Is the Equal-Weight View Really Supported by Positive Crowd Effects?[*]

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Abstract

[87] In the debate of epistemic peer disagreement the equal-weight view suggests to split the difference between one's own and one's peer's opinions. An argument in favour of this view—which is prominently held by Adam Elga—is that by such a difference-splitting one may make some use of a so-called *wise-crowd effect*. In this paper it is argued that such a view faces two main problems: First, the problem that the standards for making use of a wise-crowd effect are quite low. And second, the problem that following the equal-weight view decreases such effects and by this the argument's own basis is defeated. We therefore come to the conclusion that an argument for the equal-weight view with the help of wise-crowd effects as provided more or less explicitely by Elga does not succeed.

Keywords: epistemic peer disagreement, equal-weight view, wisdom of the crowd, Condorcet Jury Theorem

1 Introduction

Adam Elga is one of the most prominent defenders of the so-called equal-weight view in the debate of epistemic peer disagreement, the view that in case of a disagreement between equally well inferentially trained and with the same amount of evidence equipped epistemic agents the difference in opinions should be splitted into equal parts. In fact the equal-weight view presented in (Elga 2007) is a little bit more fine-grained, because it also copes with situations of disagreement between epistemic non-peers—may they be no peers due to a lack of equally distributed knowledge about the evidence or due to unequal

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competences in making adequate inferences (cf. for the more fine-grained version Elga 2007, p.490). But for the purpose of our paper it is enough to work with this general characterization: Epistemic peers should meet in the middle.

There are two core-problems of the equal-weight view, namely the problem of spinelessness and the problem of a lack of self-trust (cf. Elga 2007, p.484). The first problem states that an application of the equal-weight view oughts one to suspend judgement on the issue under discussion too often. The second problem states that an application of this view leads to the implausible consequence "that rationality requires you to give your own consideration of the issue [. . .] a minor role" (cf. Elga 2007, p.485). According to Elga the problem of spinelessness is not that pressing, because very often "in real-world cases one tends not to count one's dissenting associates [. . .] as epistemic peers" (cf. Elga 2007, p.492). But what of the problem of a lack of self-trust? In Elga's eyes [88]

> "That problem arose because the equal-weight view entails that one should weigh equally the opinions of those one counts as peers, even if there are many such people. The problem is that it seems wrong that one's independent assessment should be so thoroughly swamped by sheer force of numbers. Shouldn't one's own careful consideration count for more than 1/100th, even if there are 99 people one counts as epistemic peers?" (Elga 2007, p.494)

But

> "The short answer is: no. If one really has 99 associates who one counts as peers who have independently assessed a given question, then one's own assessment should be swamped. This is simply an instance of the sort of group reliability effect commonly attributed to Condorcet. [. . . The equal-weight view] requires one's opinions to be swamped by the majority when one counts a very great many of one's advisors as peers. That is a little odd, but in this case we should follow the Condorcet reasoning where it leads: we should learn to live with the oddness." (cf. Elga 2007, p.494)

So, his main argument against the self-trust problem seems to be to accept the oddness of a lack of self-trust in order to make profit of a so-called *Condorcet-* or *wise-crowd effect*: If you accept the equal-weight view, you may loose self-trust, but you win a Condorcet- or wise-crowd effect.

In the following sections we will shortly motivate the problem of peer disagreement (2) and then characterize the Condorcet- or wise-crowd effects in detail (3). Afterwards we will raise two main problems or provisos of Elga's argument (4) and end up with a critical conclusion (5).

