Coaching Technique for Safety Training Using Self-assessment

Takafumi INOUE
Safety Psychology Laboratory, Human Science Division

Yasuhiro KITAMURA
Safety Psychology Laboratory, Human Science Division

A coaching technique was developed to train drivers in operational safety. First, drivers took part in a self-assessment of their attention characteristics. Drivers were able to identify their weak points in the feedback, and were given the opportunity to think of possible ideas to prevent errors. In order to draw more ideas, group discussions were held. Managers then conducted interviews with their drivers using the coaching technique, and encouraged them to deepen their ideas to prevent errors. The validity of this technique was discussed based on results from follow up questionnaires given to the drivers.

Keywords: safety coaching technique, group meeting, weak point, ideas to prevent errors

1. Introduction

This paper describes a new technique for dispensing safety training to train drivers.

Traditional training usually involves a trainee learning and adopting the teacher’s knowledge, skills and values.

In order to maintain safety, learners are expected to maintain a basic level of knowledge and skills and need to share a common set of values. Learners are likely to understand the applicability and purpose of the skills and knowledge being dispensed in training, and therefore will naturally accept the content of the training. However, this is not the case with “values” which are more difficult to associate with practical situations. This may lead to situations where trainees do not accept these values, or, they may adopt the values in principle, but not apply them in practice.

In order to overcome this problem, a different approach in training should be taken which steers drivers towards adopting the desired safety related values. Coaching, aimed at human resource development and which has become increasingly mainstream in recent years, is one such alternative method [1]. Coaching is designed to guide training in the desired direction by taking into account the trainees values.

After several trials in actual railway companies aimed at testing various concrete methods, a new safety training technique was designed called the “safety coaching technique” which applies the principles used in coaching. This paper describes the results of these trials, and the design process leading to the final technique.

2. Coaching technique

The difference between coaching and traditional training is shown in Tables 1 and 2. Table 1 presents the comparison from the learner’s perspective, whereas Table 2 indicates differences from a pedagogical point of view.

However, is safety coaching effective for dispensing train driver safety training?

Table 1 Differences perceived by the learner between coaching and traditional training

| Coaching | Traditional training |
|----------|----------------------|
| The learner has knowledge. | The learner has no knowledge. |
| The learner has skills. | The learner has no skills. |
| The learner is expected to have a desire to improve by himself. | The learner is not expected to improve by himself. |
| The learner is independent. | The learner is dependent. |
| The learner is considered as an individual. | The learner is just a member of a group. |

Table 2 Pedagogical differences between coaching and traditional training

| Coaching | Traditional training |
|----------|----------------------|
| Knowledge is drawn or pulled out. | Teach knowledge. |
| The learner is made to think about what should be done. | Teach why it should be done. |
| The learner is made to think about why it should be done. | Reprimand the learner when they do not or cannot do something. |
| The learner is given recognition regardless of their performance. | Praise the learner when they are able to do something. |
| Methods are adapted to the learner. | Learners are all taught following the same pattern. |
Train drivers must read, digest and memorize many regulations and manuals which include mandatory actions. Since a large proportion of a train driver’s activity is based on these manuals and regulations, this leaves little margin for a driver’s own judgment. From this point of view, the traditional training approach could be considered more suitable than coaching. Yet, in practice there are situations where drivers do have room and should take the initiative in order to avoid accidents, and drivers are expected to be proactive outside the workplace, for example to ensure they remain in fit for work. Furthermore, drivers often work alone and remote management would be difficult. Therefore at some point, managers must respect and recognize a driver’s autonomy and ability to manage situations they may find themselves in. As a precedent, coaching techniques aimed at motorcar drivers have been developed [2]. It is through that some of the lessons drawn from these coaching techniques could be applied to the purpose of this study.

Private sector qualifications to become a coach exist, based on one hundred hours of classes and practical experience. However, it would be difficult to expect such a high level qualification in a railway company for safety coaching. Therefore for the trials in the railway companies, an outside coach was hired for a single day of coaching training. Using this as a base, other required skills were added using other methods.

