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SCIENCE DIRECT®
Artificial Intelligence 169 (2005) 180
Artificial Intelligence
www.elsevier.com/locate/artint

Response to review by Kyburg

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Available online 3 November 2005

I am grateful to Professor Kyburg for taking the time to study my book *Causality*, and for summarizing its main ideas in such an accurate and insightful way. I would like to comment on one issue that Professor Kyburg considers central, and I consider tangential to the study of causality—the distinction between relative frequencies and subjective beliefs.

True, frequencies are often the basis upon which beliefs are founded. Furthermore, frequencies are arguably a proper model for the calculus of beliefs, belief combination, and belief dynamics. That is why probability is rarely challenged as a representation of beliefs, and when systematic disagreements are found experimentally, they evoke much surprise and heated debates. However, the ultimate target of most tasks in artificial intelligence and the cognitive sciences is not the frequencies themselves, as they appear in or inferred from data, but the beliefs that those frequencies evoke or support.

As an example, unless you are a pollster or a public health administrator, your ultimate interest in studying medical records is not the percentage of patients that were cured by a certain drug but, rather, your belief that you, or your sick cousin will be cured by that drug. It is those latter beliefs that we use to guide our decisions. It is those latter beliefs therefore that we store in, and infer from our knowledge base—the frequencies serve merely as temporary agents in forming those beliefs.

Thus, contrary to Kyburg's assumption, my intent throughout Causality was to use probabilities as representation of normative subjective beliefs. Therefore, it is perfectly legitimate to claim that variances and distributions change in response to observations, and that the conditioning operator stands for the sentence "given that we see".

Still, readers who are more inclined to interpret Causality in the context of relative frequencies will not have any difficulty making the translation. They should be willing to concede though that relative frequencies do change in response to observations, because observations redefine the relevant sample space.

I thank Professor Kyburg for the opportunity to discuss this issue. Additional discussions of readers comments can be found on my website, http://bayes.cs.ucla.edu/BOOK-2K/discussion.html.

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0004-3702/$ – see front matter
doi:10.1016/j.artint.2005.10.004