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Research Article

Role of executive attention in consumer learning with background music

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Abstract

This paper examines how the type of background music (vocal vs. instrumental) affects consumers' cognitive performance depending on individual differences in executive attention (i.e., working memory capacity). Across three experiments, we find that vocal music leads to poorer cognitive and attitudinal outcomes for consumers lower in working memory capacity but does not affect those higher in working memory capacity. However, short-term habituation to background music helps mitigate this negative effect of vocal music on consumer ad recall. Finally, consumer performances on computing discount prices are also affected by music type depending upon whether prices are communicated in verbal or numeric form. Overall, this research lays out an executive-attention based process mechanism explaining when and how background music shapes consumer learning and memory. The outlined theory enriches the literature on music effects as well as immediate-term learning by explicating the role of selective attention in the processing of multi-modal marketing stimuli.

Keywords: Background music; Unattended speech effect; Executive attention; Multi-modal learning; Working memory capacity

Vocal music is a pervasive part of the modern consumer's daily life. On any given day, a consumer might see outdoor advertisements during her commute while the car stereo is playing her favorite pop song, conduct online shopping while listening to, or estimate price discounts in a store, playing background music. Recent reports suggest that we spend in excess of 4h every day listening to music (Peoples, 2014); furthermore, a major proportion of it tends to be vocal music (Mori & Iwanaga, 2013).

The ubiquity of vocal music and marketers' practices relating to its use raises the question: how does the type of music affect consumer information processing? In particular, we focus on the issue of how music type (vocal vs. instrumental) affects consumer attention to shape what they learn from marketing stimuli. We also examine how individual differences in controlling attention moderate the impact of music on consumer learning.

Prior research has employed many approaches to study the effect of background music on cognitive performance. In the early 1990s, the popular claim of the "Mozart effect" asserted that listening to classical music enhanced spatial or non-verbal performance (Rauscher, Shaw, & Ky, 1993). However, subsequent attempts to replicate this effect failed, and a meta-analysis led to the conclusion that the Mozart effect was most likely attributable to arousal (Chablis, 1999). The most popular and well-accepted framework currently used to describe how music affects ongoing cognition is the working memory model (Baddeley & Hitch, 1974). This model is often used to explain the unattended speech effect—words spoken in the background impede learning visually presented information (Salamé & Baddeley, 1982). As applied to music, the unattended speech effect typically manifests with vocal (vs. instrumental) music (Salamé & Baddeley, 1989).

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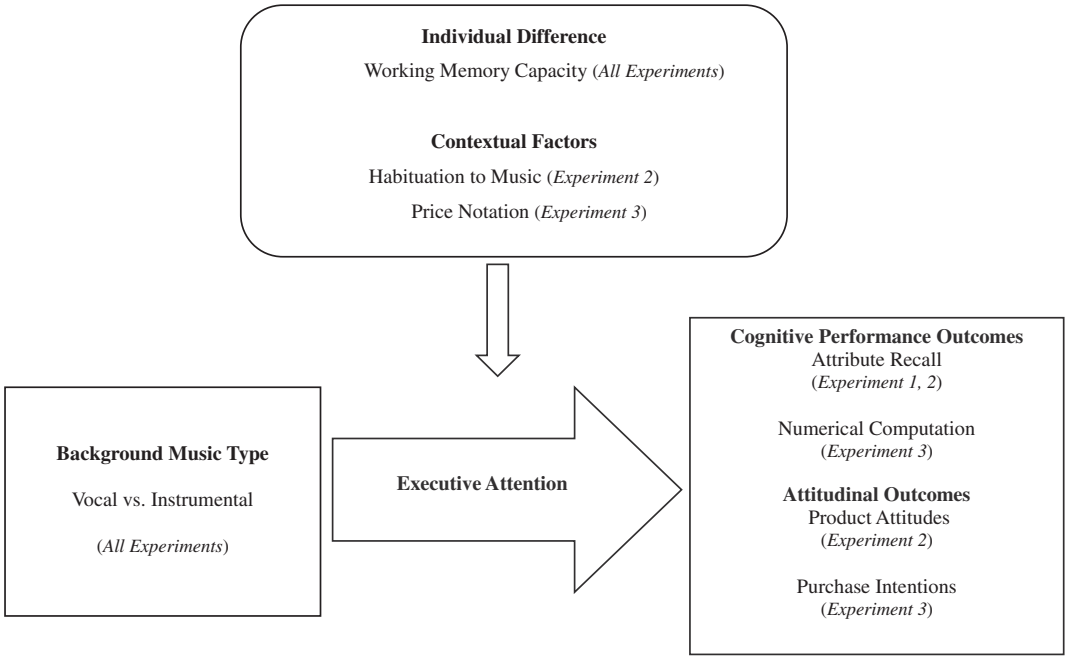

