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MULTISTABILITY AND COMPLEX ISOTOPY  
IN MAKAM MUSIC ANALYSIS  
THE LINK BETWEEN COGNITION AND SEMIOTICS  
IN AESTHETICS OF TURKISH MUSIC

INTRODUCTION

The analysis of Turkish makam music in the Ottoman tradition is largely influenced by prescriptive theoretical models and pedagogical methods which establish an a priori definition of a makam identity. To address the lack of empirical criteria for makam analysis, the larger scope of my doctoral thesis is an adaptation of Fred Lerdahl and Ray Jackendoff's seminal *A Generative Theory of Tonal Music* (GTTM).<sup>1</sup> This model proposes a method of reductive and prolongational analysis based on the cognition of the listener, which determines the essential characteristics of a makam melody a posteriori. In order to better understand how perception determines signification in Turkish makam music, the study at hand investigates the concept of *multistability* (multiple alternating perceptions), which I present as a cognitive correlate to the semantic concept of *complex isotopy* (multiple meanings) in Algirdas J. Greimas' semiotic theory. In generative musical analysis, these two interrelated concepts manifest in phrasal groupings, time-span reduction, and prolongational reduction, where they form an integral part of the aesthetics of Turkish makam music and related traditional art forms.

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<sup>1</sup> Fred Lerdahl, and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, MA: MIT Press, 1983).

Eero Tarasti has connected semiotics to generative grammar by citing Greimas' identification of *semio-narrative structures* that progress from deep to surface levels of a text. Tarasti distinguishes that Noam Chomsky's generative tree models (the inspiration for GTTM) are devoid of signification.<sup>2</sup> This is confirmed in Chomsky's own determination that grammatical and syntactic structures should be considered independently of linguistically associated meanings.<sup>3</sup> However, the signification Chomsky denies is that which relates syntax to external signification in semantics, not that of the internal signifying relationships inherent to the cognition of syntactic structure. Charles S. Peirce's identification of indexical signs perhaps applies best to the internal semiosis of Chomsky's cognitive syntax: a *pure index* conveys no information or signification on its own, but brings attention to an object it denotes.<sup>4</sup> The musical analogue of internal, syntactical signification is what Tarasti, borrowing from Greimas, refers to as *interoceptive* relations within a musical work. Examples of interoceptive semiosis within a composition include syntagmatic sectional significations and functional chord progressions, cadences, sequences, as well as paradigmatic sectional and chordal substitutions. In contrast, Tarasti defines *exteroceptive* musical semiosis as that which involves extra-musical significations, such as *topic* figures in Classical-era repertoire.<sup>5</sup> Recent scholarship has connected *introversive* (interoceptive) semiosis in Arabic makam music with the cognition of intrinsic meanings in its musical grammar.<sup>6</sup> This suggests that the study of interoceptive signification in makam repertoire is fertile and relatively unexplored territory, especially in consideration of the abstracted and apparently non-narrative nature of makam music. This study therefore emphasizes the importance of ascertaining the cognitive/interoceptive significations associated with multistability and complex isotopy in traditional Ottoman-Turkish music. To support this proposed understanding of perceptual aesthetics, comparative examples from traditional Turkish art, literature, and theater will be employed throughout this study.

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<sup>2</sup> Eero Tarasti, *A Theory of Musical Semiotics* (Bloomington: Indiana University Press, 1994), 27.

<sup>3</sup> Noam Chomsky, *Syntactic Structures*, 2nd edition (Berlin–New York: Mouton de Gruyter, 2002), 92-105.

<sup>4</sup> Charles S. Peirce, *The Essential Peirce: Selected Philosophical Writings*, vol. 2 (1983-1913), ed. Peirce Edition Project (Bloomington: Indiana University Press, 1998), 705-6.

<sup>5</sup> Tarasti, *A Theory of Musical Semiotics*, 57.

<sup>6</sup> Nidaa Abou Mrad et al., "Discrimination cognitive des modalités sémantiques des monodies modales," *Revue des traditions musicales*, no. 16 (2023): 67-92.

