THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

SCHOOL OF PSYCHOLOGY

118 College Drive #5025 | Hattiesburg, MS 39406-0001
Phone: 601.266.5411 | Fax: 601.266.5580 | mark.huff@usm.edu | www.usm.edu

May 10, 2021

Psychonomic Society
2424 American Lane
Madison, WI 53704-3102

Dear Graduate Travel Award Section Committee:

With great pleasure I am writing this letter on behalf of Nicholas Maxwell to support his travel to the 2021 Psychonomic Society meeting in San Diego, CA. Nick is currently pursuing a PhD in Cognitive Psychology in my lab at The University of Southern Mississippi and this award will greatly assist Nick in attending this year's conference. In addition to providing Nick with the opportunity to present his research, this award will greatly help with his educational development and afford him critical networking opportunities as he seeks a career as an academic in the Cognitive Sciences. Indeed, Nick will be active on the job market in the Fall, and the Psychonomic Society conference will be an excellent opportunity for him to interact with prospective employers.

Nick is fully eligible for this award: He is currently a graduate student who is enrolled in our PhD program and will be the first author presenter on his submitted poster. Additionally, I am a Fellow of the society and will be sponsoring his submission to the conference. As you will see from Nick's submission, he did a fine job in preparing a brief research summary and preparing an abstract for the conference. I can verify that Nick's submission is entirely his own. I am very proud of Nick's efforts on this project and I hope that you find his application suitable for funding for this year's conference.

If you have any questions about Nick's conference submission or his application, please do not hesitate to contact me following my contact information below.

Sincerely,

Mark J. Huff, PhD
Assistant Professor, Psychology
The University of Southern Mississippi
mark.huff@usm.edu

The judgment of learning (JOL) task is often used to assess memory monitoring at encoding. In the JOL task, participants study cue-target word pairs (e.g., mouse-cheese) and are asked to rate the probability of correctly recalling the target in the presence of the cue at test (e.g., mouse-?). Previous research has shown that the accuracy of JOLs is sensitive to perceptual cues, and these cues can induce metacognitive illusions in which JOLs overpredict subsequent recall. One example is the *font-size effect* (Rhodes & Castel, 2008), which occurs when participants inflate their JOL ratings when word pairs are presented in a large font versus small font without a concomitant increase to recall. While the font-size effect has been reported under several conditions, the underlying factors driving the effect remain unclear. Two theories have been proposed to account the font-size effect—the fluency account and the beliefs account. First, the fluency account states that larger words are more perceptually fluent than smaller words. Due to their greater perceptual fluency, participants process larger words more efficiently and/or effectively, leading to higher JOLs (Undorf, Zimdahl, & Bernstein, 2017). Alternatively, the beliefs account posits that participants expectation about an item's memorability is the primary factor influencing JOLs. Regarding the font-size effect, participants may assign higher JOLs to large items because they expect that large pairs are easier to learn than small pairs (Mueller, Dunlosky, Tauber, & Rhodes, 2014).

The present study provides an additional test of the font-size effect while also testing whether other perceptual manipulations affect correspondence between JOLs and recall. First, Experiments 1A and 1B were designed to replicate the font-size effect and tested whether JOL overestimation extended to a highlighting manipulation. Participants studied a list of forward (e.g., credit-card), backward (e.g., card-credit), symmetrical (e.g., king-queen) and unrelated (e.g., muffin-floor) word pairs generated using the University of South Florida Free Association

Norms (USF Norms; Nelson, McEvoy, & Schreiber, 2004). These pairs were presented as either large (54-pt.) or small (12-pt.) Arial font pairs (Experiment 1A), or as 32-pt. Arial pairs that were either presented highlighted in yellow or presented with no highlight (Experiment 1B), in which font size and highlight/no-highlight pairs were manipulated within-subjects. Importantly, all experiments included a pure-control group comparison in which only the standard perceptual condition is used (i.e., all pairs presented in a standard font size), rather than a mix of perceptually fluent/disfluent pairs. These control groups were included because encoding manipulations have been shown to spill-over into other encoding tasks when encoding is manipulated within-subjects (Huff, Bodner, & Gretz, 2021). This additional comparison group allowed us to gauge perceptual effects on JOLs more accurately relative to a baseline condition. Overall, in Experiment 1A, large font increased both JOLs and recall rates equally relative to small font, but did not differ between large or small font pairs relative to the control group (Figure 1). In Experiment 1B, JOLs and recall did not differ as a function of highlighting, and no differences were found across highlighted pairs, non-highlighted pairs, or the control group (Figure 2). Thus, the font-size effect was not in evidence, and the pattern did not extend to highlighting.

