Narrative as Lingua Franca:

Investigating and Quantifying Narrative Contextualization of Elliott Carter's *Enchanted Preludes* and *Virgula Divina* (Original Composition)

by

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This dissertation, focusing on Elliott Carter's *Enchanted Preludes,* presents a methodology that allows for data garnered from music theoretical analyses, musical recordings, real-time listener narrative contextualization, and longer-term narrative analyses to be meaningfully compared in a single analytical framework. Chapter 1 presents the relevant existing literature on presenting music theory analysis by narrative means in the larger Elliott Carter literature. Chapter 2 engages with the existing literature relevant to *Enchanted Preludes*. Chapter 3 presents my music theoretical analysis of the piece. Chapter 4 presents the structure and findings of a study focused on capturing participant's narrative impressions of *Enchanted Preludes*. Chapter 5 concludes the dissertation, presenting ideas to contextualize the findings of the study and analysis as well as expand the presented analytical framework. Virgula Divina, the composition component of this dissertation, is a chamber opera composed for three vocalists and five instrumentalists. The piece focuses on combining traditional operatic conventions and newly designed software. This software allows for the easier execution of real-time stochastic operations within the limitations imposed by traditional operatic performance.

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Preface

I would like to use this brief preface space to thank my collaborators, friends, and family without whom this dissertation would not be possible. Firstly, I would like to thank Jessica Lanay, my dear friend and librettist for *Virgula Divina*, the composition portion of this dissertation. Her support and dedication to our friendship and professional endeavors has been and will continue to be invaluable to me as I move onto my next steps in life. We have a lot more art to make and a lot more living to do. I am beyond thankful for that.

I would also like to thank D. Angus Clark and Shruthi Venkatesh, who assisted with running the study for this dissertation, data formatting, and data analysis. Their unwavering support for me, both personally and professionally, has allowed me to reach higher with this dissertation than I ever would have suspected possible. They have been my constant supporters and have my deepest friendship and loyalty.

I would like to thank my dissertation advisor and committee chair, Dr. Eric Moe for helping to make this dissertation a reality. I hope to one day support my students in the same manner that you have.

Finally, I would like to thank my Mom, Dad, and sister for supporting me through this entire decade long journey to a PhD. It's been stressful, but we did it! I'm looking forward to the future for all of us. In particular I'm looking forward to Julianne's inevitable fame.

1.0 Introduction

An ever-growing segment of the literature regarding Elliott Carter's music employs narrative as a means by which to contextualize, digest, and communicate the complexity inherent in Carter's music in an accessible way. Narrative, for the purposes of this dissertation, is "A spoken or written account of connected events; a story"[1]. This dissertation concerns itself with analysts who wish to make better sense of Carter's music by "retelling" a piece in written form as a series of connected or sequential events, derived from their own analysis.

This method of music analysis provides the immediate advantages of allowing a diversity of communicative styles as well as improving the accessibility of analysis across multiple levels of analytical expertise and familiarity with Carter's music. Indeed, this is one of the primary aims of music-theoretical communicative analyses (MTCAs), the type of analysis on which this dissertation will focus. MTCAs are a particular variety of narrative analysis in which the analyst conveys their listening experience, which is in turn informed by music theoretical analyses, in order to impart a presumably more informed, careful, and/or educated perspective onto a listener who may not possess the theoretical tools or time to come upon such an understanding unaided.

Despite the purported goal of a wider dissemination of informed listenings, upon investigation of the MTCA literature on Elliott Carter, it becomes immediately apparent that this potential of the MTCA is not being sufficiently realized. Despite individual efforts at creating

[1] Lexico Dictionaries | English. "Narrative | Meaning of Narrative by Lexico." Accessed January 7, 2020. https://www.lexico.com/definition/narrative.

"accessible" MTCAs, the sheer diversity and specialization of approaches results in a landscape that is difficult to navigate, summarize, and communicate within, even for the specialist. However, this complex landscape in and of itself is not problematic, as it is merely a reflection of the diversity of communication styles available to the authors of various narratives. Yet, if one wishes to use narrative understandings of music as a communication device of a broader appeal than a somewhat exclusive dialogue among professional analysts, new approaches must be developed.

This dissertation presents a software-assisted analytical approach employed within a formal study in which:

1. Narrative dimensions[2] are drawn from the specialized MTCA literature on Elliott Carter and specifically defined.
2. Narrative dimensions are adapted to a format that allows real time listener rating of these dimensions in the form of quantitative data.
3. A music theoretical analysis of the score is performed and adapted to a format that is compatible and therefore comparable to the narrative dimension derived data and data derived from listener ratings.
4. The resulting data, narrative and music theoretical, are then directly mapped to the recording/score, allowing the resultant data types to be compared and analyzed in an exploratory fashion.

[2] Dimensions, here and throughout the paper, is used in a general sense to mean "any quantifiable element that can be rated by the listener/analyst". For example, on a 1-7 rating scale, a listener could rate a given section of the music as simple to complex, calm to intense, soft to loud, etc.

Pursuant to these four goals, this dissertation will be divided into five chapters exploring the following topics:

1. Introduction to MTCA literature.
2. Specific application of MTCA methods to Elliott Carter's Enchanted Preludes.
3. Music theoretical analysis
4. Study design, description and results.
5. Exploration of overall project, and calls for further work.

1.1 Introduction to MTCA Literature

Rather than attempt to give an all-encompassing definition of MTCA that will inevitably exclude some useful MTCA literature, this dissertation will begin with three examples of MTCAs "in action". My commentary highlights working examples of MTCA in practice and demonstrate the diversity of approaches within the field. Before moving into MTCA analyses specifically however, it is important to acknowledge that "MTCA" is a term coined specifically for the purposes of this dissertation. This term was developed in order to better highlight ideological precursors to my work as well as to allow analysts to more easily identify the kinds of work that would integrate meaningfully into this dissertation's proposed analytical methodologies in the future. That said, one should note that, although the three examples presented in chapter 1.1.1 display narrative analyses fit neatly into what I've labeled as MTCA, the field of narrative analysis regarding Carter's music is much broader. For this reason, I will briefly list a few examples of

writings that were integral to the development of this dissertation and that highlight some of the greater diversity of the narrative analysis currently being done on Carter's music.

1. Alan Theisen's dissertation, "A Multifaceted Approach to Analyzing Form in Elliott Carter's Boston Concerto". Theisen's use of "open listenings" in chapter five of his dissertation was especially influential to the development of my s. This particular facet of Theisen's work demonstrates a means by which narrative/perceptual analysis can be incorporated into a broader multifaceted analysis. Theisen's demonstration of this analytical synthesis was extremely informative to the development of this dissertation.
2. Marguerite Boland's "'Linking' and 'Morphing': Harmonic Flow in Elliott Carter's 'Con Leggerezza Pensona'" posits that Carter's conception of narrative is heavily influenced by metaphors derived from literature, film, and ballet. Boland focuses on the idea of "morphing" which she defines as, "a modern digital graphics effect where one image is turned into a different image and the transitional phases of this transformation are shown as the process occurs. By maintaining some of the old image and gradually introducing some of the new image, independent transitional shapes emerge. However, these transitional shapes acquire their meaning only through references to the initial image. . . and the final image.[3]" Vitally, Boland ties this visual metaphor of morphing to Carter's use of All-Trichord Hexachords and Non-All-Trichord Hexachords, demonstrating a means by which narrative descriptions of a piece can be tied to specific score events.

[3] Marguerite Boland,"'Linking' and 'Morphing': Harmonic Flow in Elliott Carter's 'Con Leggerezza Pensosa,'" *Tempo* 60 no. 237 (2006): 35.

3. Johnathan Bernard's article, "Elliott Carter and the Modern Meaning of Time" tracks Carter's concept of musical time as it evolves throughout his career. Considering Carter's words and scores alongside analogous narrative constructions in contemporaneous works of film, ballet, and literature, Bernard creates a semi-biographical picture of Carter's use of musical time in his music. Through the analogues in other narrative art forms, one can often see narrative aspects of Carter's style highlighted, although this resource does not focus on narrative exclusively.

1.1.1 MTCA Example #1, David Schiff: Narrative as Large-Scale Form

In his book *The Music of Elliott Carter*, David Schiff sketches a portrait of the composer from a myriad number of angles. Many of these approaches fall outside the purview of this paper, but Schiff makes room for the inclusion of narrative in the opening of his first chapter beginning with the sentiment, "[Carter's] music is often Apollonian and Dionysian at the same time. This is not because different aspects of the music belong to one of these categories or the other, as when we say that Brahms's melodies are romantic and his structures classical, but because every aspect of the composition articulates opposed values."[4] It is important to note that Schiff frames all of his analysis within this fundamental narrative. Whether exploring sets, metric modulation, or orchestration, Schiff's underlying goal is to gather evidence for the premise that Carter's style is defined by his affinity for musical and ideological contrast. In chapter seven, "Ideas of Disorder, 1959-1964", Schiff turns his focus to large-scale narratives created from the "opposed values" of

[4] David Schiff, *The Music of Elliott Carter* (Ithaca, NY: Cornell University Press, 1998), 13.

independence and co-operation. Schiff focuses on Carter's Second String Quartet, *Double Concerto for Harpsichord and Piano with Two Chamber Orchestras,* and *Piano Concerto*. One such example of this can be seen in chart 17[5] where Schiff visualizes the Second String Quartet as an oscillation between co-operative and independent behavior.

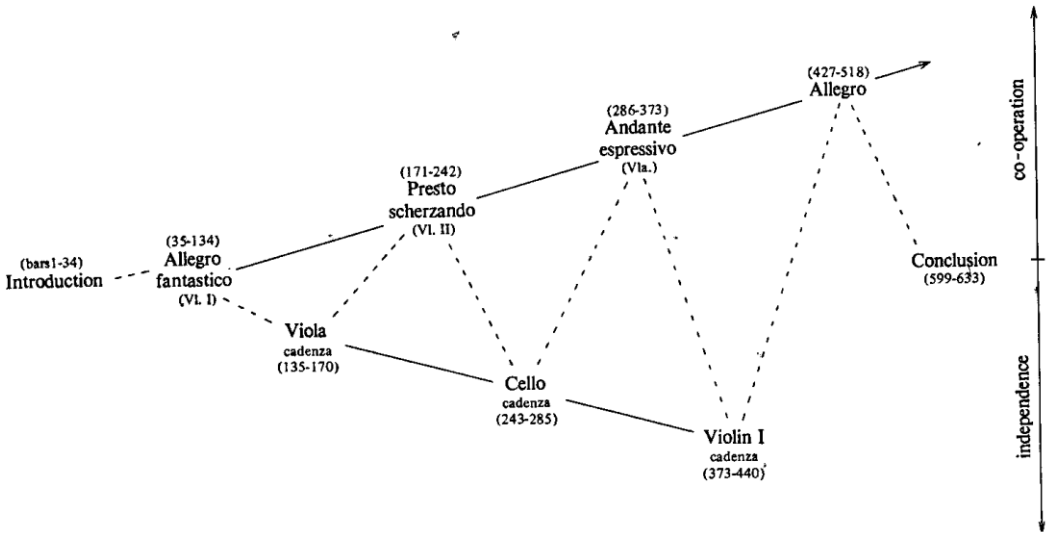

Figure 1[6]

Such a visualization allows the reader to see that "The form of the work expresses these relations in terms of two interlaced processes. Within the frame of the introduction and coda, the four movements move towards greater co-operation, while the three cadenzas dramatize increasing opposition..."[7] Schiff goes on to more precisely define these co-operative and independent behaviors in the following section on form in the Second Quartet:

> *It is natural from such an explanation of the work to start to think of the instruments as having conflicting roles within the ensemble and to therefore see*

[5] See Figure 1 in this paper.

[6] Ibid., 198.

[7] David Schiff, *The Music of Elliott Carter* (Ithaca, NY: Cornell University Press, 1998), 198.

> *the work as an unfolding narrative of the interaction of these characters. Indeed, it seems that Carter himself shared this conception of his own music, as Carter points out, the four characters [of the quartet] are archetypes - not caricatures. They can be seen as archetypical musicians- the 1st violin is a virtuoso, cello self-indulgently romantic; the 2nd violin, like a composer, tries to create order among its narcissistic neighbours. . . [etc.]*[8]

Contextualizing Carter's work in such a fashion is indeed attractive, in this case providing a large-scale narrative framework in which many of Carter's compositional choices can be understood within a larger narrative, an unexpectedly simple one, given the music's compositional language. As stated by James Eugene Wierzbicki, "For any musically trained person who has grappled with the intricacies of a Carter score, surely the temptation is great to focus largely on technical matters…Elliott Carter's music *is complex.* But it has never been music *about* complexity." [9] Put briefly, David Schiff, in his discussion of the Second String Quartet, substitutes this basic narrative outline for traditional large-scale musical form, using story and narrative where structures like Sonata and Rondo form have been traditionally implemented. The more mathematically rigorous styles of analysis traditionally associated with Carter scholarship[10] become subservient and supportive of this simpler narrative form while the narrative form, in turn,

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[8] Ibid., 198.

[9] James Eugene Wierzbicki, *Elliott Carter* (Urbana, Chicago, and Springfield, IL: University of Illinois Press, 2011), 1.

[10] i.e. Large scale metrical analyses and pitch set analyses.

provides a reference to which to tune the analyst's choice of degree of granularity when implementing these mathematical analyses.

1.1.2 MTCA Example #2, Brenda Ravenscroft

Despite the majority of academic focus on Carter's instrumental work, some of the most elucidating scholarship regarding his music focuses on Carter's relationship with text. By examining a piece in which the program is unambiguous, or at the very least, the text itself is visible to then be contested, the analyst is presented with the gift of a narrative on which to graft an analysis. Given such a backbone, the analyst is freer to relate more seemingly disparate analytical outcomes to a single common reference.

One example of such an analysis is "Setting the Pace: The Role of Speeds in Elliott Carter's *A Mirror on Which to Dwell*"[11] by Brenda Ravenscroft. In what is among the most focused of the articles presented in this survey, Ravenscroft brings forth "a brief summary of salient points from the analyses of 'Anaphora' and 'Sandpiper' [revealing] the gamut of ways in which he relates speeds to the text"[12] in order to demonstrate a phenomenon which she dubs "speed as representation". These examples provided by Ravenscroft focus on the immediate and are relentlessly dynamic, presenting the perspective of a listener who is sharply attuned to the soundworld of the piece with a particular focus on rhythm, e.g. "the bird is represented by the

[11] Brenda Ravenscroft, "Layers of Meaning: Expression and Design in Carter's Songs" in *Elliott Carter Studies*, ed. Marguerite Boland and John Link (Cambridge: Cambridge University Press, 2012).

