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Psychological Reactions and Experiences Among Swedish Citizens Resident in Kobe During the 1995 Earthquake*

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This paper discusses reactions and experiences of temporary residents and transients in a community struck by a major natural disaster. A retrospective questionnaire study was conducted among a group of Swedish citizens who were resident in Kobe during the Great Hanshin-Awaji earthquake. Respondents describe aspects of their behavior before, during, and after the earthquake. The findings indicate that, as a group, the Swedes appear to have coped well, even though they were not well-prepared for this type of situation. One factor found to be related to the behavioral responses was ability to speak the local language, in this case Japanese. On the basis of the study results, some particular needs and resources of foreign residents are discussed.

An earthquake is among the most dramatic and powerful of disaster experiences. At the psychological level, behavioral research has primarily been concerned with two main aspects of human reactions to these events: preparatory activities during the pre-impact period and possible long-term post-traumatic reactions after the event. A third area

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of research interest concerns immediate reactions during and just after impact. Knowledge of factors affecting how people actually behave, what they will be motivated to do, and what they are capable of doing in an acute situation is important in minimizing negative consequences. Experiences during this phase may be influenced by preparatory behavior beforehand and may in turn affect psychological reactions in the long term.

How people cope in an actual earthquake situation has been documented in some studies. There appears to be general agreement about the frightening nature of the immediate experience (McCaughey et al. 1994). However, reports of behavior immediately after an earthquake differ. Some studies report quite dramatic effects on behavior such as panic (non-rational imperative behavior) resulting in injuries (Alexander 1990). Others emphasize coping responses primarily geared toward escaping from danger, information collecting, and restoring order (Mikami and Ikeda 1985; Ohta and Ohashi 1985). Behavioral responses can be related to a number of individual and situational factors, one of which is the seismic intensity of the earthquake (Ohta and Ohashi 1985).

The significance of social characteristics in determining a wide range of earthquake-related behaviors has been emphasized in recent surveys (Quarantelli 1996). In general terms, findings tend to indicate that individuals with strong social, economic, and personal resources are more likely to have made some preparations, are often less vulnerable (housing conditions are better, for example), and are less likely to suffer psychological distress (Freedy et al. 1994) after an earthquake. It has been suggested furthermore that those who are more involved in and bonded to the community are more willing to invest resources and effort into earthquake preparation (Russell et al. 1995), although the general finding is that it is difficult to motivate people to take preparatory and protective actions concerning earthquakes (Lehman and Taylor 1987; McCaughey et al. 1994; Edwards 1993).

Studies of reactions in response to a natural disaster generally focus upon the community and its members. However, in the international and dynamic society evolving today, increasingly a number of people who do not have their roots in the community are likely also to be affected in community disaster events. These people may be separated linguistically and culturally from the rest of the community. Social networks,

which are considered to be important for coping with the distress of an earthquake (Bland et al. 1996), may, for example, be of a different kind among such groups. Drabek (1996) has recently focused attention on the situation of transient residents and visitors in reacting to a disaster situation, in particular concerning evacuation behavior. Transients in a community constitute a heterogeneous group, and the particular resources and needs of different categories need to be identified and related to key factors characterizing specific groups. The present study aims to contribute to this work by examining experiences of one such group in an earthquake situation.

At 5:46 a.m. on January 17, 1995, an earthquake with a magnitude of 7.2 on the Richter scale hit the area around the town of Kobe (population 1.5 million) in Japan. In this major disaster, generally referred to as the Great Hanshin-Awaji earthquake, over 5,000 people were killed and 25,000 moderately to seriously injured (Hayashi and Kawata 1995; Heath 1995). Among the foreign subjects resident in the area were a number of Swedish citizens. This study examines reactions to the earthquake and experiences before, during, and after the event among this group, focusing in particular on aspects of their situation as residents or visitors in a foreign country. The findings are also related more generally to previous earthquake research regarding behavior and coping during and immediately after the acute impact phase.

