# Semantic Extents of Sketches

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This paper investigates how an interpreter resolves a particular type of ambiguities common in sketches, namely, the ambiguities as to what graphical variables (such as line width in sketched maps) areexpressive and what are not. We hypothesize that a graphical variable is assessed to be non-expressive if it has a unified value throughout the sketch (e.g. all bands representing roads have the same width in the sketch). Our experiment, which analyzed interpretative decisions of human subjects on sketches, has in fact demonstrated such an unfiedness effect, although an interesting collection of exceptions were also found. We discuss the implications of these results, and offer the interpretation of the unfiedness effect as an evidence to the veristic disambiguation strategy.

More specifically, we will start with  characterizing a kind of ambiguities common in sketches, namely, ambiguities as to whether a graphical variable expresses information or not, as opposed to (usual) ambiguities as to what particular value it takes in the sketch and what information it expresses accordingly. The former is an issue of semantic extents of sketches, whereas the latter is an issue of their semantic contents that can arise only after the former is settled.

We had one pilot experiment and two subsequent experiments. In the pilot experiment, Two subjects were asked to draw a sketch map and auother person was asked to read the

map. We found two important tendencies. One is the "conservativety", namely, the tendency for an interpreter to read off less information than a drawer puts in the map. The other is the unifiedness effect, namely, the tendency for, an interpreter to refrain from interpreting a variable if it has a unified value throughout the sketch. In the second, the subject read computer-generated map. This experiment turned out to be insufficient for addreading our question, mainly due to in appropriate stimuli. We collected subject judgements on road maps with varied and unified variables, and found that there in fact were hypothesized effects in the cases of width, shape, and angle of road icons. We found, however, a significant number of exceptions too, especially in connection to the distance variable.

Finally, we will extracted several implications of our results related to sketch communications in general. First, global properties of sketches (unfiedness and variedness of a variable in this case) can constrain an interpretation of even a small part of the sketch. Secondly, there can be interfering factors to the unfiedness effect, including the salience of a particular structure in the sketch and the biasing influence among different variables. And finally, it may be a general interpretative strategy to avoid an interpretation of a variable if it would result in an utterly implausible information in view of the commonground in the present communication, namely, what the presenter and the interpreter of a sketch commonly presuppose. Substantiation of these suggestions will be an important contribution to the understanding of the reality of sketch communications.