[12] Ibid., 277.

speed MM 315 . . . in the voice and the viola, cello and double bass. Unlike the slow, sustained string events that suggest the ocean, these fast pizzicato staccato string attacks connote the bird's rapid and sharp movements." Ravenscroft, however, goes one step further and graphs these interactions (which, in the case of "Anaphora" she comes to refer to as divergence and convergence) against time and against the poem. In this way, Ravenscroft clearly demonstrates that "[i]n addition to literal 'characters' in the poems being suggested by individual speeds, and their interaction connoted by the conjunction of those speeds, the combination of different speeds also provides deeper, more metaphorical connections to the text."[13]

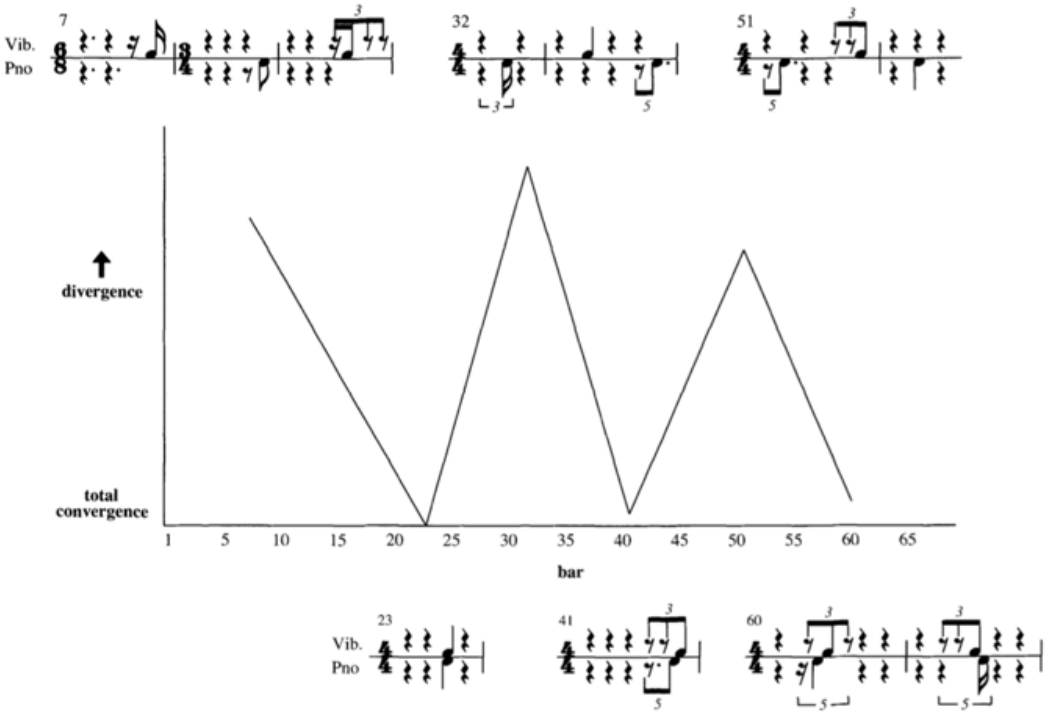

Figure 2

[13] Brenda Ravenscroft, "Layers of Meaning: Expression and Design in Carter's Songs" in *Elliott Carter Studies*, ed. Marguerite Boland and John Link (Cambridge: Cambridge University Press, 2012), 277.

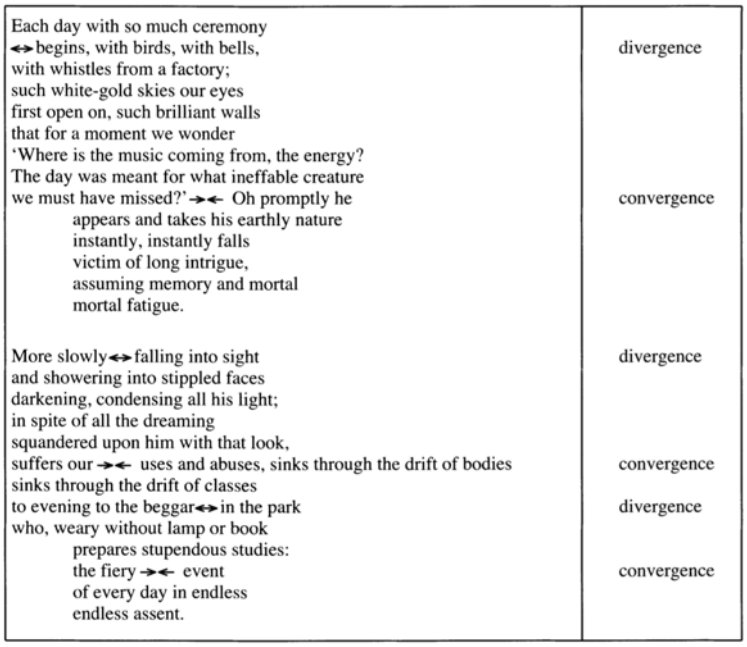

Figure 3

1.1.3 MTCA Example #3, Joshua B. Mailman

An essentially similar though more explicitly numerically focused approach to that of Ravenscroft is presented by Joshua B. Mailman in "An Imagined Drama of Competitive Opposition in Carter's *Scrivo in Vento*." Although "Scrivo in Vento" is "a solo instrumental work, which involves only one player and does not set a text. . . it does in its published state have a text, published with the score."[14] Mailman uses this "non-verbal text", *Beato in Sogno* by Petrarch, as a means to begin his dramatization of the work. This dramatization often takes place as the personification of oppositional forces within the music. The most important of these oppositional

[14] Joshua B. Mailman, "An Imagined Drama of Competitive Opposition in Carter's *Scrivo in Vento*, With Notes on Narrative, Symmetry, Quantitative Flux and Heraclitus," *Music Analysis* 28 no. ii-iii (2009): 377.

forces are what Mailman refers to as the "agreeable" and the "combative" to characterize the mood of the work at a given juncture, and the roles of the "incumbent", "challenger", and "arbiter" in reference to the three primary pitch sets and their interactions. Mailman, having decided on his characters, shows with extreme specificity not only how these characters and moods can be identified in the moment, but also demonstrates how these interactions extend across the entire piece, creating a detailed written dramatization of this interaction. This dramatization is described not merely in flowery language but in detailed graphs showing, for example, the temporal distribution of the pitch class sets that define each character[15], the "Flux of mood modelled as temporal density, dynamic level and ambitus[16], or the "cumulative difference (CuDiff) of assertions of CHALL[17] versus INCU in oppositional struggle."[18] All of these are an attempt to quantify the nature of the interaction between the challenger, incumbent, and arbiter. This approach culminates on page 403 with a graph describing the "interaction between flux of mood and competitive opposition of tetrachord rivals". In brief, we are able to see, in a quantifiable way, a large-scale interaction of characters from which we can then draw an overall drama or narrative.

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[15] Joshua B. Mailman, "An Imagined Drama of Competitive Opposition in Carter's *Scrivo in Vento*, With Notes on Narrative, Symmetry, Quantitative Flux and Heraclitus," *Music Analysis* 28 no. ii-iii (2009): 386.

[16]Ibid., 383.

[17] Challenger and Incumbent essentially become quantifiable variables later in the paper and this shortening is used.

[18] Ibid., 400.

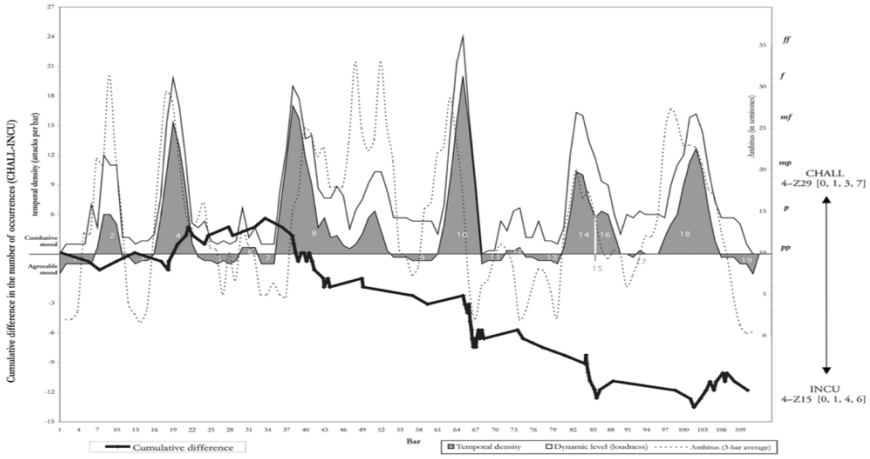

Figure 4

These three examples of MTCA regarding Carter were chosen not only due to their relevance to Carter but also for their diversity of approaches. Schiff develops an analysis by presenting the ideas of co-operation and independence as a large-scale dialectic, focusing on each instrument's role in the overall dialectic. Ravenscroft focuses more singularly on using narrative description and text analysis as a means to communicate large-scale rhythmic structuring. Finally, Mailman focuses on a numerically based approach focusing primarily on pitch. These three examples are not meant to be a comprehensive overview of MTCA but instead are meant to demonstrate the remarkable flexibility of the analytical medium.

1.2 State of Current Research

Although the current and potential analytical reach of MTCA is far more diverse than the given sample, with these three working examples of MTCA research in action, we can see some commonalities among functional and informative MTCAs within the Carter literature.

First, in all three examples, spatial distribution of narrative elements moving from left to right or up to down is used to present the progression of a narrative in time. Despite the complexity of Carter's musical language, his narratives, at least as perceived by the given authors, are linear, and primarily unidirectional in their trajectory. Despite various metrical manipulations, including the metrical modulations for which the composer is famous, time operates in a linear and constant manner within his music, rendering the composer's musical universe decidedly straightforward, uncluttered, and comprehensible. Indeed, alinearity from a narrative perspective does not often seem to be employed by those conducting narrative research on Carter's music. For example, despite the diversity of approaches presented above, all three authors' approaches are dependent on a "Newtonian" musical universe in which time progresses linearly and is an external object to which all of the musical characters can unambiguously refer. In turn, this core similarity among many MTCAs regarding Carter allows for Newtonian time to serve as an object of common reference for the analysts as well as the musical characters. If an analysis shares this conception of time in regards to Carter's music, we are then afforded the massive communicative advantage of an object of common reference among Carter analysts, namely Newtonian time.

Put differently, the authors, using the common tool of XY plane visual displays[19], are able to sufficiently "zoom out" when examining Carter's larger scale musical form and rhetoric. Such an overhead, large scale perspective on form and rhetoric renders Carter's myriad compositional intricacies as merely decorations and ornaments to a rhetorically clear and unrelenting narrative within each of his pieces. From the perspective of the analyst, if they are able to agree upon the

[19] Which are only possible given an acceptance of the premise of Newtonian time in Carter's music.

use of a common X-axis[20], they will then be able to pool their analyses and gain insights about this larger abstract narrative object through the changes in their Y variables of choice over time considered in the larger context of the provided Y axis variances of their colleagues.[21] If there indeed is a strong unifying narrative or rhetorical strategy in each of Carter's pieces, surely the pooling of a large number of analyses compared in this manner would uncover rich insights into the nature of this narrative. This dissertation provides one working prototype of such a framework.

Furthermore, according to each of these MTCA examples, there exists the opposition of two narrative forces or "energies" which drives the given work. These narrative energies can be conceived as two rhetorical poles for the work, two abstract extremes by which all actions are judged and situated in relation to. In all three cases presented, phrased one way or another, the authors speak of the extremes of total independence and total cooperation[22] as these poles. Indeed, a prevailing theme within narrative research concerning Carter is the juxtaposition of the individual and the collective, chaos and order, Apollonian and Dionysian aesthetics[23]. Far from binary in aesthetic, however, the establishment of these poles allows the composer to create a continuum between them, giving the composer nearly infinite expressive options within a musical universe with a very clear set of rules.

Finally, all of these analytical examples choose to focus on one piece at a time, preferring deep analytical dives within a single work over establishing a wide-ranging network of

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[20] i.e. time.

[21] Their analytical topic on interest.

[22] Among the musical characters within the given work.

[23] The listed examples of musical "poles" are not intended to be read as equivalent, but are merely examples of the aforementioned abstract extremes that create the Y-axis space within the instruments move.

commonalities among pieces throughout Carter's oeuvre. The analyses, especially in the case of Brenda Ravenscroft's analysis, may then draw comparisons between seemingly disparate works, but the primary and foundational hermeneutical approach for Carter analysis currently exists at the level of the individual piece. Although such an observation may seem rather pedestrian it is not necessarily a given, nor should it be assumed to be the most useful lens through which to view Carter's work. As previously noted, for example, narrative analyses are repeatedly finding the opposition of polar forces within Carter's music. One could certainly conceive of more holistic approaches to the entire Carter oeuvre where his output is scrutinized from an even more "zoomed out" hermeneutical lens. Indeed, one could also conceive of approaches more akin to large scale data analyses of syntactical units within Bach's entire opus of chorale writing. In such analyses, compositional devices and rules are garnered from musical units much smaller than the level of the full piece understood within the context of data drawn from the composer's entire output. A concrete example of such an analysis exists within Martin Rohrmeier and Ian Cross's *Stastical Properties of Tonal Harmony in Bach's Chorales* in which, "[their study] analyses aspects of tonal harmony and harmonic patterns based on a statistical, computational corpus analysis of Bach's chorales. This is carried out using a novel heuristic method of segmentation developed specifically for that purpose. Analyses of distributions of single pc sets, chord classes and pc set transitions reveal very different structural patterns in both modes, many, but not all of which accord with standard music theory."[24] Such approaches may not only elucidate an overall understanding of

[24] Martin Rohrmeier and Ian Cross. "Statistical Properties of Tonal Harmony in Bach s Chorales." (2008), Pg. 1.

narrative within Carter's music, but may also become more practical and attractive as computational power and availability increases. In addition, the possibility of creating analyses conducted collaboratively by multiple researchers would allow individual MTCAs to be more clearly and readily understood in context of the larger field. This idea specifically applied to my view of the trajectory of research on Elliott Carter's music will be elaborated on in chapter 5.

In addition to a somewhat narrow range of hermeneutical lens, the MTCA Carter literature could do much more to engage in a genuine dialogue with this listener. Despite the explicit goal of this literature, the communication of a more comprehensible narrative to the reader and listener, it ultimately manifests in a very "top down" manner. In reading the MTCA literature, the listener is, in essence, being presented with a prescribed listening strategy derived from a thorough investigation of the score. Although this prescribed listening could emerge as a valuable step in the reader and listener's personal exploration of Carter's music, little is done in the MTCA literature to otherwise engage the listener, invite their participation, or encourage their imagination.

