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Conformity among Cowitnesses Sharing Same or Different Information about an Event in Experimental Collaborative Eyewitness Testimony

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Using the MORI technique (Mori, 2003), in which two different movies presented on the same screen are viewed separately by two groups without them noticing the duality, two experiments were carried out with a total of 138 undergraduates in groups of varying sizes to examine the effects of co-witnesses with the same or different information on witnesses' memory distortion. Experiment 1 investigated the co-witness effects in a one-versus-two situation, while Experiment 2 investigated the effects in a two-versus-two situation. Results showed that isolated eyewitnesses who had no supporting co-witnesses changed their minds more frequently in accordance with the majority, and when they had a co-witness who shared the same information, they tended to stick to their original reports even after being confronted with conflicting information in a discussion.

Key words: eyewitness testimony, memory distortion, social influence, the MORI technique, conformity

Since Loftus' pioneering study (Loftus & Palmer, 1974), eyewitness testimony has been a popular research topic in applied cognitive/social psychology (e.g., Dunning & Stern, 1994; Gonzalez, Ellsworth, & Pembroke, 1993; Krafka & Penrod, 1985; Sheehan, Statham, & Jamieson, 1991; see Wright & Loftus, 1998 for reviews). In the Loftus paradigm, participants observed criminal acts or traffic accidents and then were asked several questions. Loftus' work and many subsequent studies have shown that memory of an event could easily be distorted by post-event information (PEI), such as researchers' questions. Although there is a great deal of literature on how witness memory can be distorted by PEI, as Gabbert, Memon, and Allan (2003) stated, the memory distortion effects of PEI from other witnesses (i.e., co-witnesses) who observed the same event have been largely neglected in the eyewitness memory literature. There have been some studies that presented co-witness information to witnesses-participants, but it was only indirectly through the experimenters (e.g., Luus & Wells, 1994; Shaw, Garven, & Wood, 1997).

Much has been written concerning the superiority of groups over individuals in witnessed memory retrieval. In general, it can be assumed that an eyewitness has observed only a part of the whole event because of limitations of perceptual information processing and/or attention limitations. He or she might have overlooked something important, and discussion with co-witnesses could make up for this gap. For example, Warnick and Sanders (1980) compared individuals with groups of witnesses in experimental eyewitness testimony and found that groups performed slightly better than individuals. Stephenson, Clark, and Wade (1986) had participants listen to tape-recorded interrogations by police in three different-sized groups: groups of four, two, or individuals. The results showed that the larger the group size, the better the recall performance. Yarmey and Morris (1998) investigated the effects of discussion among eyewitnesses on the accuracy of their recalled memory of a videotape of an armed bank robbery, and found that discussion between two eyewitnesses improved their memory performance.

It has been shown that social influence processes play a key role in human behavior, including cognitive aspects such as judgment or recollection. (For an intensive review of social influence research, see Forgas and Williams, 2001). For example, Hoffman, Granhag, See, and Loftus (2001) conducted a series of experiments using a modified Asch (1958) conformity paradigm to study the impact of social influence on reality-monitoring decisions about new items. Participants first studied pictures of some objects, imagined others, and later were asked to judge whether certain items had been perceived in the study phase, had been imagined, or were new. Hoffman et al. found that memory for new items was influenced by erroneous responses of confederates. Roediger, Meade, and Bergman (2001) presented common household scenes to a group of participants and had them recall them afterwards. They found that memory for objects in the scenes was influenced by confederates in a collaborative recall task. Bless, Strack, and Walther (2001) reported similar results, concluding that an individual's memory performance is very susceptible to social influence.

These social influence studies would suggest the possibility that discussion among eyewitnesses could be a major source of memory distortion if some witnesses misperceived or overlooked aspects of the event. What happens if there are conflicts among witnesses to the same event? It is an interesting question, but the PEI literature has not yet addressed how witness memory might be affected by a co-witness who observed the event differently. Misperceptions or oversights could be studied as an aspect of human error studies (Reason, 1990). Humans are prone to making mistakes. However, it is rather difficult to observe incidental errors consistently in the laboratory setting. When a group witnesses an event, misperceptions must occur frequently among them, but they are not frequent or consistent enough for researchers to study them effectively in the laboratory.