Methods

Sample

A list of Swedish citizens who were resident in the area during the earthquake was acquired from the Swedish Embassy in Japan in October 1995 (nine months after the event). This list was based on registered residents and on employees of Swedish companies in the area. According to the embassy, 78 Swedish citizens, including children, were living in the area of Hyogo (excluding Osaka/Kyoto). The names on the list gave a total of 50 adults.

In the spring of 1996 a request for the current addresses of employees who had since left Japan was mailed to 12 Swedish companies listed in the information from the embassy. Seven of the companies answered the request. In this manner information on names and addresses of four

subjects who were visiting Kobe more temporarily at the time of the event was obtained.

Procedure

During the summer of 1996 questionnaires were distributed to the addresses on both lists, that is, both home to the subjects and to all the companies. In the former case we requested that all adults in the household fill in the questionnaire. In the latter case we requested that the questionnaire be distributed to the Swedish employees who had experienced the earthquake.

Twenty-five returned completed questionnaires. Clearly there were difficulties in determining the population of Swedes resident in the area at the time and in distributing the questionnaire to all concerned. It is therefore only possible to roughly estimate how many actually received the questionnaire, and thus also the percentage of non-responders. Based on the lists used to distribute the questionnaires, the response rate could be estimated to be about one third of the intended population of Swedish subjects resident in Kobe at the time of the earthquake, and to about half of those who had actually received a questionnaire.

Questionnaire

The questionnaire included both questions with fixed-response alternatives, which concerned general reactions and experiences, and open-ended questions, which were designed to map the unique pattern of experience of individual subjects.

Table 1 provides a summary of the content areas covered by the questionnaire as related to behavior before, during, and after the earthquake situation. Details concerning design of questions mapping different areas are given below.

Two questions were used to map *previous experience of disasters*. One of these was related to present or previous occupational contacts with accidents (yes/no). On the other question the respondent reported (yes/no) whether he or she had direct experience of any of the following: fire, war/warlike situation, traffic accident, air accident, train accident, industrial accident, earthquake, avalanche, other natural disaster (hurricane, floods, etc).

Table 1.
Overview of Areas Covered by the Questionnaire

Before	During Earthquake	After
Previous experience	Activities during quake	Evaluations of own actions
Disaster preparations	Feelings/emotions	Damage consequences
Information received	Reactions and actions	Personal consequences
Prior concern/worry	Observations of others	Experience of help

Disaster preparations were assessed with a behavioral report list of 13 predefined actions (yes/no). These actions were based primarily on an advice sheet about suitable preparations for earthquakes produced by the Swedish Embassy in Tokyo. The number of actions taken was counted and formed an *index of preparedness.*

Satisfaction with information received prior to the earthquake was assessed on a scale from 1 (completely unsatisfactory) to 5 (completely satisfactory).

Personal concern/worry prior to the earthquake was assessed on a scale from 1 (not at all worried) to 5 (very worried) for the following events: burglary, traffic accident, earthquake, fire, air or train accident, violence. Concern about a possible earthquake was treated as a separate variable. An *index of prior risk concern* was computed from the other assessments (Cronbach's alpha = 0.87). Respondents also assessed *risks as experienced today* in the same way. A *risk today* index was computed with alpha = 0.87.

Activities at the time of the earthquake were mapped by two open-ended questions asking respondents to describe their activities briefly, (i) during the first two hours after the quake and (ii) during the remainder of the first day and night after the quake. Respondents were asked to particularly consider: where they were; what they did; what measures they took; and which people they were in contact with, during how long a period.

Feelings and emotions during the acute phase were described through two questions. In the first of these a list of 29 adjectives describing *emotions and feelings* (e.g., frightened, angry, tired) were assessed on a scale from 1 (not at all) to 5 (completely) to describe the respondent's reactions (i) directly after the quake and (ii) after about one hour.

