



## Methodological choices have predictable consequences in replicating studies on motivation to think: Commentary on Ebersole et al. (2016)



Richard E. Petty<sup>a,\*</sup>, John T. Cacioppo<sup>b</sup>

<sup>a</sup> Ohio State University, United States

<sup>b</sup> University of Chicago, United States

### ARTICLE INFO

#### Article history:

Received 9 December 2015

Accepted 15 December 2015

#### Keywords:

Need for cognition

Argument quality

Replication

Attitudes

### ABSTRACT

Ebersole et al. (2016) aimed to conduct a direct replication of Cacioppo, Petty, and Morris (1983, Study 1) looking for a Need for Cognition X Argument Quality interaction on attitudes in response to a persuasive message. Although this effect has been replicated in the literature a good number of times, Ebersole et al. did not obtain it. We attribute their failure to the fact that in their replication effort they used neither of the original independent variables and indeed changed them substantially. Furthermore, they made some other methodological changes to the procedure used in the original study that subsequent research has plausibly suggested would reduce the likelihood of finding the effect. We conclude that because of all of these methodological changes as well as their failure to pretest the impact of these modifications, the replication effort is uninformative.

© 2015 Elsevier Inc. All rights reserved.

Experiments in basic social psychology involve translating one's conceptual independent and dependent variables into specific operational instantiations that are examined in a given context with a particular population at a given point in time. Replications of such studies therefore come in two common forms – *conceptual* and *operational* – with the latter sometimes known as a direct or exact replications.<sup>1</sup> In operational replications, one uses the same operations and procedures as in the initial study. In conceptual replications, one aims to instantiate the original concepts but using operations and procedures that vary from a little to a lot from the original study.

Ebersole and colleagues (2016) aimed to conduct an operational or direct replication of Cacioppo, Petty, and Morris (1983, Study 1; CPM), but what they actually did was very far from it. Two key independent variables (IVs) were involved in the original study: *need for cognition* (NFC) and *argument quality* (AQ). Cacioppo and Petty (1982) introduced the NFC scale to measure individual differences in enjoyment of thinking. Many subsequent studies have shown that the scale is quite useful in assessing motivation to think across a wide variety of situations (see Cacioppo, Petty, Feinstein, & Jarvis, 1996; Petty, Briñol, Loersch, & McCaslin, 2009, for reviews).

Petty, Wells, and Brock (1976) introduced the argument quality (AQ) manipulation as a means of assessing the extent of information processing in a persuasion context. That is, the more careful people

are in processing a persuasive message, the more their attitudes should be sensitive to the quality of the arguments it contains. Like need for cognition, this manipulation has been used in a large number of subsequent studies to gauge the extent of information processing (see Carpenter, 2015; Clark, 2014, for reviews).

Considering both variables, the prediction of the original CPM study was that NFC would interact with AQ to affect evaluations such that higher scores on NFC would be associated with greater attitudinal differential of strong from weak arguments. This pattern was found in the original investigation and in numerous other studies since. However, when Ebersole et al. set out to conduct a direct replication, they failed to find the key interaction. Although the authors did “not have an explanation for why no effect was observed,” let us suggest a few. We start with the fact that neither of the IVs they used was the same as the original study, nor were their new IVs pretested to meet the original criteria (Petty & Cacioppo, 1986).

With respect to NFC, instead of using the established 34 item scale as in CPM or even the validated 18 item shorter version (Cacioppo, Petty, & Kao, 1984), they used a 6 item scale with reduced reliability. This, of course, would decrease the likelihood of obtaining the effect.

With respect to AQ, although they seem to believe that they used the same arguments as CPM, they did not. Specifically, CPM stated that they used a modified version of the “strong” and “very weak” arguments from Petty, Harkins and Williams (1980; PHW). CPM said they took the strong message from PHW and made it even stronger by adding “more impressive and believable statistics” (p. 808) because in their pretesting, the high NFCs were able to counterargue the strong PHW message. Ebersole et al. failed to do this. Then, CPM used the “very weak” message from PHW as their “weak” one. In contrast Ebersole et al. used the “weak” rather than the “very weak” message from

\* Corresponding author at: Department of Psychology, Ohio State University, 1835 Neil Avenue, Columbus, OH 43210–1222, United States.

