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Social processing improves recall performance

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One recent theory (Dunbar, 2003) has highlighted the importance that processing social information might have had on the evolution of human cognition. Based on an analysis of that theory, researchers predicted that processing information in a social manner would improve recall performance in comparison with nonsocial processing. In order to test this prediction, three experiments were conducted in which participants studied 30-item word lists that were composed of common character traits (Experiment 1) or common category exemplars (Experiments 2 and 3). Next, participants reviewed 5 list items that were purportedly recalled by either a group member or the computer. Finally, after a brief distractor task, participants were asked to complete an individual recall test for all of the items on the original 30-item list. Of primary interest was recall performance for the list items that were purportedly recalled by either another participant or the computer. We observed that recall performance for list items purportedly recalled by another participant was superior to that for items that were recalled by the computer.

A number of recent articles have examined the impact of working with others on participants' memory performance (see, e.g., Basden, Reysen, & Basden, 2002; Betz, Skowronski, & Ostrom, 1996; Bless, Strack, & Walther, 2001; Gabbert, Memon, & Wright, 2006; Hoffman, Granhag, See, & Loftus, 2001; Meade & Roediger, 2002). Some of these studies have found that adding a social context to more traditional memory paradigms can lead to different results than those obtained using methods in which participants are asked to remember information on their own (e.g., Reysen, 2007). The explanations for these results have been as varied as the methods used to obtain them. Adding to the complexity of the issue is that sometimes working with others appears to hurt participants' memory performance (see, e.g., Wright & Klumpp, 2004), and other times, working in a social context has been found to improve performance (e.g., Rajaram & Pereira-Pasarin, 2007). Despite these differences, one overriding conclusion derived from this body of work is that there seems to be something unique about processing information in a social context. The goal of the present experiments was to make an initial attempt to identify some underlying psychological principles that might be responsible for these results.

As the interest in the effects of social influences on memory performance has increased, so has the interest in examining human memory from a functionalist perspective (see, e.g., Nairne, 2005; Sharps, Villegas, Nunes, & Barber, 2002). In one example of this line of inquiry, Nairne, Thompson, and Pandeirada (2007) tested a prediction that processing list items in terms of their survival value might benefit participants more than other well-established deep-processing manipulations. In their experiments, participants were exposed to word lists after listening to different processing instructions. They were asked to rate list items using a 5-point scale on one of several measures, including the following: pleasantness, the item's value for assisting with a move, the ease with which it elicited an autobiographical memory, and its value for survival in a dire situation. Across four experiments examining both recall and recognition performance, Nairne et al. observed a reliable benefit for items processed in terms of survival. Even more remarkably, a recent experiment found that thinking about items in terms of their survival value after processing them appears to retroactively enhance recall performance for the previously studied list items.

Both the Sharps et al. (2002) article—despite some item-selection issues—and the work of Nairne et al. (2007) demonstrated that empirical tests of a priori predictions that are based on a functionalist analysis of human memory are possible, and they can lead to fruitful avenues of investigation. In fact, both studies pointed to the conclusion that thinking about objects in terms of their prospective uses seems to be one of the best deep-processing tasks uncovered to date. The present experiments were designed to expand on both the studies that have examined human memory from a functionalist perspective and the studies that have focused on social influences on memory performance. More specifically, we were interested in analyzing participants' memories for information that was processed in a social manner in comparison with memories for information that was processed in a nonsocial manner. If human cognition evolved—at least in part—in response to environmental pressure to encode, store, and retrieve social information (Dunbar, 2003), then one might predict a mnemonic advantage for information processed in

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a social manner. Thus, the motivation for the present experiments was to test a hypothesis concerning social influences on memory performance on the basis of a particular functionalist interpretation of human memory.

We are aware of one study (Mesoudi, Whiten, & Dunbar, 2006) that examined whether participants' recall of social information is better than that for nonsocial information. In that study, participants were asked to read and subsequently remember three short text passages. One passage was composed of factual information about an individual (e.g., *Nancy is a 22-year-old college student*), another described a person who had become pregnant while having an affair with a married college professor (gossip condition), and a third consisted of factual information about the city of Denver (e.g., *Denver is the capital of Colorado*). After reading the passages, the first group of participants was asked to recall all three text passages. Next, the recall output from the first group was passed on to a second group of participants, and the second group was asked to read and recall what the first group had written. This process was repeated two more times, for a total of four "generations."

