from the time-related decay of memory traces when attention is occupied by the spatial task. However, what are the features shared by squares and letters that could explain this phenomenon? Beyond the computational simulation of existing sets of data, is there a metric of this feature-sharing interference that would make it possible to predict the amount of interference between two given stimuli? What is the function relating this amount of interference with memory performance? If interference is the sole source of forgetting, can one identify stimuli whose processing does not interfere at all with given memory material? As long as these minimal commitments have not been met, as they are by time-based theories [5] (Box 1), interference-based accounts seem to rest on arguing from null effects [4] and on post-hoc explanations for time-related effects. Actually, the similarity resulting from feature overlap has little effect in working memory [6].

Second, calculating a time-loss function as Lewandowsky *et al.* [1] do by plotting the amount of memory loss on the delay between encoding and recall is questionable. It is beyond doubt that mechanisms of maintenance are used to counteract forgetting in the short term [7,8]. Thus, a proper assessment of time-related loss must take into account the interplay between the time during which these maintenance activities either can or cannot take place. When this is properly done, another picture appears, revealing the effect of time (Box 1).

Finally, contrary to Lewandowsky *et al.*'s [1] claim, the TBRS model does not assume that forgetting is only a function of cognitive load, but integrates the effect of peripheral interference [5]. Moreover, ruling out the TBRS model necessitates experiments in which time is carefully controlled, which was not the case in the self-paced tasks used by Oberauer and Lewandowsky [4]. Interestingly, and contrary to interference-based accounts that deny any role of time in short-term memory [4], the authors concede that 'the time available for memory restoration' has an effect on recall performance: this is perhaps a first step in acknowledging that time has a crucial role in short-term forgetting.

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Letters Response

Response to Barrouillet and Camos: Interference or decay in working memory?

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Barrouillet and Camos raise three objections to our conclusion that short-term forgetting is caused by interference rather than decay [1]. They suggest (i) that interference models are 'vague', (ii) that considering forgetting as a function of delay is questionable and (iii) that the time-based resource-sharing (TBRS) model is not challenged by the data we cited. We believe that these objections do not withstand scrutiny.

First, at least one interference model (serial order in a box [SOB] [2,3]) is precisely specified and quantitatively predicts 'accuracy and latency of responses', including in Barrouillet and Camos' complex-span task. The TBRS, by contrast, does not seem able to predict data such as serial position curves, grouping effects or effects of phonological similarity.

We agree that interference models should predict the effects of distractor type – as indeed they do; the extent of forgetting differs considerably between different distractors [4], exactly as predicted by SOB and contrary to a simple decay view. Furthermore, Barrouillet and Camos ask whether stimuli could be sufficiently dissimilar not to cause interference; evidence for nonspecific retroactive interference [5] indicates that the answer is 'no'. Simulations with SOB show that interference does not require similarity; dissimilar distractors disrupt the memory representation at least as much as similar ones. Another interference model [6] predicts that feature overlap (not similarity) causes interference, and the data also confirm this prediction [7].

Our case against decay does not rest on a null effect but on (i) massive forgetting created by a single interfering event, with (ii) almost no further forgetting caused by several additional identical events [8]. Decay models can-

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not handle both results simultaneously because they must assume strong decay combined with weak rehearsal to explain (i), and weak decay combined with strong rehearsal to explain (ii).

Second, Barrouillet and Camos object to our examination of forgetting as a function of time, arguing that we must consider the opportunity for memory restoration (via rehearsal) in between distractors. Our article reveals our agreement (see Figure 2 in Ref. [1]). We agree, in particular, that additional time for restoration translates into better memory. This is why we examined time-based forgetting while preventing rehearsal by continuous distraction [8].

Barrouillet and Camos' third objection concerns our 'self-paced' methodology [8], which ostensibly permitted rehearsal. But by using Barrouillet and Camos' own way of computing cognitive load (CL) as the ratio of measured reaction times (RTs) to available time (Box 1 in Barrouillet and Camos' letter), our method is appropriate to maximize CL: we likewise measure RTs and immediately present the next stimulus, hence CL is approximately equal to 1. Moreover, Barrouillet and Camos' observed CL approximately equals 0.5, which reveals their procedure to be as self-paced as ours because the RTs of their participants were not capped by a deadline; hence the only difference between procedures is the post-response delay.

It follows that the TBRS is challenged by data in which CL is approximately equal to 1 and distractor time has no effect on forgetting [8]. Dismissing these results by appealing to rehearsal risks an escape into circularity that is common with verbal theorizing and that reinforces the principal point of our article [1]: progress is possible only by modelling the processes involved in memory and forgetting. The onus is on decay theorists to implement a process model that can quantitatively account for all the available data.

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