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RUNNING HEAD: Enhancing the comparability between part-list cueing and collaborative recall

Enhancing the comparability between part-list cueing and collaborative recall: A gradual part-list cueing paradigm

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Abstract

The effects of part-list cueing and of collaborative recall in memory performance have been recently addressed as parallel phenomena. Notably they both impair recall (and boost frequency estimates) and they have been explained by the same underlying mechanisms. However the comparability between the two paradigms is hindered by a number of procedural differences. The main contribution of this paper is the introduction of a new paradigm that makes standard part-list cueing and collaborative recall more comparable. In our study we compared free recall and frequency estimates of participants in a non-cueing condition with the same performance in a standard part-list cueing condition and in a condition in which part-list cues were gradually presented during recall (as it occurs in collaborative recall). Results indicate that the effects of part-list cueing continued to be reliable in both cueing conditions. Namely, recall was impaired and frequency estimates were boosted relatively to a non-cueing condition. The results obtained with this new method that enhances the direct comparability of the two paradigms, provides further evidence for the parallel between the two effects.

Keywords: part-list cueing, gradual-list cueing, collaborative inhibition, person-memory

The effects of part-list cueing and of collaborative recall in memory performance have been recently addressed as parallel phenomena (e.g., Basden, Basden, Bryner, & Thomas, 1997; Garcia-Marques, Garrido, Hamilton, & Ferreira, 2011; Garrido, Garcia-Marques, & Hamilton, 2011). Research has shown that both the provision of cues at recall and the memory outputs of the members of a group recalling in collaboration have detrimental consequences for recall. Moreover, the underlying mechanisms that explain these effects were also suggested to be the same.

The goal of the present research is to further explore this parallel in an impression formation context using a new experimental paradigm which enhances the direct comparability of the two effects. In one experiment, we compared the retrieval outputs in a standard part-list cueing manipulation with a new manipulation of part-list cues that attempts to reproduce a standard collaborative recall paradigms. This new manipulation involves a gradual release of part-list cues that allows a more direct comparison with part-list cueing while retaining the major characteristics of a collaborative recall paradigm. Notwithstanding, if the part-list cueing effects fail to occur under conditions in which the cues are gradually released, the parallel between part-list and collaborative inhibition effects would be severely undermined.

In a standard *part-list cueing paradigm*, participants are presented with a list of words which they are asked to recall after a brief retention interval. At test, participants are either asked to free recall the presented words without any cues or, before performing the recall task, they are given memory cues, that is, a random subset of the words' list. Surprisingly, the recurrent finding is *retrieval impairment*, that is, fewer non-cued words are recalled in the presence of part-list cues (e.g., Slamecka, 1968). This result challenged the standard memory assumptions at the time which assumed trace-dependent storage (e.g., Tulving & Pearlstone, 1966). That is, memory items acquired in the same context should become associated, such that the increased accessibility of some items at recall should increase the probability of retrieving the remaining items.

In a standard *collaborative recall paradigm*, several individuals successively recall aloud items from a stimulus-list that was previously presented to all of them. The task of each participant is to recall, aloud and in turn, a list item that has not yet been recalled by him / herself or by any of the other participants. The typical output observed in this paradigm is termed *collaborative inhibition*, that is, the diminished recall under collaborative relative to nominal groups (see Basden et al., 1997; Weldon & Bellinger, 1997; Weldon, Blair, & Huebsch, 2000). Specifically, groups of individuals recalling previously presented items together do worse than nominal groups that is, groups composed by the same number of participants recalling individually. Like part-list cueing effects, the harmful outcomes of collaborative recall were also received with surprise both by researchers and laypersons to whom "two heads should be better than one". Notably, there are many circumstances where the group performs better than the individual (e.g., Clark & Stephenson, 1989), and where individuals benefit from others' memory (e.g., Meade & Roediger, 2002; Wegner, 1995; Wegner, Erber, & Raymond, 1991; see Betts & Hinsz, 2010 and Rajaram & Pereira-Pasarin, 2010 for a review). However, some of the grounds for such a well-established aphorism are observations and empirical studies that fail to contrast the performance of the individuals and the group under directly comparable conditions. That comparison can only be made when one contrasts the recall performance of two groups of participants: a collaborative group (a group of individuals recalling together) and a nominal group (a group with the same number of individuals recalling separately) that have been exposed to the same stimulus

information (see Weldon & Bellinger, 1997). Under these circumstances the latter outperforms the former.

