

# Tree parameters' impact on visual perception, preference and recreation

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There is a large body of empirical evidence that nature delivers benefits to people. In the face of progressive urbanisation, urban nature and its design are becoming increasingly important. At the same time, climate change endangers biological diversity and consequently ecosystem functioning. Thus, for urban landscape planners who consider both ecosystem health and residential well-being, it is attractive to simultaneously increase plant diversity and the recreational value of urban nature. The present dissertation investigates the role of tree parameters for perception, preference, and recreation and elucidates how findings can contribute to human and ecosystem health in cities.

In a first study, the following tree parameters were identified to be relevant to perception: Conifers versus deciduous trees, crown height to crown width ratio, crown size to trunk height ratio, and crown density. These results add to previous studies, as they are based on more realistic-looking images. Furthermore, the parameters are metric, were generated by study participants and represent a hierarchy.

Two further studies demonstrated that the greater the crown relative to trunk height, the more pleasant and the more beautiful a tree is perceived and the denser a crown, the heavier and the more rugged a tree is perceived. Both parameters predict tree preference. This is consistent with theories and previous findings on landscape perception and adds more precise parameters for tree preference prediction to the literature.

A fourth study revealed no effects of tree characteristics' diversity in urban green spaces on how fascinating and coherent they are perceived. This suggests that species diversity in green spaces can be increased without reducing restorativeness.

The identified tree parameters can be used to select various, similar-looking species to increase both human well-being and ecosystem health. Furthermore, the knowledge on the tree parameters' semantic meaning can facilitate expert-lay communication. The preferred tree characteristics can be used to increase residential satisfaction. Finally, tree species diversity in urban green spaces can be increased without mitigating the recreational value.