Commentary on David Temperley's "Melodic Pattern Repetition and Efficient Encoding: A Corpus Study"

JON B. PRINCE [1]
Murdoch University, Perth, Australia

ABSTRACT: The following is a commentary of David Temperley's article on melodic pattern repetition and encoding. The article advances our understanding of patterns that could foster efficient encoding of melodies in Western tonal music. The research has room to grow in the theoretical context and provides opportunities for experimental work to test its predictions.

Submitted 2023 December 19; accepted 2024 January 30.
Published 2024 June 7; https://doi.org/10.18061/emr.v18i2.9733

KEYWORDS: *melodic repetition, corpus analysis, encoding, commentary*

IN this study, Temperley (2023) uses corpus analysis of classical period themes and folksongs to examine the use of metric parallelism, motive transposition, and repetition length. It is insightful, careful work that offers a strong contribution to the literature, and creates opportunities for both further theoretical development and experimental verification. Below I provide more detail on these opportunities.

The most obvious extension to this work would be to incorporate less-exact repetitions. In the Introduction, Temperley discloses that "looser forms of similarity—elaborated repetition and contour similarity—complicate the problem still further; in the current study I limit my attention to exact repetitions of pitch, diatonic interval, and/or rhythm" (p. 99). Although justifiable in this initial exploration, this limitation means that repetitions with miniscule alterations would not be considered. For example, subdividing a half note into two quarter notes (without changing the pitch) in a repetition would destroy entirely the ability to recognize it as a pattern repetition. Of course, considering anything other than an exact match leads toward a slippery slope of computational complexity, however if evaluated in a graded fashion, this could substantially improve the recognition of patterns in music analyzed in this fashion. The issue of contour (both melodic and rhythmic – see Dowling et al., 1999; Monahan et al., 1987; Schulkind, 1999) similarity to identify/evaluate pattern repetitions represents a further theoretical extension. Contour is central to music perception, as listeners often focus on this general melodic shape when listening to music, and there are numerous models of listeners' internal representation of contour (Schmuckler, 2016). As Temperley states, "much work remains to be done in the modeling of musical pattern identification" (p. 112).

Experimental verification of the principles that Temperley has documented would provide strong support for the argument that these patterns are indeed related to encoding efficiency instead of limited to compositional practice. This is of particular interest to me as an experimental psychologist, because when I see an interesting pattern in natural stimuli (such as the use of repetition in composition), my first question is whether it is born of convenience or shaped by perceptual processes. In other words, does the phenomenon have psychological reality or is it merely a theoretical curiosity? For example, when I was working on a corpus study demonstrating the alignment of tonality and meter (Prince & Schmuckler, 2014), I wanted to know if this pattern was meaningful in a perceptual sense – that is, would listeners be sensitive to manipulations of the tonal-metric hierarchy? This led to behavioral work in which I used a phase-shifting approach to show that listeners rated sequences that preserved the tonal-metric hierarchy as better melodies than those that disturbed this alignment (Prince et al., 2020). The same question applies to the principles that Temperley reveals in his article; accordingly, he touches on this issue at the end of the Discussion (positing a "complex process of back-and-forth influence between composition and perception", p. 112). He concedes that he has "assumed that music listening involves an active process of searching for repeated patterns" (p. 112) – this is probably true, but compositional expediency could also account for a fair amount of these sorts of pattern repetition (in turn, I concede that he explains that there is no obvious benefit to a composer of constraining the distance of intervallic repetitions). Regardless, definitive answers to questions of the

psychological reality of these principles are possible through a variety of behavioral experiments. For example, one could split a melody in half and create variants of the second half that vary in the degree to which pattern repetitions preserve metric parallelism. Listeners could then rate how well the second half fits with the first, judge the similarity between halves, or even rate overall goodness. If the responses reliably change as a function of metric parallelism, then this provides direct evidence for the role of this principle in music perception (and not just composition). Another complementary approach could focus on memory – present a list of melodies in an exposure phase, and then in the test phase play variants that preserve/perturb the metric parallelism. Such approaches have the additional advantage of being more tightly linked to memory processes (of which encoding is a central part) and provide the opportunity to vary the number of intervening melodies between exposure and test (i.e., distance, as per Herff, Olsen, & Dean, 2018; Herff, Olsen, Prince & Dean, 2018). Indeed, although these examples primarily focus on metric parallelism, researchers could apply such approaches to both other principles as well.

In light of the above, I welcome this new contribution to the empirical musicology literature and am eager to see how this research agenda progresses. It represents an important advance in our understanding of the use of melodic patterns and has room to grow (both theoretically and experimentally).

ACKNOWLEDGEMENTS

This article was copyedited by Eve Merlini and layout edited by Jonathan Tang.

NOTES

[1] Correspondence can be addressed to: Jon B. Prince, School of Psychology, Murdoch University, 90 South Street, Murdoch Western Australia 6150, Australia. Email: Jon.Prince@murdoch.edu.au

REFERENCES

Dowling, W. J., Barbey, A., & Adams, L. (1999). Melodic and rhythmic contour in perception and memory. In S. W. Yi (Ed.), *Music, Mind, and Science* (pp. 166-188). Seoul National University Press.

Herff, S. A., Olsen, K. N., & Dean, R. T. (2018). Resilient memory for melodies: The number of intervening melodies does not influence novel melody recognition. *The Quarterly Journal of Experimental Psychology*, *71*(5), 1150-1171. https://doi.org/10.1080/17470218.2017.1318932

Herff, S. A., Olsen, K. N., Prince, J. B., & Dean, R. T. (2018). Interference in memory for pitch-only and rhythm-only sequences. *Musicae Scientiae*, *22*(3), 344-361. https://doi.org/10.1177/1029864917695654

Monahan, C. B., Kendall, R. A., & Carterette, E. C. (1987). The effect of melodic and temporal contour on recognition memory for pitch change. *Perception & Psychophysics*, *41*(6), 576-600. https://doi.org/10.3758/BF03210491

Prince, J. B., & Schmuckler, M. A. (2014). The tonal-metric hierarchy: a corpus analysis. *Music Perception*, *31*(3), 254-270. https://doi.org/10.1525/mp.2014.31.3.254

Prince, J. B., Tan, S. E. J., & Schmuckler, M. A. (2020). Listeners perceive complex pitch-temporal structure in melodies. *Memory & Cognition*, *48*(4), 526-540. https://doi.org/10.3758/s13421-019-00987-5

Schmuckler, M. A. (2016). Tonality and contour in melodic processing. In S. Hallam, I. Cross, & M. Thaut (Eds.), *The Oxford Handbook of Music Psychology* (2nd ed., pp. 143-166). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780198722946.013.14

Schulkind, M. D. (1999). Long-term memory for temporal structure: Evidence from the identification of well-known and novel songs. *Memory & Cognition*, *27*(5), 896-906. https://doi.org/10.3758/BF03198542

Temperley, D. (2023). Melodic pattern repetition and efficient encoding: a corpus study. *Empirical Musicology Review*, *18*(2), 97-116. https://doi.org/10.18061/emr.v18i2.9289