RECOGNITION OF COMPUTER-GENERATED TREES

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This research assessed the importance of rendering specific details when creating a virtual forest. Specifically, we examined memory for computer-generated trees using a modified recognition task in which participants were shown a target tree, engaged in a distractor task, and then ranked the similarity of seven foils to the original tree they had seen. Five of the foils represented changes on only one dimension of the tree whereas the other two foils represented modifications to either five features previously identified as salient or all nine tree features. Results showed that similarity rankings were largely based on overall structural similarity of the trees as opposed to similarity on smaller details such as branch thickness or leaf size. Additionally, perceived similarity rankings varied as a function of the symmetry of the tree. Virtual forests need to show realism for different features depending on the forest type.

Virtual environments have become increasingly more realistic and detailed. However, many virtual representations of natural scenes still require enormous computing power to present landscapes that are not entirely realistic. Those creating virtual representations of trees face a specific problem as little research has even addressed the perception of actual trees (Bingham, 1993a, 1993b). Thus, researchers have begun to argue that more research is needed on the perception and understanding of natural features (Darken & Banker, 1998; Cutting, 1997; Wann & Mon-Williams, 1996; Reddy, Watson, Walker, & Hodges, 1997; Hughes, Moshell, Sims, &Yu, 2000; Sims**,** Moshell, Hughes, Cotton, & Xiao, 2001).

Our previous research has centered on understanding which aspects of virtual trees are most salient and thus in greatest need of accurate representation (Hughes, Moshell, Sims, &Yu, 2000; Sims**,** Moshell, Hughes, Cotton, & Xiao, 2001). This previous work utilized a memory paradigm in which participants viewed a virtual tree and had to re-create it using special tree editor software. The results showed that participants were more accurate when the tree presented was highly symmetrical and could be reconstructed using a typical "tree schema." Additionally, participants were most accurate at re-creating gross structural dimensions of a tree such as height and leaf size, and were particularly inaccurate at re-creating the curvature of tree branches. Furthermore, overestimates were more likely for gross structural dimensions, whereas participants greatly underestimated the amount of curvature that had been present in the original tree stimulus. These data