On the basis of common meaning and correlation patterns, the adjective list was reduced and summarized into the following indices (number of adjectives and Cronbach's alpha values in parentheses): *calm* (3, 0.90); *active* (6, 0.93); *panicky* (2, 0.79); *helpless* (4, 0.73); and *frightened* (1).

The next question presented a list describing 17 different *reactions and actions* (e.g., "I was able to cope well with my own reactions," "I sought help from others"). These descriptions were based on interview data from previous studies of persons who had experienced severe stress situations (Wallenius 1997). Each statement was assessed on a scale from 1 (completely untrue) to 5 (completely true).

Respondents gave an overall *subjective evaluation* of how they had dealt with the situation using three response alternatives: better than expected; as expected; and worse than expected.

Observations of *how others reacted* were recorded on a question presenting a list of 11 descriptions of others (e.g., people were confused, people reacted with panic), with response alternatives from 1 (very uncommon) to 5 (very common).

Personal consequences of the earthquake for the respondent were assessed in two ways. Direct consequences in terms of damage and injury were assessed with a list of 11 possible consequences (e.g., fire in immediate vicinity, furniture damaged, lack of food) on a scale from 1 (not at all) to 5 (to a very high degree). The sum of consequences occurring to some degree was used as a total measure of *damage consequences*. Personal consequences as effects in terms of economy, social changes, distress, psychological reactions and symptoms (e.g., intrusive thoughts) for self and other family members were assessed on a scale from 1 (not at all) to 5 (very much). An index based on these alternatives was computed (alpha=0.80) as a measure of *personal consequences.*

Experiences of help during and after the earthquake from organizations and friends/neighbors respectively were assessed using open-ended questions.

Methods of Analysis

The open-ended questions were analyzed by sorting different meaning units in the answers into higher-level categories from a grounded

theory approach. The aim here was to achieve a qualitative mapping of different outcomes. The results reflect on the one hand the more typical responses and, on the other hand, also some deviations and specific individual reactions.

In the quantitative analysis, differences in means and proportions between subgroups of participants were tested for statistical significance using Mann-Whitney U tests, Kruskal-Wallis one-way analysis of variance, and chi-square tests.

Respondents

The questionnaires were completed by 25 respondents, 32 percent (8) women and 68 percent (17) men. Of the respondents, 81 percent (21) were married, 60 percent had children, and 64 percent had a university-level education. Ages varied between under 20 (2 respondents) up to the age group 51-65 years (4 respondents). Half of the group was between 36 and 50 years old.

Nine persons had lived less than a year in the Kobe area, 8 persons 1-2 years, and the remaining 8 for a longer period, the longest being 16 years. Half of the respondents reported living in their own house, the remainder in apartments in multistory buildings. Respondents marked where they had lived on a map.

Respondents were asked concerning their ability to speak Japanese at the time of the earthquake. Sixty-four percent (16) responded "No," 24 percent (6) "Partly," and 12 percent (3) "Quite well."

Results

Results from the questionnaire are first presented for the whole group to describe reactions and experiences before, during, and after the earthquake on the basis of qualitative and quantitative response data. Thereafter data are analyzed with a view to identifying and comparing subgroups.

Before the Earthquake

Sixty percent of the respondents indicated that prior to the earthquake they had not been at all concerned about such an event.

Respondents were more concerned about being involved in a traffic accident or particularly in an air or train accident. Several have also commented on their own lack of awareness:

> In Kobe we lived as we had lived in Stockholm, without a trace of earthquake preparation, since the risk of a catastrophe was never considered thinkable.

And:

> Through all the years we had always heard that Kobe was "completely outside the earthquake zone." We had never thought that this could happen.

Over half of the respondents had lived in other earthquake zones (mainly in Japan, South America, and the U.S., and 28 percent (7) reported having experienced an earthquake previously.

