Garrido, M. V., Garcia-Marques, L., & Hamilton, D. L. (2012). Hard to Recall But Easy to Judge: Retrieval Strategies in Social Information Processing. Social Cognition, 30, 56-70. doi: 10.1521/soco.2012.30.1.56

RUNINGHEAD: Retrieval strategies in social information processing
ms# 10-161
Research Article

Hard to Recall But Easy to Judge:
Retrieval Strategies in Social Information Processing

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Word Count: 6104 (+abstract: 146 words)
40 references

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Abstract

The present research distinguishes two different retrieval modes: exhaustive and heuristic retrieval. Whereas exhaustive retrieval is elemental and retrieves specific memory traces, the output of heuristic retrieval is a memory composite. Different memory tasks depend upon these two retrieval modes in various degrees. Using a part-list cueing paradigm, we found a dissociation: providing part-list cues hindered the retrieval of the non-cued behaviors in free recall but boosted frequency estimates. In a second study, using a collaborative recall paradigm, each of three participants recalled one of the previously presented behaviors in turn. We hypothesized that behaviors recalled by other participants would become hyper-accessible, inhibiting the retrieval of non-recalled behaviors but boosting the corresponding frequency estimates relative to non-collaborative recall conditions. The results supported the hypotheses. The parallelism of the results of the two studies suggests that retrieval interference or inhibition is a crucial feature of social memory.

Memory retrieval occurs in different ways in our day-to-day living. Sometimes we remember an episode with many precise details, for example, when we remember the conversation we had with a colleague the previous day. Other times we just “feel” that the assertion “Nefertiti was an Egyptian queen” rings true or we “know” that a given person is ambitious without considering the particulars that substantiate our impressions. In fact, when participants of memory experiments, which involve the learning and reproduction of long stimulus lists, are asked to apply this distinction to the items they recognize, they will be able to do so very easily (Gardiner, 1988). The diverse nature of retrieval experiences and processes has recently been acknowledged by a number of dual-retrieval models (e.g., Brainerd, Reyna, & Mojardin, 1999; Gillund & Shiffrin, 1984; Humphreys, Bain, & Pike, 1989; Jacoby, 1991; for supporting empirical results, see for instance, Dyne, Humphreys, Bain, & Pike, 1990; Hintzman & Curran, 1994; Yonelinas, 1997). Although these models diverge in many ways, they share an important feature – they distinguish between the direct retrieval of specific episodic traces and a similarity-based match process between a retrieval cue and memory.

In social cognition, dual-process theories of retrieval have been less common but recently, the Twofold Retrieval by Associative Pathways model (“TRAP” for short) has been proposed in order to account for a number of disparate findings in the literature (Garcia-Marques & Hamilton, 1996; Garcia-Marques, Hamilton, & Maddox, 2002; Hamilton & Garcia-Marques, 2003). The TRAP model distinguishes between *exhaustive retrieval* and *heuristic retrieval*, a formulation that converges with the above-cited distinction between a specific trace retrieval search and a diffuse retrieval match. The TRAP Model was initially developed as an attempt to incorporate into a single theoretical framework two apparently discrepant social cognition findings: the incongruency effect in person memory (i.e., the greater recall of expectancy-incongruent than expectancy-congruent information, see Hastie & Kumar, 1979; Srull, 1981; Srull & Wyer, 1989) and the expectancy-based illusory correlation effect (i.e., higher frequency estimation of expectancy-congruent information, see Hamilton & Rose, 1980). According to the TRAP Model (and other person memory models, e.g., Srull, 1981) the information pertaining to a given social target (e.g., behaviors performed by a person) is represented in an episodic network. Because expectancy-incongruent information items are harder to integrate in the network, they become less strongly associated with the general impression of the person but trigger more extensive processing and therefore form more associations with other items, relative to expectancy-congruent information.

The TRAP model proposes that two distinct retrieval modes – exhaustive and heuristic – underlie different memory or judgment tasks. The exhaustive mode corresponds to the classical views of memory retrieval, involving an effortful, systematic, and non-selective search of memory, examining specific traces (as typically happens in free recall). Because inter-item associations facilitate later retrieval, recall performance is typically better for items that are densely interconnected with other items. In person memory research this feature has resulted in better memory for expectancy-incongruent items (Hastie & Kumar, 1979; Srull, 1981; Srull & Wyer, 1989). In contrast, the heuristic mode represents a fast and low-resource-demanding indirect way of probing memory which takes the degree of fit between a retrieval cue and the stored memory traces as a whole as a clue to some aspect of memory content (e.g., the frequency of a given episodic event). This retrieval process favors “mainstream” information (e.g., items that are congruent with general impressions), which are then overestimated in frequency judgments (Hamilton & Rose, 1980).

