

Examining Definitions of Resilience and Adjusting a Resilience Model to the Japanese Cultural Context: a preliminary study

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Synopsis

The term *Resilience* has gained increased attention recently in the field of risk and disaster research, but different researchers tend to use it in different ways. For the purpose of better understanding of what this important notion means to the community of disaster researchers we examined definitions of resilience and its applications, particularly in the study on social resilience to the volcanic eruptions in Auckland, New Zealand. Finding this application model insightful and useful, we then carried out a comparative study in Japan. Although the study is yet under way, this paper presents its tentative results. We also developed one scale “Collective Action Coping” in order to examine specifics of social resiliency against disasters in Japan.

Keywords: resilience, comparative study, questionnaire survey, collective action coping, disaster risk management

1. Introduction

Resilience seems to be a multidimensional concept which makes it difficult to define, operationalize and measure. Current definitions of resilience imply the notion of adaptive capacity which “is not bringing any of clarity into the resilience theory (Klein 2003)”. Other researchers claim the significance of operationalization and have proposed methods of quantification of social resilience to disasters based on the definition of resilience which corresponds to the notion of adaptive capacity (Paton 2006). Paton developed a model to quantify social resilience to disasters, and applied to Auckland, New Zealand. We are currently applying this model in Japan. In this process it required a careful translation into Japanese and then back-translation into English, which helped us examine a subtle bias and deviation which might possibly be entailed in the interpretation of this type of cross-cultural analysis performed here.

2. Definitions of Resilience

Holling (1973) defined resilience as i) the ability of the system to “bounce back” to the previous equilibrium state after the disturbance. It is called: engineering resilience ii) as the degree to which the system can absorb the disturbance still remaining in the same equilibrium state. In this case the resilience is operationalized in terms of magnitude of the disturbance. Pimm (1984) defined the resilience in terms of the time needed by the system to get back to the previous state.

Resilience is seen differently by psychologists as ex.: i) the ability of the person to regain the previous shape after going through the crisis’s as well as ii) the ability to cope and to do well in life in spite of the difficulties (Gunnestad 2006), or as an active process of self-righting, learned resourcefulness and growth - the ability to function psychologically at the level far greater than expected given the individual’s capabilities and previous experiences (Paton et al 2000). At this

point we can see that when the concept is applied to the human world, it may well be related to the notion of society's adaptive capacity or adaptive coping.

Resilience Alliance the international group of researchers devoted to resilience studies defines the "ecosystem resilience as the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems has the added capacity of humans to anticipate and plan for the future. Humans are part of the natural world. We depend on ecological systems for our survival and we continuously impact the ecosystems in which we live from the local to global scale. Resilience is a property of these linked social-ecological systems (SES). "Resilience" as applied to ecosystems, or to integrated systems of people and the natural environment, has three defining characteristics:

- The amount of change the system can undergo and still retain the same controls on function and structure
- The degree to which the system is capable of self-organization
- The ability to build and increase the capacity for learning and adaptation" (Resilience Alliance 2007)

As we can see, resilience when applied to human systems has the added value of Adaptive Capacity, which is per se another multidimensional concept. Resilience is a concept which has many meanings depending on the area of research it is applied to. This concept of resilience is yet not very well operationalized and there are limited cases made for testing measurement and formalization (Klein 2003). Klein and others proposes distinction between the two concepts, resilience and adaptive capacity. He proposes to use adaptive capacity as an umbrella concept that includes the ability to prepare and plan for hazards. Resilience is being proposed to be treated as one property that influences adaptive capacity (Klein et al 2003)

3. Quantification of resilience

Since there has been a great deal of research

work conducted on ecological resilience, and in contrary the social aspect of resilience has not been well examined enough (Sapirstein 2006)

Therefore we will first introduce a case study carried out by Paton (2006), in Auckland, New Zealand, with a focus on the quantification of social resilience.

The goal of the case study was to identify from a large number of factors a parsimonious and cost – effective generic model of resilience. The model consists of 3 types of variables: Individual, Community and Institutional. The most innovation of this model is that it examines the collective role of all types of variables since other works on social resilience take as the unit of analysis the unit of either household or community.

To achieve his research purpose, Paton defined the resilience in terms of how well people and societies can adapt to a changed reality. This definition of resilience embodies the notion of adaptive capacity (Paton 2006). As above mentioned, the model consist of three types of variables: Individual (Critical awareness, Self efficacy, Sense of community etc.), Community (Collective efficacy, Participation, Commitment, Information exchange etc.), and Institutional (Empowerment, Trust, Resources, etc.). Each level of the variables corresponds to the scales developed for its measurement. As the predictor of resilience the "intentions" – scale was employed. The questionnaire was administered by telephone survey to 400 households in August 2005. Out of 400, due to the mistake of the company which carried out the survey, 297 cases were available for the model.