Therefore, in order to produce testimony conflict among eyewitnesses in a laboratory setting, researchers must present differing information to participants. Both Gabbert et al. (2003) and Kanematsu, Mori, and Mori (1996/2003) independently investigated memory conformity effects between paired participants who witnessed the same event differently and discussed it in a 'live' situation after observing the event. In both studies, each member of the pair watched a different video version of the same event without being aware of the duality. In this way, they simulated either different witness perspective (Gabbert et al., 2003) or misperceptions (Kanematsu et al., 1996/2003). Both studies investigated the memory conformity effects of co-witnesses as a social influence process rather than an individual cognitive process.

In the Gabbert et al. experiment, each video version contained two unique items that were seen by only one witness. Each member of a participant pair individually watched one of the two versions, but they were led to believe that they were seeing the same video version as their co-witness. Gabbert et al. (2003) found that a significant proportion (71%) of witnesses who had discussed the event went on to mistakenly recall items not actually presented, but acquired during the discussion. They also found an asymmetry of memory conformity: the witnesses who had not seen a critical scene conformed more frequently to those who had seen it (18/30) than the other direction (5/30).

We could use a confederate witness who would act as if he/she had observed a dark car when another participant witness had actually observed a white car, and let them discuss how to reconcile their initial disagreement. Social psychologists have sometimes used confederates in their experiments. One of the best-known experiments (Asch, 1958) concerning misperception and conformity used a group of confederates to show that participants tended to conform to the group consensus. An example of research in children's eyewitness testimony used an unfamiliar male confederate in a play session with child participants (Goodman, Tobey, Batterman-Faunce, Orcutt, Thomas, Shapiro, & Sachsenmaier, 1998). However, using confederates in an experiment has several drawbacks. For one thing, participants are not so naïve as to be fooled by them easily. For another, it also restricts experimental design. It is difficult, if not impossible, to deal with pre-existing interpersonal relations among participants. It is also very hard to find a good child confederate. All things considered, it is almost impossible to successfully investigate memory

conformity between co-witnesses to the same event in a 'live' situation.

Mori (2003) invented an experimental technique, Manipulation of Overlapping Rivalrous Images by polarizing filters (MORI), for presenting two different images on the same screen that can be seen separately by two groups of viewers without them noticing the differing overlapping images. Two video projectors, hidden behind a half-transparent screen, project polarized images that are perpendicular to each other. Participants wear a pair of polarizing sunglasses which look similar to ordinary sunglasses but can filter out one of the projected images. The simplicity of the experimental setting should prevent the participants from becoming suspicious about the presentation trick. The goal is to make the participants think they are observing the same event together when, in fact, that they are observing two different versions.

Kanematsu et al. (1996/2003) carried out an experiment in which 30 pairs of undergraduates observed an event secretly presented using the MORI technique with three differing points (critical items), such as a white car or a dark one. Each pair of participants was instructed to act as eyewitnesses to a criminal event that happened in the dark. Therefore, ostensibly, it was necessary for them to wear sunglasses to observe the videotaped event. Immediately after the presentation, they were asked to report individually on what they had seen. Then they were allowed to discuss the event they had just observed. Fifteen pairs of participants were instructed to come to an agreement in order to make a unified report, whereas the other fifteen pairs were instructed to discuss what they had seen and to report again individually. Participants were invited to come to the laboratory a week later to report on what they had seen the week before. At the very end, they were asked whether they had noticed that they had seen two different versions.

In the Kanematsu et al. study, none of the participants indicated that they had noticed the presentation trick, and no pairs failed to reach agreement, even on the three critical items. Unlike in Gabbert et al. (2003) or Wright, Mathews, and Skagerberg (2005) in which those who actually saw something tended to be dominant over those who did not, there were no clear tendencies concerning which one of the pair changed his/her opinion in order to reach agreement. Other findings were: (a) once eyewitnesses had reached agreement, those who changed their minds tended to report the distorted memory again a week later, with or without being aware of it; and (b) even those who changed their minds after discussion rated high on confidence in their reports.

