Formation of Collective Memories through Group Conversations: Examining the Involvement of the "Post-Event Misinformation Effect"

Yasuhiro Ozuru, Ph.D.¹

Abstract ~ The term "collective memories" refers to memories shared within a given group of people. It is hypothesized that one of the ways in which memory acquire "collectivity" is through "post-event misinformation effect" (Loftus, 1975) of group conversation. In an experiment testing this hypothesis, individuals from eight four-member groups read stories containing conflicting information. Following a group recounting on the next day, they performed individual free-recall and forced-choice recognition consisting of the four alternatives appearing in the four dif-

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ferent versions of the stories (e.g., Camel, Marlboro, Winston, and Parliament). Subjects were more likely to falsely recognize as well as recall other members' version when it was mentioned in the group recounting. The individuals who undertook the majority of the recounting, who were defined as Narrators, were more likely to insert their own versions into other member's subsequent recall and recognition. This advantage allowed the Narrator to shape the post-group individual memories.

Introduction

This paper is concerned with formation and transformation of "collective memory." Collective memory usually refers to memory of an event shared within a given group of people. For example, Lifton (1967) reported that bombing victims of Hiroshima tended to have similar accounts of the event of bombing, regardless of their distance from the epicenter at the time of explosion. The collective memory phenomenon can also involve "collective amnesia," in which a group of people collectively forget a certain traumatic historical event; as observed in Romanian's "collective amnesia" of holocaust of Jews and Gypsies (Butnaru, 1992; Ioanid, 2000).

At the most fundamental level, memory could acquire "collectivity" in two ways. On the one hand, collectivity of a memory could emerge out of the group perception of an event. Various psychological studies indicate that people's experience of an event are often colored by their attitude (Hastorf and Cantril, 1954), mood (Toner and Gates, 1985), knowledge (Bransford and Johnson, 1973), goal, and other person-related and situation-related factors. If group membership of a person has an impact on the person's perception of an event (Hastorf & Cantril, 1954), the person's "take" of an event and the resulting memory should reflect the group's take of the event.
However, memory can also be shaped, indeed, changed by external (Loftus, 1975; 1979; Loftus, Miller, and Burns, 1978), and internal (Linton, 1986; Bartlett, 1932) influences that occur after the initial experience of an event. This paper addresses the effects conversations may have on the memory of shared past event and in particular if conversations lead to an increased mnemonic consensus.

Various areas of psychology research have documented the impacts of conversations on misleading post event memory, (Nelson, 1993; Fivush & Fromhoff, 1988; Higgins & Stangor, 1988; Echterhoff & Hirst, 1998.) Given the extensive literature on the effect of misleading post-event information on memory, it is reasonable to expect that conversations may influence subsequent remembering.

Manier, Cuc, and Hirst (2001) directly explored the question of how conversational interactions influence collective memory emerging from group conversations. Manier et al (2001) found that the group discussions were "cooperative" (Grice, 1975) and often deferred to one to do the narrating (Narrator being defined as the most prevalent contributor). What makes this observation about conversational dynamics so important for the study of collective memory is that the Narrator sets the stage for the formation and/or transformation of a collective memory. As such, even though each conversational participant begins the group recounting with quite different memories of a shared event (only 6.4% of narrative tellings in the pre-group individual recollections were found in ALL four conversational participants), the memory emerging in the group recounting will be that of the Narrator, especially if the Narrator is particularly strong.

When uniform memory emerges in the group recounting, it may influence subsequent remembering in a manner that leads to a convergence of memory that emerged in the group conversation.
Manier et al. (2001) found a significant increase of the overlap in the member's memory in post-group individual recall in the experimental condition compared to a control condition. Moreover, they found that increased overlap of member's post-group memory could be mostly traced to the information provided by the Narrator. The stronger the Narrator, the more likely the post-group memories would converge on the Narrator's rendering of the past.

Inasmuch as Manier et al. employed recall as a measure of memory, it is possible that the conversation did not change members' memory; it merely influenced the way in which other members "narrate" the story in the subsequent individual recall. Moreover, the increase in overlap Manier et al. observed could have occurred not through a change in the memories the participants had, but by reinforcing extant memories.

