MEMORY, 1999, 7 (3), 293–308

The Credibility of a Source Influences the Rate of Unconscious Plagiarism

Martin L. Bink, Richard L. Marsh, Jason L. Hicks, and Jesse D. Howard

University of Georgia, USA

Three experiments were conducted to investigate the relationship between the credibility of information and later unconscious plagiarism of that information. In each experiment, ideas concerning ways to reduce traffic accidents were presented from a more credible source (traffic planners) and a less credible source (college freshmen). After a distractor task, participants were asked to generate novel ways to reduce traffic accidents. In Experiments 1 and 2, unconscious plagiarism of ideas presented from the more credible source was greater than from the less credible source. In neither experiment was explicit memory for ideas from each source different in tests of source monitoring or free recall. However, the difference in unconscious plagiarism was eliminated in Experiment 3 by having participants generate the implications of ideas at study. The results are discussed in terms of the explicit factors that affect the incidence of unconscious plagiarism.

INTRODUCTION

When people generate novel products, they often believe incorrectly that their creation is truly novel despite the fact that it can be shown objectively that it is not (e.g. Marsh, Ward, & Landau, in press; Ward, 1994). Unconscious plagiarism tends to occur in generative tasks that require participants to devise novel products. Our working definition is that the incorporation of information in a generative cognitive task, despite explicit admonitions against doing so, constitutes a form of unconscious plagiarism, or *cryptomnesia* (Brown & Murphy, 1989). In general, paradigms of unconscious plagiarism introduce material to participants in an original encoding session. That material can be presented either in the form of experimenter-provided examples or as material that emanates from fellow research participants. After admonition instructions are delivered to avoid using the original material, participants are asked to engage in a generative task related to (or identical to) the encoding task that required them to be cognitively creative. During this second, generation phase

Requests for reprints should be sent to Richard L. Marsh, Department of Psychology, University of Georgia, Athens, GA 30602-3013, USA. Email: marsh@meme.psy.uga.edu

unconscious plagiarism can occur by repeating forbidden words in puzzle tasks (e.g. Marsh & Bower, 1993) or in category generation (Brown & Murphy, 1989), by using only parts of words (Marsh et al., in press), by repeating entire idea units in brainstorming sessions (Marsh, Landau, & Hicks, 1997), or by incorporating old features from examples into ''novel'' space creatures being designed in a creative drawing task (Marsh, Landau, & Hicks, 1996; Smith, Ward, & Schumacher, 1993).

One of the curious and interesting features concerning the phenomenon of unconscious plagiarism is that it appears to be influenced both by explicit memory processes and by more implicit mechanisms. For example, Marsh and Bower (1993) demonstrated that manipulating standard learning variables such as depth of processing or retention interval will affect the incidence of plagiarism (see also Brown & Halliday, 1991). Deeper processing at encoding reduced plagiarism and longer retention intervals increased it. In contrast to these explicit influences, there are also implicit ones. Marsh and Landau (1995) had participants alternate with a computer partner playing the word game *Boggle* during original encoding. When participants were asked to regenerate their own solutions or to provide brand new solutions they often claimed that their partner's solutions were their own novel solutions. Marsh and Landau introduced a lexical decision measure of activation in between initial generation (i.e. encoding) and the generation phase in which the plagiarism occurred. They found that items that were plagiarised were more available (i.e. faster lexical decisions) prior to their plagiarism. They argued that the effect was an implicit influence on unconscious plagiarism with the more available items being more readily plagiarised.

The paradigms that have been used to study unconscious plagiarism and this theory that information is plagiarised because it is readily available fit nicely with Jacoby's (1991) work on the process dissociation procedure. In that procedure, an exclusion condition is tested in which, say, participants are asked to respond ''yes'' if an item was heard at encoding and ''no'' if an item was seen or is a truly new item. Thus, participants are to exclude seen items. To the extent that seen items receive a ''yes'' response, they have not been truly excluded by means of recollection and have passed the criterion by means of familiarity or availability. Likewise, when participants unconsciously plagiarise information they are failing to exclude that information (as in Jacoby's procedure) and are accepting it as a consequence of familiarity.