This dissertation presents an example of an analysis which aims to address some of these issues, with a particular focus on establishing a method of analysis which invites a more horizontal power structure in appraising a given piece. In addition, this dissertation will present a method of analysis that is reproducible and therefore subject to critique, improvement, and engagement by a larger research community. Both of these concerns will be addressed in more detail in chapter 4. Before moving to that, however, chapter 2 will discuss the current state of music theory literature regarding Elliott Carter's *Enchanted Preludes*, laying the framework for and describing the environment in which the study presented in chapter 4 is based.

The study presented in this dissertation is an exploratory one, in which correlations and intersections of data derived from numerically based music theoretical analyses, narrative

analyses, and listener experience are investigated. Listener, here, is used in the widest sense of the word possible, as the study involves the collection of data from listeners of various experience levels with Carter's music and contemporary classical music in general. In this way, the study aims to create a community-based analysis, in which diverse listener perspectives are considered in tandem with techniques derived from the existing music theoretical and MTCA literature.

2.0 MTCA Applied to *Enchanted Preludes*

In order to better contextualize the study which will be presented in chapter three, this chapter has two central aims. The first of these is to justify the choice of *Enchanted Preludes* as the particular focus of this study. Second, this chapter will present and reinterpret John Roeder's analysis of *Enchanted Preludes*, the most relevant narrative analysis of the piece. As alluded to in chapter one, this reinterpretation will focus on quantifying Roeder's analysis in a manner that will allow its comparison to the analyses of other scholars, theorists, and listeners.

2.1 The Choice of *Enchanted Preludes*

Enchanted Preludes is an approximately six-minute long duet for flute and cello and is a relatively late piece in Carter's overall oeuvre, composed in 1988 with minor errata corrections added in 1991. *Enchanted Preludes* was commissioned by Harry Santen as a birthday present for his wife, Ann Santen. Such an occasion for the commissioning of the work has often been a source of initial direction in creating narratives for *Enchanted Preludes*. Indeed, when considering the occasion of the commission along with Carter's preexisting predilection for character depiction through individual instruments, it is very difficult to not see the duet as reflective of a relationship between two people or characters. In the words of the composer, "It is a duet for flute and cello in which the two instruments combine their different characters and musical materials into statements

of varying moods. The title comes from a poem of Wallace Stevens [.]"[25] The poem, *The Pure Good of Theory,* sets its focus on the manner in which time affects the body, "It is time that beats in the breast and it is time that batters the mind[.]"[26] There is a particular focus in the poem on the unpredictability, and instability of our experience and bodies as a result of time's passage. Donna Hildreth's analysis of the poem vividly paints a stark picture of this effect. Intriguingly, she frames her analysis of the poem as drawn between two narrative poles over time, allowing us to see why Carter may have been so aesthetically aligned with the work in the first place. "A constant tension pulls in two directions: the world of the intellect and the world of the senses. The first section, 'All the Preludes to Felicity, would seem to promise a musical introduction to happiness. However, the first three lines tell us that in reality this is a foreshadowing of death. Time ticks away in sounds inner and outer, each breath acting as a metronome ordering and marking its relentless tempo.'[27] The titular and closing lines of the poem state this tension in sublime fashion:

Felicity, ah! Time is the hooded enemy,

The inimical music, the enchantered space

In which the enchanted preludes have their place.[28]

In this prose description of the duet, the composer mentions several elements which fit into the previous discussion of his music and render it an ideal subject of study with use of MTCA methodologies. Firstly, in his own words, the composer refers to "the two instruments combin[ing]

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[25] Elliott Carter, *Enchanted Preludes.* London: Hendon Music Boosey & Hawkes, 1988.

[26] Wallace Stevens. "The Pure Good of Theory." *The Palm at the End of the Mind.* Ed. Holly Stevens. Vintage ed. New York: Random, 1990. 265-68.

[27] Donna Hildreth. "Stevens's the Pure Good of Theory." *The Explicator* 60, no. 3 (January 2002): 151–53.

[28] Ibid. Stanza 7.

their different characters". Though at first a seemingly unremarkable statement, when considered within the greater narrative discussion on Carter, one can see an opportunity to seize a particularly advantageous analytical position. Indeed, from the perspective of an MTCA, a duet provides a compositionally and auditorily obvious distillation of Carter's use of poles within a composition. These poles, more abstract in a piece like Carter's Second String Quartet, for example, are here rendered more immediately audible by the reduction of the available instrumental resources to heterogenous duo. One might initially think that a solo piece, with a single instrument moving between two narrative poles, would serve as a better subject if we desire the utmost clarity. However, it is not simply movement between narrative poles in a composition that is relevant in this analysis, but the action and reaction of multiple and varied "personalities" or "characters" forming an abstract unified narrative movement. Put another way, it is helpful to think of the characters in Carter's piece as reacting to a developing situation in their own unique ways, but nonetheless locked into an shared fate. The combination of the unique journey of each character along with their part in forming the greater overall narrative forms the resultant musical and dramatic tapestry. So, although the Carter opus does contain solo pieces, if one wishes to explore this particular narrative reoccurrence[29] in Carter's music, a duet provides the most distilled subject for investigation.

Furthermore, the instrumentation, flute and cello, makes these roles unambiguous and readily identifiable for the listener. This point will come further into focus as I address the study design in chapter three, but put briefly, the collection of listener respondent data requires the most unambiguous separation of character/instrumental roles possible. In particular, the inclusion of

[29] That is, the reaction of multiple characters to unified movement between narrative poles.

inexperienced listeners in such a study requires immediate recognition of the two instrumental characters at all points throughout the piece. In addition to the ease of instrumental differentiation, the duration of *Enchanted Preludes* makes it an ideal candidate for study trials, allowing for multiple listenings within the standard thirty to sixty-minute window that a study setting allows.

Finally, *Enchanted Preludes* is a piece which is situated well to serve as an example for further work within the large and diverse discussion of Carter's narrative structures. Not only does it serve as an ideal small-scale example of a common narrative theme in Carter's compositions, but it also features:

1. Source text relating back to the poem on which the piece is based.
2. Complex pitch content which evolves over the piece.
3. Large scale metric modulation schemes that contribute to the overall form.
4. Both string and wind writing, providing two different timbral embodiments of similar musical ideas.

This short piece offers a plethora of options for study, giving text based narrative researchers, Forte ran pitch set analysts (see the Mailman example in chapter one), rhythm centered analysis (see the Ravenscroft example chapter one), and studies that focus on specific embodiment of narrative (see Roeder, in discussion to immediately follow). Although there may be more ideal candidates of study for researchers with each of these specializations, there is *something* for each of them to latch onto in *Enchanted Preludes*. If the goal of this dissertation is to provide an analytical model that will be adaptable for researchers of multiple specializations within the overall field of Carter research, *Enchanted Preludes* is a piece in which a diverse array of researchers have already found and will continue to find their methods relevant and applicable. Although this dissertation does not employ all of these possible analytical methods, it does provide a framework

and methodology through which all of these potential methods and many others could be integrated.

2.2 Embodiment of Narrative: John Roeder's *Autonomy and Dialog in Elliott Carter's Enchanted Preludes*

John Roeder, in his book chapter *Autonomy and Dialog in Elliott Carter's Enchanted Preludes*[30], explores *Enchanted Preludes* from an angle that seamlessly merges the ethnomusicological and music theoretical. In a brief summary of this approach, Roeder first documents the increasing emphasis on the individual within chamber music in the twentieth century. Pushed by social and economic forces, composers of western chamber music focused increasingly on novelty of compositional language and virtuosity of instrumental performance. In comparison to chamber music of the common practice, chamber music of the twentieth century began to lose a social dimension, and therefore lost a powerful means of expression. Having presented this historical context, Roeder frames Carter's *Enchanted Preludes* as Elliott Carter's response to this problem, an attempt to regain the expressive tool of "conversation" within chamber music while retaining the control and virtuosity made possible by contemporary classical musical language. From this perspective, *Enchanted Preludes* becomes a piece in which the two instrumental characters move between the poles of independence and cooperative dialogue, physically enacting a historically, socially, and economically charged negotiation. Therefore,

[30] This book, Analytical Studies in World Music, is a collection of article length chapters by different authors. Roeder's chapter is a stand-alone unit and not connected to a larger text.

Roeder's view allows us to see *Enchanted Preludes* as a primarily dramatic work in which two performers actively embody the composer's internal struggle to serve two paradoxical Muses, with the duet partners fluidly changing the ground-rules of their social interaction between co-operative and independent.

Moving now to the perspective of the music analyst, Roeder defines the soundworld of *Enchanted Preludes* as a combination of three primary compositional variables[31]. These are pitch considerations, timbre, and the "articulative capabilities of two strongly contrasting orchestra instruments."[32] Each of these variables, take texture for example, are then dissected to reveal their constituent elements. For example: "Certain types of gestures recur: *trills*, by which I mean any rapid, even alternation of two pitches…*tremolos*, by which I mean the rapid reiteration of a single pitch… *sustained* sounds and *lines*, or connected pitches."[33] Now, given a way to document each instrument's behavior across three variables via their constituent elements over the length of the piece in a systematic fashion, Roeder can then compare the two instrument's behavior relative to one another within each variable. Roeder classifies these behaviors as either cooperative or non-cooperative.

So, first, changes in each of the three variables are described and catalogued for each instrument throughout the piece. Then, the interaction of the two instruments is documented based on the interaction of constituent elements within each variable, allowing Roeder to speak of

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[31] Roeder does not refer to these as variables within his own article. This term is used for ease of transition into my own analysis.

[32] John Roder "Autonomy and Dialogue in Elliott Carter's *Enchanted Preludes*," in *Analytical Studies in World Music*, ed. Michael Tenzer (New York: Oxford University Press, 2006), 383.

[33] Ibid. pg. 385.

cooperative and non-cooperative behavior across the piece within each variable. From this analysis, Roeder is then able to extract the "story" of the piece for each of these three variables, spinning a narrative based on the fluid and dynamic interchanges of non-cooperative and cooperative behavior, hence the title *Autonomy and Dialog in Elliott Carter's* Enchanted Preludes. With this analytical foundation laid by Roeder, I will present my primary analytical techniques for analyzing Carter's duet. My analytical approach seeks to address three primary avenues that Roeder did not explore or that could be developed further:

1. Although Roeder's approach is largely focused around cataloguing events within the score and then drawing an analysis from this list of events over time, he chooses to document events of personal salience rather than providing any truly rigorous or systematic documentation of the piece at large as we see in Joshua B. Mailman's work. Roeder's goal is to provide description and documentation of his personal experience, so this is perfectly sufficient. However, if one wishes to perform an analysis at a level other than a description of personal experience with *Enchanted Preludes,* providing a means by which to evaluate events in the score relative to all other events on a standard metric would be of paramount importance.
2. In addition to Roeder's lack of a system by which to evaluate events objectively within the score, his approach is also limited by its singular perspective. Roeder's chapter would also be virtually inaccessible to a listener without specific professional training in western music. Again, this is not a flaw in his analysis, but a limitation inevitably imposed by an analysis performed with the goal of articulating a professional analyst's individual perspective. This dissertation provides a methodology by which listeners of varying experience levels can document their experience and hearing of *Enchanted Preludes*. In this way, the hearing of the

piece can be "crowdsourced" and multiple perspectives included in the final analytical outcome.

3. The element of Roeder's approach that needs the most development, however, is not imposed by his choice of hermeneutical lens, but instead his lack of emphasis on creating a holistic analysis. The author puts surprisingly little emphasis on combining the perspectives garnered from analysis and documentation of individual variable levels. Although Roeder briefly discusses similarities in variable behavior in his summary section to close out the chapter, the vast majority of the chapter reads as a description of behavior of individual variables. As a result, the perspective garnered from his analysis is elucidating, but ultimately scattered and disunified in terms of forming a large-scale analytical perspective on *Enchanted Preludes* as a whole.

Consequently, this dissertation will attempt to provide three new avenues of analysis to supplement the foundation laid by Roeder's chapter. These are objective documentation of score events, inclusion of multiple and diverse listener perspectives, and a more comprehensive synthesis of compositional variables within *Enchanted Preludes*.

2.3 Analytical Methodology

2.3.1 Technique #1, Establishing a System of Common Reference

As referenced in Chapter 1, a common element of MTCA analyses is the need for a backbone or common structure to which seemingly disparate events can be referenced, giving each event context within the larger narrative of the piece. In the case of a piece that presents the

complexities of *Enchanted Preludes*, I deem it best to choose the passing of time itself, or in the case of written music notation, the measure numbers as that object of common reference. This isn't to imply that the particular progression from measure to measure is necessarily a significant unit, but instead to establish an X-axis that is as neutral as possible yet germane to the piece. Once established, this X-axis allows any number of Y axis variables that can then be charted against time. In brief, the establishment of a relatively neutral X-axis allows for the comparison and exploration of potential correlations among any variable that changes over time. Let us call these variables that change over time **time-variant variables.**

2.3.2 Technique #2, Establishing Objective Time-Variant Variable

With a system established for common reference, the changes to any time-variant variable can now be tracked as the piece progresses. Practically speaking, in a traditional music theory analysis, this amounts to a catalogue of events. For instance, if we choose the unit of the measure as our segmentation threshold for a pitch class set analysis of the piece, we can track the prime forms of the flute, cello, and their combined composite set for the first ten measures of the piece. Note here that the unit of the measure is chosen for two reasons:

1. This analysis deemphasizes specifics of segmentation because it aims to provide a description of the changes in pitch class set usage over the entire course of the piece. This is a more "zoomed out" approach than is traditional. This change of analytical emphasis is due to the extreme pitch density that Carter's music presents. In addition, this analysis will combine the pitch class set analysis with other forms of analysis in order to garner a more holistic perspective of the piece. The unit of the measure serves as an intuitive yardstick by which all

score events can be easily ordered and organized. Therefore, this choice of segmentation is chosen for its consistency and ease of use.

2. Choosing the measure allows us to speak of number of pitch classes per measure, giving a rough proxy for both rhythmic and pitch density in one variable.

Table 1

Measure #	Flute Prime Forms	Cello Prime Forms	Composite Prime Forms
1	01258	F#	012358
2	01568	05	013568T
3	014	05	01257
4	013	01236	0124679
5	01	01	0167
6	05	0123	012347
7	012346	012346	0123456789T
8	01245689T	012346	0123456789T
9	02358	024579	01234578T
10	0124	013478	01235689

2.3.3 Technique #3, Establishing Subjective Time-Variant Variables

The term “objective” time-variant variables (OTVV) is employed here to differentiate from their subjective counterparts (STVV). In the case of OTVV, if I had, for example, made a mistake in cataloguing a prime form, another analyst could correct me in an unambiguous fashion by showing the error in my math. STVV, on the other hand take the form of interpretive extrapolations drawn from humanistic analysis of various OTVV interactions. Put succinctly, OTVV are the

description, STVV are the interpretation. However, despite the subjectivity of STVV, in order to allow further analysis of TVV correlations, it helps to catalogue these interpretative analyses in numerical form. For example, in table 2 we see a fifth column added to the format of the previous chart, cataloguing, much in the style of Roeder, the interaction of pitch as "together" or "against" in binary form (0=against, 1=together). Furthermore, information already recorded in OTVV fashion can then be subjectively catalogued into bins. This binning can be a form of OTVV or STVV depending on the situation. In this case it is a form of STVV as the categories are rather subjectively chosen and the specific assignment of each prime form to a given bin could be performed differently by different analysts.