The present experiment addresses these concerns by varying the procedure used by Manier et al. (2001). In Manier et al. (2001), four group members read the same stories. In the present study, we had subjects read slightly different stories, thereby ensuring that each subject had different, even contradictory, pre-group memory.

In the present experiment a group of four individuals read different versions of short stories in which the details were changed to produce systematic discrepancies between their memories of a given story. Following an individual recall, subjects went through group recounting session. Finally in the test phase, subjects' individual memories of the original stories were tested with free-recall and forced-choice recognition measures. The prediction was that subjects should be more likely to falsely recognize and recall the items mentioned by other group members during group recounting following the group recounting than following the individual recounting (control condition) in which no such item
was introduced.

Finally, we were interested in revisiting the claim of Manier et al. (2001) that the consensus version emerging in the post-group recollections was the version held by the Narrator. It is predicted that the items uttered by the Narrator during group recounting should be more likely to be subsequently falsely recognized by other members than items uttered by non-Narrators.

**Method**

**Participants**
A total of 32 English-speaking adults, who were recruited by a flyer posted around the New School University campus, participated in the experiment. Of those, 14 were male and 18 were female, ranging in age from 18 to 49 years old. They received $20 dollars each for their participation.

**Stimulus and materials**
Four short stories were used as stimulus materials. Different versions of each story were constructed by changing specific details of each story. For example, depending on different versions of a story, a couple met in a café, bar, Italian restaurant, or steakhouse.

For the recognition task, a questionnaire consisting of four-item forced choice recognition probes was constructed. Each question and four possible answers for the question were printed on a letter-sized paper. Each page also contained a confidence-rating section in which subjects were requested to indicate their confidence for the answer on a Likert scale of 1 to 6. The recognition questionnaire contained 40 questions: four questions probing for critical items, and four questions probing for non-critical information for each of story.
Procedure
Participants were assigned to a group consisting of four unrelated individuals. One within-subject variable was manipulated between the learning and test phases of the experiment. Participants recalled two stories in the group recall condition (experimental condition) and two other stories in the individual recall condition (control condition). The assignment of the stories was counter-balanced for experimental and control conditions. Each participant read the four short stories twice in a separate room. There was no time limit given for reading. At the time of reading the stories, participants were told that the experimenter was interested in their memory of both the gist and the details of the story. After reading the stories twice, they were given 20-minutes of distraction (a personality questionnaire). Then, they were requested to recall all four stories. At the time of the individual free-recall, subjects were instructed to recall as much information as possible without summarizing the story. At the end of each individual recall, subjects were asked if they could recall more, and the experimenter did not go onto the next story until the subject assured him that he or she could not recall any more.

In the second phase of this study, a day after the first phase, the participants were instructed to cooperate as a group and to begin by spending 15 minutes talking and getting to know each other. The experimenter then asked if they "really could not recall any more", and only stopped querying them when they firmly asserted that they had recalled all that they could. They were subsequently asked to recall a second story. They were then ushered into separate rooms and asked to recall the remaining two stories, one story at a time. Again, at the end of each individual recall, subjects were asked if they could recall more, and the experimenter did not go onto the next story until the subject assured him that he or she could not recall any more. The order of the sequence (group recounting, then individual recall) was counterbalanced, as was the assignment of the stories to the group...
recounting and individual recall conditions, as already noted.

Phase three of the study began after a 20-minutes distraction task (crypt-arithmetic). Subjects were ushered back into the individual rooms and asked to individually free-recall all four stories. The stories were probed in the same order in which they were recalled during the first phase of this study. The recognition test was administered immediately after the individual free-recall task. In the recognition test, subjects were instructed to choose the item they remembered from the text and to assign the confidence rating to each of their response.

Results

There are four main results to be reported: 1) Subjects' recognition memory performance; 2) subjects' confidence rating of the recognition; 3) subjects' individual free-recall performance, and; 4) the conversational roles.

The present data analysis adopted the techniques provided by Kashy and Kenny (2000), taking Intraclass Correlation of group into account. In this way, it is possible to factor out "group effect" and "group-treatment interaction."