The present study aimed to investigate further the memory conformity of eyewitnesses using the Kanematsu et al. experimental paradigm. It especially focused on the effect of the presence of a co-witness with a sharing information. In the Kanematsu et al. study, witnesses observed an event in pairs, each of them watching one of two different versions. During the discussion, the witness pairs discovered discrepancies on several points and their reporting broke down into one-versus-one confrontation. What would happen if three witnesses attended the same experiment and discussed it in a one-versus-two situation? The isolated witness would confront a pair of co-witnesses having different information about the event, while each member of the pair would be faced with two types of co-witnesses; one with different information and one with the same information. It is natural to hypothesize that the isolated witness would conform to the other co-witnesses more frequently. In other words, the witness accompanied by a co-witness having the same information would not change his/her opinion as easily if he/she were confronted with another co-witness having different information. It is also worth investigating the effect of the presence of a co-witness in a two-versus-two situation. It is hypothesized that neither witness, accompanied by their supporting co-witness, would easily conform to the other co-witness group. The frequency of conformity would be less than that found in the one-versus-one situation, in which neither of the witnesses would have a co-witness.

In the present study, two experiments were carried out to investigate the effects of co-witnesses with the same or different information on participants' memory distortion, using participants attending the experiment in groups of three (one-versus-two) in Experiment 1, and in groups of four (two-versus-two) in Experiment 2. The results were then compared with those of the Kanematsu et al. (1996/2003) experiment in which participants attended in groups of two

(one-versus-one).

Experiment 1

Method

Participants and Experimental Design

Seventy-eight undergraduates at Shinshu University voluntarily participated in groups of three. Participants were asked to come to the laboratory with two friends of the same sex. Therefore, all triads were either male-only or female-only. Ten male groups and 16 female groups participated in the experiment. Thirteen triads, five male triads and eight female triads, were assigned randomly to each of the following two conditions:

Agreement Condition. Participants were to make a unified report after discussing what they had observed.

Control Condition. Participants were to make individual reports after discussion.

Simulated Criminal Event

The same videotapes and presentation equipment used in Kanematsu et al. (1996/2003) were used in this experiment. The outline of the criminal event and the three differing critical items are explained below. The total duration of the event was about one minute. No sound was presented during the enactment.

Outline of the event. A car pulls up in front of a pedestrian (female) standing by the road near a mountainside. The driver (male) gets out of the car with a map in his hand to ask her for directions. While she is explaining the directions using the map, having left her bag on the ground, another passenger (female) sneaks out of the car to steal something from the bag and returns to the car. Then the driver bows his thanks to the pedestrian and drives away. The pedestrian starts walking away without noticing the thievery.

Three critical items. The following three elements differed between the two versions: (a) the color of the car, dark vs. white; (b) the clothes of the driver, a parka with stripes vs. a white shirt; and (c) the direction the pedestrian walks after the robbery, up toward the viewer vs. down away from the viewer.

Apparatus

The experimental apparatuses were equivalent to those used in the Kanematsu et al. study. A half-transparent screen and polarizing sunglasses were newly prepared for the present experiment.

Video projectors. Two LCD video projectors (JVC PD-V7) were used. Each had a 0.7-inch LCD panel with approximately 100,000 pixels. The illuminance of the 12v 30W projection lamp was approximately 15 lx. Liquid crystal displays (LCDs) are composed of a liquid crystal layer sandwiched between a pair of polarizing filters. Therefore, the projected image from an LCD projector is polarized. Placing an LCD projector sideways can create an image polarized perpendicular to an ordinary projection. The projectors were mounted on tripods and set side by side approximately 60 cm behind a half-transparent screen to project two different images polarized perpendicularly to each other.

Half-transparent screen. A 20cm x 20cm plain ground glass pane 5mm thick was used as a half-transparent screen. It was mounted on a 180cm (height) x 90cm (width) x 0.5cm (thickness) wooden panel which contained a 20cm x 20cm window in the middle for the screen. Two versions of the video images were projected onto the same half-transparent screen. Because one of the video projectors was placed sideways to make its polarized image perpendicular to the other, the intersection of the two images became a square of the shorter side of the two rectangles. Therefore, the screen shape was a square rather than a regular 3:4 rectangle.

Polarizing sunglasses. Two types of polarizing sunglasses suitable for viewing one or the other of the two video images were prepared. They looked similar to ordinary sunglasses, and were almost identical to each other. They were made using ordinary sunglass frames and cutouts from a

sheet of polarizing filter 0.8mm thick.

Procedure

The experimental procedure was carefully followed to replicate the Kanematsu et al. experiment. For practical reasons, only minor modifications were made in order to conduct the experiment more easily and efficiently.

Presentation. Participants entered the laboratory in groups of three and sat on chairs facing the screen approximately 1m apart. Two types of sunglasses, one pair for one version and two pairs for the other version were set on the table in front of them, and participants chose a pair at will. They were instructed to wear the sunglasses to watch a videotape about one minute long of an event that happened in the dark.

