

1 Minimization

2 When explaining phenomena by theorizing and formulating laws, it is important to use
3 the simplest possible language. Simplifying explanations with fewer conditions allows
4 for a broader range of phenomena to be explained. This is the reason for simplification.
5 The Copernican heliocentric theory was accepted not because it was proven correct and
6 the geocentric theory was proven wrong, but because the heliocentric theory could
7 explain all the phenomena that the geocentric theory could, and additionally explain
8 phenomena that the geocentric theory could not. Instead of discarding unexplained
9 phenomena as exceptions, we should choose laws that can explain a broader range of
10 phenomena.

11 When the initial solution of QCA (Qualitative Comparative Analysis) is linguistically
12 expressed, it becomes a long and difficult explanation. To make this understandable
13 and simple, by adding logical remainders, the conditions that constitute logical
14 conjunctions and disjunctions are reduced, making the logical structure more
15 parsimonious. This is called Minimization. From the obtained solutions, the final
16 solution is selected based on the balance of coverage (the proportion of cases in the
17 entire dataset that can be explained by it), consistency, and linguistic interpretative
18 validity. This is the analysis of QCA. If this process is carried out rigorously, a logically
19 valid and interpretable solution can be obtained. There is no problem here. However, in
20 the earlier stages, in the stages of determining thresholds and membership values,
21 manipulating membership values to increase coverage can lead to a kind of overfitting
22 (a phenomenon where the explanatory power is high only for that particular case and
23 does not apply to other cases).

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