Recognition

Analysis of subjects' performance in the recognition test focused on the critical items. Averaged across eight groups tested, at least one version of an item was mentioned 71% of the time. The present analysis was confined to those instances in which at least one version of a critical item was mentioned during the group recounting session.

A subject's response was counted as a "false recognition attributable to group conversation" (Critical False Recognition) if the subject recognized an item as originating from the text when in
fact it had been mentioned by another group member in the group recounting. All the other types of false recognition were counted as Random False Recognition. Table 1 shows the recognition performance (averaged across subjects).

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td><strong>Experimental Design</strong></td>
<td></td>
<td></td>
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<tr>
<td>Hits</td>
<td>.78</td>
<td>.22</td>
</tr>
<tr>
<td>False Recognition attributable to the conversation (Critical False)</td>
<td>.16</td>
<td>.21</td>
</tr>
<tr>
<td>False Recognition not attributable to the conversation (Random False)</td>
<td>.06</td>
<td>.08</td>
</tr>
<tr>
<td><strong>Base Rate</strong></td>
<td>.13</td>
<td>.13</td>
</tr>
<tr>
<td><strong>Control Condition</strong></td>
<td></td>
<td></td>
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<tr>
<td>Hits</td>
<td>.84</td>
<td>.14</td>
</tr>
</tbody>
</table>

Table 1. Performance on Post-group Recognition Task.

There were two critical comparisons: 1) the comparison between the Experimental Hits and Control Hits, and; 2) the comparison between Critical False Recognition and Base Rate.

The Base Rate for Critical False Recognition was computed for each subject by taking the number of alternative versions mentioned by other members into account. This operation was necessary because the design of the response format (a forced-choice recognition) made it impossible to distinguish Critical False Recognition from Random False Recognition. The following formula was used for the computation of the Base Rate.

\[
\text{Base Rate} = (1.0 - \text{Experimental Hits}) \times \frac{\text{the number of versions of a critical items emerging in the group}}{3}
\]

The comparison between Experimental Hit and Control Hit revealed that, whereas Intraclass Correlation was not significant
for the group main effect, $F(7, 24) < 0.9$, it was marginally significant for group by treatment interaction, $P=.202$, $F(7, 24) = 2.01$, $p<0.1$. According to Kashy and Kenny (2000), when there is evidence of nonindependence for group-treatment interaction, groups need to be treated as the unit of analysis. This operation revealed that the difference between Experimental Hit and Control Hit was not significant, $F(1, 7) = 1.16$, $p>0.1$.

Similarly, the comparison between Critical False Recognition and Base Rate revealed that, whereas the Intraclass correlation was not significant for group main effect, $F(7, 24) = 1.04$, $p>.4$, it was significant for group by treatment interaction, $P=.365$, $F(7, 24) = 3.3$, $p<.05$, indicating that group, instead of individual subject, needs to be treated as the unit of analysis. The analysis revealed that the rate of Critical False Recognition was not above Base line, $F(1, 7) =1.3$, $p>0.1$.

This disappointing result may have arisen in part because some of the subjects may have become aware of our manipulation. If they knew that different members of the group received different versions of the stories, they may have become skeptical about what other mentioned in the group conversation. We divided the eight groups into two sets - those who explicitly mentioned in their group recounting that there were discrepancies ("Aware") and those who made no explicit referral to discrepancies ("Unaware"). We confined our analysis to the "Unaware" group.

For the "Unaware" groups, the comparison between Experimental Hit and Control Hit revealed that the Intraclass Correlation was not significant for either the group main effect, $F(3, 12) < 0.6$, or group by treatment interaction, $F(3, 12) = 1.13$, $p>0.3$. However, a paired-sample t-test revealed that subjects were more likely to make a false recognition following group recounting (experimental condition) than following individual recall (control condition), $t(15) = 2.53$, $p<0.05$.
Similarly, a paired-sample t-test indicated that the occurrence of Critical False recognition were reliably higher than the Base Rate, $t(15) = 2.37, p<.05$. These results are consistent with the prediction, indicating that 1) subjects' false recognitions are more likely to increase following group recounting than following individual recounting; 2) substantial portion of the increased false recognitions following group recounting can be traced to the content of group recounting.