More specifically, several main features differentiate between the exhaustive and heuristic retrieval modes. (1) *The cognitive resources required.* Exhaustive retrieval is effortful, more resource demanding, and more interference-prone than is heuristic matching. (2) *The importance of a strategic search component.* Exhaustive search is often triggered by an intentional retrieval goal and often involves the development of a retrieval plan whereas heuristic search is less deliberate, occurring both when memory is probed intentionally and when memory probing is carried out in the service of other cognitive tasks (e.g., judgments). (3) *The degree of process-awareness.* Exhaustive retrieval is relatively accessible to self-examination, whereas heuristic matching is more introspectively opaque. (4) *The nature of retrieval output*. The output of exhaustive retrieval involves accessing individual memory traces, whereas the output of heuristic matching is often a composite of different memory traces.

The most basic evidence for this distinction comes from the dissociative effects of expectancies in free recall and in frequency estimates obtained in the responses of the same participants to the same stimulus information on immediately successive tasks (Garcia-Marques & Hamilton, 1996; Garcia-Marques, et al., 2002). In one study, for example, participants were asked to form an impression of a target person in whom a prior expectancy (e.g., cultured) had been induced. They read a series of sentences describing behaviors performed by the person. One third of the sentences were expectancy-congruent (cultured behaviors), one third were expectancy-incongruent (uncultured behaviors), and one third were expectancy-neutral. Participants were later asked to recall the behaviors and to estimate the number of behaviors illustrative of each trait. Analyses showed that participants recalled more of the incongruent than congruent behaviors, but estimated there had been more congruent than incongruent behaviors presented. These results, demonstrating seemingly-incompatible effects on immediately successive tasks, support the TRAP Model predictions based on a dissociation between exhaustive and heuristic retrieval processes (Garcia-Marques & Hamilton, 1996). Further evidence for this framework is found in a number of other results. For instance, cognitive load and specificity of the retrieval goal moderate the output of exhaustive retrieval but leave heuristic retrieval unaltered (Garcia-Marques et al., 2002).

Two other well-known (and probably related) phenomena can potentially provide further differentiation between these retrieval modes. One is *retrieval interference*, that is, the fact that retrieval of a subset of target items makes the recollection of non-retrieved items more difficult (see Brown, 1968; Anderson & Bjork, 1994; Anderson & Neely, 1996). The other is *collaborative inhibition*, that is, the fact that when participants successively recall together items from the same provided stimulus list, their recall is poorer than in individual-recall contexts (see Basden, Basden, Bryner, & Thomas, 1997; Weldon & Bellinger, 1997; Weldon, Blair, & Huebsch, 2000). In the research reported here, retrieval interference was the focus of Experiment 1 and collaborative inhibition was the focus of Experiment 2.

In the present work, we extended retrieval interference and collaborative inhibition to person memory. Although these effects emerged in different literatures, Basden et al. (1997) suggested the existence of a parallel between the processes underlying part-list cueing and collaborative inhibition effects. We sought to explore this parallel further. First, because it allows us to bring a very relevant but often neglected area of study (i.e., retrieval inhibition and collaborative retrieval) to the attention of person memory researchers. Second, because the detailed approaches derived from part-list cueing and collaborative recall research offer the opportunity to improve our understanding of social memory. Finally, we consider this extension to person memory as valuable because we suggest that retrieval inhibition phenomena are the rule and not the exception in everyday situations in which available cues from the context and from other persons may interfere with our impression formation and judgment tasks.

A better understanding of the interplay between retrieval inhibition effects and person memory would not only be informative about the generality of part-list cueing and collaborative inhibition effects in general but would also contribute to uncovering their possible boundary or moderating conditions in social information processing and retrieval. Thus, although the present work is not directly targeted at providing a differential test of the various explanations of part-list cueing and collaborative inhibition, our data may nevertheless contribute to understanding the processes underlying these effects.

Experiment 1

In the part-list cueing paradigm, first studied by Slamecka (1968), participants are presented with a list of words that they are asked to recall after a brief retention interval. Recall is tested either by free recall without cues or with a random subset of the stimulus words presented as part-list cues. The recurrent finding is that fewer non-cued words are recalled in the presence of part-list cues. This result was received with quite some surprise because most memory models at the time assumed trace-dependent storage (e.g., Tulving & Pearlstone, 1966). That is, traces that are acquired in the same context become associated, such that the fate of one affects the status of another. In such cases, assuring the accessibility of some items at recall should increase the probability of retrieving the remaining items (Slamecka, 1968). However, part-list cueing promotes retrieval inhibition, not facilitation. It is therefore not surprising to find that a host of different explanations have been offered for these effects (for reviews, see Anderson & Neely, 1996; Nickerson, 1984).