Table 2.
Number (percent) of Respondents Who Had Undertaken Preparations in the Event of an Earthquake (N = 25)

Obtained a flashlight	16 *(64 percent)*
Obtained a first-aid kit	15 *(60 percent)*
Checked insurance policies	13 *(52 percent)*
Learnt to give first aid	13 *(52 percent)*
Obtained a smoke detector	13 *(52 percent)*
Obtained a fire extinguisher	10 *(40 percent)*
Checked gas pipes, electricity wires etc	7 *(28 percent)*
Prepared evacuation route from home	5 *(20 percent)*
Obtained special equipment or tools	4 *(16 percent)*
Discussed emergency measures with family/friends	3 *(12 percent)*
Prepared food store	2 *(8 percent)*
Prepared an emergency bag	1 *(4 percent)*
Taken part in practice exercises	1 *(4 percent)*

Table 2 indicates that the preparations most frequently made by respondents were those which could be generally useful in a number of situations, such as procuring a flashlight or first-aid kit. Very few had made more elaborate preparations for a possible earthquake such as preparing food stores or even discussing measures with others.

Those who had lived previously in earthquake zones had generally received information of some kind before, but no one had received any information in Kobe. Again, respondents referred to being convinced that there was no necessity for such information. There was no difference in preparedness between those who had previously lived in earthquake zones or experienced an earthquake and those who lacked this experience.

Experiencing the Earthquake

Since the quake occurred in the early morning, most of the subjects were in bed at the time. A few were awake or half-asleep, but most of the respondents were awakened by the subjects woke up due to the heavy rumbling and shaking. During the main quake about one-fifth of the subjects described that it was not possible to get out of bed due to the shaking.

Among the initial actions described are taking cover under a table and trying to secure an escape route by opening the doors. Since it was still dark outside and the electricity was not functioning, one of the first actions was also to search for a flashlight. Finding shoes was important, since walking on the floor without shoes could be problematic due to broken glass and china. One of the first actions was also to get dressed. About one-fifth of the respondents also mentioned gathering together warm clothes to prepare to leave the home.[1]

No one lived in a house that collapsed. The most direct consequences of the earthquake were damaged furniture, crockery, and home furnishings. One respondent with family continued to stay indoors after judging it to be safe, but it was more common for respondents to have left their house or apartment. Families and households gathered together, in a majority of cases with friends in neighboring apartments. Activities included checking out possible injuries and giving support to family members and friends in need.

Immediate Reactions

In their assessments of their own reactions and actions immediately after the earthquake, the picture presented by the respondents showed high consistency within the group. Fear is the reaction most strongly

expressed reaction by the respondents, in particular immediately after the earthquake. The respondents also tended mostly to describe themselves as feeling active and calm. The assessments of feelings one hour after the earthquake reflect some changes, specifically significant decreases in feeling weak, helpless, and panicky and increased feelings of calm.

Statements describing ineffective or poor reactions were given low ratings (signifying completely untrue or almost untrue). Respondents on the other hand generally agreed with statements expressing effective coping, calm, and assistance to others. In evaluating their own ability to cope with the situation, 68 percent (17) felt they had coped better than they would have expected, 28 percent (7) rated coping as expected, and only one respondent gave an evaluation as poorer than expected.

During the Day

Table 3 shows the direct experiences of damage after the earthquake. Almost all respondents were without water, gas, and electricity for some time, lost telephone contact, and suffered damage to their homes and possessions. The loss of gas, water, etc., also meant that heating and toilets were not functioning. The electricity began to function again later during the day, in some cases just for a while. Four persons reported sustaining some kind of personal injury themselves.

The activities reported during the day were concerned with securing main necessities of life, such as water, food, and important personal belongings. Many respondents reported giving practical or psychological support to family, friends, and neighbors. The damage inside and outside the home was also examined, and one common activity was to tidy up. One or two went to inspect their office and about one-forth of the respondents mentioned telephone contacts with colleagues to check their condition or phoning their company to report their own condition.