Because Rhodes and Castel (2008) showed that the font-size effect was moderated by pair relatedness and strongest with unrelated word pairs, we reasoned that the font-size effect may have failed to emerge in Experiments 1A and 1B due to our inclusion of related pairs. To account for this, Experiments 2A and 2B provided additional tests of both font-size and highlighting on JOLs using only unrelated word pairs. However, in Experiment 2A, the font-size effect again was not in evidence, as JOLs and recall were again equally boosted for large pairs relative to small pairs. Again, no differences were detected relative to the control group (Figure

3). In Experiment 2B, JOLs and recall again did not differ as a function of highlighting, and no differences were detected relative to the control group (Figure 4).

Finally, Experiment 3 tested whether presenting pairs using Sans Forgetica—a perceptually disfluent font designed to improve memory (Earp, 2018)—would result in inflated JOLs. Recent research, however, suggests that this font does not improve memory and may induce a memory cost (Geller, Davis, & Peterson, 2020; Tayler, Sanson, Burnell, Wade, & Garry, 2020). However, although this font is disfluent, participants may hold the belief that Sans Forgetica will improve memory, resulting in inflated JOLs for Sans Forgetica pairs. Thus, Experiment 3 used this font to contrast the fluency and beliefs accounts of how perceptual features affect JOLs. Based on the fluency account, the disfluent nature of Sans Forgetica should produce lower JOLs relative to a more fluent font such as Arial. However, if participants hold a memory belief that pairs presented in Sans Forgetica are more likely to be correctly recalled at test, then JOLs may be inflated for the Sans Forgetica pairs. Overall, a memory cost was found for the Sans Forgetica font relative to pairs presented in standard Arial font, and it had no effect on JOLs. Furthermore, Arial pairs presented in mixed lists with Sans Forgetica pairs showed greater JOLs and recall rates than Arial pairs in the pure group, suggesting that the mixed list context increased both JOLs recall of Arial pairs (Figure 5).

Collectively, this set of experiments provides a greater understanding of how perceptual features influence JOLs and recall, particularly within the context of cued-recall testing. In doing so, this research supports the Pychonomic Society's mission of fostering the science of cognition via the advancement and communication of basic research in experimental psychology by (1) attempting to replicate the font-size effect, which is an established finding in metamemory research, (2) testing whether similar effects can extend to additional manipulations (highlighting

and Sans Forgetica), and (3) novel comparisons to control groups which allowed us to assess the effects of context on fluency effects, providing a more complete assessment of how these processes affect both JOLs and recall. In sum, this set of experiments suggests that perceptually fluent and disfluent study pairs do not appear to selectively inflate JOLs at study.

References

Earp, J. (2018). Q&A: Designing a font to help students remember key information

Geller, J., Davis, S. D., & Peterson, D. J. (2020). Sans forgetica is not desirable for learning. *Memory*, *28*(8), 957-967.

Huff, M. J., Bodner, G. E., & Gretz, M. R. (2021). Distinctive encoding of a subset of DRM lists yields not only benefits, but also costs and spillovers. *Psychological Research, 85*, 280-290.

Mueller, M. L., Dunlosky, J., Tauber, S. K., & Rhodes, M. G. (2014). The font-size effect on judgments of learning: Does it exemplify fluency effects or reflect people's beliefs about memory? *Journal of Memory and Language*, *70*, 1-12.

Nelson, D. L., McEvoy, C. L., & Schreiber, T. A. (2004). The University of South Florida free association, rhyme, and word fragment norms. *Behavior Research Methods, Instruments, & Computers*, *36* (3), 402–407.

Rhodes, M. G., & Castel, A. D. (2008). Memory predictions are influenced by perceptual information: Evidence for metacognitive illusions: *Journal of Experimental Psychology: General, 137*(4), 615-625.

Undorf, M., Zimdahl, M. F., & Bernstein, D. M. (2017). Perceptual fluency contributes to effects of stimulus size on judgments of learning. *Journal of Memory and Language*, *92*, 293-304.