**Confidence Rating**

As described in the preceding section, subjects' recognition responses were classified into three categories: "Hit," "Random False Recognition," and "Critical False Recognition." Subjects' confidence rating was analyzed for the three types of response. Table 2 indicates the mean confidence rating for each type of the response.

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hits</strong></td>
<td>5.18 (.91)</td>
<td>5.31 (.60)</td>
</tr>
<tr>
<td><strong>Critical False Recognitions</strong></td>
<td>4.62 (1.08)</td>
<td>------</td>
</tr>
<tr>
<td><strong>Random False Recognitions</strong></td>
<td>2.86 (1.48)</td>
<td>3.28 (1.07)</td>
</tr>
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</table>

Table 2. Confidence ratings for each type of response in recognition task (6 point scale of 1-6, 6 very confident; standard deviations in parenthesis).

A comparison of means revealed that the difference between Experimental Hits and Experimental Random False, $t(22) = 5.999, p < 0.01$, and between Critical False Recognition and Experimental Random False, $t(12) = 2.982, p < 0.012$, were both statistically significant. On the other hand, the difference
between Experimental Hit and Critical False Recognition (attributable to group recounting), t(16) = 0.8076, p > 0.3, was not significant. This pattern of results indicates that when subjects made Critical False Recognitions, they were quite confident about the accuracy of their response, suggesting that Critical False Recognition differed subjectively from Random False Recognition.

**Individual Free Recall**
As with the recognition measures, the analysis of the individual free-recall focused on the subjects' memory of the critical items in the instances in which at least one version of a critical item was mentioned during the group recounting. There were a total of 57 instances or 228 critical items (57 instances x 4 people) in the experimental condition, and because of yoking procedure, the same number of instances in control condition.

The pre-group and post-group individual recollections were transcribed and then checked by a second individual naïve to the goals of the project. They were then coded by two independent coders, one of whom was naive to the project and goals of the study. The coders' agreement was 93.3%. All the conflicts between the coders were subsequently resolved.

Next, the coders classified the recalled critical items into correct and incorrect recall. That is, for each target item recalled, coders examined whether the information reflects the content of the text. For example, whereas a subject mentioning "the elephant was by the water hole" would be considered accurate recall for a text information "elephant was by the water pond," it wouldn't be considered accurate recall for a text information "elephant was by a river." The coders' agreement on this classification was nearly perfect, above 99%. Furthermore, the recall of incorrect information in the post-group individual recall in experimental condition was classified into "Random False Recall" and "Critical False Recall."
Recall." The coders' agreement was perfect. The recall results are indicated in the Table 3.

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
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<tbody>
<tr>
<td></td>
<td>Pre-group</td>
<td>Post-Group</td>
</tr>
<tr>
<td>Critical items correctly recalled</td>
<td>.58</td>
<td>.52</td>
</tr>
<tr>
<td>Random false</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
<td>Random false</td>
<td>--</td>
<td>.05</td>
</tr>
</tbody>
</table>

Table 3. Memory of Critical Items of Pre-group and Post-group Individual Recollections.

A repeated measures ANOVA for the total false recollection scores (random plus critical) in the pre-group and post-group recollections in the experimental and control conditions indicated a marginally significant interaction, $F(1, 29) = 3.86, p < .06$, suggesting that subjects' false recollections tended to increase more rapidly when following a group recounting than when following an individual recollection. This result is consistent with the hypothesis that conversational interactions influence subsequent memories such that individual memories become more similar to each other.

A repeated measure ANOVA for false recall in the first and the final recalls in the experimental and control conditions using the data of these 9 subjects revealed that the interaction was significant, $F(1, 8) = 15.57, p < .01$, indicating, for these 9 subjects, false recall is likely to increase following group recounting than following individual recollection. This pattern of the result, which hints at large individual difference in the degree to which people are susceptible to conversational influence, appears to be consistent with the past finding that indicate the existence of a large individual difference in suggestibility (e.g., Mitchel & Johnson,
2000; Loftus & Mazzoni, 1998; Hyman & Billings 1998). Possible interpretations of the individual difference of the effect found in the present experiment will be discussed later in detail.