Table 2

Prime Form Pitch Bins:

Red: dense set in excess of 7 distinct pitch classes represented.
Pink: 05 centric sets
Yellow: 04 centric sets
Blue: 03 centric sets
Green 02 centric sets
Gray: 01 centric sets
Uncolored: Other

Measure #	Flute Prime	Cello Prime	Comp. Prime	Pitch T vs. A
103	01235789	012345678T	0123456789TE	1
104	012345678T	012345789T	0123456789TE	1
105	04	014568	01234789	0
106	024	0125	0123579	0
107	0123458	01234568	0123456789T	1
108	0123456789T	0134689	0123456789TE	1
109	012345679T	012356791	0123456789TE	1
110	0134679	03	01234578T	0
111	013	0126	012346	1
112	0147	026	01457	1
113	01347	01458	013478	1

My criteria for deciding "Pitch T vs. A" are as follows:

1. **Together:** - the instruments' pitch material is said to work together if any of the following occur:
    - Instruments use similar or identical sets.
    - Sets work together to create an aggregate or similar structure (i.e. filling in the pitches that the other instrument didn't cover in a large or small-scale chromatic aggregate).
    - Different prime form sets are presented but the pitch classes have a great deal of overlap (for example measure 112 in the score in tandem with table 2.)
2. **Against:** - the instruments' pitch material is said to work against one another if any of the following occur:
    - Instruments present sets of radically different densities (for example measure 105 in table 2).
    - Instruments present sets of similar prime forms but radically different pitch classes without forming a chromatic aggregate (example measure 106 in table 2.)
    - Instruments present prime forms from different bins with no other compelling reason to call the behavior cooperative.

Please note that these criteria are not meant to be comprehensive, or present the only way to classify pitch behavior in *Enchanted Preludes*. STVV are meant to provide a numerical version of a specific hearing of the piece rather than an objective or perfect classification system. In addition, I fully recognize that there are measures where a binary decision might not be easy. However, in this case, the forcing of a binary decision based on available evidence in the score and audio is indicative of a specific listening choice. The STVV as a result, is just a numerical reflection of a specific listening or interpretative decision.

2.3.4 Technique #4: Including Live Listening

A fundamental paradox sits at the heart of music theory research on Elliott Carter. On one hand, comprehension of the composer's musical language requires the use of mathematical procedures such as pitch class set analysis or large-scale documentation of metrical procedures. On the other, the composer's use of direct and unadorned narratives renders the rhetorical goals of each piece rather transparently displayed. Such a scenario presents the analyst with the proposition that perhaps analysis should be approached "ears first" rather than score first. At the very least, the analyst should be approaching the problem of analysis from both angles. Peter Christian Wyse Smucker argues in their dissertation on Carter:

> *In an attempt to comprehend an experience of Carter's music, an analyst must therefore be willing to change an analytic approach if it will accommodate a different perceptual viewpoint. One person will certainly experience a piece differently than another person, or will experience it differently under varying circumstances. Thus any standardized theory of how one might hear something should be flexible enough to allow for these different circumstances. David Lewin also encourages the possibility of evolving perception-based analyses: 'We should certainly be willing to alter our theoretical discourse...whenever a*

certain mass of perceptual experience leads us to believe that the alterations might enable us to articulate valuable analytic insights.'[34]"[35]

Now that this dissertation has presented multiple means by which theoretical findings can be translated into quantitative data, a framework is needed to allow for listener data to be collected in similar fashion. This dissertation employs two methods of data collection from participants:

1. Time-invariant listener data: Time-invariant participant data are collected from the listener and do not change in any significant way over the course of their listening experience. Examples of time-invariant listener data are age, gender, level of music theoretical experience, etc.
2. Time-variant listener data. Time-variant listener data are collected from the listener during the course of their listening experience and can change based on listener response throughout the piece. For example, in the case of this study the listener is asked to rate the "intensity of interaction" between the two duet instruments over the course of the piece with that data collected continuously throughout the listening experience. One would be correct to note here that, from a data analysis perspective, time-variant listener data is no different from STVV data. From a humanities perspective, this distinction should be made as the data is drawn from radically different sources (the study participant vs. analyst subjective perspective), but from a purely data driven perspective, they are both combined in the time-variant category, which will be explained in chapter 2.4.

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[34] David Lewin "Music Theory, Phenomenology, and Modes of Perception." In *Studies in Music with Text,* (Oxford Studies in Music Theory. New York: Oxford University Press.), 91.

[35] Peter Christian Wyse Smucker "A Listener Sensitive Analytic Approach to Elliott Carter's Late Chamber Music, 1990-2012." Ph.D diss., The University of Chicago, 2015, 3.

2.4 Data Types Summary

1. Time (x-axis): derived from the score in the form of measures/rhythmic durations and from the recording in the form of audio data.
2. Time-variant data (anything moving up and down on the Y-axis over time): This includes; OTVV, STVV, binned data, and time-variant listener data.
3. Time-invariant data: Data collected from the listener or from the score that does not change over the course of the listening experience.

The specific methodology of the study will be presented in chapter 4 after a deeper dive into the music theoretical findings of this paper in chapter 3. In brief, however, this architecture of data organization allows for data analysis to be performed with use of a multi-level model[36], where correlations can be analyzed among multiple data types, investigating the degree to which change in a given variable(s) predict for change in other variable(s). In this fashion, possible correlations among listener data, music theoretical data, and auditory data can be meaningfully investigated.

[36] This dissertation will merely employ MLM as a data analysis technique and will not attempt to explain the data analysis procedures in full. However, all of the study's code and data will be available in the supplemental materials for this dissertation. For an introduction to MLM, please refer to Tom Snijders and Roel Bosker. *Mulitlevel Analysis: An introduction to basic and advanced multilevel modeling*. London: Sage Pulications, 1999.

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3.0 Music Theory Analysis

Before moving into study participant data, this chapter presents a more traditional music theoretical analysis of *Enchanted Preludes*. Central to this analysis are three perspectives:

1. Pitch class set documentation.
2. Textural documentation.
3. Contour documentation.

In each of the following three sub-chapters, I will explain the method by which each of these three methods of analysis is manifested or translated into quantitative data in order to arrive at OTVV or STVV numbers. I will then investigate each data set from a music theoretical perspective with the primary aim of providing insights about the large-scale form of the piece and therefore, narrative insight which will be presented in the final sub-chapter. In brief, this chapter culminates in my MTCA of *Enchanted Preludes*. Chapter 4 will then incorporate listener data in order to compare the MTCA to real-time hearings of the piece.

3.1 Pitch Class Set Documentation

As mentioned in chapter 2, I have chosen the unit of the measure as the unit of pitch class set segmentation. However, I wish to justify this choice in more detail before proceeding with the music theory analysis.

1. This analysis is interested in large scale correlative findings garnered from a survey of the entire piece. In other words, this analysis concerns itself with large scale form. Therefore, the

importance of seeing the change in pc-set usages over larger time scales far outweighs importance of one segmentation being prioritized over another. Measure segmentation is perfectly sufficient to observe these large-scale changes.

2. The somewhat consistent in size[37] and compositionally relevant (i.e. put there by the composer) unit of the measure already exists in the score and presents premade time points for any analysis. The unit of the measure is also significant experientially from the standpoint of the performer. As a result, performers wishing to inform their study of *Enchanted Preludes* with the data garnered from this dissertation will find the measure numbers to be a convenient reference.
3. This dissertation presents a methodology for evaluating pitch set density regardless of pitch set size. As a result, we can then meaningfully speak of the "pc-set density" of a measure. Tracking the pc-set density of each measure over time will give an idea of the pitch class set usage changes over the course of the entire piece.

Deriving a pc-set density for each measure gives a rough proxy for the rhythmic density in each measure[38], allowing for rhythmic density and set density to be subsumed in a single figure. Measures are, definitionally, a rhythmically derived unit and therefore present a logical choice for presenting a figure that carries both pitch and rhythmic information.

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[37] The vast majority of measures in the score are 2.79 to 2.85 seconds long when played exactly as the score indicates. The longest measure is 4.28 seconds and the shortest is .833. Variance in measure length is generally brief, returning to the norm.

[38] This is not true in the case of all composers, but is generally true in the case of Carter, who generally avoids motoric repetition of notes.

3.2 Calculating Pc-set Density

Pc-set analysis and classification has long relied on the cataloguing of sets by their relative compactness. It is both a logical mathematical means of cataloguing the pc-sets as well as auditorily meaningful with sets progressing from most to least dense to the ear. For example, trichords are catalogued in table 3. Forte numbers, therefore, are helpful for the theorist to keep track of sets within an analysis and be aware of their relative compactness.

Table 3

Forte number	Prime Form
3-1	012
3-2	013
3-3	014
3-4	015
3-5	016
3-6	024
3-7	025
3-8	026
3-9	027
3-10	036
3-11	037
3-12	048

Despite their usefulness, Forte numbers do not allow for the comparison of pitch-set compactness for pitch-sets of dissimilar composition. For example, one cannot meaningfully speak, within the standard Forte cataloguing system, of whether a tetrachord of mid-level density is more compact than a trichord of mid-level density without segmenting the tetrachord into its

constituent trichords. This chapter section will present a system for allowing such a comparison. For ease of use, I will present this process step by step, as detailed below:[39]

1. Step One
    - List all intervals within each pitch class set read from left to right by separating each step into dyads. For example, a 013 tetrachord consists of a 01 and 02 dyad.
2. Step Two
    - Weight each dyad in the resultant list (01, 02,….06) in terms of its density. 06 being the least dense and 01 being the most. In brief, this creates a "point system" in which half steps are weighted the heaviest and tritones the lightest. This weighting is spelled out in table 4. A simple linear weighting was chosen as the distances between intervals also progresses in a linear fashion.

Table 4

Dyads	Weight
01	6
02	5
03	4
04	3
05	2
06	1

[39] Note that the implementation in this specific system as presented in this paper is meant to account for prime forms, but could easily be adjusted to deal with normal forms or many other systems of pitch-set documentation so long as it boils down to numeric expression of intervallic content.

3. Step Three
    - Add up the weights of each dyad to get a pc-set density score (psds) for the pc-set. The absolute minimum score will be given to 06 with a score of 1psds and the absolute maximum will be given to 0123456789TE with 66psds.
4. Step Four
    - Investigate the change in psds numbers over the course of the piece for an evaluation of changes in pitch language density over the course of the piece.

The *Enchanted Preludes* psds graph is presented in figure 5. Drawing upon this data to inform a large-scale formal analysis, one can observe that the opening section of the piece is marked by peaks and valleys, juxtaposing extreme density with less dense moments. This rather intense opening third of the piece is followed by a sudden drop-off in the second third of the piece. After this drop-off psds ascends steadily through the middle of the piece with mounting pressure, until we arrive at the final third of the piece which, much like the first third, presents rapid juxtaposition of psds peaks and valleys. From a narrative perspective, we begin in one setting and then are suddenly in a new terrain in the second third of the piece. The second third, in this new location, focuses on a consistent build of pressure and progress in order to return to where we started in the final third.

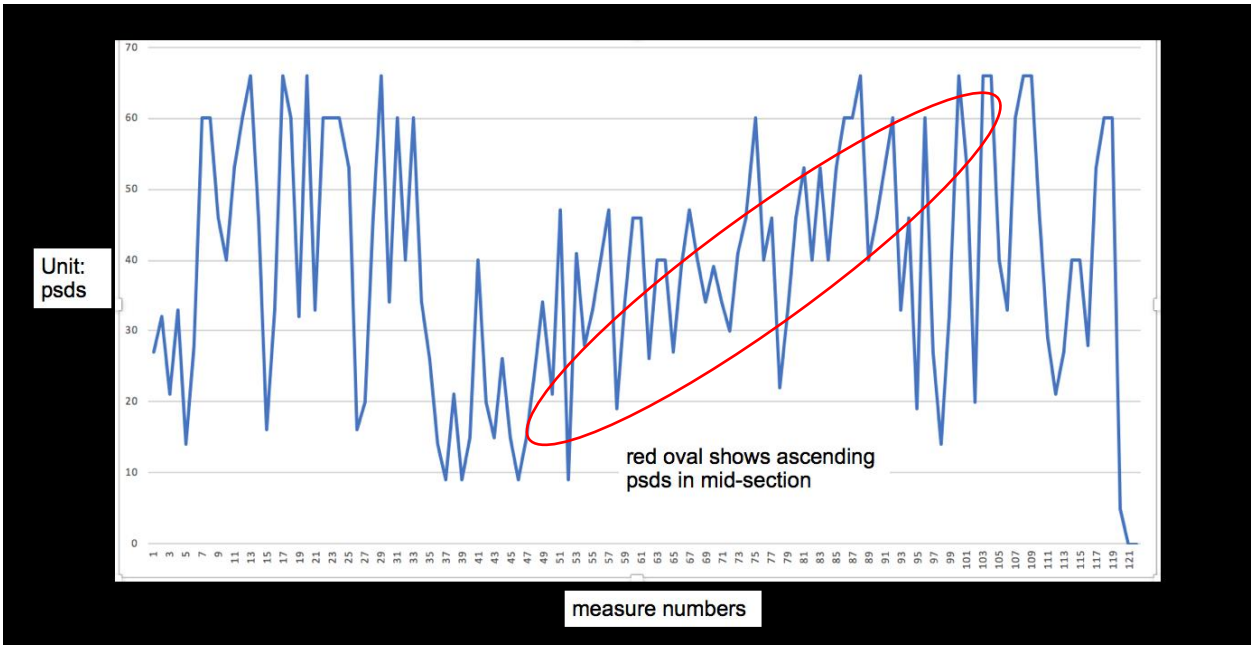

Figure 5

Psds is a broadly applicable analytical method to investigate pitch language usage, but has specific advantages in the investigation of Carter's music. As outlined in chapter 1, Carter's compositional language is centered on gross omnidirectional narrative movement rather than focusing on complexity itself. These gross large-scale directed narratives are indeed ornamented by a large number of complex and intricate compositional devices, but the analysis of the narrative-focused theorist must be ultimately related back to the unadorned gross narrative movement. In other words, reducing the complex pitch language to a density score serves to quantify these large-scale pitch language changes within the piece rather than getting lost in specific issues of segmentation, phrasing etc. This approach is in one way Schenkerian-influenced, in that it sees pitch language, when stripped of its more decorative elements, as intimately interlinked with large-scale form.

