Does capitalisation facilitate sarcasm comprehension? Evidence from self-paced reading

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Background: Prosody is one of the cues that listeners use to detect sarcasm in spoken language [1]. In text-based communication, these vocal cues are absent, making sarcasm difficult to detect [2]. One widespread strategy in digital communication is capitalisation (e.g., writing "this is GREAT" rather than "this is great"). Multiple lines of evidence suggest capitalisation should help readers detect sarcasm. On the production side, corpus and computational studies show that writers systematically use word-level capitalisation in sarcastic and ironic contexts, and capitalisation is a significant predictive feature in computational sarcasm detection systems [3]. On the theoretical side, capitalisation has been argued to function as a written prosodic cue that encodes emphatic stress rather than merely signalling emotion [4], and the Implicit Prosody Hypothesis [5] holds that readers naturally project prosodic contours onto text during silent reading. If capitalisation activates emphatic prosody in a reader's inner voice, it could facilitate sarcasm detection by simulating the contrastive stress typically associated with sarcastic speech. Yet despite this converging production, computational, and theoretical motivation, no controlled psycholinguistic experiment has directly tested whether capitalisation facilitates real-time sarcasm processing during reading. The present study fills this gap.

Method: We used a self-paced reading paradigm, in which participants read sentences word-by-word at their own pace by pressing a key, and reading time on each word was recorded. The experiment employed a 2 (Capitalisation: present vs. absent) × 2 (Sentence Type: sarcastic vs. literal) within-subjects design with 32 experimental items adapted from prior work [6,7]. Each item consisted of a context establishing a positive or negative situation, followed by a response containing a critical evaluative expression rendered in capitals or lower-case (Table 1). The key dependent variable was reading time at the critical phrase, which is the point at which sarcastic and literal meanings diverge. A total of 113 participants (3,512 observations) completed the experiment online using PCIbex.

Results: Capitalised words were read significantly more slowly than non-capitalised words (p = .005), confirming that capitalisation attracted attention and disrupted fluent reading. At the critical phrase, the sarcasm processing cost was not significant (p = .335), but a robust sarcasm cost emerged at the spillover region, the word immediately following the evaluative expression (p = .001; Table 2), suggesting that sarcasm comprehension costs accumulate downstream. Crucially, the predicted Capitalisation × Sentence Type interaction was not significant in any analysis region (all ps > .09): capitalisation did not reduce the reading time cost associated with sarcasm. Bayes factor analyses (BF^{01} = 33–55 across regions) provided strong evidence favouring the null, and equivalence tests confirmed the interaction was statistically equivalent to zero at the critical and combined regions.

Discussion: Despite strong theoretical and production-side reasons to expect capitalisation would aid sarcasm detection, these results indicate it does not. It slows reading regardless of whether the sentence is sarcastic or literal, consistent with its role as a marker of visual salience. The finding that sarcasm costs emerge downstream of the critical word aligns with accounts suggesting that pragmatic inference unfolds incrementally as readers integrate the evaluative expression with the preceding context. The consistently null interaction is supported by both frequentist and Bayesian evidence and challenges the assumption that typographic emphasis can compensate for absent vocal prosody in sarcasm detection, and suggests that readers rely more heavily on contextual and semantic information than on typographic formatting when identifying sarcastic intent in text.

