A Multidimensional Approach to 'better than'

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Outline

MLTB = multidimensional lexicographic theory of ‘better than.’

The plan:

1. Motivate why ‘better than’ is multidimensional.
2. Properties that suggest/hint at lexicographic comparisons, but are not decisive.
3. Illustrate how MLTB tackles Spectrum Cases and Parity.
4. Formal Issues (if time permits): Aggregation, etc.

Why Is ‘better than’ Multidimensional?

- There is good linguistic evidence for it: Stojanovic (2015), McNally (2017), Sassoon (2013, 2017).
- It is intuitively plausible to assume that if it is asserted that ‘*a* is overall better than *b* (all things considered)’ such a verdict is often based on multiple evaluations of the items *a* and *b* under considerations, which are sometimes also called ‘criteria’, ‘features’, or ‘attributes’.
- Usually, an item *a* is better than an item *b* in some aspects, but not in others, and there is a weighing or outranking of these aspects to determine which item is better.

Value Dimension $\neq$ Value Aspect

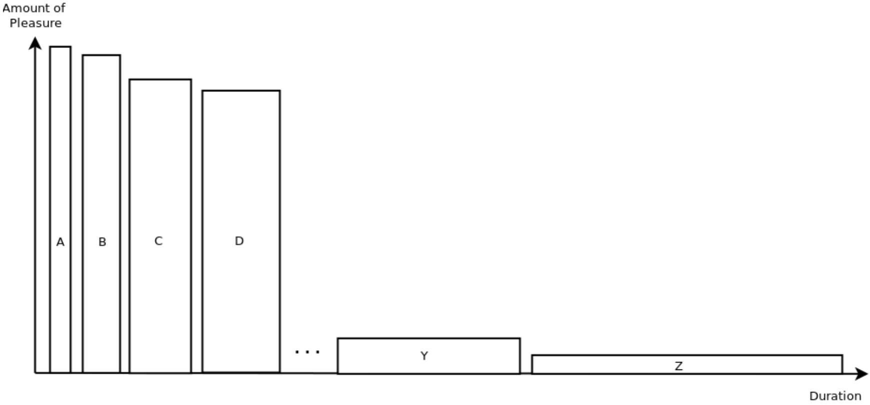
Dimension: The range of natural properties of an aspect of 'better than.' Aspect: The *evaluation* of particular properties within that range.

- Dimensions often have an associated natural ordering. For example: the number of polite acts per week (lower to higher), low sodium levels per time unit to high sodium levels, less pleasure to more pleasure, etc.
- If the number of polite acts per week increases, then at some point politeness turns into creepiness.
- Very low sodium level cause hyponatremia (bad for health, life threatening), higher sodium levels are good for health, and then even higher sodium levels become bad for health because of an increased risk of cardiovascular disease.
- Pleasure can be good from an hedonic perspective, but turn into debauchery at some level.

Lexicographic Thresholds

- One interpretation of such examples is that a value changes into a disvalue within the given dimension, or vice versa.
- This happens when a threshold is reached.
- For example, debauchery$\neq$pleasure (in the hedonic sense).
- The cases so far *can* be modeled with utility functions that increase and decrease, but that modeling does not do justice to the fact that the value changes.
- Klocksiem (2016) tackles Temkin's Spectrum Arguments using absolute thresholds.

A Spectrum Argument (Individual Hedonic)



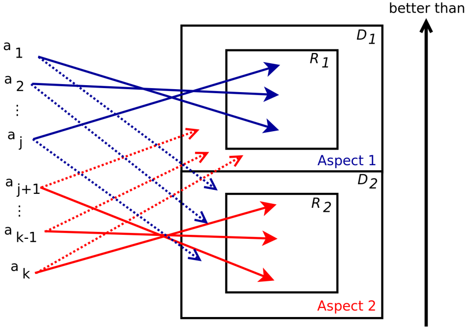
$B \succ A$, $C \succ B$, $D \succ C$, ... But: $A \succ Z$

Rachels on Badness (Individual Hedonic)

Based on Rachels (1998), cf. Temkin (2012: Ch. 3&4):

A: one year of extreme agony
B: 100 years of slightly less agony than A
C: 300 years of slightly less agony than B
$\vdots$
Z: millions of years of extremely mild pain (e.g. pinprick, mosquito bite)
$A \succ B \succ C \succ D \succ \ldots$ But: $Z \succ A$

Dealing With Spectrum Cases



Assuming that Aspect 1 is lexicographically preferred to Aspect 2, the outcome of aggregating them is:

$$a_j \succ a_{j-1} \succ a_{j-2} \succ \cdots \succ a_1 \succ a_k \succ a_{k-1} \succ \cdots \succ a_{j+1}$$

What Does this Mean?

Temkin remains right, because we need to *reject* some of his standard views, those that regulate comparisons between adjacent items.

- Principle: For every two adjacent pairs a_i, a_{i+1} in the spectrum we can clearly judge that $a_{i+1} \succ a_i$ for the positive case (vice versa for the negative case).
- The lexicographic approach rejects this principle
- At some point in the spectrum, we would *not* judge this way upon sincere reflection.
- According to MLTB, that is so, because the evaluation changes qualitatively, from one subvalue/aspect to another.

