

Recalling Chernobyl: Reflections Among Swedish Farmers*

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Interpretations of past disaster experiences are likely to influence reactions to future threat situations. This study examines recollections and interpretations of a diffuse threat situation among farmers in areas of Sweden affected to differing degrees by radioactive fallout from the Chernobyl accident in 1986. 20 farmers were interviewed and the data were analyzed using a grounded theory approach. The analysis resulted in a model in which personal reflections emerged as a filtering link between recollections of the past event and anticipations about the future. Differences in recollections, reflections and anticipated behaviors could be related to differing experiences among the farmers. The main category of reflections exemplified ways in which memories from Chernobyl were reassessed and evaluated in a sense-making process. On the basis of these reflections, two differing patterns of anticipated future behavior could be identified: the first being passive and reactive in response to the actions of authorities; the second active and relying mainly on personal judgments and decisions.

*This study formed part of a project concerning food production in Sweden in the event of a radioactive fallout situation and was partly funded by the Swedish Board of Agriculture.

Introduction

2006 marks twenty years since the reactor accident at Chernobyl. The accident and the effects of the radioactive fallout after the event gave rise to strong reactions in many European countries (Renn, 1990). Reactions were related to people's immediate concerns, to a general increased awareness of risks and vulnerabilities, but also to the perceived lack of preparedness and coping ability generally demonstrated by authorities. Although reactions to the Chernobyl accident varied in different countries, dissatisfaction with the perceived lack of clear and reliable information from authorities formed a consistent theme throughout most of Europe. Results from a Eurobarometer public opinion survey in 1988 showed that the number dissatisfied with the information they had received ranged from 58% to 70 % (Tønnessen, Mårdberg and Weisaeth, 2002). In Sweden, the Chernobyl period has generally been regarded as having constituted a major information crisis for the government and for the organizations responsible for managing the situation (Lundin, Mårdberg and Otto, 1993). This critical assessment led to strong demands for lessons to be learned and for experiences to be implemented in preparedness and mitigation measures.

Exposure to radioactive contamination constitutes a diffuse threat situation, impossible to register with the senses and difficult to assess in terms of geographical spread or time of exposure. This opens up a number of different interpretations among those affected. Previous research has demonstrated that radiation risks can be interpreted very differently according to context, and also that experts and laypeople differ in their assessments (Slovic, 1996). Dealing with invisible toxic contaminants also raises particular disaster management problems related to different beliefs and reactions both in the acute and aftermath stages (Kroll-Smith and Couch, 1993).

Studies conducted after the Chernobyl accident provide valuable information about how people reacted at that time (Drottz-Sjöberg and Sjöberg, 1990). The question in the present study concerns factors influencing how people think back on these experiences and how they might react to a future situation. A comparison between reactions among the Norwegian public in 1986 and public anticipations of

reactions to a future event, as measured in a 1993 survey, revealed a tendency towards sensitization (Weisaeth and Tønnessen, 1995). Far more people reported expecting to react strongly than actually did react strongly in 1986. According to a stress theoretical position, coping under stress is determined primarily by how the individual appraises a situation and his/her own resources to deal with this situation (Lazarus and Folkman, 1984). The influence of previous experience of accidents or disasters on personal protective behavior has also been shown to be dependent on how the individual interprets this experience (Weinstein, 1989). Long-term impressions from major crisis events can be expected to be influenced both by interpretations of personal experience and by collective influences via media reports, public inquiries, etc (Boholm, 1998; Larsson and Enander, 1997; Kofman Bos, Ullberg and t'Hart, 2005). Few studies have, however, attempted to trace the processes by which individuals recollect, reflect upon and possibly reassess such experiences after diffuse threat situations.

