

Comments on Sternin, “The effects of background music on cognitive functioning”

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This paper gives a clear and thoughtful review of several factors that mediate the cognitive effects of background music. It covers extensive literature, while also proposing theoretical hypotheses that could guide future research. At times, I felt that certain topics could be more strongly connected to the hypotheses, and discussing potential criticisms could help refine the argument. Overall, though, I found this to be a successful and engaging paper.

The following comments address specific points:

- p. 2 - “Participants listened to Mozart music...” This should presumably be “Mozart’s music.” As a musicologist, I would tend to be more specific. You could say “Participants listened to a Mozart piano sonata...” (A more precise version—e.g., “Participants listened to Mozart’s Sonata in D for Two Pianos, K. 448...” —probably isn’t necessary here.) At the bottom of the page, you should also make it clear that the period of “relaxation” involved listening to a “relaxation tape” (which presumably included nature sounds).
- p. 4 - You may be interested to know that Rumelhart’s work is reasonably well-known in cognitive musicology, where schema theory is an active subfield. For an overview, see Vasili Byros, “Meyer’s Anvil: Revisiting the Schema Concept,” *Music Analysis* 3 (2012), particularly the section titled “The Penn School.”
- p. 6 - The subtitle here is “Effect of the Presence of Speech,” though you discuss both speech and sung lyrics. You might tweak the subtitle to make it more inclusive/accurate.
- p. 7 - As it turns out, the section is a lot about seriation too. In your summary of Banbury et al. 2001, I’m not clear on the following sentence: “In the music, changes in the tonal or rhythmic pattern requires organization of the order of the auditory input making the music the second source of serial information.” Should it be “changes...require [no S] organization...”? Meaning “changes require the brain to organize...”? Is this just a complicated way of saying that musical events have a certain order (i.e., that music occurs in time)? I think a bit of revision could clarify this. It might also be useful to discuss potential criticisms of Banbury et al.’s theoretical framework. While it seems possible to actively maintain lists in memory, I’m not convinced that this usually happens when we read stories or hear songs or watch movies (when we are more interested in the gist of things, rather than memorization). Theoretically, what would change if we simply focused on processing *similar* stimuli (or temporal information), without putting the burden on serial ordering or making assumptions about mental representation?
- p. 8 - What about vocal music without lyrics? (I remember reading about some research on this—but unfortunately I don’t have the reference on hand.)
- p. 9 - A small comment on your summary of Yang et al. 2016: You use the word “affect” twice here. From context, I assume that this effect is negative (i.e., that musicians’ performance on the tasks is worse while listening to their own instruments). But the

word “affect” on its own doesn’t explicitly tell me whether performance is enhanced or reduced.

p. 10 - I agree that trained musicians can typically perceive musical details that are inaccessible to non-expert listeners and may be able to associate these details with explicit music-theoretical concepts. However, I feel like this account starts to run into trouble at the following sentence: “To a musician, the music may be a type of language requiring serial processing...” In my view, this suggestion creates more problems than it solves. First, this distinction between musicians’ serial and non-musicians’ holistic approaches to musical processing seems to contradict the earlier section of the paper, which suggested that all musical processing involves seriation. (What exactly is meant by “holistic” here? Is this mode of listening always inaccessible to musicians?) Second, there are certainly overlaps between music perception and language perception (as discussed in Aniruddh Patel’s book, *Music, Language, and the Brain*), but these overlaps are not unique to trained musicians. Now, I don’t think you overcommit to this account, since you quickly turn to schema theory (which I find more convincing). Still, it might be useful for you to point out some potential criticisms of the seriation-based explanation.

p. 11 - A potential objection: If musicians’ schemas are more efficient, wouldn’t it be *easier* for them to process musical information? Why isn’t music for one’s own instrument *easiest* to process? Addressing this may help you refine your argument here. (My own answer to these questions would have to do with the way that schemas are automatically activated, and with the way that performance training coordinates auditory, motor, and visual schemas. Whereas untrained listeners tend to have strong auditory schemas for familiar musical styles, they lack the multimodal connections/levels of detail that musicians cultivate. From this perspective, then, the difference is not just about the *strength* of schemas, but about different kinds of schemas.)

Effect of Age

This section is less theoretical than the section on musical training. (Perhaps that would be less noticeable if this section came before the preceding one.) I would be interested to see how this might connect with your broader hypotheses. On the one hand, younger or older people might tend to have different information-processing capacity. On the other, older people, being more experienced, might have more developed (though perhaps less flexible) schemas to guide their listening. (You get into this a bit on p. 14. Perhaps you could just foreshadow or point forward to that.)

p. 17 - In the introduction, you put forth two hypotheses. Here, in the conclusion, you have three.