E-mail address: [petty.1@osu.edu](mailto:petty.1@osu.edu) (R.E. Petty).

<sup>1</sup> We prefer the *operational replication* term because it makes more clear what is directly replicated (i.e., the operations and not the subjects, setting, or time of the initial investigation).

PHW. Thus, they did not use either the strong or the weak message used by CPM. Not surprisingly, then, their AQ induction was much less effective than in the original study as indicated by their AQ effect size being dramatically smaller.

Notably, the average ratings of message persuasiveness for the Ebersole et al. strong and weak arguments were 5.9 and 5.4 (on an 11 point scale where 11 is compelling) whereas in CPM they were 5.8 and 2.4 on the same scale. The weak message used by Ebersole et al. is especially problematic in that the mean rating is not even on the weak side of the compellingness scale suggesting it likely would have elicited a mixture of positive and negative thoughts. Prior studies using such mixed messages indicate that they are less likely to elicit any differences in attitudes with variations in motivation to think (e.g., see PHW; Briñol, Petty, & Tormala, 2004). Had Ebersole et al. either used the original messages from CPM or engaged in the same pretesting as CPM, their chances of replicating the effect would have increased. This substantial change in the AQ induction is not reported as a “known difference” by Ebersole et al., yet it is likely a critical divergence from the original study.

Although not using comparable materials for either IV is likely an important determinant of their failure to obtain the same result, there are still other differences in procedure that could have been involved. For example, Ebersole et al. told participants that the recommendation for senior exams was proposed to take effect “immediately,” but CPM did not. This enhanced relevance could have increased reflection on the arguments among those low in NFC (Petty & Cacioppo, 1979). Also, CPM equated those high and low in NFC on their initial attitudes toward the issue but Ebersole et al. did not. Although they note that NFC did not relate to message evaluation, it could still be the case that NFC related to initial attitudes on the issue. If those low in NFC were more opposed to the proposal (as shown in prior research), this could motivate them to think. Third, the messages used by Ebersole et al. were shorter than in CPM and in most other work using AQ to index information processing. This is potentially important because research has demonstrated that if the message is perceived to be easy to process or not complex, this increases the interest of low NFCs in processing and decreases the interest of high NFCs (See, Petty, & Evans, 2009).

Research following the CPM study has shown that any background contextual factor in the situation that can motivate low NFCs to think (e.g., high relevance, surprise, an untrustworthy source) or reduce the interest of high NFCs in processing (e.g., an easy message) can attenuate the NFC X AQ interaction (e.g., Priester & Petty, 1995; Smith & Petty, 1996; Wheeler, Petty, & Bizer, 2005). Failure to consider the impact of known moderators of the initial CPM effect likely played a role in the Ebersole et al. outcome. In general, any contextual factor that unduly raises or lowers the background level of thinking in the situation would influence the likelihood of finding an impact of a given determinant of extent of thinking because extent of thinking is multiply determined.

In sum, it turns out that except for increasing the number of participants, nearly every modification made by Ebersole et al. such as changing and not pretesting the NFC and AQ independent variables, failing to control for initial attitudes, using a shorter message, and potentially enhancing the personal relevance of the proposal, all seem to work in the direction of making the NFC X AQ interaction less likely to emerge. If the conditions are not present for an effect, increasing the number of participants will not help uncover it. It is thus not surprising, in our view, that Ebersole et al. failed to find the same effect as CPM. Indeed,

because of the procedures they used, we find their replication attempt to be uninformative with respect to the overall reliability of the effect they aimed to replicate. In this regard, we remind readers that published replications of the NFC X AQ interaction continue to accumulate (e.g., see Clark & Thiem, 2015) and that both an early (Cacioppo et al., 1996) and more recent (Carpenter, 2015) meta-analysis demonstrated robust support for it in the literature.

