**“They don’t know better than I do”: People are reluctant to rely
on the wisdom of crowds in individual decision making**

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Authors’ Note

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Abstract

Establishing the way people decide to use or avoid information when making a decision is of great theoretical and applied interest. In particular, the “big data revolution” enable decision makers to harness the wisdom of crowds (WoC) toward reaching better decisions. The WoC is a well-documented phenomenon that highlights the potential superiority of collective wisdom over that of an individual. However, individuals may fail to acknowledge the power of collective wisdom as a means for optimizing decision outcomes. Using a random dot motion task, the present study examined situations in which decision makers must choose between relying on their own personal information or relying on the WoC in their decision. Although the latter was always the rational choice, a substantial part of the participants chose to rely on their own observation and also advised others to do so. This choice tendency was associated with higher confidence, but not with better task performance, and hence reflects overconfidence. Acknowledging and understanding this decision bias may help mitigating it in applied settings.

Keywords: wisdom of crowds, overconfidence, decision making

Introduction

The finding that a group of lay people pooling their judgements can outperform even the judgment of experts is referred to as the wisdom of crowds (WoC). Many studies have demonstrated numerous situations in which aggregated performance is superior to that of individuals. These include quantity estimation (Galton, 1907; Treynor, 1987), problem solving (Laughlin et al., 2006), and medical diagnostics (Kurvers et al., 2016). Utilizing knowledge and opinions of collectives can potentially revolutionize a wide range of domains and lead to better, more accurate decisions. But as human decision-making is far from a normative rational process, it is possible that individuals fail to appreciate the power of collective wisdom and dismiss its valuable benefit. The present study examined whether individuals are willing to rely on the WoC in their own individual decisions, as well as the internal and situational correlates of such a behavior.

Studies from the advice-taking literature thoroughly described when, how, and how well individuals utilize advice from others (For a review, see Bonaccio & Dalal, 2006). While advice-taking behavior depends on the characteristics of the source, the recipient, and the nature of the decision, it appears that more often than not people take advice in a suboptimal manner. Specifically, several studies suggest that while taking advice, people tend to favor their own initial judgments and underweight others' (Harvey & Fischer, 1997; Hutter & Ache, 2016; Soll & Larrick, 2009; Yaniv & Milyavsky, 2007). However, advice is more heavily weighted when the advisor is trusted by the decision-maker (Snizek & Van Swol, 2001), when the advice is paid for (Gino, 2008), and when the task is difficult (Gino & Moore, 2007).

In the advice-taking literature, the extent to which individuals use advice is often evaluated using the "Judge-Advisor System" (JAS; Snizek & Buckley, 1995). In the JAS, the experimental procedure involves an estimation or a choice task. The judge is asked to provide an

initial response. Then, she receives the advisor's (or multiple advisors') response and can revise her first response accordingly. This design enables inferring the weights that the judge assigns to her own estimate and to the advisor's estimate. In contrast to this paradigm, the present study examined situations where the judge must choose between two mutually exclusive options: either rely on her own estimate, or only rely on the WoC. Although the latter was the rational decision, it is unclear whether participants would prefer this strategy or adopt a self-reliant, suboptimal approach.

In a series of four experiments, participants performed a random dot motion task (RDM), in which they had to decide whether the dots move to the right or to the left. After each decision, they were given the distribution of left/right responses that was attributed to a group of other observers who viewed the same display. After a series of practice trials, a critical test trial appeared, in which they could earn extra reward for a correct answer. To do so, they had to choose between observing the RDM display, or the distribution of group responses (but not both). Since individual-level accuracy in this task was above 50% (except for Experiment 2, see below), the probability that the majority decision among a group of independent observers was correct was larger than that of a single individual (Condorcet, 1785). Accordingly, relying on the WoC was always the logical, reward-maximizing choice. Nevertheless, our results show a strong and prevalent tendency to dismiss the WoC, which was associated with individual's overconfidence in their own estimates.