3. Safety coaching technique

Coaching is usually given to support people who have already set themselves a target or a goal. However, safety training for drivers is fundamental and not an option, therefore it is necessary to design a means to stimulate the drivers into setting themselves a target and encouraging them to take the initiative to work towards that goal.

3.1 Self-assessment and feedback

The first step in generating a desire among the drivers to receive coaching was therefore to allow them to identify their weaknesses themselves through feedback from a self-assessment. An Everyday Attentional Experiences Questionnaire (EAEQ) [3] was selected to conduct the self-assessment after having tested several off-the-shelf standard questionnaires, and psychological survey methodologies. There were three reasons for this choice, firstly the short time required to complete the self-assessment, secondly the attention assessment is closely linked to the type of error which can occur in the workplace, and thirdly it was easy to understand.

The EAEQ is based on 32 questions about daily events which are concerning to attention span and attention characteristics. Although the standard questionnaire includes questions about study and the workplace, for the purposes of this study, the questions were limited to work related situations. The EAEQ evaluates 4 characteristics; (1) the ability to concentrate, (2) the ability to control cognitive processes, (3) proneness to distraction, and (4) the tendency to perform tasks concurrently.

Each characteristic is evaluated by computing a score. However, the standard used for this evaluation was based on college student data (N=608, Average age=19.37). Consequently, it would be difficult to apply this data to an average train driver, or many train drivers would have to answer the EAEQ in order to collect enough data. At the same time, there was a concern that the effectiveness of the training would be jeopardized if too many drivers answered the questionnaire before taking part in the training; therefore the idea of collecting driver responses was dropped. Managers calculated a score for the collected answers, and the feedback was grouped into three categories: upper, middle and lower. The number of characteristics in each category for each driver was adjusted in order to obtain as even a spread for each driver in each group. This was done by shifting some results from the middle group into either the upper group, or into the lower group. These adjustments were made on the premise that drivers which had some positive feedback would be more inclined to accept their weak points, and a weak point would make more of an impression than if all the answers were in just the middle or upper group.

The assessment result was provided to the drivers in a user friendly, easy-to-understand paper format (Fig.1). An explanation was provided for the EAEQ and each characteristic, together with the actual assessment result and advice. Feedback in the lower group was given in a text box with a red border and an illustration, stating “you are weak in this area.” In the upper group, the feedback was presented in a text box with a blue border and an illustration, stating “you are strong in this area.” This evaluation was accompanied with a general statement saying, “In which areas of work could this weakness become a danger? If you are weak in this area, how can you reduce the potential danger in your work?” For feedback in the middle group, the feedback box was left blank.

After filling in the questionnaire and receiving feedback, participants were asked whether they were convinced by the feedback, and whether they felt it could contribute to accident prevention. Some respondents were interviewed to gather their views.

3.1.1 Participants

The participants were 38 train drivers from two train divisions.

3.1.2 Procedure

The EAEQ was answered in May, 2011 and the result was returned with a follow up survey in August. Participants were asked to write their names on the follow up surveys, which were then sealed in an envelope, before being handed back to their manager. The survey included questions about acceptability of feedback results, usefulness of the exercise in accident prevention, and suitability of content.

Interviews to accompany the follow up survey were conducted in a meeting room at the train division in October, 2011. The interviewers were two researchers from RTRI, and the manager did not attend. The drivers were interviewed about the self-assessment and results for about 30 minutes. Ten participants were interviewed in
total, five from each of the two train divisions. The content of the interviews was summarized in a way which ensured that no individual could be identified.

3.1.3 Result and discussion

Participants were asked to grade the feedback on a scale of four, in terms of acceptability from “acceptable” to “unacceptable.” Most replies fell into the categories “acceptable” or “a little acceptable” (Table 3).

Participants were asked to grade the usefulness for accident prevention on a scale of four, in terms of usefulness from “useful” to “useless.” Most replies were either “useful” or “a little useful” (Table 4).