Taylor, A., Sanson, M., Burnell, R., Wade, K. A., & Garry, M. (2020). Disfluent difficulties are not desirable difficulties: the (lack of) effect of Sans Forgetica on memory. *Memory*, *28*(7), 850-857.

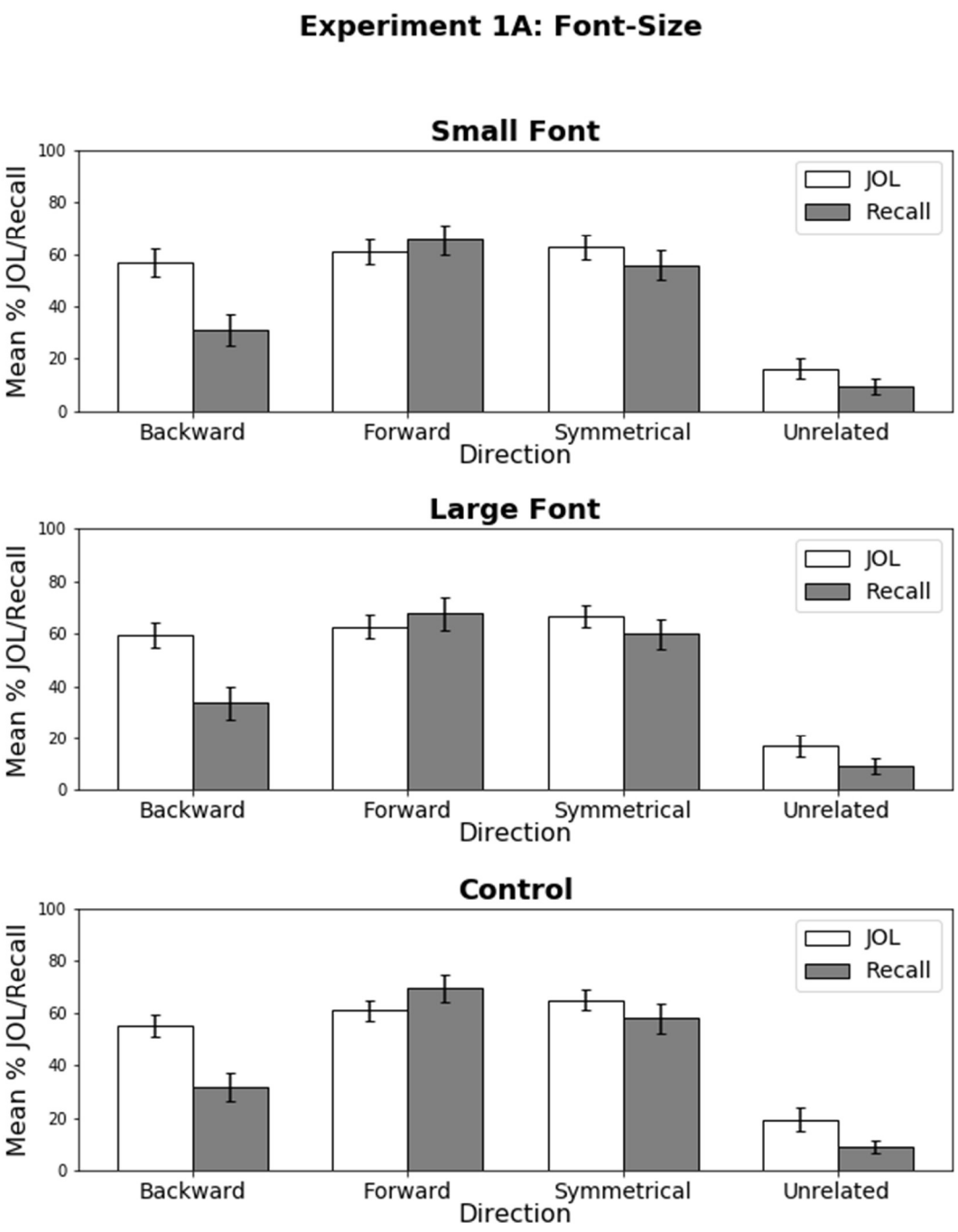

Figure 1. Mean JOL and recall rates as a function of pair type for pairs presented in small font (top panel), large font (middle panel), and the control group (bottom panel) as a function of pair direction in Experiment 1A. Bars represent 95% confidence intervals.