Part-list cueing effects in recall are commonly explained with reference to trace competition. Items that share some of the same retrieval cues compete for retrieval because they cannot be simultaneously retrieved (Anderson & Spellman, 1995). According to different (but not necessarily opposing) views, the conjunction of part-list cues and response competition can cause either the occlusion of non-retrieved items (Rundus, 1973), their inhibition (Anderson & Bjork, 1994; Anderson & Neely, 1996), or the disruption of optimal idiosyncratic recall strategies (Basden & Basden, 1995; Sloman, Bower, & Rohrer, 1995).

Note, however, that response competition can only occur when the goal of retrieval necessarily presupposes the retrieval of specific memory traces, as is the case in free recall. According to the TRAP Model, however, the output of heuristic retrieval is a composite (i.e., the overall familiarity with the retrieval cue) because only a generic judgment (e.g., frequency estimates) is called for, not the retrieval of individual items. Thus, although the elemental nature of exhaustive retrieval will often result in response competition, the same will not occur when the retrieval output is a composite, as is the case with heuristic retrieval. On the contrary, without response competition, strengthening a subset of the presented items (by re-exposing them to participants) should heighten the activation of these items and therefore also of the set of presented items as a whole. This increased activation would lead, as a consequence, to higher frequency estimates. Based on this reasoning, we hypothesized that part-list cueing would have a dissociative effect in exhaustive and heuristic retrieval tasks. Specifically, we predicted that presenting part-list cues at retrieval (a) would inhibit retrieval of non-cued list items in free recall but (b) would increase the corresponding frequency estimates.

In Experiment 1 we extended the part-list cueing paradigm to an impression formation task. The part-list cueing paradigm in person memory contexts was previously used by Garcia-Marques and colleagues (2002) in an attempt to differentiate the operation of two different retrieval modes. However the interpretation of their results is debatable, allowing for alternative accounts of the dissociation. Specifically, it is possible to argue that in frequency estimation tasks, instead of activating the category as a whole, the cues provided merely increase the pool of accessible items and therefore foster higher frequency estimates. This would obviously constitute a challenge to the dissociative interpretation of the effects of presenting part-list cues in exhaustive and heuristic retrieval modes. However if one assumes that cues increase the overall pool of accessible items and therefore boost frequency estimates, this increased pool of accessible items should also be reflected in recall. Unfortunately this analysis is not presented in Garcia-Marques et al (2002) and so it is impossible to assess this alternative interpretation. In the present experiment, participants were asked to recall (and estimate) all the presented items (the stimuli *and* the cues). If the alternative interpretation is valid, then the overall recall of all items should also be increased as a function of the number of cues presented. Additionally, the present experiment included three levels of cues (instead of only two levels), thus allowing a clearer demonstration of the linear and symmetric effects in the two dependent measures (a feature that is in line with the criteria established for the rejection of a single process model, Dunn & Kirsner, 1988). A higher number of cues will also allow for a better clarification of the processes underlying frequency estimation. Frequency estimations can sometimes be enumerative, for example, when people try to count how many instances of a given category they can recall, and then based on that counting, make a plausible estimation (Brown, 1995, 1997). Note that, by using this kind of enumerative strategy, frequency estimations would be moving closer to the processes underlying an exhaustive process. We tried to prevent participants from engaging in enumerative strategies by limiting the time they had to perform the frequency estimation task and by omitting any reference to the overall number of behaviors presented. These modifications may in our view strengthen the assumption of the operation of two different retrieval processing modes in person memory contexts.

Note also that the extension of the part-list cueing paradigm to an impression formation task is theoretically important as well. Part-list cueing effects are typically obtained under intentional learning conditions with very simple stimulus materials (but see Weldon & Bellinger, 1997, Experiment 2). Impression formation, by contrast, is an incidental learning task that involves richer materials (i.e., traits and behavior-descriptive sentences). If the typical part-list cueing effect occurs under these conditions, this extension would add to generality of these effects.

In addition, impression formation processes lead to the development of highly integrated person representations that typically involve high levels of spontaneous inter-item associative or "integrative" processing (e.g., Asch, 1946; Hamilton, 1989). This processing produces an associative network representation of densely interconnected items (Hamilton, Driscoll, & Worth, 1989; Srull & Wyer, 1989). Such processing, however, may represent a boundary condition on part-list cueing effects. In fact, in densely interconnected representations, part-list cues and non-cued items are strongly associated, and thus non-cued items suffer less from occlusion and/or are harder to inhibit (Anderson & McCulloch, 1999). If that is the case, then part-list cueing effects might fail to emerge in social cognition settings (Dunn & Spellman, 2003). However, if part-list cueing effects are due to the disruption of an optimal retrieval strategy, they should emerge even in densely interconnected representations because, if anything, sophisticated retrieval strategies are more likely to be developed in the case of these complex representations.