## MULTISTABILITY AND VISUAL AESTHETICS

Multistability is a phenomenon of perceptual psychology where a subject experiences the alternation of more than one dominant percept from a single physical stimulus. Ambiguous figures such as the Necker cube and Rubin's vase/face are among the most well-known types of multistable visual stimuli, where the same figure can be interpreted in more than one way. However, multistable perception may occur in any sensory modality, such as hearing, taste, smell, and touch.<sup>7</sup> In the field of Oriental visual art, David Hockney's compelling analysis of Chinese miniature scrolls provides evidence of what can be called *multistable perspective*. The principle of *moving focus* in Chinese miniature art invites the observer's eye to wander in multiple directions, perceiving life and motion in a flat scene.<sup>8</sup> Hockney proposes that the observer is placed in central, omniscient position, where the eye is guided to multiple pathways and can view multiple angles normally unavailable to a real person's singular vantage point. Thus, we see a tendency for the lack of realism in miniature art to lend itself to multistable perception of objects and scenes: one views both shopfronts as if facing them on the street as well as the entire length of the street as if walking down the street; the side of a bridge from the perspective of the river bank or the city homes from a perspective upon the bridge.<sup>9</sup>

Begüm Ö. Fırat's examination of Turkish miniature art confirms a multistable aesthetic similar to that of the Chinese miniature scrolls. In the miniature *Timur on Expedition to Attack Sultan Husayn*, Fırat describes multiple possible visual readings. Following the spiraling motion of the army in the center of the painting, the miniature culminates with Timur himself as a central figure in the foreground. However, the eye continues to follow a tree behind Timur, ending in a battle near a castle at the top of the painting.<sup>10</sup> Fırat suggests that the painting can be read in the context of the manuscript it illustrates, resulting in a right to left, up to down flow following the direction of Arabic script that begins with the uppermost castle scene. Fırat comments that both readings of the miniature "promote a horizontal

<sup>7</sup> Jean-Luc Schwartz et al., "Multistability in Perception: Binding Sensory Modalities, an Overview," *Philosophical Transactions of the Royal Society* 367, no. 1591 (2012): 896-98, accessed April 10, 2024, <https://doi.org/10.1098/rstb.2011.0254>.

<sup>8</sup> "Day on the Grand Canal with the Emperor of China," lecture by David Hockney, September 27, 2017, YouTube video, 55:09, <https://www.youtube.com/watch?v=FvZmKMEdetY>.

<sup>9</sup> David Hockney, "A Day on the Grand Canal with the Emperor of China: excerpts," YouTube, January 17, 2022, documentary, <https://www.youtube.com/watch?v=mwJiBY2UsRg>.

<sup>10</sup> Begüm Ö. Fırat, *Encounters with the Ottoman Miniature: Contemporary Readings of an Imperial Art* (London: I.B. Tauris, 2015), 349-55.

and curvilinear mode of looking” and that “the miniature is like a text in which the viewer/reader is left free to wander among the letters, a text in which the hierarchical relation between up and down has been disrupted.”<sup>11</sup> As will be exemplified below, the disruption of strict hierarchies in reductive analysis is one distinguishing feature of generative theory’s adaptation to makam music.

### COMPLEX ISOTOPY AND LITERARY AESTHETICS

If we consider elements of multistable perception in terms of structuralist oppositions, the significations of the semantic pair ‘horizontal’ (shopfront perspective) vs. ‘vertical’ (perspective on the street) manifest as a *complex term*, an inclusive combination of both oppositional terms. Greimas provides an example of a complex term in the French word ‘tic,’ whose meaning is dependent on the interpretation of one of two oppositional *semes* (signified semantic terms) – ‘aggressive touch’ vs. ‘convulsive reaction.’<sup>12</sup> In literature, Greimas similarly references the use of the complex term in semantic ‘themes’ extracted from the text known as *isotopies*. As such, the *complex isotopy* confuses meanings by equivocating oppositional contextual *semes* (defined as *classemes*), whose resultant ambiguity suggests a narrative that deprives one of a choice between terms. In the example of a Charles Baudelaire poem, the semantic content ‘exterior’ is understood in context of ‘interior’ significations, providing what Greimas refers to as *symbolic ambivalence*. Greimas considers literature in general as “games of consciousness charged with a function of giving us aesthetic pleasure through the unveiling of hidden isotopies.”<sup>13</sup>

Classical Turkish poetry similarly contains ambiguity of classematic content. Fatma Kola explains that classical Turkish literature and poetry give a spiritual quality to the term ‘love’ (*aşk/’ışk*), due to the influence of Islam and Sufi mysticism. According to mystical literature, love is the cause of the moral realm of existence’s creation. Kola notes that in classical Turkish poetry, ‘love’ can be used in a spiritual sense, as mortal romance, or as a bridge that transcends mortal feelings to spiritual love. Likewise, mortal love is seen as a manifestation of spiritual love in the physical world.<sup>14</sup> Common themes in poetry such as ‘wine’ and ‘drunkenness’ take on

<sup>11</sup> Fırat, 371-75.

<sup>12</sup> Algirdas J. Greimas, *Structural Semantics: An Attempt at a Method*, trans. Daniele McDowell, Ronald Schleifer, and Alan Velie (Lincoln–London: University of Nebraska Press, 1966), 71.

<sup>13</sup> Greimas, 110-11.

