HOW THE OPINIONS OF OTHERS AFFECT MEMORY FOR
CONSUMPTION EXPERIENCES

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ABSTRACT
Consumers rely on their memory for past consumption experiences when next purchasing in the product category, when advising other consumers, and when setting expectations for future consumption experiences. Although previously considered to be a permanent record of the experience, consumer memory has recently been demonstrated to change with exposure to post-consumption advertising. The results reported here show that post-experience word-of-mouth comments altered memory for the evaluation of the experience, particularly when the consumer could not recall the source of the comment. The altered memory mediated the relationship between the initial evaluation and purchase intention. Also, consumers that were more confident in their memory of the evaluation had a higher evaluation-purchase intent correlation.
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INTRODUCTION

Memory for past consumption experiences plays an important role in the decisions consumers make for themselves and the decisions made by other people they share their memories with. Consumers use previous evaluations of products and services as an input in choice, as advice for other consumers searching for information to make their own choices, and as a factor when developing expectations for future experiences. Given that memory is so critical to current and future behaviour, it is essential to understand when it accurately reflects the past. Although we prefer to believe that our memories are fixed, recent evidence suggests that memory for the facts of a particular consumption episode can change after exposure to misleading advertising (Braun 1999; Braun, Ellis, & Loftus 2002; Cowley & Janus 2002), and critical reviews (Cowley & Caldwell 2001). In addition to advertising and reviews, consumers are also exposed to word-of-mouth (WOM). Whether the comments of others can affect consumers’ memories for their own consumption experiences and evaluations of those experiences has not been explored. This research investigates when and how post-experience comments made by other consumers can alter consumers’ memory of their affective reaction to the experience, and whether an alteration in memory will affect purchase intention.

WORD-OF-MOUTH AS POST-EXPERIENCE INFORMATION

WOM is defined here as any comment about a product or service made by a non-marketing source. WOM communication has generally been studied as a component of information search (Duhan, Johnson, Wilcox, & Harwell 1997; Eliashberg & Shugan 1997; Feick & Price 1987; Herr, Kardes, & Kim 1991; Woodside and Delozier 1976) or as an outcome of product consumption (Richins 1983; Watkins & Lui 1996). Although consumers are also exposed to WOM after they have consumed a product or service, virtually no attention has been paid to post-consumption WOM and its affect on memory.

When recalling a past experience, all of the knowledge and information that is activated in memory, including information encountered both before and after the event, is used. Instead of accessing an independently stored ‘file’ of an event, retrieval is a process of reconstructing
the past by combining information from many sources (for reviews see Koriat, Goldsmith, & Pansky, 2000; Schacter 1995; 1996) including post-experience information.

How might the WOM heard after an experience affect memory? Although the question has not been investigated in the marketing literature, a related literature in eyewitness testimony investigates the effect of exposure to post-experience misinformation on memory for a fact seen or heard earlier (for reviews see Roediger & McDermott 2000; Loftus 1996). One of the key findings in this literature is that eyewitnesses sometimes include post-event suggestions as part of their own memory (for reviews see Belli & Loftus 1994; Loftus 1993). In these studies, subjects alter memory for a witnessed event after answering leading questions tainted with misinformation. It is generally accepted that these misinformation effects are caused by source confusion where witnesses misattribute a information learned after the event as information learned during the original event (Mitchell & Johnson 2000). Another explanation is that the information from the experienced event was not encoded as deeply as the information as the post-experience information (McCloskey & Zaragoza 1985).

Therefore, during retrieval when the memory is reconstructed, the more accessible post-experience information is included in the memory for the original event.

Even when post-experience information is not misleading, it can impair memory. Just hearing another consumer put their thoughts and evaluations into words can affect retrieval as the verbalised words may guide elaboration and retrieval (Melcher & Schooler 1996; Roediger & Guynn 1996). Verbalisation can impair memory because individuals rely on the attributes verbalised which can be “quite detrimental as most individuals possess only rather meager linguistic skills for communicating complex perceptual experiences” (Melcher & Schooler 1996, pp. 232). Verbal overshadowing may cause an evaluation verbalised by another consumer to be easier to retrieve than ‘own’ evaluation.