3.3 Pitch Aggregates in *Enchanted Preludes*

Tracking the psds numbers over the course of the piece also starkly highlights specific moments in *Enchanted Preludes*. These moments are measures in which density most dramatically rises (i.e. psds in excess of 60). More specifically, from the perspective of pc-sets we can see that within these measures, Carter either presents a full chromatic aggregate or 11 out of the 12 pitches needed to complete a chromatic aggregate. I will henceforth refer to these moments as pitch-aggregates. From the perspective of auditory experience these pitch-aggregates result in "waves" of pitch density followed by relief, forming tension and release in Carter's music as a result of pitch language manipulation. In addition, in the following near-aggregates section, I will further explain how these moments relate to large-scale pitch structure in *Enchanted Preludes*. In figure 6 on the following page, these moments are highlighted in pink with the chart moving measure by measure from the top to the bottom. The black lines indicate the divisions between sections of the piece.

In viewing such a chart, one can see that aggregate and near-aggregate distribution starkly divides the piece into three sections. The first and last thirds of the piece present roughly symmetrically distributed aggregates and near-aggregates, while the middle third presents none. In the end, the listener has experienced opening and closing sections in which tension and release are starkly juxtaposed while in the middle section, a bit of auditory relief is allowed to the listener. Although complex and highly ornamented, this ultimately results in a view of *Enchanted Preludes* as a piece in ternary form, from the perspective of pitch-set density distribution.

Figure 6

3.4 Near-Aggregates

Especially curious in the case of pitch aggregates in *Enchanted Preludes* are the moments in which Carter presents every pitch class except for one in a given measure (i.e. 11 out of 12 pitch classes). Take, for example Figure 7, mm. 96-97, in which measure 96 presents a full aggregate save for the pitch class D, immediately followed by measure 97 in which the pitch is presented immediately and loudly, the significance of this pitch class further highlighted by the textural change to tremolo in the flute. The same idea occurs in mm. 86-87 presented in Figure 8 in which the pitch class B is omitted and then immediately provided by the flute and texturally highlighted in the following measure. In a similar compositional gesture, Carter uses a G omitted near-aggregate in bar 18 and then provides the missing G with a texturally and registerally differentiated low G with a left hand pizzicato in the cello.

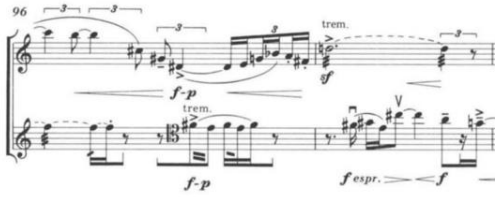

Figure 7

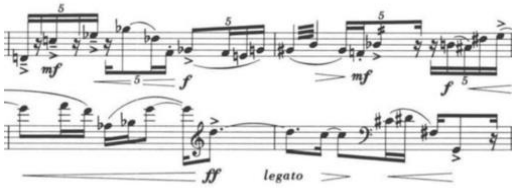

Figure 8

In other measures, such as mm. 24-25 there is a similar occurrence where the flute repeatedly plays the "missing" pitch G# in the following measure or mm. 22-23 where the cello immediately plays the missing G# in measure 23. This effect also happens exactly one time in reverse in mm. 74-75, a measure which I will highlight shortly. Alternatively, the missing sets are immediately followed by the full 12 note aggregate such as in mm. 12-13 and mm. 86-88 or another near-aggregate that ultimately, in turn, leads to a 12 note aggregate as in mm. 22-24 or 107-109.

The musical effect of these near-aggregates is the creation of a gravity or tension in these measures. Carter uses these moments of pitch absence create an obligation of resolution within *Enchanted Preludes* forming tension and release in his pitch language.

With a harmonic system and syntax established for *Enchanted Preludes* specifically, Carter is able to organize these aggregates and near-aggregates in order to create large-scale musical form. The composer accomplishes this in two specific ways.

First, as alluded to earlier in the chapter, these aggregates and near-aggregates are concentrated in the first and last third of the piece. From the perspective of the listener, this distribution creates a very specific effect. In the first and last third we are guided from to one pitch class and another by means of near-aggregates. In some cadential cases, the listener is given the missing desired pitch in a complete and satisfying way and at other points they are given the full aggregate. Both solutions are satisfying in different ways and resolve the tension created by the pitch absence, making the first and last thirds active and unsettled. The middle third, however, contains no aggregates or near-aggregates and is much less rhythmically active. This contrast among the thirds results in a floating feeling in the middle third in which the pitch centers are removed from the equation and the instruments play more flowing lines. The flute and cello also move into textures that revolve around sustained pitches and melodic lines. From the perspective of pc-sets, the pitch language becomes more homogenous, focusing on 012 and 013 sets primarily rather than on the tension around the expectation of specific pitches. With all of these elements combined, we can see the piece in terms of a ternary structure ABA in which the sound-world and landscape of the piece radically changes in the middle third. The listener is guided, given grounding and then has that grounding suddenly removed, only for that grounding to return in the final third. From a narrative perspective, this can be contextualized as the middle third B section

being the “enchanted space”, radically different and uncentered, a floating and unsure auditory space before the listener is returned to a more familiar guided listening. This narrative reading of a grounding and return being derived from cadential function is further reinforced by the piece’s final near aggregate in bar 119 where a G omitted near aggregate is immediately resolved in bar 120 without any further pitch development finally bringing the pitch movement of the piece to a rest. Figures 9 and 10 display the aggregates and near-aggregates with their measure number occurrence below. X noteheads indicate a full 12 note aggregate.

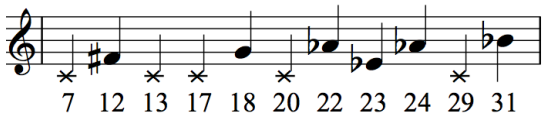

Figure 9

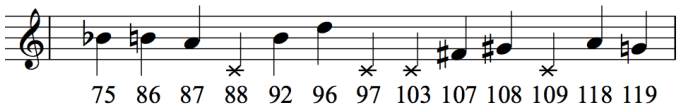

Figure 10

Second, the specific pitch omissions of the near-aggregates over the course of the piece are distributed in a structured manner that allows a consistency of sonic character in the piece. In addition, this structure contributes to the form of *Enchanted Preludes*. This structure can be seen in figure 11.

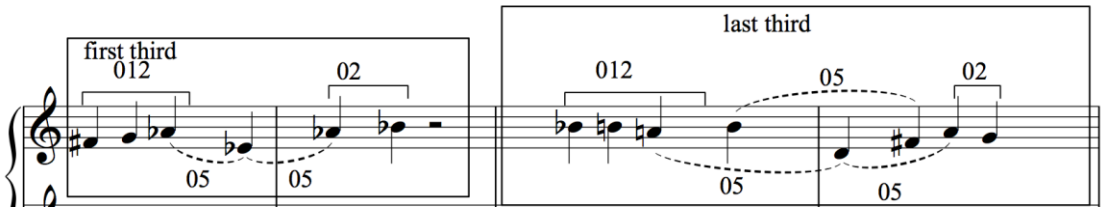

Figure 11

Again, the aggregates and near-aggregates are distributed into two sections, the first and last third of the piece[40]. In the first third of the piece, the aggregates and near-aggregates form an ascending 012 set and conclude in an ascending 02 dyad from Ab to Bb. The interior of the set presents a 05 dyad, Ab to Eb. These pitch ideas are mirrored and developed in the final third of the piece with the same opening 012 gesture, and the same closing 02, this time descending in contour. The interior is a more developed version of the 05 idea, placing the pitch D at the center between two As. This pitch D is then surrounded by another 05 set, in a series of interlocking fifths. In this way, Carter is able to extend and develop the material of the first third in the final third.

All this established, I can begin to formulate a narrative outline of the piece onto which more information can be grafted. The first third is an ascent, moving slowly upwards and culminating in the pitch Bb. This slow and deliberate ascent moves us to the de-centered and disorienting, but ultimately calmer, space of the middle section. The middle section, representational of an enchanted space, is without aggregate and near-aggregates and therefore less directed and centered to the listener. It is also far less texturally chaotic, focusing on textural relationships formed between the two duet partners in order to provide its shape. This idea regarding the middle section will be further explored in chapter 3.3 following this discussion. After the middle section, Bb is reintroduced via the piece's only instance of a near-aggregate which is pre-emptively resolved in measure 75, bringing us back into the pitch-directed yet chaotically-

[40] Third does not imply even divisions here, but simply that there are three sections. In a performance executed exactly as notated the proportional length of each third would be as follows: section 1: 23%, section 2: 39%, section 3: 38%.

textured listening style of the opening third. From here, the pitch structures of the opening ascent are mirrored and extended, but this time ultimately descend towards the pitch class G which completes the final near aggregate.

In summary, the opening of the piece moves rapidly and unexpectedly. In the middle section a different, more texturally centered listening is required. The piece then returns to where it started, leaving the enchanted space and returning to a more directed, intense, and varied pitch language. The pitch language of the final section is drawn from extended and developed pitch ideas of the first third, as evidenced in pc-set connections established through aggregate and near-aggregate usage, providing the auditory context for the feeling of a return.

3.5 Textural Documentation

After much experimentation with different ways of speaking of texture in *Enchanted Preludes* I settled on a categorization drawn heavily from Roeder's but that is ultimately simpler. This simplification is in the interest of capturing large scale structural changes rather than capturing a great deal of granularity in specific changes. For each measure of the piece, I assigned each instrument a single textural profile from a list of four options:

1. Trill (purple)
    - any rapid alternation between two or more pitches that presents a relatively static pitch profile.
2. Sustained Sounds (yellowish green)

- Either long[41] musical lines or literal sustained single pitches. Less active musical textures.

3. Scattered (puce)

- Rapidly and acrobatically moving from pitch to pitch with a focus on sharp or sharply articulate gestures.

4. Rest (white)

- This only happens five times in the whole piece. A hallmark of this piece is the constant activity of both parts.

[41] In note duration.

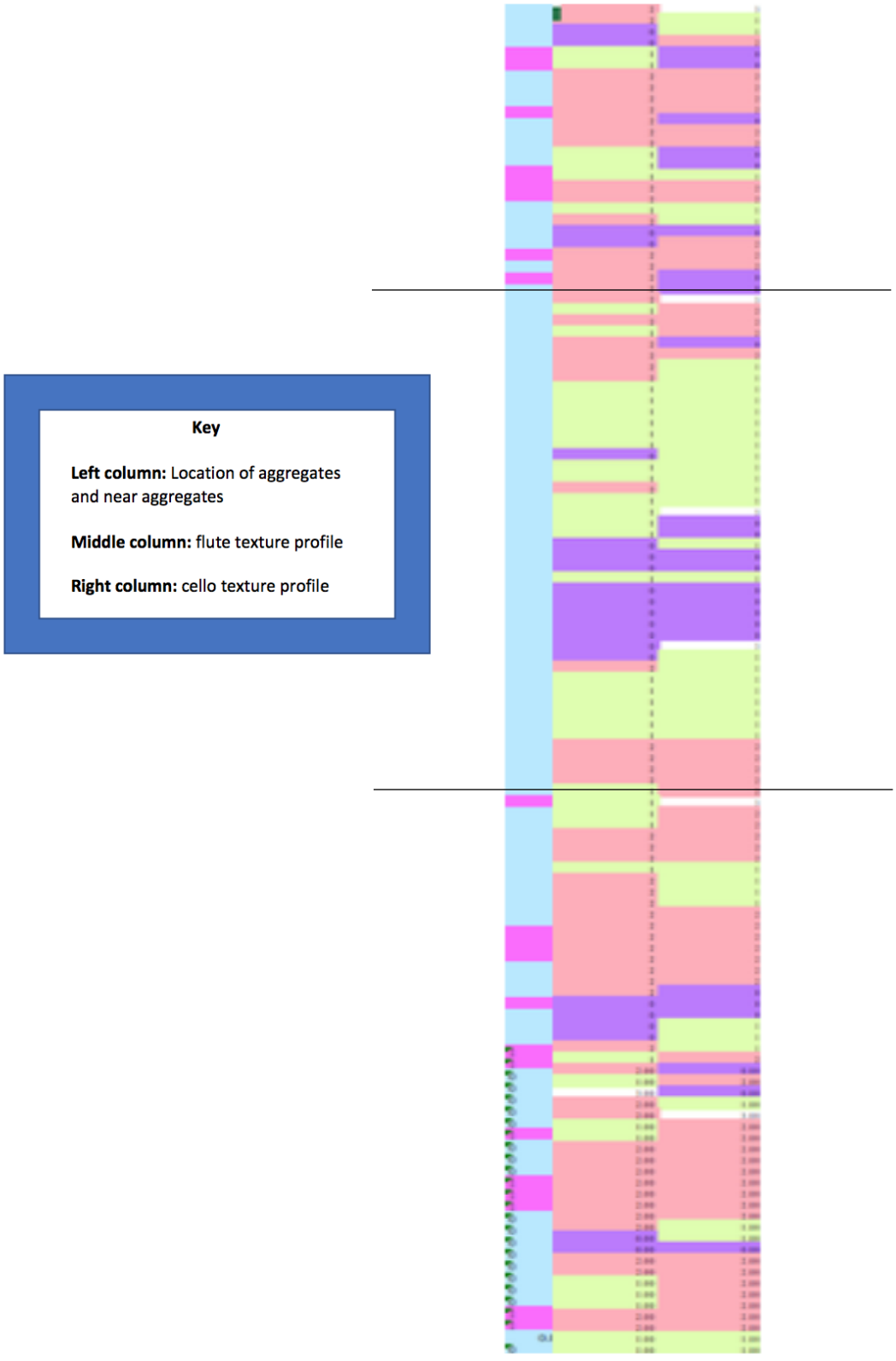
Key
Left column: Location of aggregates and near aggregates
Middle column: flute texture profile
Right column: cello texture profile

Figure 12

Figure 12[42] proceeds from top to bottom as the piece progresses. Column 1 is the pc-set density profile from figure 6[43]. Column 2 is the flute texture profile and column 3 is the cello texture profile. The lines indicate the section divides discussed above and drawn from pitch analysis.