Respondents inspected the damage in their neighborhood, which varied according to the area. Heavy cracks in the ground outdoors made many roads unusable. Some respondents witnessed fires, although no one seems to have experienced this in the close vicinity of their own house/apartment.

Table 3.
Number (percent) of Respondents Experiencing Various Damage/Consequences after the Earthquake (N = 25)

Damage/consequence	None	Somewhat[a]	A great deal[b]
Lack of water, gas, electricity etc	-	1 *(4 percent)*	24 *(96 percent)*
Furniture, crockery etc damaged	-	3 *(12 percent)*	21 *(84 percent)*
Road communications broken	-	8 *(32 percent)*	17 *(68 percent)*
Telephone, fax out of function	1 *(4 percent)*	6 *(24 percent)*	18 *(72 percent)*
Difficulty in contacting others	1 *(4 percent)*	9 *(36 percent)*	14 *(56 percent)*
Gas or water leakage	4 *(16 percent)*	8 *(32 percent)*	11 *(44 percent)*
Lack of food	5 *(20 percent)*	8 *(32 percent)*	10 *(40 percent)*
Home damaged	6 *(24 percent)*	10 *(40 percent)*	6 *(24 percent)*
Fire in immediate vicinity	8 *(32 percent)*	9 *(36 percent)*	6 *(24 percent)*
Injured or dead people in immediate area	10 *(40 percent)*	8 *(32 percent)*	5 *(20 percent)*
Injured myself	19 *(76 percent)*	3 *(12 percent)*	1 *(4 percent)*

[a] Categories 2-3 on the 5-point scale
[b] Categories 4-5 on the 5-point scale

Several reported searching for information, but only about one-third mentioned listening to the radio or watching television. The possibility of getting information through the media appear to have been limited, and the media seem to have played a minor role for the respondents during this early period.

The majority of the respondents did not report visiting any meeting place. Those who did almost all lived in apartments in the same part of Kobe (Rokko Island), where they first gathered together at a hotel and later at the international school. The decision to collect together in this way is described as a result of information received during the day, rather than as a result of any prior information from authorities.

Reactions and Contacts

About one-fifth of the respondents described their own psychological reactions in terms of shock and distress. There was concern in particular for children. The aftershocks continued through the day, which was described as especially distressing. The first night after the quake was described by one or two respondents as frightening and horrible with all the aftershocks. Contact with relatives was one source of com-

fort, as was also contact with friends in the neighborhood. Respondents generally described it as very common that other people whom they had seen immediately after the earthquake were frightened, made contact with others, and helped each other. Panic behavior and apathy were described as unusual.

An important issue in this study is the question of whom the Swedes turned to for information, support, and emergency resources in the midst of a foreign disaster. The help and support received came from different sources and can be summarized as follows:

Japanese authorities: Respondents generally seem to have received little in the way of help from organized or official sources. A few mentioned fresh water supplied by the Kobe rescue services. Practically no other contacts were mentioned.

Other organizations: The International School (Canadian Academy) was mentioned by those living in the part of Kobe called Rokko Island. The form of support was food, accommodation, and transportation. Knowledge about this appears to have been spread mainly by word-of-mouth.

Radio/TV: Listening to the radio or watching television are mentioned by about a quarter of the respondents. Several of these could not understand what was said, since the local broadcasting was in Japanese. Watching international television channels (e.g., CNN) is, however, also mentioned. Radio/television do not seem to have been of immediate help but could provide a source of more general information concerning the consequences of the quake.

The Swedish Embassy: The embassy does not appear to have played any role during the first days. The embassy was only mentioned by a couple of the respondents, and then in critical terms as having been slow in contacting the Swedes in the area. One respondent was contacted by a letter in the mail two weeks after the earthquake; another cited a collect call message three days after the quake as the first contact.

Local Swedish employers: These were mentioned by about a quarter of the respondents as being an important source of support, including accommodation, food, and transportation. Contact with company headquarters and with local offices and colleagues were also emphasized by individuals in positions of responsibility.