This study was carried out in the context of a project examining experiences and future issues related to a situation where the production of food in Sweden is affected by radioactive fallout. In this situation farmers play an important role. In 1986, farmers in more heavily contaminated areas had to take a number of measures, such as not allowing their cows out to pasture during many weeks, destroying milk and crops, replacing topsoil, etc. Farmers were also among the groups who showed strongest concern about the Chernobyl accident (Drottz-Sjöberg and Sjöberg, 1990). Focusing upon farmers as an important and experienced group, the purpose of the present study was to examine the personal memories and interpretations of the Chernobyl accident among persons involved in food production in Sweden, and to examine how such memories and interpretations might affect reactions to a future similar event.

Method

The study was conducted as a qualitative interview study during the period 1999-2000. The interviews were conducted within the framework of a study concerned with psychological and social

aspects of a situation where the production of food in Sweden was affected by radioactive fallout.

Subjects

The interviewees were in total 20 dairy farmers. The main criterion for selection was that the individual had been active as a dairy farmer at the time of Chernobyl and was still at least partly active in farming. In order to obtain a wide range of experiences during and after Chernobyl, interviewees were selected from three different categories. These categories were intended to reflect differing degrees of effect of the event as follows:

Strongly affected at the time. Eight farmers lived in the area around Gävle near the east coast. This area had been subject to considerable fallout in 1986, and it was necessary for these farmers to take extensive actions during and after that period (keeping cattle inside, discarding contaminated products, etc). These farmers were selected with the aid of county and local officials on the basis of the location of their farm and their experience of protective activities after Chernobyl. The age range of this group was 35-55 years.

Strongly affected at the time and after the event. A second group of six farmers also came from the Gävle area, and were part of a group subject to regular whole-body measurements of radioactive cesium run by the Swedish Radiation Protection Institute (SRPI) as part of a research program after Chernobyl. Thus this group was affected by fallout at the time, but had also been reminded of and involved in the analysis of effects over a long period of time. The age range of this group was 35-69 years.

Marginally affected at the time. Six farmers lived in a county in western Sweden (Värmland) which was only marginally affected by radioactive fallout from Chernobyl. These farmers were selected with the aid of county and local officials and represented a similar range of farm size and farming activities (primarily dairy) as those selected in the Gävle area. The age range of this group was 44-66 years.

Mean age of the interviewees was 48 years, 3 were women. In addition to dairy farming, the majority of the interviewees grew crops and were involved in forestry activities.

Data collection

The farmers participating in the SRPI program were interviewed in connection with a measurement visit to the Institute. The other farmers in Värmland and Gävle were interviewed in their homes. The interviews took on average 1-1½ hours and were recorded on tape. They were semi-structured around the following main themes, taking the interviewees' personal situation and life as a farmer as the starting point:

- Perceptions of current and future risk and threat scenarios
- Recollections of the Chernobyl accident in terms of:
 - Spontaneous reflections (e.g. “what comes into your mind when you think back to the Chernobyl event?”)
 - Descriptions of personal experiences and actions (e.g. “how do you recollect your own thoughts and actions in connection with the Chernobyl event?”)
 - Reflections on societal impact and response (e.g. “how do you recollect reactions to the Chernobyl event in Sweden generally? “)
- Evaluations of experiences 1986 in the light of hindsight (“thinking back, how do you feel today about ...”)
- Views on preparedness and actions in the event of a future similar situation (“What are your thoughts today about your reactions, if a similar event should occur again?”)
- Other personal reflections (“does anything else come into your mind when you think about the Chernobyl event?”)

Analysis

The interviews were transcribed verbatim and analyzed according to the constant comparative method introduced by Glaser and Strauss (1967). In the first step, the transcripts were examined line by line and meaning units indicating recollections, thoughts, feelings or actions related to the interview themes were identified. These were then coded in terms closely derived from the data. In the second step these codes were compared and sorted into different categories.

