

"Can more knowledge really be a bad thing? Challenging the Principle of Non-Monotonicity"

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For comments or questions: fanny.verrax@svt.uib.no

The principle of non-monotonicity

From Martin Peterson (2007), Should the Precautionary Principle Guide our Actions or Our Beliefs? *Journal of Medical Ethics*, vol. 33 (1): pp 5-10

The principle of non-monotonicity holds that "more is not always better". There are epistemic situations in which decisions will be worse if more information is acquired. This is a controversial claim, and the principle could be easily misinterpreted in a way that would make it trivially false. For example, there is no reason to believe that an ideal decision maker, with unlimited computing capacity, could ever fail to make a decision that is at least as good as before by acquiring more information, provided that no old information is rejected or ignored. The principle of non-monotonicity could also be misinterpreted in a way that would make it trivially true: It is easy to imagine that a non-ideal decision maker, with limited computing capacity, would sometimes make a worse decision after having acquired more information simply because he failed to process the huge amount of information available to him. None of these interpretations of the principle of non-monotonicity will be given any further consideration here.

According to the interpretation of the principle of non-monotonicity considered in this paper, there are epistemic situations in which decisions will become worse if more information is acquired, and this holds true even if the decision is taken by an ideal decision maker. Imagine a new drug which is to be approved by some regulatory agency. Initial tests suggest that the incidence of some adverse drug reaction, say agranulocytosis, is about 1 in 1 000 000. On the basis of this piece of rather imprecise information, we may assume that the agency would be prepared to approve the new drug, given that (1) it is at least as good as previous substances and (2) the incidence of agranulocytosis and other adverse drug reactions is no higher than for similar substances. However, the regulatory agency then acquires more information. The incidence of agranulocytosis is not randomly distributed in the population. In fact, there is reason to believe that only patients who are bearers of some yet undiscovered gene will contract agranulocytosis when treated with the new drug. On the basis of this enhanced information, the regulatory agency then decides that the new drug can be approved only if the gene causing agranulocytosis is identified. This would allow doctors to make genetic tests before prescribing the drug to patients. Unfortunately, numerous examples indicate that commercial companies requested to provide this type of information very often conclude that the costs of identifying the relevant gene would not exceed the expected profits. Therefore, the gene will never be identified and the new drug will never be approved. This is a pity, as the aggregated amount of human suffering could have been decreased by approving the new drug, even if the relevant gene was not identified, as the new drug was in fact more efficient than the old one.

The agranulocytosis example indicates that in some cases it is better, when making a precautionary risk appraisal, to believe that some hazard is randomly distributed rather than deterministically distributed, given that there is no practically feasible way to find out who will be affected by the hazard. The veil of ignorance surrounding a random distribution helps

the decision maker to make better decisions. This holds true even if the decision maker is an ideal person who is able to process unlimited amounts of information in virtually no time

Melvin Kranzberg's six laws of technology:

(From Kranzberg, Melvin (1986) *Technology and History: "Kranzberg's Laws"*, *Technology and Culture*, Vol. 27, No. 3, pp. 544-560.)

1. Technology is neither good nor bad; nor is it neutral.
2. Invention is the mother of necessity.
3. Technology comes in packages, big and small.
4. Although technology might be a prime element in many public issues, nontechnical factors take precedence in technology-policy decisions.
5. All history is relevant, but the history of technology is the most relevant.
6. Technology is a very human activity - and so is the history of technology.

An essay on criticism, Alexander Pope (1709)

“A little learning is a dangerous thing;
drink deep, or taste not the Pierian spring:
there shallow draughts intoxicate the brain,
and drinking largely sobers us again.”

Second example of the non-monotonicity example

(from: private e-mail conversation with Martin Peterson)

“Here is another, analogous example: Imagine that a vaccine is discovered to have certain adverse effects, and that people as consequence of this stop taking the vaccine; and since they stop taking the vaccine more people die. So the information we got, that the vaccine has some adverse effects, actually made the overall outcome worse; given the way people reacted to this information, it would have been better to not know about the adverse effects of the vaccine.”

Sāi Wēng Lost his Horse

(Chinese Folk Tale, retrieved from <http://www.yellowbridge.com/literature/horse.php>)

“A man who lived on the northern frontier of China was skilled in interpreting events. One day for no reason, his horse ran away to the nomads across the border. Everyone tried to console him, but his father said, "What makes you so sure this isn't a blessing?" Some months later his horse returned, bringing a splendid nomad stallion. Everyone congratulated him, but his father said, "What makes you so sure this isn't a disaster?" Their household was richer by a fine horse, which the son loved to ride. One day he fell and broke his hip. Everyone tried to console him, but his father said, "What makes you so sure this isn't a blessing?" A year later the nomads came in force across the border, and every able-bodied man took his bow and went into battle. The Chinese frontiersmen lost nine of every ten men. Only because the son was lame did father and son survive to take care of each other. Truly, blessing turns to disaster, and disaster to blessing: the changes have no end, nor can the mystery be fathomed.”