

AARON CASSIDY'S SECOND STRING QUARTET: RESILIENT STRUCTURES,
INDETERMINATE LOCALITIES, AND PERFORMANCE PRACTICE

BY

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DISSERTATION

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ABSTRACT

When Aaron Cassidy's *Second String Quartet* was premiered in 2010 by the JACK Quartet, the work's innovative, physical action-based score drew considerable attention in contemporary music circles. Despite the enduring enthusiasm for Cassidy's multi-colored prescriptive notation, much of the foundational information about his ever-adapting experimental choreographic compositional approach and how to perform his works remains obscure. Drawing on *Second String Quartet*'s score, recordings, compositional sketches, as well as new on-site research and interviews at the University of Huddersfield, this dissertation examines the work's aesthetic context, structures, sound, and its interpreters' performance practice. The analysis provides an introduction to parsing Cassidy's notation, then focuses on the distinct relationships between the quartet's resilient yet provocative structures and the indeterminate localities situated within them. In doing so, the choreographic means and sonic results of how Cassidy's quartet utilizes a non-hierarchical approach to its musical material are discussed in detail. This includes how he creates local, sometimes atemporal, variation networks and deploys the motive-like transitional figures he calls "gestural models." Approaches to learning and performing this work and Cassidy's music in general are similarly addressed, with input from Cassidy, JACK Quartet members Chris Otto and John Pickford Richards, line upon line members Matthew Teodori, Cullen Faulk, and Adam Bedell, ELISION Ensemble members Daryl Buckley and Kathryn Schulmeister, and Weston Olencki.

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Chapter One: Introductions

1.1 Introducing the Text

This dissertation examines Aaron Cassidy's *Second String Quartet* (2010) through a combination of music theory analysis, existing literature, new interviews, and findings from my three-week research trip to the University of Huddersfield in Fall 2019. This document, read in whole or in part, will ideally serve the different needs of musicians who are curious about performing, listening to, or analyzing Cassidy's music, particularly *Second String Quartet*.

My weeks on-site at the University of Huddersfield have played a significant role in understanding Cassidy's aesthetic perspective, the ways he approaches composition, and how he builds strong, positive relationships with performers. While I was there, he allowed me to have full access to view and document original drafts of *Second String Quartet* as well as interview him on a number of occasions. This time in-person with Cassidy and the full collection of drafts clarified so much about where his music comes from, the questions and processes that constitute *Second String Quartet*, and where his music has ventured since 2010.

As part of this research trip, I also observed him working with line upon line on his new percussion trio *A republic of spaces* (2018, rev. 2019). This included the piece's revised premiere at the University of Liverpool's Open Circuit Festival; an all-day rehearsal back at the University of Huddersfield preparing for the following day's recording session; and the recording session. While this trio is different in important ways from *Second String Quartet*, witnessing how a new work by Cassidy moved from page to stage has informed and bolstered my writing about critical elements that routinely come up in discussions about Cassidy's work.

In particular, the late-stage rehearsals and recording of *A republic of spaces* were unique opportunities to see what aspects of the work, its experimentalism, and its sound world meant to

Cassidy and collaborators as they discussed and finessed it. Additionally, thanks to being present for the interactions with line upon line, I was able to better understand the supportive, collaborative spirit that inspires Cassidy's compositions and how he cultivates longtime, sometimes decades-long, musical partnerships with motivated, engaged performers.

Throughout this document I aim to share these clarifying experiences to enhance the discourse on Cassidy's music. Chapters One and Two introduce Cassidy, where his music is situated, and its relationship with experimentalism. After doing so, the analysis of *Second String Quartet* begins in Chapter Three. Because of the issues that arise in writing about music with unique approaches to notation and expression, the analysis starts by examining the notation employed within *Second String Quartet*. In explicating this first, the reader can move beyond their curiosity about the notation and its morphology, and better interact with musical examples from *Second String Quartet's* score in the following chapters.

Similarly, while Cassidy's compositional process is a rich topic, this document seeks to put its emphasis on the completed score and performances of the composition. The analyses in Chapters Four, Five, and Six focus on the completed score and its performances, with special attention paid to the music's provocative, determinate structures and the indeterminate localities within them. This emphasis continues an overall focus on demystifying Cassidy's works for musicians less familiar with his music. Later chapters examine how Cassidy composed *Second String Quartet* and how performers can prepare and interpret the piece. The concluding chapter summarizes the larger points of this project's analysis and reflects on where Cassidy's music has ventured since 2010's *Second String Quartet*.

As part of an attempt to support curious musicians doing initial surveys into Cassidy's composition, I will suggest some more efficient entryways for better engaging with or

understanding his music. These suggestions come from recurring questions or issues I have encountered in numerous conversations about Cassidy's work with professional musicians and scholars. While the entirety of the dissertation addresses Cassidy's music in detail, these suggestions are meant to highlight critical points in this text that clarify often misunderstood elements of Cassidy's practice.

Although this document ventures beyond focusing on the notation's innovation, a necessary task before further analysis of the work is to remove at least some of the confusion or worry about how a musician reads Cassidy's notation. Rather than use traditional notation where the resulting parts of sounds (pitches, rhythms, and more) are on the page, Cassidy's notation is after something more ephemeral. The physical gestures that make up Cassidy's notation are meant to realize indeterminate yet specific (in differentiation) sounds. In using examples from *Second String Quartet*, Chapter Three seeks to create clear, actionable examples for a performer with their instrument, or a composer trying to understand the premises of the notation's choreographic inputs and sonic outputs.

Importantly, throughout this dissertation, a different notion of accuracy in performing music from its score is discussed in detail, what ELISION Ensemble Artistic Director and guitarist Daryl Buckley describes as "poetic precision."¹ Rather than valuing mechanical exactness, accuracy relies on how musical the performers are in managing the give and take of multiple levels of contrapuntal relationships within their parts and amongst each other. While more remains to be said about this, the notion of a perfect performance of notation as seen in typical Western canon works is set aside for something that aspires toward a more living,

¹ Daryl Buckley, interview by author, Melbourne, Australia, January 18, 2021.

indeterminate musical expression.² Thus, Cassidy's compositions are made up of carefully designed situations that rely on frictional relationships between its elements. This leads to unexpected musical outcomes that are highly focused in such a way as to produce an unstable and volatile sound world.

A similar sense of confusion about how someone prepares a work by Cassidy may be a reason for a reader's initial survey of this text. Preparation and interpretative issues are discussed within Chapter Eight. It includes information from my interviews with Cassidy, JACK Quartet members Christopher Otto and John Pickford Richards, and line upon line members Matthew Teodori, Adam Bedell, and Cullen Faulk. In collecting such insights from practitioners, this document aims to be helpful while at the same time appreciating Cassidy's position that a performer's learning process is "their turf."³ (While maintaining this respect, I have seen first-hand, that when collaborating, Cassidy is ready and able to share clear, conductorly suggestions with performers).

This "turf" Cassidy refers to is the space in which a performer can employ all manner of methods to prepare the music for performance. For example, while Otto shared his learning process with me for *Second String Quartet*, he observed how Cassidy's music sometimes eludes typical ways a musician can self-assess improvement in practice sessions.⁴ With this in mind, he adapted how he prepared the work and has since further reflected on new, more efficient ways of grappling with Cassidy's scores. Through demystifying the notation, exploring what accuracy means in a work like *Second String Quartet*, and discussing different experiences learning

² Frank Cox, "Notes Towards a Performance Practice for Complex Music." in *New Music and Aesthetics in the 21st Century Vol. 1 Polyphony and Complexity*, ed. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2002) 70-132.

³ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

⁴ Christopher Otto, interview by author, New York City, New York, Nov. 7, 2019.

Cassidy's works, my aim is to allow a curious performer to feel more supported in preparing this music for performance.

Finally, in an attempt to create more points of access within this document, I have paired the writing in these chapters with listening prompts and visual references, including graphics about different aspects of form and content. The text has also been informed by feedback from a number of undergraduate, graduate, and professional string instrumentalists, music theorists, and composers. I hope that in reading this dissertation, Aaron Cassidy's music makes more sense and the pathways forward to engage with it feel more actionable.

1.2 A Short Biography of Aaron Cassidy

Aaron Cassidy (b. 1976) is an American composer and conductor whose music has been performed by contemporary music specialists including ELISION Ensemble, Ensemble Musikfabrik, EXAUDI, and JACK Quartet and soloists including Garth Knox, Ian Pace, Carl Rosman, Mieko Kanno, Ryan Muncy, and Christopher Redgate.⁵ Based in the United Kingdom since 2007, he is currently Professor of Composition and Director of the Centre for Research in New Music (CeReNeM) at the University of Huddersfield.⁶ Some notable programming of his works include international festivals such as Donaueschingen, Ultraschall, Warsaw Autumn, Huddersfield, Darmstadt, Gaudeamus, June in Buffalo, and Dark Days Music.⁷

As a conductor he has made "guest appearances with ELISION, Ensemble Musikfabrik, and the International Contemporary Ensemble (ICE)" as well as served as the conductor for

⁵ Aaron Cassidy, "Bio," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com>

⁶ Ibid.

⁷ Ibid.

University of Huddersfield's New Music Ensemble and University Symphony Orchestra.⁸ Active as an author, he has contributed articles to the *New Music and Aesthetics in the 21st Century* series as well as to journals including *Sonic Ideas/Ideas Sónicas*, *Search Journal for New Music and Culture*, and *Contemporary Music Review*.⁹ He co-edited the book *Noise In And As Music*, published in 2013 by Huddersfield Press.¹⁰

Cassidy was born in Urbana, Illinois on July 1, 1976.¹¹ Raised in a family with an active musical life, he discovered an interest in singing early on. In an interview with ELISION's Daryl Buckley, he describes his mother Carolynne Mathis as his first music teacher.¹² In addition to receiving piano lessons from her, he was a student in a eurhythmics class she taught. Later when he was a boarding student at the American Boychoir School in Princeton, New Jersey, he sang with their choirs throughout the United States, Europe, and Asia. When his family left Princeton to move back to Dallas, Texas, Cassidy's interest in music led him to return to the school, continuing his studies as a boarding student.¹³

Music composition eventually overtook singing as his primary interest during his first year at Northwestern University.¹⁴ During his undergraduate years, he studied with Michael Pisaro and Jay Alan Yim, completing a Bachelor of Music in 1998.¹⁵ Following this, Cassidy attended the State University of New York at Buffalo as a Presidential Fellow, studying with David

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Evan Johnson, "Aaron Cassidy," Oxford Music Online, Accessed December 13, 2016, <http://www.oxfordmusiconline.com:80/subscriber/article/grove/music/2082324>

¹² Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015.

¹³ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

¹⁴ Ibid.

¹⁵ Oxford

Felder. Throughout his time as a student, he participated in master classes with composers including Franklin Cox, Pauline Oliveros, Marta Ptaszynska, Richard Rijnvos, Rodney Sharman, and Tristan Murail.¹⁶ His dissertation was a composition entitled *String Quartet* (2002) and was dedicated to the Berlin-based Kairos Quartett.¹⁷ He graduated with his PhD in 2003.¹⁸

In the abstract for *String Quartet*, Cassidy describes the compositional practices he employed during his time in Buffalo: “The vast majority of my work since late 1998 has centered on instrumental decoupling, an experimental process wherein the component parts of sound production on a given instrument are separated and stratified into rhythmically independent, ‘parametricized’ layers.”¹⁹ He continues about *String Quartet* saying, “the physical, visual nature of this work is critical. Here harmony is no longer the result of abstract relationships of pitches or intervals; instead, the physical disposition of the hand and fingers on the fingerboard drives the harmonic organization.” He concludes the final paragraph with a comment that especially continues to impact his work today: “The piece’s ‘material’ is not the pitches or rhythms created by the performers but rather the *actions employed* to create those sounds.”²⁰ Within *String Quartet* and its abstract, it is clear that Cassidy’s creative interest in sonic results drawn from carefully layered physical actions was already at work.

In addition to providing a window into his musical practices at the beginning of the 2000s, the acknowledgements section of the dissertation also indicates ties to colleagues with whom his work would be particularly associated with, including Wieland Hoban, Wolfram Schurig, Claus-

¹⁶ IRCAM, “Aaron Cassidy,” Accessed January 17, 2021, <http://brahms.ircam.fr/aaron-cassidy>

¹⁷ Aaron Cassidy, “String Quartet,” dissertation, University at Buffalo, State University of New York, 2002

¹⁸ Oxford

¹⁹ Cassidy Dissertation

²⁰ Ibid.

Steffen Mahnkopf, and (the previously mentioned) Franklin Cox. These associations are seen again with regard to Cassidy's 2002 contribution to the book series *New Music and Aesthetics in the 21st Century*. It is edited by Mahnkopf, Cox, and Schurig, and Hoban provides English and German translations for it. Cassidy's chapter, entitled "Interconnectivity and Abstraction: Metallic Dust as a Testing Ground for Monophonic and Structural Polyphonies," discusses *Metallic Dust*, a work for amplified bass clarinet from 1999. As indicated in Cassidy's dissertation abstract and later in Evan Johnson's biographical entry about Cassidy for New Grove Dictionary, *Metallic Dust* is the particular point where Cassidy invests in decoupling approaches—the ones he sees in the music of Klaus K. Hübler and Franklin Cox.²¹

In the years between graduating from University at Buffalo and beginning work at the University of Huddersfield in 2007, Cassidy was a Visiting Assistant Professor at Buffalo State College and lecturer at Northwestern University. Notable works from around this time include *The Crutch of Memory* (2004) for indeterminate string instrument, *I, purples, spat blood, laugh of beautiful lips* (2004-2006) for solo voice with live, computer-generated pitch material, and *the green is either* (2002-2003), a work consisting of three trios for seven players. In a new article from that time for *New Music and Aesthetics in the 21st Century*, he further explains the morphology that his music uses and how his notation supports it.²²

In the time after his arrival in Huddersfield, Cassidy's music has continued to draw attention. In 2008, Mahnkopf lists him among notable "Second Modernists" in his chapter "Second Modernity—An Attempted Assessment" in volume 6 of *New Music and Aesthetics in the*

²¹ Oxford

²² Claus-Steffen Mahnkopf, "Second Modernity—An Attempt at Self-Assessment," in *Facets of the Second Modernity*, eds. Claus-Steffen Mahnkopf, Franklin Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2008), 9-16.

21st Century alongside composers including Chaya Czernowin, Steven Kazuo Takasugi, and his future Huddersfield colleague Liza Lim. The premiere of *Second String Quartet* (2010) at Donaueschinger Musiktage by JACK Quartet and their American tour performing it and *String Quartet* drew attention from a number of people writing about contemporary music, including music writer Tim Rutherford-Johnson and violinist Irvine Arditti.²³

In recent years, major highlights include becoming Professor of Composition and Director of the Centre for Research in New Music (CeReNeM) at the University of Huddersfield and his inaugural professorial lecture entitled “Imagining a Non-Geometrical Rhythm.”²⁴ Works from this time include *the wreck of former boundaries* (2014-2016) with ELISION Ensemble and *A republic of spaces* (2018, rev. 2019) with line upon line. The first part of *A way of making ghosts* (2018-2020), *Self-Portrait, Three Times, Standing (15.3.1991-20.3.1991)* was premiered by ELISION Ensemble in 2019 in Buffalo, New York. The second part, *Self-Portrait, 1996*, was premiered in Cologne, Germany by Ensemble Musikfabrik in March 2020.

