Peer Community In Registered Reports

Evaluating adaptive and attentional accounts of sensorimotor effects in word recognition memory

*A recommendation by **Clara Cohen** and **Chris Chambers** based on peer reviews by **Gordon Feld** of the STAGE 2 REPORT:*

Agata Dymarska, Louise Connell (2025) Sensorimotor Effects in Surprise Word Memory – a Registered Report. OSF, ver. 2, peer-reviewed and recommended by Peer Community in Registered Reports. https://osf.io/mg9jt

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Words have served as stimuli in memory experiments for over a century. What makes some words stand out in memory compared to others? One plausible answer is that semantically rich words are more distinctive and therefore exhibit a mirror effect in recognition memory experiments where they are likely to be correctly endorsed and also less likely to be confused with other words (Glanzer & Adams, 1985). Semantic richness can arise due to extensive prior experience with the word in multiple contexts but can also arise due to sensorimotor grounding, i.e., direct perceptual and action-based experience with the concepts represented by the words (e.g. pillow, cuddle). However, previous experiments have revealed inconsistent recognition memory performance patterns for words based on different types of sensorimotor grounding (Dymarska et al., 2023). Most surprisingly, body-related words such as 'cuddle' and 'fitness' exhibited greater false alarm rates. In the current study, Dymarska and Connell (2025) tested two competing theories that can explain the increased confusability of body-related words: 1) the adaptive account - contextual elaboration-based strategies activate other concepts related to body and survival, increasing confusability; and 2) the attentional account - somatic attentional mechanisms automatically induce similar tactile and interoceptive experiences upon seeing body-related words leading to less distinctive memory traces. The adaptive account leads to different predictions under intentional and incidental memory conditions. Specifically, contextual elaboration strategies are unlikely to be employed when participants do not expect a memory test and therefore in an incidental memory task, body-related words should not lead to inflated false alarm rates (see Hintzman (2011) for a discussion on incidental memory tasks and the importance of how material is processed during memory tasks). However, the attentional account is not dependent on the task instructions or the knowledge about an

upcoming memory test.
Here, Dymarska and Connell (2025) undertook an incidental recognition memory experiment with over 5000 words, disguised as a lexical decision task using carefully matched pseudowords during the encoding phase. The sample size was determined by using a sequential hypothesis testing plan with Bayes Factors. To test the predictions of the adaptive and attentional accounts, the authors derived a set of lexical and sensorimotor variables (including a body-component) after dimensionality reduction of a comprehensive set of lexical and semantic word features. The analysis involved running both Bayesian and frequentist hierarchical linear regression to explain four different measures of recognition memory performance based on the key sensorimotor variables and other baseline/confounding variables. While this analysis plan enables a comparison with the earlier results from an expected memory test (Dymarska et al., 2023), the current study is self-contained in that it is possible to distinguish the adaptive and attentional accounts based on the effect of body component scores on hit rate and false alarm rate. Results provided support for the attentional account: body-related words increased false alarms even when attention was not directed to them during the study phase, consistent with a somatic attentional mechanism that causes body-related words to activate tactile and other bodily modalities that render their representations less distinctive as a memory trace and retrieval cue. Overall, the authors conclude that their findings point to a reconsideration of the role of semantic richness in word memory.
The manuscript was evaluated over one round of review, after which the recommenders judged that the submission satisfied the Stage 2 criteria and awarded a positive recommendation. **URL to the preregistered Stage 1 protocol:** https://osf.io/ck5bg **Level of bias control achieved:** Level 6. *No part of the data or evidence that was used to answer the research question was generated until after IPA.* **List of eligible PCI RR-friendly journals:**

- Advances in Cognitive Psychology
- Collabra: Psychology
- Cortex
- Experimental Psychology
- F1000Research
- Journal of Cognition
- Peer Community Journal
- PeerJ
- Royal Society Open Science
- Studia Psychologica
- Swiss Psychology Open

References:

Dymarska, A. & Connell, L. (2025). Sensorimotor Effects in Surprise Word Memory – a Registered Report [Stage 2]. Acceptance of Version 2 by Peer Community in Registered Reports. https://osf.io/mg9jt

Dymarska, A., Connell, L. & Banks, B. (2023). More is Not Necessarily Better: How Different Aspects of Sensorimotor Experience Affect Recognition Memory for Words. Journal of Experimental Psychology: Language, Memory, Cognition. Advance online publication. https://dx.doi.org/10.1037/xlm0001265

Glanzer, M., & Adams, J. K. (1985). The mirror effect in recognition memory. Memory & Cognition, 13, 8-20. https://doi.org/10.3758/BF03198438

Hintzman, D. L. (2011). Research strategy in the study of memory: Fads, fallacies, and the search for the "coordinates of truth". Perspectives on Psychological Science, 6, 253-271. https://doi.org/10.1177/1745691611406924

Reviews

Evaluation round #1

DOI or URL of the preprint: https://osf.io/mg9jt
Version of the preprint: 1

Authors' reply, 08 February 2025

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Decision by Clara Cohen and Chris Chambers, posted 29 January 2025, validated 29 January 2025

Minor Revision

Thank you for your Stage 2 submission. One of the original Stage 1 reviewers was available to evaluate your manuscript, and we have decided to proceed on the basis of this review and my own reading of the manuscript. As you will see, the reviewer judges that your submission broadly meets the Stage 2 criteria and is a strong example of a rigorous and transparently reported Stage 2 RR. There are just three points to address in a revision. The first is the rationale for the exploratory analyses (Stage 2 criterion 2D). In my reading, they make sense, but I agree with the reviewer that their rationale could be fleshed out more to make their purpose crystal clear to readers. The reviewer also suggests deploying drift diffusion modelling as part of these exploratory analyses. On this point, I agree that this approach could offer some very interesting insights. At the same time, I also think the analyses as reported are sufficient to justify the conclusions, so I will let you be the judge of how to respond to this idea. Under PCI RR rules, at Stage 2 the scope for requiring additional exploratory analyses is (by design) highly constrained, unless the reviewers/recommenders judge that such analyses are necessary to justify the conclusions being drawn (a circumstances which does not apply in this case). Second, I would be grateful if you could update the study design table (p35) to add a column on the far right called "Observed outcome", which summarises in very basic terms whether the hypothesis was confirmed or disconfirmed in each row. This will provide a helpful overview for readers and can assist in future systematic reviews. Please also give this table a name and caption. Finally, in the section 'Ethics and Consent' you note that "All materials, anonymised data, analysis code and full results are available on the

Open Science Framework at https://osf.io/3ct7h/". This link points to the Stage 1 registration made by PCI RR but doesn't contain any materials, data or code. I believe the correct link to include here is this one: https://osf.io/hqd2m/ so please adjust as necessary. Once we receive your revision and response, a final Stage 2 recommendation will be rapidly forthcoming. best wishes, Chris Chambers PCI RR Managing Board

Reviewed by **Gordon Feld**, 25 November 2024

Overall, the authors stuck to their plan and report the results in an unbiased way. The discussion is aligned with the results and offers speculations on those that are not predicted by the hypotheses.

I am unsure what the exploratory results add. Maybe the authors could explain this a little more. In this regard, it may be more interesting to perform drift diffusion modelling on the RT data. In addition, the authors may gain insights from computing the decision criterion in addition to d-prime.

These are of course just some suggestions and the stage 2 RR can of course be published as is, if the authors wish. I see no deviations from the stage 1 plan that would neccesitate a revision.