Method

Participants and Design

116 University of Lisbon students were randomly assigned to the cells of a 3 (number of part-list cues: 0, 4 or 8 cues) X 4 (target replication: computer programmer, construction worker, childcare professional, or traffic policeman) X 2 (cue replications) x 2 (task order: free recall first or frequency estimation first) between subjects factorial design.

Stimulus materials

75 University Institute of Lisbon (ISCTE-IUL) students were asked to generate ten behavioral descriptions that would illustrate four personality traits (intelligent, non-intelligent, friendly, unfriendly). From an initial set of 201 behaviors generated for each trait, 131 non-redundant behaviors were selected. These behaviors were evaluated by another group of participants who were asked to indicate on a 9-point Likert scale to what extent they considered the presented behaviors as illustrative of a given personality trait (1 represented the negative pole "unfriendly" or "non-intelligent" and 9 the positive pole "friendly" or "intelligent"). The behaviors most illustrative of each trait were selected (Garrido, 2003).

Procedure

Participants were tested in small groups of up to 8 persons at a time. Participants were informed that they would be presented with a list of behaviors performed by a given person and to form an overall impression of him. Four sets of pre-tested behaviors were used. In each set of 30 behaviors, 18 manifested a specific trait and a stereotyped occupational role; the remaining 12 were trait-irrelevant behaviors. The target person replications (occupation and associated traits) used were: computer-programmer/ intelligent, construction-worker/ unintelligent, childcare-professional/ friendly, and traffic policeman / unfriendly. Participants were first provided with a set of instructions that informed them about the target occupation and the kind of impression that he produces in persons that frequently interact with him (*e.g., João Fonseca is a computer programmer, very intelligent, wise, and a quick thinker*). All participants then received a booklet with the 30 behaviors randomly organized and presented one item on each page. They read through the booklet, following audio-recorded instructions to turn to the next page every 8 seconds. Participants then performed a filler task that took about 15 minutes. Half of participants were then asked to free recall all the behaviors and then to estimate the number of behaviors exemplifying the trait relevant for that role/trait condition. The other half of the participants performed the same tasks in the opposite order. To prevent the use of enumerative strategies in the frequency estimation task, participants were given only 10 seconds to provide their estimates after which their response sheets were removed.

Before completing the dependent measures, the part-list cueing manipulation was conveyed by asking the participants to study a subset of previously presented (relevant) behaviors (4 or 8 items from the middle range of the list) in order to "aid their performance in the subsequent memory tests.” We used two different subsets of cues for replications purposes. A third no-cue condition was also included in which no part-list cues were presented.

Results and Discussion

Preliminary analysis revealed that the frequency estimates were not homocedastic across conditions. This problem was solved by excluding three outliers (estimates that deviated more than 2.5 standard deviations from the mean estimate). We therefore excluded data from these participants from all analyses.

Recall

A coder blind to the experimental conditions, using a lenient gist criterion, coded the behavior descriptions recalled by each participant. Recall intrusions were very infrequent (less than 3%) and were excluded from all analyses. In the subsequent analyses we also excluded irrelevant behaviors in order to allow a more direct comparison with the results of the frequency estimates (the inclusion of these behaviors in an analysis produced identical results).

In addition, to enhance comparability across conditions, we excluded from the recall protocols of participants of 4 and 8 cues conditions, the relevant recalled behaviors that had been used as cues and divided the resulting number of non-cued recalled behaviors by the maximum possible number non-cued relevant recallable behaviors, 18 in the case of the no cues condition (18-0 = 18), 14 in the case of 4 cues condition (18-4 = 14) and 10 in the case of the 8 cues condition (18-8 = 10).

We computed a 3 (number of part-list cues: 0, 4 or 8 cues) X 4 (target replication: computer programmer, construction worker, childcare professional or traffic policeman) X 2 (cue replications) X 2 (task order: free recall first or frequency estimation first) ANOVA on the proportion of items recalled. Only a Number of Part-list Cues main effect emerged. The main effect, $F(2, 65) = 4.24$, $p < .019$, $MSE = .02$, $\eta^2 = .07$, revealed the predicted decrease of recalled items as a function of the number of cues (see Figure 1, panel A). More importantly, this negative linear trend was reliable, $t(65) = -2.86$, $p < .003$, one-tailed, $SD = .15$, $d = .51$, and the residual variance was negligible, $t(65) = -.77$, $p < .445$, two-tailed. Participants in the no-cueing condition remembered the greatest number of relevant behaviors and this number decreased as a function of the number of part-list cues provided ($M_{0\ cues} = .37$, $M_{4\ cues} = .30$ and $M_{8cues} = .27$). This result was not qualified by whether recall occurred before or after the frequency estimation task.

