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RESEARCH INTO PRACTICE

Music Listening and Learning Interference

Does listening to music or other sounds while studying impede learning? Based on decades of research, the answers are pretty clear: Yes. No. And it depends.

Teachers struggle with a lot of distractions, but an icon of the 21st Century is the ubiquitous phone or digital music device with an attached headset clamped to their students' ears. Does listening to music affect learning? It's an open question.

Yes it Does.

Perham (2010) describes the "irrelevant sound effect (ISE)" – or the presence of sound that is irrelevant to the task at hand. According to his research, sounds that exhibit "acute changing states" or acoustical variations impair outcomes when performing a memory or linear task, such as recalling a string of numbers. Sounds with little acoustical variation, or "steady state sounds" don't impair learning quite as much.

Because much of what students listen to – including speech, most music, and even TV sound effects – may be characterized as having "acute changing states," the interference of the "irrelevant sound effect" is quite common. Sounds with little acoustical variation, such as a hum or non-inflected speech, are less likely to interfere with learning because they can be tuned out more easily. Of course, they are also more likely to put the listener into a soporific state.

The interference seems to be the same whether subjects listen to music they like or dislike. Both types impaired performance on serial-recall tasks.

Some might argue that relatively few learning tasks are of the serial-recall variety, so Perham's conclusions may be very limited in their applicability to actual school tasks and classroom learning.

But other studies by Perham indicate that reading while listening to music, especially music with lyrics, interferes with comprehension of the reading material as well. The reason, says Perham, is that the reader is getting semantic information from the book and irrelevant semantic information from the lyrics. If you can understand the lyrics, whether you like them or not, it impairs comprehension, he claims (Cutler, 2013).

Other research on more complex cognitive tasks seems to support Perham's conclusions. Early work by Smith and Morris (1977) showed that students studying in silence our performed those listening to "stimulant" music or "sedative" music, although those listening to sedative music did slightly better than those listening to more stimulating sounds. Dobbs, Furnham, and McClelland (2011) found that silent conditions were better than music, which, in turn, was better than background sound (e.g., TV) for the performance of learning tasks.

Research briefs are prepared by Howard Johnston, Professor Emeritus of Secondary Education at the University of South Florida and Ronald Williamson, Professor of Educational Leadership at Eastern Michigan University. Practical Leadership, LLC is a full service educational consulting firm specializing in research, evaluation, leadership development and achievement-focused school improvement.

No it Doesn't

By some estimates, about 8% of the population is not affected in any way by music or background noise while working or studying. For the rest of us, the issue of music, noise and learning is very relevant.

Contrasting with research cited above, Pool (2002), found that students who listened to background sounds from TV while doing homework were not impaired in completing the homework assignments or in the quality of those assignments. Hallman, Price and Katsarou (2002) studied 10-12 year olds while learning arithmetic concepts and found that calming and relaxing music did not interfere with their performance, even compared with a no-music condition, but arousing, aggressive and unpleasant music disrupted learning quite dramatically.

According to Angel, Polzella and Elvers (2010), college-age students were given spatial processing and linguistic processing tasks while listening to instrumental selections by Mozart. Background music increased the speed of spatial processing and the accuracy of the linguistic processing. Their conclusion: background music can have predictable effects on cognitive processing.

Perham has suggested that this "Mozart Effect" (or "Schubert Effect," or "Stephen King Effect" if the learner likes recorded books) is actually strongest when the listening is done *before* the task is performed. The explanation is that the music creates "arousal," a state in which the organism, in this case the student, is on "high alert" and attentive to its environment. This state of anticipation makes the learner very receptive to the information that follows.

It Depends

The most definitive answer to the question about whether listening to music or other sounds affects learning performance is "it depends."

A classic "it depends" study was conducted by Shih, Huang and Chiang (2009) who examined the effects of "piped in" music on work performance, concentration and learning. Although a silent work environment produced the best results, the music environment showed the greatest variability among the subjects. In other words, the top music-listening learners outperformed the silent work environment group by a large margin. According to Doraiswamy (2012), "this could imply that *the effect of music can vary a lot from person to person*, and they believe that more research needs to be done on how factors such as tempo, genre, or whether students are used to having music on, make any difference."

Although the evidence is not strong, taken as a group, studies suggest that following variables and conditions may affect whether music interferes with learning or not.

The student. If the student is one of the lucky 8%, it doesn't seem to matter if they listen to music, or anything else for that matter. Also, habitude seems to play a role as well: students who are accustomed to listening to music while they work may have developed adaptations that keep it from interfering with their cognitive work.

The task. Serial, memory and complex analytical tasks seem to be most affected by the "irrelevant sound effect." Songs with lyrics appear to interfere with reading comprehension, especially the learning of complex, technical information. Music does not seem to interfere with recreational reading, and may enhance other forms of productivity – such as artistic creation or expressive writing.

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The sound. Preference for the type of music being played doesn't seem to have much effect if the learning task is the type that is susceptible to interference. But for some learners, calm, soothing music did seem to promote learning of arithmetic skills, while aggressive, raucous music interfered with such learning.

The learning environment. If personal music devices keep students from attending to other, important "sounds," such as a teacher's lecture, or academic instructions or the soundtrack from an informative video, obviously it will affect learning. The extent to which one individual's music distracts another student is also an issue if it is being played too loudly.

The Bottom Line

Like most things in education, "one size doesn't fit all" in the case of music listening and learning interference. While certain learning environments need to control student auditory attention for instructional or even safety reasons, distractibility is highly idiosyncratic and results from a combination of factors, including the learning task, the student's ability to distinguish among audio inputs, and the acoustical intensity and variation of the music itself.

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