The analysis composed of three steps. PCA (Principal Components Analysis) to determine whether scales met the psychometric standards. The development of the resilience model using SEM (structural modeling analysis) which allows to depict the casual relationships between the dependent and independent variables (also non-direct relationships). The third level of analysis aimed in i) identification of prevailing level of resilience and constituent components, and ii) comparing levels of each variable across area of residence and ethnicity to identify whether there were any significant inter-group differences present for this purpose. The analysis requires one-way

analysis of variance and post hoc comparisons (Turkey's Honestly Significant Difference Test) (Paton 2006).

As a result the final model was developed. The model consists of those pathways that depict significant casual relationships between variables. The numbers associated with the lines inform about the strength of the relationships between factors. This number indicates that change in the one standard deviation in the predictor variable will result in x% change in the standard deviation of the target variable. This allows us to target the areas of intervention. Model proved no in-group differences (Paton 2006)

The model has been found to be an effective approach to resilience assessment and planning. It effectively identifies factors that i) affect resilience, ii) are manageable to change, and iii) are under control of planning process.

4. Questionnaire design process requiring adjustment of the model to Japan

Because the above mentioned Paton's model is considered to be relevant and applicable, we decided to carry out a comparative study in Japan. Before that, some modifications have been made to i) find out to which extent social resilience is culturally conditioned, ii) assess the factors of resilience in a Japanese city, iii) develop some appropriate social resilience strategy for the case study area, and iv) assess the role of participatory management as a significant factor in the overall social resilience.

For the purpose of this study we translated the English version of the questionnaire originally designed by Paton into Japanese. This translation consisted of several steps. Firstly a non-Japanese junior native speaker translated the English version into Japanese. This version was then improved by another Japanese native speaker 1. Then this version was back-translated into English by another Japanese native speaker 2. Examining both Japanese and its back-translated English versions, the non-Japanese native speaker together with the Japanese native speaker 2 developed the first draft of the Japanese questionnaire. This draft was again re-examined and refined by a Japanese native speaker 3 who

improved the entire quality of the translation, particularly such that it sounds more "natural" to Japanese respondents. Next the non-Japanese native speaker checked the Japanese translation in order to compare it with the original version. Clarifications have been made and shared by those involved in order to identify subtle differences and a bias caused by back-and forth translation processes.

There were several issues worthy to be mentioned during the translation process. Firstly, the English word "community" has no single adequate equivalent of translation in the Japanese language, therefore researchers have to use different words to mean "community" depending on the kind of community they deal with, such as rural community or village which may be called *mura*, while town community is *machi* or town neighbourhood, *chonai* in Japanese.

Because the Japanese society is commonly considered as collective, researchers developed "*Collective Action Coping Scale*" that corresponds to the "*Individual Action Coping Scale*" in the original questionnaire. *Individual Action Coping* is defined as the problem of solving competence, *collective action coping* should be defined as the problem of solving competence of a particular group. In our case it is neighborhood-based group as *chonaikai jishubosaisoshiki* or any other locally based organization of citizens.

Another issue to be mentioned is the concept of *setai* – household and its implications for the sampling procedure. Since our survey data are intended to be collected by mail-survey, we have such a limitation that samples will be selected not by a unit of individuals, but that of households only. This implies that the household sampling may somewhat entail the effect of family hierarchy or a bias of someone who represents one's household in the questionnaire survey. For instance, *setainushi* – the head of the household who officially represents the entity of one's household in the Japanese family register system. It may influence the representativeness of our household samples because it is likely to happen that each *setainushi* will be the person to answer the questionnaire. In order to decrease this bias we have designed to mention that in the introductory and explanatory part of the questionnaire *setainushi* should not always be the person to answer our questions but instead it can be

any person in the household. Additionally we added to the questionnaire the table where the respondent marks one's position in the hierarchy of the household.

5. Some preliminary results on the process of cross-cultural translations

In the process of translation of the questionnaire we have identified interesting issues which will definitely influence our view and the way of interpretation of our results.