Pre-discussion reports. After watching the videotape, the participants filled in a cued recall sheet individually. The cued report sheet consisted of 25 questions concerning the event among which the three critical items were mentioned. Each question was followed by a seven-point confidence rating scale, ranging from "absolutely confident" (=7) to "least confident" (=1). All the instructions were printed on the sheets. No time limits were set, but it took about five minutes to complete the reports.

Discussion. After completion of the Pre-discussion Reports, participants were asked to talk together for five minutes about what they had observed and written. During the discussion period, they were allowed to look at their reports but not to change what they had written. At the end of the discussion period, the Pre-discussion Reports were collected.

Post-discussion Reports. Participants were instructed to make either a unified report (Agreement Condition), or another individual report (Control Condition) on what they had observed on a new cued recall sheet, identical to that of the Pre-discussion Reports.

Week-later Reports. Participants were invited to come again a week later to report what they had observed one week before. They were instructed to report independently of the former reports, but to underline their answers if they had adopted them from their co-witnesses. Again, they filled in a new recall sheet in about five minutes.

Interview. Following the completion of the Week-later Reports, participants were asked whether they had noticed the presentation trick or not.

Results and Discussion

Interview

Two isolated participants in different groups expressed their suspicion of the presence of two different versions. One of them mentioned that there must have been some tricks because it was a psychology experiment. The other was vaguely suspicious that she might have seen different things than the other two co-viewers. However, since neither of them was certain of their suspicion and they eventually made unified group decisions despite their doubts, their data were included in the subsequent analyses.

Occurrences of Conformity on the Critical Items

Participants in the Agreement Condition were obliged to report their unified decisions on the three differing critical items in the Post-discussion Reports, whereas it was not required of those in the Control Condition. Therefore, only results from the Agreement Condition were used in the following analyses.

Agreements in the Post-discussion Reports. No triads in the Agreement Condition failed to reach agreement, even on the three critical items. In most cases, the majority opinion was adopted. As for the color of the car, all 13 triads reported the majority opinions. Nine isolated witnesses who answered correctly on their Pre-discussion Reports, changed their opinions to conform to the majority. The other four isolated witnesses reported the same answers as those of the majority even in their Pre-discussion Reports. Therefore, this did not constitute conformity in a strict sense. However, these were treated as conformed answers in this study.

Nine triads reported the driver's clothing correctly and four triads reported incorrectly. Except for one, all the other 12 triads adopted the majority's opinion regardless of correctness. However, it was difficult to summarize these results in terms of conformity in a strict sense because there was a variety of answer patterns concerning the driver's clothes, including one blank answer. As for the last critical item, the direction the pedestrian walked after the thievery, three triads chose the minority's opinion and ten triads chose the majority opinion as their group answers.

Confidence ratings and conforming patterns. Participants rated their confidence from "absolutely confident" (=7) to "least confident" (=1) for each answer in the Pre-discussion Reports. It is reasonable to expect that witnesses who were less confident would be more likely to defer to their more confident co-witnesses when asked to make a group decision. Wright, Self, and Justice (2000) reported that when one person was confident in asserting what he/she saw, the other person tended to agree with him/her. This could be called the "confidence rule". As stated above, the majority rule seemed to be a major factor in the making of group decisions. However, what happens if the two rules conflict with each other?

Although the two video versions were prepared so as to be equivalent, the confidence ratings of the majority pairs were relatively high even in the Pre-discussion Reports. ($F_{(1,37)} = 5.30$, $p = 0.03$, $MSe = 17.88$, $d = 0.82$). It should be noted that since no participants had yet been confronted with any discrepancy among co-witnesses before discussion, the difference in the confidence ratings should have been only accidental and not attributed to the fact that the viewers observed in pairs. Because of these accidental high confidence ratings among the majority viewers, there were only five cases in which the majority rule and the confidence rule conflicted with each other out of 39 observations (three critical items x 13 triads). Three of these five cases contained "no answer" among the to-be-majority viewers, failing to create a majority. The two remaining cases were genuine examples of conflict of the two rules. In one case, the isolated viewer's confidence score was 6 and the majority viewers' scores were both 5. In the other, the isolated viewer had a score of 6, and the majority viewers, scores of 3 and 4. For both of these cases, the majority's answers were taken as their group decision despite their lower confidence ratings. Although it is difficult to judge from only these limited cases, the majority rule seemed to override the confidence rule. There were three other anomalous cases in which both the rules were broken; the isolated viewer's original opinions were taken as their group decision despite the fact that their confidence scores were lower than those of majority.