**Eye-witness memory versus consumer memory**

The critical difference between eyewitness memory and consumer memory is that eyewitnesses are asked to remember facts about a crime scene, consumers are generally asked for their affective reactions to a consumption event. In other words, the post-experience information in an eyewitness testimony study typically concerns the weapon or the description of the criminal, while consumers may be asked for the attribute levels of an event,
they are more likely to be asked for their self-generated affective reactions and evaluations. Memory for an evaluation may be particularly sensitive to post-experience suggestion as it is a subjective evaluation made by the consumer, and is dependent on selective attention and the weighting of the attributes during the formation of the evaluation (Eagly & Chaiken 1998).

**H1:** Memory for an evaluation will be affected by post-experience WOM.

**MEMORY FOR WOM AS A MODERATOR OF MEMORY DISTORTION**

Two pieces of information that are critical for a consumer to effectively manage the use of a WOM comment are the source and the details of the comment itself (Gilly, Graham, Wolfinbarger, & Yale, 1998). Between hearing a WOM comment and retrieving ‘own’ evaluation for use in future decisions, the accessibility of these two pieces of information may vary. There are four possible outcomes for memory of the WOM comment: explicit memory for the source or context of the comment (yes, no) and explicit memory for the details of the comment (yes, no).

*Source Confusion.* If the overhearing consumer does not recall hearing an evaluative comment about the experience, but does recognise the details of the comment, then memory distortion is attributable to source misattribution. The comment itself is distinguishable from other information stored about the film, but the information connecting the comment to the source and therefore, the episode or context, is not accessible. Memory distortion has been demonstrated to occur more often when the source is difficult to remember (Lindsay 1993; Zaragosa & Lane 1998).

*Implicit effects.* If both the source and the comment are not explicitly remembered, then there may still be an implicit effect on memory causing memory distortion. Individuals need not be aware of the occurrence of a previous event for that event to have an effect on future memory performance (Kunst-Wilson & Zajonc 1980; Seamon, Williams, Crowley, Kim, Langer, Orne & Wishengrad 1995).

*Pattern separation failure.* If the overhearing consumer remembers the episode in which someone made an evaluative comment about an experience, but does not explicitly recognise what the comment was, then any evidence of memory distortion of ‘own’ experience may be
attributable to pattern separation failure (Schacter, Norman, & Koustaal 1998). Of the many thoughts, evaluations, observations and events stored in memory about a product, the consumer is not able to identify exactly what was included in the comment, and therefore may not be able to separate the comment from ‘own’ thoughts. This fusing of memory traces has been found when post-experience advertising presents misleading information (Braun & Loftus 1998).

*Accurate memory for post-event episode.* If the consumer does remember the episode in which a comment was made and the comment, then memory distortion can still occur, but should be reduced. Subjects that recall where the post-event information was seen and details of the misinformation correctly, have been found to be susceptible to memory distortion (Loftus, Feldman, & Dashiell 1995). The effect may be reduced, however, because although subjects that remember the post-event information and its source have been shown to use the post-event information less, the information still interferes with their ability to retrieve the original event accurately (Lindsay 1993). In this case, some of the individuals remembering the comment may assimilate the comment into ‘own’ memory and others may be less accurate due to the interference from the WOM comment. The assimilation will cause systematic distortion, the inaccuracy will cause an increase in variation, but not necessarily in agreement with the WOM comment. See the table below for clarification.

<table>
<thead>
<tr>
<th>Explicit memory for the episode/source</th>
<th>No Memory</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit memory for the comment</td>
<td>No Memory</td>
<td>No explicit memory</td>
</tr>
<tr>
<td>Memory</td>
<td>Memory</td>
<td>Source confusion</td>
</tr>
</tbody>
</table>

**PURCHASE INTENTION**

When will altered memories affect future behaviour? Braun (1999) found that exposure to positive post-experience information about a target brand resulted in more subjects choosing the target brand in a forced choice task. It is expected here that regardless of the basis of the memory for the experience, the initial evaluation of a consumption experience will be a
significant factor in the decision to purchase. However, memory for the evaluation will mediate the effect.