1.3 A Short Introduction to the History of *Second String Quartet*

Aaron Cassidy’s *Second String Quartet* was commissioned to be performed by JACK Quartet by “Südwestrundfunk for the Donaueschinger Musiktage 2010, with additional support from the Practice-Led and Applied Research Grant scheme of the Arts and Humanities Research

²³ Tim Rutherford-Johnson, “A Journey to Aaron Cassidy’s Second String Quartet,” NewMusicBox, Accessed January 20, 2020, <https://nmbx.newmusicusa.org/a-journey-to-aaron-cassidys-second-string-quartet/>

Irvine Arditti and Robert HP Platz, *Techniques of Violin Playing* (Kassel: Bärenreiter, 2013), 80.

²⁴ Aaron Cassidy, “Imagining A Non-Geometrical Rhythm,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

Council (UK) as well as research grant support from the Music Department of the University of Huddersfield.”²⁵ Cassidy started composing the quartet in Fall 2009 and completed it in June 2010. JACK Quartet premiered it on October 16, 2010 as part of Donaueschinger Musiktage, broadcast on German radio on SWR-2 that day, and subsequently on NDR and SR-2. As of 2021, all additional performances of the quartet have been by JACK Quartet during 2011. After a performance of *Second String Quartet* at the Ultraschall Festival in Berlin in January 2011, JACK toured it through the United States in February of that year. The quartet received its US premiere as part of the Monday Evening Concerts series in Los Angeles on February 14th, and had subsequent performances at Carnegie Mellon University, Oberlin Conservatory, and University at Buffalo. The most recent performance of *Second String Quartet* as of this writing was on October 26, 2011 at Columbia University’s Miller Theater.

Cassidy has written about how *Second String Quartet* appeared as a next step in his ongoing experimental inquiries with decoupling. He reflects on the decade of compositional work that led to it in *Second String Quartet*’s program note (itself a shortened version of the program booklet essay he wrote at the request of Armin Köhler, former Artistic Director of Donaueschingen):²⁶

The story of this work starts with my String Quartet of 2002, which involved a focusing and minimizing of earlier experiments I had made in instrumental ‘decoupling’, a separation of the various activities of instrumental sound production (drawing on work by Hübler, Barrett, Ferneyhough, and others). I had been working with this approach to instrumentation for 2-3 years by 2002, but String Quartet involved a significant reduction in available physical movements and, concomitantly, a new way of thinking about material (here prioritizing physical motions to the point that these motions themselves were materials, rather than means to an end).

Cassidy describes the earlier quartet as being something that was initially about refining or

²⁵ Aaron Cassidy, “Second String Quartet,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/second-string-quartet/>

²⁶ Ibid.

“closing in” on what he had learned in those early pieces, but that instead wound up being an “opening out” and “a springboard for eight years of new experimentation.”²⁷ This brought forth a “lengthy but extremely fruitful process of developing tablature notations which better represented and communicated the role of physicality as material” that leads directly to *Second String Quartet*.²⁸

As he describes in his article “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” these competing inclinations of continued experimentation and refining what has been learned from past inquiries and musical traditions are both present in *Second String Quartet*. Perhaps most interestingly is how he goes about refining this ongoing tablature project through a “focusing and condensation” of what has he come across in works such as *The Crutch of Memory* (2004) and *The Pleats of Matter* (2007).²⁹

While *Second String Quartet* does not completely let go of the notational facade of New Complexity and Hübler’s multi-stave decoupling, it reflects Cassidy’s ongoing pursuit of how to deploy contrapuntal physical behaviors. Instead of continuing to build outwards with more staves and more information as his predecessors have, Cassidy’s approach in *Second String Quartet* reconsiders what kinds of material are needed to achieve these physical gestures and how to better capture these transient qualities of performer manipulating an instrument:³⁰

Whereas in my earlier works for strings each individual layer of planar motion (x, y, and z axis motions for both the right and left hands) was notated independently on a separate staff, here these movements are compressed onto a single, multi-

²⁷ Ibid.

²⁸ Ibid.

²⁹ Aaron Cassidy, “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” *Contemporary Music Review* 32 (2013): 305-323.

³⁰ String Quartet as Laboratory 305

colored staff. This simpler, more direct, more immediate presentation of materials opened up an extremely exciting new range of musical materials for me.

The possibilities of this different approach toward experimental tablatures allowed for new avenues of creativity for him, finding new gestures but also “new ways of thinking about how those materials can be shared and exchanged in the unique polyphonic world of the string quartet.”³¹ Within the quartet itself, this multi-colored unified staff brings new emphasis on the multiple dimensions of physicality at the heart of his work. By seeing the different kinds of physical acts together, twisting and folding at different rates rather than coordinating them as discrete elements on cleanly divided staves, the informed blur of body and its interactions begins to displace the orderly yet irrational guidance from any rhythmic stratum. In the long-term, these acts of “focusing and condensation” of notation led to an increasingly graphical turn that focuses closer in on the choreographic goals within his predecessors' innovative use of multi-stave rhythmic strata.

In the following years he would “open out” by more openly discussing the longtime experimentalist practices within his music and the indeterminacy that was always present when realizing them. While doing so, he also “closes in” on these inquiries about tablature and physicality by leaving behind the complex rhythmic strata that was already beginning to fade into the background of his compositional practices. Rather than being a simple refinement of earlier work, *Second String Quartet* provided Cassidy with another “springboard” for his experimentalism that has in some ways continued on in his practice until his current compositions in 2021.

³¹ Aaron Cassidy, “Second String Quartet,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/second-string-quartet/>

Chapter Two: Cassidy as an Experimental Composer

2.1 Locating Cassidy's Music and Influences

At the time of writing this document, coverage of Aaron Cassidy's aesthetics is both codified by numerous articles in the first decade of the 2000s and has received reframing in Cassidy's recent writing and in the pages of new contemporary music survey books by Tim Rutherford-Johnson and Jennie Gottschalk.³² While what the former and latter discuss is not explicitly contradictory, the 2010s have been a time for increased clarity and reflection about Cassidy's two decades of ongoing experimental practices with concepts such as prescriptive notation tablature, decoupling, and their indeterminate outcomes.³³

Cassidy's music draws heavily from the different creative endeavors of Post-Serial and American Experimental composers, offering an example of the kind of personalized practice found in today's contemporary music that allows distinct approaches and aesthetics to meld together. While the influences from New Complexity-associated composers such as Richard Barrett (1959-) and Brian Ferneyhough (1943-) are seen in his works' processes and notation, the specific impetus for Cassidy's practices is the music of Klaus K. Hübler (1956-2018) and Franklin Cox (1961-). In a passage from *Music After the Fall*, Rutherford-Johnson summarizes those innovations of Hübler's that inspire Cassidy's music:³⁴

Around the turn of the decade [the 1980s], Hübler began to develop a new approach to composing musical gestures, based on part of his own extensive studies of Renaissance and Baroque music. His key innovation, which built on ideas already present in the works by Xenakis, Lachenmann, and Ferneyhough,

³² Aaron Cassidy, "I Am An Experimental Composer," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/experimental-composer/>

³³ Aaron Cassidy, "metallic dust," Aaron Cassidy Personal Website, Self-Published, Accessed August 7, 2020, <http://aaroncassidy.com/music/metallicdust.htm>

³⁴ Tim Rutherford-Johnson, *Music After the Fall*, (Oakland, University of California, 2017) 104.

was to conceive of the playing of an instrument not as a combination of actions towards a single end (i.e. sounding a particular note) but a polyphony of differently moving body parts—left hand, right hand, mouth, diaphragm, and so on—that might be “decoupled” from one another and composed separately.

Although both Hübler and Cox studied with Ferneyhough themselves, their works’ distance, individual creativity, and increasing departure from any static, academic impression of New Complexity is important to stress when reflecting on their impact on Cassidy’s starting point. That is to say, their methods inspire the initial questions and means of Cassidy’s inquiries about decoupling and its representation via prescriptive notation, but do not limit or entirely define where he has taken them since. Rather, with the benefit of hindsight, we can see how throughout these two decades, Cassidy’s music has continued to question the initial frameworks he began with. For example, while prescriptive notation was already being employed by Barrett, Hübler, and Cox, Cassidy has departed from more standard elements found in conventional scores, even relative to the work in New Complexity circles, to better solve his particular questions about notation and physical choreography that his projects present him with.³⁵

Other important sources of inspiration for Cassidy include experimentalists such as John Cage (1912-1992), Morton Feldman (1926-1987), Peter Ablinger (1959-), and Alvin Lucier (1931-).³⁶ Notably, these composers tend to be both curious about the experimental possibilities of music making yet have rigorous, individualized creative processes.³⁷ Most also frequently

³⁵ Mieko Kanno, “Prescriptive notation: Limits and challenges,” in *Contemporary Music Review*. Vol 26, (2007): 231-254

³⁶ Experimental Composer; Aaron Cassidy, interview by author, Huddersfield, October 24, 2019.

³⁷ James Pritchett, *The Music of John Cage*, New York: Cambridge University Press 1993, p. 74–104.;

Morton Feldman, “Crippled Symmetry,” *Give My Regards to Eighth Street*, ed. B.H. Friedman (Cambridge, Exact Change, 2000), 134–149.

utilize aesthetically rich, specifically designed notations or texts to draw out indeterminate music in performance, as is particularly seen in works by Cage and Feldman.³⁸ In contrast, for example, Cassidy is not especially inspired by the modes of experimentation or instrument builder/tuning theorist sensibilities of Harry Partch (1901-1974) even though Cassidy did explore using microtonality as a means toward his compositional goals in *String Quartet* (2002).³⁹

In the same way that Hübler and Cox's approaches inspire the processes within Cassidy's compositions, their works, including Hübler's *Opus Breve* and Cox's *Clairvoyance*, are also useful in illustrating the baseline of Cassidy's sonic expression.⁴⁰ By disrupting the typical mechanical or physical relationships with sound production, tense, unstable, and fleeting circumstances permeate their works. Cassidy's multi-axial instrumental (and vocal) choreography brings forth distorted grinding, faint whispering, and abrupt glissandi. These gestures are displayed with the kind of structural care found in Post-Serial music, balancing what seems "too much" across his usually short, single movement chamber works for instruments (and occasionally, voice). While presented in bouquets of distortion, the music often demonstrates considerable clarity regarding how leading and contrapuntal lines noisily proceed. Cassidy's current biography on his website further explicates the furor and fragility heard in the relationship between his materials and the music they create:⁴¹

His interest in notation has always been driven by an approach to musical material that is deeply physical, resulting in a soundworld that is expressive and energetic, fractured but dancelike, sometimes violently mangled and sometimes fragile and

³⁸ Kyle Gann, "In Dispraise of Efficiency: Morton Feldman," Kyle Gann Personal Website, Self-Published, Accessed July 8, 2020, <https://www.kylegann.com/Feldman-DispraiseofEfficiency.html>

³⁹ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

⁴⁰ Aaron Cassidy, "metallic dust," Aaron Cassidy Personal Website, Self-Published, Accessed August 7, 2020, <http://aaroncassidy.com/music/metallicdust.htm>

⁴¹ Aaron Cassidy, "Bio," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com>

vulnerable, but always grounded in a fascination with the sounds and textures that become possible when we allow ourselves to rethink our assumptions about what might constitute musical material.

While Cassidy has consistently shared about important elements in his practice in published writings since 2002, his language about the experimentalism within his music becomes especially overt starting in 2012 with a lecture to Belgium’s Orpheus Research Centre in Music (ORCiM). Entitled “I Am An Experimental Composer.” Cassidy acknowledges at the beginning of his presentation that at an early point in his career, he was talked out of using the words “experimental composer” by a German colleague. Despite this, Cassidy relates that:⁴²

...the fact has remained that what I do as a composer – and why I do it – is driven by a dedicated prioritization of experimentation. Virtually every stage of the compositional process, and indeed the compositions themselves and their performances, revolve around an effort to foreground a practice of experimentation – that is, a process that is driven by questions, rather than answers, hypotheses, rather than conclusions. Most critically, what has been central to my work is the fact that the work itself is the experiment, rather than what seems to me to be a more common practice of exploring/experimenting before the work, with the composition appearing as a statement or answer or at least provisional conclusion.

Cassidy continues, highlighting the large-scale modes of experimentation within his process. While those reading earlier articles about Cassidy’s compositions may not be entirely surprised by the methods he describes, his lecture presents a more complete picture of his process. In addition, the following list lines up neatly with the workflow and materials he uses in creating *Second String Quartet*, which are discussed in detail in Chapter Seven:⁴³

⁴² Aaron Cassidy, “I Am An Experimental Composer,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/experimental-composer/>

⁴³ Ibid.

1. experiment in compositional practice (experimentation through discovery, emergence, investigation; that is, ‘the work as experiment’)
2. experiment in performance (experimentation through unpredictability, instability, and indeterminacy)
3. issues and questions – both artistic and ethical – that emerge from this approach

When describing experimentation within his writing process, he takes a somewhat Cagean tone, stating that, “critically, the form of a piece is not something I decide, as such – sectional divisions, durations, tempi all have a life of their own that I then have a responsibility to react to and ‘articulate’ through other lower-level compositional decisions.” This in particular refers to the “constraint window” referred to as “Constraint Schemata” or “windows” in other writings—the spaces where Cassidy creatively sculpts the ramifications of the local looping processes he has unleashed:⁴⁴

My compositional method is driven by a ‘ground-up’ construction process – as opposed to ‘top-down’ – that forces all material (form, shape, scale, interaction between voices, gesture, dynamics, register, etc.) to emerge. To take a reasonably simple example, structure in my work – tempo, sectional divisions, phrase lengths, meter – all emerge from the ground up from the intersection of local level processes, typically stacks of short loops of varying lengths. These numerical cycles – which, not coincidentally, are constructed with random number generators – each spin at their own rates, and points at which the cycles click into nodes of alignment generate higher-level divisions and groupings. (The more cyclic nodes that realign, the heavier the ‘weight’ of that higher-level division ... and from there, those higher-level divisions form their own cycles, and their own nodes at points of alignment – this continues until the overall shape and scale of the piece appears.)

Importantly, despite being constructed with these looping processes, they more resemble isorhythmic practices such as ones from Renaissance music that inspired Hübler in that they generate distinct ongoing material or circumstances rather than obvious, audible loops.

⁴⁴ Ibid.