Experiment 1: Low RDM coherence, small group size

Method

The experiment was built using Qualtrics and was distributed to 107 participants (34 females, mean age = 36.6, sd = 10.7) via Amazon Mechanical Turk (MTurk). One participant was excluded from the analysis due to an irrelevant answer in the final question of the experiment, so a total of 106 participants are included in the results. The experiment lasted 13 minutes on average. Each participant received a fixed payment of \$2 and could earn additional \$2 depending on their accuracy in the critical trial of the experiment (see below). The experiment and all subsequent experiments were approved by the Ethics Committee of the Department of Psychology at Ben-Gurion University of the Negev in accordance with American Psychological Association guidelines. The experiment was composed of a 10-trial “practice” phase, followed by a single “test” trial. In each of the practice trials participants performed a random dot motion (RDM) task (see Figure 1). In this task, an array of 150 moving dots appeared on the screen within a borderless circle. Only 5% of the dots moved coherently to the right or the left side of the screen, while the other dots moved randomly. The participants had to indicate the movement direction, and their confidence in their response using a 0-100% analogue scale, in a self-paced manner. After their responses, the participants passively viewed a bar graph showing the distribution of left/right responses that was attributed to a group of 20 other observers who performed that trial. The distributions of decisions were generated by drawing from a binomial distribution with $N=20$ and $p=0.67$. This success probability was based on the results of a previous study conducted in our lab using the RDM task. During the practice trials, the majority decision in all the presented distributions was compatible with the correct motion direction. In the critical trial, participants were instructed to answer as accurately as possible, and were told

that a correct response will earn them an additional \$2. They were presented with the following choice: “You need to make a decision about the direction of movement of an array of dots. The dots can move either to the right or to the left. In order to make your decision, you can watch a video clip of the moving dots or the responses of 20 other participants who viewed this video, but not both”. Since the individual-level accuracy in the task was only 67%, and the probability that the majority among 20 participants is correct was 91.3% (calculated from a binomial distribution), the rational decision in the test trial was to observe the group distribution rather than the RDM display. After observing the chosen stimuli in the test trial, the participants had to indicate their left/right decision and a 0-100% confidence. Also, they were asked to shortly explain the reasons behind their choice. To test the potential role of individual differences in the choice to use or dismiss the WoC, participants completed a short version of the Rational-Experiential Inventory (REI-10, Epstein et al., 1996) that assesses preferences for information processing style, a short version of the Narcissistic Personality Inventory (NPI-16, Ames et al., 2006), and a single self-criticism item (“I tend to be very self-critical”), scored on a scale from 1 (strongly agree) to 7 (strongly disagree). The Rational-Experiential Inventory is composed of two sub scales - Need for Cognition (NFC) and Faith in Intuition (FI). Individuals higher in NFC are described as more rational decision-makers (Curşeu, 2006) and were also reported to actively seek advice and recognize others as valuable information sources (Curşeu, 2011). Individuals who score high on the FI scale rely more heavily on intuition and past experience, and are often guided by reinforcement-based heuristics in their decisions (Alós-Ferrer & Hügelschäfer, 2012). Narcissistic tendencies are positively associated with overconfidence (Campbell et al., 2004) which is pertinent to the choice of whether or not to utilize external sources of information in decision making.

Results

A majority of 66% (70 out of 106 participants) chose to make their final decision by watching the RDM display by themselves. Reasons for this choice included “I preferred to judge for myself than to rely on others' decisions”, “I didn't always agree with what the majority thought”, “I felt confident in my ability” and “If I'm going to be right or wrong I want it to be because I chose the outcome” (see full data in <https://osf.io/ztj73/files/>).

Notably, participants who chose to watch the RDM display were more confident in their decisions than those who chose to see the distribution of group responses (see Table 1). This was true both in the practice trials, $t(104) = 5.140, p < .001, \text{Cohen's } d = 1.054$, and in the test trial, $t(104) = 3.262, p = 0.001, \text{Cohen's } d = 0.669$. However, no significant differences were found in the accuracy rates of the two groups in the practice trials, $\chi^2(1) = 0.011, p = 0.916, \text{Cramer's } V = 0.003$. In the test trial, however, those who chose to watch the distribution of group responses were significantly more accurate compared to those who viewed the RDM display, $\chi^2(1) = 4.448, p = 0.035, \text{Cramer's } V = 0.205$. This was expected as most of them relied on the majority decision which pointed to the correct response.

No significant group differences were observed in the NFC sub scale of the REI, $t(104) = -0.435, p = 0.664, \text{Cohen's } d = 0.089, BF_{10} = 0.234$, nor in FI, $t(104) = 1.620, p = 0.108, \text{Cohen's } d = 0.332, BF_{10} = 0.683$. No significant differences were observed in NPI either, $t(104) = 1.254, p = 0.213, \text{Cohen's } d = 0.257, BF_{10} = 0.431$. We posited that individuals higher in narcissism will report higher confidence in their decision, but this was not supported, $r = 0.132, t(104) = 1.361, p = 0.176, BF_{10} = 0.333$. Also in contrast to our expectations, participants who chose to watch the RDM display scored significantly higher on the self-criticism item, mean = 4.24 vs. 3.33, respectively, $t(104) = 2.642, p = 0.009, d = 0.542$.