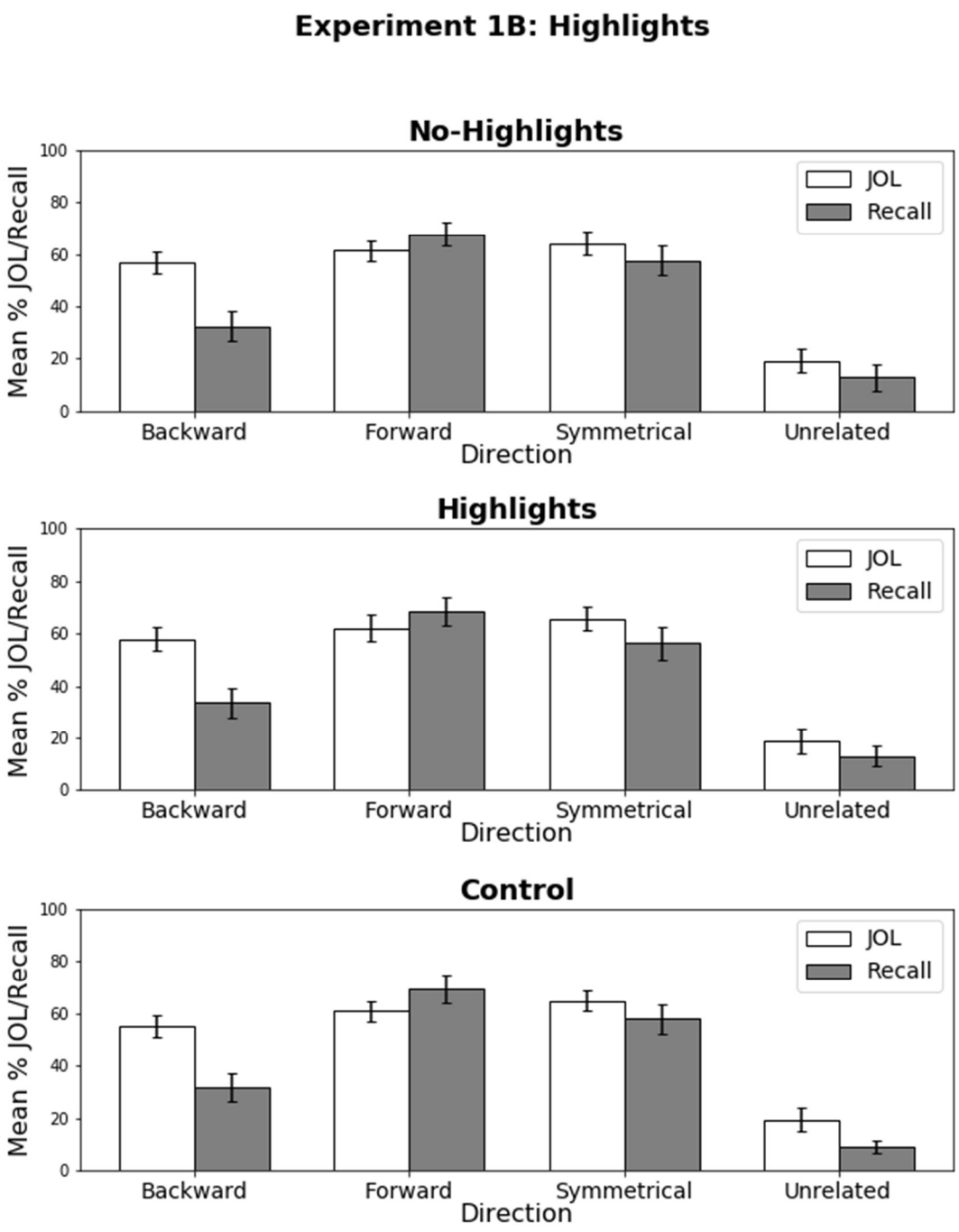

Figure 2. Mean JOL and recall rates as a function of pair type for highlighted pairs presented in mixed lists (top panel), non-highlighted pairs presented in mixed lists (middle panel), and non-highlighted pairs presented the control group (bottom panel) as a function of pair direction in Experiment 1B. Bars represent 95% confidence intervals.