The focus of Mesoudi et al.'s (2006) study was less on recall ability than on a possible bias for social concepts in the conveyance of information in human social groups. A propositional analysis determined that participants recalled more propositions from the gossip text than from the other two text passages, regardless of the "generation" analyzed. For the present purposes, perhaps the most important result is that participants who studied only the original texts recalled approximately 9 out of 14 propositions in the gossip condition, about 6 out of 14 propositions in the condition in which they studied factual information about a person, and only about 3 out of 14 propositions in the "Denver" condition. Thus, participants' ability to recall the propositions from the texts appeared to vary as a function of the social nature of the information.

Despite the robust effects observed in Mesoudi et al.'s (2006) study, there are several important limitations to consider. Two of these considerations are that both the order in which the passages were presented and the passages themselves remained constant throughout the duration of the experiment. It is possible that either order effects or subtle effects of the wording of each passage may have led to differential recall rather than the social or nonsocial nature of the passages. For example, if the topic of the third passage had been strictly nonsocial in nature but had consisted of something more inherently interesting than basic factual information about Denver, then that change might have affected participants' recall performance.

EXPERIMENT 1

The primary goal of the present experiments was to examine the effects of social processing on recall without altering the stimuli across conditions. In lieu of manipulating the stimulus materials, participants were led to believe that some of the information that they studied originated from either a social or a nonsocial source. If there is a mnemonic advantage for social information over nonsocial information, then one might expect that differential recall performance could be observed without using different stimuli across conditions. To achieve this result, participants were asked to study 30 list items for an upcoming memory test. Immediately after, participants in Experiments 1 and 2 were asked to remember 5 items from the list. After recalling 5 items, participants were given a chance to see 5 more items from the original 30-item list, which purportedly originated from one of three sources. In one condition, participants were told that the 5 items were recalled by a fellow group member who had been instructed to type the 5 items from the list that best described the group member. In a second condition, participants were told that the 5 items were generated by the computer. Finally, all participants completed a short distractor task that was followed by a final individual recall test for all of the items that had been presented in the original 30-item list.

Method

Participants, Materials, and Procedure. Sixty introductory psychology students from the University of Mississippi participated in return for partial course credit. Participants arrived at the laboratory either alone or in pairs and were seated in front of computer monitors that were situated in individual cubicles so that each participant could only view his or her own monitor. Participants listened to instructions that indicated that they would be studying a number of words in preparation for an upcoming memory test. Participants were told that they would be completing the test with the help of either a group member or the computer. The participants were then prompted to type their initials. Next, 30 common character traits (e.g., *humble*, *social*, *illogical*, *impatient*, *confident*) were presented one at a time at a rate of 5 sec per word in the center of each monitor. Immediately after the presentation of the last item, each participant was asked to type five words from the list. In one condition (social), 2 participants seated in adjacent cubicles were instructed to simultaneously type the 5 trait items from the original 30-item list that best described themselves. In a second condition (nonsocial), a single participant was asked to type the 5 trait items from the list that best described him- or herself.

Participants were instructed to push the return key after each item that they had typed, and the items were displayed in a column in the center of the monitor. After recalling 5 items from the list, the 5 participant-recalled items were replaced with 5 items that were selected randomly from the remaining set of 25 original list items. During this phase of the experiment, participants were provided with an opportunity to study these 5 items in preparation for an upcoming test. The items were displayed in a column in the center of each monitor for 20 sec. Participants in the social condition were led to believe that these five items were those that their group member had typed and had felt best described themself. Participants in the nonsocial condition were led to believe that the items had been generated by the computer. Thus, although all of the participants viewed 5 items that were randomly drawn from the list at this stage of the experiment, the instructions were designed to influence the participants' perceptions of the source of those words (person or computer). Given their significance to the hypothesis examined in this study, these 5 randomly generated list items that all participants viewed after recalling 5 list items themselves will henceforth be referred to as the *critical items*. Finally, the participants completed single-digit addition and subtraction problems for 15 sec and were then prompted to recall as many words from the original list as they could. The final recall test was self-paced. After completing the test, participants were debriefed and received credit for their participation.