The main insight to be drawn from this method of analysis is that the textural profile in *Enchanted Preludes* changes dramatically in each section of the piece. Section 1 presents the most varied textural palette in which textures are rapidly juxtaposed in a scattered and unpredictable fashion. This mirrors the extremely active density profile of the section. Section 2, representative of the enchanted space, consists of a textural arch form, ABCB'A' (scattered, sustained, trill, sustained, scattered). This form is significant from a narrative perspective as shown in the process of transition into the enchanted space (A), the immersion within that space (B), the dramatic zenith of that journey (C), descent from the zenith (B'), and return to the auditory world of the opening (i.e. leaving the enchanted space) (A'). Section 3, from a textural perspective, just as with the aggregate and near-aggregate usage, is an extended version of the Section 1 profile with longer development of the scattered texture sections, and with far more textural juxtaposition of texture than the central section.

[42] Black lines in figure 12 indicate sectional divides as before in figure 6.

[43] Pink is aggregate and near-aggregate locations. Blue measures do not contain aggs or near aggs.

3.6 Contour Documentation

From the perspective of contour, *Enchanted Preludes* often presents the listener with large sweeping gestures and rather intense evocative melodic shapes. Even within its scattered textures, there is often a direction in which all or most of the pitches are moving, allowing the listener to perceive contour changes over quite large spans of time. For example, measures 69-73 in figure 13 present a varied contour profile.

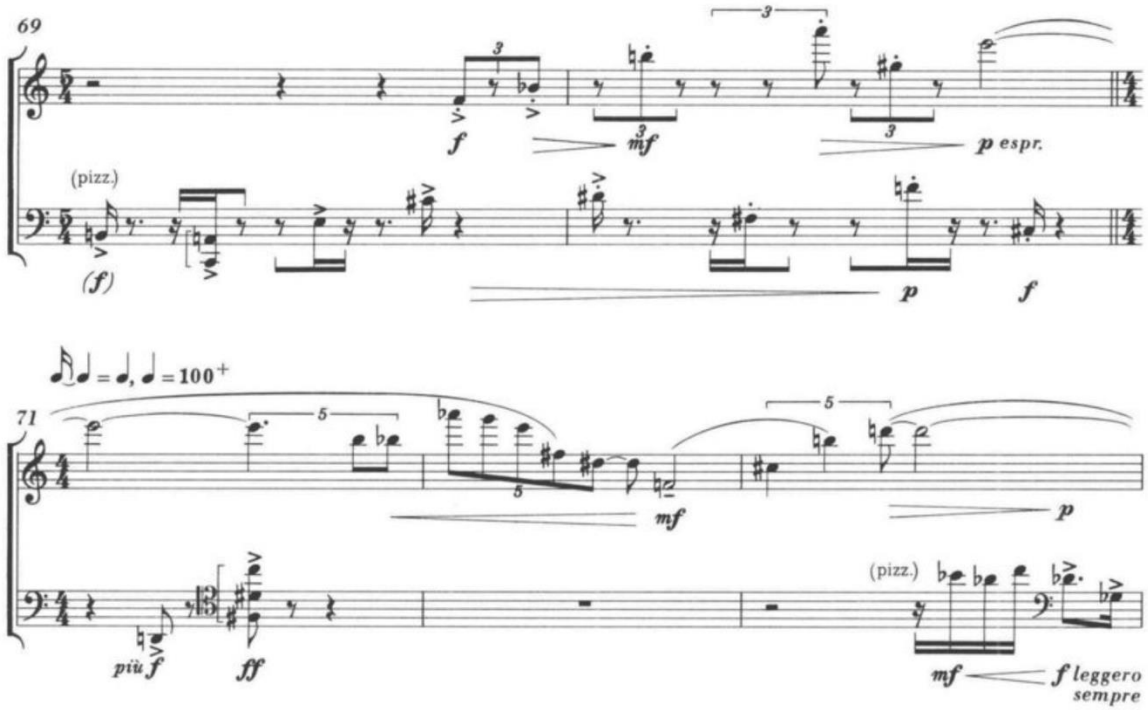

Figure 13

In order to capture these larger scale contours in action over the course of the piece and quantify the results for eventual inclusion in the multi-level model, I devised the following system illustrated in figure 14. The result is an STVV which shows my hearing of contour in each instrument from measure to measure of the piece. For each measure of the piece, each instrument

is assigned a value on a scale from -3 to 3 based on the extremity and direction of the instrument's line contour. Undirected or scattered lines in which there is no obvious unified contour are also treated as 0. In brief, this system is only interested in capturing obvious contour that extends at least to the level of the measure and errs on the side of underrating contour.

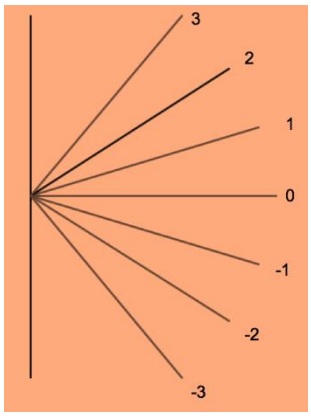

Figure 14

Table 5

Measure number	Flute Contour	Cello Contour
69	1	3
70	3	1
71	0	0
72	-3	0
73	2	-1

For an example reading using this method, measures 69-73 are scored in table 5 below. Measures 69 and 70 show a particularly interesting case where the flute and cello work together over the course of two measures to create a single ascending line. Using this analytical method, such an event manifests as a contour exchange where we see each instrument having a "turn" at extreme ascending contour. When graphing contour out over the course of the piece, this effect manifests in similar contour shapes displaced by a measure or two as can be seen in measures 61-73 in the full contour graph presented in figure 15 (orange:flute, blue:cello) . In examining contour over the course of the piece, a few large-scale insights can be gleaned. First, the piece progresses,

in general, from disunity in contour to a greater degree of contour agreement in the second half of the piece, i.e. contrary motion progressing to similar motion. In addition, the extremity of contour increases drastically in the second half of the piece.

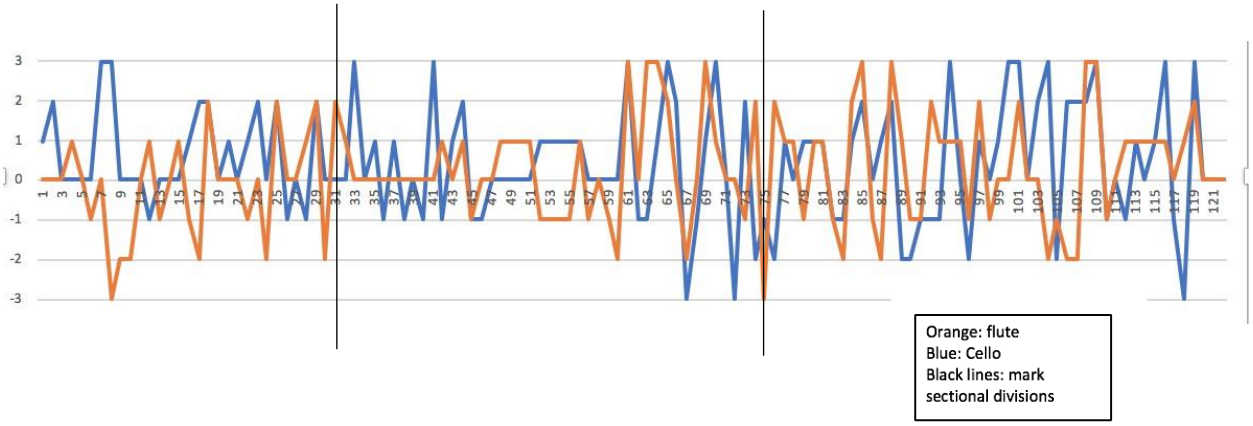

Figure 15

On a smaller scale, a few interesting moments can be highlighted. First, in measures 47-57 we can see a large-scale contour exchange at a low level of contour intensity. Interestingly, these measures coincide with the "trill section", the C segment of section 2's ABCB'A' form discussed during the textural analysis. Such an effect shows an evolving dialogue between the instruments in terms of contour during this unique textural moment in the piece. The piece, in general, progresses from the use of more contrary contour gestures to the use of more similar contour gestures from the 1st to the 2nd section. The 3rd section opens with the similar contour gestures of the 2nd section and then returns to the contrary contour gestures of the opening. In this way, although somewhat temporarily displaced from what was found in texture and pitch documentation, contour usage reinforces the overall emerging narrative idea of ABA.

Another interesting moment occurs in the opening of the piece in bars 5-9. During these bars, Carter provides the most extreme contour contrast in the entire piece. In this way, the

composer presents the greatest possible contour contrast between the two instruments in order to open up the registral[44] space of the piece, giving the listener a metric by which to judge later events. This gesture, in turn, dramatically sets up the contrary motion dynamic discussed earlier. As a result, moments like the contour exchange in bars 47-57 can be heard in comparison as gentle and delicate exchanges. Subsequently, the return of extreme contours starting in bar 62 can be seen as a return to an original contour idea, a fulfillment of the composer's implicit promise created by the opening of the earlier auditory space. The increasing contour unity as the piece progresses from its first section to its second/third sections further adds direction to this narrative.

3.7 Narrative Analytical Synthesis

With all of these methods of musical documentation established in principle, in addition to the pitch bin data referenced in chapter 2, the next step is to synthesize all of this information into a single coherent narrative of *Enchanted Preludes*. This narrative primarily divides the piece into thirds as this was the most significant large-scale division found in the course of the above analysis. This narrative will serve as a summary of my hearing of the piece as a result of analysis, in brief, my novel MTCA for *Enchanted* Preludes. After this narrative is presented, it can then be meaningfully compared to listener results garnered from the study that will be presented in chapter 4.

[44] Referring to frequency here.

3.7.1 Section One (Disorientation and Disunity)

Enchanted Preludes begins with a flurry of movement: the listener presented with a great variety of textures and pitch densities. Measures 7-9 present a wide contour contrast, displaying a disconnect between the two duet partners. It's as if we've caught these partners *in medias res*, in the middle of a conversation to which we are not privy. Lost in this disorienting dialogue, we begin to find our footing, finding a reliable way to gauge the intensity of the conversation via its recurring waves of density, in the form of aggregates and near-aggregates. These waves of pitch density, although erratic, begin to feel "normal" and we begin to grasp the rhythm of the conversation. The two participants in the conversation are verbose, throwing a great variety of pitch constructions at each other drawn from a history of which we are unaware. The effect is somewhat analogous to hearing an argument in a foreign language: we are able to grasp the emotion and the pentameter of the conversation without being able to grasp the specific details. By measure 31, we have gained more of a footing and began to form expectations for this argumentative dialogue despite its chaotic nature, feeling the ebbs and flows of pitch density and cadential structure. However, this state of affairs is quite short-lived.

3.7.2 Section Two (The Enchanted Space and Brief Unity)

Suddenly there is a drop in pitch density and the landscape has changed. The conversation is suddenly more comprehensible to our ears. The conversation has both slowed down and the duet partners are speaking with more subtly and reciprocity, mirroring each other's gestures. The argument we were observing has suddenly lost its fire and there is an attempt at reconciliation. The texture is far less chaotic as the duet partners settle on a more hushed and unified tone, now with

more agreement in terms of texture, moving together in long, slow, and flowing lines. The flute is a bit more dramatic and expository while the cello sits back a bit more in repose. The intense ebbs and flows of the former conversation have been replaced by a more static pitch and textual dialogue at a low pitch-set density. The inactivity is simultaneously a much-needed reprieve from the frantic nature of the first half and a jarring shift in disposition between the two duet partners. The flute holds steadfast with 013 or 03 pitch ideas in bars 35-50 while the cello presents more varied pitch-set ideas. For this moment, the conversation is civil, but stability is far from promised.

Next, we begin to observe a more cool-headed negotiation taking place in which both instruments move into the trill texture, sending small pitch ideas back and forth in the form of compact and varied pitch sets. In bars 47-55, the two instruments slowly exchange contour ideas, circling around each other as the conversation begins to regain heat and intensity. It is during this trill section that we begin to feel the pressure of the pitch density which has been quietly yet steadily and slowly increasing since the drop-off that opened[45] the second section. Pitch density continues to rise as the instruments move together from a trill-based texture back into long flowing lines. The duet partners also begin to present similar contours imitating each other as these contours gain in intensity. The conversation begins to regain its original character as pitch density increases, contours become more dramatic and the pitch language becomes more varied and independent.

[45] Or, put differently, delineated the second section in the first place.

3.7.3 Section Three (Return)

As listeners, we are thrown back into the feeling of the opening, our brief ability to understand the conversation pulled out from under our feet as we return to a more disorienting texture. Pitch sets are wildly juxtaposed, contours increase in intensity, and the textures are less predictable and unified. However, these ebbs and flows of conversation are now familiar and we can latch on to the cadential moments, gaining our footing more easily than last time. This third section is also less compact than the first third, allowing us time to hear more subtlety in the conversational syntax. For example, in bars 92-100 we see a particularly intense juxtaposition of sparse and intense densities between the two instruments, culminating in the most dramatic gesture of the piece in bar 100 where the flute presents a full 12 tone set aggregate as the cello rests.

From here, things remain intense, but also begin to move toward stability. The contours aren't entirely dissimilar, but also aren't identical. The instruments present pitch sets of increasingly similar density and composition in bars 102-119. There are waves of pitch density as before, but they are the result of similar motion towards a shared goal. In bar 119, we hear our final near-aggregate which is satisfyingly completed with the pitch "G" in bar 120 and sustained to the end of the piece. The duet partners have reached some kind of understanding without totally giving up their autonomy. We, as listeners, are not fully privy to the details of this resolution, but it is clear that some understanding has been reached. And with that, our view of the conversation ends.

4.0 Introduction

Chapter 4 will present the specific means by which participant data were collected for eventual inclusion into the analysis of Elliott Carter's *Enchanted Preludes*. The chapter will be formatted largely as a science paper, with introduction, method, data analytic strategy, and results section. The introduction and conclusion sections are truncated as the rest of the dissertation serves to provide the greater context of the study. My intention in doing so is to present the following study activities and findings in as clear terms as possible before considering the implications of these results from the standpoint of a music theoretical analyst, which will be the aim of chapter 5. This approach was chosen in order to allow researchers from other fields to engage directly with the results of the study and be able to replicate or adapt the study in subsequent research.

4.1 Method

4.1.1 Participants

This sample comes from students, faculty, and staff at the University of Pittsburgh. The sample included 48 participants, all recruited during the Spring semester of 2018. All participants were over the age of 18. Participants were only excluded if they had a history of epilepsy or severe migraines in response to computer screen exposure. Active efforts were made to recruit participants of varying levels of musical experience, from the amateur to the professional.

Due to the fact that this participant pool was drawn exclusively from the University of Pittsburgh community, this study is limited in that its participants were generally more educated than the general population. In addition, although there was no explicit data collected on this matter, samples collected in this way tend to be from individuals more affluent than is representative of the general population. An ideal sample would also be larger and more diverse in terms of age, race, and ethnicity than the given sample. As a consequence, these results are not intended to be generalizable to the larger population. In addition, the results drawn from this sample remain preliminary. This study only aims to be exploratory in nature.