2 The Problem of Peer Disagreement

Classical epistemology is concerned with the notions of 'belief', 'knowledge', 'justification', 'truth', amongst others. These notions are classically explicated with respect to individual agents α_1, α_2 etc. So, e.g., the classical theory of knowledge $\mathcal{K}$ and qualitative belief $\mathcal{B}$ contains some principles like $\mathcal{K}_{\alpha_1}\varphi \rightarrow \varphi$, i.e. what is known is also true, and $\mathcal{K}_{\alpha_1}\varphi \rightarrow \mathcal{B}_{\alpha_1}\varphi$, i.e. what is known by an agent is also believed by the agent etc. These notions are discussed not only qualitatively, but also comparatively and metrically, as, e.g., in Bayesian epistemology, where one introduces the notion of 'degrees of belief' by a subjective probability function p. Well-known problems discussed in this area are, e.g., the problem of how to combine qualitative, comparative and metrical notions via bridge principles, the problem of how to justify rationality constraints on principles for these notions, and the problem of how to deal with multiple degrees of belief of one and the same agent α_1 in the case of belief updating and of different agents α_1 and α_2 in the case of social epistemology in general. The last mentioned problem lead to some new focusing in epistemology, namely to a focusing on the social component of knowledge, by which it is aimed at providing some principles for combining different degrees of belief p_{α_1} and p_{α_2} to one set of degrees of belief $p_{\{\alpha_1,\alpha_2\}}$. As an example you may think on the stock value prediction of two equally competent or successful stock [89] traders α_1 and α_2 of one and the same company. So, roughly speaking, they share the same empirical data:

- $p_{\alpha_1}(V_{\alpha_T}(x) = V_{\alpha_1}(x)) = 0.8$ (α_1 is quite sure that her prediction of the event x is correct, where $V_{\alpha_T}(x)$ is the true outcome of x and $V_{\alpha_1}(x)$ is the by α_1 estimated outcome of x)
- $p_{\alpha_2}(V_{\alpha_T}(x) = V_{\alpha_2}(x)) = 0.8$ (α_2 is also quite sure that her prediction is correct).

Since the trader's company has to perform an action, there should be some way of combining both degrees of belief, i.e. α_1 and α_2 have to end up with single degrees of belief $p_{\{\alpha_1,\alpha_2\}}(V_{\alpha_T}(x) = V_{\alpha_1}(x))$ and $p_{\{\alpha_1,\alpha_2\}}(V_{\alpha_T}(x) = V_{\alpha_2}(x))$ and should act according to this pooled opinion. Take, e.g., both traders to agree about the statements of the past, i.e. $V_{\alpha_1}(x_{-1}) = V_{\alpha_2}(x_{-1})$, $V_{\alpha_1}(x_{-2}) = V_{\alpha_2}(x_{-2})$ etc. And take trader α_1 to predict that the stock value will fall, so it holds that $V_{\alpha_1}(x_{-1}) > V_{\alpha_1}(x)$. In addition take trader α_2 to think that the stock value will rise, so it holds that $V_{\alpha_2}(x) > V_{\alpha_2}(x_{-1})$. Such a case is a so-called case of *peer disagreement*, since α_1 and α_2 disagree about the true value of the event x, although both are equally competent, i.e. both were equally successful in the past, and both make use of the same empirical data in their predictions (cf. Feldman 2007). According to these predictions, α_1 probably would suggest selling some stocks, whereas α_2 probably would suggest buying some more stocks. The problem of peer disagreement is now exactly the question whether both can be considered to be (equally) justified and if so, how to decide on this basis of conflicting opinions?

As we have seen in the introductory part, the equal-weight view suggests to affirm the question of considering the conflicting positions as (equally) justified since this is just an implication of considering agents as real epistemic peers. What about deciding on basis of the conflicting opinions? Here the equal-weight view stresses the equality of the justifications against an extra-weight view: To extra-weight an opinion in an overall decision making procedure would be adequate only if different opinions were justified to a different degree, but since in the case of peer disagreement the disagreement is amongst epistemic peers, i.e. amongst opinions of equal justification, also extra-weighting an opinion is inadequate in such a case. Furthermore—and this is not only arguing against an opposing view, but directly arguing in favour of the equal-weight view—in performing a difference-splitting strategy one may also make use of a wise-crowd effect. In the following section we will make the assumptions of this argument explicit.