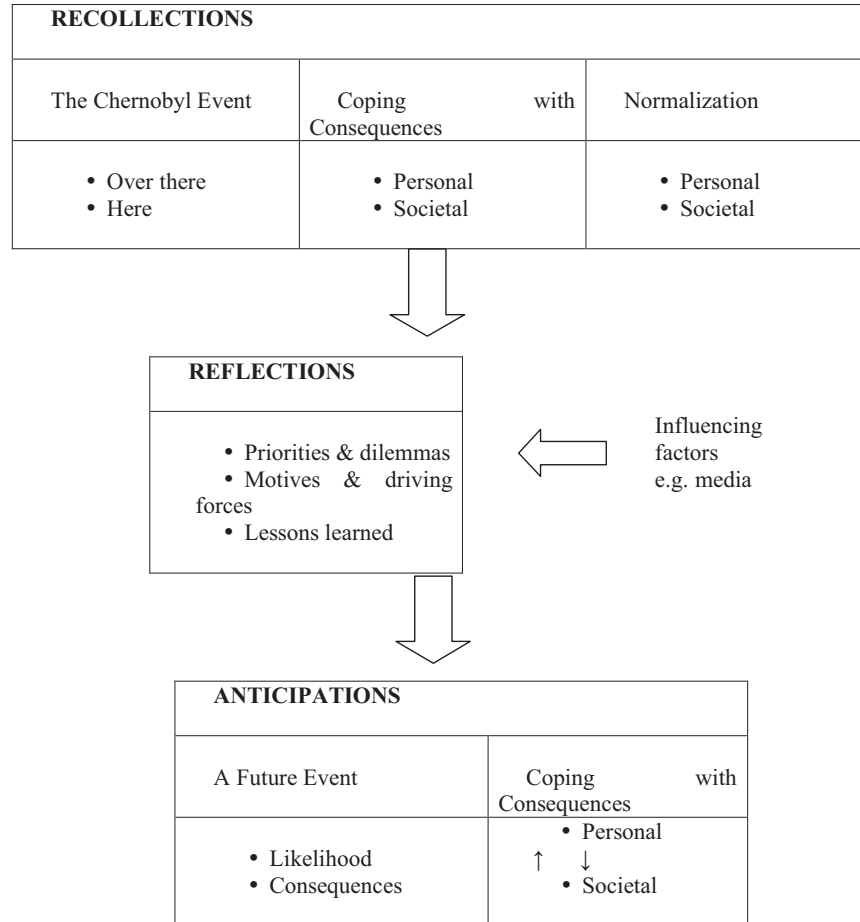
As an example: *“when the restrictions were lifted it was done one area at a time. It all seemed a bit too schematic – how could they be sure, the measurement equipment wasn’t at all accurate?”* was coded as “Questioning how restrictions were lifted” and sorted into the category “Unclear reasons behind authorities’ actions”. Another statement: *“It is frightening to see how easily people forget”* was coded as such under the category “Evaluations of people’s reactions”. In the next step the categories were compared and sorted into superior categories, the above two examples being included in “Motives and driving forces” and “Lessons learned” respectively.

In this analysis these steps of identification, comparison, coding and categorization were carried out within the different interview groups. In the further analysis comparisons were made between categories developed from the different groups, identifying similarities and differences in an iterative process. This process was conducted by moving backwards and forwards from the data to codes, codes to categories and from categories to structuring the relationships between categories and superior categories. As this analysis progressed, a main category comprising “Reflections” emerged to form a filtering link between “Recollections” of the past event and “Anticipations” about the future. Both “Motives and driving forces” and “Lessons learned” formed part of the main category “Reflections”. The overall model is presented in the next section, followed by a more detailed presentation of the different categories and links between these.

Results

The overall model is shown in Figure 1. Recollections are the thoughts, actions and experiences that the farmers report having occurred in connection with the Chernobyl event, as they remembered them at the time of the interview. These recollections could be related on an approximate time scale to: learning of the event itself; dealing with the consequences at a personal and societal level; and lastly the period of recovery from the event and gradual normalization. In the light of hindsight, the farmers reflected upon these recollections with comments and evaluations. These reflections can be seen as

Figure 1. The recollection – reflection – anticipation model



indicators of a process of reassessment of different aspects of the Chernobyl experience, influenced by internal and external factors. These reflections can also be viewed as a filter affecting how the farmers anticipate thinking and acting in the event of a similar threat in the future. Intended future actions are affected by experience, since the farmers are no longer “naïve” about radioactive threats. The anticipated mode of reaction may, however, be very different from last time, depending upon the individual’s reflections and reassessments over time.