The focus of a great deal of attitude research has been on identifying moderating variables in the relationship between attitude and behavioural intention (for a review see Ajzen 2000). In a memory-based choice setting, an important determinant of the attitude-purchase intention correlation is the how confident the consumer is in their memory for their evaluation. It has been shown that memories retrieved with more confidence are more likely to be used in choice (Cowley 2002). Therefore, it is expected that the evaluation-purchase intent correlation will be higher for those consumers indicating more confidence in a retrieved memory.

**H2:** The memory for evaluation will mediate the relationship between the initial evaluation and purchase intention.

**H3:** More confident consumers will be more likely to use the evaluation in purchase decisions.

Finally, the effect of explicit memory for the source and details of the comment on the amount of memory distortion is treated as somewhat exploratory here. It is expected that memory distortion will occur regardless of explicit memory for the comment, and that less distortion is expected when both the source and the details are explicitly remembered. More specific research hypotheses may be premature as research regarding memory for the misinformation itself and its affect on memory distortion is scarce, and investigates the occurrence of distortion, not the degree of distortion.

**METHOD**

**Subjects**
One hundred twenty six participants received course credit in an undergraduate marketing course in exchange for their participation in this study. The study was ostensibly investigating how people use their impressions of a film to decide whether they would pay to attend a sequel.
Timing of the exposure to the comment

Consumers sharing a consumption setting may hear the comments of other unknown consumers during or immediately after they form their own evaluation. For instance, as consumers leave a cinema, they may hear other consumers discussing whether they enjoyed a film and why. Consumers may also be exposed to WOM sometime after the experience. For instance, a few days after seeing the film, a consumer overhears a work colleague talking about the film. Previous research shows that the misinformation effect is stronger in the delay condition (Loftus, Miller, & Burns 1978). However, the results are based on memory for a fact, not memory for a self-generated evaluation. To investigate whether the delay effects will be similar with memory for an evaluation, two WOM conditions are included in the design: immediate and delay. Subjects were randomly assigned to one of two word-of-mouth conditions immediate (n=39), delay (n=46) or to a control condition (n=41).

Procedure

Participants gathered in a room with 4-6 other students and a confederate. The first task was to view a 10-minute excerpt of a film called *Rosencrantz and Guildenstern are Dead*. Just after starting the video the administrator asked if the sound level was alright. After the excerpt participants were asked to fill in a number of scales describing the attributes of a film\(^1\), and also to indicate their overall evaluation of the film by making an X on a 100mm scale anchored with ‘liked the film very much’ to ‘disliked the film very much’. After all participants were finished filling in the scales and the paper had been collected, the confederate made a comment to the study administrator. In the immediate condition, the confederate said “I thought the game of questions was really clever. I liked that film a lot.” (A game called ‘questions’ was played between the two lead characters in the film excerpt.) In the delayed and control conditions the confederate said “By the way, sound level was just right”. Participants then responded to a number of questions related to cinema attendance and video and DVD rentals, their preferences in films, and then in a filler task. Fifteen minutes after the evaluation of the film had been made the participants were told they would be answering more questions about the film and attending a sequel. At that point the

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\(^1\) Participants rated the film on how much the film had of each of four attributes; character development, dialogue (verbal comedy), physical comedy, and the storyline. The scales were 100mm continuous scales anchored with ‘no (character development/ verbal comedy/physical comedy/coherent story line)’ to ‘lots of (character development/ verbal comedy/physical comedy/ coherence in the story line)’.
confederate made another comment. In the delayed condition, the confederate said “I thought the game of questions was really clever. I liked that film a lot.” In the immediate and control conditions the confederate said “Did they make a sequel?”.  

The first question in the next section required participants recall how much they said they liked the film earlier in the first study session. The same scale used earlier was provided. The second question asked for an indication of how sure they were about their response to the first question. Confidence was conveyed by placing an X on a 100mm scale anchored with ‘not very sure’ and ‘very sure’. The third question asked for a list of any comments that were made by their colleagues during the session.

