Guidelines for Making Emergency Announcements Taking into Consideration the Psychological State of Passengers

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The characteristics of the psychological state of passengers when trains stop moving for reasons such as an accident, inter alia, were modelled. Then, guidelines for making announcements were compiled, taking into account the state of mind of passengers. The guidelines were developed with a focus on “organizing ability,” “supportive ability,” and “explanatory ability.” Furthermore, the effectiveness of the guidelines was examined based on the results of surveys conducted on passengers and station staff. The survey on passengers indicated that passengers felt that announcements after the guidelines had been put in place, were more suited to the situation than conventional announcements. The survey on station staff indicated that the guidelines had been widely accepted by staff, and were considered useful for improving announcement skills.

Keywords: railway emergency announcements, psychological process model of passengers, announcement guidelines, service disruption

1. Introduction

The number of urban railway users in Japan is comparatively higher than in other cities such as London, Paris, or New York. Moreover, in Japan, railways serve as a transportation system for commuters. A person in Tokyo will use the railways 742 times a year, which is higher than Paris with 216 a year, London 129, and New York 94 times a year [1]. Railway operation in Japan has achieved a high standard of performance compared to other countries, assessed on the basis of the average delay for local trains of 0.9 minutes. In Japan, a punctual service is defined as a service with delays of one minute or less, whereas in other countries the tolerance is for delays of up to 10-minutes. Therefore, according to international standards, Japanese railways offer a highly reliable service. Nevertheless, the high dependence on railways and the large number of passengers can easily create situations that trigger passenger discontent.

In recent years, the “service disruption” rate has increased longitudinally in large cities [2]. This is because railways networks have been developed by interconnecting two or more railway lines operated by different companies cooperating together in order to improve passenger convenience, whilst at the same time the number of suicides has increased due to negative economic conditions. A service disruption is defined as a situation where train operations do not run normally for over 30 minutes because of an accident. To deal with this problem, railway companies have developed service disruption prevention plans and plans to minimize the effects of delays. It is known that the inadequate provision of information leads to passenger discontent. Therefore, improving the provision of information to passengers is critical. In particular, passengers rely heavily on announcements made at stations and trains, and therefore, improving the quality of announcements is essential [3].

An “emergency” differs in scale and the magnitude of its disruptive effect might also differ. Some disruptions are relatively easy to explain through announcements; operations can give an approximate time when services will resume early on during the disruption, and then approximately every 10 minutes until service resumes at the announced time. In other cases passenger announcements are more difficult to make, such as when the expected time when service can resume is not certain, if it has to change several times, or if the train schedule is repeatedly disrupted after resuming services. In this article, the first situation where making announcements is relatively easy is called a “typical emergency”, the second series of situations in which making announcements is difficult, are called “irregular emergencies”.

An “irregular emergency” leads to longer disruption times and elicits more discontent in passengers than a “typical emergency”. This therefore calls for more flexible provision of information suited to each type of situation, based on guidelines in a manual for making emergency announcements, as well as provision of more passenger-centered information. However, in reality, education aimed at improving announcement skills for providing more suitable information is heavily dependent on the characteristics of individuals and the experience of train crews and station staff. This meant that a set of announcement guidelines was required as a guide to making more effective announcements.

The guidelines proposed in this paper are based on psychological research and a survey of passengers in “irregular emergencies”. The effectiveness of the guidelines was examined by having station staff and passengers evaluate them. This article provides a summary of announcement guidelines that were developed and the results of the survey on their efficiency.
2. Guidelines for making emergency announcements

A model was developed of the psychological state of in emergencies. This model was then used to compile guidelines for making passenger announcements in emergencies. Using the guidelines as a foundation, station and train staff were then instructed on how to make announcements.

2.1 Psychological process model of passengers who face emergencies

As shown in Fig. 1, when perceiving any type of emergency, including a railway emergency, people begin to collect information about the situation based on their past knowledge and experience, by using information panels in stations and trains, as well as by using smartphones [4]. Then people try to answer the question, “what will happen if I do not act right now,” or “redefine the situation.” If they decide that “they should do something,” then, they examine their behavioral choices and their effectiveness to plan action (decision to act). In this process, people use their experience and knowledge and make assessments, which lead to inferences that are made based on information, including external information. The decision to act includes, “external action,” such as making a detour by taking a taxi, and “internal action,” such as engaging in emotional self-control activities including calming the mind. If the redefinition of the situation results in taking no further action, then, internal action tends to increase.

People are also known to feel intense stress when they cannot take countermeasures in a given situation. Moreover, when taking countermeasures and making a decision, information related to three perspectives, “status recognition (current status),” “prediction” and “behavior,” is known to be helpful [5]. Therefore, providing information in the light of these three perspectives should facilitate the implementation of countermeasures by passengers, which would essentially reduce their stress. Information related to “prediction” is the most important among these three perspectives, because predictive information is useful for redefining the situation, and predictive information is the foundation for deciding to take action. Table 1 describes the three perspectives with reference to examples of information provided in railway emergencies.