Therefore, on the whole, the data and theory suggest that the incidence of unconscious plagiarism is a complex function of both conscious and unconscious memorial processes. More recently, we have claimed that unconscious plagiarism constitutes a source-monitoring error (Marsh et al., 1997; see also Johnson, Hashtroudi, & Lindsay, 1993). We brought participants into the laboratory in small groups and had them brainstorm ways to improve the university and ways to reduce traffic accidents. After a one-week delay, we

brought them back and asked them to generate four new ways to address each problem. Participants were specifically admonished to avoid repeating what had been generated in the previous session. After the generation of ''novel'' ideas during the second session we gave them source-monitoring tests in which they had to specify whether they had offered the idea last week, one of their peers had done so, or the idea was brand new. Interestingly, despite plagiarising approximately 21% of their new ideas during the idea generation phase in the second week, their source monitoring was incredibly accurate, with the self-appropriation of ideas on the source-monitoring test ranging only from 0.5% to 5–6% depending on the specific conditions tested. Thus, unconscious plagiarism can occur during idea generation because people fail to use all of the information that they have in memory about an item (i.e. source information) to avoid the error.

Our goal in this article was to explore whether the credibility of a particular source would affect subsequent unconscious plagiarism of information from that source. A number of findings suggest that credibility should affect plagiarism. For example, according to the tenets of the source-monitoring framework, qualitative characteristics are stored at encoding such as the amount of perceptual detail, affective information, and cognitive operations that come from organising and elaborating at study (cf. Bower, 1967). These characteristics are weighed when making source judgements and they serve as important diagnostic evidence concerning the origin of memory traces. The evidence from the social psychological literature suggests that people tend to elaborate on or spontaneously generate implications to ideas that come from more credible sources as opposed to less credible sources (Heesacker, Petty, & Cacioppo, 1983; Petty & Cacioppo, 1986). From this theoretical perspective, ideas from more credible sources might be better remembered because they have additional or more detailed characteristics encoded, and consequently they may be unconsciously plagiarised less often (as in Marsh & Bower, 1993). On the other hand, when people work with ideas similar to generating implications the consequences are not always to affect explicit memory, and sometimes such manipulations only have indirect or implicit effects in judgements such as how long ideas have been a part of one's knowledge repertoire (e.g. Landau, Marsh, & Parsons, 1998; Wicklund, 1988; Wicklund, Reuter, & Schiffman, 1988). Therefore, whether credibility of source would affect plagiarism of that source is not entirely clear, nor is the directionality of any influence to either increase or decrease plagiarism easily specified.

In the cognitive literature the credibility of different sources of information has not been studied that extensively. However, we do know that more credible sources of information are weighted more heavily in certain judgement and decision-making situations (e.g. Birnbaum, Wong, & Wong, 1976). Results such as these suggest that the credibility of a source can amplify the weight assigned to the information, at least in a judgement task. The implication of such results is

that the credibility of sources may affect what qualitative characteristics are encoded, or the credibility may affect what weight information is given in paradigms of unconscious plagiarism. Therefore, sources of information that differ in credibility may affect *whether* an item or set of items is encoded, or it may affect the *manner* in which those items are encoded by changes in the types and amounts of qualitative characteristics. We have designed three experiments that were intended to discriminate among and resolve some of these issues, admitting that not every issue can be laid to rest neatly in just one article.

The general paradigm for the three experiments was our brainstorming task in which participants were given eight ideas each from a more credible source and a less credible source on ways to reduce traffic accidents. The ideas from the credible source were portrayed as having been generated by a panel of traffic planners (experts) and those from the less credible source were portrayed as having been generated by college freshmen (novices). After a delay and admonition instructions to avoid using those ideas, participants in Experiment 1 generated four new ideas and took a source-monitoring test for the ideas that they had learned earlier. A control condition was also used in which idea were learned from two sources that did not differ in credibility (two colour names). This design provided both implicit measures of unconscious plagiarism and an explicit test of source information. This design was replicated in Experiment 2 in which a second condition was tested where participants free recalled all of the ideas rather than generated new ideas, in order to obtain a second measure of explicit memory for what had been learned at encoding. In Experiment 3, we explicitly had all participants generate implications at encoding when learning the 16 ideas, in order to test one theoretical account of the differences found in Experiments 1 and 2.

EXPERIMENT 1

The purpose in conducting Experiment 1 was to determine whether sources that vary in their credibility are unconsciously plagiarised to differing degrees. Theoretically, the results could go either way. If the consequence of learning ideas from a more credible source is to make those ideas more salient or better learned, then Marsh and Bower's (1993) results suggest that the more credible source should be plagiarised less often. This outcome would also necessarily exhibit itself on an explicit memory test such as the source monitoring test used in this experiment (or the free recall test used in Experiment 2). On the other hand, the implicit components of unconscious plagiarism might suggest that no explicit differences in memory would be present. By this notion, the credibility difference associated with information might change how available that information is in memory. These availability differences might be a consequence of the different characteristics associated with each source (see Brown & Murphy, 1989, for a similar hypothesis). Such a theory might predict

that a more credible source would be plagiarised more often rather than less often, if additional qualitative characteristics are associated with the more credible source thereby making the source more available. Of course, the uninteresting outcome would be that neither theory is correct, in which case the credibility of sources would not affect unconscious plagiarism. We turn now to specifying the procedural details.