<sup>14</sup> Fatma Kola, “Aşka Dair Bazı Tasavvurlar (XVI. Yüzyıl Divanlarındaki Aşk Redifli Gazellerden Hareketle),” *Littera Turca: Journal of Turkish Language and Literature* 2, no. 2 (2016): 68.

another realm of meaning, bearing mystical associations with love and ecstasy.<sup>15</sup> Kola provides the example of a couplet from the poet Emrî to illustrate the multiple meanings of love in drunken ecstasy:

Ben meste dime ‘aklunı almış şarâb-ı ‘ışk  
 Bu ‘akl ile bilinmez efendi kitâb-ı ‘ışk  
 [Do not tell a drunkard like me the wine of love has taken my mind  
 The book of love cannot be known with this drunken mind].<sup>16</sup>

In this excerpt, the ambiguous equivocation of oppositional classemes such as ‘mortal vs. mystical’ and ‘intoxication vs. ecstasy’ renders complex isotopies whereby multiple meanings may be considered. Similar to ambiguous form in visual multistability, the poetic aesthetic involved can be said to provoke multiple percepts of meaning within the subject’s mind.

When mapped onto the semiotic square, the cognitive process of multistability closely resembles the process of veridictory narrativity as Greimas conceived it. The transformation of knowledge within a *complex narrative plot* constitutes a cognitive event where the passage from erroneous to true knowledge creates a *narrative pivot*. Greimas describes such a narrative plot on the veridictory square: the main contrary axis of “truth” is presented as ‘being vs. appearing’ ( $S_1$  vs.  $S_2$ ), which is contradicted by terms of the subcontrary axis “falsehood,” ‘not being vs. not appearing’ ( $\bar{S}_1$  vs.  $\bar{S}_2$ ), before reaching a new “truth.”<sup>17</sup> Similar to the cognition of narrativity, multistable percepts begin with the affirmation of one of the two contrary terms and move to their contradictory term as the cognitive negation of that percept in its absence. This, in turn, thereby implicates the other contrary percept as a *deixis* relationship. In this manner, multistable perception can be described as a constant fluctuation between the main contrary terms competing for “truth” on the veridictory square (Figure 1).

<sup>15</sup> Kola, 81.

<sup>16</sup> Kola, 81. Translated by P.N. Salvucci.

<sup>17</sup> Algirdas J. Greimas, Joseph Courtés, and Michael Rengstorf, “The Cognitive Dimension of Narrative Discourse,” *New Literary History* 20, no. 3 (1989): 570-71, accessed April 10, 2024, <https://doi.org/10.2307/469354>.

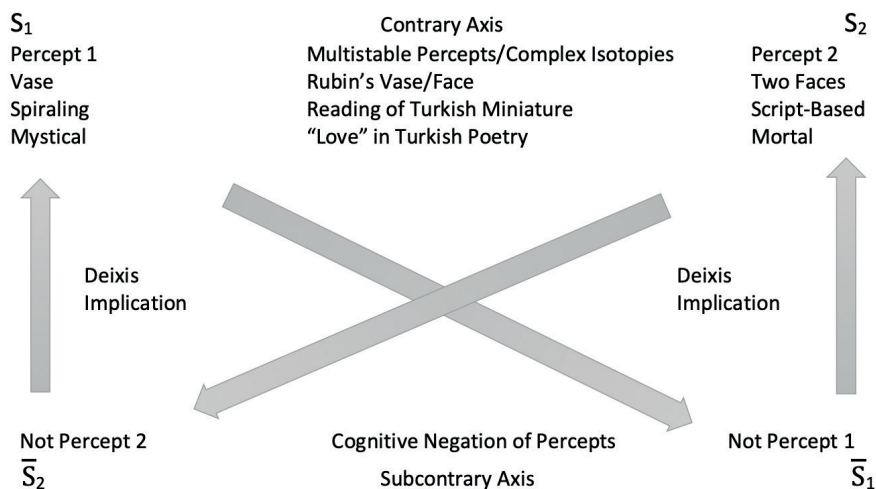


Figure 1. Multistable percepts on the veridictory square

## AUDITORY MULTISTABILITY AND MUSICAL AESTHETICS

Multistability in speech is known to occur in the ambiguous perception of the same word repeated on loop and without intervals. Richard M. Warren and Richard L. Gregory were the first to introduce the concept of *verbal alternation*, which they suggested was comparable to the perception of ambiguous visual figures. A word stimulus such as “say” repeated on a tape loop was found to shift between the multistable percepts of “say” or “ace,” depending upon which phoneme (/s/ or /a/) was perceived as the beginning of the word.<sup>18</sup> Similarly, the example of *Rast Ağır Semai*<sup>19</sup> in Figure 2 illustrates that the arrival on the *perde* (note)<sup>20</sup> of G-Rast on the first

<sup>18</sup> Richard M. Warren, and Richard L. Gregory, “An Auditory Analogue of the Visual Reversible Figure,” *The American Journal of Psychology* 71, no. 3 (1958): 612-613, accessed July 9, 2024. <https://doi.org/10.2307/1420267>.

