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Comment on Article by Albert et al.

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1 Comment

This is a very thought provoking paper that takes forward the combination of disparate expert judgements in a very useful way. I congratulate the authors in developing a Bayesian way of tackling the issues in a domain that has been dominated by averaging and pooling approaches for so many years. My comments below concern the conceptualisation of the issues.

The authors assert that their approach can "underpin aggregation of expert assessments in three broad contexts: the decision maker (DM) problem, the group decision problem, and the textbook problem." Perhaps, but it is not transparent that this is so for all three cases. Summarising the three contexts (French 2011):

The decision maker or expert problem. In this a group of experts are consulted by a single decision maker who faces a specific decision and is not a member of the group. The decision maker alone is responsible and accountable for the decision. In this case the judgements that drive the ultimate decision making all belong to a single person, the decision maker[1].

The group decision problem. The group itself is jointly responsible and accountable for the decision; they are also their own experts. They wish that, to the outside world, their decision appears rational and, possibly, also fair and democratic.

The textbook problem. The group is simply required to give their judgements for others to use in future, undefined, circumstances. Thus the emphasis here is on reporting their judgements in a manner that offers the greatest potential for future use, but as yet there is neither a decision nor consequently any identified decision makers.

In all three cases, the combination of expert judgement is fraught with difficulty. If one takes a non-Bayesian approach one encounters inconsistencies between what at first sight seem reasonable principles to demand of the combination method, be it pooling, averaging or something else. The paradoxes that Arrow, Black, Condorcet and others have found in voting and social choice, that von Neumann and Morgenstern and others have found in non-zero sum games and that deny entirely convincing solutions to bargaining and arbitration problems despite valiant attempts by Nash and others also surface in non-Bayesian approaches to combining expert judgement (French 1986, 2007, 2011).

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[1] I originally termed this the expert problem; the authors refer to it as the decision maker problem.

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The essence of the problem, it seems to me, is that thought, inference, judgement, beliefs and the expression of free will in decision making need to exist within a single person's mind. Groups do not have minds; people do. It is no accident that Bayesian inference and decision making are personalistic theories. Ramsey, DeFinetti, Savage and many others recognised this and axiomatised personal theories of subjective probability and utility.

Thus for a Bayesian the expert problem for a single decision maker is easy to address, at least conceptually. The experts' statements are data to the decision maker and she should update her prior beliefs using these. The authors and I agree on that; and they have only my admiration for the manner in which they have structured the process of building the relevant parts of the prior and likelihood, which may conceptually be easy but in practice is far from so. One suggestion that I would make is that it would be good to find a way of including calibration data. Experts are seldom well calibrated and, as Cooke has emphasised repeatedly, it is better to use data to understand and correct for their calibration than prior beliefs (see, e.g., Cooke 1991). As a Bayesian, I naturally have opinions about everything! But my opinion about any expert's calibration will seldom be little better than vague. The transformation in Wiper and French (1995) may be of use in using calibration data within the authors' models. So we have little difference in terms of the expert problem.

Turning to the group problem, I think we may have a difference. The group need to agree how to combine their views. The paper takes a Supra-Bayesian approach, constructing a model of an altruistic, rational, initially ignorant decision maker who learns from each of the group members and then decides on their behalf. I have always had difficulty with this. Quite simply, the Supra-Bayesian does not exist. So the group have to agree on principles on how the Supra-Bayesian should be constructed. In other words, one problem in which agreement is far from guaranteed, i.e. the original group decision problem, is replaced by another for which, it seems to me, there is no reason to suppose that agreement is any more likely. My impression reading the literature on Supra-Bayesian theory is that the motivation is to be objective in some sense, to deal with disagreements by pretending that there is an unarguable solution. And, quite simply, there is not. I and others have argued (Dryzek and List 2012; French 2007) that the way to address group decision making is to recognise the issue as one of supporting a wider process not simply of constructing group probabilities and utilities and forming an expectation. The *Supra-Bayesian* analysis may create a *reference* analysis which can serve as a basis for sensitivity explorations (French 2003), but it is those sensitivity explorations which support the group process much more than the single Supra-Bayesian analysis. The same approach can be used to describe the building of scientific consensus, i.e. the accumulation of human knowledge. This may seem an esoteric point, but in practice it can be very important. In applications I have often come across groups who disagree fundamentally and want me as analyst and facilitator to wave a mathematical wand to create agreement. That is impossible and it would be unprofessional for me to pretend otherwise. My role is to challenge their thinking, make them aware that it is their responsibility to come to some agreement, and then help them explore the issues until they do or until events happen while they debate!

Turning lastly to the text-book problem: recently I have argued that this is gaining in importance in the context of public participation in societal decision making (French 2011, 2012). I have argued that we need to develop meta-analyses to help draw together relevant evidence from past expert judgement studies. The models in this paper are particularly interesting because their hierarchical nature have many parallels with the hierarchical models used in meta-analyses of empirical studies. Structurally the authors' models may offer a way forward. However, conceptually and methodologically there is work to be done to understand how to use such models. Is the concept of a Supra-Bayesian useful in the context of meta-analysis? The non-existence of the Supra Bayesian may be less of an issue when there is no formal group of decision makers who have to reach agreement. But the analyst will need to be careful not to let his or her prior beliefs implicitly shape the construction of the Supra-Bayesian.

I am very impressed by the authors' work. My concern is that to use these ideas professionally we need to be very to be clear on the context, lest we inadvertently cross an ethical boundary.

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