Review 2: "COVID-19 is Feminine: Grammatical Gender Influences Future Danger Perceptions and Precautionary Behavior"

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RR:C19 Evidence Scale rating by reviewer:

- **Strong.** The main study claims are very well-justified by the data and analytic methods used. There is little room for doubt that the study produced has very similar results and conclusions as compared with the hypothetical ideal study. The study's main claims should be considered conclusive and actionable without reservation.

Review:

Grammatical gender is completely arbitrary. For example, a toaster is feminine in Greek but masculine in Italian. Even within the same language, French, an artifact with typically masculine associations (chainsaw) is grammatically feminine but an artifact with typically feminine associations (mascara) is grammatically masculine. There is good evidence that despite these arbitrary associations, assigning gender to nouns affects how speakers of those languages may think about the objects. For instance, describing a key as 'hard' if you're a German speaker whose language classifies this noun as masculine, but describing the same key as 'lovely' if you're a Spanish speaker whose language assigns feminine gender on that word (Boroditsky, Schmidt, and Phillips, 2003). Seeing a chainsaw and a heavy-duty shirt in quick succession will lead French speakers to describe an artificially manipulated 'genderless' face as charming and dreamy, typically feminine traits, despite the masculine stereotypes invoked by the object primes (Sato & Athanasopoulos, 2018). It seems that the primes' grammatical gender (they are both feminine in French), more than any other experiential information, creates and shapes stereotypical associations.

The authors of the current paper take these lines of research further: if grammatical gender is such a powerful shaper of perception, then what are the consequences of grammatical gender for future behaviours and actions in response to something so fundamentally harmful for humanity, namely the coronavirus pandemic: "We propose that activating thoughts about the virus using the feminine-marked *la* COVID-19 will lead to lower perceptions of future danger compared to activating thoughts using the masculine-marked *le* coronavirus, which in turn will lead to lower intentions of taking precautions to avoid contracting the virus in potential consumption episodes." French-speaking participants answered questions about future consumption behaviour, and then answered questions about future danger perceptions. Indexed on a seven-point Likert scale, findings confirmed the predictions: participants answering questions

about la COVID-19 tended to be less cautious than participants answering questions about le coronavirus. The same pattern held for the perception of future danger, evaluated as greater by participants in the le coronavirus condition than in the la COVID-19 condition. Importantly, however, further analyses showed that the effect of grammatical gender on future precautionary consumer behaviours was mediated by perceived future danger: The virus in its grammatically masculine form predicts greater perceived future danger, and the more dangerous you think the effects of the virus will be, the more caution you express in your future behaviour. This relationship is not surprising when we consider the hypothesised underlying cognitive mechanism at play. If grammatical gender activates and emphasizes gender-specific associations, then we might imagine that the association between threat/danger and masculinity is more prominent than the possible association between cautious behaviour and femininity, due to the former's increased affective intensity. The authors replicated these findings in a Spanish context, which presents the same grammatical phenomenon in its linguistic description of the disease and the virus.

With these two studies, the authors have shown replicable associations. But what about evidence that grammatical gender, rather than any other spurious uncontrolled variable, actually causes the reported effects? After all the words themselves differ in how they sound and what they refer to, which may generate different connotations not associated with their grammatical gender per se. The authors rigorously addressed this in two ways. Firstly, they replicated the study with English speakers (a genderless language). "[R]esults showed that future danger perceptions and behavioral intentions were virtually identical" across the coronavirus vs. COVID-19 conditions. As the main comparisons are non-significant the authors do not present a full statistical analysis, but it would be interesting to see if the relationship between greater perceived danger and more cautious future behaviour holds in this sample of speakers as well, regardless of grammatical gender. Secondly, the authors tested French speakers again, but this time they manipulated only grammatical gender, keeping the word constant (le COVID-19 vs. la COVID-19). The results mirrored those of the previous studies. This is a little surprising, since in this manipulation grammatical gender becomes more salient for the participants in the le COVID-19 condition (which is the more marked/unusual form), so future perceived dangers may have been exacerbated further, if grammatical gender per se is the primary driver of the effect. Perhaps there is a ceiling on a Likert scale for how much greater future dangers are evaluated to be in the masculine condition. But what makes these findings particularly robust is that they presented with the same mediating relationship between grammatical gender,

perceived future danger, and intended future behaviour, as the previous studies did. The fourth study yielded converging evidence from a different methodology, namely online search behaviour patterns. As ever, the findings from this secondary analysis alone would not be sufficient to establish an association between a grammatical feature of language and human perception and behaviour. But the findings do converge with the findings of the more rigorous questionnaire-based studies reported earlier in the paper.

I am confident that the data the authors present in this paper, taken in its entirety, fully justify their interpretation and conclusion: “[W]e show that the virus is considered less likely to be dangerous in the future when thoughts of the concept are activated with the feminine grammatical gender than when they are activated with the masculine grammatical gender, which in turn reduces intentions to engage in behaviors to reduce the chances of contracting the disease or spreading the virus in potential consumption episodes.” Given the remarkable cross-linguistic variation that exists across the world’s languages in how many genders they specify and the rigour with which such specifications are applied, potential new research avenues are opened here that may enhance our understanding of how small quirks of grammar may tilt perception of the dangers of the virus, which in turn may affect future consumer intentions.