ation. In the first block that he used, when the same words were presented in quiet, there was no significant intergroup difference. However, because the first block was also the easiest one, more direct experiments are needed to dissociate between the impact of priming and the impact of noise on the performance of each group.

In summary the anchoring hypothesis stresses an often neglected point, namely that when we use many repetitions to improve our statistics we also modify participants' perceptions. It proposes that we modify controls' perceptions to a larger extent than dyslexics'. Ziegler's letter [11] reveals that as researchers we are also typically unaware of the impact of the introductory part that often precedes the 'real' experiment, which is aimed to verify that participants understand the task. This introduction provides brief training and a specific anchoring opportunity. The anchoring hypothesis proposes that this very brief stimulus-specific training, which is often very useful for control participants, is typically less effective for dyslexics.

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Book Review

Music of language or language of music?

Music, Language, and the Brain by Aniruddh D. Patel, Oxford University Press, 2008. £35.99 hbk (528pp) ISBN 978-0-19-512375-3

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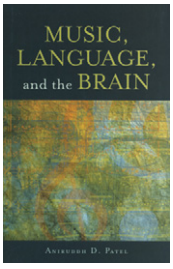

The 19th century saw intense discussions about the evolutionary relationship between music and language. Spearheaded by Herbert Spencer's 1857 essay 'The Origin and Function of Music' [1] and its novel thesis that music evolved as an emotional accentuation of speech, this movement caused not just Charles Darwin to get into the act of discussing music evolution but also many renowned figures from physiology, anthropology and musicology. Although interest in this topic continued into the first half of the 20th century, the cognitive revolution of the second half of the century effectively catapulted language into a unique position as a symbolic information-processing system, one that made any connection with music seem all but irrelevant. This attitude has persisted to the present day. Although many music psychologists still cling to a faith in the kinship between music and language, music doesn't really have a place on the map for the majority of linguists. And the evolutionary aspersions cast by linguists like Steven Pinker [2] – that music is a functionless fancy – only helps to solidify the apparent demise of music–language theories.

So it should come as no surprise that the most recent attempt to illuminate the music–language relationship is written by a music psychologist. Aniruddh Patel's *Music, Language, and the Brain* is a wide-ranging, well-researched and highly readable exploration into this old problem. But how much has changed since Spencer's essay in 1857? Or since 1957 for that matter? Is there anything new in this book that should cause linguists to raise an eyebrow? To answer this question one has to examine music's connection with, on the one hand, speech and, on the other hand, language. Simply stated, it is much easier to develop a synthetic account of the music of language than the language of music.

The first topic brings us into the realm of phonology and the sound properties of speech and music. Patel devotes the first three chapters to examining pitch, rhythm and melody in speech and music. This is an excellent and extensive survey of studies from many areas. Music typically is seen as having a periodicity of pitch and of duration that everyday speech doesn't (setting aside metric linguistic forms like poetic verse). Patel presents a meticulous account of where shared mechanisms probably exist and where they probably don't. My own feeling is that he is too accepting of the differences between music and speech, and that future work in this area should strive toward a joint set of principles that can account for music and speech as variations on a common phonological theme of generating pitch

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sequences in time. We're not there yet, but Patel's book is a major step in the right direction.

With speech spoken for, what can be said about language? Here the chasm seems wide. Language employs words, which themselves represent concepts about objects, events and their properties. Syntax expresses relationships between these concepts, relationships that concern identity and causality. Could there possibly be a hope of showing a deep kinship between music – that seemingly meaningless thing – and language? Well, one approach is to be a Spencerian and argue that music emanated from language as a way to emotionally accentuate linguistic expression. This would certainly account for the fact that songs generally contain words (rather than meaningless syllables) and that they often function as a kind of enhancement and stylization of the ideas being expressed in the text. Although this piggyback scenario would certainly gratify linguists, it fails to explain much about music's tonal and rhythmic properties. So, unless we can find some deep similarities between music's structural organization and language's semantics and syntax, then music–language theories are doomed to failure (if even music–speech theories show genuine promise). It's worth pointing out that linguistic theories of music have had a prominent place in music psychology for many decades now; it has been commonplace to talk about musical syntax and semiotics. The real question is whether these concepts reflect mere analogies or, instead, deeper mechanistic relationships.

Where does Patel stand on this issue? Chapters five and six of the book are devoted to syntax and meaning, respectively. Patel doesn't deny that the syntaxes of music and language deal with different 'representation networks'; the objects that they organize and the phrases that they generate are quite different in kind. However, he argues that there might be a sharing of neural resources for the operations of these syntactic mechanisms. Might there be a central sequencing device that guides both language and musical syntax? Patel recounts neuropsychological findings demonstrating that patients with Broca's aphasia – a condition often associated with agrammaticism – show parallel syntactic deficits for language and music.

Regarding semantics, we come face to face with the absence of a detailed theory of emotive or connotative meaning in semantic theory. The expression of denotative meanings in music, through the use of such things as leitmotifs or sound imitations, is possible but is clunky and inefficient. We couldn't really imagine a generative grammar based on leitmotifs. At the other extreme, musicalization of sentences with speech surrogates like drummed or whistled languages creates a true means of conveying linguistic messages (on the assumption that there exists a language to imitate) but serves as a poor model for music as we know it. Music's tonal structure is a different kind of matter. And most people agree that it is about conveying emotional meanings, not unlike connotation in speech. Hence, the most fruitful way to create a dialogue between musical semanticists and linguistic semanticists is to examine deep links in emotional meaning between prosodic devices, like intonational melodies, and musical devices, like scale types. But this places the comparison squarely back in the domain of phonology rather than the amodal, abstract realm that semanticists inhabit. So, in the end, it looks like a language of music can go only so far as a music of language, not beyond it, which doesn't bode well for the future of music–language comparisons.

Despite the book's many strengths, it is plagued by the trademark weakness of music psychology as a whole, namely its overriding emphasis on perceptual processes to the exclusion of motor and performance issues. Patel ignores much literature on vocalization and instrumental performance that could greatly strengthen his arguments. Likewise, the chapter on evolution covers the standard evolutionary-psychological territory about adaptiveness, ignoring the rich literature (from Plato to Mithen) about potential homologies between speech and song. In many ways these latter acoustic connections are much more approachable by using the tools of cognitive psychology, neuropsychology and brain imaging than are questions about primordial function. This is yet one more reason why a neglect of the vocalization literature leaves a void in this book.

Patel's book is the most scholarly and comprehensive account of the topic yet published. It should be of special interest not only to music psychologists and phonologists but also to other linguists who want to expand their horizons. Although Patel offers an optimistic vision about music–language kinship, I walked away with the feeling that we are far closer to developing a unified account of the sound properties of speech and song than of the semiotic properties of language and music. But Patel's book should serve as an excellent stimulus for researchers interested in tackling these fascinating – and enduring – issues.

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