

Effective Emergency Communication : A Relevance Theory Perspective (小椋康宏教授 退 任記念号)

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Effective Emergency Communication
: A Relevance Theory Perspective

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Kyoko Arai

1. Introduction

On 11 March 2011, the great M9.0 earthquake (and many other big earthquakes) occurred in East Japan and were followed by the most disastrous tsunami in recent years. Approximately 20,000 people were dead or reported missing and 90% of the deaths were reported to be caused by drowning. Since the disaster occurred, the Japan Meteorological Agency (JMA) has been attacked by the criticism that their underestimated tsunami forecasts and ambiguous warnings delayed evacuation. To respond to these criticisms, the JMA organized a committee consisting of representatives from the municipalities of Tohoku area, seismologists, and people from the mass media, and held several meetings to discuss how to convey tsunami warnings more effectively. According to the surveys conducted during the meetings in the disaster-stricken area and the reports of the meetings, many people pointed out that one of the major problems related to the words and phrases they heard as warnings. As a result of the last three meetings, the JMA has decided to make certain modifications to the timing when warnings are posted and to the ways in which the warnings are expressed.

Although the committee has realized that emergency communication should be considered from the standpoint of their audience, the meetings included no scholars from the field of pragmatics, or from any other linguistics field. As a result, the modifications made to the ways in which the tsunami warnings are expressed do not seem effective from the pragmatic perspective.

The aims of this paper are to identify what constitutes effective emergency communication within the framework of relevance theory, delineate the problems of the current tsunami warnings and evacuation directives, and suggest certain modifications to the ways in which warnings are expressed and the warning system itself. According to the JMA's surveys, thus far the following problems have been found: the futility of information transmission, ineffective phrasing, the meta-message effects, and the different contextual assumptions residents make. These problems are discussed in each of the following sections one by one. In the final part of the paper, one of the best examples of tsunami evacuation directives issued by the municipal office of Oarai in the Ibaraki Prefecture is introduced; the reasons why the directives were so effective are examined using the analyses of the previous sections.

This paper also argues that pragmatics – especially relevance theory – could be an extremely useful tool for constructing literacy in relation to disaster prevention communications. This literacy, which applies relevance theory, could be highly effective for both those who make the official announcements relating to disaster prevention and those who listen to these announcements and make crucial decisions.

2. Problems with emergency information transmission

Previous studies of emergency information transmission, which do not have insights from linguistics, seem problematic. One of the issues concerning the flood evacuation directives in Japan pointed out by Kanai et al. (2011) relate to the so-called ‘meta-message effects’. According to their survey, the local residents interpreted the evacuation directives in a manner that differed from the literal meaning and this hindered them from making appropriate decisions concerning evacuation. Although Kanai et al. (2011) recognized the multiple meanings of an utterance interpreted variously by the audience, they did not clarify what the meanings were or the fundamental reasons why the audience tended to interpret the multiple meanings differently.

Relevance theory can help us understand why people infer different meanings rather than the literal meaning by using the mechanism of utterance interpretation. People tend to infer the optimal relevant meaning of any utterance so this must be taken into account and the meta-message which they might infer must be considered.

However, Kanai et al. (2000) concluded that the level of the residents’ recognition of inundation risk was such that it could promote the intention to evacuate. They further considered that a person who had good knowledge of the risk could understand the speaker’s intentional interpretation and that he/she could make the right decision in terms of evacuation. Knowledge of risk is one contextual assumption in an account applying relevance theory but many other kinds of assumption are made when we process an utterance. Let us say a person has the appropriate knowledge of inundation risk, if the accessibility of the knowledge is low at the moment when the person hears the evacuation directives, he/she might not use the knowledge as the basis for one of their contextual assumptions. Utterance interpretation is not as simple as it may appear. Therefore, it is necessary to gain greater understanding of the problems of emergency communication using the framework of relevance theory, and to make good use of the results of study to find appropriate modifications to the existing evacuation directives and comprehensive emergency communication.

In the following sections the four main issues relating to emergency communication set out in the introduction are addressed, especially focusing on

tsunami warnings and evacuation directives.

3. The futility of information transmission

Immediately after one of the biggest earthquakes in a few hundred years had occurred in East Japan, many media started to broadcast the estimation of tsunami arrivals issued by the JMA and the precautions to be taken. In addition, sirens were blown and pre-recorded messages were repeatedly and loudly announced. However, too many kinds of message were sent through too many kinds of media; thus many residents who answered the JMA's survey said: "They were sent to people in a broad area and we didn't know for whom the warnings were meant. So after a while we stopped paying attention to them".