Voluntary agreements in the Week-later Reports. Participants were to report what they had seen in the Week-later Report individually. Therefore, those who had deferred in the unified reports were able, when reporting individually, to choose between two options, either reporting their original observations or the conformed answers. If they chose to agree rather than stick to their original observations, these were considered voluntary agreements, or voluntary conformities, which were different from the compulsory agreements in the unified reports. The participants were instructed to indicate by underlining when they had chosen the co-viewer's answer rather than their own original observation as their answer. In this way, we distinguished between the two types of voluntary agreements, those with or without underlining. The former agreement answer was considered a conscious voluntary agreement, whereas the latter was considered an unconscious one. The occurrences of unconscious voluntary agreements were especially important in witness studies because they would mean that the witnesses had failed to monitor properly the source of their recollection.

Irrespective of being conscious or unconscious, the voluntary agreements themselves were an important measure of the degree of memory distortion. If all the participants had reported correctly what they had seen, there would have been two different answers in the three non-conforming critical items resulting in no agreements. Therefore, the number of agreements in the Week-later Reports is a good measure of the degree of memory distortion. Table 2 shows the frequency of agreements in the present experiment. It showed that voluntary agreements

occurred more frequently in the Agreement Condition ($X^2_{(1)} = 25.32$, $p < .01$, Cohen's $w = 0.569$). There were no interactions between conditions and the occurrence of conscious or unconscious agreements ($X^2_{(1)} = 0.83$, n.s., Cohen's $w = 0.121$).

Table 1
Confidence Ratings on Pre-discussion Report and Conformity: Experiment 1.
(Thirteen triads in the Agreement Condition)

Car Color			Driver's clothes			Pedestrian's direction		
Isolated	Paired		Isolated	Paired		Isolated	Paired	
*3*a)	**6**	**5**b)	*6*	**6**	**2**	*6*	**7**	**0**
6	**6**	**2**	*4*	**0**	**1**	*5*	**6**	**7**
4	**6**	**1**	**1**	*0*	*0*	*6*	**3**	**4**
5	**6**	**7**	*2*	**1**	**2**	*5*	**7**	**7**
1	**5**	**7**	*3*	**5**	**6**	*7*	**6**	**7**
6	**5**	**5** c)	*1*	**1**	**2**	**1**	*5*	*7*
2	**7**	**3**	*0*	**7**	**3**	**1**	*5*	*7*
6	**7**	**7**	*2*	**1**	**3**	*5*	**7**	**7**
5	**4**	**7**	*0*	**0**	**5**	*7*	**0**	**6**
4	**7**	**7**	*0*	**3**	**4**	*0*	**5**	**6**
5	**7**	**5**	*0*	**1**	**0**	*4*	**7**	**5**
5	**5**	**3**	*1*	**4**	**0**	*6*	**7**	**4**
1	**7**	**2**	*0*	**5**	**5**	**4**	*2*	*6*

a: 7="absolutely confident", 1="least confident," and 0 denotes no answer/rating.
b: Bold numbers denote those answers which were taken as group decisions, while italicized ones denote answers which were changed to defer to others.
c: The five cases where the majority rule and the confidence rule conflicted with each other are shaded.

Table 2
Frequencies of Voluntary Agreements in Week-later Reports: Experiment 1.

Conditions	No agreements	Conscious agreements	Unconscious agreements	Total
Agreement	1	25	13	39
Control	21	14	4	39

Experiment 2

Experiment 1 showed that when a witness was confronted with a conflicting memory recall given by a pair of co-witnesses, he/she tended to conform to the pair who formed the majority in the group of three. The isolated witnesses conformed more frequently and unilaterally than those witnesses in the Kanematsu et al. (1996/2003) experiment, in which, when a witness was confronted by another, neither of them formed the majority or minority. In Experiment 2, we further examined the second-order effect of the presence of co-witness in two-versus-two witness groupings. It was hypothesized that witnesses accompanied by a supporting co-witness would less frequently conform to the other co-witnesses than the single witnesses in the Kanematsu et al. experiment, even though in both the witnesses were balanced in number, two-versus-two or one-versus-one.

Method

The experimental procedure was basically the same as for Experiment 1 except that, in the interest of experimental economy, the control condition was omitted.