<sup>19</sup> The musical example I will be using throughout this study is a developed vocal form known as *ağır semai* in Rast makam, attributed to the famous seventeenth-century composer Buhurizade Mustafa Itri: Buhurizade Mustafa Itri, *Rast Ağır Semai*: “*Ne Bülbül-süz Ne Giriftar-ı Reng ü Bû Oluruz*,” music notated by Cüneyt Kosal, accessed April 10, 2024, [http://www.sanatmuziginotalari.com/nota\\_inderme.asp?notaid=58118&mode=1&sessionid=612002036](http://www.sanatmuziginotalari.com/nota_inderme.asp?notaid=58118&mode=1&sessionid=612002036).

<sup>20</sup> *Perde* is the traditional designation of a special pitch name within the gamut. Thus, in this study, “G-Rast” references the *perde* named Rast, which is notated by modern convention as ‘G’ on the staff.

beat of the third *usul cycle* (measure)<sup>21</sup> can be interpreted as either the ending or beginning of a phrase. Similar grouping overlap exists throughout smaller phrase structures, such as the temporary closure on A-Dügah on the ninth beat of the second cycle leading to G-Rast and the subsequent arrival on d-Neva on beat eight of cycle three, which in turn opens the next phrase ending on g-Gerdaniye in the fourth *usul cycle*. Melodic grouping and phrasal overlap (shown with blue brackets) is such a common compositional device for ambiguous melodic progression and imbalanced continuity that it deserves recognition as a fundamental aesthetic of multistability in traditional Turkish makam music.



Figure 2. Phrasal overlap in Itri's *Rast Ağır Semai* as a multistable aesthetic

In generative analysis, the cognitive hierarchy of pitches is determined by *time-span reduction*, which is based on the combination of grouping and metrical structures.<sup>22</sup> In makam music, this translates to a reduction into cognitively salient *central perde* based on the interaction between melody and *usul* beats. The term *central perde* is a functional designation originally theorized by M. Ertuğrul Bayraktarkatal and Okan M. Öztürk<sup>23</sup> describing a point melodic focus or phrasal rest.

<sup>21</sup> *Usul* is a rhythmic cycle with a particular pattern of beats represented by a time signature in the convention of modern Turkish notation, where each *usul cycle* of a composition is depicted with bar lines.

<sup>22</sup> Lerdahl and Jackendoff, *Generative Theory of Tonal Music*, 8.

<sup>23</sup> M. Ertuğrul Bayraktarkatal, and Okan M. Öztürk, "Ezgisel Kodların Belirlediği bir Sistem Olarak Makam Kavramı: Hüseyini Makamı'nın İncelenmesi." *Porte Akademik* 3, no. 4 (2012): 34;

I hypothesize that time-span segments can reflect competitive multistable percepts (multiple central perde) at the same level of reduction, whereby one of the multistable percepts/perde may emerge as singularly dominant in the larger temporal scope of its higher time-span level. In an experimental study using timbral alternations to produce auditory multistability, it was determined that when one timbral stream was perceived, notes of the other stream fell into an incoherent auditory background.<sup>24</sup> These findings suggest that while multistability is non-hierarchical, the temporary dominance of one auditory percept creates a foreground–background contrast that could ultimately resolve into a superordinate position within the cognitive hierarchy. Multistability in music perception thus mitigates the strict hierarchy that is found in the generative analysis of tonal music, expressing the perceptual ambiguity characteristic of Ottoman-Turkish art music.

Building upon the previous example of Figure 2, the interaction between phrasing and usul affects the multistable perception of significant perde. As seen on level d of the time-span analysis in Figure 3, the dominance of A-Düğah perde appears to continue from the first usul cycle into the second one. However, the repetition and focus on d-Neva perde by the fourth beat alternately suggests that for the time-span of the first several beats of the second usul cycle, multistable percepts of both perde are heard. The largest multistable ambiguity occurs with the dominance of A-Düğah perde at the time-span of two usul cycles (level b), which shifts to the perceptual dominance of G-Rast only after the phrasal extension to the beginning of the third usul cycle is heard (level a). The alternative time-span of G-Rast is heard as dominant from the inception of G-Rast perde at the first beat of the first usul cycle to the same beat of the third usul cycle, due to what I call *local cyclical prolongation*, inspired by Ozan Baysal’s theory of usul-based perde prolongation.<sup>25</sup> As highlighted in the purple-bracketed segments of Figure 3, the “out of phase” alignment between grouping parameters of phrasal structures and “metric” parameters of the usul cycles<sup>26</sup>

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Okan M. Öztürk, *Makam Müziğinde Ezgi ve Makam İlişkisinin Analizi ve Yorumlanması Açısından Yeni bir Yaklaşım: Perde Düzenleri ve Makamsal Ezgi Çekirdekleri*, PhD diss., Istanbul Technical University, 2014, accessed April 10, 2024, <https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=sY7m19PfcL6F1NUw-cr80PsawSAunY-n96UBGEQ26zS6mhHXvepRJ0GUwm6Nfl7E>.