In the present work we used a new experimental paradigm which enhances the direct comparability between the part-list cueing and the collaborative inhibition effects. Note that despite the similarity between the two paradigms, the recall impairments they generate (e.g., Basden et al., 1997; Weldon & Bellinger, 1997) and the memory dissociation they promote (Garcia-Marques et al., 2011; Garcia-Marques, Hamilton, & Maddux, 2002; Garrido et al., 2011), the two paradigms have fundamental differences. First, they differ in the social context where they occur: while in standard part-list cueing paradigms the encoding and recall of the information is individual, in standard collaborative recall paradigms the retrieval of the information encoded is a joint task of the group members. Secondly and more importantly, there are potentially crucial differences in the way participants are exposed to previously presented items: whereas in a standard part-list cueing paradigm the entire subset of retrieval cues is presented to participants before the memory task, in a standard collaborative recall paradigm the outputs of the other participants (that work as part-list cues) are gradually presented to the participants during the recall task. Note that this latter difference is critical to the validity of the aforementioned parallel. If in conditions in which the cues are gradually released (such as the case of collaborative recall) the part-list cueing effects fail to occur then the theoretical parallel between the part-list cueing and collaborative inhibition can no longer be held. In addition, the impact of manipulating this factor (standard versus gradual release of recall cues) may pose additional constraints to the applicability of the most important available accounts of the two effects as we shall discuss.

But before describing the present experiment, we review the most important theoretical accounts for part-list cueing and collaborative inhibition effects. Part-list cueing effects in recall can be explained by response competition, that is, items that share similar retrieval cues cannot be simultaneously retrieved (Anderson & Spellman, 1995). Part-list cues can therefore cause the occlusion of non-retrieved items (Rundus, 1973). An alternative account suggests that part-list cues disrupt the use of recall strategies that participants have developed at encoding (e.g., Basden & Basden, 1995; Basden, Basden, & Galloway, 1977; for a review, see Nickerson, 1984). The provision of part of the learning set as cues disrupts the organizational memory structure of the items. The more the recall strategy suggested by the cues deviates from that initial encoding organization, the worse recall performance is.

Notably, the same accounts can be used to explain the pattern of results observed in collaborative recall paradigms. Hearing the items recalled by other group members can disrupt optimal idiosyncratic recall strategies (Basden et al., 1997). However, it is also possible to assume that items recalled by other group members may become hyper-accessible and block or inhibit the retrieval of less accessible non-recalled items (e.g., Anderson, Bjork & Bjork, 1994; Anderson & Spellman, 1995; Rundus, 1973).

The part-list cueing effects have recently been demonstrated in a standard impression formation paradigm (e.g., Garcia-Marques et al., 2002, Experiment 3; Garcia-Marques et al., 2011; Garrido et al., 2011). In these experiments, participants were given a few traits of a target person, and then were asked to form an impression as they read a list of behavioral items describing the target. In a subsequent recall task, part-list cued participants received a set of the previously presented behaviors whereas non-cued participants were asked to perform the same task without the provision of such cues. The provision of part-list cues produced memory inhibition effects which were shown to extend to person memory contexts. Additionally, participants were also asked to provide estimates of the frequency of occurrence of the trait-relevant behaviors

presented. Interestingly, a dissociation of the effects of part-list cueing in recall and frequency estimation was observed: while the recall of the presented behaviors was better in non-cueing than in part-list cueing conditions, frequency estimates were higher in the latter relative to the former case (see Garcia-Marques et al., 2002; Garrido et al., 2011). This dissociation was interpreted under the assumptions of the Twofold Retrieval by Associative Pathways Model (TRAP; see Garcia-Marques & Hamilton, 1996) about the different nature of the memory processes underlying recall and frequency estimation. This assumption is that part-list cues interfere with the process of following encoding associations during exhaustive retrieval search (as it is the case of free recall) and, as a consequence, recall performance is impaired. However, the heuristic retrieval process that underlies frequency estimation tasks does not entail sequential retrieval of specific traces. Instead it corresponds to a composite, a global memory response which reflects the degree of match or familiarity between retrieval cues and the whole memory content. Therefore the provision of a subset of items as cues increases the activation level of all traces formed at encoding and consequently gives rise to a stronger heuristic response (e.g., a higher frequency estimate).

