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The effect of repeated photographic identification and time delay on the accuracy of the final photographic identification and the rating of memory

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ABSTRACT

In the historically well-known case of Teigin Jiken (the case of Imperial Bank), eyewitnesses were presented with a large number of photos repeatedly, during a six-month investigation, before they finally identified a suspect. In this paper, by partially modelling their study on the investigation after Teigin Jiken, the authors examine the possibly negative effect of repeated photo identification (RPI) and time delay on memory for a face, and subjects' ratings of the state of memory and confidence. Undergraduates participated in a staged event followed by a delay with or without RPI, and then the final photo identification. The results showed a cumulative effect of RPI and time delay. In particular, subjects with RPI were less accurate in the final photo identification, and their ratings of the state of memory and confidence were less calibrated to accuracy.

INTRODUCTION

When a person witnesses a crime but cannot specify the suspect, the witness may be asked by law enforcement to go through a large set of photos to identify a suspect (mug shots). If the witness cannot identify the suspect, they may be presented with even more photos until they finally pick one out or give up. Although it is a common practice, one could raise the question whether being exposed to such a large number of photos would obscure the witness's memory for a face.

Teigin Jiken (the case of Imperial Bank), is an historically well-known criminal case

to the Japanese. On 26th January, 1948, a medical doctor visited S Branch of Imperial Bank. The man announced that a customer of the branch was infected with dysentery and thus the clerks working there must take preventive medicine. In fact, it was poison and 12 clerks out of 16 were killed. Because this 'doctor' had visited two other branches beforehand, though failing to give medicine, more than 40 people saw him. After six months of intensive search in vain, SH was arrested on rather weak evidence. Eye-witnesses went through photo identification and then a single line-up. Although many witnesses hesitated about identifying him in the beginning, they eventually did identify him as the perpetrator. SH pleaded not guilty, but he was sentenced to death in 1950. One of the main pieces of evidence was the identification by more than 40 witnesses. Though 50 years have passed, it is still argued it could have been misidentification (Morikawa, 1977).

In this case, the photo identification of SH took place six months after the event. In addition, witnesses were presented with many photos, up to 8,000, in repeated photo identification conducted by police investigators and journalists. In the court of justice, 31 witnesses out of 40 studied by the authors mentioned the number of photos they saw during the investigation.

Ten witnesses said they saw fewer than ten photos, nine said ten to 100 photos, four said 100 to 1,000 photos, six said more than 1,000 photos, and two said 'many'. Such practice could have obscured their memory, as one of them said 'I saw 30,000 to 40,000 photos at the police department. It's no good to see the photos in such an involuntary way. I had a dream watching a film in slow motion.'

Being exposed to such a large number of photos as well as a long delay may indeed contaminate a witness's memory. There seems, however, to be no heed taken of this in investigations in those days and even today.[1] In this paper, by partially modelling the study on the Teigin Jiken investigation, the authors examined the possibly negative effect of time delay and repeated photo identification (RPI) on the performance of final photo identification, and subjects' ratings of the state of memory and confidence.

In the following, the authors first present a staged event (tea-tasting experiment), which was followed by some delay (30 minutes to five months) with or without RPI, and then the final photo identification. As is summarised in Table 1, five conditions were set up: A 30-minute delay without RPI (Condition 1); a three-week delay without RPI (Condition 2); a three-week delay with RPI (Condition 3); a five-

Table 1: The description of conditions and the questionnaires used[†]

Condition	Number	Repeated identification	Delay	Final identification	Target in the final identification
Condition 1	37	No	30 minutes	Photo (D)	Yes
Condition 2	34	No	3 weeks	Photo (D)	Yes
Condition 3	33	Yes (C)	3 weeks	Photo (D)	Yes
Condition 4	30	No	5 months	Photo (D)	Yes
Condition 5	34	Yes (C)	5 months	Photo (D)	Yes

[†]: Questionnaires used are shown in parentheses.
(C) = Questionnaire C for the repeated photo identification.
(D) = Questionnaire D for the final photo identification.

month delay without RPI (Condition 4); and a five-month delay with RPI (Condition 5.)

METHOD

Subjects

One hundred and sixty-eight Japanese undergraduates from four universities in the Tokyo area participated in a dummy taste experiment and completed RPI and the final photo identification. Table 1 shows the number of subjects for each condition.

Materials

Four photo albums, each of which contained 100 different photos, were created. Photos were black-and-white photographs of Japanese males aged from 25 to 60. The first three albums, which did not contain the target, were used for RPI. The fourth album, which contained the target, was used in the final photo identification. In addition, four kinds of questionnaires (Questionnaires A to D) were created.