Fellow Swedish citizens: Asked about the help they received after

the earthquake, almost all respondents gave examples of help from friends, neighbors, and colleagues. One commented: "We talked and helped and supported one another." Another commented: "Again and again we went through what had happened. When one was frightened there was somebody there to talk to who understood." The forms of support include accommodation, moral support, companionship, money, and other practical help.

Expatriates from other countries than Sweden: A few respondents mentioned these as a source of similar support as from fellow Swedes. This seems to have been based on established friendship or neighbourhood relations.

Local Japanese citizens: These were only mentioned by a few, and then with regard to neighbours. Support was more commonly mentioned in the opposite direction, i.e., that local people received support from the Swedes.

Friends and relatives in Sweden: These were among the most important contacts during the first day, mentioned by almost all of the respondents. Most used car or mobile phones to get in touch.

During the Following Days

One question for the respondents was whether it was possible to remain in their own home. This differed among them. Only a minority continued to live in their own home throughout the entire course of events. More than one-third reported living temporarily with other Swedish families in less damaged areas for a period varying from one night up to a week. This was arranged through personal contacts within the circle of friends. Three respondents reported staying at a hotel outside the most damaged zone. More than 50 percent of the respondents left for Sweden after a few days, the majority of these for a restricted period. In many cases only the wife and children in the family moved to Sweden, while the husband remained in Japan. For a few this was a permanent farewell to Japan.

Table 4.
Number (percent) Experiencing Personal Consequences of the Earthquake for the Respondent and His/Her Family (N = 25)

Personal consequence	None	Somewhat[a]	A great deal[b]
Psychological distress	3 *(12 percent)*	15 *(60 percent)*	7 *(28 percent)*
Psychological reactions/symptoms - self	5 *(20 percent)*	10 *(40 percent)*	10 *(40 percent)*
Psychological reactions/symptoms - family	5 *(20 percent)*	12 *(36 percent)*	8 *(32 percent)*
Economic effects	9 *(36 percent)*	11 *(44 percent)*	5 *(20 percent)*
Social changes	11 *(44 percent)*	6 *(24 percent)*	8 *(32 percent)*

[a] Categories 2-3 on the 5-point scale
[b] Categories 4-5 on the 5-point scale

One open-ended question asked respondents to assess when they felt that their situation was safe again. Responses vary from three to five days after the earthquake up to six months after. Table 4 indicates that for most of the respondents the personal consequences of the earthquake have reflected psychological reactions rather than economic effects or social changes. In the comments, difficulties in sleeping and nervousness were mentioned, but also "gratitude" over the experience, an increased sense of inner strength, humility, and ability to handle crises. One respondent described feelings associated with leaving Japan soon after the earthquake:

> It took me a year to get over the worst. Since I left on the Friday (after the earthquake) and never returned, I have the feeling that I never had the chance to say goodbye to friends and to my son's playschool. About like when somebody dies and you are not able to go to the funeral.

Summary of Experiences and Reactions

Analysis of the individual descriptions of how respondents acted during and after the earthquake revealed a fairly consistent pattern, reflecting an initial narrow mental focus just after the main quake, with a gradual broadening of the subjective perspective over the course of the events. The time perspective in the descriptions runs from the start of the main quake until a few days later, when some subjects left Kobe

and Japan. Table 5 summarizes in a tabular form the main themes emerging from the response data and the specific issues for this particular group. Regarding contacts, the emphasis is on informal and close contacts via social and company networks in the area. One respondent commented: "When it happens you have to look after yourself with your friends. Forget the authorities."

Table 5.
The Main Themes and Group-Specific Issues Reflected in the Response Data

	Impact – During the morning	*During the day*	*During the evening/night*	*During the following days*
Main goals/ decisions	• Secure life/safety • Secure family • Secure important belongings	• Secure main necessities • Housing, food and drink	• Decision about temporary living	• Decision on evacuation from the area
Group-specific priorities	• Need to contact: family, colleagues, company management, relatives in Sweden	• Need to obtain information, • Language problems, • Contact with other expatriates, • Company responsibilities, • Maintain contact with Sweden	• Establish support network among expatriates and colleagues, • Share information	• To stay or to leave Japan - all or part of the family?