Recollections

The first category of recollections concerned the actual Chernobyl accident itself. The cognitive and affective content of these recollections differed markedly between the more and less affected groups respectively. Among the less affected farmers of Värmland, memories concerning the accident focused on *Over there*, with mental pictures dominated by the nuclear power plant and scenes of refugees from the area. Among the farmers in the more affected Gävle-area, memories all concerned their own land and environment, *Here among us*. These memories showed two particular common characteristics. The first was the focus on images of vulnerability particularly of children, animals, and crops. “*The children were sitting in the sandpit all day, while it rained.*” “*We had a pram outside the house.*” “*I see my youngest daughter, 10 months, sitting in a muddy puddle pouring water over her brother.*” A second common characteristic concerned memories related to the environment, often with strong sensory content and in several cases with a hint of mysticism. “*The dust that swirled around the tractor, all around.*” “*It was a Tuesday, it rained and was strangely warm. The spring flood that year was enormous.*” “*My father was out in the boat, came home and said he had seen strange bubbles on the surface*” (before they knew about the accident).

The second, major category of recollections concerned *Coping with the consequences* at the personal and societal level. Personal coping dominated among the more affected groups, while in the less affected areas the focus tended to be on societal coping, as perceived through the media.

Personal coping was composed of two subcategories, relating to emotions and actions respectively. The Värmland farmers provided fewer memories related to personal emotions, although some did characterize their remembered feelings as those of relief, sometimes tinged with guilt: “*we felt lucky to be so little affected*”, “*really, you can't take on all the problems everywhere else*”. Memories of actions in this group tended to be hazy, the strongest recollections concerning waiting for or actively seeking information. Among farmers in affected areas, on the other hand, memories of their

personal emotions and actions remained vivid. Recollected personal emotions comprised four main categories, reflecting a range from acute strong feelings to more chronic effects on mood:

Fear: “*at first there was almost a feeling of panic*”. Fear was primarily linked to recollections of the first reports of fallout in areas of Sweden.

Worry: “*I was most worried about the children*”. Worry was closely related to perceived vulnerabilities and choices in different ways of coping.

Helplessness: “*It all made you feel so very small*”. Sense of helplessness was linked to the perceived scope of the event in terms of long recovery period and widespread effects.

Low spirits, preoccupation: “*Feeling sad*”; “*downhearted, thinking about it all the time*”. Descriptions of these feelings of sadness were characteristic over a longer period of recovery time, relating for example to loss of joy in certain activities.

Recollections about the actions the farmers had taken comprised four main categories, of which two were more internally focused and two more externally focused:

Cognitive processing (internal focus): “*Tried to think of other things I could compare with*”. This category included different ways of trying to gain some cognitive control over a diffuse concept of threat.

Resignation (internal focus): “*there was no point in thinking too much, best just to accept*”. Acceptance was closely related to leaving decisions to authorities, and to doing as one was instructed.

Activities (external focus): “*production was so important that there was no time to think about personal safety*”. Many recollections focused on the hard work involved during that period, pushing personal considerations into the background.

Information-seeking (external focus): “*read everything in the papers, listened to the information*”. Seeking information did not apply only to the acute phase, but characterized descriptions also over a longer period of time.

Among the less affected farmers, memories of how others and how authorities reacted tended to be related to media reports. Criticism of media sensationalism was one major theme. While interviewees recalled that authorities were criticized, these recollections were

vague and seldom expressed in emotional terms. In the affected areas the memories of authorities' actions were more varied and set in the context of personal experience and assessments. Strongest emotional reactions were expressed in relation to memories of negligence or lack of empathy from authorities and organizations. Such memories could still elicit observable emotional responses. *“Those people from the Health and Environment Board had a strange attitude—seemed to think my precautions were ridiculous. That has really stuck—I have no time for them.”*

Reflections

This main category comprises different ways in which memories and experiences from Chernobyl were considered, evaluated or reassessed by the interviewees. Reassessments could be related to new knowledge gained (for example from media), or to the passage of time and increased mental distance. Three categories of reflections were identified: Priorities and dilemmas; Motives and driving forces; and Lessons learned.

