

# Language and Music Use the Subassembly-type as Universal, but not the Pot-type

## Merging Operation

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Language and music have been comparing from the many viewpoints for a long time. There are studies comparing language syntax and musical syntax at sentences, phrases of language and music, and chord progression levels (Cona & Semenza, 2017; Lerdahal & Jackendoff, 1983; Patel, 2003; 2008; Katz & Pesetsky, 2009; revised 2011). To create hierarchical structures in language, we need a syntactic operation, namely, “Merge.” There are two subdivisions of Merge to create a complex syntactic hierarchy with more than two words: the pot-type (Pot-Merge) and the subassembly-type (Sub-Merge) (Fujita, 2014; 2017), which were adapted the concept of Action Grammar (Greenfield, 1991). We verified whether musical triads also have the same syntax as language or not. Hence, we compared musicians’ and non-musicians’ syntax with a Merge order judgement task of triads (chord task) designed as the two-alternative forced-choice discrimination task. If non-musicians, who do not have musical syntax due to have never taken any special musical training, could have recognized the operations, it would mean that the operations were shared with language. Participants were asked to choose Pot-Merge or Sub-Merge for each stimulus. Musicians recognized both Pot-Merge and Sub-Merge, while non-musicians were only able to recognize Sub-Merge. Moreover, a positive correlation was found between only the Pot-Merge and the special instrument playing period. We also did a similar task used Japanese three-word compounds as stimuli (word task) to corroborate the homology of the merging operations between language and music. Both musicians and non-musicians recognized Pot-Merge and Sub-Merge. The results in two tasks bared out that anyone could use the subassembly-type merging operation and only experienced people could use the pot-type merging operations, that is to say, the subassembly-type is shared between language and music domains, while the pot-type is not shared between language and music domains.

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