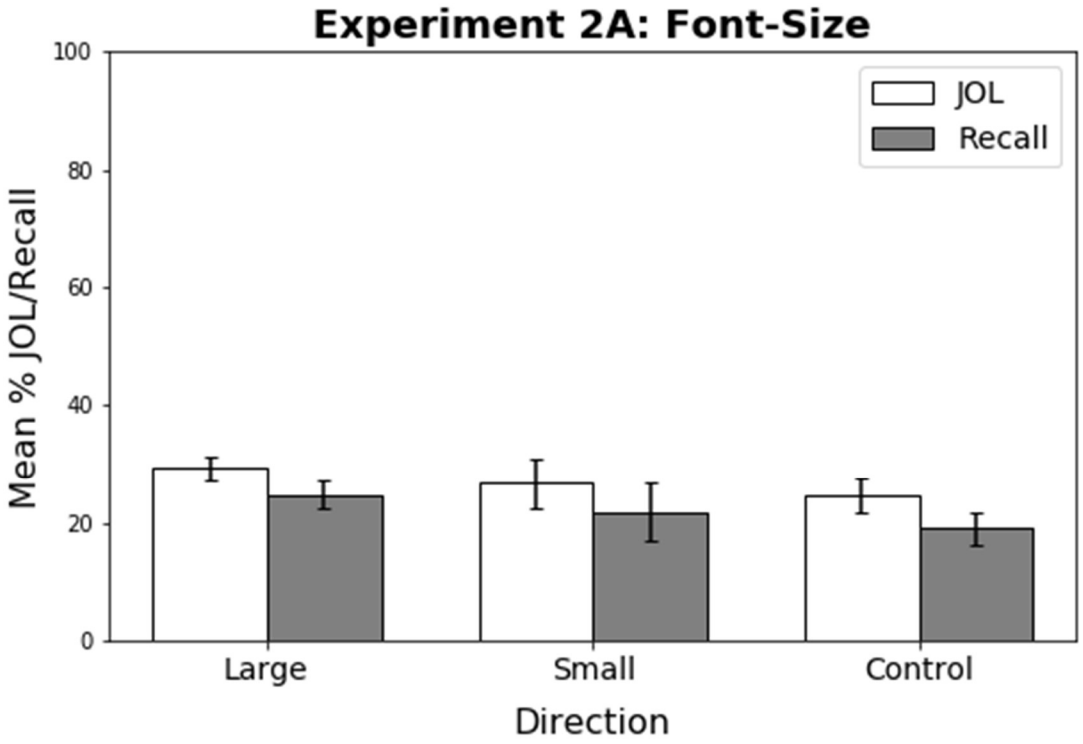

Figure 3. Mean JOL and recall rates as function of pair type in Experiment 2A. Bars represent 95% confidence intervals. All study pairs were unrelated.