3 Condorcet Juries and Wise Crowds

There are different strategies discussed in the context of peer disagreement. One strategy is to stick to the disagreement, so α_1's and α_2's degrees of belief remain unchanged. This strategy is sometimes called 'no-difference-splitting strategy'. Another strategy is the one under discussion here, namely to equally weight the opponent's degrees of belief and to end up with a mixed belief [90] (cf. for such a difference-splitting strategy Page 2007, p.231; and Elga 2007). If we assume that α_1 and α_2 have degrees of belief as described above (p_{α_1} and p_{α_2}) and if they were absolutely sure that one of them is right, then their pooled degrees of belief $p_{\{\alpha_1,\alpha_2\}}$ would be according to a equally weighting difference-splitting strategy:

$$p_{\{\alpha_1,\alpha_2\}}(V_{\alpha_T}(x) = V_{\alpha_1}(x)) = p_{\{\alpha_1,\alpha_2\}}(V_{\alpha_T}(x) = \\ = V_{\alpha_2}(x)) = \frac{0.8+0.2}{2} = 0.5$$

So, the traders in the foregoing example were as unsure whether the stock value will rise or not, as they were unsure whether the stock value will fall or not and so their suggestion for buying, selling or keeping the stocks would probably depend on their disposition of being an optimistic, pessimistic or neutral gambler.

There are very interesting simulations that suggest not following only one strategy in cases of peer disagreement, but, depending on the purposes at hand, to perform different strategies in such a case. Igor Douven, e.g., made some simulations on simple models of peer disagreement in the empirical sciences where the models consist of three components: disagreement among experts, experimental feedback and noisy data. Very generally summarized, his simulations show that in order to track the true value of an experimental outcome with one's predictions, one could follow different strategies for different situations (cf. Douven 2010):

- In case of unnoisy experimental data, performing a no-difference-splitting strategy is, with respect to the purpose of tracking the true value, of equal value as performing a difference-splitting strategy. In such a case experimental feedback does the job, namely to end up with an agreement about the true value relatively close to the true value. Performing a difference-splitting strategy only diminishes the average time needed for predicting the true value (cf. Douven 2010, p.150).
- In case of noisy experimental data, performing a difference-splitting strategy is more valuable than performing a no-difference-splitting strategy. But in order to diminish the average time needed for predicting the true value, it can be helpful to switch between difference-splitting and no-difference-splitting strategies (cf. Douven 2010, p.151 and p.154).

Besides such a heuristics for performing different strategies in cases of a peer disagreement, there are also some more general results for justifying the use of a specific strategy. One and perhaps in a broader context also the best known result regarding this matter is the *Condorcet Jury Theorem*. As we have seen in the introductory part, Elga makes use of this theorem in order to argue against the self-trust problem of the equal-weight view. The theorem states that in the situation of an independent and competent jury that was set up for deciding a yes-no-question, it is more probable that the group's majority decision is correct than the decision of an individual member of the jury. And if the jury size tends to infinity, then the majority decision will be correct. The conditions of the situation are in detail as follows (similar results hold also for situations with weakened conditions [91]: (cf. for references on weakening the independence and competence condition: Dietrich 2008; cf. for weakening the duality condition: List and Goodin 2001):

- Independence condition: The votes of $\alpha_1, \ldots, \alpha_n$ are independent.

$$p(V_{\alpha_i}(x) = V_{\alpha_T}(x) | V_{\alpha_j}(x) = V_{\alpha_T}(x)) = p(V_{\alpha_i}(x) = V_{\alpha_T}(x)) \quad \forall i \leq n,\ \forall j \neq i \leq n \tag{1}$$

- Competence condition: $V_{\alpha_1}, \ldots, V_{\alpha_n}$ are equally competent and at least better than a fair coin.

$$p(V_{\alpha_1}(x) = V_{\alpha_T}(x)) = \cdots = p(V_{\alpha_n}(x) = V_{\alpha_T}(x)) > 0.5 \tag{2}$$

- Duality condition: The vote is about two options.