Results and Discussion

The mean proportions of items correctly recalled as a function of experimental condition are displayed in Table 1. The goal of Experiment 1 was to test a prediction that was generated by considering a particular functionalist interpretation of human memory based on the social brain hypothesis (Dunbar, 2003). More specifically, we predicted that processing information in a social manner would lead to better recall than would nonsocial processing. The primary test of this hypothesis was whether participants would remember a greater proportion of critical items if they believed that those words originated from a social source rather than a nonsocial source. An independent samples *t* test contrasting the proportion of critical items recalled as a function of instructional condition revealed statistically significant differences between the groups. Participants recalled a greater proportion of critical items in the social condition than in the nonsocial condition [$t(58) = 4.86$, $p < .0001$]. Thus, altering the experimental instructions to encourage either social or nonsocial processing had an effect on participants' recall ability. Comparisons were also conducted in order to seek out potential differences across the conditions in the number of intrusions, the proportion of words that were recalled on the final test that participants themselves had recalled earlier, the proportion of list items other than critical and self-recalled items that were recalled on the final test, and the total number of items that were recalled on the final test. None of these comparisons resulted in statistically significant results (all ps $> .05$). Thus, the only difference observed between the two instructional conditions in Experiment 1 was that for the critical items.

EXPERIMENT 2

The purpose of Experiment 2 was to attempt to replicate the findings that were obtained in Experiment 1 by using different stimulus materials. Given that social processing was found to improve recall performance for social information such as trait items, could the effect be extended to nonsocial information as well? The answer to such a question might have applied implications. If people possess a natural proclivity toward remembering information processed in a social manner, then educators might consider instructional methods that are designed to facilitate social processing.

Method

Participants, Materials, and Procedure. Sixty introductory psychology students from the University of Mississippi participated in return for partial course credit. The materials and procedure for Experiment 2 were the same as those used in Experiment 1, with one exception. Rather than having participants study 30 trait items, the 30-item study list that was used in Experiment 2 was composed of unrelated category exemplars from Van Overschelde, Rawson, and Dunlosky's (2004) norms (e.g., *uncle*, *church*, *diamond*, *magazine*, *beer*). Despite the change in stimulus materials from trait items to category exemplars, participants seemed to have no difficulty choosing items from this new set of materials that described them.

Results and Discussion

The mean proportions of items that were correctly recalled as a function of experimental condition are displayed in Table 1. Experiment 2 was designed to determine whether the results that were observed in Experiment 1 could be replicated using nonsocial stimuli, such as category exemplars. In other words, would processing nonsocial information in a social manner lead to better recall than would nonsocial processing? As in Experiment 1, the primary test of this hypothesis was whether participants would remember more critical items if they believed that those words originated from a social source rather than a nonsocial source. Planned comparisons confirmed that participants recalled a greater proportion of critical items in the social condition than in the nonsocial condition [$t(58) = 3.23$, $p < .01$]. Thus, as in Experiment 1, recall for items that had been processed in a social manner proved to be superior to that for items that had been processed in a nonsocial manner. Further comparisons revealed that participants' overall recall levels were higher in the social condition than in the nonsocial condition [$t(58) = 2.29$, $p < .05$], likely because of the increase in critical item recall in the social condition.

As in Experiment 1, other comparisons were conducted in order to seek out potential differences between the conditions in terms of the number of intrusions, the proportion of words recalled on the final test that participants them-

Table 1
Mean Proportions and Standard Errors of Items Recalled on the Final Recall Test As a Function of Instructional Condition and Item Type in Experiments 1 and 2

	Social				Nonsocial			
	Experiment 1		Experiment 2		Experiment 1		Experiment 2	
Items	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Critical	.61	.16	.65	.25	.37	.22	.44	.26
Self-reference	.75	.18	.92	.13	.81	.17	.89	.13
Other list	.14	.09	.29	.18	.13	.11	.23	.14
Total correct	.32	.07	.46	.15	.28	.09	.38	.12

Note—Critical, five randomly selected list items purportedly recalled by either a group member or the computer; Self-reference, five items recalled by the participants themselves immediately after studying the original list; Other list, those items other than critical items and self-reference items recalled on the final recall test; Total correct, the total proportion of items that were recalled correctly on the final recall test.

selves had recalled earlier, and the proportion of list items other than critical and self-recalled items that were recalled on the final test. As in Experiment 1, none of these analyses resulted in statistically significant results (all $ps > .05$).

EXPERIMENT 3

The results obtained in Experiments 1 and 2 provide empirical support for the hypothesis that social processing can improve recall performance. However, there are at least two alternative explanations for these observations. First, participants in the social conditions always worked in the presence of another participant, whereas participants in the nonsocial conditions always worked without the presence of another participant. Thus, it is possible that social facilitation effects factored into participants' recall performance. In order to explore this possibility, Experiment 3 included a new condition in which two participants listened to the nonsocial processing instructions and completed the experiment in one another's presence. If the presence of another participant improved participants' recall performance in the prior experiments, then participants in this new nonsocial condition would be expected to outperform those who were working alone. Second, in order to eliminate any potential item selection biases, the same 5 critical items were used in all three conditions in Experiment 3. In other words, rather than randomly selecting the critical items from the set of 25 words that the participants did not type themselves, the critical items were held constant across conditions.