Like part-list cueing, the collaborative recall paradigm has also been used in an impression formation setting (e.g., Garcia-Marques et al., 2011; Garrido et al., 2011). In these experiments participants were asked to form an impression of a target-person based on some target-related preliminary information and then were provided with a set of behavioral items describing the target. At recall participants were either asked to individually free recall the target's behaviors or to perform this task in a collaborative group by recalling, in turn and aloud, the target's behaviors. The collaborative inhibition effect was found to extend to person-memory contexts: the combined output of participants recalling individually was superior to the collaborative group recall output. Furthermore, participants were also asked to perform a frequency estimation task. Again, a dissociation between recall and frequency estimates was observed: while the recall of the presented behaviors was better in nominal than in collaborative groups, frequency estimates were higher in the latter relative to the former. The same assumptions about the operation of two retrieval modes advanced by the TRAP Model can explain this dissociation.

The empirical demonstration that part-list cueing and collaborative recall produced, in person memory contexts, effects that are similar to those found in the cognitive literature strengthens the hypothesis of a parallel between the two effects even further. Moreover, the main theoretical accounts for the mechanisms suggested to underlie these effects were put to test and can also account for the pattern of results observed in person memory contexts. Therefore, studying retrieval interference effects in person memory benefits both fields because in the social world, retrieval interference from informational or social contexts is the rule and not the exception. Further, person memory provides a more severe testing ground for retrieval interference theoretical accounts because it extends these effects to a common incidental learning setting. This extension shows that retrieval interference and /or inhibition is not a side-effect of intentional learning strategies and that it prevails even when integrative processes rarely obtained with simpler world lists are at stake. Therefore we will test the parallel between part-list cueing and collaborative recall within a person memory framework, with materials and procedures that have already been extensively used.

As the main goal of the current research was to explore the parallel between part-list cueing and collaborative recall, the present experiment was specifically designed to enhance the comparability between both paradigms and to replicate previous extensions of these effects in person-memory contexts in this revised

paradigm. In particular we will test whether the dissociation of exhaustive and heuristic retrieval observed in both part-list cueing and collaborative recall standard paradigms can be reproduced in this new experimental framework.

Research Overview

In the present experiment we pursued the parallel between part-list cueing and collaborative inhibition effects. To ensure direct comparability between the original paradigms, in one of the experimental conditions we introduced some modifications in the standard part-list cueing paradigm used in the literature. Specifically, instead of providing all the cues before the retrieval task, retrieval cues were released gradually during the recall test. Additionally, we increased the number of cues usually provided in a standard part-list cueing condition to make it more comparable to the amount of cues each participant hears from the other group members, in a three-member collaborative recall group (i.e., 2/3).

Notwithstanding these adaptations of the paradigm, we make similar predictions to the ones presented in previous studies because we assume that these adaptations do not change the critical features for obtaining the simultaneous (a) diminished recall of non-cued items and (b) the increased frequency estimates, both in standard part-list cueing and gradual part-list cueing conditions in comparison to base-line conditions where no cues are presented.

Regarding the magnitude of the expected effects in both cueing conditions and from a disruption strategy framework, it seems likely that when cues are gradually presented, recall may be particularly impaired because participants are constantly confronted with new retrieval cues which may repeatedly hinder the way they have structured the information in memory. Previous research has shown that when cues are removed, participants can return to their preferred retrieval strategy and the part-list cueing effect disappears (Basden & Basden, 1995; Basden et al., 1977). Accordingly, the standard (early) release of all cues (compared with the gradual release) may make the return to the participants' original retrieval strategy and its benefits for memory performance more likely.

Regarding the frequency estimates we predict that both cueing conditions will boost the number of estimated items in comparison to conditions where no cues are presented. Considering that in both cueing conditions participants receive the same number of cues we have no reason to assume that their estimates will differ.

Method

Participants and Design

60 university students (44 female, M_{age} = 21.57) were randomly assigned to the cells of a 3 (Part-list Cueing: no cueing, standard cueing, gradual cueing) x 4 (Target Replication: childcare-professional, skinhead, computer-programmer, construction-worker) between subjects factorial design.

Procedure

Participants were invited to come to the lab in groups of up to 5 persons at a time. The goal of the experiment was introduced as regarding the way we easily form impressions about other persons. Participants were told that their task was to form an impression about a target-person and were informed about his occupation and the kind of impression that he produces in persons that frequently interact with him (*e.g., John is a computer programmer, very intelligent, wise, and a quick thinker*). All participants then received a booklet with 30 pre-tested behaviors randomly organized and presented one on each page.