Participants were then asked to answer eight recognition questions. They read comments that could possibly have been made during the session and answered ‘yes’ if they had heard the comment and ‘no’ if they had not. If they answered ‘yes’ they were asked to describe the nature of the memory as ‘remember’, ‘know’ or ‘guess’. The instructions were adapted from Tulving’s (1985) instructions. The statements included the target WOM comment, the filler comments and five foil statements. Three versions were used to counterbalance the order of presentation of the comments.

Finally, subjects completed four behavioural intention scales asking how likely they would be to: 1] suggest that a group of friends see a sequel of the movie at the cinema if the ticket price was $14.00 (per person), 2] go along with a group of friends to see the sequel at the cinema if the ticket price was $14.00, 3] suggest to a friend that the friend rent the sequel as a new release video for $7.00 (if the friend had not seen it at the cinema), and 4] have a friend agree to jointly rent the sequel as a new release video for $7.00 (if the friend had not seen it at the cinema). Responses to these questions were collected on 10-point scales anchored with "not at all likely" (1) to "very likely" (10). A debriefing, question period, and thank you followed.

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2 The intention to behavior measure used here was similar to a measure recently demonstrated to predict behavior (Chandrashekaran, McNeilly, Russ, & Marinova 2000). The scales were pre-tested twice to ensure that the first two situations were perceived as financially risky and the first and third situations were perceived as socially risky. The first pre-test required 40 undergraduate students to rate the scenarios indicating the level of social risk on an 11-point scale anchored with ‘not at all risky’ and ‘very risky’, and the level of financial risk on the same type of scale. The amount of money spent in each situation was altered on the second pre-test. A
RESULTS

Memory for the overall evaluation of the film

Hypothesis 1 states that consumers exposed to positive consumption-related WOM will remember their evaluation of the consumption event more positively than consumers not exposed to the WOM (in the control condition). Before exposure to the WOM comment, the initial rating of the film excerpt was 45.76mm on a 100mm continuous scale in the control condition and 46.67mm in the positive film-related WOM conditions ($M_{immediate} = 43.41mm$, $M_{delayed} = 49.44mm$). Participants in the control condition remembered the initial rating of the film to be 44.10mm which not different than the initial rating ($t = 0.33, p = .74$). Participants in the immediate condition remembered the initial rating of the film to be 54.59mm, which is significantly different than the initial evaluation ($t = 2.52, p < .01$) and significantly more positive than the memory for the evaluation in the control condition ($t = 4.41, p < .0001$). Participants in the delayed condition remembered the initial rating of the film to be 57.20mm which is significantly different than the initial evaluation ($t = 2.03, p < .05$) and is significantly more positive than the memory for the evaluation in the control condition ($t = 3.48, p < .001$). There is no difference in the amount of memory change between the immediate and delayed conditions ($M_{immediate} = +11.18$, $M_{delayed} = +7.76$, $t = 1.20$, $p = .24$).

Memory for the comment as a moderator of the WOM effect

Fifty three percent of the subjects in the WOM conditions recalled the episode in which they heard a positive movie-related WOM comment, while 72% recognised the statement made by the confederate. Subjects were split into four groups based on their ability to recall hearing the comment and their ability to recognise the comment. Recalling the episode was decided by the subjects’ response to the question asking if they could recall anyone making any comments during the session. If the subject remembered that someone said they liked the movie, they were determined to have recalled the episode. Recall responses were coded by two independent judges. The judges agreed on all but one occasion, the disagreement was resolved by discussion. Recognition category was based on the separate group of 40 undergraduates responded to the same questions. The mean rating on the scales was 5.71 and 5.32 for social and financial risk for scenario one, 3.42 and 5.24 for scenario two, 4.83 and 2.46 for scenario three and 2.53 and 2.30 for scenario four.
accurate recognition of the WOM statement concerning the cleverness of the game of questions.