Experiment 2: Zero RDM coherence, small group size

In the previous experiment, people who chose a self-based decision exhibited greater confidence (but not accuracy) than those who chose to rely on the WoC. We therefore hypothesized that reducing this confidence will lead more people to prefer the WoC option. This was done by presenting participants with RDM displays that involved no coherent motion. In such a situation the responses in the practice phase were random, and the feedback given by observing the group distribution was uncorrelated with the responses. We expected this manipulation to reduce overall confidence and hence to increase the reliance on the WoC.

Method

102 participants were recruited via MTurk (43 females, mean age = 37.4, sd = 10.9). One participant was excluded from the analysis due to an irrelevant answer in the final question of the experiment, so a total of 101 participants are included in the results. The procedure was similar to that of Experiment 1 with a single modification – the RDM task involved a 0% coherence in the practice phase, namely a complete random motion. In such a situation the decision was based entirely on noise. We used the same distributions of group decisions as in the previous experiment, so no congruence was expected between the participants' own left/right decisions and the group decisions. In the test trial, we used a 5% coherence RDM display rather than 0% so we could pay the bonus reward based on accuracy in this trial, as was done in Experiment 1. The REI-10 and NPI-16 questionnaires were omitted from this experiment in light of the results of Experiment 1, and only the self-criticism item was administered.

Results

A slight preference for viewing the group responses was observed in the test trial; A majority of 55.4% (56 out of 101 participants) opted for this choice. This pattern of preference was significantly different from the one observed in Experiment 1, $\chi^2(1) = 9.576, p = 0.002$, *Cramer's V* = 0.214. Still, a substantial proportion of participants (44.5%) chose to adhere to their own judgment of the RDM display.

As in Experiment 1, participants who chose to view the RDM display in the test trial were significantly more confident than those who chose to view the distribution of group responses. This was true both in the practice trials, $t(99) = 3.979, p < .001$, *Cohen's d* = 0.796, and in the test trial, $t(99) = 4.814, p < .001$, *Cohen's d* = 0.964.

There was no correct answer in the practice phase trials, and hence no accuracy. However, we tested whether there were group differences in the congruence between the individual decisions and the majority decision of the group distribution in those trials. This was done in order to rule out the possibility that the final choice was correlated with the perceived correctness in the practice phase. As expected, overall congruence between participants' responses and group responses during the learning trials was not statistically different from chance level (49.3%, $p = 0.682$). Congruence during the practice phase did not differ between the groups, $\chi^2(1) = 0.029, p = 0.864$, *Cramer's V* = 0.005. Since the test trial involved a 5% coherence stimulus, those who viewed the group responses were again more accurate, but not significantly so, $\chi^2 = 4.415, p = 0.078^1$, *Cramer's V* = 0.209.

¹ p value was computed by Monte Carlo simulation to deal with small expected counts.

Unlike Experiment 1, no group differences were found in the self-criticism item, $t(99) = -0.269$, $p = 0.788$, $Cohen's d = 0.054$, $BF_{10} = 0.218$. Accordingly, this item was not used in the following experiments.

Experiment 3 – Low RDM coherence, large group size

Condorcet's (1785) Jury Theorem holds that when individual accuracy is higher than chance, the group majority is more accurate than individual's decision for any group size. According to this principle, observing the group response was the rational decision in our task, regardless of the group size. However, we hypothesized that people might be more likely to rely on the WoC when it reflects the opinion of a larger group.

Method

101 participants were recruited via MTurk (41 females, mean age = 38.9, sd = 12.61). The procedure of Experiment 1 was used with one modification. Here, the group distributions of left/right responses that were presented in the practice phase were attributed to a group of 200 observers, and were generated by drawing from a binomial distribution with $N=200$ and $p=0.67$, in which the majority always indicated the correct decision. No questionnaires were administered to assess individual differences.

Results

A majority of 52.5% (53 out of 101 participants) chose to make their final decision based on watching the RDM display by themselves. As predicted, this proportion was significantly lower than in Experiment 1, $\chi^2(1) = 4.158$, $p = 0.041$, *Cramer's V* = 0.141.