Method

Participants, Materials, and Procedure. Ninety introductory psychology students from the University of Mississippi participated in return for partial course credit. The materials and procedure for Experiment 3 were similar to those employed in Experiment 2, with three notable exceptions. First, a third condition (nonsocial paired) was added in which two participants completed the experiment in one another's presence after receiving the nonsocial processing instructions. Second, the same 5 list items were used as critical items in all three conditions. Finally, in order to facilitate the aforementioned change, participants in Experiment 3 were not asked to recall 5 list items prior to both viewing the critical items and attempting to recall all 30 original list items. Instead, the instructions used in Experiments 1 and 2 were altered slightly. In Experiment 3, participants were informed that after studying the original list, they would be asked to either recall the 5 items from the list that best described them or retype some letters. In fact, after studying the original 30-item list, all participants were asked to retype five 8-character letter sequences that were composed of randomly selected letters (e.g., *nvlkjsad*). In other words, although all of the participants were asked to complete the retyping task, participants in the social condition were led to believe that the 5 critical items that they viewed were produced by their group member who had completed the self-description task. Like the 5 critical items, the five 8-character letter sequences remained constant across conditions.

Results and Discussion

The mean proportions of items that were correctly recalled as a function of experimental condition are displayed in Table 2. The goal of Experiment 3 was to eliminate two seemingly unlikely—but conceivable—alternative explanations for the results that were obtained in Experiments 1 and 2. More specifically, Experiment 3 was designed to eliminate both social facilitation effects and item selection biases as explanations for the observed results. A one-way ANOVA contrasting the proportion of critical items recalled as a function of experimental condition revealed statistically significant differences across the groups [$F(2,87) = 8.11, p < .001$]. Planned comparisons confirmed that participants recalled a greater proportion of critical items in the social condition than in both the nonsocial condition [$t(58) = 3.21, p < .005$] and the nonsocial paired condition [$t(58) = 3.74, p < .001$]. Participants' recall performance was statistically equivalent in both the nonsocial and nonsocial paired conditions [$t(58) = 0.21, p > .05$]. Thus, participants tended to recall more critical items when they were processed in a social rather than a nonsocial manner. Importantly, this result was obtained when the critical items were held constant across conditions and when participants in the nonsocial paired condition completed the experiment in the presence of another participant.

One-way ANOVAs were also conducted to seek out potential differences across the three experimental conditions in terms of number of intrusions, the proportion of list items other than critical items recalled on the final test, and the total number of items recalled on the final test. None of these ANOVAs resulted in statistically significant results (all $ps > .05$). Thus, as in Experiment 1, the only differences observed among the experimental conditions in Experiment 3 were for the critical items.

GENERAL DISCUSSION

One point to consider regarding the present results is that any manipulation that suggests to participants that there is something important about a subset of list items might render those items more memorable. Thus, further empirical support for the present hypothesis could be obtained by comparing participants' recall performance following social processing instructions with other processing instructions. Despite this consideration, the goal of the present experiments was to determine whether social processing can improve recall performance. The results obtained in all three experiments support the conclusion that social processing can confer a recall advantage for both inherently social information, such as character traits, and nonsocial information, such as category exemplars. These

Table 2
Mean Proportions of Items and Standard Errors Recalled on the Final Recall Test As a Function of Instructional Condition and Item Type in Experiment 3

	Social		Nonsocial		Nonsocial Paired	
Items	*M*	*SE*	*M*	*SE*	*M*	*SE*
Critical	.67	.26	.45	.27	.43	.22
Other list	.30	.10	.29	.14	.29	.14
Total correct	.37	.09	.33	.14	.33	.12

Note—Critical, five list items held constant across conditions that were purportedly recalled by either a group member or the computer; Other list, items other than critical items recalled on the final recall test; Total correct, the total proportion of items recalled correctly on the final recall test.

observations were obtained by testing a prediction based on an analysis of the social brain hypothesis (Dunbar, 2003) and are consistent with the idea that our mnemonic abilities might have been shaped through natural selection toward a predisposition for encoding, storing, and retrieving social information.

AUTHOR NOTE

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