Conversational Roles
Manier et al. (2001) study indicated that the person adopting the conversational role of Narrator (Hirst et. al., 1996) is more likely to impose his or her own version of the past onto other members' subsequent recall than one would expect from chance. In order to examine whether this was also the case in the present study, the transcript of the group recountings were analyzed using a coding scheme developed by Hirst et al. (1996).

Two independent coders, one of whom was naive to the experimental procedure and hypothesis, divided the group recall transcripts into "narrative units" following Dritschel (1991) and Bangerter (2000). A narrative unit, consisted of a subject (sometimes implicit) and a predicate, and describes a single "state," "action," or "event." Not every utterance in a transcribed discourse could be called a narrative unit. Metamemory statements, such as "I don't remember," or overt requests for assistance, such as "was he the lawyer of the husband, or of the wife?" do not describe an event or a state. Such utterances were treated as non-narrative units. Thus the recall transcripts were divided into narrative and non-narrative units.

According to the coding scheme developed by Hirst et al. (1996), "Narrator" is defined as: 1) whose share of all narrative tellings uttered in the conversation is greater than would be expected from chance (for a group of four, chance is .25); 2) narrative tellings are the most preponderant structural unit in the Narrator's contributions to group recounting. Therefore, coders job was: 1) classifying all the utterance in the discourse into "Narrative unit" and "Non-narrative unit;" 2) breaking down "Narrative units" and "Non-narrative units" to more specific structural (idea) units; 3)
counting "narrative telling (a type of narrative units)" to determine the conversational role of the Narrator. 1901 structural units of the 16 stories recounted by 8 groups were coded. Kappa on the coders' agreement was 0.76, indicating excellent agreement. Any discrepancies between the coders were subsequently resolved. Since the subsequent correction of the coding did not affect the classification of the conversational roles, the originally coded data were used for the present data analysis.

A critical question is whether information contributed by Narrator(s) is more likely to be falsely recognized by other members compared to the information contributed by non-Narrators. A comparison of means indicated that the difference is marginally significant, \( t(7) = 1.86, p < 0.11 \), weakly suggesting that Narrators versions, compared to non-Narrators' version, are more likely to be falsely recognized by other conversational participants in the post-group phase of the study. If we exclude the Aware groups, we now find a significant effect, \( t(4) = 3.64, p < .05 \), suggesting that Narrators versions were significantly more likely to be falsely recognized than non-Narrators version in subsequent recognition.

**Discussion**

The main finding of the experiment is that, as far as Unaware groups are concerned: 1) subjects were more likely to falsely recognize an item following group recounting than following individual recall; 2) the occurrence of Critical False Recognition attributable to group conversation was significantly above the base line. Together these results suggest that a group recounting tends to influence subjects' subsequent recognition memory by changing their memory, or at least their memory based on the content of the stories, to the direction consistent with the content of the group recounting. A similar pattern of results, though less pronounced, was obtained on free-recall measures. The increase
in the number of falsely recalled item was greater in the exper-
imental condition than in the control condition, and the increased
false recall in the post-group individual recall was largely Critical
False Recall attributable to the content of group recounting. In
addition, the present study showed that conversational role of
Narrators have disproportionately large influence on conversa-
tional participants' subsequent recognition memory, replicating
Manier et al.'s (2001) finding. Together these results support the
hypothesis that group conversations can influence the partici-
pants' subsequent memory by changing the conversational partic-
ipsants' memory, or memory belief.

Subjects who falsely recognized the "other's items" as their own
text version could be doing so because their memory of the orig-
inal text item was extremely poor or non-existent (Schneider &
Watkins, 1996). In such a case, given that subjects were required
to make some kinds of response to the forced-choice recognition,
they would have picked an item mentioned by other members by
guessing. Even though the recognition result indicated subjects'
preference to choose the critical item from the conversation over
other alternatives, this alone is not strong enough to rule out such
a possibility. The data on confidence rating, however, indicate
that subjects were not merely "guessing" in choosing what was
said in the conversation; subjects gave significantly higher confi-
dence ratings to Critical False Recognitions than to Random
False Recognitions, and the confidence ratings assigned to
Critical False Recognition did not differ significantly from those
assigned to Hits. This pattern of the data implies that in choosing
critical items mentioned in the conversation the subjects' decision
process was clearly influenced by the content of group conversa-
tions.