$$V_{\alpha_T}(x) \in \{0,1\} \; and \; V_{\alpha_i}(x) \in \{0,1\} \forall i \leq n \tag{3}$$

For such a situation the Condorcet Jury Theorem holds (cf. Dietrich 2008):

Observation. Provided the conditions of independence, competence and duality, it holds that:

- The probability that the majority's vote regarding x is right is greater than the probability that the individuals are right. In a slogan: "A group is more competent or wise than the average of its members." Formally put:

$$p(V_{\{\alpha_1,\ldots,\alpha_n\}}(x) = V_{\alpha_T}(x)) > p(V_{\alpha_i}(x) = V_{\alpha_T}(x)) > 0.5\ \forall i \leq n, \text{ where}$$
$$V_{\{\alpha_1,\ldots,\alpha_n\}}(x) = V_{\alpha_T}(x) \text{ iff } |\{i :\ i \leq n \text{ and } V_{\alpha_i}(x) = V_{\alpha_T}(x)\}| > \frac{n}{2} \tag{4}$$

- The probability that the majority's vote regarding x is right approximates to one by approximation of the group size to infinity. In a slogan: "Infinitely large groups of independent and competent members are absolutely wise." Formally put:

$$\lim_{n\to\infty} p(V_{\{\alpha_1,\ldots,\alpha_n\}}(x) = V_{\alpha_T}(x)) = 1.0, \text{ where}$$
$$V_{\{\alpha_1,\ldots,\alpha_n\}}(x) = V_{\alpha_T}(x) \text{ iff } |\{i :\ i \leq n \text{ and } V_{\alpha_i}(x) = V_{\alpha_T}(x)\}| > \frac{n}{2} \tag{5}$$

There are many interesting implications of this theorem. It shows, e.g., that under the described circumstances the competence of the group increases with the competence of its members. But note that the theorem does not state, as is sometimes assumed, that the bigger a group of independent and competent voters is the more wise the [92] group's decision is. As a counterexample for such a claim just take the following situation: Let the independence and competence condition be satisfied for the voters α_1, α_2 and α_3 and let their votes be as follows: $V_{\alpha_T}(x) = V_{\alpha_1}(x) = 1$ whereas $V_{\alpha_2}(x) = V_{\alpha_3}(x) = 0$. Then, expanding a group $\Gamma_1 = \{\alpha_1\}$ by the independent and competent voters α_2 and α_3 to a group $\Gamma_2 = \{\alpha_1, \alpha_2, \alpha_3\}$ does *de facto* not enhance the majority's vote. On the contrary, whereas Γ_1's majority decision was right, Γ_2's majority decision is wrong.

As the formal description of the theorem shows, the jury's decision on an event x ($V_{\{\alpha_1,\ldots,\alpha_n\}}(x)$) is a function of the jury members' decision-functions on x ($V_{\alpha_1}(x), \ldots, V_{\alpha_n}(x)$). So the jury's decision method as well as all methods within a difference-splitting strategy are meta methods in the sense that they do not operate on the object level, but on the level of methods, whereas the member's methods are object-based. The theorem states that in specific circumstances performing a meta method is better than performing an object-based method only.

To return to our example of the stock market: The theorem suggests that if there is some disagreement about buying some stocks within a group of independent and competent traders, then the traders should perform a difference-splitting method (here: majority voting) to end up with a probably right decision of the question at hand, namely the question of *to buy or not to buy?*

There is another very general result concerning the justification of a difference-splitting strategy (for the following definitions cf. Krogh and Vedelsby 1995; and Feldbacher-Escamilla 2012, sect.3): Take a group's prediction of the value of an event x to be—similar to the majority voting method in the qualitative case of the Condorcet Jury Theorem—the average of the individuals' decisions (cf. Krogh and Vedelsby 1995, p.232):

$$V_{\{\alpha_1,\ldots,\alpha_n\}}(x) = \frac{\sum_{i=1}^{n} V_{\alpha_i}(x)}{n} \tag{6}$$