<sup>24</sup> Orsolya Szalárdy et al., “Foreground-Background Discrimination Indicated by Event-Related Brain Potentials in a New Auditory Multistability Paradigm,” *Psychophysiology* 50 no. 12 (2013): 1245-1246.

<sup>25</sup> Ozan Baysal, *Phrase Rhythm and Time in Beste-i Kadims: A Cyclical Approach*, PhD diss., Istanbul Technical University, 2011, accessed April 10, 2024, [https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=EEdeQgIdFRxX5NbvVau-At0w5ww\\_K75fuKI45r1X7FYiYHaPTYn1-22uwOb\\_O8jG](https://tez.yok.gov.tr/UlusalTezMerkezi/TezGoster?key=EEdeQgIdFRxX5NbvVau-At0w5ww_K75fuKI45r1X7FYiYHaPTYn1-22uwOb_O8jG).

<sup>26</sup> Lerdahl and Jackendoff, *Generative Theory of Tonal Music*, 30, 149-50.



creates irregular, *augmented time-spans*<sup>27</sup> and facilitates the multistable overlap of perde in various time-span levels.

Figure 3. Multistability in time-span regions

The multistable competition between the central perde A-Düġah and G-Rast is represented as the combination of two contrary terms on the semiotic square,

<sup>27</sup> Lerdahl and Jackendoff, 127.

resulting in a complex isotopy (Figure 4). As contradictory and subcontrary terms, the tensional perde which directly lead to each central perde possess a natural relationship of implication as deixes. We see the function of c-Çargah perde, coinciding with the strongest usul beat 8, which signifies a temporary closure on A-Düğah in the end of the second usul cycle. The directive quality of Bd-Segah perde on the relatively weaker usul beat 10 actually signifies a stronger closure on G-Rast due to its larger, salient phrasal ending supported by local cyclical prolongation.

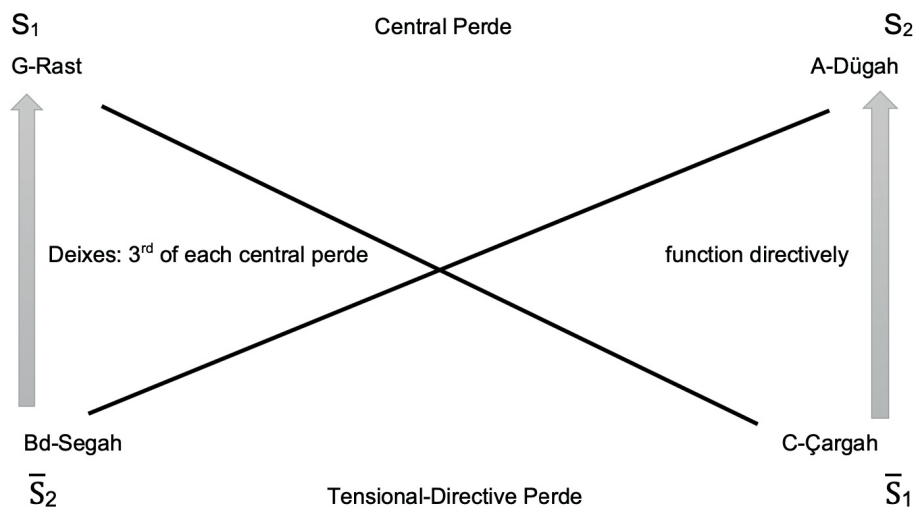


Figure 4. Multistability of central perde as complex isotopy

#### THEATER, TEMPORAL PERCEPTION, AND MUSICAL PROLONGATION

Similar to how Hockney described the forced narrative of a static viewpoint in European paintings using perspective,<sup>28</sup> Metin And characterizes *closed-form* aesthetics in Western art and narrative theater as goal-driven, based on a chain of events in sequence.<sup>29</sup> The closed-form narrative aesthetic coincides with the formalization of goal-driven harmony and tonal music in seventeenth-century Europe,

<sup>28</sup> David Hockney, “A Day on the Grand Canal with the Emperor of China: excerpts,” documentary, January 17, 2022, YouTube video, 4:58, <https://www.youtube.com/watch?v=mwJiBY2UsRg>.