Parity

Trichotomy Thesis

'better than', 'equally good', and 'worse than' are the only types of overall value comparison.

Chang (2002): This is not the case. Sometimes we judge two items on a par, and this is neither 'equally good' nor 'noncomparable (tout court)'.

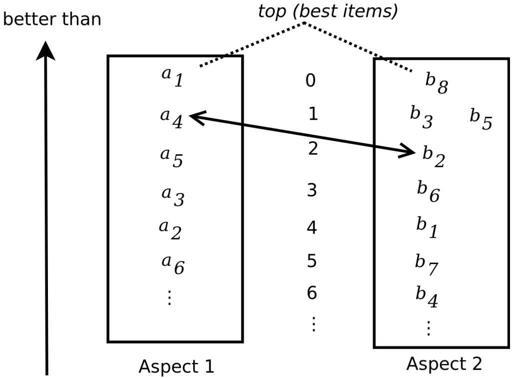
Examples: The creativity of Michelangelo and Mozart may be on a par, a life as a lawyer vs. life as a clarinetist, etc. All kind of 'hard cases' of comparisons.

Small Improvements Argument

A small difference between two evaluatively very different items does not necessarily lead to a different assessment of parity.

- Michelangelo^{+} is a little bit better than Michelangelo.
- Suppose Michelangelo is neither clearly better than Mozart, nor is Mozart clearly better than Michelangelo. (in terms of their creativity)
- We would still say that Michelangelo^{+} is not better than Mozart.
- If completeness also holds, then it follows that the Trichotomy Thesis is false. [PI-transitivity: $aPb \ \& \ bIc \Rightarrow aPc$.]
- The missing fourth value relation is parity.

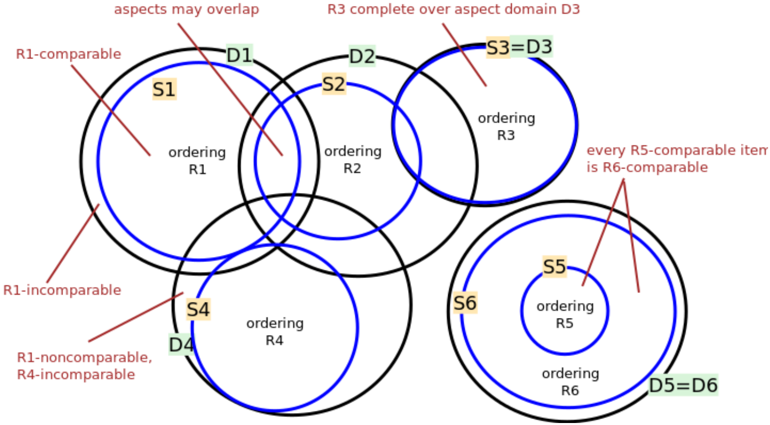
Multidimensional Parity



What Does this Mean?

- According to MLTB, creativity of a musician and creativity of a painter are two different, though related, aspects of 'better than.'
- Mozart's creativity is not directly comparable with the creativity of painters.
- Michelangelo's creativity is not directly comparable to the creativity of a musician.
- We judge them on a par w.r.t. creativity, if they are roughly within the same top-distances in their respective creativity.

General Structure of MLTB Domains



Aggregation of Aspects/Subvalues

Two good methods, Kemeny distance minimization and Borda Count. In the paper, I use Borda Count.

For two items a, b:

1. Find the aspects in which they are comparable.
2. Aggregate those aspects by weighted sum over their Borda Counts by using canonical, normalized ordinal utility functions.
3. For finite domains, a recursive function ensures that ordinal utilities take into account the lexicographic ordering between aspects.
4. For infinite domains, other methods have to be used (e.g. hyperreal numbers).

What About Cardinal 'better than'?

- Hard to argue against cardinal utility if the underlying dimension already supports it, e.g. monetary value.
- Requires no major changes:
  - Replace Borda Rank by the cardinal utilities.
  - Re-use the same top distance concept for parity.
  - Hence, the underlying scale is an interval scale.
  - Aggregation remains the same.
- But: Aggregation of mixed cardinal and ordinal utilities cannot be justified.

Summary & Conclusions

- MLTB gives particular types of explanations of Spectrum Cases and parity.
- Lexicographic ordering of aspects can occur even within the same dimension.
- Spectrum Cases suggest lexicographic aggregation, but there is no final knockdown argument for or against such rationality principles.
- Overall betterness remains transitive in the proposed theory.

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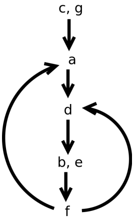
Remark: Acyclicity Not Needed For Rational Choice

Minimal conditions for decision making are laid out by Hansson (2001):



Weak Eligibility

An item a is weakly eligible iff. no other item b ($a \neq b$) is strictly better than a.

Top Transitivity

If a is weakly eligible and $a \sim b$, then b is weakly eligible, too.

Imposed on a *particular* value relation, these conditions ensure that a rational decision can be made.