The *Priorities and dilemmas* category comprises considerations about decisions and choices that were experienced during the Chernobyl period. These could concern the individual (primarily reflections from the more affected groups), or relate to the reactions of authorities and society as a whole. At the individual level, dilemmas focused particularly on thoughts about the balance of concerns between personal health and the wellbeing of one's family on the one hand, and maintaining production of milk and minimizing unnecessary losses on the other hand. A similar dilemma concerned taking the situation seriously without alarming the children unduly. At the societal level some differences in emphasis emerged between the farmers in the less and more affected areas respectively. The less affected Värmland farmers tended to emphasize the importance of precautionary principles and safety margins. In the more affected areas the difficult balance in finding the right level of societal concern appeared to be an issue which many of the interviewees had reflected on over the years. Farmers could be perceived as a stoic group who were generally reluctant to complain, which might lead

to society underestimating the long-term effects of the disaster. One comment pointed out that much of the discussion after the event has been about “*the money and compensation, but loss of joys in life has been the worst*”. These joys might concern fishing in the local lake, or picking mushrooms and berries in the forest.

A related area concerns what was given priority at the time, and how the interviewees regard this today. It was important then to show loyalty and unity in the actions taken, but that did not necessarily mean that one believed in these actions. Doubts about how well-founded this loyalty might be are reflected in the comment: “*we followed directions so obediently—someone has spoken and we do as we are told. I have often thought how easily led we were—really quite dangerous*”. Reflections on the information provided at the time comprised three themes: chaos and lack of clarity; lack of openness and corresponding mistrust; and exaggeration leading to unnecessary fear. The less affected Värmland farmers tended to be somewhat less critical and more forgiving of the mistakes made by authorities: “*it is easy to be critical, but perhaps they shouldn't be judged so harshly, this was the first time ...*”. Participants in the SPRI group tended to be most critical of exaggerations and excessive reactions, focusing on the risk that this might lead people to become skeptical and take future events less seriously.

The perceived *Motives* behind different actions form a central reflective category. Emptying the children's sandpit may in hindsight be viewed as overreacting, but the motive to protect the family makes the action still reasonable. Throwing away good milk was necessary in order to maintain public confidence in dairy products. On the other hand, actions seen as being initiated on the basis of lack of interest or understanding from authorities are judged more harshly in retrospect. Similarly, motives attributed to different actions on the part of authorities influence how these are assessed: “*they only did this to keep us quiet*”. Again, more affected farmers appeared to attach greater significance to motives than did the farmers in less affected areas. Distinctions between motives could be quite fine, for example between actions motivated by lack of knowledge and those prompted by lack of effort to gain more knowledge (interpreted as nonchalance). Lack of interest in the problems of farmers was for

example attributed to some central authorities: *“a pity the stuff didn’t land on Stockholm or in southern Sweden— it would have been dealt with differently then”*.

The most extensive category of reflections is related to the *Lessons learned*, at individual and societal level. A major lesson at both levels concerns vulnerabilities, and awareness of how values in life can be taken for granted. The need for preparedness and what this might entail at different levels is also a recurring theme. Another aspect concerns whether the right lessons have been learned, and the risk that people very rapidly forget. Particularly among the more affected farmers there was a feeling that they themselves had learned a great deal, but that this was not true of society as a whole. *“You only have to go to a village a few miles away and they have forgotten all about it”*.