2.2 Guidelines for making emergency announcements

Based on the psychological model of passengers in emergency situations described above, the authors developed guidelines for making announcements by focusing on developing announcement scripts and delivering information taking “organizing abilities,” “supportive abilities,” and “explanatory abilities” into consideration (Fig. 2). These abilities have a hierarchical relationship with each other with “supportive abilities” being the core element, supported by “organizing abilities” and improved by “explanatory abilities.” “Organizing ability” is the ability to accurately comprehend the context and progress of a disruption, judge whether it is a “typical emergency” or an “irregular emergency” and decide if supportive and explanatory abilities must be engaged. “Supportive ability”

![Psychological process model of passengers facing emergencies](image)

**Table 1** Three perspectives and corresponding examples of information provided in railway emergencies

| Perspective | Description | Examples |
|-------------|-------------|----------|
| Current status | Information about the current state of affairs | Information about restoration work, (e.g. time when railway workers arrive on site, what difficulties they may be encountering, etc.) |
| Prediction | Predictive information | Information about time services are expected to resume, or estimated time of arrival at the terminal station |
| Behavior | Information to facilitate decision about what action to take | Traffic rerouting |
is the ability to consider information related to the three perspectives shown in Table 1 “current status,” “prediction” and “behavior” at an early phase, when making announcements. “Explanatory ability” is the ability to make announcements that are easily understood by passengers by considering “how to deliver messages.” Passengers that face emergencies need and demand explanations from station staff to understand their situation and take appropriate action. Therefore, when providing information about the current status, prediction and behavior, it would be effective to add an appropriate explanation to promote passenger understanding. Moreover, explanatory ability includes providing balanced information by adjusting the proportion of each of the three perspectives in the information provided, which forms part of the supportive ability, to prevent repeatedly calling for people’s attention, by adding expressions such as “this is a repeated announcement” at the beginning of an announcement.

3. Passengers evaluation of guideline efficiency

This section reports on the results of a survey to examine the effectiveness of the proposed announcement guidelines from the point of view of passengers listening to the announcements.

3.1 Evaluation method

A group-administered survey was conducted in late October in 2012 on passengers (monitors) using the Chuo Line (N =220, 124 men, 96 women, age range 20 to 68 years, mean age 42.1 years, mean age of men 45.2 years and mean age of women 38.8 years, SD 12.5 years, 12.1 years for both sexes). 62.7 % of respondents used the train over 5 days a week, and 66.4 % indicated that they used the railways for “commuting to work or school.”

The survey consisted of three parts: Surveys 1 to 3. Surveys 1 and 2 were scenario experiments, and Survey 3 was an inquiry about the wording and expressions used in the announcements. In Surveys 1 and 2, participants received information about a disrupted train schedule (scenario) through a typical train station announcement. Then, participants evaluated the announcement. This article reports on the results from Survey 2, for which three scenarios were prepared (Table 2). Participants listened to two types of scenario for each situation. The first announcement was made according to the newly developed announcement guidelines (modified announcement) and the other announcement was a typical train station announcement (conventional announcement). As mentioned in Chapter 4 below, 90 % of train crews responded that the conventional announcement was similar to the type of announcement they usually made at stations.

All three scenarios involved passengers listening to announcements about disrupted services while waiting for a train at a station. However, as can be seen in Table 2, the station, time of day, the reason for taking the train and the cause of the disruption differed in each scenario. For example, in Scenario S1, passengers were expecting to get on an express Chuo line train that leaves Kokubunji station, which is the station closest to their home, at 8:02 am to arrive at Shinjuku station close to their offices at 8:34 am. However, while waiting for the train on one of the Kokubunji station platforms, they heard an announcement that services were disrupted due to a fatal accident. Figure 3 shows the chronological sequence of events in Scenario S1 and a summary of the announcements. Modified and conventional announcements were based on information provided by the same operator. However, the modified announcement made good use of enhanced explanatory abilities compared to the conventional announcement by

![Guidelines for making emergency announcements](https://example.com/guidelines.png)

**Fig. 2 Guidelines for making emergency announcements**

| Scenario number | S1 | S2 | S3 |
|-----------------|----|----|----|
| Station         | From Kokubunji station to Shinjuku station (familiar route) | From Shinjuku station to Kokubunji station (familiar route) | From Kokubunji station via Shinjuku station to Nissin station (unfamiliar route) |
| Time zone of the day | Morning rush hour | Evening rush hour | Morning rush hour |
| Purpose of train journey | Commute to work | Returning home early because of the typhoon | Business trip |
| Cause of disruption | Accident involving a person on the line | Fallen tree on line because of typhoon | Detection of abnormal noise |

Table 2 Comparison of the three scenarios

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actively providing predictive information, and was timed to be made earlier. Moreover, as a response to changes in predictive information, the announcement also included more detailed objective information including reasons being given for the schedule change. Furthermore, even after the resumption of service, staff continued to announce information regarding congestion resulting from the disruption, which was expected to influence the decision making behavior of passengers. The announcements also updated the train schedule.