The follow up survey interviews revealed that some train drivers mistrusted psychological tests per se. Others stated that the questionnaire was out of context; therefore, for example, they felt their character differed when at work and when engaged in other ordinary daily activities away from the workplace, and also depending on the time of day.

Despite the doubts expressed in the EAEQ itself, many train drivers accepted the results and thought that it was likely to be useful for accident prevention.

On reviewing the content of the questionnaire, since

| Table 3 | Results from survey about level of acceptability of self-assessment feedback results (unit: person) |
|---------|-----------------------------------------------------------------------------------------|
|         | Acceptable ← → Unacceptable No answer Total |
| Ability to concentrate | 11 | 11 | 6 | 1 | 9 | 38 |
| Proneness to distraction | 16 | 12 | 3 | 1 | 6 | 38 |
| Ability to control cognitive processes | 16 | 12 | 2 | 0 | 8 | 38 |
| Tendency to perform tasks concurrently | 9 | 17 | 2 | 1 | 9 | 38 |
| Total | 52 | 52 | 13 | 3 | 32 | 152 |

| Table 4 | Results from survey about level of usefulness for accident prevention (unit: person) |
|---------|----------------------------------------------------------------------------------|
|         | Useful ← → Useless No answer Total |
| Ability to concentrate | 11 | 10 | 7 | 1 | 9 | 38 |
| Proneness to distraction | 14 | 12 | 5 | 1 | 6 | 38 |
| Ability to control cognitive processes | 10 | 15 | 5 | 0 | 8 | 38 |
| Tendency to perform tasks concurrently | 12 | 12 | 5 | 1 | 8 | 38 |
| Total | 47 | 49 | 22 | 3 | 31 | 152 |
the work of a train driver does not require performance of tasks concurrently it was decided not to include “the tendency to perform tasks concurrently” in subsequent results. During the subsequent trials the corresponding question was left in the questionnaire, however it was deleted later when the questionnaire was used in practice. The number of questions in the final version of the questionnaire was reduced to 26.

3.2 Trial 1 of the coaching interview

Using feedback from the self-assessment as a reference, the train driver was given a coaching interview.

3.2.1 Participants and interviewers

The participants were 14 drivers with three months unassisted driving experience. The interviewer was either the head or an assistant of the train division.

3.2.2 Procedure

The Everyday Attentional Experiences Questionnaire (EAEQ) was answered and the results were returned in January, 2012. Feedback sheets included a comment and an illustration of a railway scenario for each characteristic not only falling into the upper group or lower group but also falling into the middle group (Fig. 2). A nominative follow up survey was conducted after the EAEQ questionnaire to establish the level and order of concern or anxiety felt about each characteristic.

Coaching interviews were conducted with three objectives in mind: firstly to show clearly whether the self-assessment result could be used to improve a driver’s safety attitude. Second to prioritize the characteristics which should be covered in the training. Thirdly to increase the driver’s awareness about accident prevention. Interviewers prepared the interview using feedback from the driver’s self-assessment and responses to the follow up survey.

Interviews began with a brief explanatory introduction from the interviewer. Characteristics discussed as a priority were those classed in the lower group, and were accepted as such by the driver. Failing any characteristic falling into this category, or when this first discussion finished, next in priority were characteristics classed in the lower group which were not accepted as such by the driver. In this case, the driver was asked why they thought the result was not acceptable. If there were no characteristics in the lower group, the discussion centered on those characteristics which caused the highest degree of anxiety.

Following this stage the driver was asked to talk about an accident which could have been connected with the characteristic in question. If no relevant accident could be recalled, then the driver was asked to talk about a near accident experience, and if there was no near accident experience, the driver was asked to imagine the type of accident which could occur. The driver was then prompted to talk about what kind of work could be a problem because of the characteristic in question and think of possible solutions to the problem.

Before the coaching interview, a questionnaire survey was conducted to find out whether the driver thought the

![Fig. 2 Example of feedback falling in the middle group](image)

measure useful or not for accident prevention. After the interview, another questionnaire survey was made to gather impressions of the coaching interview.

