1. **Title:** Outliers: obligations and opportunities
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1. **Keywords:** outliers, anomalies, value-laden judgements, ethics
2. **Executive summary**

Data scientists are often confronted with decisions about outliers or anomalies. What are outliers? How should we define, detect and deal with them? Where do they come from? Here I argue that answers to these questions require value-laden judgements.

To motivate this topic, I first expose the pernicious consequences that can arise from our misadventures with outliers. For this, I review several consequential historical examples. Cases where a XYZ are discussed. After review of these cases, one feels inclined to deliver a diagnosis – what forces animate these decisions?

The forces that animate these decisions about outliers are a special case of a more fundamental problem first identified by philosophers - that reality is how it appears.

Further, I describe how systematic outlier omission might snowball and stifle scientific advancements by suppression of anomalies - the things that Thomas Kuhn argued often precipitate paradigms shifts.

Finally, I summarize cases where inclusion and exclusion of outliers from data sets can introduce biases and conflicts between our fiduciary and moral responsibilities. From these premises, I argue that confrontation with outliers can challenge ethical principles that are not always obvious and demand critical examination, caution, and actions that may be at odds with near-term analytical duties. It is therefore incumbent upon us to be explicit about the value-laden decisions we use to navigate encounters with outliers and balance both analytical and moral obligations. To satisfy these responsibilities, recommendations are offered.

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