Metaphorically, we do not notice the clock gears spinning against one another but hear how their teeth grind and slip over time. For example, after Cassidy creates the initial looping number pattern, he unleashes it to create the foundations of *Second String Quartet*. After that process yields the underlying structures of the quartet, a slew of random numbers paired with another set of loops is the primary means used to build the extensive network of motivic transformations. Once these activities are complete, Cassidy then focuses on his “responsibility to react to and ‘articulate’ through other lower-level compositional decisions.”⁴⁵

While featuring a less declamatory title, his 2013 article “The String Quartet as Laboratory and Playground For Experimentation and Tradition” captures the essence of how Cassidy’s music reflects on 20th century (and earlier) innovations and employs rigorous examination to the possibilities and questions he encounters.⁴⁶ While scholarly articles continue to use labels such as New Complexity or the more recently coined “complexist” to describe Cassidy’s work, the last two decades have demonstrated Cassidy’s stronger allegiance to experimenting with what the body can do in decoupled spaces, how notation can reveal new opportunities for this, and an examination of the resultant sound.⁴⁷

Cassidy’s 2015 Inaugural Professorial Lecture at the University of Huddersfield “Imagining a Non-Geometrical Rhythm” continues this trend. Presented from a general vantage point of a researcher reflecting on previous and current inquiries, which in this case are his various extended tablatures, Cassidy discusses specific and wide-reaching changes within his

⁴⁵ Ibid.

⁴⁶ Aaron Cassidy, “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” *Contemporary Music Review* 32 (2013): 305-323.

⁴⁷ Benedict Weisser, “Notational Practice in Contemporary Music: A Critique of Three Compositional Models (Luciano Berio, John Cage, and Brian Ferneyhough),” (PhD diss., The City University of New York, 1998).

compositions based on the methods described above:⁴⁸

Even *more* recently, the primacy of these shifting, transitional, movements has been brought further to the notational foreground. Starting in 2010, with my *Second String Quartet*, I have been working with a multi-coloured, multi-layered tablature notation that, like the earlier tablature work, indicates the movements of the performers rather than the sonic results of those movements, but here there has been an effort to create a more direct, more communicative, and frankly *simpler* notation for those movements.

He also comments on consistent aspects within his practice regarding movement and sound, and how they are rooted in how his music is responding to traditional ways rhythm and other elements are used in Classical music and similar traditions:⁴⁹

Ironically, given this predilection for the horizontal and vertical, my music has always been about in-between states. It has always been about the glissando, the timbral transition, the movement between bow positions or pressures, the change from one embouchure tension to another, the constant shift from one dynamic to another. That is to say, it has always been about the diagonal. The points on either side have often been immaterial—they are simply the starting and stopping points of unstable, transitional movements. From the beginning, this interest in transitional states has, to a certain extent, fought against the notational conventions of Western musical rhythms, which depict the *onset* and *duration* of a musical event in a single notational mark. Any notation of what happens *after* the onset relies on other notational layers, and implicitly, one might argue, assigns a certain secondary status to those additional instructions. The ‘note’ is primary, and whatever dynamic or timbral change that follows is purely subsidiary.

The “non-geometrical rhythm” described in the title of the talk, particularly comes to bear on his then-newest work *The wreck of former boundaries*, which replaces previous conventional

⁴⁸ Aaron Cassidy, “Imagining A Non-Geometrical Rhythm,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

⁴⁹ Ibid.

rhythmic systems based on counting for ones based on movement and resistance within set time durations.⁵⁰

The manner in which Cassidy closes his talk showcases his exuberance and ongoing curiosity. Reflecting on *Second String Quartet*, he is both pleased and frustrated with the outcome of that particular endeavor. Additionally, he lays bare how no matter what avenue his notation experiments take him down, avoiding “flat” time-space notation (as in attack-centered conventional Western notation) is a consistent value.⁵¹

I also don’t particularly like the multi-stave approach in this system. I’m looking at ways of integrating the information into a more unified image, but doing so in a way that prevents the image from simply becoming a flat, graphical, time-space notation. I’ve experimented with various approaches to compressing the material into a single staff, but so far in each case the nested, contingent element of the notation is removed and it loses the resistance, twisting, and magnetic weighting present in the current proposed version. In any case, I’ll keep working.

In addition to Cassidy’s speeches and writing, Rutherford-Johnson and Gottschalk each have presented Cassidy in circumstances in their books that place his music in different terms. As quoted earlier from *Music After the Fall*, Rutherford-Johnson discusses Hübler’s approach precisely. He uses it to segue to Cassidy’s music and how it employs decoupling within in a chapter entitled “Fluidity: Digital Translations, Displacements, and Journeys.”⁵² Importantly, both of these composers are not mentioned in the later “Superabundance: Spectacle, Scale, and Excess” chapter, where he writes explicitly about New Complexity.⁵³ Instead, he essentially

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Tim Rutherford-Johnson, *Music After the Fall*, (Oakland, University of California, 2017) 87–119.

⁵³ *Music After the Fall* 162-205.

anoints Claus-Steffen Mahnkopf as a sort of generational successor to Ferneyhough.⁵⁴ While this does not deny the relationship between Cassidy's works and New Complexity, it is part of an emerging record noting how Cassidy's music has taken a distinct path starting with the Hübler and moving onward:⁵⁵

The sound of Cassidy's music is of a surface warped, folded, and scored beyond all recognition, like a photograph blistering against a flame. It is like a sonic version of the curved metallic surface of a Frank Gehry building or the smeared paint streaks of a Francis Bacon portrait, both artists Cassidy has invoked in descriptions of his work. The ear struggles to grasp a semantic structure, patterns of repetition or opposition that would suggest an underlying grammar, and instead listens in the moment, hearing the motion of continual uprooting.

Although referencing other artworks or media when describing someone's music can risk further confusing a reader or make the subject seem more esoteric, Rutherford-Johnson's invocation of Francis Bacon (1909-1992) is especially helpful. Bacon's visceral, physically grotesque paintings have served as extramusical inspiration for a number of Cassidy's works' titles and content throughout his career, rivaling only how often Cassidy refers to the writing of philosopher Gilles Deleuze (1925-1995).⁵⁶ As a further example of the impact of these two influences on Cassidy, the program note for his composition *And the scream, Bacon's scream, is the operation through which the entire body escapes through the mouth (or, Three Studies for Figures at the Base of a Crucifixion)* includes a number of quotes from Deleuze's *Francis Bacon: the Logic of Sensation*.⁵⁷

⁵⁴ *Music After the Fall* 179.

⁵⁵ *Music After the Fall* 104

⁵⁶ Aaron Cassidy, "A Painter of Figures in Rooms," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/a-painter-of-figures-in-rooms/>

⁵⁷ Aaron Cassidy, "And the scream, Bacon's scream, is the operation through which the entire body escapes through the mouth (or, Three Studies for Figures at the Base of a

Deleuze's impact on the trend of "musical materialism" in contemporary composers' works, with Cassidy's music as a particular example, is similarly being more closely examined at this time by contemporary music scholars.⁵⁸ However, for the purposes of reflecting on this particular connection, guitarist Diego Castro-Magas' 2012 article "Deleuze's Fold in the Performing Practice of Aaron Cassidy's *The Pleats of Matter*" provides a useful baseline for what inspiration Cassidy takes from Deleuze.⁵⁹ After introducing how the work's title is distinctly drawn from Deleuze's *The Fold: Leibniz and the Baroque*, Castro-Magas draws on an interview he did with Cassidy while he was studying at the University of Huddersfield. Cassidy refers to how the limitations his processes put on the fret space and actions indicated within them, saying, "these are not notes as in 'sounds', but as 'folds.'"⁶⁰ He continues, discussing how:⁶¹

... 'material' is very rarely present as such, or at least, musical material is never present as an object, as a defined and delimited event or entity. Instead, material is the *result* of forces, flows and energies—movements of fingers, strings, elbows, and feet—that push against boundary spaces on the instrument that are themselves in flux. The collisions and tensions between these 'movement spaces' and topographical 'boundary spaces' force a *folding*.

In another revealing portion of his article, Castro-Magas describes the opening line of Deleuze's chapter. The passage he cites in Deleuze's writing, aside from the reference to "The Baroque," almost reads as if it were Cassidy writing about his process: "The Baroque refers not to an essence but rather to an operative function, to a trait. It endlessly produces folds. It does not

Crucifixion)," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/and-the-scream/>

⁵⁸ Matthew Sergeant, Isabella van Elferen, and Samuel Wilson, "Introduction—Musical Materialisms (Plural)," *Contemporary Music Review* 39, Issue 5 (2020): 517–525.

⁵⁹ Diego Castro-Magas, "Deleuze's Fold in the Performing Practice of Aaron Cassidy's *The Pleats of Matter*," *The Dark Precursor* 1 (2017): 56-66.

⁶⁰ Castro-Magas 62

⁶¹ Castro-Magas 62

invent things....Yet the Baroque trait twists and turns its folds, pushing them to infinity fold over fold, one upon another.”⁶²

This notion within Deleuze's introductory remark of a process that makes endless folds runs parallel to how Cassidy's use of ongoing, overlapping looping processes to situate so much of his work. In general, Deleuze and his examples of Leibniz's Baroque House serve Cassidy as extended metaphors for the deep disconnect between the physical and the sonic. Castro-Magas' article concludes by pairing Deleuze's "pleats of matter" with Cassidy's prescriptive notation and actions and Deleuze's "folds of the soul" with Cassidy sonic results.⁶³

Gottschalk's writing in *Experimental Music Since 1970* provides a further departure from tropes about Cassidy's work from the previous decade. Writing within a context that seeks to better shine a light on the numerous expressions of experimental music beyond the venerated New York School (Cage, Feldman, Wolff, and Brown), the book surveys different kinds of experimental practitioners from around the world.⁶⁴ In addition to the pages in which Gottschalk covers Cassidy directly, her opening chapters lay bare a more inclusive set of definitions for modes of experimentation to better discuss recent and contemporary practices.⁶⁵ For example, alongside the Cagean "release of control" variant of indeterminacy, Gottschalk profiles four others, including a Tudorian one focused on "imitating nature," and one about "prescribed actions, varied consequences," the latter of which especially reflects the partnership in Cassidy's music of specific, rigorous work with unstable, energetic outcomes.⁶⁶

⁶² Gilles Deleuze, *The Fold: Leibniz and the Baroque*, trans. Tom Conley (London: The Athlone Press Ltd. 1993), 3.

⁶³ Castro-Magas 66

⁶⁴ Jennie Gottschalk, *Experimental Music Since 1970*, (New York, Bloomsbury Academic, 2016) 6–7

⁶⁵ Gottschalk 1–7

⁶⁶ Gottschalk 8–20

Gottschalk discusses Cassidy's work within a chapter entitled "Physicalities" in a section focused on "physicalities of performance." Gone is any mention of typical 20th century pedigree and in its place is a direct discussion of experimental physical inputs and sonic outputs of the music. Cassidy is grouped with other musicians whose "works make the physical actions of the performer a fundamental point of tension or interest in their encounters with thresholds of audibility, capability, and raw physicality." In addition to Cassidy, his longtime colleague, composer Evan Johnson, as well as Neil Luck, Simon Steen-Anderson, and Phil Minton are included in this section.⁶⁷

In Aaron Cassidy's work, effort is not always rewarded with sounding results either. Cassidy separately notates multiple parameters of playing as independent streams of action that act variously with or against each other as obstruction, tension, or confluence. His work operates in a network of force fields, energy, effort, rawness, and exposure. Where artifice, control, and conventional beauty are lost, broken textures, interrupted flows, wasted efforts, and awkward constrictions are found instead, revealing a raw power of their own."

Gottschalk emphasizes the indeterminacy housed within his works, such as *Being itself a catastrophe, the diagram must not create a catastrophe* (2007-2009) where the oboe and clarinet embouchure movements will provide noticeably different results in multiple performances.⁶⁸ Similarly, while noting the changes in notation approaches between *The Crutch of Memory* and *Second String Quartet*, she maintains focus on how decisive this interruptive, multi-layer choreography is to his music as a whole.⁶⁹ As she puts it, his work has "strands of activity that could be separately analyzed, but the piece does not really exist until these parameters are physically intercutting one another."⁷⁰

⁶⁷ Gottschalk 79

⁶⁸ Gottschalk 81

⁶⁹ Gottschalk 81

⁷⁰ Gottschalk 82

Pending further large shifts in Cassidy's practice, this emphasis on experimental and physical aspects of his music is likely to be the subject of future writing about Cassidy. As I found while interviewing his collaborators for Chapter Six's overview of preparation and interpretation strategies, younger, American performers such as ELISION Ensemble's bassist Kathryn Schulmeister and trombonist/composer Weston Olencki use their understanding of this to be creative, innovative, and playful when learning, returning to, or performing the works. In doing so, their efforts are part of the experimentation that fosters Cassidy's creativity, and continues on in performances throughout the United States, Europe, and Australia.

2.2 Three Foundational Concepts in Cassidy's Music

Aaron Cassidy's music generally employs these three concepts:

1. The composition of the work, notation of the score, and the performance of that score are experimental musical acts.
2. His scores almost exclusively utilize decoupled physical actions as the musical material. They are notated in prescriptive notation where the actions are indicated but the resulting sounds are not.
3. The contrapuntal interactions and collisions of the different parts of performers' decoupled actions (i.e. left hand doing certain finger pressures and lateral movements against the right-hand bow pressures and bowing up and across the string) result in sonically indeterminate yet precisely coordinated musical gestures. Specifically, the music's particular sound world arises from how the decoupled layers of actions blur, bend, and morph the individual musical elements into unstable, sputtering, wheezing gestures. While an individual rhythmic line from the many simultaneous layers played by an individual performer is often not audible, the composite gesture's entrance, duration, and exit is. Similarly, even though the contents of the gestures move

in wild, transitory ways, the gestures themselves exist within a fixed point in the score and performance.

2.3 Experiments in Notation

While Cassidy's bold, inquisitive notation has been carefully discussed by scholars including Mieko Kanno, Christopher Redgate, and Tim Rutherford-Johnson, a moment from one of my interviews with Cassidy in Huddersfield may shed further light on the impact of experimental practices in notation on his compositions.

As we talked in his office about his practices, he stood up in mid-thought and retrieved a copy of Morton Feldman's *Give My Regards to Eighth Street* from a nearby bookshelf. He turned the pages of the collection of Feldman's writings to the essay entitled "Crippled Symmetry." Within it, he explained, was a particular passage that had been especially clarifying and inspirational when finding his own musical trajectory. Next to two large exclamation points he had drawn into the margin of the book years before, Cassidy pointed a finger at the heavily underlined text that read: "the degree to which a music's notation is responsible for much of its composition itself, is one of history's greatest secrets."⁷¹

In the passage, Feldman argues that notation has driven compositional innovation rather than the other way around, asserting that:⁷²

Many composers and theorists will disagree with the hierarchical prominence I attribute to the notation's effect on composition. They would argue that new musical concepts, resulting in innovative systems, necessitated changes in notation. This is then referred to as, say, a new 'piano style,' as Leibowitz did in discussing an important early piano piece (Op. 11, 1909) by Schoenberg. This interpretation cannot be refuted, but some room should be left open to question it. My speculation over how a 'notational look' may have contributed to the music of Webern, or for that matter Boulez (who, incidentally, has composed a work called

⁷¹ Feldman 144

⁷² Feldman 144-145

Notations), might appear dubious. But notation can have an aspect of ‘roleplaying,’ and I feel it is a strong voice, if not onstage, then off.