The coaching interviews were performed in February, 2012 and two researchers from RTRI recorded their content.

3.2.3 Result and discussion

Table 5 shows results from the questionnaire about impressions after the coaching interview.

Participants were asked to grade the interview on a scale of four, from “pleasant” to “not pleasant.” If the coaching was functioning properly in the interview, the drivers’ impression should have been “pleasant.” The reason for this is that the driver should have felt that the interviewer was taking a genuine interest in their answer and was giving valid advice. Results showed an almost equal number of affirmative and negative replies. Therefore, it can be said that the half the coaching interviews were performed well.

Participants were asked to grade the interview on a scale of one to four for usefulness for accident prevention, from “useful” to “useless.” Most replied that it was “a little useful.”

Participants were asked to grade the interview on a scale of one to four for interview time, from “short” to “long.” Most replied that it was “a little short.”

Participants were asked to grade the interview on a scale of one to four for the wish for another interview, from “wish” to “not wish.” Most replied that it was “wish a little.”

As mentioned above, the questionnaire results about the interview were in general favorable.

Although many participants expressed a wish to lengthen the interviews, the companies for their part expressed the desire to keep interview length to a minimum, because of the extra burden.

The follow up survey conducted among participants having completed the questionnaire and received feedback,
produced the following answers: two “useful,” 10 “fairly useful,” 2 “not very useful” and 0 “not useful.”

3.3 Trial group meeting

Since individual coaching interviews take time, it was decided to use group training to explain the characteristics. Small group discussions were added to the training, based on the Accident Round-table Discussion (ARD) technique [4], in order to identify the ideas which drivers did not know. This method was called the “group meeting method.”

3.3.1 Participants and facilitators

The participants were 32 drivers (with a maximum driving experience of 28 years) and 3 trainees for the train driver’s license. The facilitators were the drivers’ line manager.

3.3.2 Procedure

In May and July, 2012, EAEQ was answered and the results were returned as described in Chapter 3.2.2, but the naming and explanation of characteristics were improved (Fig.3).

The facilitator gave an explanation of the purpose of the group meeting as an introduction. Then, the participants talked about the comments in the self-assessment and the feedback. Next, the facilitator explained the ability to concentrate. The content of the training included the definition of the characteristics, features of a person with high ability, examples of the type of behavior or driver error which low ability could lead to. The participants were asked to talk about an accident similar to the example and suggest ideas which could prevent errors. The same
thing was repeated for each of the other characteristics. The whole session lasted between 60 and 90 minutes. A researcher from RTRI attended the group meetings.

A questionnaire survey about whether the degree of understanding about each characteristic improved was made before and after the group meeting, in order to examine the effect of the explanation. Another questionnaire survey about the explanation given of the group meeting itself and a questionnaire survey about the degree of anxiety attached to each characteristic, were also conducted.

3.3.3 Result and discussion

The group meeting was held twice in each of the two train divisions. The participants in each meeting were 10, 10, 10 and 5 persons.

Table 6 shows the questionnaire result about the degree of understanding of each characteristic. Compared with responses from before the meeting, the number of replies in the post-meeting survey showed a decrease in “having understood a little” and an increase in “having understood.”

Table 7 shows questionnaire results about the group meeting evaluation. Participants were asked to grade their experience of the group meeting on a scale of one to four from “pleasant” to “not pleasant.” Results showed a majority of those surveyed selected “fairly pleasant” which indicates that the meetings were active.

Participants were asked to grade the interview on a scale of one to four for usefulness for accident prevention, from “useful” to “useless.” Most replied, “a little useful.”

Researchers observed all the meetings and concluded that the main content of the talks revolved principally around accident examples, with little talk about the characteristics or the ideas. This indicated room for improvement in the future.

3.4 Improvement of the group meeting

In order to structure the group meeting and make it more effective, a guided discussion approach was taken with clear objectives.

3.4.1 Participants and facilitators

The participants comprised 86 driver trainees. The facilitators were driver line manager.