As in the previous experiments, higher confidence was observed in participants who chose to view the RDM display in the test trial compared to those who preferred to view the group responses. However, unlike the previous experiments, this pattern did not reach significance, neither in the practice phase, $t(99) = 1.909$, $p = 0.059$, $d = 0.38$, nor the test trial, $t(99) = 1.465$, $p = 0.146$, $d = 0.292$.

As before, no significant group differences were found in accuracy during the learning trials, $\chi^2(1) = 1.38$, $p = 0.24$, *Cramer's V* = 0.037. In the test trial, those who viewed the group responses were again more accurate, $\chi^2 = 5.253$, $p = 0.032^1$, *Cramer's V* = 0.228.

Experiment 4 - Advising another person

On the final experiment we wished to explore whether distancing participants from the decision by asking them to advise someone else regarding the best decision strategy will elicit a more rational thinking pattern which will manifest in a greater preference for watching the group's responses.

Method

102 participants were recruited via MTurk (37 females, mean age = 35.3, sd = 10.52). The practice phase was identical to that of Experiment 1. In the test trial, the following scenario was described:

“Sarah is participating in an experiment similar to this one. She is asked to make a decision about the direction of movement of dots, just as you did before. Unlike you, she only needs to answer one question regarding one array of dots. In order to answer correctly, Sarah can either: (a) watch the video of the moving dots, or (b) see the responses of a group of 20 other people who viewed this video. However, she cannot see both. What would you advise Sarah to do in order to maximize her chances of answering correctly?”.

Half of the participants were randomly assigned to read this scenario, while the other half read the same scenario about an individual named John. After indicating their answer, the participants were asked to briefly explain their choice of advice. Unlike the previous experiments, no test trial was administered.

Results

A majority of 70.6% (72 out of 102 participants) advised Sarah/John to watch the RDM display by themselves. This pattern did not differ significantly from the one observed in Experiment 1, $\chi^2(1) = 0.433$, $p = 0.510$, *Cramer’s V* = 0.046.

As in the previous experiments, participants whose advice was to view the RDM display were significantly more confident during the practice phase compared to those who advised to view the distribution of group responses, $t(100) = 2.099$, $p = 0.038$, *Cohen’s d* = 0.456.

Accuracy rates during the practice phase were higher among participants who advised to watch the distribution of group responses, $\chi^2(1) = 8.401$, $p = 0.004$, *Cramer’s V* = 0.091. This difference in accuracy was not observed in the previous experiments, and hence should be taken with caution.

Table 1

Experiment	Decision	N	%	Practice Trials		Test Trial	
				Confidence (mean $\pm$ sd)	Accuracy	Confidence (mean $\pm$ sd)	Accuracy
1	RDM	70	66.0%	71.8 ($\pm$ 13.3)	68.6%	75.1 ($\pm$ 16.32)	78.6%
	Group	36	34.0%	55.3 ($\pm$ 19.4)	68.9%	63.5 ($\pm$ 19.00)	94.4%
2	RDM	45	44.5%	68.4 ($\pm$ 18.9)	49.1% ²	78.3 ($\pm$ 19.34)	84.4%
	Group	56	55.4%	52.1 ($\pm$ 21.6)	48.6% ²	57.2 ($\pm$ 23.75)	96.4%
3	RDM	53	52.5%	67.5 ($\pm$ 18.8)	67.0%	73.94 ($\pm$ 22.09)	84.9%
	Group	48	47.5%	59.9 ($\pm$ 20.9)	70.4%	67.75 ($\pm$ 20.20)	97.9%
4	RDM	72	70.6%	70.3 ($\pm$ 18.6)	64.3%		
	Group	30	29.4%	61.6 ($\pm$ 20.2)	73.7%		
Overall	RDM	240	58.5%	69.8 ($\pm$ 17.3)	66.6% ³	75.6 ($\pm$ 19.1)	82.1%
	Group	170	41.5%	56.7 ($\pm$ 20.9)	70.8% ³	62.4 ($\pm$ 21.8)	96.4%

² Accuracy here refers to congruence between participants' decision and the group decision³ Experiment 2 was excluded

Figure 1

(a) A practice-phase trial in Experiment 1. (b) Distribution of choices in the critical trial across all 4 experiments. (c) A multi two-group estimation plot (Ho et al., 2019). The scatter plot shows the observed confidence levels of each group in each experiment (and in all experiments combined in the rightmost plot) during the practice phase. The vertical lines beside each group indicate the mean $\pm$ 1 standard deviation. The effect size (mean difference) and 95% CI are positioned below the raw data. The curve indicates the resampled distribution of the mean difference, given the observed data. (d) Practice-phase mean accuracy rates ($\pm$ SE) in each experiment.