Method

Participants. A total of 84 University of Georgia undergraduates volunteered in exchange for partial credit towards a research requirement. Of these, 41 served in the experimental condition in which ideas were attributed as having been generated by traffic planners or by college freshmen. The remaining 43 participants were tested in a control condition where the ideas came from the purple or the brown groups, which were not intended to differ in credibility. Testing occurred in small groups of 5 to 10 people.

Materials. Two lists of possible solutions were constructed to address the problem *How can the number of traffic accidents be reduced?* (see Marsh et al., 1997). A total of 30 ideas were selected from participants' responses in that earlier study. These 30 ideas were rated on a 7-point Likert scale for their overall quality by 177 participants as a distractor task in unrelated memory experiments conducted in our laboratory. On the basis of these average quality ratings, the ideas were ranked from best to worst. The seven best and the seven worst ideas were discarded, leaving sixteen medium-quality ideas that were used in this study. The sixteen ideas were evenly assigned to the two lists such that the mean ranks of each list did not differ from one another. Therefore, the quality of each list was equivalent.

Each of the lists was transferred to overhead projector slides to serve as the stimuli in the experimental condition. The eight ideas printed on each slide were on separate lines in 16-point Times-Roman font. The header of each slide restated the problem (i.e. reducing traffic accidents) as well as providing the ostensible origin of the ideas. A given list of eight ideas served equally often as having been generated by traffic planners (i.e. the credible source) and by college freshmen (the less credible source). This counterbalancing required different slides with the same ideas being labelled either as generated by traffic planners or by college freshmen. Similar counterbalancing measures were taken in the control condition where the origin of the ideas were simply labelled as having been generated by the brown or the purple group.

Procedure. As a cover story, participants in the experimental condition were told that the researchers in our laboratory had asked traffic planners and college freshmen to generate solutions to the problem of how to reduce traffic

accidents. They were further told that their task would be to rate the effectiveness of each idea that had been collected. The participants were instructed that they would be shown each idea for 10 seconds, during which time they would rate the idea on a 7-point Likert scale with anchors at *not effective* (1) and *very effective* (7). Responses were recorded in booklets prepared for this encoding activity. Before the ideas were presented, the experimenter revealed the header of each slide and reminded participants about the origin of the ideas on the particular slide. Each idea on the list was presented individually using a mask and was read aloud by the experimenter. Timing was recorded by a hand-held stopwatch.

Because participants saw ideas from both the traffic planners and college freshman (or from the purple and brown groups) the order of presentation of the two lists was counterbalanced as first or second and, as described earlier, each of the two lists of ideas had the origin of traffic planners or college freshmen (or brown and purple) approximately equally often. For the control condition, no cover story was given. The participants were merely instructed that they would rate the effectiveness of ideas and that the ideas presented came from two groups of people that we had arbitrarily designated as the purple and the brown groups.

After this encoding task was completed, participants were given 12 minutes to complete the Remote Associates Test as a distractor activity. In the generation phase of the experiment that followed immediately after the distractor task, participants were asked to generate on paper four new solutions to the problem of reducing traffic accidents. They were strongly admonished not to use any information previously presented in the effectiveness rating task performed at encoding (specific admonition instructions can be found in Marsh et al., 1997). The four new ideas were recorded in booklets that had four numbered entries in which participants could write their new ideas. After everyone in the group had finished generating four new ideas on how to reduce traffic accidents, a three-alternative source-monitoring test was administered. The test contained each of the traffic planners' and college freshmen's ideas from the encoding task plus eight new ideas that had not been used at encoding. Therefore there were 16 old ideas and 8 new ideas randomly intermingled on the source test. Participants were instructed to circle the source of each idea as having come from traffic planners, college freshmen, or new.

Results and Discussion

Unless specified otherwise by a P value, statistical tests are significant at the conventional 5% alpha error level throughout this article. During the encoding task, participants rated the effectiveness of the ideas. The average effectiveness rating when ideas were presented as having been generated by traffic planners was 4.98 and for college freshmen it was 4.81. These two averages do not differ from one another, $t(40) = 1.26$, n.s. This result suggests that

participants did not view the average quality of the ideas generated by traffic planners as being objectively better than those generated by college freshmen. This result was almost preordained because we selected items for the two lists based on nearly identical quality ratings given by a large sample of other participants. Nevertheless, the ideas from traffic planners could have been viewed as subjectively better at encoding simply because they were associated with the more credible source. However, they were not. In the control condition, the brown group had an average effectiveness rating of 4.60 and the purple group had an average of 4.48, and these averages did not differ either, $t(42) < 1.0$, n.s. We did not expect differences in this condition and found none.

