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OPEN PEER REVIEW

Side-by-Side Observation of the *Ebbinghaus illusion* Affects Motor Performance, But Not Learning

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About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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1 Original submission

4 comments · 18 Dec 2025 – 20 Feb 2026

Referee 1 Reviewer

MAJOR REVISION 18 Dec 2025

The article is within the scope of the journal.
The article is novel.
The title reflects the content appropriately.
There is no abbreviation in the title.

Referee 2 Reviewer

MAJOR REVISION 12 Feb 2026

*Statistical Power and Sample Size Justification
*Inconsistency in ANOVA Reporting and Interpretation
In the putting accuracy results, the group × block interaction is reported as $F(12,42) = 1.38$, $p > .05$, $\eta^2p = .06$, yet it is discussed as if meaningful.
*The conclusion that visual illusions affect performance but not learning requires stronger theoretical justification.
*Learning was assessed only using a 24-hour retention test. The lack of a transfer test and longer-term retention assessment should be acknowledged as important limitations, and the conclusions regarding learning should be tempered accordingly.
Self-Efficacy Questionnaire Validity and Reliability
The source, validity, and reliability of the self-efficacy questionnaire are not reported.

Associate Editor

MAJOR REVISION 16 Feb 2026

Major revision

Editor-in-Chief

MAJOR REVISION 20 Feb 2026

Dear author

Thank you for submitting your manuscript entitled "Side-by-side Observation of the Ebbinghaus Illusion Affects Motor Performance, But Not Learning" to the Journal of Motor Control and Learning. Your work addresses an interesting topic within the OPTIMAL theory framework and has been reviewed by experts in the field.
Based on the reviewers' recommendations, I am pleased to inform you that your manuscript requires Major revisions. Please address the reviewers' comments carefully in your revision.

Additional Editorial Request:
During the review process, our editorial office identified a related manuscript currently published online elsewhere (https://spsyj.ssrc.ac.ir/article_4877.html?lang=en) that shares conceptual similarities with your work. To ensure that the unique contribution of your study is clearly established, I must ask you to provide a clear explanation of the differences between your manuscript and the related study.
Please provide a point-by-point explanation in your response letter that clearly articulates the unique

contribution of your study.
I look forward to receiving your revised manuscript and your detailed response.

Sincerely,
Editor-in-Chief
Journal of Motor Control and Learning

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Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

The manuscript addresses an important and timely topic, attempting to contribute to the existing literature in a meaningful way. The study design is generally appropriate, and the authors have made a clear effort to present their objectives, methodology, and findings in a structured manner. The topic is relevant to the scope of the journal and has potential practical and theoretical implications

Please check the comments.

Lines 4–8 (Background): Consider explicitly distinguishing performance and learning already in the background to align with the central theme of the manuscript.

Lines 11–15 (Methods):Please clarify that learning is *operationally defined* as retention performance. This distinction is critical and should be explicit, especially given later interpretation.

Lines 16–20 (Results): The Results section is clear; however, reporting effect sizes (e.g., ηp^2) in the abstract would strengthen it and align with best practices.

Lines 21–24 (Conclusions): The conclusion is appropriate but slightly broad. Consider explicitly stating that learning was operationalized via retention performance to avoid ambiguity.

Lines 28–34 The rationale for using golf as a paradigm is appropriate. However, the paragraph would benefit from a clearer logical transition from general motor learning principles to visual illusions.

Lines 35–44 This section is well-written and theoretically grounded. A brief summary sentence at the end clarifying how self-efficacy links to *visual illusions* would improve coherence.

Lines 45–54 The explanation of the Ebbinghaus illusion is clear. However, note a conceptual inconsistency later in the manuscript regarding which illusion leads to “larger perception.” Please ensure consistent terminology throughout (large-perception vs. small-perception).

Lines 55–61 Good historical grounding. However, clarify whether Witt et al. (2012) focused on performance only, or whether learning was also assessed, to avoid later conceptual overlap.

Lines 76–86 This paragraph effectively introduces controversy. Consider explicitly stating why conflicting findings justify the present design, rather than implying it.

Lines 87–99 The discussion of Maquestiaux et al. (2021) is important. However, the description becomes dense. Consider summarizing their findings in a table or schematic for clarity (optional but recommended).

Lines 100–124 This paragraph mixes methodological critique with theoretical interpretation. Consider separating:

- Methodological limitations of prior work
- The specific gap the present study addresses

This will sharpen the study rationale

Lines 126–132 The sample is clearly described. However:

- Please report whether a power analysis was conducted.
- If not, explicitly acknowledge this as a limitation.