Participants and Experimental Design

Sixty undergraduates at Shinshu University in a teacher training course participated in groups of four as a part of course requirements. Participants were assigned only to the Agreement Condition in groups of four. Sex and group relationships were not taken into consideration.

Apparatus

All the apparatus, including video contents and presentation materials, were the same as those used in Experiment 1.

Procedure

Presentation-recall-discussion-recall session. All participants participated in the experiment during one class period. The participants were assigned to groups of four according to their seat location in the classroom, and each group was instructed to move to a laboratory where the presentation session was done group by group every three minutes.

Presentation procedures carefully replicated those of Experiment 1, with four participants attending at one time. Two pairs of sunglasses for each version of the video were prepared, so two participants would observe one version while the other two observed the other version (two-versus-two situations). After watching the videotaped event, each group was guided to one of four nearby rooms where they participated in the recall and discussion session. First, participants were asked to complete the Pre-discussion Report, which was the same as the one used in Experiment 1. Then, they discussed what they had seen for about five minutes and were instructed to make a unified report within an additional five minutes. After that they went back to the classroom. It took about 15 minutes for each group to complete both the presentation and recall-discussion sessions.

Week-later Report and Questionnaire. Participants were to report what they had observed again in the class meeting the following week. The same type of cued-recall sheet was given to all participants. They were instructed to report individually without talking to each other. As in Experiment 1, they were also instructed to report without considering their previous responses, but to underline any answer they had adopted from the other viewers. This took about five minutes.

Following the completion of the Week-later Report, the participants were given a questionnaire and asked to write down anything they might have noticed about the presentation of the videotaped event. This procedure was used instead of the individual interviews in Experiment 1.

Results and discussion

Questionnaire

Five participants out of 60 expressed their suspicion that there might have been two different versions because they disagreed so much despite the fact that they had watched the event so carefully together. However, none of them mentioned that they had actually observed two overlapping images. Their suspicions remained unconfirmed. In fact, all of them eventually agreed to make unified group decisions. Therefore, their data were included in the subsequent analyses as in Experiment 1.

Occurrences of Conformity in the Three Critical Items

Confidence ratings and rates of agreement As in Experiment 1, participants rated their

confidence level for each answer in the Pre-discussion Reports. All groups eventually came to an agreement even on the three critical items. Because both of the groups consisted of two viewers in Experiment 2, majority rule was not applicable for making a group consensus decision. There were 29 cases out of 45 (three critical items x 15 groups) in which the original answer of more confident pairs was taken as their group answer. However, in eight cases, the original answer of less confident pairs was chosen in their unified report. Dominance was not clear in the other eight cases, in which either confidence ratings were balanced or one or more participants had no answer. Overall, it can be concluded that confidence level was a major factor in the making of group decisions in Experiment 2.

Table 3
Frequencies of Voluntary Agreements in Week-later Reports: Agreement Condition.

Experiment	No agreements	Conscious agreements	Unconscious agreements	Total
One vs. one (Kanematsu et al., 1996/2003)	9	22	14	45
One vs. two (Experiment 1)	1	25	13	39
Two vs. two (Experiment 2)	28	29	33	90

Voluntary agreements in the Week-later Reports. The number of voluntary agreements and whether they were conscious or not were analyzed in the same way as in Experiment 1. Table 3 shows the frequency of voluntary agreements along with corresponding values obtained from previous studies. Voluntary agreements were counted on all three critical items, witness by witness. Therefore, the maximum number was 90, if all fifteen pairs had deferred to the other pairs on all three critical items. A Chi-square test performed on the data in Table 3 was significant ($X^2_{(4)} = 17.16$, $p < .01$, Cohen's $w = 0.221$). Residual analyses showed that voluntary agreements occurred most frequently in triads (Experiment 1; 38/39 or 97.4%), and least frequently in groups of four (Experiment 2; 62/90, or 68.9%). Further comparisons among the results of the three experiments revealed that conscious agreements occurred significantly more often in Experiment 1 (25/39 or 64.1%) and significantly less often in Experiment 2 (29/90, or 32.2%). In Experiment 1, the isolated subjects were forced to agree unwillingly, and remembered until a week later that they had adopted the others' answers. On the other hand, in Experiment 2, the total percentage of voluntary agreement was the least because there were fewer isolated witnesses in the two-versus-two condition and because those witnesses who had a supporting co-viewer would maintain their original answers even though they had deferred once before. It is noteworthy that the percentage of unconscious agreement was relatively stable across the three experiments.