4.1.2 Measures

4.1.2.1 Ten Item Personality Inventory

“The TIPI is a 10-item measure of the Big Five (or Five-Factor Model) dimensions”[46] The TIPI is designed for use in studies in which time is extremely limited. “Although inferior to standard multi-item instruments, the instruments reached adequate levels in terms of (a) convergence with widely used Big-Five measures in self, observer, and peer reports, (b) test-retest reliability, (c) patterns of predicted external correlates, and (d) convergence between self and observer ratings. On the basis of these tests, a 10-item measure of the Big Five dimensions is

[46] |an Gosling, “Ten Item Personality Measure (TIPI).” Accessed December 16, 2019. https://gosling.psy.utexas.edu/scales-weve-developed/ten-item-personality-measure-tipi/.

offered for situations when very short measures are needed, personality is not the primary topic of interest[.]"[47]

4.1.2.2 Demographic Questionnaire

Each participant was asked to self-identify their Gender, Age, Race/Ethnicity, Education (highest degree achieved), and Major, if applicable.

4.1.2.3 Musical Experience Questionnaire

On a 1 to 7 scale ranging from no engagement to detailed study and/or profession engagement, participants each wrote the number that best corresponds to their level of engagement with the following topics: Frequency of music consumption, Frequency of classical music consumption, Engagement with contemporary classical music, Engagement with Elliott Carter specifically, and Engagement with the creation of music.

4.1.2.4 Primary Listening Task Measure

For the purposes of utmost clarity regarding participant listener ratings, I will print the primary survey instructions verbatim below as they appeared to study participants. In addition, figure 16 presents the display to which the survey instructions refer. The participant would initiate the study by pressing the center gray button, after which the software would begin playing *Enchanted Preludes*[48] and continuously collect their mouse location for the duration of the piece

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[47] Ibid.

[48] Johannes Martens Ensemble, "Enchanted Preludes," track 7 on *Chamber Music by Elliott Carter-Figments and Fragments,* 2I, 2008, CD.

at 20ms intervals. All participants used the same recording, headphones, set of instructions and interface to complete this task.

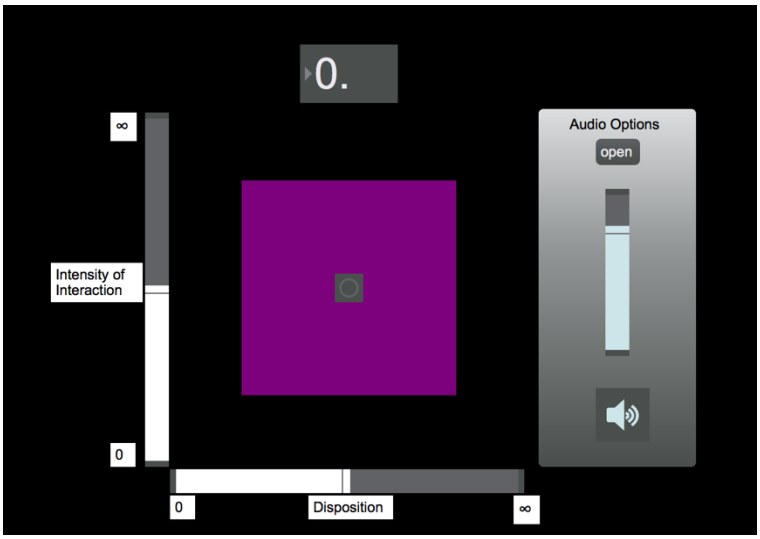

Figure 16

4.1.2.5 Survey Instructions[49]

You will be asked to rate two dimensions (characteristics of the music) on a scale of 0 to ∞ over the course of a 1-minute sample task followed by a 6 to 7-minute full task using a visual software. You may repeat the sample task once and the full task up to two additional times. The piece of music that you are assessing is *Enchanted Preludes* by Elliott Carter for cello and flute.

[49] Section 4.1.2.5 presents the unedited survey as it appeared to the participants. Therefore, it does not conform to the same editing guidelines as the rest of the dissertation.

Dimension #1, Disposition

Disposition is the extent to which the two instruments (cello and flute) are behaving cooperatively vs. non-cooperatively relative to each other in your view. Disposition will be represented by left/right mouse location (0, hard left mouse location, being completely cooperative and ∞, hard right mouse location, being totally non-cooperative. The space between these extremes represents the possible dispositions between these extremes. For example, the midpoint of the box represents total ambiguity of interaction.) Note that the borders of the box are your maximum and minimum limits. Going beyond the box's borders will not allow a more extreme rating. Consider the following in assessing **disposition**:

1. Are the two instruments "working together" or "working against each other"? Are the two instruments acting in a manner that is complementary to their duet partner or do the two instruments actions not "belong" together? Below are some possible factors to consider in evaluating this.
2. If you are able, try to use specific musical cues to establish the nature of the relationship of the two instruments to each other. Use the technical information to try to imagine a narrative, tracking the changing nature of this relationship.
3. If you are inexperienced with the identification of specific musical cues, use your "gut feel". Does it sound like the instruments are arguing, agreeing, etc.? Try to imagine a narrative, tracking the changing nature of this relationship.

Dimension #2, Intensity of Interaction

Intensity of Interaction is the extent to which you interpret the interaction between the two instruments as "intense" and will be represented by up/down mouse location. 0, hard down

mouse location, will represent no intensity while ∞, hard up mouse location, will represent maximum possible intensity. Again, the space in between these extremes allows for ratings that fall in-between these extremes. Consider the following in assessing **Intensity of Interaction**:

1. Is this a moment of high drama in the interaction of the two instruments? Is it a calmer moment? Something in between?
2. Note that this dimension is not the same as dynamic intensity (loudness vs. softness) though these dimensions MAY coincide.

----------End of Survey as it appeared----------

The specific dimensions of intensity of interaction and disposition were chosen to provide a real-time proxy for Roeder's idea of autonomy and cooperation. In other words, the listener's appraisal of both the intensity of the given moment as well as the degree to which the two characters were behaving cooperatively allowed each participant to create a numerical version of a narrative accounting of the piece in the terms that Roeder laid out. Each of these personalized narrative readings will be made available in this dissertation's supplemental materials.

4.1.2.6 Debrief Measures

After completing the primary study task, each participant completed a survey asking them to rate, again on a 1 to 7 scale, their enjoyment of the listening task, the degree to which they understood the task, the degree to which they learned something through the task, the degree to which they feel their ratings are unique, and the degree to which they enjoyed the piece *Enchanted Preludes.*

4.2 Incorporating Music Theoretical Measures

See chapter 3 for a presentation of the primary methods of music theory analysis. It is important to note here, however, that the participants are deriving their ratings from a recording while the music theoretical measures are drawn directly from the score. In order to allow comparison of these two sources of data, all events in the music theoretical/score derived data need to be tied to specific time points in the recording. This was accomplished via the following methodology:

1. Step 1
    - All music theoretical data were collected at the rate of 1 sample per musical measure.
2. Step 2
    - A "perfect playing" time of the score was calculated. In other words, if the performers played the piece exactly as written or the score was realized via a computer, how long would each measure and be? Carter uses exact tempo markings at all times so this calculation can be made unambiguously at 327 seconds in total. The perfect playing length of each measure was also calculated.
3. Step 3
    - This perfect playing time was then compared to the actual recording duration (with end silence removed. The resultant time was 382 seconds for the total recording time. The recording time is therefore 14.4% longer than the perfect playing time.
4. Step 4

- Each measure was then scaled by this factor from perfect playing time to recording time, allowing the data derived at the rate of one sample per musical measure to be meaningfully compared to continuously collected listener rating data.

4.3 Data Analytic Strategy and How to Interpret Numerical Results

The data produced by this study presents the issue of what Tom A.B. Snijders and Roel J. Bosker refer to as "nested sources of variability" in their text, *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling* For instance, in this study, there is potential for variability in participant ratings of intensity of interaction and disposition based on their level of musical experience, their enjoyment of the listening task, their personality data derived from the TIPI, their age, gender, or any other manner of information collected about them. Multilevel Models (MLMs) are specifically designed to account for all of these potential sources of variability by calculating the degree to which change in one variable or nested groups of variables are correlated with change in another variable. In particular, MLMs are successful in simultaneously accounting for time-variant and time-invariant data which are referred to as level 1 and 2 predictors respectively.

After analysis employing an MLM has been performed, the resultant data is output primarily in terms of correlation coefficients. For level 1(time-variant) predictors, these correlation coefficients describe the degree to which change in this variable during the listening task correlates with change in other variables in real-time during the task. For level 2 (time-invariant) predictors, these correlation coefficients describe the degree to which higher/lower ratings in a given variable

correlate with higher/lower ratings of another during the entire task or during targeted sections of the task (i.e. between two specific timepoints).

Although interpreting these correlation coefficients is a subtle and complex task, one can use this rule of thumb to have a rough idea of the magnitude of these correlations presented in figure 17. Positive numbers indicate a direct correlation between two variables while negative numbers indicate an inverse relationship between two variables.

Correlation Coefficient	"Rule of thumb" size of effect
0 to +/- .1	Extremely small or no correlation evident.
+/- .1 to +/- .3	Small to moderate correlation[40]
+/- .3 to +/- .5	Moderate to large correlation
+/- .5 to +/- 1	Extremely large correlation

Figure 17

4.4 Results

Due to the massive amount of data output by this form of analysis, I will highlight the primary findings of this study. However, the full results table will be available in this dissertation's supplemental materials. I will highlight general trends and then show how a few specific findings support these overall trends.

4.4.1 Difference in Expert and Non-Expert Narrative Accounts

First and foremost, it should be stated that experts and non-experts[50] seem to contextualize *Enchanted Preludes* through narrative in radically different ways. Many findings support this notion but I will briefly summarize the most important. First, experts and non-experts mitigate the relationship between Disposition (D1) and Intensity of Interaction (D2) in radically different ways. When looking at the full piece, the correlation coefficient between D1 and D2 for the entire group of experts is .52 while for non-experts it is .11 within this sample. One would initially read this to say that experts strongly correlate motion in D1 with motion in D2 on the visual interface used in the study while non-experts don't. Such a strong correlation indeed suggests that experts are treating the two dimensions as intimately interlinked if not virtually synonymous while non-experts are treating these dimensions as two distinct entities. Put more simply, for experts, rises in intensity occur in tandem with more non-cooperative behavior between the duet partners while non-experts see no such relationship. However, the picture is much more dynamic and interesting than this. If the piece is broken into the three sections suggested by pitch aggregate density as presented in chapter 3, one can observe that while experts hold a relatively stable view of the relationship of D1 and D2 (between group correlation coefficients of .44, .35, and .37 respectively) non-experts have a much more dynamic view of the relationship between D1 and D2 (between group 0, .46, and -.22 respectively). Although it is difficult to draw specific conclusions based on these findings, one can say that it seems non-experts are reporting perceived changes in the nature

[50] Experts were separated from non-experts by averaging each participant's music experience score and separating the participants as less or more than the mean (experts greater, non-experts lesser).

and the dynamic of the communication style between the two duet partners. In particular, the sectional divisions noted in my narrative analysis seem to be relevant. Experts, however, seem to have a more stable view of the communication style of the partners, hearing changes in the piece as a series of events expressed in a seemingly more unchanging and comprehensible communication style. Supportive of this idea is another finding regarding intra-class correlations or ICC. Put simply, ICC describes the degree to which data in a single dimension are internally consistent. For the purposes of this study we can think about ICC as a number that describes how much is the participant's mouse moving in a given dimension during a given timespan. ICC can range from 0 to 1 with 1 being a completely stationary mouse for D1 or D2 and 0 being a wildly moving erratic mouse (i.e. constant erratic change in a dimension). With this established we can look at ICC for D1 and D2 in experts across the entire piece. For intensity of interaction (D2) ICC is fairly consistent between experts and non-experts across the entire span of the piece and within specific targeted sections (D2 Expert ICC for the full piece .39 and D2 non-expert ICC for the full piece .32). However, there is a disparity between D1, i.e. dispositional ICC, between experts and non-experts across the entire piece (.28 exp and .12 non-exp). When viewing the piece in thirds this difference is even more stark (exp .43, .39, 42 and non-exp .3, .15, .24). Broken down even further, if we examine the opening gestures of the piece[51] exp D1 ICC is as high as .94 while non-exp D1 ICC sits at .48. With all of this established, a trend becomes visible where non-experts see the disposition of the two duet partners as more fluid and dynamic than experts, who hold a relatively stable view of their disposition.

[51] Specific sectional time divisions provided in supplemental materials.

Moving to more music-theoretically generated OTVVS and STVVs, we can see this greater dispositional flexibility of non-experts manifest in reaction to specific musical events. Of particular interest are the multiple instances in which experts and non-experts agree on the significance of an event but disagree on how to account for this event in narrative terms. For example, when investigating cello set-density, composite set-density, and the measures in which the number of unique pitch classes exceeds 7[52], one can observe that although the correlation coefficients are relatively small, ranging from .1 to .2, non-experts consistently accounted for changes in set density as changes in disposition while experts interpreted these events as related to changes in intensity of interaction. This same "transference effect" can be observed when investigating total contour extremity and when viewing the "trill section" of the middle third exclusively. In brief, both groups are to some degree recognizing a significant musical event but narratively contextualizing it in radically different ways.

Finally, it seems that experts see the narrative progression of *Enchanted Preludes* in a more linear fashion than non-experts. For experts, time is correlated at .195 with D1 and .16 with D2 while this relationship is virtually non-existent in non-experts. When viewing the piece in the three sections outlined in chapter 3, we can see how this change in expert ratings specifically manifests in the comparison of the final third to the first two thirds of the piece (with D1 progressing -.109, -.105, .17 and D2 progressing -.053 -.102, .12 in experts). In other words, for experts, the final third of the piece presents a rise in intensity and a more non-cooperative disposition while for non-experts, the relationship is far more unpredictable and dynamic. With this in mind we can tentatively glean that D1 is driven by longer term goals for experts, in other words a sense of

[52] Marked composite color 7 in the full data set.

larger-scale form, while D1 is driven more by in the moment events for non-experts. Again, D1 and D2 are intimately linked for experts so this linear progression is seen across both dimensions. In regards to music theory derived STVVs and OTVVs, D2 is far more difficult to account for in non-experts with no significant correlations observed.

4.4.2 Personality Effects Narrative Contextualization

The accompanying questionnaires investigating personality, demographics, level of musical experience, and level of task engagement yielded a rich assortment of results. Again, the full results are in the supplemental materials of this dissertation, but I will summarize them briefly here.

