Investigating Processing Dependencies in Speech Perception with General Processing Tree Models

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A General Processing Tree (GPT) model family was developed for investigating processing dependencies at two levels in speech perception. The family includes the two factor, four category fuzzy logic model of perception (FLMP) as a special case, so the GPT approach represents a generalization of the FLMP approach. Each member of the model family tests a different hypothesis about processes underlying speech perception. GPTs were fitted to data from two experiments in which listeners made decisions about vowel quality and final stop voicing in CVSs on the basis of two acoustic factors. The modeling suggested that, in each experiment, listeners' vowel and voicing decisions were influenced by both factors, and that the decisions were independent. The independent decision result supports Mermelstein's (1978) speech perception model, and the model was extended to accommodate the finding that both acoustic properties contributed to each decision.