During the generation task, each participant was required to generate four new ideas on ways to reduce traffic accidents. These ideas were scored independently by two raters for unconscious plagiarism of the 16 ideas presented during encoding. As we found in the Marsh et al. (1997) study, these plagiarisms could be identified with little ambiguity and differences were resolved in conference with the two raters and the first author. Despite our admonitions to avoid the ideas presented earlier, 15% (*SEM* = 3%) of the participants' novel ideas were unconsciously plagiarised when they were associated with traffic planners. By contrast, 8% (*SEM* = 2%) of the participants' novel ideas were plagiarised from the college freshmen. When these two means are added together, the 23% plagiarism rate is very close to that reported earlier in the Marsh et al. study. The important point is that participants plagiarised the more credible source more frequently than they plagiarised the less credible source, $t(40) = 2.08$. We will return to this point after the source-monitoring data have been presented.

Unconscious plagiarism in the control condition was slightly less than in the experimental conditions. Brown items were plagiarised at a 5% rate (*SEM* = 2%) whereas purple items were plagiarised at a 4% rate (*SEM* = 2%). These rates do not differ from one another, $t(42) < 1.0$, n.s. Because these rates are more similar to those obtained when ideas were presented from college freshmen, the lower incidence likely shares a theoretical rationale. To the extent that participants plagiarised the less credible source less frequently, they also did not very often plagiarise the ideas that had no associated credibility (i.e. colour names). Thus, these data suggest that brown, purple, and college freshmen ideas all share a similar credibility value. Given that Marsh et al.'s (1997) participants plagiarised approximately 21% of their new ideas, these data suggest that people accord their brainstorming partners in that earlier work with some degree of credibility.

The reason for collecting source data was to obtain an objective measure of participants' explicit memory for the origin of the ideas. Thus, this test served as a solid test of explicit, retrospective memory and it provided a measure of origin information. Participants were quite accurate at identifying

new items 92% (*SEM* = 2%) of the time. They were less accurate at identifying items generated by traffic planners (73%, *SEM* = 3%) than they were at specifying the origin of ideas generated by college freshmen (77%, *SEM* = 3%), but the difference was small and not significant, $t(40) = 1.22$, n.s. The vast majority of the old ideas not correctly identified as to their origin were labelled as having coming from the other old source, with only 2% of each of the ideas from each the old sources being labelled new. Thus, there were no source-monitoring biases found in this experimental condition. Source monitoring was worse in the control condition with the groups labelled simply brown and purple. Once again, new items were correctly identified as such the vast majority of the time at 94% (*SEM* = 1%). Correct attributions to the brown (61.6%, *SEM* = 3%) and purple groups (59.6%, *SEM* = 3%) did not differ from one another, $t(42) < 1.0$, n.s. These data suggest that giving participants the labels college freshmen and traffic planners improved their origin memory, but no explicit biases in either the control or the experimental condition were detected in the source-monitoring data.

On the whole, these data suggest that items from the two sources were rated equivalently in effectiveness at encoding. During the source test, retrospective origin judgements were also equally accurate for the two sources. However, during idea generation participants unconsciously plagiarised the more credible source more frequently than the less credible source. Therefore, in the paradigm we have used the results suggest that something of a dissociation exists in which retrospective memory does not differ (source performance) whereas implicit memory does differ (unconscious plagiarism). The fact that only 2% of the old ideas were claimed to be new on the source test suggests that participants in the experimental condition had quite a bit of information in memory that could have been used to avoid unconscious plagiarism. This result corroborates Marsh et al.'s (1997) findings where a similar claim was made. Thus, the error of unconsciously plagiarising someone else's idea might result from failing to engage in adequate source-monitoring processes during generative cognitive tasks.

EXPERIMENT 2

The purpose of Experiment 2 was to replicate the findings of Experiment 1 and to test another retrospective memory measure in addition to source performance. Two conditions were tested in Experiment 2. One condition replicated the sequence of introducing the ideas from college freshmen and traffic planners, the generation of four new ideas, and a test of memory for origin information. If unconscious plagiarism of a more credible source is truly greater than a less credible source, this condition should exactly replicate the results of Experiment 1. The second condition replaced the generation of four new ideas with a free recall task. Because source tests have been classified as modified recognition

tests, perhaps differences in retrospective memory for ideas generated by traffic planners versus college freshman would appear in a different retrospective memory task like free recall. Free recall might be a more sensitive test because item *accessibility* is measured in free recall rather than item *availability*, which is measured by tests of recognition (Tulving & Pearlstone, 1966). The use of a free recall task also allows us to perform more fine-grained analyses, such as whether ideas from traffic planners versus college freshmen tumble out of memory in a different order. For example, if ideas from traffic planners are no better recalled than those of college freshmen, then perhaps they are nevertheless output first, which might lend important evidence concerning their accessibility in memory.