Anticipations

All interviewees anticipated that a similar event could, or even would, occur again in the future. The possibility that the consequences would be worse was also raised. *“The stuff is still here in the ground, supposing it happened again then there would just be even more.”*

When personal memories were considered in relation to a possible future event, two major patterns of reactions emerged. One pattern could be characterized as accepting and somewhat resigned: *“there is little the individual can do, one must adapt to external pressures and decisions.”* This pattern was characteristic primarily among the little-affected Värmland farmers. In the second reaction pattern the role of knowledge and experience as motivators for more active personal decisions was the main theme: *“I would make far stronger demands on authorities and not be so compliant next time.”* This reaction pattern could be related to critical reflections regarding priorities and motives of authorities, in particular among the more affected groups.

Expectations regarding the coping ability of authorities also demonstrated two differing categories. One category reflected that lessons had been learned, and that preparedness and awareness of the problems involved had increased. The second category comprised

more pessimistic expectations relating to lessons being forgotten and to lack of competence among authorities. The former expectation was more often voiced by farmers in the less-affected areas, while comments from those in more affected areas tended to reflect acknowledgement that authorities and experts had better knowledge today, but doubts as to how they might use this knowledge in a real situation. Distinctions were made between the increased knowledge of scientists, which was particularly emphasized by the participants in the SRPI program, and more doubtful assessments regarding the increased knowledge of authorities.

Expectations about personal reactions were linked to these anticipations regarding the capabilities of authorities. If authorities were mistrusted then personal initiatives and activity became all the more important.

Discussion

One of the most common questions posed to behavioral scientists in the area of risk and disaster may be “how should we expect people to behave if such-and-such occurs?” The response is probably most often some variant of “that will depend ...” If the anticipated disaster has occurred previously, then people are likely to presume that similar reactions can be expected next time. In revealing the many factors influencing responses to risks and crises, disaster research has collected considerable evidence to question the soundness of such assumptions. The study reported here has focused on one such factor, namely the way in which people remember and reflect upon their previous experiences, to demonstrate ways in which such reflections can affect how people anticipate acting in possible future situations. Although this is no guarantee of how they will in fact act, there is theoretical and empirical support indicating that intentions do form relatively sound predictors of future behaviors (Fishbein and Ajzen, 1975).

This study revealed a wealth of memories related to the Chernobyl disaster. Differences in the subject matter and emotional content of memories between the respective groups indicate the significance of personal experiences even over long time and regarding an event which has been much publicized and debated in media.

One focus of interest in the study was to examine what kind of memories people might have of a crisis situation affecting their daily life, yet impossible to perceive via their own senses. The interviewees had no difficulty in recalling those days in April when the news about the accident dominated the media. Many gave personal descriptions of their own circumstances and actions at the time, even their first reflections and concerns. These memories bear many of the characteristics of so-called flashbulb memories, which describe the often vivid and concrete recollections of personal circumstances that people have of when they first heard of a dramatic event or disaster. Modeling of flashbulb memories after disasters indicates that personal importance is a critical predictor of maintaining these memories, and that social sharing has a reinforcing effect (Er, 2003). Thus, while these memories are personal they are also reinforced and formed in a social context and contribute to collective memories of special events (Finkenauer, Gisle and Luminet, 1997; Zerubavel, 1997).

Reflections about the implications of the Chernobyl event and anticipations about the future revealed some clearly different patterns of thought among the farmers interviewed. The development of different non-empirical belief systems among the affected public has been described in relation to toxic accidents such as Love Canal (exposed 1978) and Three Mile Island 1979 (Vyner, 1988). It has been hypothesized that the ambiguity of invisible toxic events places less situational constraints upon the interpretations of the event, thus leaving greater influence from individual psychological factors. The results from this study indicate that such different systems of beliefs and interpretations can develop and be maintained long after the actual event. The similarities within and differences between the groups of more and less affected farmers can be seen to reflect different remembrance environments or communities of thought, as discussed by Zerubavel (1997).