The booklets contained one of four possible sets of behaviors which corresponded to four different target-person replications: childcare-professional / friendly, skinhead / unfriendly, computer-programmer / intelligent, and construction-worker / unintelligent. In each set, two-thirds (20) of the behaviors were illustrative of a stereotyped occupational role and the respective trait (e.g., *Won a chess tournament with more than 50 participants*); the remaining third (10) was composed of trait-irrelevant behaviors (e.g., *Took the elevator to the fourth floor*). Participants then read through the booklet, following recorded instructions indicating, every eight seconds, to turn to the next page. After completing a 15 minutes filler task participants were directed towards a computer screen for further instructions. Up to this point the procedure used is identical to the learning stage of both part-list cueing and collaborative recall standard paradigms.

The standard part-list cueing manipulation was introduced by presenting participants with a list of previously presented behaviors which would "help them in the subsequent tasks". They were then asked to free recall all the items presented in the booklet and then to estimate the frequency of trait-relevant behaviors (according to the target replication condition they had been assigned with).

In the gradual cueing condition participants were presented with pairs of behaviors that sequentially appeared in the computer screen for 30 seconds, followed by a warning sound five seconds before the screen changed. Their task was to read each pair of behaviors and write it down. The items were presented in pairs in order to correspond to collaborative recall conditions under which participants hear two subsequent items recalled by their fellow collaborative group members before recalling an item themselves. After reading and writing down the two part-list cues, participants were asked to recall and write down a new behavior from the initial stimulus list (they had two minutes to do so). This process continued until the 20 part-list cues (13 relevant and 7 irrelevant) were presented. After this task participants were asked to estimate the frequency of occurrence of trait-relevant behaviors.

In the no-cueing condition no part-list cues were presented. Participants in this condition were asked to spend a few minutes thinking about the stimulus items they had just read and to mentally review the behaviors presented. They were then asked to free recall all the items presented in the booklet and then to estimate the frequency of trait relevant behaviors.

Results and Discussion

Two of the participants did not provide frequency estimates thus data from these participants were excluded from all analyses.

Recall

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

To enhance comparability across conditions, and following the standard procedures in retrieval inhibition paradigms, we excluded recalled behaviors that had been used as cues in the cueing conditions from the analysis of the recall protocols of participants in both cueing and non-cueing conditions. That is, participants' recall score could range from 0 to 10 (30 items presented – 20, the number of part-list cues provided). We computed a 3 (Part-list Cueing: no cueing, standard cueing, gradual cueing) x 4 (Target Replication: childcare-professional, skinhead, computer-programmer, construction-worker) ANOVA on the number of recalled items.

Only a Part-list Cueing main effect emerged. The Part-list Cueing main effect,

$F(2, 46) = 11.03$; $p < .001$, $\eta_p^2 = .324$, MSE = 2.59, revealed that the three cueing conditions differed significantly ($M_{no\ cueing} = 5.47$; $M_{standard\ cueing} = 3.05$; $M_{gradual\ cueing} = 3.90$, see Figure 1, panel A). The planned contrast between no-cueing and the two cueing conditions indicates, as predicted, that recall performance is better when no cues are provided compared to standard or gradual cueing conditions, $t(46) = 4.43$, $p < .001$ (two-tailed). This result is consistent with part-list cueing effects found in the cognitive literature and lends novel support to previous findings in impression formation contexts (Garcia-Marques et al., 2002; Garcia-Marques et al., 2011; Garrido, et al., 2011). As we are introducing a new cueing procedure (i.e., the gradual cueing), it becomes important to check whether this new procedure replicates the part-list cueing effect usually obtained in this literature. Therefore we computed single degree of freedom contrasts and their corresponding effect sizes for each of the two cueing conditions and the no cueing baseline. In fact, the effect of part-list cueing continued to be reliable both in the standard part-list cueing condition $t(46) = 4.63$, $p < .001$ (two-tailed), d = .90 and after the changes we introduced in the experimental paradigm to enhance direct comparability with collaborative recall (gradual release of part-list cues), $t(46) = 3.05$, $p < .004$ (two-tailed), d = 1.71. More importantly, and following the procedure recommended by Schmidt (1996), we estimated the confidence intervals for each of the two effect sizes. These confidence intervals were, respectively for standard cueing and gradual release cueing conditions]d = .77; d = 2.34[and]d = .34; d = 1.71[. As the two intervals overlap, we feel confident to claim that the new cueing procedure replicates the part-list cueing effect usually obtained in the literature with paradigms similar to our standard cueing condition.