Procedures

The experiment consisted of four parts:

(1) a dummy taste experiment where the subjects met the target
(2) immediate verbal description of the target's face
(3) the delay with or without three trials of photo identification
(4) the final photo identification.

The following are the details of each part. See Table 1 for the summary of conditions.

(1) A dummy taste experiment: The subjects participated in a dummy taste experiment in groups of 15 to 20 subjects. A male experimenter (target) in his mid-40s in a white robe announced that he wanted the subjects to taste two kinds of tea for evaluation. In order to draw the subjects' attention, he explained how to taste tea and

asked the subjects to follow the instructions. ('Just like I do, please retain the tea in your mouth for a while so you can taste it well.') After the subjects had tasted two kinds of tea, the experimenter left the room, and a female assistant came in and asked them to fill out Questionnaire A for evaluation of taste. During the taste experiment, the subjects could observe the experimenter for about five minutes from 2.0 to 2.5 metres away.

(2) Verbal description of the face: Approximately 20 minutes after the taste experiment, all subjects were asked to answer Questionnaire B, in which they were to give a verbal description of the target's face. They also answered the same questionnaire before the final photo identification. The purpose of this questionnaire was to see how the verbal description might change over time, but the results are not reported in this paper.[?]

(3) Repeated photo identification: The subjects in conditions 3 and 5 were asked to attend three time trials of photo identification, once per week for three weeks. At each trial, subjects were individually given an album of 100 photos and Questionnaire C. By the end of these three trials, they had seen 300 different photos, which did not contain the target. The main questions asked in Questionnaire C were

(a) the state of memory before and after the photo identification [rated as 1: no memory, 2: vague, 3: clear]
(b) the possibility for identification [1: impossible, 2: uncertain, 3: possible]
(c) the number of likely photos ('There may or may not be the target in the album, but examine carefully and choose up to three photos that are likely to be the experimenter.')
(d) the most likely photo ('Choose the most likely one from three candidates and make a decision whether or not he is the experimenter.').

(4) The final photo identification: The subjects attended the final photo identification 30 minutes after the taste experiment (condition 1), three weeks after the taste experiment (conditions 2 and 3), or five months after the taste experiment (conditions 4 and 5). The subjects were individually given an album containing 100 photos, which included the target, and Questionnaire D. The main questions in Questionnaire D were

(e) the state of memory before and after the photo identification
(f) the possibility of identification
(g) the most likely photo ("There might or might not be the target in the album, but examine carefully and choose a photo that is most likely to be the experimenter.")

(h) confidence in the choice (1: not confident at all to 5: very confident).

RESULTS

The following are the results from RPI (Questionnaire C) and the final photo identification (Questionnaire D).

The repeated photo identification (Questionnaire C)

Table 2 (top) shows

(a) the state of memory before and after identification

Table 2: Experiment results

	(a) State of memory		(b) Possibility	(c) Likely photos (up to 3)	(d) Most likely photo	
	Before	After			Choice %	Confirmation %
Repeated photo identification						
First trial	2.0	2.1	2.2	2.6	85	50
Second trial	1.9	2.0	1.9	2.2	85	21
Third trial	1.9	1.8	1.8	2.2	83	16

	(e) State of memory		(f) Possibility	(g) Correct decison %	(h) Confidence
	Before	After			
Final photo identification					
Condition 1 (No. 30 min.)	2.1	2.5	2.3	78	3.3
Condition 2 (No. 3 wk.)	2.0	2.6	2.2	84	3.1
Condition 3 (Yes, 3 wk.)	1.9	2.3	1.8	58	3.1
Condition 4 (No, 5 mo.)	1.8	2.2	1.8	58	2.9
Condition 5 (Yes, 5 mo.)	1.9	2.0	1.9	42	2.8

† 'Yes' and 'No' indicate whether or not the condition included repeated photo identification. The time indicates the delay.

(b) the possibility for identification on a three-point scale

(c) the number of photos that are likely to be the target (up to three photos)

(d) the most likely photo and the ratio of subjects who confirmed the photo as the target, even though the target was never present in these trials.