This “strong voice” of notation has resonated throughout his work in the last two decades. In particular, this is seen in his persistent use of prescriptive notation to write works with decoupled actions as he encountered them in works by Hübler and Cox. Those writing about Cassidy’s work, even as early as Mieko Kanno, take special care to note how Cassidy’s notation (as in his earlier *The Crutch of Memory*) of these physical actions unleashes new, and at times, unpredictable sonic possibilities.⁷³

In “I Am An Experimental Composer,” Cassidy writes extensively about the debt his scores’ indeterminacy has to American Experimentalist composers:⁷⁴

Most significantly, the near elimination of direct score-sound compliance in these works owes a substantial debt to the notational practice of American Experimental Tradition, particularly from Cage, but also from Feldman’s use of notation as a destabilizing force. Because it is action that is specified in these works, and because this action is often intentionally vague/imprecise in its actual application in its interaction with the instrumental mechanism (most notably in the finger movements in the oboe/clarinet duo), and because there are frequently several levels of similarly imprecise activity overlaid on top of one another, the sounds resulting from these actions will, even for the player, often be surprising, unpredictable, and unstable.

While these notation-related topics within *Second String Quartet* are discussed in detail later in this document’s Chapter Three, his concerns and questioning regarding his experiments in notation are at the heart of the creation of the quartet. In reflecting on his past string works, Cassidy was inspired by questions about how to continue notating decoupled physical actions while integrating them into a more fluid single notational space.⁷⁵ Similarly, in the works that

⁷³ Kanno 251

⁷⁴ Experimental Composer

⁷⁵ Aaron Cassidy, “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” *Contemporary Music Review* 32 (2013): 312-313.

followed its premiere, Cassidy has continued to explore, as noted above in the discussion of his inaugural professional lecture, ways of letting go of less pertinent aspects of notational materials in favor of ones that better unleash the multi-axial expressive physical energies he seeks from performers.⁷⁶

As part of profiling the experimentation and changes in his notation, one might consider a loose parallel between how both Feldman and Cassidy remained at work on particular materials throughout their careers but radically altered their notational practice over time.⁷⁷ When Feldman found frustration in how his earlier box notations allowed too much freedom for performers, he moved closer to conventional notation while embedding it with deliberately slippery inconsistencies and provocative nuances.⁷⁸ (As indicated in the quote above and throughout my interviews with Cassidy, he is aware of Feldman’s strategies.)⁷⁹

Cassidy, meanwhile, stands out when viewing the Post-Serial trends he has been associated with, especially decoupling, as they tend to be ones that demand more staves, more parameters, more information. Rather than continue that trend, Cassidy approaches decoupled materials from a kind of centripetal perspective. He sorts and emphasizes the most necessary elements in his notational experiments, recentering them on what serves the particular piece’s goals. Cassidy describes this in the article “String Quartet As Laboratory” where he describes how he balances acts of experimentation and consolidation, which he calls “opening out/closing

⁷⁶ Aaron Cassidy, “Imagining A Non-Geometrical Rhythm,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

⁷⁷ Morton Feldman, *Morton Feldman: Essays - Autobiography*, ed. Walter Zimmermann (Beginner Press, Kerpen, 1985) 38-39.

⁷⁸ Gann

⁷⁹ Experimental Composer

in.”⁸⁰ Gottschalk voices similar comments about how “there is a strong practical concern for how readable a score is for a musician.”⁸¹

An intriguing example of this centripetal quality comes from his 2011 YouTube interview with his former teacher composer Michael Pisaro (1961-).⁸² Cassidy describes how while creating his first string quartet in the early 2000s, he spent considerable time examining left-hand finger positions and transcribing them down to the eighth-tone to better notate what he was after. The more time he spent with the material, he found that the hand gestures and finger widths employed were far more important to him than the specific microtonal pitches. He discontinued using microtonal guide pitches in future works, calling it a “dishonest notation.”⁸³ Cassidy uses similar language when discussing the increasingly overt indeterminacy of his earlier works in his 2008 “Determinate Action/Indeterminate Sound” article.⁸⁴

So, while Cassidy is not interested in allowing the scores to go the way of the flat musical shapes he describes in his 2015 lecture, his notation has “opened out” and “closed in,” only to focus more on its physical, contrapuntal qualities. In leaving pitch, nested tuplets, time signatures and other elements behind, the tablature retains Cassidy’s decoupled interests while using graphic notation of movement and tension to pursue them.⁸⁵ When listening to more recent Cassidy works, the new notational solutions do not suffer from lack of guide pitches as in *String Quartet* or the multiple nested tuplet-laden rhythmic strata of *Second String Quartet*. Instead,

⁸⁰ String Quartet as Laboratory

⁸¹ Gottschalk 81

⁸² mondayeveningconcert, “MEC Music Talk: Aaron Cassidy and Michael Pisaro,” Feb. 7, 2011, video, 16:49, https://www.youtube.com/watch?v=4T4dbDsM_5o.

⁸³ Ibid.

⁸⁴ Aaron Cassidy, “Determinate Action/Indeterminate Sound Tablature and Chance in Several Recent Works,” in *Facets of the Second Modernity* eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2008), 17-32.

⁸⁵ Non-Geometrical Rhythm

they seem to be increasingly potent manifestations of his aesthetic's physical tension and sonic rawness.

2.4 Physical Actions as Material

Guitarist and ELISION Ensemble artistic director Daryl Buckley begins explaining the role of physical motion in Cassidy's music in a succinct manner: "he composes sound through the composition of movement."⁸⁶ Buckley builds on Cassidy's longstanding discussion of "performative physicality and choreography as morphological determinants," where the body and motion are the material rather than pitch or rhythm.⁸⁷ He highlights how Cassidy pursues this approach especially because it offers unexpected and different solutions he might not otherwise find. Buckley shares an example of this process, where a large gesture collides with a particularly confined "constraint window."⁸⁸

So for example, if I had something really simple like a maximal say UP-DOWN. . . and we took the guitar fingerboard; if I have the entire space that is available that movement generates one particular kind of energy, but when I think about that movement in a small space, in a constricted space. It's an energy. And so the gesture is different if it happens at the top of the fingerboard or the bottom of the fingerboard because of how it relates to the center of the body, changing those energies.

These kinds of choreographic solutions, made within Cassidy's "constraint windows," have the body moving in combinations of overlapping presses, squeezes, contractions, strains, and releases. They create distortions and filters that constitute the sounding work. Castro-Magas,

⁸⁶ Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015: 23.

⁸⁷ Ibid.

⁸⁸ Ibid.

building on Buckley's previous writing, concurs stating that "body movement is thus central in Cassidy's music, as a generator of energy by itself."⁸⁹

While Cassidy's notations remain the most-often discussed part of his practice, the decoupled choreography of his work is becoming more explicitly highlighted. This has led to him being grouped with composers such as his longtime colleague Evan Johnson (1980-) and former student Timothy McCormack (1984-). Buckley has begun referring to them as the "American Choreographic School."⁹⁰ Similarly, the Fall 2020 issue of *Contemporary Music Review*, refers to works by Cassidy and McCormack as a significant example of a thread of the multiple examples of "musical materialisms" present in today's contemporary music spaces.⁹¹ As part of that issue, Luc Döbereiner contributes an article that discusses works of Lachenmann, Georges Aperghis, Ashley Fure, and Cassidy within the context of "Materiality, Contingency and Emergence of Compositional Material."⁹²

On a small but perhaps provocative note about Cassidy, choreography, and experimentalism, while I was informally discussing Cassidy and his experimentalism with composer and Cage scholar William Brooks, he suggested an intriguing additional take. He brought up how, in his view, Cassidy's work is closer to choreographer Merce Cunningham's contingencies than Cage's version of indeterminacy.⁹³ As he described it, the resultant music is

⁸⁹ Castro-Magas 61

⁹⁰ Daryl Buckley, interview by Matthew Lorenzon, "ELISION ensemble: a bold 30 year adventure," realtime, Accessed September 8, 2020, <https://www.realtime.org.au/elision-ensemble-a-bold-30-year-adventure/>

⁹¹ Sergeant, van Elferen, Wilson 517–525.

⁹² Luc Döbereiner, "Materiality, Contingency and Emergence of Compositional Material," *Contemporary Music Review* 39, Issue 5 (2020): 602-617.

⁹³ William Brooks, email message to author, Jan. 5, 2021.

closer to the incidents caused by Cunningham's choreography rather than the large-scale unknowns of Cage's indeterminacy.

Brooks' observations certainly appear to align with Gottschalk's invocation of "prescribed actions, varied consequences." Gottschalk's approach to a more-widely defined indeterminacy is especially helpful in communicating about Cassidy's work because it is rooted in a wider, more inclusive practice while not entirely letting go of these more well-known experimental reference points. Tracy McMullen, for example, has written about how Cage and Cunningham had significantly different feelings about the body in art marking. As she relates, Cage was initially distrustful of the body early in his career (seeing it as something that could obstruct the mind from letting go of expressing its likes).⁹⁴ Later, he began to reevaluate how the body could relate to his principles.⁹⁵

It seems to me that, in an art like the dance, the discipline is not what mine is, of sitting still and putting ink on paper, but is a daily discipline connected with the body. It closely resembles the disciplines of going in (and sitting, breathing, etc.). And though Merce Cunningham also uses, not always and not as I do, but in his own way, chance operations, it seems to me that the dance frees the body from the closing-in-on-itself aspect of the ego: what happens is that a concept disappears and simply a movement is made.

Although the parallels dwindle further into the specific practices of Cunningham and Cassidy, similar thoughts arise in Rutherford-Johnson's encouragement to listeners of Cassidy's *Second String Quartet*:⁹⁶

⁹⁴ Tracy McMullen, "Subject, Object, Improv: John Cage, Pauline Oliveros, and Eastern (Western) Philosophy in Music," *Critical Studies in Improvisation*, Accessed September 10, 2020, <https://www.criticalimprov.com/index.php/csieci/article/view/851/1918>

⁹⁵ Ibid.

⁹⁶ Tim Rutherford-Johnson, "A Journey to Aaron Cassidy's Second String Quartet," *NewMusicBox*, Accessed January 20, 2020, <https://nmbx.newmusicusa.org/a-journey-to-aaron-cassidys-second-string-quartet/>

So, discard everything. Start from nothing. No pitches. No dynamics. No “natural” sound. No “correct” way to play the instrument, no tradition. No ground, no decoration. There is no normal anymore. What is left? Up, down, left, right, on, off. Instruments, and ways of making them sound. Simple things.

2.5 Sound

There is a moment in nearly every article about Aaron Cassidy’s music when the writer finally concludes their examination of the design and intentions of the notation and how it makes the performer move through the indicated decoupled gestures. At this moment, the sonic possibilities of Cassidy’s music are discussed, often with words that indicate how noisy yet fragile it is.⁹⁷ Before any more sonic information is related, the next topic begins or the article concludes.

This endless flirtation with the impossibility of discussing sonic results ironically may be both the greatest consistent disservice to Cassidy’s music and one of the longest running admissions of the indeterminacy within it. Even Rutherford-Johnson, one of the finest sources aside from Cassidy himself, offers a curious example of this in his *NewMusicBox* article about *Second String Quartet*.⁹⁸ On the one hand, he makes the especially important points that “it is a tenet of Cassidy’s composition to resist the acousmatic ‘ideal.’ His credo for more than a decade

⁹⁷ Kanno 252
NewMusicBox
Castro-Magas 63–64
Christopher Redgate, “Re-inventing the oboe,” in *Contemporary Music Review* 26, (2007): 182-184.

Gottschalk 81–82
⁹⁸ NewMusicBox

has been that ‘the way in which a sound is made, and the sound it makes, are fundamentally intertwined.’”⁹⁹

On the other hand, Rutherford-Johnson is writing this article four months after the premiere of the quartet (which had been recorded at Donaueschingen and would later be distributed by NEOS) and was available as a recorded excerpt embedded in his article.¹⁰⁰ Yet, there is no mention of what the quartet sounds like regarding defining elements such as its duration, counterpoint, textures, and so on. And while it certainly is important to know that the work resists the fixed-ness of being heard the same way every time, the article reads as though the quartet has not been listened to even one time. In contrast, a few years later, in his survey book *Music After the Fall*, he uses exquisite references to the visual art Cassidy is inspired by to attempt to convey the soundworld.¹⁰¹ While nothing replaces listening, discussing the sonic dimensions of Cassidy’s work will ideally aid in further engagement with it. With this in mind, the analysis in Chapters 3 and 4 reserves special attention for this.

As discussed earlier in the foundational concepts subsection, Cassidy’s music’s gestures and structures are fixed in relation to one another. When comparing recordings of *Second String Quartet*, there is a twenty-five second difference in the overall timing of the Donaueschingen/“studio” recording and the US premiere video from Monday Evening Concert.¹⁰² Even so, the main sections, gesture to gesture counterpoint, and motivic network

⁹⁹ Ibid.

¹⁰⁰ Aaron Cassidy, “Second String Quartet,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/second-string-quartet/> (Performance History)

¹⁰¹ *After the Fall* 104

¹⁰² JACK Quartet–Topic, “Second String Quartet,” Feb. 13, 2015, video, 9:09, <https://www.youtube.com/watch?v=AKMg1iZW3hc>.
mondayeveningconcert, “Aaron Cassidy: Second String Quartet,” Feb. 26, 2011, video, 9:29, <https://www.youtube.com/watch?v=Pd6B5zLaHiU>

remain audibly intact. In both recordings, the quartet's sections move by at the quick, uneven yet deliberate speed expected in Post-Serial music during the quartet's eight-and-a-half to nine minute performance duration.

Cassidy has admitted (such as in his inaugural professorial lecture) that he purposely avoids steady-state materials.¹⁰³ This is at play within the quartet, where transition and change are normative, such as a sudden dampening of heavy bow pressure into relative silence or a hushed *col legno* squeal trailing off interrupted by new brash attacks. So much of the work sets foregrounded gestures with expansive (even when completely constrained), “diagonal” sonic against much quieter, flickering contrapuntal moments.¹⁰⁴ That is to say that for all of the talk about Cassidy's music's noisiness, the quartet is epitomized by a discontinuous soloist's noise set against brief, broken-sounding counterpoint.