Method

Participants. A total of 64 volunteers who had not participated in Experiment 1 were recruited from the same pool. They were awarded course credit towards fulfilling a research requirement.

Materials and Procedure. The materials and procedure were identical to Experiment 1 in the generation condition where four new ideas were collected after the distractor task. After generation of four new ideas, the same source-monitoring test was administered. In the recall condition, the generation task was replaced with a free recall task in which participants were simply asked to recall on a piece of paper all of the ideas that they could remember from the encoding task in which the effectiveness of the 16 ideas were rated. This new condition also had a source-monitoring test follow the free recall test. The control condition from Experiment 1 in which ideas were labelled as coming from brown and purple groups was not tested again.

Results and Discussion

As in Experiment 1, the mean effectiveness rating assigned to ideas from traffic planners (generation 4.76; recall 4.74) did not differ from those assigned to college freshmen in either condition tested (generation 4.64; recall 4.83), $t(33) < 1.0$, and $t(29) < 1.0$ n.s. These null results replicated Experiment 1. The critical data are summarised in Table 1 as the percentage of plagiarisms in the generation condition and the percentage of the ideas recalled in the free recall condition. The plagiarism data wholly replicated Experiment 1 in which participants plagiarised the more credible source of traffic planners more often than they did the less credible source of college freshmen, $t(33) = 2.18$. Moreover, mean levels of plagiarisms were almost identical in the two experiments. To the extent that unconscious plagiarism is an implicit memory error, these data suggest that such errors are sensitive to the credibility of the encoded sources of information. By contrast, the free

TABLE 1
Generation Plagiarism and Free Recall Performance in Experiment 2

	Origin of Ideas	
	TP	*CF*
Generation Plagiarism	15.3 (3.0)	8.7 (2.1)
Free Recall	69.6 (2.4)	69.1 (2.8)

TP = Traffic Planner,
CF = College Freshman.
Standard errors in parentheses.

recall data demonstrate that ideas from each source were learned and recalled equally well, $t(29) < 1.0$, n.s. Together, the plagiarism and the recall data replicated the dissociation between implicit memory and explicit memory performance, respectively.

Source-monitoring performance was assessed after generation of ideas or after free recall. As in Experiment 1, new ideas were identified best, with 91% (*SEM* = 1%) of these items correctly labelled new in the generation condition and 89% (*SEM* = 1%) correctly labelled new in the free recall condition. The mean percentages of ideas correctly assigned to the traffic planners were similar in the two conditions, with 82% (*SEM* = 2%) correctly assigned in the generation condition and 83% (*SEM* = 3%) in the free recall condition. The same was true of correctly labelling ideas ostensibly generated by the college freshmen, with 84% (*SEM* = 2%) and 84% (*SEM* = 2%) assigned in the generation and free recall conditions, respectively. Obviously, none of these means differs significantly from the others no matter how the statistical tests are computed. Therefore, similar to Experiment 1, there was no hint that explicit memory performance differed for the two encoded sources of traffic planners versus college freshmen.

The free recall data were further analysed by assigning a rank output order to each idea recalled. The mean rank for the college freshmen versus traffic planner ideas was computed separately. The metric of output order of ideas could reflect differences in accessibility for the two classes of items if the free recall processes are sensitive to any differences in the two classes of items. Mean output order for the traffic planner ideas was 6.02 (*SEM* = .39) and for the college freshmen it was 6.29 (*SEM* = .42). The average ranks do not differ from one another $t(29) < 1.0$, n.s. Similar to the overall free recall performance, this analysis suggests that there were no detectable differences in explicit memory for the two classes of items.

EXPERIMENT 3

The results of Experiments 1 and 2 converge on the notion that participants can recall ideas and determine the origin of ideas equally well for two sources that differ in their credibility. Nevertheless, unconscious plagiarism was greater for ideas believed to be generated by the more credible source. The effect is not numerically large, but it is consistent across the two experiments and therefore seems to be a reliable effect. This difference in magnitudes of unconscious plagiarism is also on the order of differences typically found in studies of unconscious plagiarism with similar materials (e.g. Marsh et al., 1997). This effect is not an artifact of the stimuli or the procedures used in either experiment, because ideas attributed to traffic planners were attributed to college freshmen and vice versa as a counterbalancing measure. Nor was there an ordering effect, because ideas from traffic planners were presented first and second as another counterbalancing measure. Therefore, the effect must have some other theoretical mechanism.