A 3 (repetition) x 2 (before/after) ANOVA conducted on (a) state of memory resulted in the main effect of repetition [F (2, 340) = 32.52, p < .01]. The rating decreased over trials with the significant differences between each trial (2.1, 1.9, 1.8 for the first, second and third trial respectively), suggesting that the subjects became less certain of their memory as they repeated the photo identification. As for (b) the possibility and (c) the number of the likely photos, one-way ANOVAs yielded the main effect of repetition [F (2, 204) = 24.63, p < .01; F (2, 214) = 17.26, p < .01]. The possibility as well as the number of photos decreased over trials, suggesting growing uncertainty in subjects (2.3, 2.0, 1.9 for the possibility, and 2.7, 2.3, 2.1 for the number of photos for each trial respectively.) It should be noted, however, as shown in Table 2, that more than 80 per cent of subjects chose (d) a most likely photo and many confirmed it as the target.

The final photo identification

Table 2 (bottom) shows

(e) the state of memory before and after identification

(f) the possibility for identification

(g) the ratio of subjects who chose the correct photo

(h) the confidence in their choice.

As for (e) the state of memory, a 5 (condition) x 2 (correct/incorrect) x 3 (before/after) ANOVA yielded the main effect of correct/incorrect and before/after [F (1,

154) = 28.83, p < .01; F (1, 154) = 40.24, p < .01]. The subjects who chose the correct photo rated the state of memory higher than those who did not (2.2 *vs* 1.8), which indicates the positive relationship between the rating and the accuracy. Furthermore, the rating increased from pre-decision to post-decision (1.9 *vs* 2.2), suggesting that the subjects could gauge the state of memory better after they had made a decision. The interaction of condition x correct/incorrect was significant [F (4, 154) = 3.28, p < .05]. As shown in Figure 1, the difference between the rating by correct subjects and incorrect subjects was greater for conditions 1, 2 and 4 (without RPI) than for conditions 3 and 5 (with RPI.) Finally, the interaction of correct/incorrect x before/after was significant [F (1, 154) = 18.87, p < .01]. As shown in Figure 2, there was no difference in the pre-decision rating between the correct and incorrect subjects, but the post-decision rating was significantly higher for the correct subjects than for the incorrect subjects, which suggests again that the post-decision rating reflects accuracy better.

A 5 (condition) x 2 (correct/incorrect) ANOVA conducted on (f) the possibility revealed the main effect of condition [F (1, 157) = 3.84, p < .01], with a contrast between conditions 2 and 3, confirming that repeated identification affected the cognisance of their performance.

Figure 3 shows (g) the ratio of subjects who made the correct choice. The delay and RPI seem to have an accumulative effect on the accuracy of identification [X^2 = 17.22, p < .01]. The X^2 score for the 2 (correct/incorrect) x 2 (with RPI/without RPI) table (ie conditions 1, 2 and 4 *vs* conditions 3 and 5 as shown in Figure 3, centre) was significant [X^2 = 10.29, p < .01], showing RPI reduced the correct choice. Likewise, the X^2 score for the 2 (correct/incorrect) x 3 (30 minutes/three weeks/five months) table (ie condition 1 *vs* conditions