Now, if we want to compare the group's prediction with that of the individuals, then we cannot do this directly since the individuals' predictions may be heterogeneous. That this was not the case in the Condorcet Jury Theorem can be seen in the competence condition above. But we can compare the group's prediction indirectly via the error of the prediction: We introduce a measure for the error of a prediction simply by measuring its difference from the true value and square it in order to achieve equal comparability of under- and overestimations (note that squaring is especially with respect to the following results a quite controversially discussed procedure here). First, we introduce a measure for the error of an individual's prediction (cf. Krogh and Vedelsby 1995, p.232):

$$E_{\alpha}(x) = (V_{\alpha_T}(x) - V_{\alpha}(x))^2 \tag{7}$$

[93] Then one can define a measure for the individuals' error just by calculating the average of the error of each individual (cf. Krogh and Vedelsby 1995, p.232):

$$E_{\varnothing\{\alpha_1,\ldots,\alpha_n\}}(x) = \frac{\sum_{i=1}^{n} E_{\alpha_i}(x)}{n} \tag{8}$$

And similar to the individual's error we measure the error of the group's prediction simply by measuring the difference of the true value and the predicted value (cf. Krogh and Vedelsby 1995, p.232):

$$E_{\{\alpha_1,\ldots,\alpha_n\}}(x) = (V_{\alpha_T}(x) - V_{\{\alpha_1,\ldots,\alpha_n\}}(x))^2 \tag{9}$$

One only needs to reformulate the equations to see that the following *The Crowd Beats the Average Law* holds:

Observation ((cf. Page 2007, p.209; and Krogh and Vedelsby 1995, p.233)).

$$E_{\{\alpha_1,\ldots,\alpha_n\}}(x) \leq E_{\varnothing\{\alpha_1,\ldots,\alpha_n\}}(x) \tag{10}$$

So, it can be shown that in general the error of a prediction of a group is equal to or smaller than the average error of the group's members, which is again a very general positive feature of applying a meta method in predicting the value of an event x. One can observe furthermore that there are two important factors that influence the group's error. Besides the influence on $E_{\{\alpha_1,\ldots,\alpha_n\}}(x)$ by $E_{\varnothing\{\alpha_1,\ldots,\alpha_n\}}(x)$, there is also some influence by the so-called factor of *diversity of the predictions* of the group's members, where the diversity of an individual's prediction is measured by its distance from the average prediction. And the diversity within a whole group is measured by averaging the diversities of the individuals' predictions (cf. Krogh and Vedelsby 1995, p.232):

$$D_{\{\alpha_1,\ldots,\alpha_n\}}(x) = \frac{\sum_{i=1}^{n}(V_{\alpha_i}(x) - V_{\{\alpha_1,\ldots,\alpha_n\}}(x))^2}{n} \tag{11}$$

With the help of this measure one can show that the diversity within a group also influences the group's error. *The Diversity Prediction Theorem*:

Observation ((cf. Page 2007, p.208) and (cf. Krogh and Vedelsby 1995, p.232)).

$$E_{\{\alpha_1,\ldots,\alpha_n\}}(x) = E_{\varnothing\{\alpha_1,\ldots,\alpha_n\}}(x) - D_{\{\alpha_1,\ldots,\alpha_n\}}(x) \tag{12}$$

It therefore holds that the lower the average error or the higher the diversity within a group, the lower the error of the group's prediction. [94]

In the discussion about the adequacy of the equal-weight view, both above stated results are put forward in favour of this view in the way we already mentioned in the introductory part. More explicitely put, the argument runs as follows:

1. Performing the equal-weight view is necessary to make use of a Condorcet- or wise-crowd effect. (since performing equal-weighting just equals satisfying the conditions for the Condorcet- and the wise-crowd theorems)

2. One ought to make use of a Condorcet- or wise-crowd effect! (since it's advantageous compared to the average performance)

3. Hence, one ought to perform the equal-weight view. (with 1 and 2)

In the following section we will discuss especially premise 2 of the argument and show that the constraint of making use of a wise-crowd effect is on the one hand quite counterintuitive from a well-performing agent's point of view. And on the other hand we will stress the fact that an agent's making use of a wise-crowd effect diminishes the advantages of such an effect.