<sup>29</sup> Metin And, “Tiyatroda Açık Biçim ve Türk Tiyatrosu Bakımından Önemi [Open Form and its Importance from the Perspective of Turkish Theater].” *Tiyatro Araştırmaları Dergisi* 1, no. 1 (1970): 27.

as well as the development of perspective in European art roughly within the same time period. Closed-form theater thus aims to emotionally identify with its audience and provoke association with its characters, which is contrasted with the *open-form* aesthetics of traditional Ottoman theater. Similar to the subjective, multistable aesthetics of miniature art, the observer committing the act of interpretation, not the lead actor(s), becomes the focal center in open-form Ottoman theater.<sup>30</sup>

In comparison to European theater, the greatly diminished sense of protagonist–antagonist relationships in conflict–resolution schemes present in Ottoman theater are correlated with a lack of narrative cause-and-effect schemes within a chain of events. This additionally results in a lack of a clear timeline, leaving the audience to infer the progression of time instead.<sup>31</sup> Such an open-form aesthetic is similar to Jonathan D. Kramer’s definition of *multiply-directed time* as a temporal modality of music, where a sense of underlying linearity is understood but is mitigated by interruptions, discontinuity, and the lack of a clear sequence of goals. Described as a “multidimensional vector field,”<sup>32</sup> the definition of multiply-directed time adequately describes the characteristic melodic progression which defines a makam, known as *seyir*. A makam’s *seyir* in its abstracted, conceptual form appears as a linear progression between one or more essential central *perde*. However, in its realization within a composition, a makam *seyir* entails a combination of cyclical and linear continuities, where the listener may hear multiple connections, explorations, and divergences along the way. In terms of prolongational analysis, I propose that a combination of linear and cyclical connections in Turkish makam compositions allows for a perceived multistability of prolongational regions. Kramer suggests that most music exhibits a mixture of temporalities as they exist between the extremes of absolute linear and non-linear time, manifesting in various perceptual foreground–middleground–background hierarchies.<sup>33</sup> Likewise, the utilization of both linear and cyclical prolongational connections in various time-span levels of generative analysis can help to establish the degree of linearity present in a composition of any musical idiom.

Figure 5 represents a composite reduction of the three highest time-span levels of the opening and ritornello sections of Itri’s *Rast Ağır Semai*, where the essential *seyir* (melodic progression) of Rast makam emerges from the prolongational connections of the most cognitively salient central *perde* (functionally defined

<sup>30</sup> And, 27.

<sup>31</sup> And, 21-23, 27.

<sup>32</sup> Jonathan D. Kramer, *The Time of Music: New Meanings, New Temporalities, New Listening Strategies* (New York: Schirmer Books, 1988), 46.

<sup>33</sup> Kramer, 58, 62.

in contemporary theory<sup>34</sup> and adapted for dual functionality, as shown in the upper right-hand box). The initial formal section containing the metered poetic line is dominated by the linear prolongation of G-Rast (in turquoise branches), which is interrupted by the linear prolongation of d-Neva into the ritornello/ *terennüm* section (usul cycles/ measures 5-14, marked by the Segno and containing words and rhythmic syllables external to the main poetry). The linear prolongation of d-Neva perde between the fourth and eighth usul cycles resolves to G-Rast perde in the ninth usul cycle. Due to the global cyclical prolongation of d-Neva perde (level a in time-span reduction, shown as a lower slurred pink grouping between usul cycles 8-11), the entire prolongational region of d-Neva can be re-interpreted as extending from the end of usul cycle four to the end of usul cycle fourteen (highlighted in pink). Multi-stable ambiguity, tension, and continuity are thereby achieved through the perceptual conflict between the prolongational region of G-Rast and the cyclically-bound region of d-Neva. The composition ends with the reinstatement of the last portion of the poetic line for the final two usul cycles, corresponding to the reinstatement of G-Rast perde as the ultimately dominant and stable prolongational percept. Of lesser importance are the cyclical prolongational regions of A-Dügah perde between usul cycles nine and thirteen and usul cycles thirteen and fifteen (shown in orange slurred groupings), which correspond to level c in time-span reduction.

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<sup>34</sup> Bayraktarkatal and Öztürk, “Ezgisel Kodların Belirlediği Bir Sistem,” 34; Ertuğrul Bayraktarkatal, and Cenk Güray, “Proposing a Makâm Model Based on Melodic Nuclei: Examples from the *Hüseynî* and *Uşşak* Families: *Hüseynî, Gülizâr, Muhayyer, Uşşak, Bayâti, Nevâ* and *Gerdâniye*,” *Analytical Approaches to World Musics* 11, no. 1 (2023): 17-19.