In searching for a better means of describing the aural experience of *Second String Quartet* and other works, Cassidy's contribution to *Noise in and as Music* comes to mind.¹⁰⁵ In it, he brings up how concert reviewers inadequately describe vocalist Phil Minton's strange, nearly inexhaustible range of extended vocal techniques, saying:¹⁰⁶

I have seen numerous concert reviews with lists of verbs attempting to describe what Minton does, but none come close to explaining what the sounds actually are, predominately because those descriptors usually rely on references to a known collection of sounds (belching, growling, Donald Duck) that dramatically minimize and reduce the actual palette of vocalizations in his work, which are quite a bit stranger.

¹⁰³ Non-Geometrical Rhythm

¹⁰⁴ Ibid.

¹⁰⁵ Noise 33-54

¹⁰⁶ Noise 37

Cassidy's article is ultimately more focused on a theory about noise and vocal transgression, but even so he makes careful use of mechanisms that interact and change within the vocal production system, rate of change throughout the works, and a sense of time, such as when describing the timeline of events in Ulay and Abramovic's AAA AAA: "The grit and vocal fatigue continue to intensify, the yells become increasingly bodily. Nine minutes in, Ulay gives up, unable to yell anymore, while Abramović continues for another fifteen seconds or so on her own. We see and hear the moment when the voice fails, where it is simply no longer possible to continue to vocalize."¹⁰⁷ By better acknowledging the specifics about the fixed and large-scale sonic qualities within Cassidy's work, their overall presentation and indeterminacy can be more carefully discussed.

A related issue regarding sound that comes up about Cassidy's music is whether Cassidy "knows" what the performers are playing. While he maintains an experimentalist's stance, Cassidy's diligent, neat, and detailed creative process allows him insights into what is still indeterminate in outcome. For example, in the previously mentioned YouTube interview with Michael Pisaro, Pisaro inquires if Cassidy does in fact know what his notation's results will sound like.¹⁰⁸ Cassidy replies, "The answer is 'Yes, but....'" He describes how at each step he was "horrified" at "not knowing what he was doing," pointing out how whenever inventing a notation system the sounding results will be so much less reliable in early practice compared to a traditional one.¹⁰⁹

Importantly, when Cassidy describes himself as "not knowing what he was doing," it is my experience that he is not really referring to a sense of total cluelessness. Instead, it is him

¹⁰⁷ Noise 41

¹⁰⁸ MEC Music Talk: Aaron Cassidy and Michael Pisaro

¹⁰⁹ Ibid.

feeling the weight of a project's inciting questions and needing to envelope its mysterious corners with all the fastidious study he brings to his pre-compositional process. Comments through the years regarding *Second String Quartet* and *the wreck of former boundaries* share this tone because both had ruminations that led to changing or upending previous approaches.¹¹⁰

Cassidy decidedly likes the sonic variances that arise from his score. He describes the process behind preparing *A painter of figure in rooms* and the delight in emphasizing indeterminacy within rehearsals:¹¹¹

A painter of figures in rooms, we have found in early rehearsals and workshop sessions that each singer can follow the same set of notational instructions and generate quite dramatically different sounding results – indeed, one of the most exciting aspects of the piece is that the natural, personal attributes of each singer's voice are magnified and intensified, undoing or at least unsettling the more learned, unified, pure, 'choral' sound that they are more accustomed to. Equally significantly, the same singer might attempt the same gesture three times in a row and get three slightly different results, and it is here that exciting aspects of interpretation start to emerge. As in, "Oooh, that one was cool, how can I get it to sound like that again?"

This kind of reaction from Cassidy is something that is not captured directly in his score obviously, but his enthusiasm for the sonic indeterminacy in his works is at the heart of his view that the performance as the next stage of the experimental process he begins within his scores.

¹¹⁰ Aaron Cassidy, "Notes on the wreck of former boundaries," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/notes-on-the-wreck-of-former-boundaries/>

¹¹¹ Experimental Composer

2.6 Long-Term Musical Partnerships

In reviewing Cassidy's musical output in the last two decades, it is clear that consistent and long-term musical partnerships have played a significant part in supporting it. That so many performers return to his works might surprise some readers, the musical experiences with Cassidy's work and what appears to be a distinct collegiality keeps those people returning. In the same way, Cassidy has repeatedly mentioned that writing for specific individuals, including friends, is a particular reason why he continues to like to compose.

Perhaps one of the best examples of this dynamic is Cassidy's partnership with the Melbourne, Australia-based ELISION Ensemble. While some ensembles may list composers associated with them on their websites, few do so as effusively as ELISION does. Grouped under a tab entitled "Sound House," six composers are listed: Cassidy, Barrett, Liza Lim, Ann Cleare, Evan Johnson, and Timothy McCormack. Below a zoomed in photo of a sketch of *The wreck of former boundaries*, ELISION's website states:¹¹²

ELISION's work has focused increasingly on pushing physical boundaries in search of certain kinds of visceral expressive experiences, the musical body in extremis being a benchmark of the ensemble's repertoire. In a digitised world where physical presence is frequently replaced by avatars generating enormously complex effects, ELISION continues to be fascinated by an artisanal and intimately gestural approach to the production of music, co-creative processes of dialogue with composers, in which musicians imagine, develop and build new technical and expressive means. Consequently, ELISION has long enjoyed significant artistic partnerships with composers Liza Lim and Richard Barrett and more recently with newly emergent strands of composition: from Ireland Ann Cleare, or Americans Aaron Cassidy, Evan Johnson and Timothy McCormack. These composers, amongst many others, are part of the ELISION family.

¹¹² ELISION Ensemble, "Sound House," ELISION Ensemble Website, Self-Published, Accessed December 2, 2020, <https://www.elision.org.au/soundhouse/>

If being considered family were not enough, as mentioned earlier, Buckley, their artistic director, dedicated a chapter of his doctoral thesis to writing about his experiences learning and playing *the wreck of former boundaries* as well as discussing *The Pleats of Matter*.¹¹³

These close partnerships and repeated programming can be seen in Cassidy returning to and explicitly writing *Second String Quartet* for JACK Quartet; repeated collaborations with Ensemble Musikfabrik; and a number of powerful soloists including clarinetist Carl Rosman, trombonist Benjamin Marks, bassist Kathryn Schulmeister, trombonist/composer/improvisor Weston Olencki, and violinists Mieko Kanno and Dejana Sekulic.¹¹⁴ (While other soloists have taken on Cassidy's work, these performers have performed one or more of his works over spans of years, at times relearning a work after a substantial break.)

These circumstances surrounding Cassidy's music have been part of the allure for some newer collaborators such as line upon line, an Austin, Texas-based percussion trio. While they first reached out to Cassidy to commission a new work from him in 2012, it did not lead directly to a new work. Cassidy was initially reluctant to write for percussion again.¹¹⁵ Instead, the trio interacted with Cassidy as guest artists hired to perform Huddersfield composers' works in 2014 and 2017. Following these visits to the United Kingdom, Cassidy began to compose *A republic*

¹¹³ Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015: 19-30.

¹¹⁴ Aaron Cassidy, "Because they mark the zone where the force is in the process of striking (or, Second Study for Figures at the Base of a Crucifixion)," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/because-they-mark-the-zone-where-the-force-is-in-the-process-of-striking/>

Aaron Cassidy, "The Crutch of Memory," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/the-crutch-of-memory/>

¹¹⁵ line upon line, interview by author, Austin, TX, Jan. 23, 2020.

of spaces for them. After the premiere of the work in Texas, Cassidy set about doing substantial edits and delivered a new iteration of the work.¹¹⁶

While line upon line was certainly surprised at receiving essentially a brand-new work by Cassidy, they enthusiastically prepared it as part of their 2019 European tour.¹¹⁷ My time at the University of Huddersfield included plans to see the premiere (in Liverpool) and collaboration between line upon line and Cassidy (back at the university in Huddersfield). The rapport between composer and ensemble was palpable. After premiering the work as part of the Open Circuit Festival, a tear down of twenty bags of percussion equipment (not all for Cassidy's work), and driving up to Huddersfield, line upon line director Matthew Teodori still insisted on joining Cassidy for a run before the day's multi-hour rehearsal.¹¹⁸

While Cassidy rarely engages in the mid-composition collaborative check-ins with performers as documented in Rutherford-Johnson's NewMusicBox article, he makes a positive impact on performers in other ways.¹¹⁹ What has consistently come through for me during the interviews done in support of this document, is Cassidy's deep respect for individual performer's approaches in learning his work, his accessibility when questions arise, and sincere joy when working together with them. One particularly illustrative example of this was in my interview with Schulmeister, saying that when they met, she was initially worried about the way that she had heavily marked up her score of *The wreck of former boundaries*: that her annotations had rendered the score less beautiful.¹²⁰ Instead, almost immediately, she encountered a big smile, a chuckle,

¹¹⁶ Ibid.;

Aaron Cassidy, interview by author, Huddersfield, UK, Nov. 5, 2019.

¹¹⁷ line upon line Interview

¹¹⁸ Ibid.

¹¹⁹ NewMusicBox

¹²⁰ Kathryn Schulmeister, interview by author, San Diego, CA, Sept. 28, 2020.

and excitement at the effort she had put into the music. While Cassidy's music asks much of a performer, he and collaborators find meaningfulness and community in their music-making together.

Chapter Three: Reading the Notation of *Second String Quartet*

3.1 Prescriptive Notation

Second String Quartet is one of the several works by Cassidy that employ prescriptive notation to focus on “the physical element of performance as the primary carrier of material in a piece.”¹²¹ While the ways in which he approaches these ideas have evolved over time, his interest in them has persisted from the late 1990s, through the quartet’s completion in 2010, and beyond.¹²² Because of this, the score’s notation represents many of Cassidy’s longtime interests and musical goals as well as a particular stage in his explorations of them. In particular, while Cassidy has consistently used prescriptive notation throughout his career, the specifics of this score’s notational approach grew out of his earlier multi-staved works (see Figure 3.1) and inform his more recent works where traditional rhythmic notation has been replaced with graphic representations of force and friction over time.¹²³

¹²¹ Aaron Cassidy, “Performative Physicality and Choreography as Morphological Determinants,” in *Musical Morphology (New Music and Aesthetics in the 21st Century, Vol. 2)*, ed. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2004), 34.

¹²² Aaron Cassidy, “I Am An Experimental Composer,” Aaron Cassidy Personal Website, Self-Published, December 29, 2012, <http://aaroncassidy.com/experimental-composer>.

¹²³ Aaron Cassidy, “Imagining A Non-Geometrical Rhythm,” Aaron Cassidy Personal Website, Self-Published, May 14, 2015, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>.

The Crutch of Memory
Aaron Cassidy

The image shows a musical score for an indeterminate string instrument. At the top right, the title "The Crutch of Memory" and the composer's name "Aaron Cassidy" are displayed. The score includes a tempo marking of quarter note = 76. The notation is divided into three horizontal sections: "fingerings", "finger spacing", and "hand position". Above the staff, there are various performance instructions such as "ord", "psp", "pst", "ppl", "pp", "p", "mp", "mf", "f", and "ppp". The "fingerings" section shows numbers 1-4 for fingers and includes a note: "(finger splined, but with continual forward momentum)". The "finger spacing" section shows arrows and numbers indicating the distance between fingers. The "hand position" section shows a diagram of a hand on a stringed instrument with Roman numerals (IV, VII, VI, II, III) indicating fret positions. The score is divided into measures with time signatures like 3/8, 9/32, 3/8, 5/8, 5/16, 2/8, 3/16, and 3/8.

Figure 3.1: *The Crutch of Memory*, for indeterminate string instrument (2004) mm. 1–7

While the prescriptive notation in Cassidy’s works can be understood to be a kind of tablature, the kinds of tablature he uses are designed so that the material of his compositions are “not the pitches or rhythms but rather the *actions employed* to create those sounds.”¹²⁴ This prescriptive notation’s interest in physical inputs differs significantly from conventional western musical notation (descriptive notation) where sonic outputs, such as pitches, rhythms, and dynamics, are represented on the score.

In her article “Prescriptive Notation: Limits and Challenges,” Mieko Kanno discusses both the definition and creative implications of this different notational approach.¹²⁵ Her writing is especially relevant because in addition to her expertise with the topic, she premiered Cassidy’s *The Crutch of Memory* (written for indeterminate string instrument) at the 2005 Huddersfield International Contemporary Music Festival and has performed it internationally, including at *O Ciclo de Conferências e Concertos Momentum* in Portugal.¹²⁶

¹²⁴ Aaron Cassidy, “String Quartet,” abstract (PhD diss., University at Buffalo, State University of New York, 2002).

¹²⁵ Mieko Kanno, “Prescriptive Notation: Limits and Challenges,” *Contemporary Music Review* 26, no. 2 (2007): 231-254.

¹²⁶ Kanno 231;

Aaron Cassidy, “The Crutch of Memory,” Aaron Cassidy Personal Website, Self-

Prescriptive notation specifies means of execution rather than resultant configurations of pitch and rhythm. A focus on performative techniques influences the way in which the composer communicates through the medium of writing. In general, prescriptive notation points to a shift in the function of notation from representation to mediation. Consequently, advantages and disadvantages of prescriptive notation are distinct from those of descriptive notation (its standard counterpart).

When writing about *The Crutch of Memory* later in her article, she explains in more detail about how “prescriptive notation unlocks creativity in areas unknown to conventional performance practice.”¹²⁷ While her article precedes *Second String Quartet* by three years, her description of *Crutch* captures the essence of what Cassidy’s use of prescriptive notation is after:¹²⁸

There is no indication, or even temptation, to suggest that pitch and rhythm, as articulated in the top stave, are primary parameters. And this corresponds to the musical reality: determinate pitch and rhythm gestures are not what one hears, and the pitch is almost always bending due to the changing finger-spacing and hand position as specified on the second and third staves. The overlaying of multiple parameters often produces unexpected outcomes (the aggregate of concurrent operations has infinite combinatorial possibilities), and sometimes these contradict each other (thus a decision has to be made) or never produce the same result (thus room has to be provided for an unpredictable outcome).

While Cassidy would eventually move on from *Crutch*’s particular multi-stave set up in *Second String Quartet*, both works are “about allowing the physical and choreographic elements of musical performance into the core of [each work’s] identity and expression— through the use of tablature-like prescriptive notation.”¹²⁹

Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/the-crutch-of-memory/>.

¹²⁷ Ibid, 231.

¹²⁸ Ibid, 232.

¹²⁹ Ibid, 232.