Analyses and Subgroup Comparisons

Relations between reactions before, during, and after the earthquake were examined on the basis of patterns of correlations using the Pearson product-moment correlation coefficient. Prior preparedness, previous disaster experience, and prior risk concern were significantly correlated with certain emotional reaction patterns during the acute earthquake. Thus, for example, prior experience was positively related to immediate feelings of calm ($r = 0.51$, $p < 0.01$) and negatively related to acute fear ($r = -0.57$, $p < 0.01$). Prior risk concern and preparedness were primarily related to

feelings of calm ($r = 0.53$, $p < 0.01$ and $r = 0.46$, $p < 0.05$, respectively). Distress and psychological reactions and symptoms after the earthquake were significantly correlated mainly with fear and panic feelings during the acute phase (r between 0.54 and 0.58, $p < 0.01$).

Comparisons were made between subgroups defined according to gender, age (under/over 35 years), children (yes/no), and ability to speak Japanese (not at all/some or considerable). The group of respondents who spoke some Japanese consisted of four women and five men who mainly were in the age group 35-50, had lived for some time in Kobe, and had children. The greatest number of significant subgroup differences was found between this group and those who did not speak Japanese. Those who did speak some Japanese were better prepared, better informed, and showed more concern before the quake and tended to rate risks generally as greater today. They also assessed their own reactions during the quake as more active. The personal consequences after the quake were greater for this group, in particular regarding psychological reactions and symptoms, such as difficulty sleeping and intrusive thoughts, for themselves and members of the family.

Significant group differences attributable solely to gender or age were very few. In describing their emotions at the time of the quake, women assessed themselves on average to be significantly more frightened than men did. Women also assessed greater experience of psychological reactions and symptoms since the earthquake. These were the only differences found in relation to gender on any of the questions or indices examined. Regarding age, those who were over 35 had made more preparations before the earthquake, were better informed beforehand, and had been more concerned about possible negative events compared to those who were younger.

Discussion

This study maps behavioral patterns and reactions before, during, and after the Great Hanshin-Awaji earthquake based on the experiences of Swedish residents in the area. It can be concluded that as a group the Swedes appear to have coped well with the immediate situation according to their own assessment, even though they were not well prepared for an earthquake.

As foreign residents these people may in a disaster differ somewhat

from the general population in both resources and needs. Overall this group was equipped with favorable financial, material, and educational resources to cope. Living abroad means that family and relatives may be far away and the circle of acquaintances limited, but it may also promote a strong social support network within the foreign community. Respondents seem to have relied to a great extent on their own social network and to have contacted and helped one another. They also had access to social support from outside the affected area and to information from sources outside the regular community. Work-oriented contacts also appear to have played an important part for most respondents, both as an area of responsibility and as a source of support. Many employing companies took active measures to help their expatriate employees.

This group also had particular needs regarding information. They needed to get in touch with the outside world in order to inform relatives, friends, and colleagues in Sweden of what had happened. They also needed to obtain information, a need that was accentuated since television and radio reports were in Japanese.

Some of the respondents had contracted to stay in Kobe for a restricted period and had only a short period of time left on their contract. This may have made it easier for them to accept a more temporary solution concerning housing. Being able to leave the area fairly quickly is one resource open to many foreign residents. However, data from the present study indicate that this may not always be psychologically unproblematic, at least for those who have developed ties to the host country. Leaving may also arouse feelings of guilt. Previous research has outlined a pattern of collective coping after community disasters, a prominent feature of this process being that people think and talk to each other about the event intensively for the first two weeks (Pennebaker and Harber 1993). It could be hypothesized that those who leave the area are less able to compare experiences and talk the event through with others.