As mentioned in the introduction, one possibility is that people tend to process information from a more credible source in a slightly different manner than they process information from a less credible source. In particular, people tend to think more deeply about credible ideas and they are believed to think about the implications of such ideas (Heesacker et al., 1983). If this is true, then we might have expected to see that the ideas from the traffic planners were better remembered by free recall or source-monitoring metrics of memory. They were not. Quite possibly, the consequences of manipulating credibility do not affect the qualitative characteristics stored at encoding sufficiently to produce differences in explicit memory. However, we assume that as ideas are being generated as candidates during the generation phase in our paradigm, these ideas are subjected to some editing process that determines whether the idea under consideration is new or has been given previously. The assumed process is entirely analogous to the editing process that has long been assumed in generate-and-edit models of free recall (Zechmeister & Nyberg, 1982). Perhaps it is at this stage that differences in qualitative characteristics, or feelings of oldness or newness, account for differences in the rates of unconscious plagiarism.

If the manner in which ideas are encoded is slightly different for ideas attributed to traffic planners versus college freshmen, then a manipulation designed to equate how items are encoded could equate levels of unconscious plagiarism. More specifically, if Petty and Cacioppo (1986) are correct that people spontaneously think about the implications of more credible ideas, then having participants generate an implication for each idea associated with both sources might equate unconscious plagiarism from the two sources. The strength of a theoretical argument is often bolstered by testing conditions that should in principled fashion eliminate the reliable differences that the theory attempts to explain (in this case, differences in unconscious plagiarism as a function of

credibility in Experiments 1 and 2). Thus, our goal in conducting Experiment 3 was to ascertain whether implication generation during encoding would eliminate the differences in rates of unconscious plagiarism from the two sources of traffic planners versus college freshmen.

Method

A total of 38 undergraduates from the University of Georgia volunteered in exchange for partial credit towards a course requirement. The procedures were nearly identical to the experimental condition of Experiment 1 in which ideas were studied, a distractor task ensued, the generation was required of four novel ideas concerning how traffic accidents could be reduced, and a final source-monitoring test was administered. The only difference was that participants were provided with lined sheets at encoding. Rather than provide effectiveness ratings of the ideas, they were required to generate and to record one implication of actually implementing the idea. No examples were provided to participants, but by way of example here, an implication of the idea ''mandatory driving tests each year'' would be ''the size of the motor vehicles department would grow in order to do all of the testing''. As another example, an implication of ''increase the number of traffic lights'' would be ''it would take longer to get to destinations''. In all other respects with the exception of this encoding manipulation, the procedure was identical to that reported before.

Results and Discussion

The key finding from this experiment was that unconscious plagiarism of ideas associated with traffic planners was comparable to that reported previously (13%, *SEM* = 3%) but this rate did not differ from ideas ostensibly generated by college freshman (11%, *SEM* = 2%), $t(37) < 1.0$, n.s. Therefore, the generation of one implication at encoding equated the rates of unconscious plagiarism that had hitherto been statistically different in both Experiments 1 and 2. This null result is a consequence of increasing the unconscious plagiarism of ideas from the less credible source. Therefore, the manipulation of implication generation did not affect the more credible source. As a consequence, it would appear that these data confirm the notion that people spontaneously generate implications (or otherwise elaborate on information) from more credible sources as opposed to less credible sources.

The generation of implications did not appear to affect explicit memory as measured in the source-monitoring task. New items were correctly identified best at 92% (*SEM* = 1%). Ideas from traffic planners were correctly labelled so 85% (*SEM* = 2%) of the time, whereas ideas from college freshmen were labelled so 84% (*SEM* = 3%) of the time, and these two figures obviously do not differ from one another. Therefore, accurate source-monitoring in this experiment was identical to performance in Experiment 2. We turn now to a

theoretical treatment of the empirical results obtained across the three experiments.

GENERAL DISCUSSION

The empirical results are straightforward. Ideas presented from two sources that varied in their credibility were not viewed as different in effectiveness during encoding (Experiments 1 and 2). Explicit memory measures such as recall or judgements of origin also did not differ for the two sources in any of the three experiments. However, unconscious plagiarism of previously encountered ideas did occur when participants attempted to generate four new ideas on how to reduce traffic accidents. Although not numerically large, participants consistently tended to plagiarise the more credible source of traffic planners more frequently than they plagiarised the less credible source (Experiments 1 and 2). Importantly, the overall levels of plagiarism obtained in these experiments were comparable to similar idea-generation experiments conducted before (Marsh et al., 1997).