Unlike a face-to-face conversation, an announcement has a mass audience, so the announcer's intention to convey information to someone cannot easily be fulfilled. The residents' ignorance of the meaning of the announcements was caused by the announcers' disregard for the importance of 'ostensive communication'. Communication can be successful if it is 'ostensive communication', which can be defined as meeting the terms of the communicative principle of relevance and the extent to which it has both informative and communicative intention. The *communicative principle of relevance* relates to the notion that: "Every act of ostensive communication conveys a presumption of its own optimal relevance" (Sperber & Wilson, 1996, p. 260). Within ostensive communication, *informative intention* aims "to make manifest or more manifest to the audience a set of assumptions I" (Sperber & Wilson, 1996, p. 58), and *communicative intention* aims "to make it mutually manifest to audience and communicator that the communicator has this informative intention" (Sperber & Wilson, 1996, p. 61).

The futile announcements in the above case must have had informative intention, but the communicative intention was not fulfilled in that it was difficult to make the fact that the announcer (communicator) had this informative intention mutually manifest to the residents (audience) and the announcer (communicator). The point is that a communicator of announcements of any kind should ensure that the audience realizes that the announcements are for them. In other words, it should be mutually manifest to the announcers and the residents that the communicator has this informative intention. The first suggestion for such announcements is that the area the announcements can reach should be as narrow as possible so that the audience can recognize the announcements' communicative intention.

4. The use of ineffective phrasing

In the survey many people complained about the ambiguous phrasing of warnings and directives. For example, the announcements made over speakers in the residential areas near the beach were heard to keep saying: "Please keep calm

and climb immediately into the hills or up tall and strong three-storey buildings”. Although in some places the residents had already noticed that large waves were almost reaching their houses, the announcements were still long and ambiguous. In particular, the use of adjectives and polite expressions are problematic.

In this section the formal aspects of language in the evacuation directives in an unexpected emergency are discussed drawing on the effective modes of expression used in airlines’ shouted evacuation commands. Arai (2011, 2013a, 2013b) has claimed that the effectiveness of evacuation commands can be described using the notion of relevance, the important elements of which are the least effort and the greatest cognitive effects.

The following examples of shouted commands are recommended for use when an aircraft is in an emergency situation. The commands given in (1) serve the purpose of ensuring that passengers’ take up the brace position.

(1) <Brace Position Shouted Commands>

- a. Head(s) down!
- b. Lean forward!
- c. Stay down!
- d. Keep down!
- e. Brace!

Airbus, Cabin Safety Compendium
(http://flightsafety.org/files/cabin_safety_compendium.pdf)

The examples in (2) relate to evacuating from the airplane using the slides:

(2) <Evacuation shouted commands>

- a. Release your seatbelt!
- b. Come this way!
- c. Jump and slide!
- d. Shoes off!

Airline Crew(<http://www.airlinecrew.net/>)

The characteristics of these shouted commands are that they are short and clear. They are all in the imperative form but the verb is omitted in (1a) and (2d) without following the rules of syntactic ellipsis. From a pragmatics perspective, any constituents of a sentence can be omitted as long as the speaker’s intention is fulfilled because the hearer can infer them through his/her pragmatic inference. These are effort-saving forms. To be optimally relevant, these utterances require the least effort. It is also advisable not to use negative expressions which are believed to require more mental effort to process.

As for the tsunami evacuation commands, the majority of the announcements made by speakers from local fire stations or municipal offices were too long, too polite, and ambiguous. For example, the use of 'tall' in relation to a tall building is not sufficiently specific. A specific building should be named, such as Tohoku Elementary School. Furthermore, after the great earthquake hit, most of the television announcers for the Earthquake and Tsunami Information Programmes repeated: "Before a big tsunami reaches your area, please climb a building of three storeys or more". Unfortunately, however, the tsunami waves were much higher than ordinary three-storey buildings in many locations in the disaster areas. To be relevant, the specific directives to be given should be considered more carefully as the airline companies have done.

5. Meta-message effects

As previously mentioned, Kanai et al. (2011) have claimed that residents in the flood disaster interpreted the directives as having a meaning other than their literal meaning and this hindered them from making appropriate decisions in terms of evacuation. In this section the dual meanings of an utterance are discussed more precisely using the relevance theory notions of explicature and implicature.

In the East Japan disaster, the tsunami evacuation directives confused people with meta-message effects. Using insights from relevance theory, it can be seen how the different inferences made on the basis of explicature and implicature confused the residents.

As an example, we can look at one of the ways in which tsunami warnings may be expressed, given in (3) below, and consider the meanings of the utterance. This expression is commonly used in the case of earthquakes occurring in Japan.