3.2 Results

Participants listened to the modified and conventional announcements in the three scenarios and evaluated the announcements by responding to nine questions on what they experienced with each announcement, with such terms as: “mostly agree,” “agree,” and “strongly agree.” Figure 4 shows the rate of participants who chose the modified announcement. Of the participants, 220 responded to questions under Scenarios S1 and S3, and 184 responded to questions under S2. More than 80% of participants chose the modified announcement (“mostly agree,” “agree,” and “strongly agree”) for positive aspects about the announcements other than “homogeneity,” implying that the modified announcement produced more positive evaluations than the conventional announcements. Less than 40% of respondents agreed that modified announcement were “homogeneous” which perhaps reflects passenger perception of modified announcements being more spontaneous.
Participants (mean age 37.1 years; SD 9.2 years, mean length 6.6 years) were asked the five questions shown in Fig. 5. Participants engaged in exercises and group discussions to enhance their understanding of the three key points. After the group discussion, a survey was conducted and participants were asked the five questions shown in Fig. 5. Participants engaged in exercises and group discussions to enhance their understanding of the three key points. After the survey, a seminar workshop was held for 55 station employees (50 men and 5 women) working in railway company A to instruct them on the content and the importance of the developed announcement guidelines, and to examine the acceptance of these guidelines by and the motivation of employees for learning them. The first session was in the form of a lecture using PowerPoint slides. After the lecture, participants were asked the five questions shown in Fig. 5. The content of the lecture was taken into account the passenger perspective. A t-test conducted on the mean score of the two groups, which exceeded 4 (slightly agree) in both groups. This suggests that the station staff still believed that the conventional announcement was passenger-centered on a six-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree).

4. Efficacy of guidelines

Results, from an investigation into the efficiency of the guidelines for station staff to make announcements, were evaluated.

4.1 Summary of the survey

A seminar workshop was held for 55 station employees (50 men and 5 women) working in railway company A to instruct them on the content and the importance of the developed announcement guidelines, and to examine the acceptance of these guidelines by and the motivation of employees for learning them. The first session was in the form of a seminar using PowerPoint slides. After the lecture, participants engaged in exercises and group discussions to enhance their understanding of the three key points. After the group discussion, a survey was conducted and participants were asked the five questions shown in Fig. 5. Participants (mean age 37.1 years; SD 9.2 years, mean length 6.6 years) responded to these questions on a six-point scale ranging from 1 (strongly agree) to 6 (strongly disagree).

4.2 Results

(1) General trend

Figure 5 shows the ratio of those who gave positive replies, defined as the summation of the ratios of “strongly agree,” “agree,” or “slightly agree” responses to the five questions described in Fig. 5. It can be seen that over 90% of responses were positive, indicating that the announcement guidelines were effective, widely accepted by the employees, and increased their motivation to follow the guidelines.

(2) Differences caused by the presence of predictive information

Responses to question 3, “How to make announcements regarding the predicted time of resuming services” was considered to be the information that passengers demanded the most. Station staff were therefore divided into two groups (43 staff members that actively announced predictive information about expected time for services to resume, provided by the operator (the active group) and 12 staff members who did not make active announcements based on the same information (non-active group)). All participants listened to the modified and conventional announcements and rated the degree to which the conventional announcement was passenger-centered on a six-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Figure 6 shows the mean scores of the two groups, which exceeded 4 (slightly agree) in both groups. This suggests that the station staff still believed that the conventional announcement was taken into account the passenger perspective. A t-test conducted on the mean score of the two groups indicated a significant difference, suggesting that staff in the non-active group believed more strongly that conventional announcements represented the view of passengers. These results suggest the importance of teaching announcement guidelines to staff members that do not actively provide predictive information. The results also indicate the importance of educating staff members so that they can understand that announcements following the guidelines do indeed meet passenger needs.

Fig. 4 Rate of participants preferring the modified announcement

Fig. 5 Ratio of positive responses (%)
Fig. 6  Rating the degree to which the conventional announcements were passenger-centered

5. Conclusion

A model was developed of the psychological state of incidents. This model was then used to compile guidelines for making passenger announcements. A survey was then conducted among station and train staff to check the effectiveness of the newly developed guidelines. A survey of passengers indicated that announcements made using the guidelines sounded more appropriate for the situation. A survey of station staff indicated that the suggested guidelines were widely accepted by station staff who recognized their efficiency for improving their ability to make announcements. Results also indicated that station staff who found it difficult to make active announcements containing information about the expected time for services to resume, also tended to consider that conventional announcements were passenger-oriented.

To conclude, there is a need to emphasize the importance and efficacy of passenger announcements when teaching the newly developed guidelines. Moreover, operators who provide information to station staff must also understand themselves the newly developed guidelines, in order to encourage staff to make suitable announcements in line with the guidelines.

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