3.2 Decoupling on a Smooth, Continuous Notational Space

When Kanno describes the “overlying of multiple parameters” within Cassidy’s music, she is describing one of its most consistent features—decoupling. “The idea of instrumental decoupling,” Evan Johnson writes in liner notes for Cassidy’s album *The Crutch of Memory*, is “...the independent treatment of the physical components of performance (embouchure and fingers on a wind instrument, for example, or the two hands of a string player).”¹³⁰ These contrapuntal physical interactions between numerous aspects of a single instrument are the means Kanno describes as “unlocking” spaces unexplored by conventional notation and what generate the “warped, folded” sonic terrain Rutherford-Johnson hears in Cassidy’s music.¹³¹ While the earlier *Crutch*’s prescriptive notation already focuses on “transitions between hand positions and finger arrangements while the bow skitters independently upon the strings,” *Second String Quartet* moves these decoupling ideas into a significantly different presentation and better capturing the music’s physical movements.¹³²

One of the most notable changes is *Second String Quartet* displays its decoupled layers on a “unified, multi-parametric” staff, specifically one that approximates the length of each instrument’s strings, instead of the multiple staves.¹³³ “The staff indicates the full length of the string from the nut to the bridge (Figure 3.2). All information on the staff is indicated

¹³⁰ Evan Johnson, liner notes to *The Crutch of Memory*, Aaron Cassidy, NEOS 11201, CD, 2013

¹³¹ Kanno 231, 251-252;
Tim Rutherford-Johnson, *Music After the Fall* (Oakland: University of California Press, 2017), 104.

¹³² Johnson liner notes

¹³³ Aaron Cassidy, “Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voice,” *Search Journal for New Music and Culture* 10, (2013): 2-24.

proportionately (and differences in distances between instruments have been calculated proportionately, as well).”¹³⁴ Cassidy makes sure to emphasize that in this space, “left and right hands are freed from their normal topographical locations — the right hand frequently appears ‘behind’ the fingered pitches of the left hand.”¹³⁵

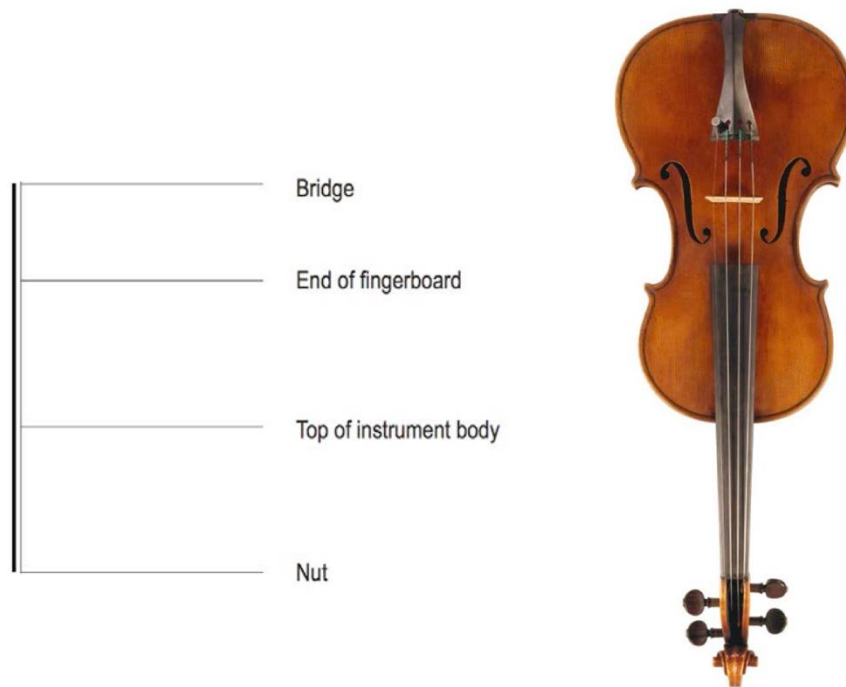


Figure 3.2: A diagram from Cassidy’s *Constraint Schemata* article showing the unified staff used in *Second String Quartet*’s tablature in comparison to a violin. The staff allows Cassidy to notate left and right-hand physical activity on each string instrument from its bridge to its nut.

Although similar instrument body staffs or bridge clefs have been part of the innovative musical practices of composers such as Helmut Lachenmann since the late 1960s, this unified staff allows Cassidy to question and experiment with how he conceives the relationships between the numerous elements of a string player’s left hand and right hand.¹³⁶ For example, where his

¹³⁴ Aaron Cassidy, *Second String Quartet* (Aaron Cassidy/ASCAP 2010) notes for performance.

¹³⁵ Cassidy *Second String Quartet* score notes for performance.

¹³⁶ Tanja Orning, “Pression – a performance study,” *Music Performance Review* 5 (2012): 12-31.

previous scores (Figure 3.3) employed relatively discrete polyphonic attack points on multiple staves, this same kind of decoupled information appearing on this unified staff aims to emphasize the counterpoint between the layers of information rather than any sense of a metrical exactness of each layer (Figure 3.4).

3/8 [fragile, splintered, but with continual forward momentum] 9/32

ord-----> psp ord-----> pst-----> psp

7:6 5:6 12:9

cl pv cl sv pv sv

I
fingerings IV

pp ppp pp ppp pp

finger spacing 4 3 1 8:9

hand position IV I IV 10:9

Figure 3.3: An example of Cassidy's *The Crutch of Memory*'s multi-stave tablature. This solo's fingerings, finger spacing, and hand position are all notated in individual systems.

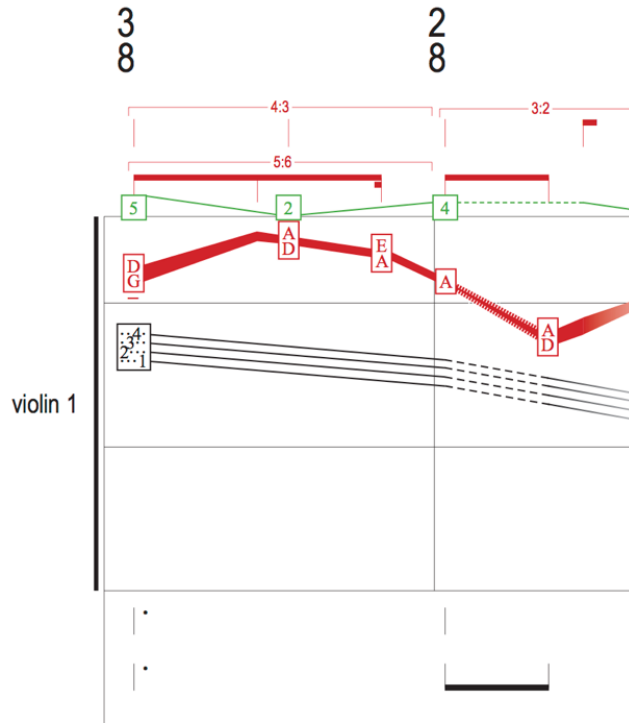


Figure 3.4: A score example of *Second String Quartet*'s unified staff (mm. 1-2). All of the elements Cassidy is using are on a single staff or floating above or below it.

This shift in Cassidy's approach toward a "smooth, continuous notational space" allowed him to achieve his goal of emphasizing his music's choreographic elements.¹³⁷ As he describes in his article "Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voices:"¹³⁸

My recent work has centered on the development of a unified notational system for multi-parametric compositional and performance techniques. It takes my earlier tablature work (beginning with 2004's *The Crutch of Memory*) as a starting point, with highly specific, prescriptive, choreographic actions stratified across multiple, physiological aspects of sound production (through various forms of instrumental decoupling), and combines those performative instructions into a single notational image. That is, [...] a notational system that takes information that had previously been dispersed across numerous staves and compresses that information onto a single staff [...] The reasons for this new approach are [...] a) to somehow integrate a multi-layered, dispersed, stratified notation into one that was much more immediately assimilable by the eye, [...] and b) to move from a very

¹³⁷ Constraint Schemata 2.

¹³⁸ Constraint Schemata 1.

digital, stratified notational space—[...] to a smooth, continuous notational space that better represents the actual topography of the instrument [...]

As Cassidy relates, within *Second String Quartet*, the consistently presented decoupled, contrapuntal layers that epitomize his music have changed from being numerous points of information to more fluid, graphical representations.¹³⁹ This increased notational focus on physical motions and what comes from their interaction furthers the distance between traditional notions of a score's exactness and what sounds can be unleashed by a body performing a polyphony of tasks on an instrument. Rather than a notation that appears to be about a densely coordinated series of attacks, this new take draws increased attention to layers of physicality as a string player's fingers, hands, and arms simultaneously move, squeeze, relax, extend, press, and release.

For example, in *The Crutch of Memory*, rhythmic elements are clearly connected to noteheads (even if they are non-traditional ones), still retaining a visual aspect of traditional exactness (discreteness) about where different contrapuntal elements align. In contrast, *Second String Quartet*'s notations move in sweeps and dips without noteheads. While the score's rhythmic stratification is still relevant, it has been pulled further into the background to allow focus to fall on the relationships of transitory positions, motions, and pressures of performers' hands on their instruments. Cassidy acknowledges this, stating "...the rhythms are intentionally pushed out to the top/bottom of the staff and are shown without full stems."¹⁴⁰ In one of my recent interviews with Cassidy at Huddersfield, he was more explicit about how keeping such

¹³⁹ Constraint Schemata 2.

¹⁴⁰ Cassidy *Second String Quartet* score notes for performance.

rhythms off of the staff was a deliberate act of foregrounding fluid physical motion and its resultant indeterminacy of certain sonic elements.¹⁴¹

3.3 Graphic Notations

3.3.1 Distinction Between Left and Right Hands

The majority of the quartet's prescriptive notation is comprised of nuanced, colorized lines and graphics that communicate about its layers of decoupled physical actions. Specifically, there are six layers being dealt with (Figure 3.5): "left hand finger position (general gestural movement), finger width (the space between fingers), and finger pressure" and "right hand bow position (gestural movements up/down string), bow pressure, bow direction (up/downbow)."¹⁴²

On a general level, this decoupling can be seen throughout the score with the left-hand actions notated in black and most right-hand actions notated in red, often moving in independent, jagged lines across the length of the instrument. The same colors are respectively used for each hand's corresponding rhythmic stratum above and below the staff. Additionally, green boxes indicating zones on the bow and transitional lines between them consistently appear near where the right hand's red jagged lines currently are on the staff to provide upbow/downbow information (as seen in Example 2021-3). "Up-/down-bow motion is notated in green and primarily indicates bow speed. The bow is divided roughly into five equal 'zones', with one towards the tip and five at the frog. Up- and down-bow motion is indicated with green diagonal lines between boxed numbers."¹⁴³

¹⁴¹ Aaron Cassidy, interview by author, Huddersfield, UK, October 29, 2019.

¹⁴² Cassidy *Second String Quartet* score notes for performance.

¹⁴³ Aaron Cassidy, "The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In)," *Contemporary Music Review* 32, no. 4 (2013): 309.

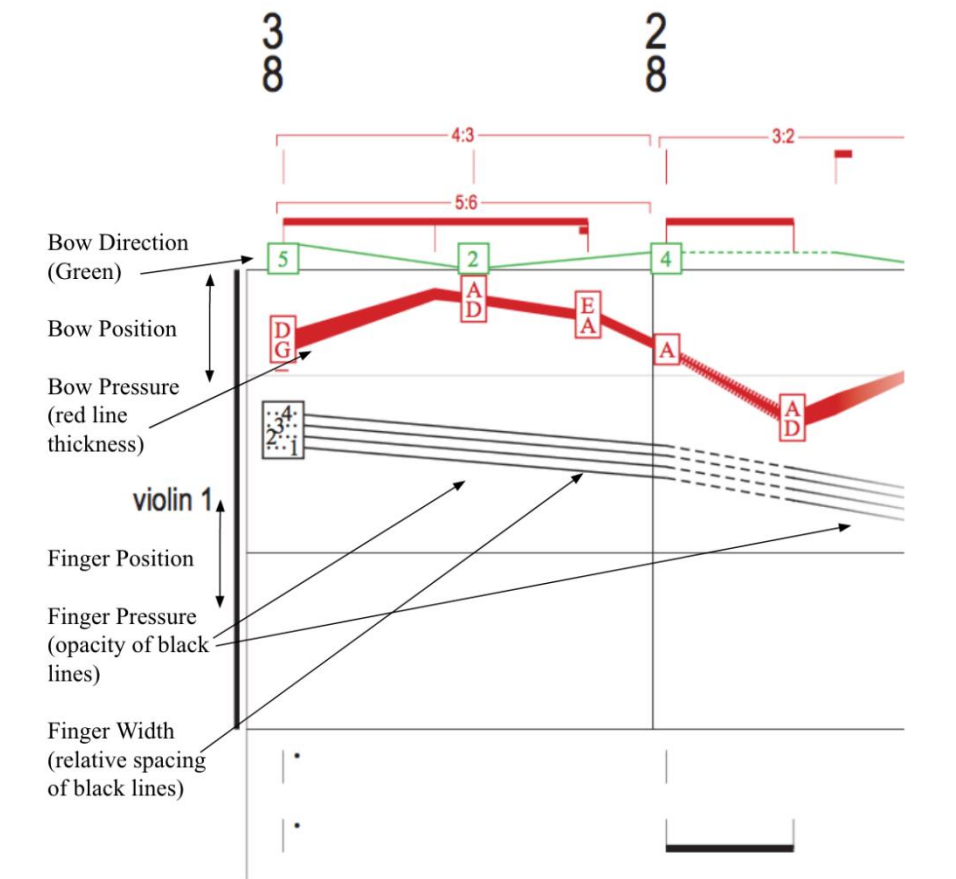


Figure 3.5: Violin 1, mm. 1–2

This use of color helps differentiate each hand’s independent activities on the unified, multi-parametric staff where they perform actions on any part of the entire vibrating length (from the bridge to the nut) of their instrument. Cassidy describes this in *Constraint Schemata*, emphasizing the independence of each hand: “the activities of both hands are notated on this single staff, and, crucially, the full vibrating length of the string is available to the right hand for bowing or pizzicato actions —the right hand movements are not constricted to their normal

location on the instrument, but instead can appear anywhere along the string, including ‘behind’ fingered pitches—and the full length of the fingerboard is available for the left hand.”¹⁴⁴

This clear distinction of left-hand and right-hand actions is supported by the numerous details within and surrounding these notations. These include color gradations, line thicknesses, and additional graphics. As Cassidy explains, “The left hand is notated in black (with grayscale variation), while the right hand is notated principally in red (with pink, purple, and blue variation) and green.”¹⁴⁵ The grayscale Cassidy mentions controls left hand finger pressure, “with the lightest grey indicating ‘harmonic’ finger pressure.”¹⁴⁶ The additional right hand colors he refers to are for specific techniques such as very light bow pressure (pink), *col legno tratto* (blue), or halfway between *col legno* and typical bowing (purple).

3.3.2 Experimentation/Consolidation of Techniques

Before venturing into the specifics of the many individual notations and the physical actions to which they refer, clarifying Cassidy’s general approach toward them should help readers and potential performers sort through them. With some exceptions, these notations often use or reuse familiar post-war contemporary music string techniques. In his deconstructing “instrumental resources to a minute degree,” these typical techniques, including variance in bow pressure, finger pressure, and more, are reimagined and presented in a new context within this multi-parametric environment.¹⁴⁷

¹⁴⁴ Constraint Schemata 2.

¹⁴⁵ Ibid, 2.