(3) "There are fears of a three-metre tsunami."

<Explicature>

There are fears of a three-metre-high tsunami in the coastal area.

<Implicatures>

You should evacuate the area.

You should climb a hill.

You should ascend a tall building.

You should climb up to the roof of the school building, etc.

As can be seen from the above, the possible implicatures of the announcement may vary depending on where the residents are. According to the JMA survey, some people said that a three-metre tsunami did not sound particularly dangerous so they just ignored it. Although three metres is much greater than a person's height, many people thought they were safe, perhaps because they were a little away from

the beach.

Before considering the various contextual assumptions the residents make, let us examine the content the disaster information system transmits and how transmissions are made to residents in Japan (see Figure 1). This is a very complicated information transmission system and this might have caused some misunderstandings amongst the local residents. The information content that the JMA sends concerns the date of any earthquake, tsunami observation results and tsunami forecasts. On the other hand, the local residents receive two different kinds of information. The first is the JMA data transmitted through the news media using the television, radio, mobile phones, etc. The second is evacuation advice or directives from the municipalities transmitted through speakers, information cars, etc.

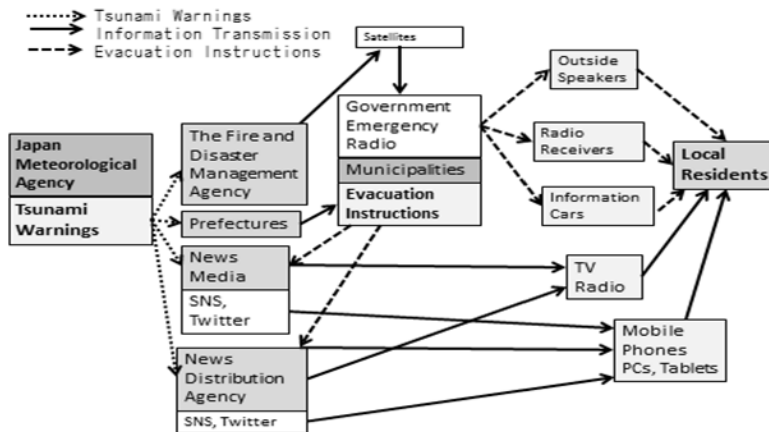


Figure 1 (Author's figure)

As pointed out, data-oriented information can have many different implicatures depending on the contextual assumptions residents make. On the other hand, by their nature, evacuation directives should result in immediate evacuation by residents. Therefore, the latter kind of information transmission should not give any opportunity for people to infer an implicature, let alone many. In other words, evacuation directives should be as explicit as possible.

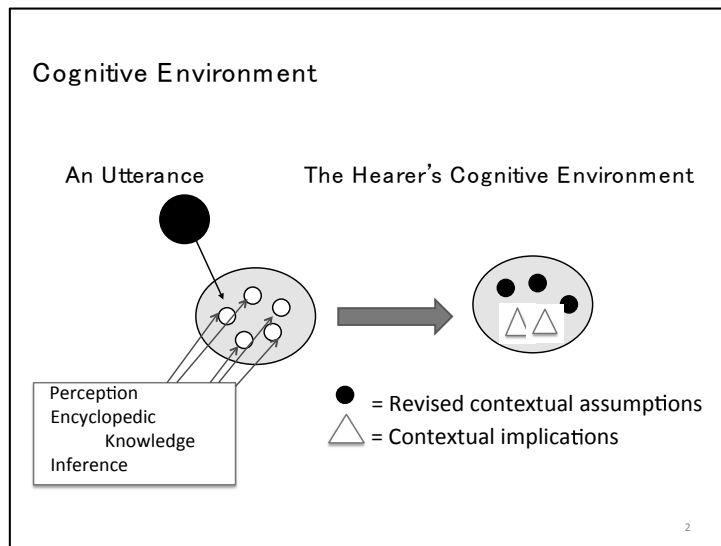
According to an article in the Asahi newspaper on 28 July 2011, it was announced by the JMA that when a tsunami of more than eight metres is estimated, the phrasing of the warnings should be: "There are fears of a great tsunami". Unfortunately, this is more ambiguous rather than less. The committee of the meeting organized by the JMA has also confused the two kinds of information. The information that the JMA sends to all media and public institutions should be data-oriented and as accurate as possible so that the local municipalities can take crucial

decisions and transmit the most explicit messages to the local residents.