The most important keyword to translate is the "Collective Efficacy/Collective Empowerment" (Paton 2006) scale that uses the word of "power." Before we illustrate briefly its translation process, it is worthy to mention that between both the English and the Japanese versions of the questionnaire, some gap has been found in (a) the introductory phrases before the items of the scale that introduces respondents into the concept measured by the items of the scale, and (b) the way of answering are different. The Japanese translation reads: この町であなかが生活していて、ご自身の位置づけを総じてどのように感じておられますか? もっとも近いものに1つ○をつけてください。

The direct back-translation (to give an idea to non-Japanese speakers) from Japanese to English would be: **This town at you are life living, yourself assess general how do you feel are you? Closest thing check please.**

Therefore the interpretation would be: **Please mark the closest answer with regard to your general feelings about living in this town.**

Its original translation was: **In regard to your general feelings about living in this community, please describe the extent to which you agree or disagree with each statement.**

As we can see the way of asking the respondent to answer to the items of the "Collective Efficacy/Collective Empowerment" scale differs between the English and Japanese versions. The English version emphasizes the conflict (agree or disagree) while the Japanese version puts emphasis on the consensus building. (Ames et al 1994).

As for the afore-mentioned concept of "power" it may be useful to give an example of translation of

one of the items from "Collective Efficacy/Collective Empowerment" scale (Paton 2006)

The Japanese version reads: 私が町内で私なりの力を出せるとしたら、町内で何かまとまった活動が行なわれて、その中に参加する場があるからである。

The direct word by word version is: **I in my town my "power" is able to be put out If, in town something completed/be settled activity is to be held, participation platform is because.**

The interpretation is: **Thanks to the participation platform in my town I may have a power/influence on activities being held in there.**

Its original version was: **I can have power in my community only by working in an organized way with other people.**

It is important to mention that Japanese translation uses the expression of 参加する場がある (sankasuru ba ga aru) which is translated into English as "participation platform is available" through which the person may have influence/power in his/her community. An interesting point is that the Japanese translation uses word "Ba" – platform which has some special meaning in Japanese language and might well be interpreted as a shared space for emerging relationships that could be either physical (office business space), mental (shared experiences), virtual (emails) or any combination of them. What makes different *Ba* from ordinary interaction is the connotation of knowledge creation going on behind. *Ba* provides a platform for advancing individual and collective knowledge. It can be also interpreted as recognition of the self in all or the context which determines the meaning (Nonaka and Konno 1998). As we can see the translation process from western to eastern languages and vice versa provides us with significant into the development of implicit knowledge about transforming from one cultural context to another. That is, the notion of *Ba* which is very prevalent in Japan and not so much in the west may need careful attention makes us in the process of interpretation, particularly that of the results of "Collective Efficacy/Collective Empowerment" scale.

6. Summary and Conclusion

In this paper we addressed the importance of examining the notion of resilience in disaster

reduction research and discussed several definitions of resilience which range from ecological, managerial and psychological perspectives. Though this concept still needs further rigorous study, how to operationalize and quantify it deserves special attention. We have found Paton's approach useful in order to develop the social resilience model. This allows us to identify factors which i) affect resilience ii) are manageable to change iii) are under control of planning process.

This model has been adapted and applied to a case study in Japan to be calibrated against the Japanese culture. One of the examples of such an adjustment is development of the "Collective Action Coping" scale that is considered promising to examine the collective notion of community resilience in Japan, which is also related to the importance of numerous local-organizations of citizens (Bajek, Matsuda, Okada 2007).

Our preliminary study shows that the thus modified model in its survey design stage of operationalization allows us to: i) find out to which extent social resilience is culturally conditioned and to what extent is context specific, ii) assess the factors of resilience in a Japanese city, iii) develop the social resilience strategy for the case study area, and iv) assess the role of participatory management to characterize the overall social resilience.

Our next step is to immediately carry out the above-designed questionnaire with a case study in the middle town of Kyoto City. This survey is planned to be conducted within May, 2007 and its results and findings will be informed in the near future.

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レジエンシーの諸定義の検討と日本的文化文脈へのレジエンシーモデルの補正的適用：予備的考察

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要 旨

昨今減災やリスクマネジメントの分野でますます関心を集めているレジリエンシーの概念は、研究者によって多様な意味で使われている。本研究では既往ならびに最新の諸定義を検討するとともに、これを災害軽減に特化して考えた場合のレジリエンシーの個別的定義とその適用の方法について検討する。その際、特にニュージーランドのオークランドの火山災害への備えに関わる地域レジリエンシーモデルの研究を応用し、これをわが国に適用する可能性を検討する。また本調査モデルが提唱する集合的行動という概念のわが国への適用可能性についても検討する。

キーワード：レジリエンシー、比較研究、アンケート調査、集合的行動、災害リスクマネジメント