Thus the results are consistent with part-list cueing effects found in the cognitive literature and therefore generalized to an impression formation context (Garcia-Marques et al., 2002). Also, this finding, which involves extending part-list cue effects to a context that involves high levels of integrative processing, fits better with a strategy disruption explanation of these effects (Basden & Basden, 1995) than with its alternatives (Anderson & McCulloch, 1999). Finally, the obtained results correspond to the first half of the predicted reversed association of the effects of the number of part-list cues on free recall and frequency estimation. We now turn to the second half.

FIGURE 1

Frequency Estimates

We computed a 3 (number of part-list cues: 0, 4 or 8 cues) X 4 (target replication: computer programmer, construction worker, childcare professional or traffic policeman) X 2 (cue replications) x 2 (task order: free recall first or frequency estimation first) ANOVA on the frequency estimates. Only a Number of Part-list Cues main effect emerged. The effect, $F(2, 65) = 4.47$, $p < .015$, $MSE = 100.58$, $\eta^2 = .09$, was due to the predicted increase in frequency estimates as a function of the number of cues provided (see Figure 1, panel B). Indeed, this positive linear trend was reliable, $t(65) = 2.76$, $p < .004$, one-tailed, $SD = 10.03$, $d = .68$, and the residual variance was negligible, $t(65) < 1$. Participants in the no-cueing condition made the lowest frequency estimates and these estimates increased as a function of the number of part-list cues provided ($M_{0\ cues} = 13.2$, $M_{4\ cues} = 14.8$ and $M_{8\ cues} = 20.1$). Taken together, the free recall and frequency estimation results have produced the predicted reversed association.

Besides replicating Garcia-Marques et al.'s (2002) results, the obtained reversed dissociation met the criteria established for the rejection of a single process model (Dunn & Kirsner, 1988), therefore supporting the assumption of two different processing modes. In this sense these findings offer additional support for the dual-process retrieval modes assumption advanced by the TRAP Model, extend part-list cueing effects to impression formation and suggest that impression formation depends from retrieval processes that are fundamentally different.

Additionally, this experiment was also designed to disentangle two possible accounts of the effects of part-list cueing in frequency estimation. One possibility is our proposal that cues activate the category as a whole, and therefore increase frequency estimates. Alternatively, the provided cues could act simply to increase the pool of accessible items. This latter interpretation, of course, also implies that total recall would also increase as of the number of provided cues. Therefore the test of these interpretations involved testing for differences in overall recall (i.e., the recall of all the relevant items including the recall of those presented as cues) as a function of the number of cues provided. The 3 (number of cues: 0, 4 or 8) X 4 (target person replication: childcare-professional, traffic-policeman, computer-programmer, construction-worker) X 2 (cue replications) X 2 (task order: free recall first or frequency estimation first) ANOVA on the number of total recalled items revealed no significant differences $F(2,65) = 2.39$, ns., $MSE = 4.23$, $\eta^2 = .04$, ($M_{0items} = 6.7$, $M_{4items} = 7.4$ and $M_{8items} = 7.8$). Even though participants recalled more cued items in the cueing conditions, this increase did not overcome the inhibitory effects on recall that they produce. Thus the pool of available items did not significantly increase as a function of the number of items provided. Additionally, the weak and non-significant correlation between the overall recall and frequency estimates ($r = 0.15$; ns.) indicates that the number of relevant items and cues recalled only explain a negligible amount of the variance ($r^2 = 0.02$) observed in frequency estimates of relevant items. These results strengthen the idea that the alternative interpretation based on an increased pool of available items does not hold for the present data. The results obtained have clear implications for the TRAP model which predicts the obtained dissociation. Although a similar pattern of results was found in previous experiments (e.g., Garcia-Marques et al., 2002) our findings eliminate possible alternative interpretations.

Note that these results may also contribute to a better understanding of the processes underlying inhibition effects. Unlike most part-list cueing experiments reported in the cognitive literature, our results were obtained under conditions of associative density that are known to promote high levels of relational processing. Under these conditions part-list cues and non-cued items are strongly associated, and thus the assumptions regarding occlusion and/or inhibition become less plausible (Anderson & McCulloch, 1999). In contrast, densely interconnected representations may favor the development of sophisticated retrieval strategies which are disrupted when part-list cues are provided, thus lending some support to the strategy disruption hypothesis (Basden & Basden, 1995; Sloman et al., 1995).

Experiment 2

Collaborative recall has recently attracted attention in cognitive psychology but much less so in social cognition (for a review, see Weldon, 2001). One of the goals of the present research was to extend collaborative recall paradigms to impression formation contexts.