Lines 133–147 There is ambiguity regarding the use of two holes simultaneously. Clarify:

- Did participants putt to one hole only?
- How was attention controlled when both illusions were visible?

This is critical for internal validity.

Lines 148–150 Radial error is an appropriate measure. Please justify the choice of 100 cm as the maximum deviation, or cite precedent.

Lines 154–180 The procedure is generally clear, but the sequence is cognitively demanding for the reader.

- Add a timeline figure (if not already sufficient in Fig. 2).
- Clarify whether drawing the circle occurred before every phase consistently for all groups.

Lines 169–172 The rationale for providing augmented feedback only in blocks 1, 3, and 5 should be explained more explicitly.

Lines 184–193 Please clarify:

- Assumptions checks (normality, sphericity)
- Corrections applied (e.g., Greenhouse–Geisser)

This is essential for transparency.

Putting Accuracy (Lines 207–218) There is a logical inconsistency:

- The interaction is reported as non-significant ($p > .05$),
- Yet group differences are discussed in a way that implies differential learning.

Please reconcile this interpretation carefully.

Self-Efficacy (Lines 219–228)
Results are clearly reported. However, clarify why self-efficacy differences persisted when learning effects did not—this issue should be flagged here, not only in Discussion.

Lines 242–254 The statement:

“This study is the first to show that the Ebbinghaus illusion does not influence learning…”

is too strong. Similar null learning effects have been reported (e.g., ref 20, 27). Please rephrase more cautiously.

Lines 255–272
This is a strong integrative paragraph. However, avoid redundancy with the Introduction; focus more on interpretation rather than restatement.

Lines 288–305
The discussion of attentional focus and novice learners is theoretically rich, but speculative. Please explicitly label speculative interpretations as such.

Lines 311–353 This section is insightful. However, the claim that perceptual effects “remained stable” requires caution—drawing circles may reflect memory or strategy, not perception per se.

Lines 354–369 The discussion of self-efficacy is strong, but the causal direction remains unclear. Please acknowledge that self-efficacy may be an *outcome* of performance, not solely a mediator.

Lines 370–382 Excellent integration of recent meta-analyses. This strengthens the manuscript considerably. Consider moving this discussion slightly earlier to frame interpretation.

Lines 383–399) The conclusion is balanced and appropriate. Minor suggestions:

- Reiterate the performance–learning distinction
- Emphasize the methodological contribution (side-by-side illusion presentation)

Response to the Associate Editor’s Comment

Dear Editor,

We sincerely thank you for bringing the related study to our attention and for the opportunity to clarify the distinct contribution of the present manuscript. While both studies address the Ebbinghaus illusion in motor task contexts, several methodological differences should be noted.

First, the experimental designs are not identical. The referenced study employed a two-group comparison, whereas the present study included three groups (large-perception, small-perception, and control), allowing for a more differentiated comparison of perceptual conditions. In addition, an important distinction lies in the nature of the motor task. The referenced study was conducted using a dart-throwing task, whereas the present study employed a golf putting task. Although both are considered ballistic skills, prior research has suggested that the effects of visual illusions may vary depending on task constraints and execution characteristics within such skills (Maquestiaux et al., 2021). Therefore, differences in task demands may partly account for variations in findings between the two studies. Taken together, although the two studies share a general conceptual framework, these differences in some design and task characteristics indicate that the present study provides a complementary perspective rather than a direct replication.

We have clarified these distinctions in the revised manuscript to better highlight the unique contribution of the present work framework of OPTIMAL theory. This provides a broader understanding of how visual illusions may influence motor behavior beyond immediate task execution. Taken together, while there is conceptual overlap in the general topic, the present study offers a distinct methodological approach and theoretical contribution. We have revised the manuscript to more clearly emphasize these differences and highlight the novel aspects of our work.

We hope this clarification satisfactorily addresses the editorial concern.

Sincerely.

2 Revision 1

2 comments · 5 May 2026 – 12 May 2026

Associate Editor

ACCEPT 5 May 2026

The authors addressed all of the reviewers' comments.

Editor-in-Chief

ACCEPT 12 May 2026

Dear Author,

We are pleased to inform you that your manuscript has been accepted for publication in the Journal of Motor Control and Learning. After careful review and consideration, the editorial board has approved your paper for final publication.

Thank you for submitting your valuable work to our journal. We appreciate your contribution to the advancement of research in motor control and learning.

With best regards,
Mehdi Shahbazi
Editor-in-Chief
Journal of Motor Control and Learning