Although it is hard to draw specific conclusions based on a sample of 48 participants, the correlation coefficients between the TIPI questionnaire items and D1/D2 are quite striking. Indeed, these specific findings should be seen not as conclusive evidence of the specific tendencies of personality types, but instead a demonstration of the need for further research into the question of personality's effect of musical narrative contextualization as well as a demonstration of the sheer variety of narrative interpretation available within even a small sample of 48 participants. With that said, a few examples of the more striking correlations regarding the TIPI were:

1. Non-experts who rated themselves higher on extraversion consistently rated intensity of interaction more highly than experts of similar ratings (Extraversion to D2 exp .05, Extraversion to D2 non-exp. .4, Extraversion to D2 full sample .18). Non-experts who rated themselves higher in extraversion also showed a greater degree of independence between D1 and D2 than experts (non-exp dimension difference .28 vs -.06 for experts).

2. Experts and non-experts who rated themselves higher in conventionality had a striking split in the way they viewed D1 (Conv to D1 non-exp .26, Conv to D1 exp -.26[53] for a correlation coefficient difference of .52 while the full sample Conv to D1 was .06).
3. For those who rated themselves high in "critical, quarrelsome" on the TIPI there seems to be a generally negative effect in D2 across the entire sample (Crit to D2 -.024[54] across the full sample). However, non-experts and experts again differed in their treatment of D1 with (Crit to D1 exp -.34 and Crit to D1 non-exp .57 for a difference of .91 between the two groups and a full sample Crit to D1 of -.02).
4. Within this sample, although the effect will almost certainly found to be less significant upon replication and larger sample sizes, experts who rated themselves higher on "sympathetic, warm" consistently rated both D1 and D2 more highly (exp Symp to D1 .42 and exp Symp to D2 .78). These strong effects were not seen in non-experts.

4.4.3 Musical Experience Consistently Effects Dispositional Ratings

For the full sample, higher ratings for frequency of: musical consumption, classical music consumption, contemporary classical music consumption, and personal musical composition as well as knowledge of Elliott Carter specifically correlated inversely with Disposition with correlation coefficients ranging from -.23 to -.32 across the full sample. In similar fashion, those who were/are in an arts major rated D1 lower than those who are not an arts major to D1 at -.33.

[53] Again, negative correlation coefficients for D1 mean hearing the piece as containing more cooperative behavior between duet partners and positive meaning the opposite.

[54] Negative numbers meaning less intense for D2

This finding is extremely consistent in reference to musical experience and would essentially mean that those with a variety of musical experiences are more likely to hear cooperative disposition between the two duet partners than those without those experiences.

4.4.4 Task Engagement Effects Intensity of Interaction Ratings

For non-experts, the degree to which they enjoyed the listening task, felt that they understood it, and learned from it correlated with higher ratings of D2 (non-exp D2 to Enjoyed .48, to Understood .36, and Learned .36). This relationship does not seem to exist for experts. However (exp D1 to Und -.28). For both groups, however, the degree to which they enjoyed *Enchanted Preludes* specifically correlated strongly with higher ratings of intensity of interaction (exp EnjCarter to D2 .35 and non-exp EnjCarter to D2 .52) (.32 for full sample). This being said, one can observe a more intense narrative experience emerge in the minds of those who enjoyed the music than those who did not. Put differently, enjoyment of music, in the case of *Enchanted Preludes* at least, seems to have something to do with the ability to create a vivid and intense narrative from the given auditory stimuli. Narrative indeed seems integral to the manner in which Carter's music is created by the listener.

4.5 Conclusion

The sheer quantity of data produced by a study such as this can be difficult to meaningfully contextualize. However, the results of this study support the need for more inquiry into the specific differences in expert and non-expert narrative accounts of Carter's music, the manner in which

personality affects narrative contextualization of music, the manner and degree by which musical experience affects dispositional ratings in narrative creation and how task engagement affects intensity of interaction ratings or, put more generally, how task engagement creates more vivid and intense narrative in listeners.

With these findings established, and the music theoretical analysis performed in chapter 3, chapter 5 will attempt to synthesize these diverse findings where possible, elaborate on specific calls for further research, and suggest study improvements and point out limitations of the current study for those wishing to replicate this study.

5.0 Future Directions and Comparing Narratives

Chapter 3 concluded with a narrative derived from my own analysis and hearing of *Enchanted Preludes*. Chapter 4 concluded with a list of the primary findings gleaned from the use of a multi-level model. This multi-level model was employed in order to investigate the intersections of chapter 3's music-theoretical data with participant musical experience/demographic data and personality difference data. With this in mind, chapters 3 and 4 can be seen as interlinked by two elements, the music theoretical data derived from chapter 3 and the piece, *Enchanted Preludes*, itself. Despite this, two very different tasks were involved in the creation of my narrative, an MTCA, and the creation of the study participants' narrative ratings. First, study participant listeners were reacting in real-time to a piece that they had never heard, so, as a result, their narrative ratings could only be created in the context of moment-to-moment comparisons[55]. My narrative, on the other hand, was created over a long span of time with multiple revisions and was informed by the perspectives of many researchers. Indeed, MTCAs are created in order to communicate a narrative reading informed by a long and detailed study of a piece. For this reason, one should consider the goal of this overall exploratory study to explore the differences between an MTCA and the manner in which listeners initially hear a piece; or, put differently, to examine the motivating factors in narrative formulation for a variety of listeners. With difference in perspective stated, the question becomes, "how does one synthesize this information?".

[55] Participants were allowed up to three trials in a single sitting, submitting the trial with which they felt most comfortable as their reading. Previous hearing of the piece did not disqualify participants, so there is a chance that some expert listeners had indeed heard the piece before.

The above question reflects a desire to somehow combine these different readings into a single, more informed understanding of *Enchanted Preludes*. However, I encourage the analyst to view this data, not as the conclusive result of a study, but instead the beginning of a novel approach that allows us to invite larger segments of the music community into the music analytical process. I invite the larger music research community to imagine databases for individual pieces in which the listenings of the larger community as well as more formal music analyses can be documented, drawn from, and compared. Researchers, in such a case, would not be limited to the score and recordings from which to draw their analysis, but would instead be able to meaningfully measure the formally ephemeral effects of musical content on audience perception, difference in audience receptions, differences in hearing based on personal differences, and more effective comparison among more formal analyses, along with a myriad of other potential comparisons. Put more briefly, such a database allows for the intersection of analyses drawn from the score itself, recordings, and audience. Such databases would allow for a wider "object of analysis" and a fuller view of what it is within a given piece that truly drives listener perception. These databases created for individual pieces could then be combined to form rich data mines from which to understand the entire output of composers, differences/similarities among composers or time periods, changing audience perceptions over time, historical data, and a countless number of other questions of interest. Such databases would also function as an online and publicly available means by which to observe and/or contribute to the discourse regarding a piece. In such an analytical environment the role of the analyst is not only the contribution of an individualized perspective on the piece, though this is still extremely valuable, but also the construction of frameworks for the contribution of data that are meaningful and valuable to the wider music analytical community.

This vision is admittedly ambitious, but increasingly possible and attainable as the music analytical community gains access to greater computing power and accepts more cooperative research techniques. The walls between musical academic disciplines become blurrier with each passing day. With this vision established, the following subchapter will present strategies for the improvement of the *Enchanted Preludes* database. In turn this subchapter will present directions for further research on this piece, but also present ideas for the creation of other musical analytical databases.

5.1 *Enchanted Preludes* Database Improvements

In order to begin drawing more comprehensive conclusions about listener/analytical interactions surrounding *Enchanted Preludes*, the following steps would be necessary.

5.1.1 Study Replication

Replication of the above study would allow for a better understanding of how personal differences account for differences in narrative formation regarding *Enchanted Preludes*. In the current sample, it seems that there is a great deal of difference in narrative formation based on personality, but replication and much larger sample sizes would be necessary to draw more specific conclusions about these differences. In addition, study replication would allow for the use of different recordings to account for the variance introduced by the idiosyncrasies of the specific recording in this study. At the very least, study replication would create a richer and more diverse database of community sourced narrative accounts, giving researchers a clearer view of how the

piece is heard and contextualized. One of the greatest limitations of this study was its small sample size and exclusive access to participants at the University of Pittsburgh.

5.1.2 Study Extension

Although there are many ways to expand the given study, the avenue that would, in my view, contribute most meaningfully to the understanding of listener appreciation of *Enchanted Preludes* would be the formulation of a study in which one group replicates the above study, while another is given my narrative account that concludes chapter 3 prior to their study participation. Would exposure to my MTCA narrative increase listener sensitivity to the STVVs and OTVVs that I considered relevant in my analysis? In other words, such a study would measure the effectiveness of the core goal of MTCAs, the passing on of an analytically informed hearing of the piece through the means of narrative. The introduction of MTCA prior to study participation could also influence listener results in unexpected ways, for instance reducing the differences between expert and non-expert listeners. More curiously, an introduction of such a narrative reading might have no effect whatsoever.

In addition, the formulation of different listener narrative feedback interfaces or even just the replacement of D1 and D2 with other narratively derived dimensions would allow for a richer understanding of narrative in *Enchanted Preludes*. Recall that disposition and intensity of interaction, the D1 and D2 employed in this study, are drawn from my own analysis and from the work of John Roeder. However, the formulation of alternative D1 and D2s by music narrative or literary scholars would contribute to the creation of a richer narrative data base. So long as these narrative dimensions could be recorded in real-time, they could be compared to the currently existing data.

Finally, although speculative, my work on this current study has led to the following thoughts which may be worth consideration in the formulation of future studies:

Experts rated section three as significantly higher in D1 and D2 than the previous two sections. However, from a music theory analysis perspective of the score content, I could not produce data which fully accounted for this dramatic contrast between ratings of section one and three in experts. Indeed, D1/D2 ratings were more similar between sections one and two for experts than between sections one and three. I would not have anticipated this at all from my own narrative or data analysis. As a result, I feel that there is much more at play here both from the perspectives of music theory and music cognition/narrative contextualization. One possible explanation for this is that section three reproduces some of the moves and techniques of section one but developed and extended without explicit repetition. Experts may be valuing this development of the section one material much more highly than non-experts in their evaluation of D1 and D2. This seems logical, but leads to the obvious desire to further test the strength of this "development effect" on D1/D2 ratings and compare it with the effects of actual repetition. In brief, it seems that development of material and/or repetition has an outsized effect on expert listener ratings. However, it is equally possible that there is a bias that exists in experts in which, from their experience and education, they expect a marked increase in drama as the piece nears its end which may or may not be present in the actual musical material. In particular, this concern leads to questions about the positive correlation of D1 and D2 with time and whether this correlation would be preserved in contexts where it is obviously not true in terms of musical content. For example, would this positive correlation exist for pieces that are algorithmically produced to avoid progression or development over time or in pieces composed using moment form approaches? Furthermore, if we had an example of a piece in which intensity clearly diminishes over time,

would we see D1/D2 fall more slowly[56] than expected in experts while non-expert's ratings diminish more as expected? In short, is a positive D1/D2 correlation with time a bias that exists for virtually anything that an expert would listen to or would it be sufficiently explained by the "development/repetition" effect? Of course, these options are neither comprehensive nor mutually exclusive.

In a similar vein, the correlation between D1 and D2 in experts alone was unexpected given the results of my narrative and theoretical analysis. In addition, my reading of Roeder's analysis of *Enchanted Preludes* didn't seem to mesh well with this appraisal of D1/D2 as intimately related over the course of the piece. Indeed, the further that I dove into this piece, the more that I found these variables to be unique operators exerting their influence on the musical texture. It is important to note that it cannot be denied that my experience of the piece after a long period of study is quite different from an expert's hearing the piece once or twice in test conditions. However, from a purely speculative perspective, one can think of a few possible explanations for this divergence in perspective other than the circumstance of one's encounters with the piece. My suspicion is that experts are more likely to treat any multi-dimensional division of a piece's characteristics as ultimately secondary to a united higher-level reading of the piece. Put differently, D1 and D2 in this case would merely be two differing aspects of some larger abstract latent variable formed by their combination along with other aspects unquantified aspects of the piece. If this were true and subsequent studies were set up to test the veracity of this suspicion, other hypothetical variables could be added to the mix (D3, D4, etc….). If these future studies were to show a greater degree of dimensional inter-correlation than would be expected by chance and/or analysis of the given

[56] i.e. "drawn upwards" by a bias of expecting development and progression over time.

piece, this would serve as strong evidence for the subordination of individual musical/narrative characteristics to a larger gestalt reading of the piece in the minds of experts. I find this possibility to be one of the more intriguing avenues of study to be offered by the present inquiry.

5.1.3 Music Analytical Contributions

The contribution of novel MTCAs regarding *Enchanted Preludes* by researchers other than myself would allow for the introduction of novel OTVVs and STVVs into the data pool surrounding *Enchanted Preludes*. For example, would the contribution of a pulse stream analysis predict more effectively for any variance in listener ratings than the music-theoretical analysis that I chose to perform?

In addition, analyses of the *Enchanted Preludes* recordings in more detail would allow for interesting sonic analysis, and permit comparison of disparate recordings of the piece. For example, which measures deviate from the strictly notated tempo to the largest degree? Where might a detailed spectrographic analysis give us more nuanced insight about textural differentiation in the piece?

If these three goals of study replication, study extension, and expansion of music analytical contributions are accomplished, researchers would have access to an extremely rich database regarding *Enchanted Preludes*. A larger participant pool in tandem with the proposed contributions and study extension would allow for meaningful conclusions on the intersection of musical events, personal differences, and narrative formation. Most attractively, however, these extensions in tandem with the creation of this database would invite the participation of researchers from, at the very least, psychology (in particular, personal difference and narrative identity researchers),

ethnomusicology (for the rich data regarding personal narrative accounts), and literary scholars who focus on narrative formation.

5.2 Conclusion

This paper has presented an overview of the current state of MTCA research on Elliott Carter's music, a data-based music theoretical analysis of *Enchanted Preludes* ultimately expressed in the form an MTCA, and a novel study that collected information on listener narrative formation relative to *Enchanted Preludes*. The paper concluded by demonstrating the steps that would be necessary to extend this dissertation's current exploratory framework into more conclusive findings in addition to more aspirational calls for the creation of music analytical databases. Although this dissertation cannot conclude with specific conclusions regarding the effect of musical events on narrative formation it did hint that expert/non-expert differences, personality differences, and specific music theoretical findings, in particular sectional divides based on set-density differences, seem to be avenues that require further exploration and study.

Appendix A

Link to online materials:

https://drive.google.com/drive/folders/1PpOnDFf3a7445PRxquFd2uWmmUGUX7Ba?usp=sharing

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