3.4.2 Procedure

In November, 2012, EAEQ was answered and the results were returned as described in Chapter 3.2.2. The group meeting was held in the training center. The meeting procedure guide was made into a manual using PowerPoint etc. After an explanatory introduction by the facilitator, discussions and reports ensued for about one hour. The goal of the discussion was to create a table containing the number of participants who were concerned for each characteristic, list of experiences which were similar to the errors given as examples, and ideas to prevent errors. RTRI researchers attended the group meeting. The follow up questionnaire survey to evaluate the group meeting was conducted one month later.

3.4.3 Result and discussion

The group meeting was held three times, with 29, 28 and 27 participants in each respectively. Participants were divided into smaller groups of five to six for the discussions. The number of reported similar experiences was 1.5 on average per group, and the number of reported ideas was 1.5 on average per group.

Table 8 shows the questionnaire results for the evaluation of the group meeting. The questionnaires were collected from 57 persons. Two questionnaires were invalidated because the respondents claimed to remember very little of the sessions, while the 55 other questionnaire results were analyzed.

Participants were asked to evaluate a scale of one to four whether their understanding had improved about each of the characteristics in question, from “deepened” to “not deepened.” The majority of participants replied, “a little deepened.”

Participants were asked to evaluate a scale of one to four whether they felt the group meeting was pleasant or not, from “pleasant” to “not pleasant.” Most participants replied “pleasant.”

Participants were asked to grade the interview on a scale of one to four for usefulness in accident prevention,

| Table 7 Questionnaire results about the group meeting (unit: person) |
|---------------------------------------------------------------|
| Affirmative | ← | → | Negative | No answer | Total |
| Pleasant    | 6 | 21 | 5 | 0 | 3 | 35 |
| Useful      | 9 | 16 | 7 | 0 | 3 | 35 |

| Table 6 Questionnaire results on degree of understanding about each characteristic (unit: person) |
|---------------------------------------------------------------|
| Before | Ability to concentrate | 10 | 21 | 2 | 0 | 2 | 35 |
| Proneness to distraction | 9 | 21 | 2 | 0 | 3 | 35 |
| Ability to control cognitive processes | 10 | 21 | 1 | 0 | 3 | 35 |
| After | Ability to concentrate | 14 | 15 | 0 | 0 | 6 | 35 |
| Proneness to distraction | 16 | 12 | 1 | 0 | 6 | 35 |
| Ability to control cognitive processes | 14 | 15 | 0 | 0 | 6 | 35 |
from “useful” to “useless.” Most replied “useful.” The increase in positive responses to the questionnaire demonstrates that the improved group meeting format was successful.

3.5 Trial 2 of the coaching interview

After having received the results of the self-assessment and having experienced the unimproved group meeting described in Chapter 3.3, train drivers and trainees received the coaching interview relevant to them.

3.5.1 Participants and interviewers

The participants comprised 17 drivers and trainees. All participants had taken part in the group meetings in Chapter 3.3.1 and only three of them were applicants. The interviewers were either the head or an assistant of the train division.

3.5.2 Procedure

Three applicants were interviewed in June, 2012 and other 14 persons were interviewed in September, 2012. The purpose of the coaching interview trials was to support the train drivers who proposed their own ideas for overcoming their concerns. First, they talked about the idea they had thought of to cope with the characteristic which was of concern to them. Secondly the discussion moved onto characteristics which were not sources of concern for the driver, but which had been classed in the lower group in the feedback.

An employee of the railway company attended the coaching interview and recorded the contents. An RTRI researcher also attended a part of the interviews. After the interviews, a questionnaire survey was conducted to gather impressions about the interviews.

3.5.3 Result and discussion

Table 9 shows the questionnaire results on impressions after the coaching interviews.

Participants were asked to grade the experience on a scale of four from “pleasant” to “not pleasant.” Most replied that it was “pleasant” in the three applicants, and results showed an almost equal number of affirmative and negative replies in the others.