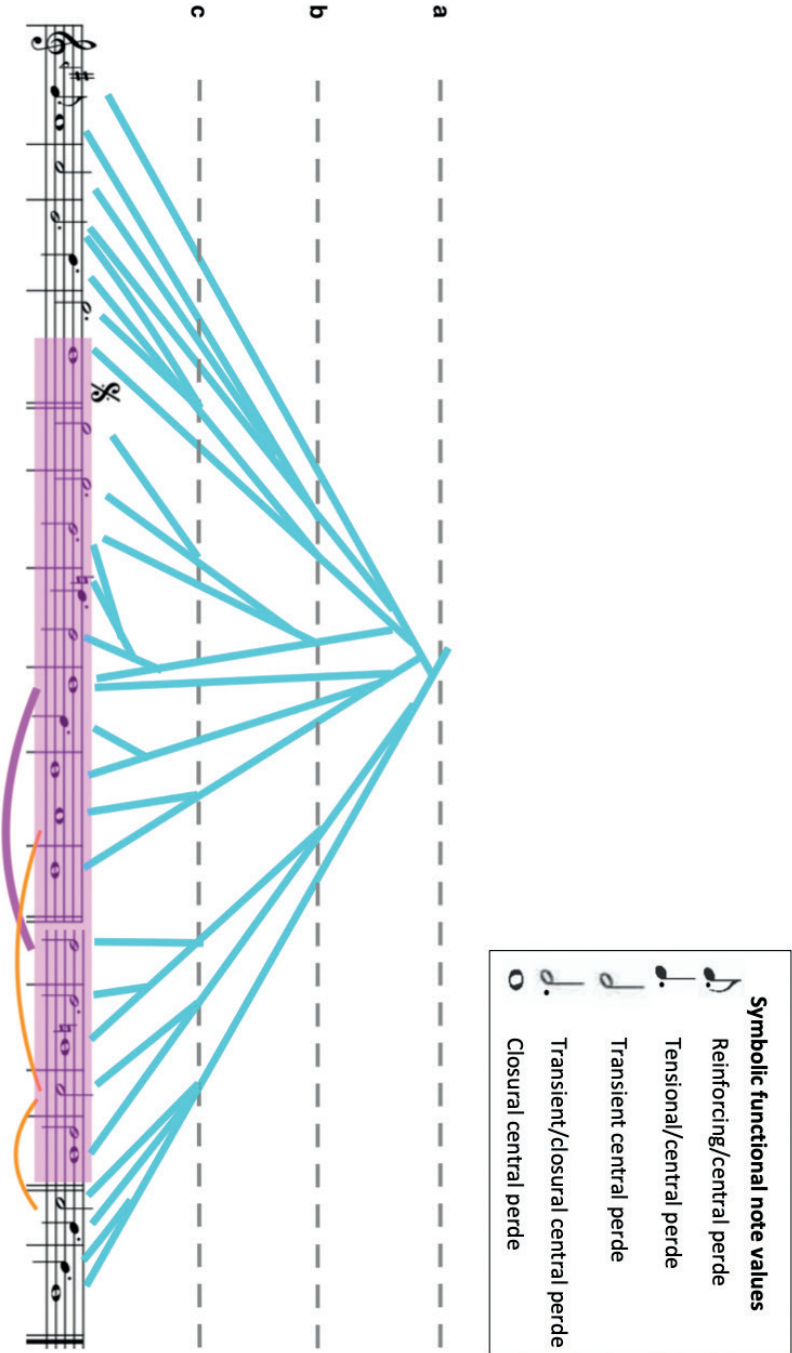


Figure 5. Prolongational multistability in *Rast Ağır Semai*

The semiotic square in Figure 6 expresses the interoceptive, semantic significance between the prolongations of G-Rast and d-Neva perde as alternately superordinate or subordinate to one another in a complex isotopy. The result of this juxtaposition of prolongational percepts is a sense of tension between terms 'S<sub>1</sub>' and 'S<sub>2</sub>', which resembles the multistable competition presented in the veridictory square in Figure 2. When one prolongational percept is cognitively negated, it becomes its contradictory term on the subcontrary axis (e.g. S<sub>1</sub> →  $\bar{S}_1$ ), signifying prolongational subordination to the dominant prolongational percept in the deixis (implicational) relationship above it (e.g.  $\bar{S}_1$  subordinate to S<sub>2</sub>). This multistable perception is only resolved when the final closure on G-Rast perde (S<sub>1</sub>) is realized as the dominant percept/isotopy.