¹⁴⁶ Cassidy Second String Quartet notes for performance.

¹⁴⁷ String Quartet as Laboratory, 309.

Less normative techniques often resemble guitar techniques, such as hammer-ons and barre-chord-like quadruple-stop fingerings. Other unusual ones originate in his previous works, especially solo works, such as the expanding and contracting finger widths for those quadruple-stops found in *The Crutch of Memory*.¹⁴⁸ This combination of reinterpreted conventions and more novel techniques is part of a larger thrust within Cassidy's approach to *Second String Quartet*, which he describes as one where "a significant interplay exists between the conservative (the consolidating, refining, solidifying of tradition, simplification and reification) and the experimental (the playful, provoking, obfuscating, ambiguous and destabilising)."¹⁴⁹

Building on experiments and experiences with earlier works, including *The Crutch of Memory* and *String Quartet*, he discusses the mixture of "opening out" and "closing in" (exploration, simplification, and consolidation) in his creative process in his article "The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In):"¹⁵⁰

The most important aspect of this 'opening out' was the freeing of physical movements from their normal geographical roles. As was true in the first quartet, this piece is 'about' the string quartet. Here, however, the string is a much more open, unbounded topographical space. The hands move across this space freely, with carefully mapped types of movement: for the left hand, the movement up and down the fingerboard, the width of the fingers and pressure of the fingers all shift independently with a sort of viscous, unstable motion; for the right hand, the contact point between bow and string up and down the length of the string, the pressure of the bow and the speed of up- and down-bow motion are again mapped as three separate planes of possible movement. Any of that movement can occupy any of the physical space of the string at any moment, i.e. the left hand can appear anywhere along the fingerboard, and the right hand can appear anywhere along the length of the string, including frequent bowing behind fingered pitches.

¹⁴⁸ Aaron Cassidy, *The Crutch of Memory* (Aaron Cassidy/ASCAP 2004): 1.

¹⁴⁹ *String Quartet as Laboratory* 306.

¹⁵⁰ *String Quartet as Laboratory* 315–316.

That Cassidy's experimentation frequently lays in a recontextualizing of techniques a contemporary string performer would already know ideally allows the reader to learn Cassidy's notations more readily. In doing so, they can focus on the recontextualizing of these familiar and experimental physical actions together within Cassidy's gnarled physical combinations.

3.3.3 Left Hand Notations

As mentioned above, left hand notations are notated in black and generally focus on these three aspects: "finger position (general gestural movement), finger width (the space between fingers), and finger pressure."¹⁵¹ When one of these aspects is present on the score, a rhythmic layer corresponding to it is included below the staff.¹⁵²

The "finger positions" that Cassidy mentions indicate how the fingers are arranged relative to each other, often with one on each of the four strings, and how they move up and down the length of the fingerboard. While the hand shapes themselves may be somewhat familiar to bowed string players in how similar chordal hand positions arise in common practice works (for example, seen in moments throughout Bach's *Sonatas and Partitas for Solo Violin* and *Cello Suites*), they are more analogous to guitar barre chords. Cassidy indicates a hand shape, then moves that hand shape up and down the fingerboard of the instrument. While this similarity to guitars moving the same hand shape is distorted by other elements within Cassidy's music, it is intriguing that this specific kind of hand shape and its glissando motion up and down the instrument replaces the ubiquitous scales and arpeggios within common practice writing for strings. (As a note, at times vertical lines rather than more diagonal lines will appear in both the

¹⁵¹ Cassidy Second String Quartet notes for performance.

¹⁵² Constraint 4

left- and right-hand parts. These indicate “the fastest, most immediate possible shifts between positions/states” and “should be clearly distinguished from a rapid diagonal movement through sudden, ‘square,’ almost mechanical motions.”¹⁵³

The finger positions are notated within “boxed enclosures” whose “dots are placeholders for the four strings.”¹⁵⁴ “The graphic is read from left to right as the fingerboard appears from the position of the performer and from ‘low’ to ‘high’ in the same manner as the string notation more generally.”¹⁵⁵

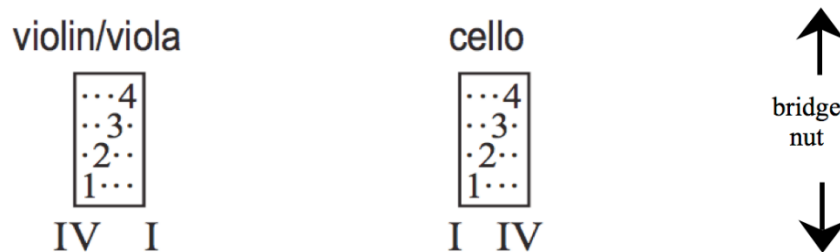


Figure 3.6: Graphic from Cassidy’s article *Constraint Schemata* that clarifies how the finger positions boxes are laid out and how the cello version is in a different order than the violin and viola.

This is a rare instance where Cassidy’s notational practice in *Second String Quartet* is particularly different for one instrument. the cello’s boxed enclosure is “different for violin and viola than it is for the cello,” in how they match “the respective layouts of the string” from the performers point of view. (For example, when a violin is in playing position, the left-most string is its IV or G string. When a cello is in its playing position, I or A string is the furthest to the left).

Cassidy further discusses how these finger positions move and their relationship with the other important aspects of left hand activity: “the movement of the fingers is indicated by the

¹⁵³ Cassidy *Second String Quartet* score notes for performance.

¹⁵⁴ *Constraint 4*

¹⁵⁵ *Ibid.*

lines extending from these boxes, showing the trajectories of the fingers up and down the fingerboard, including changes in the width between the fingers, finger pressure (black = normal finger pressure; grey = harmonic finger pressure), and various kinds of finger gestures, including vibrato, finger pressure trills, and trills and tremolos.”¹⁵⁶

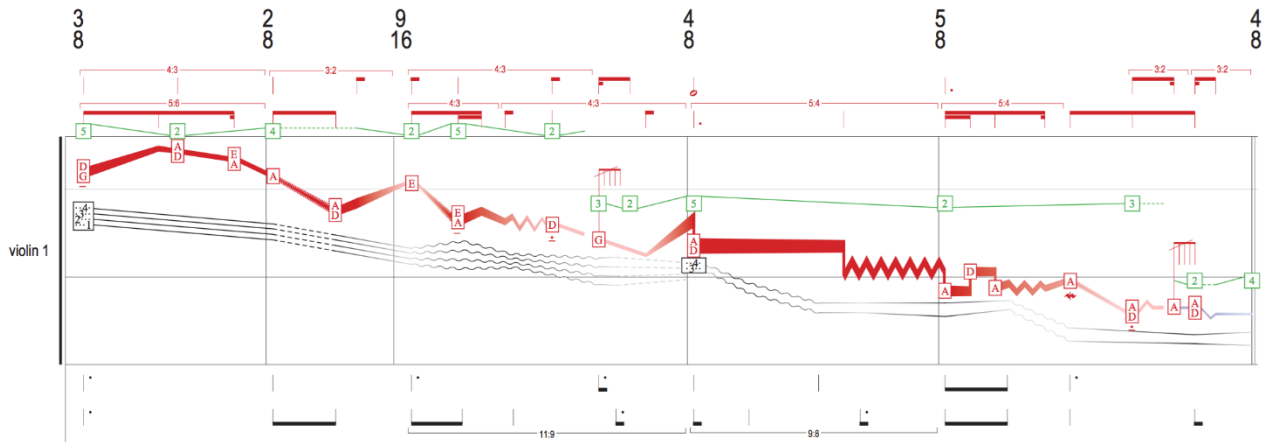


Figure 3.7: Violin 1, mm. 1–5 showcases changes in the six parameters.

While mentioned alongside other modifications of finger positions, finger widths are among the most frequent ways finger positions are manipulated. Throughout the score, they visibly stretch and squeeze the boxed enclosures and their glissandi. This approach distorts any sense of obvious parallelism that might arise from a defined handshape moving along the fingerboard. It is also an example of a technique with its own decoupled layer Cassidy used in previous works that is now represented graphically.

¹⁵⁶ Ibid.

In *The Crutch of Memory*, this technique has its own staff and five points of expression across a discrete scale (see Example 2). He defines each point and provides guidelines about consistency and repeatability:¹⁵⁷

The middle staff indicates the amount of space between the fingers on a five point scale. 1) very tight — as close together as possible; 2) close spacing, with minimal space between the fingers; 3) a natural, open hand position; 4) an extended, open hand position, with reasonably wide spaces between the fingers; and 5) the widest possible spacing, extended as far as physically possible (to the point of becoming awkward and uncomfortable). An effort should be made to keep finger spacing widths as consistent and repeatable as possible.

As with other examples from Cassidy's works preceding *Second String Quartet*, this discrete presentation has given way to a more open, graphic approach (as seen in Figure 3.5) that does not rely on those specific points in that scale of finger widths. Even so, *Crutch* provides a clear precedent and explanation for Cassidy's use of the technique.

Finger pressure, the third left hand aspect, includes the “various kinds of finger gestures, including vibrato, finger pressure trills, and trills and tremolos.”¹⁵⁸ Although the distinction between normal finger pressure (black) and harmonic finger pressure (grey) has been made earlier, the different ways Cassidy deploys them can be seen below in Figure 3.8. This graphic from *Constraint Schemata*, a slightly cleaned up version of the information in *Second String Quartet's* introductory notes, summarizes these finger gestures.

¹⁵⁷ Cassidy *The Crutch of Memory* score notes for performance.

¹⁵⁸ Constraint 4









	normal finger pressure
	harmonic finger pressure
	gradients indicate transition between normal and harmonic finger pressure
	"harmonic trill" alternating between normal and harmonic finger pressure
	"hammer-on trill" (rapidly alternating between heavy finger pressure/finger percussion and open string)
	exaggerated vibrato
	harmonic pressure trill
	trill "behind" fingered pitch, with transition from harmonic pressure to finger percussion

Figure 3.8: Finger Pressure Diagram from Constraint Schemata.

The gradient between black and grey indicating a “transition between normal and harmonic finger pressure.”¹⁵⁹ Grey dashed lines refer to “harmonic trills,” where normal and harmonic pressure are alternated. Black dashed lines refer to “hammer-on trills,” (another guitar technique), where “heavy finger pressure/finger percussion” and an open string are rapidly alternated.¹⁶⁰ “Exaggerated vibrato” is represented with a uniformly curly line.¹⁶¹ While this notation may seem like it would occlude finger widths, they are distinct when paired, such as in Figure 3.8 above.

¹⁵⁹ Constraint 4

¹⁶⁰ Ibid.

¹⁶¹ Ibid.

Cassidy clarifies that “trills and tremolos use the same “finger pressure” notation, with the addition of two slashes to clarify that both fingers are assigned to the same string.”¹⁶² Importantly, these occurrences of two fingers on the same string can occur while additional fingers are still part of the finger position, such as in the viola at m. 48 (Figure 3.9). Additionally, because of moments when the right hand/bow hand is closer to the nut than the left hand, “trills and tremolos also occasionally appear ‘behind’ the fingered pitch”¹⁶³

The image shows a musical score for the Viola part, measure 48. It consists of five staves. The top staff is a rhythmic staff with red markings and time signatures 15:16 and 11:12. The second staff shows a red trill on a G note, with a 'pizz' marking and a 'ff' dynamic. The third staff shows green fingerings (1, 2, 4, 2, 4) and a 'ff' dynamic. The fourth staff shows a trill on a G note with fingerings 4, 3, 1 and 3, 1. The fifth staff shows a trill on a D note with fingerings 4, 3, 2, 1. The bottom staff is a rhythmic staff with black markings and time signatures 7:6, 11:10, and 9:8.

Figure 3.9: Viola m. 48 is an example of how trills are notated in *Second String Quartet*

¹⁶² Ibid.

¹⁶³ Ibid.

3.3.4 Right-Hand Notations and Dynamics

The right-hand notations focus on these three aspects: bow position (gestural movements up/down string) shown in red, bow pressure shown in red, pink, purple, and blue, and bow direction (up/downbow) shown in green (Figure 3.10). Corresponding rhythmic layers for each of these layers are shown in red above the staff as needed. Throughout the work “dynamics are the result of the interaction of bow speed and bow pressure” layers, so “no dynamics are given for bowed material in the work.”¹⁶⁴

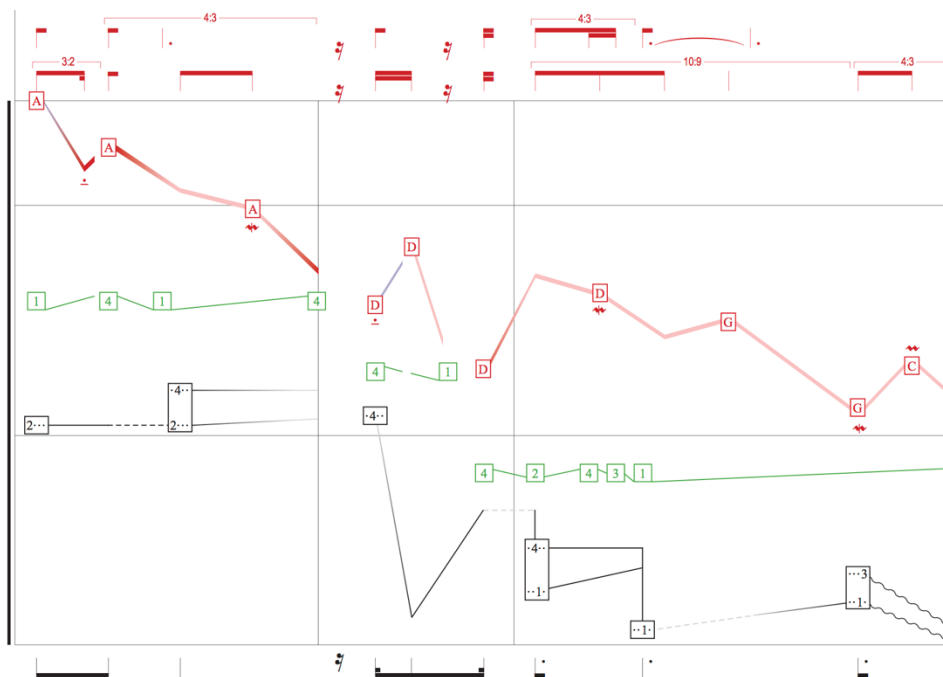


Figure 3.10: Cello mm. 6-8, showing bow position from the bridge and across the fingerboard; bow pressure transitions to light bow pressure, *col legno*, and bow mordents; green bow direction boxes and lines. The interaction of these layers is how dynamic level is managed.

As Cassidy describes, “the bow pressure/speed interface in this work will often produce unusual (and often unpredictable) results, particularly at the extremes of very fast and very slow

¹⁶⁴ Cassidy Second String Quartet score notes for performance

movements of the bow. The resulting timbres/textures will range from light, wispy, brushing sounds to various types of scrunched, scraped, and grinding sounds, each with varying and unstable amounts of pitch content.”¹⁶⁵ The exception to this approach to dynamics is also the exception to “the bow” part of “bow position”– pizzicato (Figure 3.11). In these cases, the usual descriptive notation for dynamics is used, as seen when violin 2 descends from *f* to *mp* in measure 20.