6. The problem of contextual assumptions

One of the causes of ‘meta-message effects’, as Kanai et al. (2011) have pointed out, is the contextual assumptions made by the residents when they hear warnings and directives. In relevance theory it is said that when we hear an utterance we prepare the cognitive environment with some contextual assumptions as illustrated in Figure 2.

Figure 2 (Author’s figure)



Contextual assumptions are said to be based on perceptions, encyclopaedic knowledge and inferences. This can be demonstrated by comparing and contrasting the examples of different contextual assumptions that might be developed by two residents, Resident A (4) and Resident B (5), on hearing a tsunami warning, such as “There are fears of a six-metre tsunami”.

(4) Resident A's set of contextual assumptions

Perceptions (Visual and auditory information)	I felt great tremors. I saw the big waves of a tsunami coming.
Encyclopaedic Knowledge (Information from memory)	I have experienced a big tsunami after major earthquakes.
Inference (Information from a previous conversation or circumstances)	The people around me said we are in an emergency situation → I'd better evacuate immediately.

(5) Resident B's set of contextual assumptions

Perceptions (Visual and auditory information)	I felt small tremors. I didn't see the waves of a tsunami.
Encyclopaedic Knowledge (Information from memory)	I've never experienced a big tsunami after major earthquakes before.
Inference (Information from a previous conversation or circumstances)	The people around me said we are safe → I don't need to evacuate now.

It is clear that Resident A is most likely to take the decision to evacuate immediately, whereas Resident B might wait for more information or might take the decision to stay put. It is inevitable that each person makes his/her own contextual assumptions, but there are ways to minimize this.

One solution is for those who make the announcements to try to narrow the area the announcements reach, as discussed in section 2. Those who are in the same area tend to have the same kinds of perceptual information. Another solution is to manipulate the residents' cognitive environment from the aspects of memory and experience. In Japan there have been many disaster prevention education programs in schools. Education can help people prepare the preferable contextual assumptions for evacuation from the aspect of memory. In addition, disaster prevention and evacuation drills are regularly carried out in schools, companies, and municipalities. Through such drills, people can have simulated experiences and accumulate the appropriate knowledge to apply in a disaster. The importance of education and drills can thus be explained by the notion of the cognitive environment.

7. Effective evacuation commands

According to Inoue (2011), Oarai (with a population of about 18,000) in the Ibaragi prefecture was hit by a four-metre tsunami in the great earthquake on 11 March 2011. However, there were no casualties in the town. Inoue considered that one of the reasons was the unusual voice messages broadcast through the local disaster radio system by Mr. Kotai (the mayor of the town), Mr. Furukawa (the head of the fire department) and Mr. Masuda (a fireman). The messages were unusual because they were all army-like commands, such as:

“Emergency evacuation order!”

“Evacuate immediately!”

“Evacuate to the hill!”

“Don't go back to your home!”

As mentioned in the previous section, usually evacuation commands in Japanese are still phrased politely. There are many videos online taken at the time of the tsunami hitting, including the announcements made over the disaster radio system. At the moment when the disastrous tsunami was swallowing the town, the announcements were still very polite, phrased, for example, as: “Please evacuate from this area”. According to the survey conducted by Inoue (2011) in Oarai, many of the residents said that the unusual army-like commands made them realize it was a state of emergency and helped them escape from the danger area immediately.

From the viewpoint of relevance theory, these commands were successful because they had great cognitive effects. The phenomenon of ‘crying wolf effects’ is one of the major problems with evacuation commands according to Kanai and Katada (2011). The phenomenon is that people start to ignore repeated words or the same expression of commands after a while. The repetition of the same words or same expression is followed by a decline in cognitive effects. In the case of Oarai, the new type of announcements had strong cognitive effects and drew more attention from the residents. To succeed in emergency communication we should consider the mechanism of the hearer’s processing of an utterance.

Conclusion

In this paper it has been shown that relevance theory can contribute to an examination of the problems with existing evacuation directives and can assist in proposing appropriate modifications to the phrasing of warnings and directives and to warning systems with the aim of developing more effective emergency communication. Beside the problems discussed in this paper, there are still numerous problems concerning the linguistic aspects of emergency communication in Japan.

Last year the author has convened and organized the ‘Disaster Prevention Language Study Group’, including six scholars of linguistics (from the fields of pragmatics, syntax, and semantics), one social psychologist, one marketing and advertising expert, and two meteorologists. We are now discussing what constitutes effective emergency communication in Japan and are working on developing guidelines for evacuation procedures from the viewpoint of language usage.

The head of the fire department of Oarai, Mr. Furukawa, said: “Once a disaster happens, the only means of evacuating many people is language”, which convinced us that linguists should contribute to the study of efficient and effective emergency communication.

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