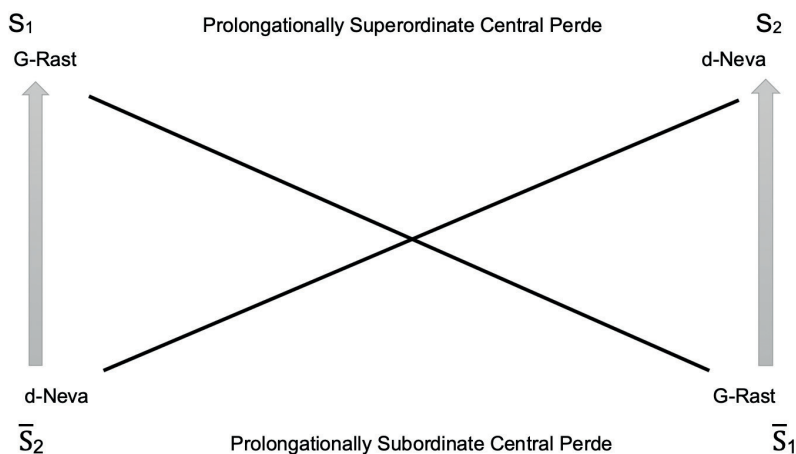


Figure 6. Prolongational multistability as a complex isotopy

## CONCLUSION

Throughout the course of this study, I have presented a series of associations and conceptual equivocations. Foremost, musical cognition and syntax are inherent processes of interoceptive semiosis. As such, the analysis of traditional Turkish makam music is rich with interoceptive significations, which reflect the cognitive syntax of this understudied musical idiom. The open-form aesthetic of traditional Turkish miniature art, poetry, and theater has been associated with perceptual multistability, and likewise connected to the cognition of Turkish makam music. In musical analysis, multistability and complex isotopy emerge in overlapping melodic

phrasings, time-span regions, and prolongational regions. I thereby conclude that a wealth of semantic value in Turkish makam music is manifest in interoceptive complex isotopies, which are cognitively apprehended as multistable percepts within a musical text. As a final consideration, this study offers the possibility for future research in interoceptive semiosis in music outside of the narrativity paradigm, as well as in research related to multistable perception and complex isotopy in other music idioms.

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MULTISTABILITY AND COMPLEX ISOTOPY  
IN MAKAM MUSIC ANALYSIS  
THE LINK BETWEEN COGNITION AND SEMIOTICS  
IN AESTHETICS OF TURKISH MUSIC

Summary

Multistability in perceptual psychology involves ambiguity or rivalry between two or more percepts of sensory stimuli. This phenomenon can be compared to the Greimassian concept of complex isotopy, where multiple terms of semantic content are simultaneously signified in the same reading of a text, providing multiple interpretational meanings. This study proposes that a key aesthetic principle of classical Turkish makam music involves the multistable perception of musical events, which in the semantic sense manifest as interoceptive, complex isotopies. The aesthetic of multiple subjective interpretations is examined in related traditional arts such as miniature art, poetry and theater. Generative theory is employed for compositional analysis in this study, as it reflects the cognitive apprehension of music. The principles of multistable perception as complex isotopy therefore provide a cognitive and aesthetic context to the author's thesis proposal for a generative theory of makam music.

**Keywords:** multistability; complex isotopy; generative theory; Turkish music; Ottoman music; makam; music and cognition; musical semiotics

MULTISTABILNOŚĆ I IZOTOPIA ZŁOŻONA W ANALIZIE MAKAMU  
ZWIĄZEK MIĘDZY POZNANIEM I SEMIOTYKĄ  
W ESTETYCE MUZYKI TURECKIEJ

Streszczenie

Multistabilność w psychologii percepcji obejmuje niejednoznaczność lub rywalizację między dwoma (lub więcej) typami postrzegania bodźców zmysłowych. Zjawisko to można porównać do



złożonej koncepcji izotopii Greimasa, w której wiele terminów o treści semantycznej jest jednocześnie znaczonej podczas jednej (tej samej) lektury tekstu, dostarczając wielu znaczeń interpretacyjnych. W przeprowadzonym badaniu założono, że kluczową zasadę estetyczną klasycznego tureckiego makamu stanowi multistabilna percepcja zdarzeń muzycznych, które w sensie semantycznym przejawiają się jako interoceptywne, złożone izotopie. Estetyka licznych subiektywnych interpretacji została zbadana w pokrewnych sztukach tradycyjnych, takich jak sztuka miniatury, poezja i teatr. W analizie przeprowadzonej w ramach opisywanych badań zastosowano teorię generatywną, jako że odzwierciedla ona poznawcze rozumienie muzyki. Reguły multistabilnej percepcji jako złożonej izotopii zapewniają zatem poznawczy i estetyczny kontekst dla autorskiej koncepcji dotyczącej generatywnej teorii makamu.

**Słowa kluczowe:** multistabilność; izotopia złożona; teoria generatywna; muzyka turecka; muzyka osmańska; makam; muzyka i poznanie; semiotyka muzyczna