The experiences of this Swedish group can be compared more generally with behavioral disaster and earthquake research. According to previous research, behavior may vary considerably in response to an earthquake, ranging from rational and intentional behavior to panic or instinctive behavior which aggravates the negative consequences. The present study mainly conforms to the former picture. No collective

panic, as described, for example, by Alexander (1990), was indicated here. Rather, these results are more in accordance with previous observations that a disaster fosters unity and helping behaviors (O'Brien and Mileti 1992). The respondents perceived themselves to have dealt with the situation better than expected and would in a similar situation have done the same thing once again. Most of them clearly emphasized that they were active, calm, and acting adaptively. They experienced strong fear but did not report losing either their emotional or cognitive control to any major extent. However, it can be noted that intensity of feelings of fear and panic during the acute phase did show a positive relationship with later distress and psychological reactions and symptoms. The mainly adaptive reactions could be attributed to factors relating both to the resources of the respondents and to objective circumstances regarding the actual earthquake. The respondents in this case were relatively lucky, since no house collapsed completely and there were few injuries to them and their families.

Adaptive performance during a disaster could also be assumed to be related to good preparations. In general the results from studies on earthquake preparedness tend to be disappointing (e.g., Russell et al. 1995), and the Swedish subjects in the present study were not well prepared for this event. The preparations made by respondents were mostly of the kind that could be useful in a number of different circumstances, while more earthquake-specific preparations were less frequently reported. The preparation pattern closely resembles that found in a survey of citizens in Sweden regarding household preparedness for accidents and disasters in general (Larsson and Enander 1997). Most respondents were not at all concerned that an earthquake might occur in Kobe, and the risk was assessed as low or negligible. A similar sense of security among the Japanese themselves has also been noted (Hayashi and Kawata 1995). Lack of preparation and risk awareness has been supposed mainly to be related to denial coping (McCaughey et al. 1994), but in this case respondents emphasized that they were informed that Kobe was outside the risk area for earthquakes. The positive relationship indicated between on the one hand preparedness and prior risk concern and on the other feelings of calm and active coping ability during the acute phase might tentatively be interpreted in terms of mental preparedness, although this hypothesis needs to be explored further.

Within the Swedish group studied here, some differences between

subgroups could be noted. The pattern of differences defined according to ability to speak some Japanese indicates that those speaking the language were better prepared but also that they suffered more strongly from personal consequences of the earthquake. Previous work has emphasized the importance of community involvement and bonding for preparedness activities (Russell et al. 1995). In the present study, ability to speak the language could be viewed as an indicator of involvement or identification with the host country. Viewed in this light, our results can be interpreted as indicating that a closer identification with the community may be something of a double-edged sword. Thus, as found in previous work, higher involvement makes for a greater degree of preparedness, but may on the other hand also magnify the personal impact of the event when it occurs.

As a subgroup, women expressed on average a greater degree of fear during impact and assessed more psychological reactions and symptoms after the event. This is in line with previous work (see, e.g., Anderson and Manuel 1994). However, it is worth noting that in the present study men and women did not differ in any other assessments, for example, regarding their own actions and coping.

One limitation of the study is the time delay from the event to the collection of data. There is, however, previous work supporting that self reports of a disaster situation are reliable even long after the event (Norris and Kaniasty 1992). Another limitation of the study is the small sample and lack of follow-up of nonresponders. It is conceivable that the responders could represent a group that was relatively better able to cope or, conversely, a group whose responses stem from the need to further process traumatic experiences. However, although suggestive rather than definitive, the results from the group studied here do reflect some particular experiences of foreigners in a disaster situation. Many possible transient or foreign groups can be identified whose particular profile regarding resource capabilities and community attachment may affect behavioral reactions in disaster situations. Defining such groups and mapping their respective experiences in relation to emergencies and disasters is an area deserving further research attention.

Note

1. Outside temperatures were around 0 degrees Celsius at the time.

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