In a collaborative recall paradigm, participants recall previously presented items in collaboration (Basden et al., 1997; Weldon & Bellinger, 1997). That is, having been exposed to the same list of stimulus items, the participants take turns in recalling items: one person recalls an item, then the next person recalls an item, and so forth. The recall performance of collaborative and nominal groups (i.e., groups composed of participants tested individually) is determined as non-redundant recall, that is, the number of items that are recalled by at least one group member. The most prominent result observed in collaborative recall paradigms is that, although collaborative groups may outperform single individuals, the recall performance of collaborative groups is poor compared to that of nominal groups. This relative impairment of collaborative relative to nominal groups is known as collaborative inhibition.

The most prevalent explanation for this effect stresses similarities with the part-list cueing effect (Basden et al., 1997). The basic argument is that hearing the items recalled by other group members disrupts optimal idiosyncratic recall strategies. Note, however, that an occlusion-based explanation (e.g., Rundus, 1973) would also be possible if we consider the possibility that items recalled by other group members can become hyper-accessible and thus block the retrieval of less accessible non-recalled items. In either case, collaborative inhibition should only occur when individual memory traces compete for retrieval or when recall performance is highly dependent on strategic memory search, as is the case for exhaustive retrieval.

In contrast, based on the TRAP Model, we expect that collaborative recall would not affect heuristic retrieval in the same way, for two reasons. First, heuristic retrieval is a less strategic form of retrieval and thus it is less dependent on optimal retrieval strategies. Second, because heuristic matching does not result in the retrieval of individual traces, the hyper-accessibility of the set of items recalled by other group members would boost the activation of the full set of items as a whole. Thus we predicted that collaborative groups (a) would recall fewer items but (b) would produce higher frequency estimates compared to nominal groups.

Method

Participants and Design

72 Lisbon University students were randomly assigned to the cells of a 2 (group condition: nominal, collaborative) X 4 (target conditions: childcare professional, traffic-policeman, computer programmer, construction worker) between subjects factorial design.

Procedure

Participants were tested in small groups of three participants per session. Participants were informed that they would be presented with a list of behaviors performed by a given person, encouraged to imagine the type of person and to form an overall impression of the target. Advanced expectancies were explicitly established by providing the target's occupation and the kind of impression he produces in persons that frequently interact with him (intelligence, stupidity, friendliness, unfriendliness), (*e.g., João Fonseca is a traffic-policeman, very unfriendly, unhelpful, and insensitive*). Participants read a list of 30 behaviors performed by the target person, which were either relevant (18) or irrelevant (12) to the expectancy provided. After a 15 minutes filler task, participants were asked to free recall all the behaviors and then to estimate the frequency of occurrence of behaviors representing the relevant trait. The group manipulation involved asking the participants to complete recall individually or in a collaborative manner. In collaborative groups, each participant recalled aloud a different behavior in turn or passed his/her turn when unable to recall a new behavior. Frequency estimations were provided individually and recorded privately.

Results and Discussion

Recall

A coder blind to the experimental conditions, using a lenient gist criterion, coded the behaviors recalled by each participant. Recall intrusions were very infrequent and were excluded from all analyses.

The three participants in a collaborative recall session generated a single (joint) recall protocol and constituted one group. Only trait-relevant items were scored (an analysis including irrelevant behaviors produced identical results). To make the nominal recall sessions comparable to collaborative recall, data from the three participants in each nominal recall session were combined by aggregating non-redundant recalls from the three individual recall protocols. Thus sessions (rather participants) were the unit of statistical analysis.

We computed a 2 (group retrieval: nominal versus collaborative) X 4 (target person replication: childcare-professional, traffic policeman, computer-programmer, construction-worker) ANOVA on non-redundant relevant items recalled per session. Two main effects emerged. The first was a Target Person Replication main effect, $F(3,16) = 4.47$, $p < .018$, $MSE = 3.04$, $\eta^2 = .28$, showing that non-redundant recall was highest in traffic policeman/unfriendly ($M = 14.83$), lowest in childcare-professional/friendly ($M = 11.17$), and intermediate in computer-programmer/intelligent ($M = 13.00$) and construction-worker/non-intelligent ($M = 12.67$) target replications. More importantly, the predicted Group Retrieval main effect was significant, $F(1,16) = 15.84$, $p < .001$, $MSE = 3.04$, $\eta^2 = .33$. Non-redundant recall was higher in nominal ($M = 14.33$) than in collaborative ($M = 11.50$) sessions (see Figure 2, panel A). A planned contrast confirmed these findings, $t(16) = 3.98$; $p < .001$, one-tailed, $SD = 1.74$, $d = 1.99$. This result supports our hypothesis regarding the retrieval inhibition effect of collaborative groups in free recall. This finding is consistent with collaborative inhibition effects found in the cognitive literature. To our knowledge this is the first instance demonstrating this effect in an impression formation context.