Figure 1
The state of memory
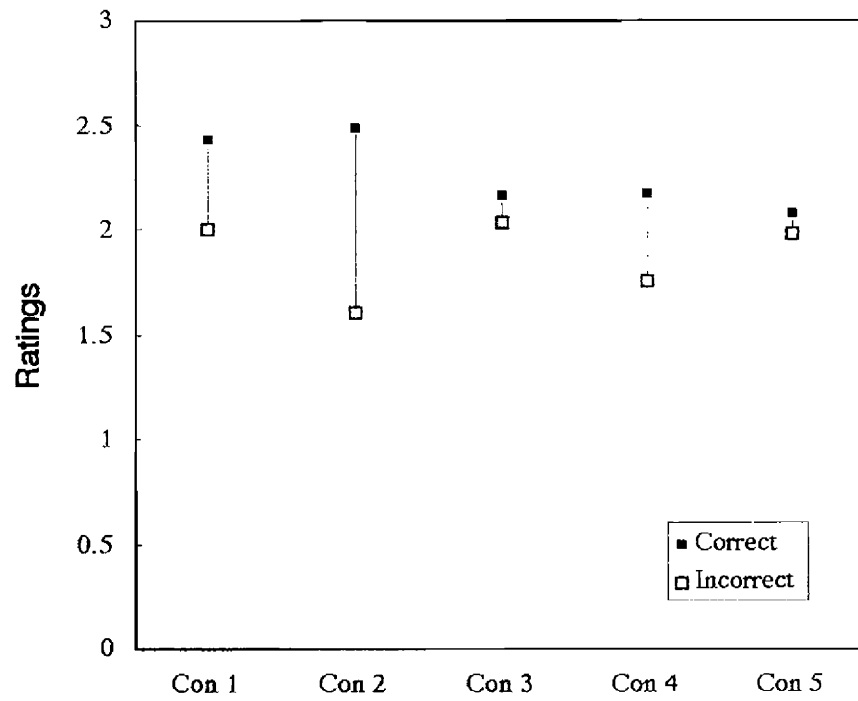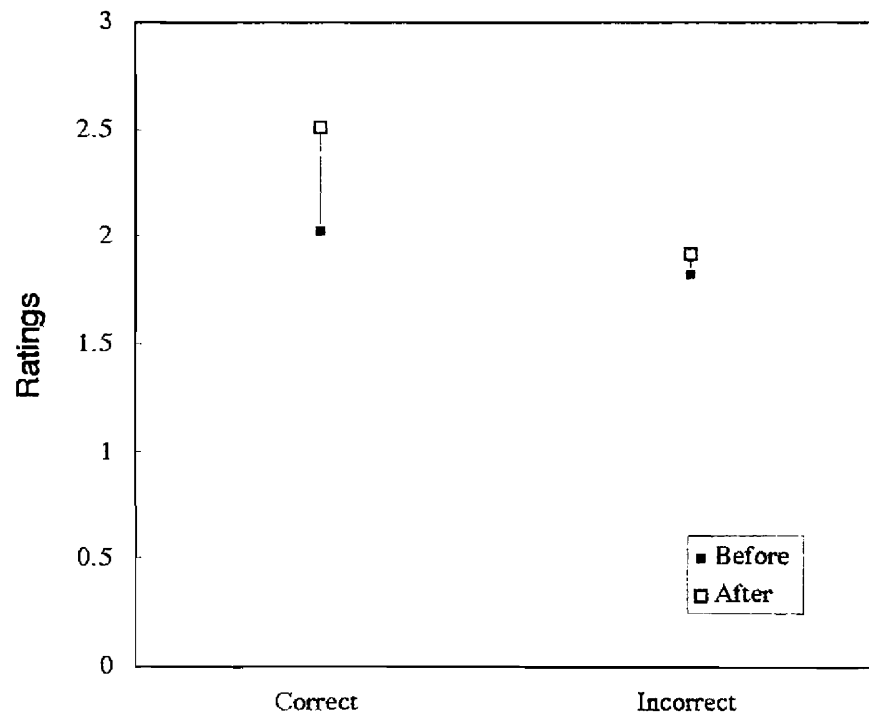*for correct and*
incorrect subjects

Figure 2
The state of memory
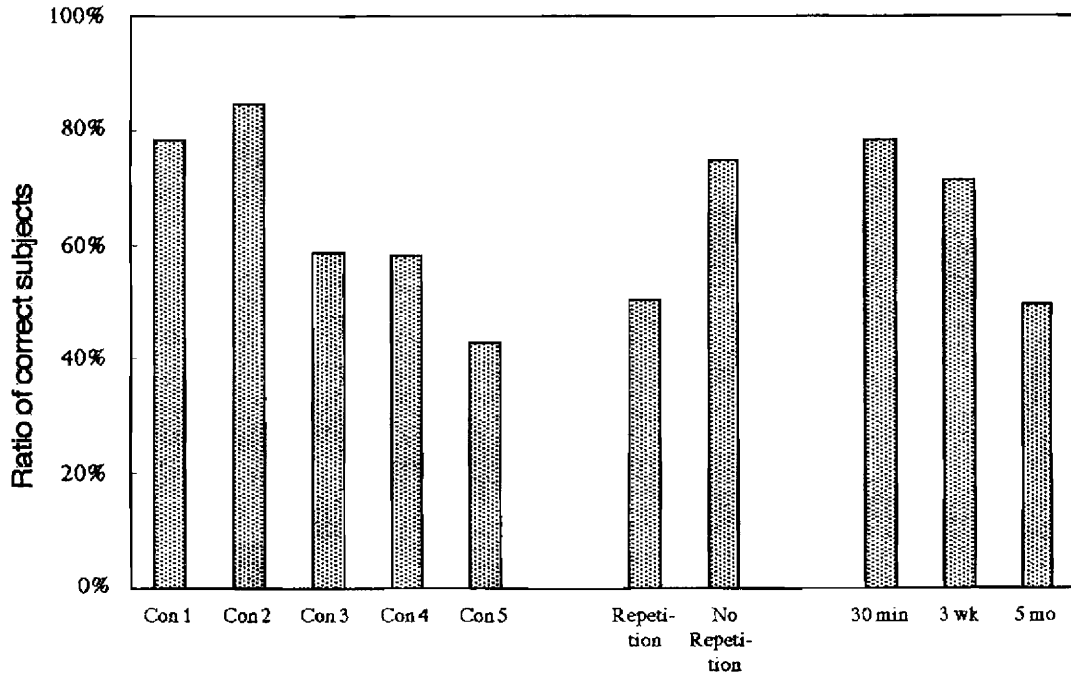*before and after the*
identification