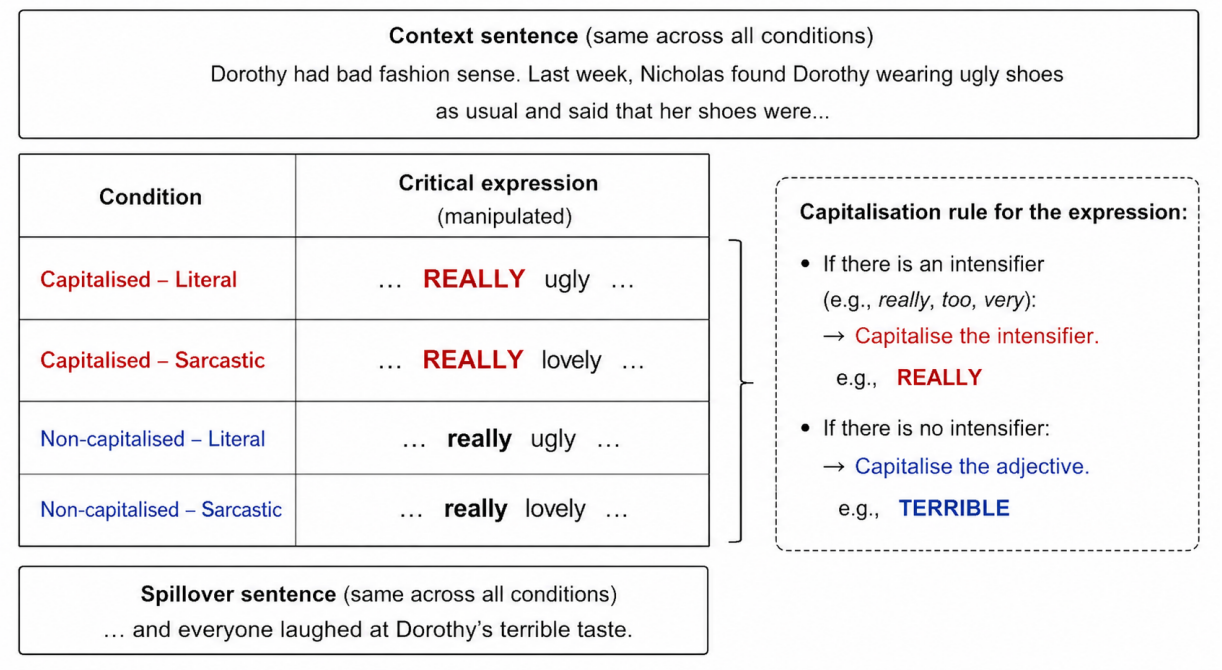

Table 1. Experimental conditions and exemplar stimuli.

		Sarcastic phrase	Spillover
Capitalised	Literal	659 (289)	479 (283)
	Sarcastic	705 (474)	515 (326)
Non-capitalised	Literal	632 (291)	475 (300)
	Sarcastic	651 (307)	532 (492)

Table 2. Mean reading times in milliseconds (SD) by capitalisation and sentence type at each analysis region.

References

[1] Rockwell, P. (2000). Lower, slower, louder: Vocal cues of sarcasm. *Journal of Psycholinguistic Research, 29*(5), 483–495.

[2] Thompson, D., & Filik, R. (2016). Sarcasm in written communication: Emoticons are efficient markers of intention. *Journal of Computer-Mediated Communication, 21*(2), 105–120.

[3] Whalen, J. M., Pexman, P. M., & Gill, A. J. (2009). "Should be fun — not!" Incidence and marking of nonliteral language in e-mail. *Journal of Language and Social Psychology, 28*(3), 263–280.

[4] Heath, M. (2018). Orthography in social media: Pragmatic and prosodic interpretations of caps lock. *Proceedings of the Linguistic Society of America, 3*(1), 1–15.

[5] Fodor, J. D. (2002). Prosodic disambiguation in silent reading. In M. Hirotani (Ed.), *Proceedings of the North East Linguistic Society 32* (pp. 113–132). GLSA.

[6] Zhu, N., & Filik, R. (2024). The role of social status in sarcasm interpretation: Evidence from the United Kingdom and China. *Discourse Processes*, 61(1–2), 69–89. https://doi.org/10.1080/0163853X.2023.2252695

[7] Huang, J., Wang, M., Zhang, T., Zhang, D., Zhou, Y., Mao, L., & Qi, M. (2024). Investigating the effect of emoji position on eye movements and subjective evaluations on Chinese sarcasm comprehension. *Ergonomics*, 1–16. https://doi.org/10.1080/00140139.2024.2325534