Finally, the planned contrast between the standard and the gradual cueing conditions suggests that the detrimental effects of cueing in recall are marginally stronger in the standard cueing condition $t(46) = 1.64$, $p < .107$ (two-tailed) which as we have argued, is hard to explain from a strategy disruption framework.

Frequency Estimates

Preliminary analysis revealed that the frequency estimates were not homoscedastic across conditions. Therefore we rank-ordered the estimates, we replaced each estimate by its respective rank and used these ranks as the main dependent variable (see Connover, 1999).

We computed a 3 (Part-list Cueing: no cueing, standard cueing, gradual cueing) x 4 (Target Replication: childcare-professional, skinhead, computer-programmer, construction-worker) ANOVA on the frequency estimates.

Only the Part-list Cueing main effect was marginally significant, $F(2, 46) = 2.93$; $p < .064$, $\eta^2 = .113$, MSE = 277.16, revealing differences in frequency estimates in the 3 cueing conditions (raw means $M_{no\text{-}cueing} = 10.95$; $M_{standard\ cueing} = 16.37$; $M_{gradual\ cueing} = 15.15$, see Figure 1, panel B). The planned contrast between no cueing and the two cueing conditions indicates, as predicted, that the provision of part-list cues both in standard and gradual cueing conditions boost frequency estimates, compared to no-cueing conditions, $t(46) = 2.00$, $p < .051$ (two-tailed). This result also replicates previous findings (e.g., Garcia-Marques et al., 2002; Garrido et al., 2011) and is quite akin to the idea that enhancing the accessibility of a subset of the previously presented items results in memory response integration, which heightens the activation of all relevant items as a whole. The planned contrast between the standard and the gradual cueing conditions indicates, as expected, that the effects of cueing in frequency estimates do not differ, $t(46) = 1.33$, $p < .191$ (two-tailed). Taken together, the results from free recall and frequency estimates produced the predicted dissociation of the effects of standard part-list cueing and gradual-list cueing in free recall and frequency estimation. More importantly, these effects continued to be reliable after the changes we introduced in the experimental paradigm.

General Discussion

In this study we explored the potential parallel between part-list cueing and collaborative inhibition effects. To do so we compared the retrieval consequences of a standard part-list cueing manipulation with a new manipulation of part-list cues that resembles and attempts to reproduce standard collaborative recall paradigms.

If the part-list cueing effects had failed to occur under conditions in which the cues are gradually released, the parallel between the processes underlying part-list and collaborative inhibition effects would be severely undermined. However, the pattern of results obtained shows that in both cueing conditions, cues impaired free recall and boosted frequency estimates compared to a standard no cueing condition. These results therefore reinforce the parallel between part-list cueing and collaborative recall and show for the first time, in a comparable paradigm, that they produce the same effects. Additionally, the obtained dissociation of the effects of the two cueing conditions at retrieval lends further support to the TRAP model namely to the assumption of the operation of exhaustive and heuristic processes of retrieving information from memory.

Yet the fact that the magnitude of the part-list cueing effects is marginally lower when cues are gradually released (as it is always the case in collaborative recall) suggests a limit to the validity of the parallel between the part-list cueing and the collaborative inhibition effects. Namely, it suggests that although both effects share common components, there may be components that are unique to part-list cueing. As we argued before, the gradual release of cues should disrupt the participants' preferred recall strategies even more severely. Therefore we would like to suggest that although strategy disruption may be present in both paradigms, it seems to contribute more directly to the retrieval inhibition effects obtained in collaborative memory paradigms. This is a possibility we certainly want explore further in future research. More

specifically, it would be interesting to assess the effects of decreasing strategy disruption in collaborative memory paradigms. To this end, it would be possible to use a modified collaborative recall paradigm, more comparable to a standard part-list cueing paradigm, in which each collaborative group member is asked to recall in turn and aloud not one but one third of all the items previously presented.

From a social cognitive perspective the parallel between the processes underlying part-list cueing and collaborative recall effects is important because emphasizes the significance of both informational and social contexts and their respective consequences to social memory. Notably, in the daily use of memory, the occurrence of such types of interference, that can impede or facilitate memory for past events, is quite likely.

From a general psychological perspective the parallel between the processes underlying part-list cueing and collaborative recall effects constitutes and attempt to counteract the increased proliferation of psychological mechanisms proposed to explain specific effects instead of, based in the same basic psychological processes, explain several cognitive functions (Abelson & Black, 1986). If we recall that science is not ultimately about demonstrating and explaining particular effects but that is about understanding fundamental principles and regularities of organization and function than the parallel between part-list cueing and collaborative recall effects assumes particular relevance.

