

Interactive comment on “The human side of geoscientists: comparing geoscientists’ and non-geoscientists’ cognitive and affective responses to geology” by Anthea Lacchia et al.

Anonymous Referee #1

Received and published: 26 December 2019

The human side of geoscientists

Thank you for the opportunity to review this article, which has the potential to make a useful contribution to the field of geoscience communication. The paper is based on a sound idea and appropriate methods, but it needs work before it will be ready for publication. My main criticisms are: 1) there needs to be more critical engagement with the literature; 2) the study uses a small, biased sample; and 3) the main conclusion needs reflection. I provide more detail below.

Main comments:

- Much more engagement with the literature around perceptions of geosciences is

C1

necessary. For example, for expert and lay perceptions of underground geology see Partridge et al (2019); Seigo et al (2014). - The conclusion that mental models are the result of beliefs that include both cognitive and affective components is not new. In two of the papers that you cite for example, the authors describe a number of ‘non-knowledge’ factors that contribute to risk perceptions – and you need to engage more with this literature (Sjoberg et al, 2007; Thomas et al., 2015). - The conclusion that experts are ‘human’ and have affective responses is also not new: see for example Wynne (1996) for a discussion of lay expertise. Some critical engagement with what constitutes expertise would also be helpful – see for example Collins and Evans (2002). - There are major biases in your sample: the geoscientists are much younger, largely students, predominantly male, and highly educated. How do you know that your results are not a function of these differences rather than the fact that they are geoscientists? A wealth of research shows that risk perceptions vary with age, gender etc – and this should be taken much more into account, as this raises serious questions for your results and conclusions. - You have some interesting qualitative findings here that deserve much more discussion. For example, what local knowledge was included? What can this tell us? What is the significance of this? Why did experts include more labels – is this anything to do with fulfilling what was expected of them? Perhaps they enjoyed it more than the lay participants so wanted to provide as much information as possible? Are geoscientists more practised in drawing diagrams, and might this explain the attention to detail? Does the amount of detail in the pictures reflect a lack of understanding or a perceived lack of understanding (the ‘I’m not a scientist so I don’t know’ phenomenon... - see for example Bickerstaff et al 2006; Michael, 1992). Is it indifference or ignorance? There are so many things here that I would like you tell me more about. Due to the nature of your sample, I think it is difficult for you to focus on the quantitative results, but you could certainly explore your qualitative results more.

Minor comments (page/line)

- (2/29) provide some examples of why geoscience is integral in society e.g. mining,

C2

risk management, landscape management, etc. etc. - (2/33) provide examples of problems with geoscience communication, such as with fracking and geohazards (e.g. L'Aquila earthquake). - (3/54-55) the term 'expert' would be more appropriate than 'geoscientist' as not all of this research looks at geoscientists. - (3/65) as the authors do in Thomas et al (2015, cited above). - (19/334) you mention lack of trust – you could relate this with previous research that also discusses lack of trust in geoscience industry (e.g. Thomas et al., 2017). - (21/385) – I have a couple of reservations about your conclusion that 'geoscientists are first and foremost human'. Of course they are – much research has shown that experts are human and that their judgements are based on biases etc. (see classic work by Tversky and Kahneman, for example). Furthermore, if you ask for an affective response, you will be given one - so it is no surprise that your geoscientists provided you with affective responses as well as 'cognitive' ones – it is their hobby/livelihood after all!

References:

Bickerstaff, K., Simmons, P., & Pidgeon, N. (2006). Public perceptions of risk, science and governance: main findings of a qualitative study of six risk cases (Technical Report 06-03): Norwich: Centre for Environmental Risk.

Collins, H. M., & Evans, R. (2002). The third wave of science studies: studies of expertise and experience. *Social Studies of Science*, 32(2), 235-296.

Michael, M. (1992). Lay discourses of science: science-in-general, science-in-particular, and self. *Science, Technology & Human Values*, 17(3), 313-333.

Partridge, T. et al. 2019. Disturbed earth: Conceptions of the deep underground in shale extraction deliberations in the US and UK. *Environmental Values* 28(6), pp. 641-663.

Seigo, Selma L'Orange, et al. "Predictors of risk and benefit perception of carbon capture and storage (CCS) in regions with different stages of deployment." *International*

C3

Journal of Greenhouse Gas Control 25 (2014): 23-32.

Thomas, M. et al. 2017. Public perceptions of hydraulic fracturing for shale gas and oil in the United States and Canada. *WIREs Climate Change* 8(3), pp. e450. (10.1002/wcc.450)

Wynne, B. (1996). May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide. In S. Lash, B. Szerszynski & B. Wynne (Eds.), *Risk, environment and modernity: towards a new ecology* (Vol. 40). London: Sage.

Interactive comment on Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2019-24>, 2019.

C4