Regarding the justification of the usual "sharp" axioms, a convenient reference is Cox (1946), a paper that was unjustly reviewed only by title in *Mathematical Reviews*, and was overlooked by most probabilists until it was essentially reprinted in Cox (1961, pages 1–24).

I'd like to comment concerning Fishburn's discussion of transitivity. It seems intuitively clear to me that if you prefer A to B and B to C, then you *should* rationally prefer A to C. The example concerning Sue's intransitivity seems to me to show that she simply made a mistake, one that, if pointed out to her, should make her reconsider her judgments unless either she is obstinate or, owing to shortage of time, she prefers to live with inconsistency. It may be useful for theoretical psychology, and practical economics, to find axioms that describe actual behavior, but my interest has been in a normative theory.

The example where $A \sim C$, $C \sim B$, and $A > B$ requires more discussion. It is analogous to a situation where A, B, and C are three points on a line, A and C being too close to distinguish, and similarly C and B; but A just far enough from B to be distinguished. The situation is like the one discussed by Good and Tideman (1981). A man in a restaurant can't at first decide between steak and chicken. He then thinks to himself that he would prefer steak to lobster (which wasn't in fact on the menu), but would not be able to *perceive* that chicken is better than lobster. From this he deduces that the utility of chicken lies between those of lobster and steak. Symbolically $U(\text{steak}) > U(\text{chicken}) > U(\text{lobster})$. We described this situation by saying that steak is *discernibly* better than chicken but not *perceptibly* better.

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Comment

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Peter Fishburn has provided an excellent, well-documented survey of the substantial literature on the axiomatic foundations of subjective probability. In my comments it is my purpose not to criticize Fishburn's survey but rather to raise some conceptual questions about the literature itself. I hope thereby to stress the importance of some problems that have received little emphasis in the literature, and consequently are scarcely mentioned in Fishburn's survey, but that are fundamental from a foundational standpoint.

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PROBLEM OF UNIQUENESS

In Section 2 of his article, Fishburn brings out the following well-known fact. The known necessary and sufficient conditions for the existence of a probability measure agreeing with the qualitative ordering, given that the algebra of events is finite, do not establish uniqueness of the measure, if no extensions to some additional sort of infinite structure are provided. The point I want to emphasize is what seems to be the fundamental character of the results here. For a given finite algebra and a given ordering, it is of course possible to write down conditions that are necessary and sufficient for existence of a unique measure, but there do not seem to be any very interesting general