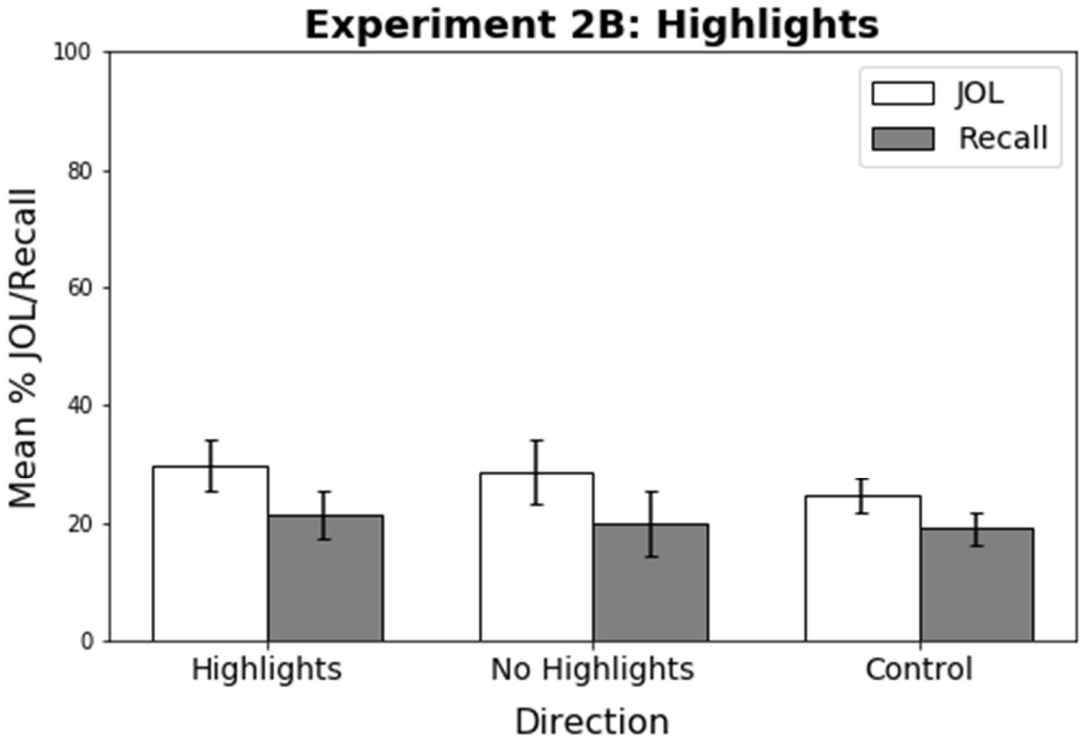

Figure 4. Mean JOL and recall rates as function of pair type in Experiment 2B. Bars represent 95% confidence intervals. All study pairs were unrelated.

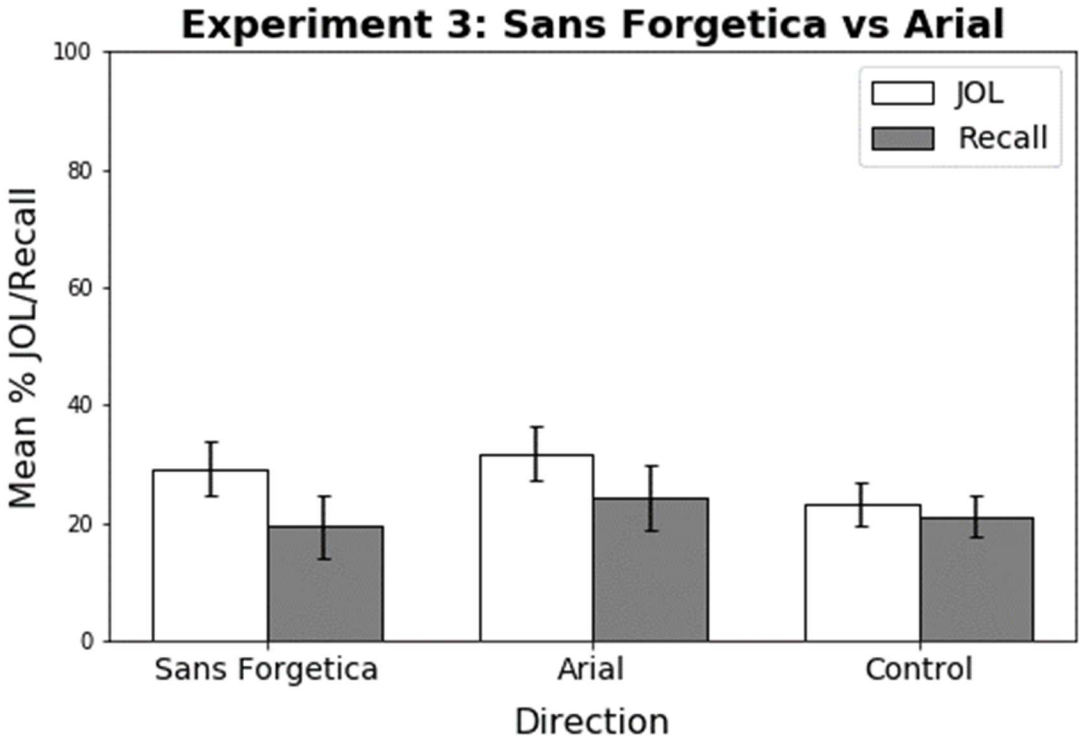

Figure 5. Mean JOL and recall rates as function of pair type in Experiment 3. Bars represent 95% confidence intervals. All study pairs were unrelated.