Background Music and Performance on Memory-related Tasks: Preliminary Findings from a Systematic Review

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Background and Aims

The effects of background music (BGM) on cognitive performance have been marked by inconsistent findings. We therefore conducted a systematic review (SR) in order to clarify previous inconsistencies and identify trends that are not apparent from the results of isolated studies. The aims of this SR are: (1) to evaluate how BGM affects performance in different cognitive tasks (e.g., reading, memory recall), and (2) to identify specific listener- (e.g., personality traits, music education, etc.), music- (e.g., lyrics, arousal, etc.) and task-related factors (e.g., difficulty, cognitive domain) that could contribute to the effects of BGM on cognitive performance. In this paper we present a preliminary analysis of the SR results focused on the effects of BGM on memory-related tasks.

Method

Empirical studies published from January 1960 until May 2020 were searched in PubMed, PsycINFO, Scopus, Web of Science, and Google Scholar databases. The searches returned 8,867 unique articles (see Cheah, Spitzer, & Coutinho, 2020 for the complete protocol). Ninety-five articles met the inclusion criteria and 28 articles (with 44 experiments) pertained to memory-related outcome measures. The memory-related experiments were further categorised into 5 task types: serial recall (n=12), immediate (n=9) and delayed (n=8) free recall, associative recall (n=6), and recognition (n=9). Analyses focused on determining (a) the effects of the presence/absence of BGM (i.e., music vs silence) on task performance; (b) the music characteristics that mediate the effects of BGM on task performance (e.g., presence of lyrics), and (c) task-specific effects of BGM within the cognitive domain. Following the recommendations in McKenzie and Brennan (2021) the findings were synthesised through vote counting based (solely) on the directions of effects, and sign tests were used to determine whether there was any evidence of the effects (Bushman & Wang, 2009).

Results (Main Contribution)

Overall (cf. Table 1), BGM had a significant detrimental effect on memory-related task performance (Test 1: only 32 out of 93 tests– 34% successes– favouring BGM). Furthermore, L-BGM was significantly more detrimental than silence (Test 2: 29% successes favouring L-BGM) and I-BGM (Test 3: 12% successes favouring L-BGM; 88% favouring I-BGM). When analysing memory tasks independently, only one task specific effect was observed: BGM had detrimental effects in 92% of the tests (cf. Test 4), whereby L-BGM always hindered serial recall task performance (cf. Test 5).

Conclusions and Implications

Overall, the results showed that BGM significantly hindered memory-related task performance (especially serial recall), but this effect seems to be mostly related to L-BGM (and not I-BGM). These preliminary results suggest that it is important to consider the characteristics of BGM used and the types of tasks (even within the same cognitive domain) when evaluating the effects of BGM on cognitive performance. We will continue with our analysis of other cognitive domains, and we expect that this work will provide relevant contributions to the field of music cognition, with practical implications to everyday life (e.g., works/study habits).

Keywords: background music, cognitive performance, memory

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Table 1

Sign test results of proportion comparisons between interventions. BGM= background music (with and without lyrics); L-BGM= BGM with lyrics; I-BGM= instrumental BGM; S= Silence (control). Only statistically significant (p<.05) comparisons are shown. "No. of successes" indicates the number of tests (i.e., outcome measures) reporting improved task performance in the music conditions compared to silence (for Tests 1, 2, 4, 5); for Test 3, it indicates the number of tests reporting better performance with I-BGM than L-BGM. "Total tests" indicates the total number of outcome measures available for analysis within each comparison (Note: number of tests ≠ number of experiments).

Test	Comparisons	No. of successes	Total tests	Proportion	p	95% Confidence	
						Lower	Upper
			All memory tasks				
1	BGM vs S	32	93	34%	.003	.255	.445
2	L-BGM vs S	12	42	29%	.008	.172	.436
3	I-BGM vs L-BGM	14	16	88%	.004	.640	.965
			Serial recall tasks				
4	BGM vs S	2	24	8%	<.001	.023	.258
5	L-BGM vs S	0	11	0%	<.001	.000	.259