Fig. 1. Conceptual overview.

Past accounts have interpreted this effect as interruption during storing and processing in working memory (Baddeley & Hitch, 1974). The view is that lyrics place an additional load on cognitive resources, which automatically constrains the learning of visually presented verbal material by reducing the 'space' available for it. This paper explores a complementary process in which executive attention—the ability to manage what we pay attention to—drives this effect.

We pull from recent advancements in working memory theory which suggest that working memory capacity correlates primarily with differences in executive attention (i.e., ability to manage distraction) (Barrett, Tugade, & Engle, 2004; Engle, 2002). From this viewpoint, vocal music should impede learning of visually presented material (such as ad messages) when a consumer is more susceptible to external auditory distractors and has less intrinsic ability to maintain attention on a focal task. To test this expectation, we take into account a key factor driving differences in attentional control—working memory capacity (Engle, 2002). In experiment 2, we examine habituation to music as a way to directly test the attentional hypothesis. Finally, in experiment 3, we expand our inquiry to price estimation in order to test the generalizability of this effect to consumers' cognitive performance. Downstream effects upon attitude formation and purchase intentions are then documented (see Fig. 1). In summary, this research re-examines the "unattended" aspect of the unattended speech effect by using individual differences in executive attention as a moderator.

Theoretical framework

Working memory and background music

Past work on working memory shows that when we try to perform two concurrent tasks that use the same perceptual domain, performance is degraded (e.g., Büttner, 2012). For instance, when an individual reads information in the presence of background conversation, the words spoken in the background interfere with and reduce the learning of the material being read (Furnham & Bradley, 1997). This effect is known as the unattended speech effect (Salamé & Baddeley, 1982).

Extant research on working memory also shows that when an individual reads text, say on a website or an ad, s/he engages in sub-vocal articulation (speaking with his/her inner voice); sub-vocal articulation has been shown to be necessary in encoding visually presented words (Baddeley, 2001; Davis & Herr, 2014). However, when reading is undertaken in the presence of background speech, the words from background speech are presumed to automatically enter working memory (Salamé & Baddeley, 1982, 1989). Such automatic entry of background conversation into working memory constrains the space available for processing words that are being read. In other words, interference occurs. Extending this idea to advertising, vocal background music leads to similar effects because lyrics automatically enter working memory, in turn constraining the space available for reading ad messages and consequently, reducing ad learning. Critically in this explanation, executive attention, i.e., an individual's ability to control and maintain attention, is not directly involved.

A more recent account of working memory (Conway, Cowan, & Bunting, 2001; Cowan, 1995; Kane & Engle, 2003) views working memory as a compound of cognitive processes driven by the ability to direct attention to task-relevant stimuli and suppress attention to task-irrelevant stimuli. This account assumes that *shifting attention* towards background music interferes with the encoding of visual messages. Importantly, in this framework, individual-specific variation in working memory capacity is directly linked to variation in executive attention capacity (i.e., the ability to manage attention rather