FIGURE 2

Frequency Estimates

We computed a 2 (group retrieval: nominal versus collaborative) X 4 (target person replication: childcare-professional, traffic policeman, computer-programmer, construction-worker) ANOVA on frequency estimates averaged per session. Although the predicted Group Retrieval main effect was marginally significant, $F(1,16) = 3.53$, $p < .078$, $MSE = 48.80$, $\eta^2 = .13$, a planned contrast testing our specific hypothesis was significant, $t(16) = 1.88$, $p < .039$, one-tailed, $SD = 6.99$, $d = .94$. Average frequency estimates were higher for collaborative ($M = 19.67$) than for nominal groups ($M = 14.31$), see Figure 2, panel B. This result supports our hypothesis regarding the enhancing effect of collaborative recall on frequency estimates. This finding completes the predicted dissociation of the impact of collaborative recall on free recall and frequency estimation tasks.

General Discussion

In two experiments we have obtained parallel results documenting two diverging retrieval outcomes in a social memory task. The differing outcomes occur as a function of whether the retrieval task calls for exhaustive versus heuristic retrieval processes. The parallel has occurred using two paradigms that in the cognitive literature have reliably shown retrieval inhibition, which we have replicated for exhaustive recall. In addition, in both paradigms we simultaneously found enhancement effects in heuristic retrieval. These findings provide clear support for the TRAP Model predictions, they extend the literature on retrieval interference to a different memory measure (frequency estimation), and they emphasize the importance of retrieval processes for understanding social memory.

The provision of a subset of previously presented items at retrieval decreased recall of non-cued items but increased frequency estimates. We believe that these findings are important to social cognition because situations analogous to part-list cueing paradigms are likely to occur frequently in the social world. The retrieval of person or group information, even when it pertains to specific facts, may often be truncated, thus inhibiting future retrieval attempts of non-retrieved information. Consequently, retrieval inhibition paradigms, far from being laboratory whims, are crucial to understanding social memory.

A parallel result was obtained in conditions of collaborative recall. Others have stressed the parallel between the retrieval processes underlying part-list cueing effects and collaborative inhibition (Basden et al., 1997). Both part-list cues and collaborative recall disrupt the use of recall strategies that participants developed at the time information was encoded. More specifically, according to Basden and colleagues (Basden & Basden, 1995; Basden, Basden, & Galloway, 1977; Basden et al., 1997; for a review, see Nickerson, 1984), when participants are asked to recall a set of items, they form a recall plan that conforms to the way they have structured the items in memory. However, when they are provided with part of the learning set as cues (by the experimenter or by their fellow collaborative group members), participants deviate from their initial plan and use whatever recall strategy is suggested by the cues. The more this new recall plan deviates from the initial encoding organization, the worse recall performance will be.

Note however that collaborative “inhibition” effects are difficult to reconcile with a pure inhibitory account (Anderson & Bjork, 1994) because the concept of inhibition is a personal concept[1]. That is, a response should be inhibited only when that response competes with the

[1] We thank to Michael Humphreys for pointing out this to us.

response one is trying to produce. No inhibition should occur when somebody else recalls another response (i.e., Experiment 2).

Moreover, the fact that we found part-list cueing effects in conditions that favor high levels of spontaneous integrative processing also fits better with strategy-disruption than with occlusion or inhibitory explanations of these effects (Anderson & McCulloch, 1999). Thus, our results are discrepant from Anderson and McCulloch (1999)'s account. However, as these authors instructed their participants to explicitly form item-to-item associations, while we did not, it remains to be seen whether part-list cueing effects can be obtained in impression formation contexts that are known to promote an even greater extent of item-to-item interconnectedness, namely, when expectancy-incongruent information is present (Hastie & Kumar, 1979).

Our results suggest that the parallel between the two paradigms extends even further, and in previously uncharted ways. As noted above, the finding of inhibition in recall replicates past results and extends them to the more complex context of impression formation. Our other findings, however – showing the effects of part-list cueing and collaborative recall on frequency estimates – are new and, in both cases, reveal an enhancement of frequency estimates compared to control conditions.

