Extension criteria for individual rankings revisited: possibility and impossibility results.

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Abstract: Throughout this poster, our main idea is to study and revise different extension criteria introduced to search for extensions of a complete preorder defined on a nonempty set to its power set. We pay attention not only to classical criteria, but to new ones that may also lead to improve results on both incompatibility or existence of suitable extensions.

Suppose that we are given a nonempty set X endowed with a complete preorder (i.e.: a transitive and complete binary relation) $\precsim$. In a way, $\precsim$ defines a ranking on the elements or "individuals" of the set X. Imagine that we can extend this ordering to the power set of X, namely the collection fo all the subsets or "collectives" of X, that we shall denote $\mathcal{P}(X)$. So, we would be looking for another complete preorder, say $\precsim_E$, now defined on $\mathcal{P}(X)$, and satisfying that given $x, y \in X$ it holds true that $x \precsim y \Leftrightarrow \{x\} \precsim_E \{y\}$.

Among possible extensions, we may be specially interested in searching for those that accomplish some suitable or "common sense" criteria imposed a priori in order for the extensions (if any) to be feasible for some objectives or desired properties to be fulfilled by a new ranking now the defined not just on the singletons of X (the "individuals") but, instead, on all the subsets of X (the "collectives").

Essentially, the main fact to analyze was the following: *once some criteria have been imposed, in order to extend a ranking from a finite set to its power set, we must prove or disprove the existence of some extension.* Given a set of criteria we wonder if it is compatible (therefore giving rise to some extension) or not.