Why Ovals in Eliciting Intervals?

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Need to elicit intervals. People's opinion is usually elicited by asking people to mark a point on a scale. This is how, e.g., students evaluate their instructors.

In some cases, people are absolutely certain about their marks. However, in many other cases, they are not so sure. For example, a person may hesitate where to mark a good but not excellent service by 7 or 8 on a 0 to 10 scale. Since the usual scale only allows one mark, the person will put either 7 or 8. We could get a more adequate understanding of the people's opinions if we allow the user, in such situations, to explicitly explain that both 7 and 8 – and thus, all the values in between – could be this person's marks. In other words, we would get a more adequate description of people's opinions if we allow them to describe their opinion by intervals, and not just by the numerical values.

Eliciting intervals is not easy. While eliciting intervals would be beneficial for processing people's opinions, people are not accustomed to marking intervals and are, thus, reluctant to do it.

To make this task easier for users, researchers tried different approaches. Interestingly, a successful approach [1] came when researchers decided to elicit a 2-D figure: an oval whose intersections with the straight line provides the desired interval.

Why? A 2-D oval contains more information that the resulting interval, so why is it easier for the users to provide ovals than to directly provide intervals?

Our explanation. Psychologists have found that the perceived complexity of a curve increases with the number of vertices (see, e.g., [2] and references therein): smooth curves like ovals are the simplest, while an interval – with 2 vertices – is much more complex. This explains why it is easier for people to draw an oval than to directly draw an interval.

References

[1] Z. Ellerby and C. Wagner, "Do people prefer to give interval-valued or point estimates and why?", *Proceedings of the 2021 IEEE International Conference on Fuzzy Systems FUZZ-IEEE'2021*, Luxembourg, July 11–14, 2021.

[2] J. Wilder, J. Feldman, and M. Singh, "Contour complexity and contour detection", *Journal of Vision*, 2015, Vol. 15(5), No. 6, pp. 1–16.