## Acknowledgments

The authors would like to thank Adam Galinsky, Andy Luttrell, Derek Rucker, and Nancy Mengran Xu for helpful feedback on this article.

## References

- Briñol, P., Petty, R. E., & Tormala, Z. L. (2004). Self-validation of cognitive responses to advertisements. *Journal of Consumer Research*, 30, 559–573. <http://dx.doi.org/10.1086/380289>.
- Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42, 116–131. <http://dx.doi.org/10.1037/0022-3514>.
- Cacioppo, J. T., Petty, R. E., Feinstein, J., & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin*, 119, 197–253. <http://dx.doi.org/10.1037/0033-2909>.
- Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment*, 48, 306–307. <http://dx.doi.org/10.1207/s15327752>.
- Cacioppo, J. T., Petty, R. E., & Morris, K. (1983). Effects of need for cognition on message evaluation, argument recall, and persuasion. *Journal of Personality and Social Psychology*, 45, 805–818. <http://dx.doi.org/10.1037/0022-3514>.
- Carpenter, C. J. (2015). A meta-analysis of the ELM's argument quality × processing type predictions. *Human Communication Research*, 41, 501–534. <http://dx.doi.org/10.1111/hcre.12054>.
- Clark, J. K. (2014). Antecedents of message processing in persuasion: Traditional and emergent perspectives. *Social and Personality Psychology Compass*, 8/10, 595–607. <http://dx.doi.org/10.1111/spc3.12140>.
- Clark, J. K., & Thiem, K. C. (2015). Group communicators, perceived entitativity, and persuasion: A self-validation analysis. *Journal of Experimental Social Psychology*, 61, 5–11. <http://dx.doi.org/10.1016/j.jesp.2015.06.005>.
- Ebersole, C. R., Atherton, O. E., Belanger, A. L., Skulborstad, H. M., & Nosek, B. A. (2016). Many labs 3: Evaluating participant pool quality across the academic semester via replication. *Journal of Experimental Social Psychology*, 67, 68–82.
- Petty, R. E., & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology*, 37, 1915–1926. <http://dx.doi.org/10.1037/0022-3514>.
- Petty, R. E., Briñol, P., Loersch, C., & McCaslin, M. J. (2009). The need for cognition. In M. R. Leary, & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 318–329). New York: Guilford Press.
- Petty, R. E., Harkins, S. G., & Williams, K. D. (1980). The effects of group diffusion of cognitive effort on attitudes: An information processing view. *Journal of Personality and Social Psychology*, 38, 81–92. <http://dx.doi.org/10.1037/0022-3514>.
- Petty, R. E., Wells, G. L., & Brock, T. C. (1976). Distraction can enhance or reduce yielding to propaganda: Thought disruption versus effort justification. *Journal of Personality and Social Psychology*, 34, 874–884. <http://dx.doi.org/10.1037/0022-3514>.
- Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer/Verlag.
- Priester, J. M., & Petty, R. E. (1995). Source attributions and persuasion: Perceived honesty as a determinant of message scrutiny. *Personality and Social Psychology Bulletin*, 21, 637–654. <http://dx.doi.org/10.1177/0146167295216010>.
- See, Y. H. M., Petty, R. E., & Evans, L. M. (2009). The impact of perceived message complexity and need for cognition on information processing and attitudes. *Journal of Research in Personality*, 43, 880–889. <http://dx.doi.org/10.1016/j.jrp.2009.04.006>.
- Smith, S. M., & Petty, R. E. (1996). Message framing and persuasion: A message processing analysis. *Personality and Social Psychology Bulletin*, 22, 257–268. <http://dx.doi.org/10.1177/0146167296223004>.
- Wheeler, S. C., Petty, R. E., & Bizer, G. Y. (2005). Self-schema matching and attitude change: Situational and dispositional determinants of message elaboration. *Journal of Consumer Research*, 31, 787–797. <http://dx.doi.org/10.1086/426613>.