It is interesting to note that many in the more afflicted areas did provide memories of strong sensory content related either to the environment (strange weather, unusual quality of the rain, strange bubbles on puddles) or to scenes of vulnerability (the children in the sandpit, the pram in the rain). The implications of the accident only gradually became clear, as the extent of the fallout was

measured and communicated to the public. Thus the sinister threat overshadowing many, at first glance innocuous, memories would seem to reflect a retrospective process where gradual accumulation of knowledge from media and other sources prompted reassessment of first recollections. One hypothesis here might be that non-sensory threats accompanied by drastic societal and personal effects and strong emotional reactions could tend to become colored with a sensory content in retrospective memories. According to Zerubavel (1997), traditions of remembering (mnemonic traditions) include not only what is remembered, but also *how* it is remembered. This can include the symbolic content attached to the memories. In this case the symbolic associations to the event itself differed in the different communities studied. Regarding the “mystic” nature of some of the reported recollections, it is interesting to note some parallels to analyses of the visual imagery accompanying media reports concerning Chernobyl. Examining the media pictures at the time of the 10-year anniversary in 1996, Boholm (1998) has discussed the strong symbolic content of this material, and the at times enigmatic and apocalyptic “metameaning” conveyed by this symbolism.

According to the model developed in the study, reflections form an important filter between the experiences of the event and anticipations about the future. The categories of reflections which emerged in this study could be interpreted as part of the process of sense-making, which forms an important part of recovery from a natural disaster (Harvey et al., 1995). By thinking about motives and driving forces, farmers could reassess the reasons behind both their own actions and those of others. Similarly, thoughts about priorities and dilemmas exemplified ways of bringing together apparently conflicting feelings and actions. This process seems to fit well with the conception of sensemaking as being more concerned with plausibility than with accuracy, and as serving as a springboard into action (Weick & Sutcliffe, 2005). Thus the farmers seemed retrospectively to be seeking meanings in their own reactions and those of society in general, which could then form the basis of rationales for future actions. This process resulted in two rather different patterns of thought: one reflecting a more compliant attitude coupled with an expectation of learning and greater preparedness among authorities;

the other focused on personal coping resources and a more skeptical interpretation of the capabilities of authorities.

At the time of the study almost 15 years had passed since the Chernobyl accident. Still, particularly in the Gävle-area, even talking about memories from that time continued to evoke emotional reactions. In particular, memories of perceived injustice or negligent treatment appeared to remain vivid, indicating the long term importance for authorities of taking seriously and dealing in a respectful way with individual needs and problems in risk situations. This is likely to be especially important when the hazard is diffuse and people are dependent on authorities for assessment and guidance.

One issue of interest in the present study concerned the reflections of the radiation measurement (SRPI) group. Awareness of personal toxic exposure has been demonstrated in some cases to lead to a sense of contamination and feelings of rejection by others (Kroll-Smith and Couch, 1993). Being selected for repeated measurements might be expected to accentuate such feelings. However, the reflections from this group rather tended to indicate a sense of community contribution in acting as local “thermometers”. Several comments also concerned the advantages gained, in terms of increased understanding of difficult concepts and phenomena, from interaction with scientists.

In this study memories have been used as data reflecting individual interpretations of a collective crisis event. The issue has not been whether or not these memories are accurate in any objective sense. Here the purpose has been to examine variations in relation to different experiences, and further to trace how these differences are reflected in current views on threats, and on personal and societal preparedness. Work on memory for emotionally arousing events indicates that greater involvement in and affect aroused by the event tends to be associated with greater consistency over time and/or amplification of memories (van Giezen et al 2005). Thus it can be hypothesized that the memories of the more affected farmers may be more consistent, and possibly amplified, compared to those of the less affected farmers. Consistency of memories is one aspect, but according to the model developed in this study, *reflections* on

these memories may be a more dynamic process which continues over a longer period of time, influenced by such factors as social interactions, media reports, or other events. From a methodological point of view, longitudinal studies tracing this process with repeated interviews focusing upon reflections and assessments could provide valuable insight into how this process might be construed.

One obvious limitation in this study concerns gender, since only three female respondents could be included. Most dairy farmers are men, and the focus of interest here concerned memories related to actions on the farm at the time of Chernobyl. Clearly it would be of interest to pursue further studies of recollections and reassessments among different groups and in relation to a broader context of experiences and situations.

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