4 Two Problems of Condorcet- and Wise-Crowd Arguments in Favour of Equal-Weighting

Both theorems, the Condorcet Jury Theorem and the last observation about a group's error function, have in common that, provided that the predictions within a group are diverse or independent, then the group's prediction outmatches the individuals' average prediction which is to say that the group's competence exceeds the competence of the individuals' average or that the group's ability is higher than the individuals' average. If the individuals' average is high enough—which is of course quite vague—such effects are subsumed under the label 'wisdom of the crowd'.

NB: In the case of the Condorcet Jury Theorem the positive impact of diversity is not that easy quantifyable since there appears no diversity factor explicitely in the equations. Nevertheless one can interpret the independence condition of the theorem as a diversity assumption. An interpretation in this line is provided, e.g., in (Ladha 1992) by showing that increasing the correllation between the votes decreases the wise-crowd effect. There are also theorems proven with a more fine-grained diversity factor as, e.g., is done in (Stone 2015) where diversity is interpreted as different biases of subgroups to differnt outcomes.

There are many empirical investigations that try to bring some more sophisticated wise-crowd effects in more specific circumstances to the light. Very straight forward is Francis Galton's observation of a wise-crowd effect in estimating, e.g., the [95] weight of an ox ((cf. the description of the example in Thorn and Schurz 2012, pp.340ff); a very general, but nevertheless good source for wise-crowd examples is (Surowiecki 2005). But there are also much trickier cases of such an effect. Think of collaborative writing platforms on the internet such as, e.g., Wikipedia. One main stream of analysis of Wikipedia is the "question whether the success of Wikipedia results from a *wise-crowd* type of effect in which a large number of people each make a small number of edits, or whether it is driven by a core group of *elite* users who do the lion's share of the work" (Kittur et al. 2007, p.1). Since it is not necessary to be a part of a user management system to write or edit contributions, it is very tricky to identify the contributors of one as well as contributors of several articles. Nevertheless one can try to identify contributors by similarity relations between IP-address, *changelogs* etc. The analysis of Aniket Kittur et al., e.g., suggests that in the early times of Wikipedia, an elite group did most of the work whereas nowadays the reliability of the articles and the relative completeness of the whole encyclopedia are due to broad collaborative work (the positive performance of group actions becomes apparent here especially if one changes the metrics from counting reliability relative to available information to counting absolutely available information – such a change in the metrics is undertaken, e.g., in (Zollman 2015). However advantageous group performance may be, one always has to take care that, as already noted for the Condorcet Jury Theorem, just increasing the group size, even by competent agents, does not guarantee an improvement of a wise-crowd effect, nor are group decisions in general the best one can do:

> "There is this misconception that you can sprinkle crowd wisdom on something and things will turn out for the best. [...] That is not true. It is not magic." (Thomas W. Malone, director of the *Center for Collective Intelligence* at the MIT in an interview, cited in Steven

Lohr's *The Crowd Is Wise (When It's Focused)* in *The New York Times*, 2009–07–18)

The main point to be considered with respect to Elga's argumentation is that in performing a difference-splitting strategy one should always keep in mind that the positive feature of the strategy is not a magical thing, but only positive compared to the individuals' average predictions. And it can be negative, e.g. in the case of a still very inaccurate prediction of a group, at least from the best individuals' point of view. So the standards for accepting an advantage of wise-crowd effects at the cost of the oddness of a lack of self-trust seems to be quite low and from a well-peforming agent's point of view just inacceptable.