General Discussion

Importance of the Presence of Co-witnesses

The present study focused on the effects of co-witnesses in eyewitness testimony, who either having the same information or different one. Participants observed two versions of a videotaped event either in groups of three, one-versus-two (Experiment 1), or in groups of four, two-versus-two (Experiment 2). The results were compared with each other as well as with those of Kanematsu et al. (1996/2003), in which participants had attended identical experimental sessions in pairs, or one-versus-one. The participants in the Agreement Conditions of these three experiments were forced to make unified reports just after discussion and asked to report individually again a week later. At that time, participants who had changed their original answers to defer to others in order to make unified reports could report their original answers if they believed they had been correct.

The results showed that isolated eyewitnesses (in Experiment 1) seldom changed back to their original answers whereas nearly one-third of those who had a co-viewer agreeing with their opinion (in Experiment 2) returned to their original answers. It clearly showed that isolated witnesses would conform to the majority more easily than supported ones.

This finding is consistent with classical conformity experiments such as Asch (1958). In the Asch study, group pressure for a member to conform to the majority was much attenuated in the presence of at least one member who had the same judgment. Although it has yet to be conducted, it could be expected that an experiment with five or more witnesses in a group which would consist of two witnesses observing one version and three or more observing another version, would yield results more similar to those of Experiment 2, two-versus-two, than those of Experiment 1, one-versus-two. At the time of making a unified report, participants may defer temporarily to the majority but they would likely maintain their original answers as long as they have a co-witness with the same opinion.

However, further analysis of the voluntary agreements in the Week-later Reports revealed that two-thirds of the agreements in the one-versus-two condition were conscious ones as opposed to fewer than half of the agreements in the two-versus-two condition. As Table 3 clearly shows, the decrease in total number of agreements in the two-versus-two-condition (Experiment 2) mainly resulted from the reduction of conscious agreements by almost half. The frequency of unconscious agreements was almost stable at a certain level across the three experiments despite the difference in the number of co-witnesses. It has been found that witnesses tend to fail to recall memory sources as well as memory contents (Lindsay & Johnson, 1989). Unconscious agreements are a type of source monitoring error because participants chose answers for which the source was not the original observation but the agreed-upon group decision, and they did not remember the source of their answers. From these results, we can conclude that the presence of co-witnesses may reduce conscious agreements and that witnesses were subject to making a considerable number of source monitoring errors regardless of the presence of co-witnesses.

The MORI Technique for Future Research in Eyewitness Experiments

The MORI technique (Mori, 2003; 2007) is especially suitable for research requiring the creation of conflict among eyewitnesses without using confederates (French, Garry, & Mori, 2008; Garry, French, Kinzett, & Mori, 2007; Hirokawa, Matsuno, Mori, & Ukita, 2006). In Gabbert et al. (2003), they simply presented different video clips separately to two groups of participants, and they reported that none of the participants indicated that they had been aware of the duality of the presentation. However, the reason they were not aware of the duality would be because Gabbert et al. only simulated different perspective, or oversights; some items were seen by one witness but not by the other. Both those who saw something and those who did not were meant to think that the latter might have overlooked it. It would not be possible to lead participants to assume they had observed the same video if different things had been presented, for example, cars of different colors as in the present experiments. As a matter of fact, even though the MORI technique was used, a few participants indicated some suspicion about the presentation in the present experiments.

It is also advantageous that this technique is easy to use for experiments with child participants. How accurate a child witness' memory is, especially in a situation where plural witnesses report an event differently, has been a crucial issue in judicial practices (cf. Bull, 2001). Mori and Kitabayashi (2007) conducted an experiment using the MORI technique, in which 15 mothers and their children aged from 6 to 12 years old participated as mother-child eyewitness pairs. The results showed that children's memory was less accurate than their mothers', but the mothers were not necessarily dominant when there was discrepancy between their memory and that of their child. Mothers deferred to their own child's opinions in about half of the conflicting cases. Creation of conflicts between mother and child pairs in eyewitness experiments could not have been done as effectively without the MORI technique. Mori and Takahashi (2004) examined memory accuracy and conformity in pre-school child pairs, finding that even young children

showed better recall in collaboration and that they tended to conform more frequently than adult participants. The new experimental paradigm reported in the present paper using the MORI technique is promising for further investigation of children's eyewitness memory.

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