

Accepted Manuscript

How do people use information presentation to make decisions in Bayesian reasoning tasks?

Manuele Reani , Alan Davies , Niels Peek , Caroline Jay

PII: S1071-5819(17)30160-X
DOI: [10.1016/j.ijhcs.2017.11.004](https://doi.org/10.1016/j.ijhcs.2017.11.004)
Reference: YIJHC 2168



To appear in: *International Journal of Human-Computer Studies*

Received date: 22 June 2017
Revised date: 25 November 2017
Accepted date: 27 November 2017

Please cite this article as: Manuele Reani , Alan Davies , Niels Peek , Caroline Jay , How do people use information presentation to make decisions in Bayesian reasoning tasks?, *International Journal of Human-Computer Studies* (2017), doi: [10.1016/j.ijhcs.2017.11.004](https://doi.org/10.1016/j.ijhcs.2017.11.004)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Highlights:

- A comprehensive study, involving quantitative analysis across several metrics, qualitative data analysis and eye-tracking, investigating the role of information visualisation in Bayesian reasoning was performed.
- We found that even people with high numeracy found the mammography problem difficult to understand.
- The format in which the information is presented does not significantly affect participants' ability to provide a completely correct answer.
- A new metric of performance was developed which provided a deeper understanding of the reasoning process, and the way in which the visual presentation of information affects it.
- When the information was presented in the tree and Venn diagram formats, people were better at identifying at least some parts of the relevant information, than when it was presented in the text-only or icon array formats.
- Moreover, trees led to faster responses, and were preferred by participants.
- The eye tracking data show that people looked in the right places for longer when the information was displayed with the Venn than when it was displayed with Tree.
- Base rate of the information affected performance. The magnitude of the error generated when estimating the correct value is not affected by Information Format, it does vary according to Base Rate.
- Participants did not like legends, suggesting that representation of complex problems involving relationships between variables should ideally reduce if not eliminate the presence of legends. This correlated with eye-tracking data, showing that extensive time was spent on legends and little time was spent on the actual graph.
- Performance was poor when the format presented included the graphical encoding of frequencies (as found in scaled Venn diagrams and icon arrays). People also disliked this formats.
- Our results support the nested-set hypothesis of Bayesian reasoning.

Download English Version:

<https://daneshyari.com/en/article/6860990>

Download Persian Version:

<https://daneshyari.com/article/6860990>

[Daneshyari.com](https://daneshyari.com)