To explain the difference in unconscious plagiarism, we have adopted one view taken by the proponents of the source-monitoring framework. That view is that memory traces consist of qualitative characteristics of the encoding experience, such as the cognitive operations from elaborating or organising, the perceptual details of the experience, or the semantic and affective details associated with the experience (to name several of many such characteristics). On the basis of the presence and quality of these characteristics, they can be used to make judgements about the origins of memory traces. In general, source judgements are rendered by an attributional process of assessing the quality and details in a memory, and inferring its most likely origin (Johnson et al., 1993). We would like to argue that a similar attribution is made during generative cognitive tasks in determining whether an idea is truly novel and therefore whether it should be offered as one's novel contribution.

We assume that in the process of generating candidate ideas some ideas will be remembered as having been experienced during the learning phase, and they can be rejected as old in accordance with our admonition instructions to avoid old ideas. The basis for this editing and withholding of old ideas is likely to be attributable to conscious recollection for some percentage of the candidate ideas considered. However, as Marsh et al. (1997) have argued, unconscious plagiarism can arise as a consequence of failing to consult all of the memorial details that are available and that are associated with items considered during generative cognitive tasks. Their argument was that the generative task itself of devising novel ideas was sufficiently taxing that it acted as a sort of natural divided attention manipulation which deflected cognitive processing away from inspection of items in a complete, detailed fashion. In these cases, perhaps more heuristic cognitive processing is applied in deciding whether an item is new or old, and consequently, whether it is to be offered as one's novel contribution.

The basis for such an heuristic editing process may be attributional in nature, with the attributions based on, say, an item's availability in memory. For example, Johnson et al. (1993) have claimed that unconscious plagiarism errors can arise because the heightened availability of past experience is not recognised as such and the availability is attributed to the spontaneity of having generated something novel. The plagiarism data reported in Experiments 1–3 are consistent with this notion and also enable further elaboration of Johnson et al.'s position. We have argued that one consequence of considering more credible information is that people might spontaneously think about the implications of such ideas (cf. Petty & Cacioppo, 1986). When we had participants explicitly generate implications of ideas from a less credible source, their plagiarism was equated with the more credible source. The implication generation might be equivalent to recording some extra cognitive operations during encoding. Because cognitive operations have been shown to revive more quickly than, say, perceptual details in a response deadline procedure (Johnson, Kounios, & Reeder, 1994), perhaps ideas associated with the more credible source revive slightly more quickly on average because of the extra cognitive operations that are associated with them. This somewhat greater availability (i.e. faster revival rate) for this class of items might be mistaken in the editing process of generative cognitive tasks not for a feeling of oldness, but rather, as Johnson et al. (1993) have claimed, for a feeling of spontaneity of having truly generated something novel.

The heightened availability of items as a theoretical explanation for the occurrence of unconscious plagiarism is not new. In their seminal work on cryptomnesia, Brown and Murphy (1989) argued that differences in residual activation could make some items more available to be plagiarised. This implicit memory argument was tested by Marsh and Landau (1995), who found that prior to plagiarism, later plagiarised items were more available in a lexical decision task (i.e. quicker latencies). All we have done here is to modify the notion that availability must necessarily reflect activation, *per se*, and argued that it could be operationalised as a quicker revival rate upon re-encountering an item or an idea (see also the general discussion section of Marsh, Hicks, & Bink, 1998 for a similar argument). If implication generation is a natural consequence of processing more credible information (Heesacker et al., 1983; Petty & Cacioppo, 1986), then perhaps the consequence is to store some extra cognitive operations at encoding which have been shown to revive slightly more quickly at test. The storing of these extra characteristics need not affect more explicit memory measures such as free recall or laboratory-based tests of source monitoring that might not depend on how long a memory takes to fully revive.

Our theory of the differences found in Experiments 1 and 2 is localised to the differences in memory traces that occur as a function of encoding differences. However, other alternative explanations of these effects do exist. For example,

asking participants to generate ideas to reduce traffic accidents may explicitly cue them about traffic issues. Perhaps the task being directly related to traffic accidents makes participants reflect more on the ideas generated by traffic planners. This self-cueing during generation may reflect a conscious strategy as just described, or it may be less conscious if the topic of traffic merely brings to mind the ideas that came from the traffic planners. This retrieval account, however, is somewhat difficult to reconcile with the results of Experiment 3 in which plagiarism was equated with an encoding manipulation. Nevertheless, we are certainly not dismissing such retrieval accounts entirely and do wish to acknowledge that alternative explanations of the data do exist.[1]