A GLM including recall and recognition performance was run on the degree of memory alteration. Neither recall nor recognition were significant factors, but the interaction was weakly significant ($F(1, 81) = 3.16, p = .07$). See Table Two for the cell means.

Table 2

<table>
<thead>
<tr>
<th>Recognise comment</th>
<th>Combined</th>
<th>Immediate</th>
<th>Delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recall source</td>
<td>Recall source</td>
<td>Recall source</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>no</td>
<td>+8.81**</td>
<td>+11.63</td>
<td>+12.25**</td>
</tr>
<tr>
<td></td>
<td>(n=16)</td>
<td>(n=8)</td>
<td>(n=4)</td>
</tr>
<tr>
<td>yes</td>
<td>+14.45****</td>
<td>+5.73*</td>
<td>+14.60***</td>
</tr>
<tr>
<td></td>
<td>(n=24)</td>
<td>(n=37)</td>
<td>(n=10)</td>
</tr>
</tbody>
</table>

Note - * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$, and **** indicates $p < .0001$.

The largest group accurately remembered the source and details of the WOM comment, and although the alteration to memory was significantly different than zero overall, it was not in the delayed condition. WOM had a greater effect on memory when the comment was heard immediately after the evaluation was formed. Eight of the 37 subjects in this group remembered the evaluation as more negative (4 in the immediate condition, 4 in the delayed condition). Only 2 other subjects of the remaining 48 in the WOM conditions remembered the evaluation as more negative than their initial evaluation. This suggests that some of the subjects did not assimilate the comment into memory, but nor were they accurately recalling their initial memory. It appears that there is evidence of both assimilation and interference effects in this condition.

The second largest group did not recall that they heard a movie-related WOM comment during the session, but did recognise the comment. This group reported the largest alteration to memory. The effect was stable across the immediate and delayed conditions. This is consistent with past explanations for memory distortions offering a source misattribution explanation (Mitchell & Johnson 2000).
The third largest group did not recall hearing a comment, nor did they recognise the comment. There was a significant effect on memory in both the immediate and delayed conditions. Though the WOM effect was larger in the immediate group, the difference was not significant. The memory for the comment appears to be implicit, however, no measures were included to test this assertion.

The smallest group did recall hearing an evaluative WOM comment, but did not recognise the comment. This pattern separation failure occurred consistently across the two conditions, and although the effect on memory was much greater in the immediate condition, the cell sizes were too small to find any significant effects.

**Purchase intention**

*The role of initial evaluation versus memory for evaluation.* Hypothesis 2 states that the relationship between initial evaluation and purchase intent will be mediated by memory for the evaluation. The four steps outlined in Baron and Kenny (1986) to demonstrate mediation were followed. First, a simple regression on purchase intent with initial evaluation as the independent variable reveals a significant effect for initial evaluation ($t = 8.39, p < .0001$). Second, a simple regression on memory for the evaluation with initial evaluation as the independent variable reveals a significant effect for initial evaluation ($t = 27.95, p < .0001$). Third, a simple regression on purchase intent with memory for evaluation as the independent variable reveals a significant effect for memory ($t = 11.17, p < .0001$). Finally, a multiple regression on purchase intention including both initial evaluation and memory for the evaluation reveals a significant effect for memory ($t = 6.90, p < .0001$) and a non-significant effect for initial evaluation ($t = 0.10, p = .92$). Including memory for the evaluation results in the previously significant effect of initial evaluation becoming insignificant, therefore memory for evaluation completely mediates the relationship between initial evaluation and purchase intention. See Figure 1 for an illustration of the steps to test mediation. There is support for hypothesis 2.

The pattern of results for the mediation test is exactly the same when the social risk and financial risk factors included in the purchase intention scenarios were included in the regression analyses. The parameter estimates are significant and negative for each of the
regression analyses run. As social risk and financial risk increase purchase intention decreases. The significance levels for the effect for social risk were \((t = -5.54, p < .0001), (t = -5.81, p < .0001)\) and \((t = -5.81, p < .0001)\) respectively. The significance levels for the effect for financial risk were \((t = -1.87, p = .06), (t = -1.96, p = .05)\) and \((t = -1.96, p = .05)\) respectively. The mediation by memory for the evaluation appears to be independent of these other two determinants of purchase intent.