Figure 3
The ratio of correct
subjects in the final
photo identification

2 and 3 vs conditions 4 and 5, as shown in Figure 3, right) was significant [X^2 = 10.52, $p < .01$], confirming the delay also decreases the accuracy.

Finally, a 5 (condition) x 2 (correct/ incorrect) ANOVA applied to (h) the confidence yielded the main effect of correct/ incorrect [F (1, 131) = 50.52, $p < .01$]. The confidence was higher for the subjects who chose the correct photo than for those who did not (3.9 vs 2.1), which suggested the positive relationship between confidence and accuracy.

DISCUSSION

The present study examined the effect of repeated photo identification (RPI) on the accuracy of the final photo identification, and on the state of memory and confidence. The main findings are as follows.

First, RPI affects the state of memory and the prediction of one's performance (the possibility for identification). Subjects'

ratings decreased over trials, suggesting they became less certain of their memory.

Secondly, RPI reduces the subjects' sensitivity to the state of memory and confidence for the final photo identification. In conditions 1, 2 and 4 (without RPI), those who chose the correct photo rated the state of memory higher than those who did not. On the other hand, in conditions 3 and 5 (with RPI), no difference was observed between the ratings of correct and incorrect subjects. Likewise, in conditions 1, 2 and 4, the post-decision rating was higher than the pre-decision rating, while there was no such difference in conditions 3 and 5. Although some research warns that confidence cannot be used as an indicator of accuracy (Bothwell, Deffenbacher and Brigham, 1987; Juslin, Olsson and Winman, 1996; Wells and Turtle, 1987), there are substantial reports showing the positive correlation between the accuracy and the confidence, especially the post-decision confidence (eg Brigham et al., 1982; Krafka and Penrod, 1985; Naka, Itsukushima and Itoh, 1996;

Sporer, 1992). It is worth noting that the relationship between the accuracy and confidence may change depending on how the subjects spend the retention interval. Engaging in RPI could seriously deteriorate the correlation.

Finally, and most importantly, RPI decreases the accuracy of identification. The ratio of correct choice decreased by about 20 per cent due to repetition.

Many factors must be contributing to the negative effect of repeated photo identification. Memory decay due to delay should be one factor (Lee *et al.*, 1998; Naka, Itsukushima and Itoh, 1996). Interference or suppression from recognising distracters may be another (Anderson, Bjork and Bjork, 1994; Anderson and Spellman, 1995). Commitment or carry-over effect might serve as well (Brigham and Cairns, 1988; Yu, Geiselman and Edward, 1993.) Furthermore, subjects might come to render more relative judgment over the trials. During the three trials, many subjects chose 'the most likely photo' (85 per cent, 85 per cent and 82 per cent for each trial), and even confirmed it as the target (50 per cent, 22 per cent and 13 per cent for each trial.) If one confirms a person as a target, the logical consequence is that she/he cannot choose another one in the following trials. Nevertheless, 9 per cent of subjects confirmed different photos in two trials, ie confirmed two different photos as the target, and 3 per cent confirmed three different photos in three trials. Such behaviour suggests they chose a photo based on the relative similarity rather than the absolute judgment (Beal, Schmitt and Dekle, 1995).

Further research is necessary to separate each factor and determine how each of them works. Yet in practice, it seems necessary to control the number of photos presented to eyewitnesses. The more one is presented with photos, the more likely one's memory as well as meta-memory is distorted.

NOTES

1 The investigative procedure do not seem to be amended much even today. For example, in Jiminoto Hoka Jiken (the case of arson of LDP headquarters building), a witness who might or might not have seen a perpetrator was shown 374 photos four months after the event (Naka, Itsukushima and Itoh, 1996). The witness identified a person who became a suspect, though he was later acquitted.

2 Another reason for conducting Questionnaire B was to make the research more realistic because in most of cases, eyewitnesses are asked to give a verbal description of a perpetrator.

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