Discussion

The results of Experiments 1- 4 consistently show that a substantial proportion of the participants preferred to make their final decision based on the RDM display rather than on the distribution of group responses. Moreover, this choice was related to higher confidence levels during the task, which did not reflect higher accuracy.

The bias we observed in participants' behavior is threefold. First, dismissing the WoC results in suboptimal accuracy. Despite being a valuable source of information, individuals waived the opportunity to use the WoC. One explanation to this seemingly suboptimal strategy is minimization of potential conflict. Sharot & Sunstein (2020) suggest that in order for information-seeking to initiate, people must predict the content of the information and estimate its value in terms of its instrumental utility (namely, the potential to increase reward and avoid harm by using this information), hedonic utility (namely, will this information induce negative or positive affect) and cognitive utility (namely, the power of the information to instill a better understanding and anticipation of reality). The result of these combined estimates can either trigger information-seeking or lead to its avoidance. The process of predicting the value of information is highly susceptible to biases, one of which is overconfidence.

Overconfidence is a robust finding in psychology and may take many forms, by which individuals often overestimate their actual ability and perceive themselves to be better than average. For example, individuals consider themselves to be more skilled than the average driver (Svenson, 1981), new business owners are extremely optimistic regarding the likelihood of their business to succeed (Cooper et al., 1988), and people even associate themselves with more fair behaviors compared to others (Messick et al., 1985). Our results indicate that

overconfidence, as demonstrated in the responses during the practice phase, was related to over-reliance on personal information and a broad dismissal of the WoC.

Boosting accuracy by accepting advice comes with the price of compromising decision autonomy. People generally value their autonomy and tend to adhere to their own opinion (Baer & Brown, 2012, but see Kassirer et al., 2020). Accordingly, they have a sense of psychological ownership towards decisions, or ideas that they develop on their own, and revising of opinions in response to environmental feedback will take place more often when the feedback adds to this sense of ownership. This ties directly to the notion of avoidance of information which has a potentially negative, or conflicting utility.

A second bias observed in our results is stronger reliance on the WoC when it reflects a larger group (20 vs. 200 members; Experiments 1 vs. 3). Indeed, given an individual accuracy rate of 68% (calculated from participants' performance in experiments 1, 3 and 4), the probability that the majority will be correct is larger for a group of 200 individuals (99.99%) than for a group of 20 individuals (92.8 %). However, in both cases, by using the WoC one clearly has a better likelihood of being correct.

Lastly, the third bias is exhibiting sensitivity to perceived individual performance. In Experiment 2, the stimulus conveyed no information, and participants were unable to rely on their own judgment. This is reflected by the inconsistent feedback they received from observing the group distributions during the practice phase. Furthermore, any sense of confidence was spurious and had no anchor in actual performance. In this instance of complete uncertainty, there was a slight preference to use the group information. Still, the proportion of people who chose to rely on themselves in this experiment was substantial, as well as associated with overconfidence, as in the other experiments.

A possible explanation for our findings is that most of the participants chose not to use the group information because they were not told anything about the nature of this group. As a result, they were perhaps inclined not to trust the group or even suspect that the information was made up or somehow manipulated. However, this explanation is very unlikely. First, when examining participants written reports regarding the reasons for choosing to make a self-based decision, only a handful made explicit references about the possibility that the group information is fictitious, and another handful explicitly mentioned characteristics of the group as the reason for distrust (for instance, "I don't trust the decisions of others I don't know"). More importantly, the choice to make a self-based decision was associated with a higher confidence already at the study phase, in which the information regarding the group responses was irrelevant. This, together with the fact that there was a decrease in this choice when the individual and group responses were uncorrelated, makes it very unlikely that the dismissal of the group information can be attributed to participant's lack of knowledge about the composition of the group alone. Indeed, some participants reported they do not trust the group (and mostly that they trusted themselves better), but this distrust is not necessarily due to lack of information about the group, and might even reflect their overconfidence.

To conclude, our findings add to a long list of examples presenting humans as irrational agents. This new manifestation of overconfidence demonstrates how cognitive biases can lead to suboptimal use of social information. Further work is needed to examine how these biases can be mitigated.

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