Participants were asked to grade the interview on a scale of one to four for usefulness in accident prevention, from “useful” to “useless.” Most replied, “a little useful.” Although there were some negative replies, on the whole there were many affirmative replies.

Participants were asked to grade the interview on a scale of one to four for interview time, from “short” to “long.” Most replied, “a little long.”

Participants were asked to grade on a scale of one to four their wish for another interview, from “wish” to “not wish.” Most replied that it was “wish a little” in the three applicants, and a majority of replies were negative in the others.

These results show that the evaluation was on the same or slightly lower level than for the first trial coaching interview described in Chapter 3.2. Participants to the first coaching interview were train drivers with an experience of three months, whereas for the second trial coaching interviews, participants included more experienced drivers. More experienced drivers may be less inclined to receive such coaching interviews from their line manager or the assistant line manager, since they are proud of their skill to drive, which may explain their lower appreciation of the coaching interviews. The fundamental solution to this problem would be to increase trust between the interviewer and the interviewee, however, this would not be an easy task. Hence, under such situation, it is recommended that the target for this safety coaching technique should be mainly train drivers with only short experience.

4. Conclusion

A coaching technique was developed to train drivers in operational safety. First, drivers took part in a self-assessment their attention characteristics. Drivers were able to

| Table 8 Questionnaire results for group meeting improvement (unit: person) |
|---------------------------------------------------------------|
| **Affirmative** | ← | → | Negative | No answer | Total |
| Deepened understanding of characteristics | 19 | 31 | 4 | 1 | 0 | 55 |
| Pleasant | 33 | 16 | 6 | 0 | 0 | 55 |
| Useful | 28 | 21 | 6 | 0 | 0 | 55 |

| Table 9 Results of interview 2 evaluation (unit: person) |
|---------------------------------------------------------------|
| **Affirmative** | ← | → | Negative | No answer | Total |
| Pleasant (applicants) | 2 | 1 | 0 | 0 | 3 |
| Pleasant (the others) | 0 | 8 | 5 | 1 | 14 |
| Useful (applicants) | 1 | 2 | 0 | 0 | 3 |
| Useful (the others) | 4 | 5 | 5 | 0 | 14 |
| Length of interview was good (applicants) | 0 | 2 | 1 | 0 | 3 |
| Length of interview was good (the others) | 0 | 3 | 10 | 0 | 14 |
| Wish for another interview (applicants) | 1 | 2 | 0 | 0 | 3 |
| Wish for another interview (the others) | 1 | 5 | 5 | 3 | 14 |

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identify their weak points in the feedback, and were given the opportunity to think of possible ideas to prevent errors. In order to draw more from these ideas, group discussions were held. Managers then conducted interviews with their drivers using the coaching technique, and encouraged them to deepen their ideas to prevent errors.

This education can be carried out only by the employee in a railway company without any power of others. The strong point of the proposed training technique is that it is suited to an individual’s own weak points. However, it is not appropriate for experienced drivers who are proud of their skill to drive and do not rely on their managers.

This technique came into use in 2013 for new drivers in the railway company. This technique will be subject to ongoing revision and improvement. For example, changes may be made to the self-assessment part, and new approaches may be incorporated. New aspects may also be added, such as evaluating tendency to commit errors, or assessing risk-taking behavior.

Furthermore, this method could be extended to other types of employee other than drivers. In such a case, it would be necessary to adapt the types of accidents used as examples to illustrate the different characteristics.

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Authors

Takafumi INOUE
Laboratory Head, Safety Psychology Laboratory, Human Science Division
Research Areas: Applied Psychology

Yasuhiro KITAMURA
Senior Researcher, Safety Psychology Laboratory, Human Science Division
Research Areas: Applied Cognitive Psychology

Ayanori SATO
Researcher, Safety Psychology Laboratory, Human Science Division
Research Areas: Human Error, prospective memory

Takayuki MASUDA, Ph.D. (Psychology)
Senior Researcher, Safety Psychology Laboratory, Human Science Division
Research Areas: Traffic Psychology, Risk Behavior