The differing results of the two paradigms on recall and frequency estimation are consistent with the TRAP model. Specifically, they highlight the importance of distinguishing between exhaustive and heuristic modes of retrieving information from memory and of recognizing their differential effects on various memory measures. In extending this parallel to frequency estimation, we again believe that this parallel is particularly relevant to social cognition. In social contexts, it seems quite likely that the opportunity to follow optimal idiosyncratic retrieval strategies arises only under exceptional circumstances. Indeed, interference with or social disruption of these strategies may well be the rule rather than the exception. Thus we think that the generalization of the findings derived from the study of isolated individuals under optimal retrieval conditions needs to be complemented with the consideration of retrieval interference and retrieval-strategy disruption in social as well as in non-social contexts.

Finally, it is important to note that, although part-list cues and collaborative recall inhibit exhaustive retrieval, they facilitate heuristic retrieval in that they give rise to higher frequency estimates. This fact may help explain why stereotype-based judgments (e.g., expectancy-based illusory correlation effects, see Hamilton & Rose, 1980) tend to prevail in social contexts while effects that depend on optimal idiosyncratic retrieval strategies (e.g., the incongruency effect, see Hastie & Kumar, 1979) are much rarer in the same contexts (Hamilton & Garcia-Marques, 2003).

The experiments reported here contribute to an increased appreciation of the theoretical role of retrieval processes in social cognition, and they provide a useful guiding framework for exploring new questions about the mental representation and retrieval of social information. Also, our results lend novel support to recent dual-retrieval approaches (e.g., Brainerd et al., 1999; Gillund & Shiffrin, 1984; Humphreys et al., 1989; Jacoby, 1991). These models converge in the distinction of two retrieval processes – the direct retrieval of specific memory traces and a global matching process. This distinction can easily be mapped onto our own distinction between exhaustive and heuristic retrieval modes. The research derived from these models, however, typically tries to tease apart the contributions of these processes to overall performance on standard memory tests (i.e., free recall and recognition). The present approach differs in that we compared performance on a standard memory task (i.e., free recall) with performance of the same participants on a memory judgment task (i.e., frequency estimation, see Hintzman, 2000). We believe that this contrast represents an important avenue for the development of dual-retrieval models because daily uses of memory will only infrequently be akin to standard memory tests and instead will often be similar to memory judgments (e.g., impression trait, affective or validity judgments, see Hamilton & Garcia-Marques, 2003).

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Author Notes

Preparation of this manuscript was supported in part by the Fundação para a Ciência e Tecnologia (Grant PTDC/PSI/PSO/099346/2008, awarded to the first author) and by the NIMH (Grant 40058) awarded to the third author. Please address correspondence to Margarida Vaz Garrido, ISCTE, Lisbon University Institute, Department of Social and Organizational Psychology, Av. das Forças Armadas, 1649-026 Lisbon-Portugal
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Figure 1

Mean recall of non-redundant trait-relevant items as a function of part-list cueing (Panel A) and mean frequency estimates for trait-relevant items as a function of part-list cueing (Panel B).

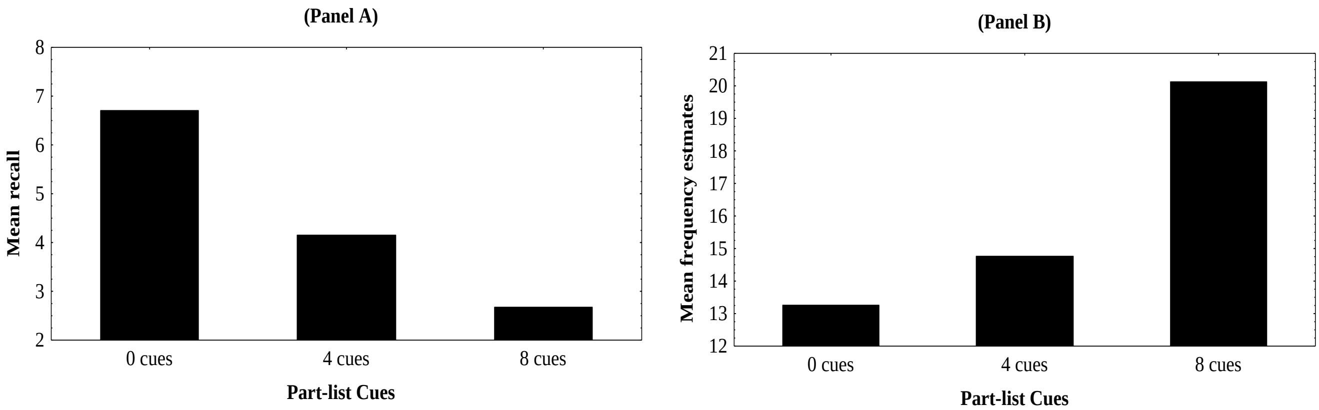

Figure 2

Mean recall of non-redundant trait-relevant items as a function of group retrieval condition (Panel A) and mean frequency estimates for trait-relevant items as a function of group retrieval condition (Panel B).