Review

The report “A fragmented news environment and the illusion of knowledge” proposes a single experiment on the influence of social media environments on the illusion of knowledge phenomenon, an in particular, the influence of emotional involvement. Despite several strengths (e.g., a broad selection of real-world stimuli, the planned sample size, the two time points of data collection), the proposal at this stage lacks theoretical fundament, transparency, internal validity, and statistical validity. I therefore cannot recommend it for acceptance at this stage. In the following, I will focus on the five criteria of the PCI RR community for stage-1 proposals, before I add some minor questions on the proposed research:

1A. The scientific validity of the research question(s). & 1B. The logic, rationale, and plausibility of the proposed hypotheses, as applicable.

My first and main issue with the proposal is that the hypotheses and the design are not sufficiently explained or theoretically justified. The proposed experiment incorporates a 2 (Emotional Intensity: High vs. Low) x 2 (Perceived Knowledge: High vs. Low) x 2 (Exposure: Yes vs. no) x Time (t0 vs. t1) mixed design, with the two latter factors manipulated within-subjects. The exposure and time factors are clear (but should be explicitly mentioned in the design section on p. 6). But why the other factors? The authors write: “Following Park’s intuition (2001) we believe that the key characteristic that might inflate perceived knowledge is the perceived involvement of the individual, regardless of the topic being assessed.” (p.4) But why do the authors “believe” that? I could not find any theoretical explanation in the proposal. The authors further propose two hypotheses H2 and H4 on emotional involvement without a theoretical explanation of why emotional involvement should have the proposed effects. I am sorry if I missed something here; I found the design and hypotheses lacked a clear theoretical fundament and sufficient explanation.

Regarding the second factor, I found no explanation in the proposal why topics are a priori selected based on perceived knowledge (high vs. low). Again, I am sorry if I missed something, but why were the materials selected based on *high* perceived knowledge (baseline) in a pretest? Such an approach is especially prone to floor effects. If participants' perceived knowledge is already very high (e.g., for global warming or abortion in the materials selected from the pretest), then exposure cannot further increase the perceived knowledge.

My second issue is that the proposal is imprecise with the terminology and lacks precise construct definitions. Is emotional intensity the same as emotional involvement and self-involvement? Whereas the first may relate to valence and arousal as the two fundamental dimensions of emotional experience, the third one is more connected to interest, previous experience, or other more cognitive factors. Perhaps also because of the lack of theoretical context, it does not become clear which construct the proposed manipulation should actually target.

On the positive side, the proposed research adheres well to ethical norms: The research protocol has already obtained funding from the research activities of the Neuroscience LAB of Intesa Sanpaolo Innovation Center and other institutions. I very much appreciate that real-world articles are used and that no deception is involved.

1C. The soundness and feasibility of the methodology and analysis pipeline (including statistical power analysis or alternative sampling plans where applicable).

The proposed sample size of n = 950 is sufficient to detect the proposed effects. However, my own power analysis with the mentioned parameters led to a required N = 580 (interaction/main effect in a 2 x 2 between-subject design). Could the authors add more context to which specific interface in Gpower led to the required N of 768? The sampling plan is transparent.

However, in regard to the proposed analysis, I have a few resentments. First, the authors want to operate with difference scores as dependent variable. I strongly advise against this because this eliminates all main effects of emotional intensity a priori. For example, 5-3 is treated equally to 7-5. Yet, the different baseline levels between conditions may be theoretically relevant. (Also, they might reveal floor/ceiling effects for some conditions that are otherwise not detectable.)

Second, the authors propose a 2 x 2 repeated measures ANOVA for H1-H2. Where do the repeated measures come from if the authors have computed a difference score? As a side note, a sphericity assumption cannot be violated if only two measures per factor exist. Overall, the proposed analysis is insufficiently explained and does not match the proposed study design as far as I understood it. It is also not mentioned which specific result relates to which hypothesis.

"If the test will give non-significant results, we will claim support for the null hypothesis, that is: the emotional intensity does not affect the knowledge illusion." Such a claim is at least problematic for standard frequentist statistics; I suggest Bayesian tests or equivalence tests for this case.

1D. Whether the clarity and degree of methodological detail is sufficient to closely replicate the proposed study procedures and analysis pipeline and to prevent undisclosed flexibility in the procedures and analyses. & 1E. Whether the authors have considered sufficient outcome-neutral conditions (e.g. absence of floor or ceiling effects; positive controls; other quality checks) for ensuring that the obtained results are able to test the stated hypotheses or answer the stated research question(s).

The authors state "If so, it may be that our selected topics failed to emotionally involve to the right extent, or, that emotional intensity does not have an effect per se. " (p.8). However, this is what a manipulation check could reveal, which the authors actually plan to

assess by measuring the emotional involvement. The authors state "Some extra control questions will be administrated to check whether subjects had paid attention to the experimental stimuli and environment." Please be more transparent regarding these attention checks to ensure reproducibility. The proposal describes the specific control variables they assess but does not outline a specific analytical strategy for these variables.

I appreciate that the original articles and the items of the knowledge tests are included in the proposal. However, as a non-Italian, I cannot provide any feedback here.

Minor comments:

- p. 2: "As far as we are aware, only two empirical studies" → Would it be more accurate to speak of "experimental studies" here, given the correlational evidence mentioned by the authors?
- p.4 "Both experiments were implemented as between-subjects designs where participants were first exposed to a newsfeed or a news article and then asked about their perceived and factual knowledge. […] The results indicated that participants who scrolled through many article previews had a significantly higher perceived knowledge that did not match their actual knowledge. "→ I did not fully comprehend the specific design and the corresponding comparison to arrive at this statement. It might help mentioning the design of these two articles here (e.g., experimental vs. control condition) and to be more precise what the comparative statement ("higher perceived knowledge") refers to as a comparison standard.
- p. 4 "Consequently, without a pre-test, the estimation of perceived knowledge obtained after an actual knowledge test may be biased by this intervention." I did not fully comprehend what type of bias the authors meant here (e.g., an underestimation of the effect).
- p. 4 What is "perceived involvement of the individual"? – who is the perceiver here?

- p. 4 The authors discuss limitations of Anspach et al. (2019) as one motivation for their own research, but no limitations of Schäfer (2020). I was just a little confused because I expected it after the limitations of Anspach.
- p. 8 → "Once the experiment is ready to run, Prolific will send an invitation email to all potential participants" → I did not know that it was possible to invite participants per mail on Prolific. Could the authors share how they did that (i.e., whether this is some custom allowlist or some other function that allows this)?

I wish the authors good luck with their research.

Best,

Moritz Ingendahl