An alternative explanation might suggest source monitoring.
Source Monitoring Theory argues that recollection involves a
decision process in which a person attributes retrieved informa-
tion to a particular source on the basis of various attributes (perceptual, cognitive, affective) of the information. If such a decision process is a critical element of the recognition task (Johnson, Hashitroudi, & Lindsay, 1993), presenting an item mentioned by other member along with the text version in the recognition task should make the decision process more difficult compared to the case in which no additional item was introduced. Indeed, the lower overall hit rate in experimental condition compared to control condition indicates the occurrence of source confusion.

Related to this point is that source monitoring difficulties could be reduced by source invalidation. Previous studies demonstrated that the credibility of misleading information had a large influence on the post-event misinformation effect (Underwood & Pezdeck, 1998; Echterhoff & Hirst, 1998). According to this line of research, invalidating the credibility of the source of misinformation would increase the overall recognition performance in the post-event misinformation effect paradigm by reducing the source monitoring difficulty (e.g. Green et al, 1982). In the present experiment, source invalidation occurred serendipitously in those groups (Aware groups) which subjects became aware of the presence of discrepancies in the original texts during the group recounting. In such a case the invalidation could influence the encoding of the post-event information and/or the retrieval (or source judgment stage) tasks. The past studies indicated source invalidation just before the misinformation stage was more effective than invalidation after the misinformation stage in reducing misinformation effect (Green et al., 1982). The present finding that Aware subjects' recognition performance does not vary between experimental and control conditions is consistent with the past finding.

Finally, the present experiment showed that false recalls and/or false recognitions didn't occur uniformly in all the subjects. At least two factors seem to be responsible in producing this effect.
First, unlike the Loftus studies (1975, 1979) in which all the subjects were exposed to misinformation uniformly, the present study let the group conversational interactions take care of the manipulation. As the result, some people, especially the ones categorized as Narrators in the present study, took the role of providing the post-event misinformation to other members. Indeed, the results indicate that Narrators had a disproportionately large influence on the participants' subsequent recognition memory. Thus, the emergence of conversational roles in group recounting was responsible in part for creating this phenomenon.

However, this seems not to be the only reason. It is generally understood that there are individual differences in vulnerability to post-event misinformation effect. For example Mitchel and Johnson (2000), reviewing the past studies on memory distortion, found that approximately 25 percent of the subjects in a given experiment were influenced by the post-event misinformation, whereas the remaining 75 percent was quite resistant to the influence. There is evidence indicating that a person's degree of suggestibility is related to certain personality characteristics tapped by the Dissociative Experience Scale (Hyman & Billings, 1998). Similarly, the degree to which subjects seek to act/perform in socially desirable ways could be another personality factor determining the degree of suggestibility. Assuming that conversational interactions on the shared past involve certain degrees of negotiation on the construction of shared reality, willingness to conform toward other members' versions of the past should have an influence on the degree of suggestibility.

**Conclusion**

The present experiment examined whether group members' memories could be transformed through conversational influence similar to "post-event misinformation effect" (Loftus, 1975; Loftus et al., 1978, Green et al., 1982) as opposed to mere
response bias and/or rehearsing effect of conversation (e.g. Nelson & Fivush, 2000). In order to test this hypothesis the study ensured that subjects' original experience systematically differed from each other by providing them with different versions of a text. The study also used forced-choice recognition measures, in addition to free-recall measures, to achieve a maximum sensitivity in measuring change of memory. Although the overall data appear to support our hypothesis that "collectivization," or increased mnemonic consensus of conversational participants' memories, can be produced by the effect similar to post-event misinformation effect of conversation, to what extent the present finding generalizes to real-life collective memory phenomenon needs to be assessed carefully.

Note:
1. The stimulus materials, four short stories, were constructed by modifying "The Lion, Prometheus and the Elephant" (Temple and Temple, 1998), "The Custody Case That Went Up in Smoke" (Kantrowith, Cohen, and Dissly, 1993), "Whose child is it?" (Aquilina, 1993), and "Can-Can" (Vivante, 1995).
References


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