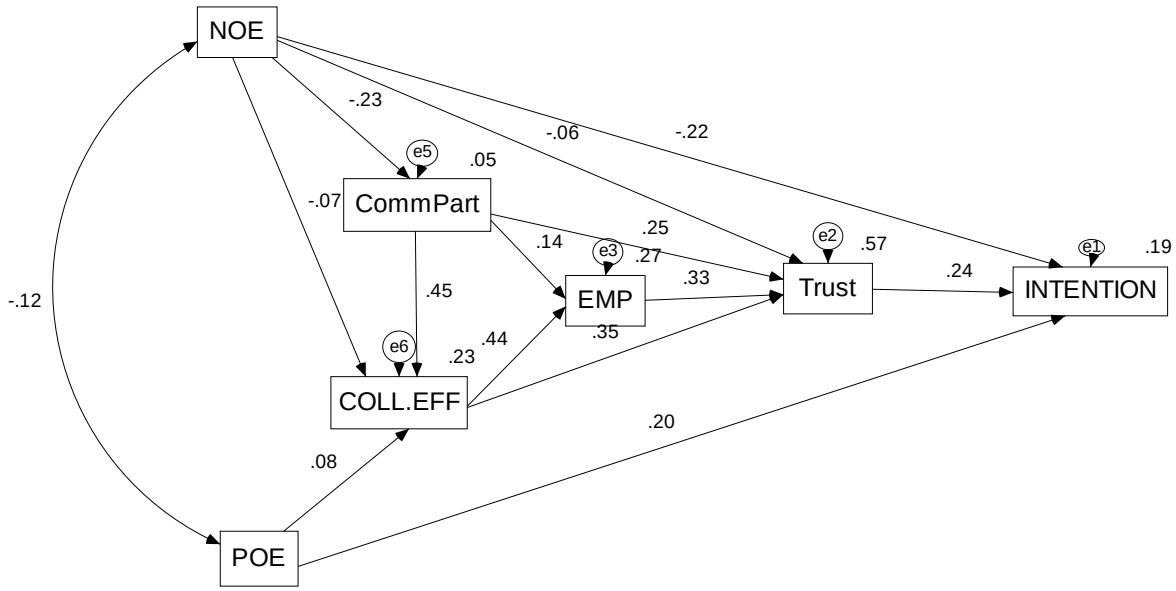


CMIN/DF=1.121 <2, NFI= .977>.90, CFI= .997>.90, RMSEA= .024<.05, PCLOSE= .665> .05

χ^2 =7.849, DF=7, P= .346> .05, thus this is a very good fit model (吳明隆, 2007).

Figure 2.

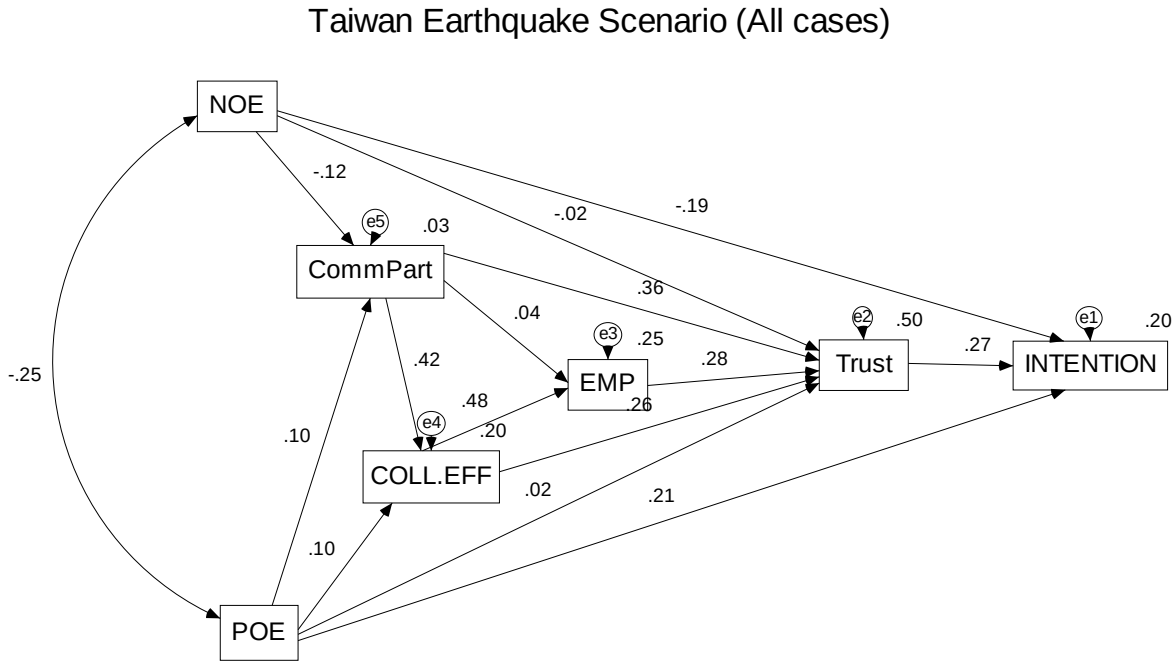
Taiwan Earthquake Scenario (Agency)



CMIN/DF=1.1433 <2, NFI= .978>.90, CFI= .993>.90, RMSEA= .041<.05, PCLOSE= .551> .05

χ^2 =10.029, DF=7, P= .187> .05, thus this is a very good fit model (吳明隆, 2007).

Figure 3.



CMIN/DF=9.458 >2, NFI= .965> .90, CFI= .968> .90, RMSEA= .091< .10, PCLOSE= .001< .05

χ^2 =56.746, DF=6, P= .000< .05, thus this is an okay fit model (吳明隆, 2007).

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