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**The perceptual and cognitive non-linearities underlying musical
preference across multiple exposures**

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Repetition is a fundamental part of engagement with the auditory world. Repeated exposures influence what gets perceived as important and what features are singled out for attention. That repetition can also influence the mysterious phenomenon of aesthetic enjoyment is a longstanding observation to which much intellectual attention has been paid. A special case of repetition and perceptual learning is music, a domain in which people choose to be exposed to the identical stimulus again and again. This apparent preference for repeated exposures connects fundamentally to notions of human identity, affect, cognitive processing, and neural function. We report on a set of experiments that uses behavioral measures to assess perceptual changes across multiple exposures (five over one week) of a twenty-minute piece for orchestra. Across the five exposures, we found an inverted U-shape preference response, which possibly is decomposable to the complex interaction of multiple nonlinear components, represented by performance on tasks relating to memory, attention, affect, syntax, and error detection. We argue that musical preference has remained a puzzle because the behavior depends on an underlying complex system with numerous nonlinear cognitive components revealed by our results. [Work supported by NIH, NSF, and Northwestern University]