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Footnotes

[1.] The exclusion of cued items from the recall protocols is standard procedure in the part-list cueing literature. The inclusion of the cued items would be make cueing incomparable with no cueing conditions because participants from cueing conditions are re-exposed to the cues and, in one condition, are even asked to copy the cues to their protocols granting them therefore an unfair advantage regarding those in no cueing conditions.

[2.] In additional analyses we excluded irrelevant behaviors to allow a more direct comparison of the recall results with the frequency estimates. The pattern of results obtained was identical: A Part-list Cueing main effect $F(2,46) = 8.31$, $p < .001$, $\eta_p^2 = .265$, MSE = 1.44, indicating significant differences across the three cueing conditions ($M_{no\ cueing} = 3.58$; $M_{standard\ cueing} = 2.00$; $M_{gradual\ cueing} = 2.90$). Results also indicate that recall performance is better when no cues are provided compared to standard and gradual cueing conditions, $t(46) = 3.36$, $p < .001$ (two-tailed). More importantly, the effect of part-list cueing was reliable in the standard part-list cueing condition $t(46) = 4.06$, $p < .001$ (two-tailed), d = 1.19, and in the gradual cueing condition, $t(46) = 1.75$, $p < .086$ (two-tailed), d = .51. More importantly, the confidence intervals for the effect size obtained also overlapped, respectively]d = .61; d = 2.14[and]d = –.04; d = 1.22[. In addition, we also obtained a further a main effect of Target Person Replication, $F(3,46) = 4.53$, $p < .007$, $\eta^2 = .228$, MSE = 1.44, indicating higher recall performance for the construction-worker / non-intelligent ($M = 3.47$) and the childcare-professional / friendly ($M = 3.33$) than for the computer-programmer / intelligent ($M = 2.21$) and skinhead / unfriendly ($M = 2.21$) target replications. The Part-list Cueing X Target Person Replication interaction was not significant.

Author Notes

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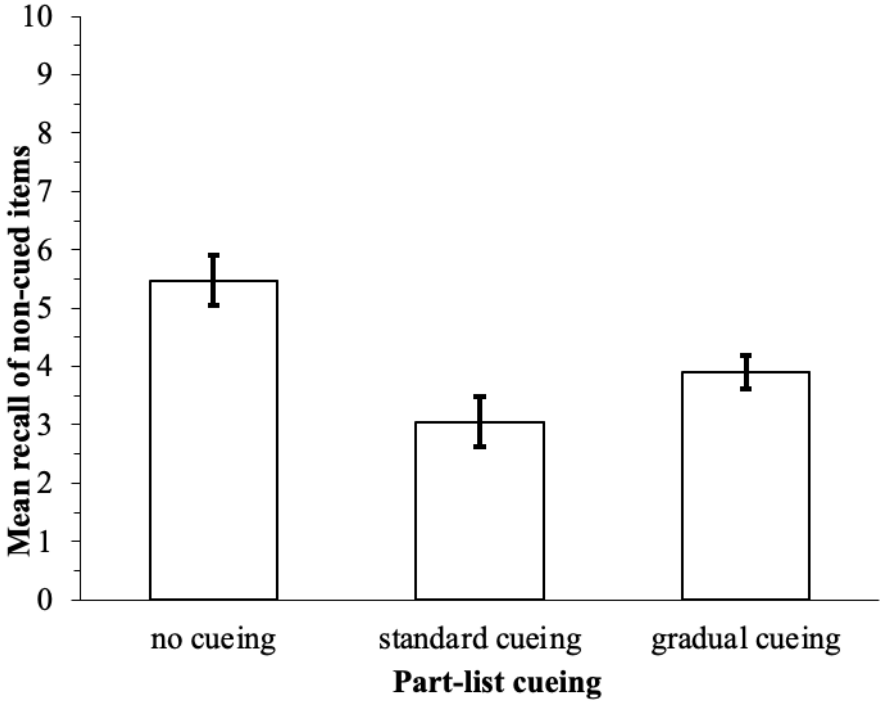
Figure captions

Figure 1: Mean recall of non-redundant items as a function of part-list cueing (Panel A) and mean frequency estimates (raw) of trait-relevant items as a function of part-list cueing (Panel B).

Figure 1

Panel A



Panel B