The pattern of results for the mediation is also the same when the regressions are run on each condition separately. This is important because it suggests that the role of memory for the evaluation and the role of the initial evaluation in purchase decisions are similar whether memory has been distorted by WOM comments or not.
**DISCUSSION**

The study reported here provides evidence that memory of an affective reaction or an evaluation can be altered after exposure to a WOM comment made by another consumer. After recording an evaluation of an experience, some participants heard an unsolicited positive WOM comment about the experience immediately or 15 minutes after forming the evaluation. When asked to remember their evaluation, consumers exposed to the WOM comment confidently recalled a more favourable evaluation than they had originally reported, and a more favourable evaluation than participants in a control group. This is important because the influence of WOM on an evaluation is generally considered to end after expectation formation and perception of the experience. These results suggest that WOM can affect memory for a consumption experience. Also important is that the comment was unsolicited, and was not made by a friend, or trusted other, but by an unknown ‘other student in the class’.

There was no difference in the degree of memory distortion for the participants in the immediate and delay conditions. This is interesting because in a related study, Loftus, Miller, and Burns (1978), tested whether misinformation provided to subjects immediately after the experience, or immediately before retrieval of the information were more affected by the misinformation. They found that a longer delay between the event and the misinformation resulted in poorer memory for the event, and the inclusion of the misinformation. There were two differences between the studies, first, in the Loftus et al. study, the memory that was

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3 As has been found in past research, memory accuracy and retrieval confidence are not correlated (Bothwell; Deffenbacher, & Brigham 1987; Cutler & Penrod 1995). The correlation between memory for the evaluation and confidence in memory is not significant in the control ($r = .07, p = .77$), the immediate ($r = -.04, p = .78$), or in the delayed conditions ($r = .20, p = .17$).
altered by post-experience information was memory for an object, a fact seen earlier. In this case, the memory altered was for a subjective judgement. Second, Loftus et al. waited a week before they asked subjects to retrieval the memory, only 15 minutes lapsed before memory was tested here. It is possible that memory distortion reported here would be even greater if the delay between the event and the exposure to the WOM comment was increased. This should be considered in future research as consumers often relate consumption experiences long after the event.

The results for the moderating role of memory for the WOM comment itself are important. In the eyewitness testimony literature the memory for the source of the misinformation and memory for the details of the information are rarely measured. An exception is a study discussed in Loftus, Feldman, and Dashiell (1995) where subjects are asked where they saw the misinformation. Of those that incorrectly included the post-experience information as original event information, 30% correctly remembered the information in the narrative only, but apparently did not remember that it was different than the information in the original event. Forty four percent of the participants recalled hearing a comment and correctly recognised exactly what was said, and as Loftus et al. (1995) found, the post-experience information still affected memory. Future research could include a measure asking the subjects if they believe the comment was consistent with their own thoughts.

Almost half of the participants in the WOM conditions did not explicitly recall that a comment about the movie had been made, yet their memory was still distorted after exposure to the comment. Even when cued with the statement, 19% of the participants did not remember the comment, yet memory distortion still occurred. There is preliminary evidence that source confusion and pattern separation failures explain much of the memory distortion found in this study, however memory distortion still occurred in the no recall, no recognition situation. This may be a result of fluency effects, but further research is necessary to test this explanation.

Consumers that were more confident in their memory, yet no more accurate, reported a higher evaluation-behavioural intention correlation. The importance of retrieval confidence has received relatively little attention. These results provide further evidence that retrieval
confidence should be added to the list of variables affecting the attitude-behavioural intent relationship.

Finally, memory for an evaluation mediates the relationship of initial evaluation and purchase intent. To best predict whether a consumer is intending to repurchase, the evaluation at the time of the experience is important, but memory for the evaluation is a better predictor of purchase intent.
REFERENCES