Therefore, we fully acknowledge that aspects of our theory have yet to receive rigorous empirical scrutiny. However, the explanation that we have put forth is entirely consistent with the empirical results and the theorising that have been reported for both the literature on source monitoring and the literature that has been published on unconscious plagiarism. Errors of unconscious plagiarism are important memory errors, and the mechanisms by which unconscious plagiarism occurs may be the same mechanisms by which patients in psychotherapy reach insights, consumers come to believe advertising claims, or people come to hold certain political beliefs. The data from Experiments 1 and 2 suggest that people process information from more credible and less credible sources somewhat differently. That processing was shown to lead to differences in unconscious plagiarism, with people inadvertently appropriating the ideas from credible sources more often than less credible sources. Although it is undeniable that unconscious plagiarism errors are source errors, and variables that affect source monitoring are likely to affect plagiarism, the dissociations found in Experiments 1 and 2 suggest that variables can affect the rate of plagiarism without affecting laboratory-based source-monitoring performance.

Manuscript received 26 June 1998
Manuscript accepted 21 October 1998

REFERENCES

Birnbaum, M.H., Wong, R., & Wong, L.K. (1976). Combining information from sources that vary in credibility. *Memory & Cognition*, *4*, 330–336.

Bower, G.H. (1967). A multi-component theory of the memory trace. In K.W. Spence & J.T. Spence (Eds.), *The Psychology or learning and motivation*, Vol. 1. (pp.229–325). New York: Academic Press.

Brown, A.S., & Halliday, H.E. (1991). Cryptomnesia and source memory difficulties. *American Journal of Psychology*, *104*(4), 475–490.

[1] We would like to thank Tim Perfect for bringing to our attention the issues raised in this paragraph.

Brown, A.S., & Murphy, D.R. (1989). Cryptomnesia: Delineating inadvertent plagiarism. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *15*(3), 432–442.

Heesacker, M., Petty, R.E., & Cacioppo, J.T. (1983). Field dependence and attitude change: Source credibility can alter persuasion by affecting message-relevant thinking. *Journal of Personality*, *51*, 653–666.

Jacoby, L.L. (1991). A process dissociation framework: Separating automatic and intentional uses of memory. *Journal of Memory and Language*, *30*, 513–541.

Johnson, M.K., Hashtroudi, S., & Lindsay, D.S. (1993). Source monitoring. *Psychological Bulletin*, *114*, 3–28.

Johnson, M.K., Kounios, J., & Reeder, J.A. (1994). Time-course studies of reality monitoring and recognition. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *20*, 1409–1419.

Landau, J.D., Marsh, R.L., & Parsons, T. (1998). *Dissociating metrics of unconscious plagiarism.* Unpublished manuscript.

Marsh, R.L., & Bower, G.H. (1993). Eliciting cryptomnesia: Unconscious plagiarism in a puzzle task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *19*, 673–688.

Marsh, R.L., Hicks, J.L., & Bink, M.L. (1998). The activation of completed, uncompleted, and partially completed intentions. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *24*, 350–361.

Marsh, R.L., & Landau, J.D. (1995). Availability in cryptomnesia: Assessing its role in two paradigms of unconscious plagiarism. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *21*(6), 1568–1582.

Marsh, R.L., Landau, J.D., Hicks, J.L. (1996). How examples may (and may not) constrain creativity. *Memory & Cognition*, *24*, 669–680.

Marsh, R.L., Landau, J.D., & Hicks, J.L. (1997). The contribution of inadequate source monitoring during idea generation to unconscious plagiarism. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *23*, 886–897.

Marsh, R.L., Ward, T.B., & Landau, J.L. (in press). The inadvertent use of prior knowledge in a generative cognitive task. *Memory & Cognition.*

Petty, R.E., & Cacioppo, J.T. (1986). Elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, vol. 19. Orlando, FL: Academic Press.

Smith, S.M., Ward, T.B., & Schumacher, J.S. (1993). Constraining effects of examples in a creative generation task. *Memory & Cognition*, *21*(6), 837–845.

Tulving, E., & Pearlstone, Z. (1966). Availability versus accessibility of information in memory for words. *Journal of Verbal Learning & Verbal Behavior*, *5*, 381–391.

Ward, T.B. (1994). Structured imagination: The role of category structure in exemplar generation. *Cognitive Psychology*, *27*, 1–40.

Wicklund, R.A. (1988). The appropriation of ideas. In P.B. Paulus (Ed.), *Psychology of group influence: New perspectives.* Hillsdale, NJ: Erlbaum.

Wicklund, R.A., Reuter, T., & Schiffman, R. (1988). Acting on ideas: Appropriating to one's self. *Basic and Applied Social Psychology*, *9*, 13–31.

Zechmeister, E.B., & Nyberg, S.E. (1982). *Human memory.* Monterey, CA: Brooks/Cole.