Besides this low standards of acceptance the argumentation of Elga raises a second serious problem: Performing the equal-weight view leads naturally to a consensus or, at least to more conformity within a group of epistemic agents. And since an increase of conformity within a group is nothing else than a decrease of diversity within the group, our detailed discussion of Condorcet- and wise-crowd effects in section 3 should make clear that an application of the equal-weight view diminishes the efficiency of wise-crowd effects: Performing the equal-weight view by the agents $\alpha_1, \ldots, \alpha_n$ results in equal estimations and by this the factor of the diversity within these agents' group, i.e. $D_{\{\alpha_1,\ldots,\alpha_n\}}$ (cf. equation 11), vanishes. As a consequence (cf. equation 12) also the wise-crowd effect vanishes. Of course, in order [96] to make use of a wise-crowd effect the group's individuals estimations have to be equalized at some point in time. But as the aforementioned simulations of Douven show it is quite dependent of the actual scenario whether such an equalization is truth-apt or not.

Note that our argumentation assumes one crucial assumption of the context in which the equal-weight view is applied. The crucial assumption is that about shared evidence. One could think that, although at some stage of scientific progress all agents of a group update their degrees of belief into a hypothesis (a specific binary event) h onto an equal level, they may still disagree about the evidence (some other specific binary events) e that supports or undermines the hypothesis, since not in every scenario agents are equally informed about and competent in evaluating the evidence e. Making still use of an equal-weight view after updating according to the equal-weight view would be possible in such a scenario. Take, e.g., a standard scenario of Bayesian update via conditionalization, where the priors are—after recognizing a disagreement—levelled up equally whereas the posteriors of the evidence remain different due to different competences in evaluating it:

$$p_{\alpha_1\text{-}prior}(V_{\alpha_1}(h) = 1 | V_{\alpha_1}(e) = 1) = p_{\alpha_2\text{-}prior}(V_{\alpha_2}(h) = 1 | V_{\alpha_2}(e) = 1) = 1$$
$$p_{\alpha_1\text{-}posterior}(V_{\alpha_1}(e) = 1) = 1, \; p_{\alpha_2\text{-}posterior}(V_{\alpha_2}(e) = 1) = 0.5$$

After updating via conditionalization α_1's posterior degree of belief in h equals her prior conditional degree of belief in h given e since α_1 grasped—correctly or not—evidence e. Agent α_2 on the other side behaves quite differently: She didn't grasp e and by this she is not forced to update similar to α_1. So it might hold that:

$$p_{\alpha_1\text{-}posterior}(V_{\alpha_1}(h) = 1) \neq p_{\alpha_2\text{-}posterior}(V_{\alpha_2}(h) = 1)$$

And by this both could still make use of a wise-crowd effect in case of a disagreement about h just by splitting the difference in their degrees of belief in h. But note that in such a scenario the evidence is not shared and by this it is no case of a *peer* disagreement. So the not fine-grained equal-weight view considered here simply doesn't apply.

To sum up the argumentation about the second problem one may notice that the provided argument in favour of the equal-weight view and against the problem of self-trust defeats to some extend its own basis.

5 Conclusion

We have seen that the argumentation for the equal-weight view as a difference-splitting strategy in cases of epistemic peer disagreements is twofold. On the one hand there is a line of argumentation which stresses problems of the opposing extra-weight view inasmuch as extra-weighting of one or another opinion amongst a group [97] of epistemic agents is adequate only if the agent's opinions are differently justified, but since in the case of an epistemic peer disagreement the agents are epistemic peers and by this they have equally well justified opinions, performing an extra-weight view is inadequate.

On the other hand there is a line of argumentation which stresses so-called *Condorcet-* and *wise-crowd effects* in favour of the equal-weight view since averaging among the opinions of epistemic peers results in a better performance than the average single performance would be. We have troubled this line of argumentation here by making two quite problematic assumptions/consequences of it explicit, namely first the assumption that the average performance is a key feature of changing one's degrees of belief in case of a peer disagreement. This assumption is from the best performing agents' point of view quite problematic. And second we showed that as a consequence of performing an equally-weighting strategy one diminishes possible advantages of Condorcet- and wise-crowd effects just by simply reducing diversity in a group.

Due to this problems we come to the conclusion that an argument for the equal-weight view with the help of Condorcet- and wise-crowd effects does not succeed.

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