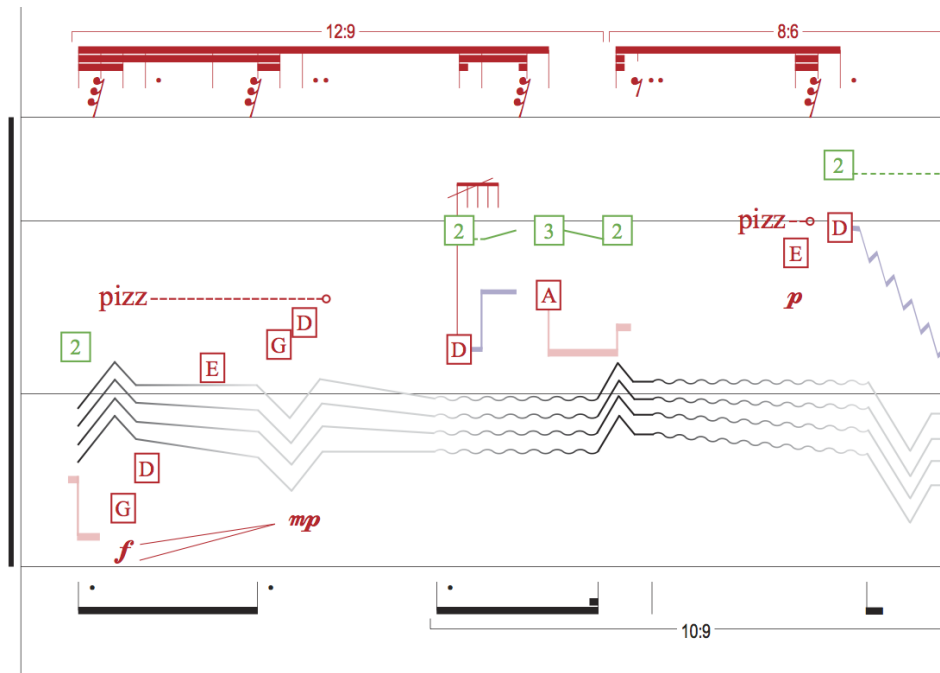


Figure 3.11: pizzicato and traditional dynamic markings (the rare use of descriptive notation) .

Whether arco or pizzicato, the “bow position” red boxes indicate the strings that the right hand make contact along as it moves in sweeping and abrupt motions along the entire string

¹⁶⁵ Ibid.

length of the instrument.¹⁶⁶ “Bowed tremolos between adjacent strings” are indicated by two slashes when present on a red box (Figure 3.12).¹⁶⁷

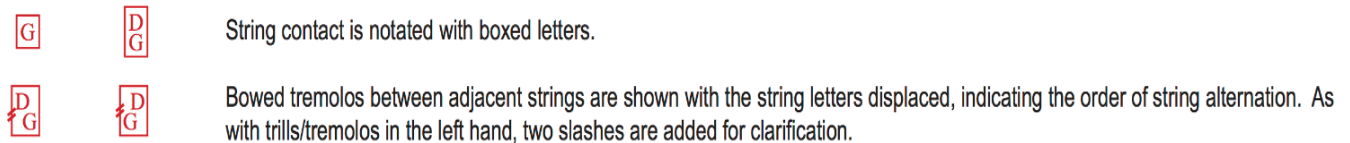


Figure 3.12: Diagram from *Second String Quartet* notes explaining how individual strings are notated

Bow pressure is “indicated with a combination of color and width” on the lines that extend from the bow position boxes.¹⁶⁸ As can be seen in Cassidy’s bow pressure diagram from *Constraint Schemata* below, each line of these six bow pressures—from *col legno tratto* to “very heavy, aggressive pressure.”¹⁶⁹ Rather than using *col legno tratto* as a technique or layer unto itself, it and its in-between point of half *col legno* are the two lightest bow pressure settings. Below the six bow pressure choices, Cassidy demonstrates two examples of graphically notated transitions between the different pressures. In the first one, the nearly opaque blue *col legno tratto* starting point widens and changes color into the wide, red line meaning heavy pressure. A similar transition is shown underneath, where ord. pressure widens into the “maximum pressure.”¹⁷⁰

While relatively obvious in the diagram, these transitions through the bow pressure continuum appear frequently and, by nature of using slim lines to show different light bow

¹⁶⁶ Ibid.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

¹⁶⁹ Constraint 6

¹⁷⁰ Ibid.

pressures, require extra attention. For example, in Figure 3.10 above, the first gesture in the cello quickly moves from half *col legno* to ord. pressure then pulls back from ord. to very light pressure. Similarly, in measure 3 in Figure 3.16 below, violin 2 moves from heavy pressure all the way to *col legno tratto*, back all the way to maximum pressure and back to very light pressure within a single measure.












	<i>col legno tratto</i> (wood only), with very light pressure
	½ <i>col legno</i> (wood plus some hair); slightly stronger pressure, but still very light
	very light pressure (ca. <i>pp-p</i>)
	"ord" pressure (ca. <i>mp-mf</i>)
	slightly heavier pressure (ca. <i>f-ff</i>)
	very heavy, aggressive pressure (ca. <i>ff+</i>)
	transition between lightest <i>col legno tratto</i> to heavy pressure
	transition between "ord" pressure and maximum pressure
	jagged lines represent a rapid back-and-forth motion along the string (always as fast as possible)
	serrated lines with white hash marks along the sides indicate a pulsed, "bowed vibrato" produced by rapidly changing bow pressure
	bowed mordent (fast alternation to the string above or below)

Figure 3.13: Bow Pressure Diagram from Constraint Schemata.

Cassidy's diagram also includes three notations for less typical bow techniques. The first two are modifications of the bow pressure coming out of a red box. In the first, jagged lines representing a sort of across the string bow tremolo, which he describes as "a rapid back-and-

forth motion along the string) always as fast as possible.”¹⁷¹ In the second, “serrated lines with white hash marks” to “indicate a ‘pulsed, bowed vibrato’ produced by rapidly changing bow pressure.”¹⁷²

The third technique, a “bowed mordent,” seems to share more in common with a technique present in the string quartet but not in the article: *jeté*, or ricochet bowing, where the arrival at a red box/a string is distorted by these quick, irregular actions (Figure 3.14).¹⁷³ The mordent is a “fast alternation to the string above or below” based on whether the marking is above or below the box.¹⁷⁴ The *jeté* can happen in two ways: when the bow is *ord.* or *col legno*.¹⁷⁵ The version of *jeté* is the only use of *col legno battuto* in the score, whether the indicating line is blue (full *col legno*) or purple (halfway between *col legno* and *ordinario*).¹⁷⁶

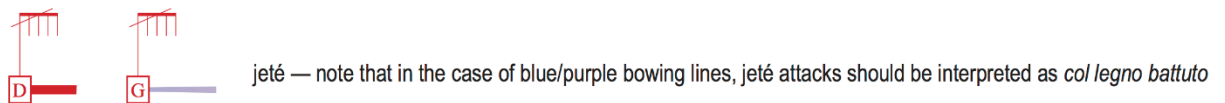


Figure 3.14: Explanatory graphic for *Jeté* from *Second String Quartet* (not included in Constraint Schemata article diagram)

Bow direction (typical upbow/down bow motion) is notated using green boxes that indicate five distinct points that range from the tip (1) to the frog (5) of the bow. While this approach is perhaps more similar to the discrete point to point style of notation in *The Crutch of Memory* compared to how other layers are notated in the quartet, bow direction employs a

¹⁷¹ Ibid.

¹⁷² Ibid.

¹⁷³ Cassidy Second String Quartet score notes for performance.

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ Ibid.

graphic sense of “down” and “up” in its notation by using corresponding down or up diagonal lines between the boxes. In Figure 3.15, Cassidy’s diagram from *Constraint Schemata*, “downbow from zone 5 (frog) to zone 2” uses a downwards line between the two boxes.¹⁷⁷ As might be expected after seeing this, the up bow example that follows this has an upwards-moving diagonal line. The dotted horizontal line meanwhile, refer to staying in that bow zone while other kinds of bow motion go on, such as the “lateral motion up and down the string.”

Tremolo (diagonal slashed lines) can happen either within one or more zones. Cassidy notes that “typically, slashes are also shown on the stem of the relevant layer to help clarify the duration of the tremolo.”¹⁷⁸

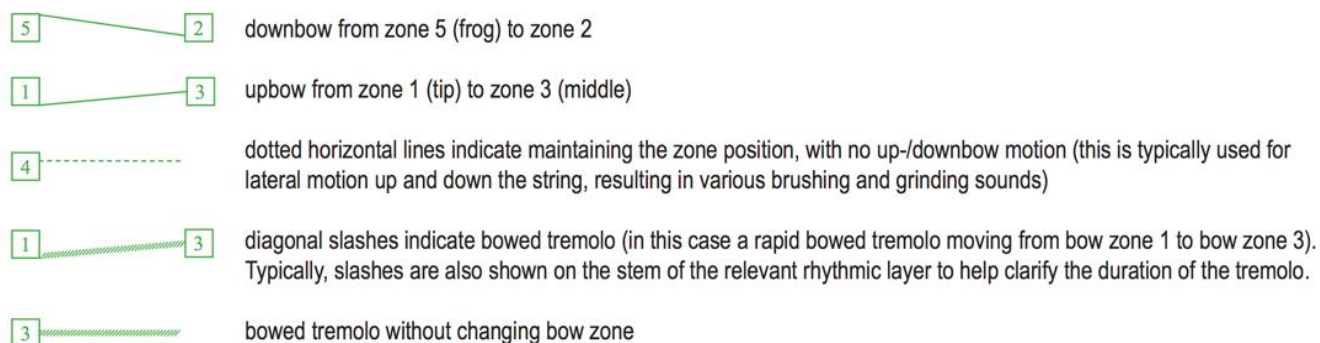


Figure 3.15: Bow Pressure Diagram from Constraint Schemata.

Much like the previous section about bow pressure, the clear diagrams Cassidy provides in his writing and score preface are helpful resources while studying the score. Bow direction tags along with the bow position/bow pressure line. Sometimes it appears above the right-hand line, while at other points it appears below or cutting through in the center as seen in Figure 3.18.

¹⁷⁷ Constraint 8

¹⁷⁸ Ibid.

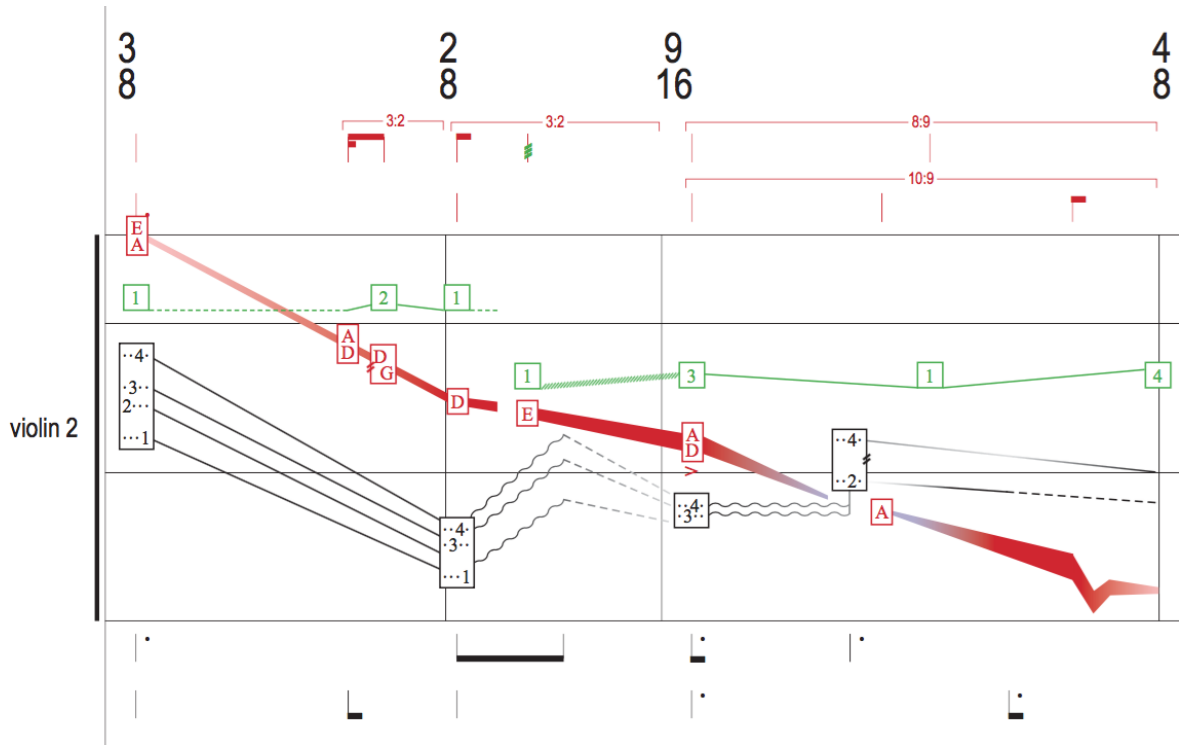


Figure 3.16: violin 2 mm.1-3–The tremolo on the rhythmic stratum coordinates with the tremolo line in m. 2.

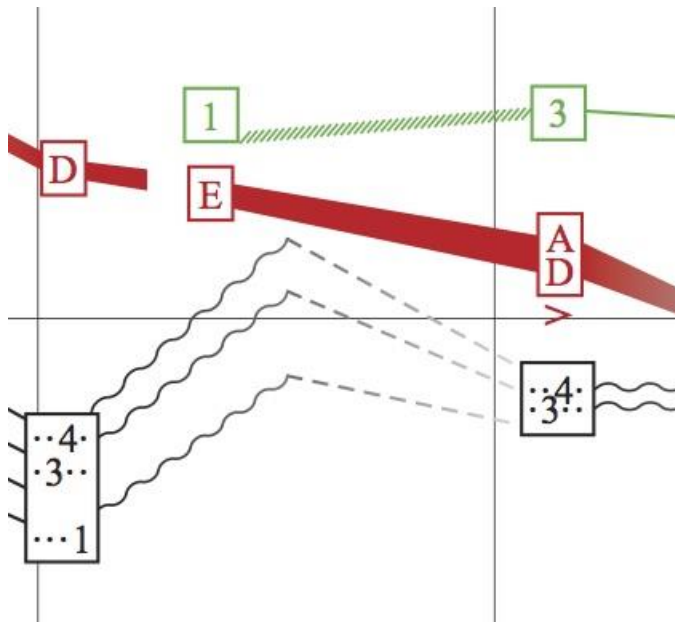


Figure 3.17 violin 2 mm.1-3 zoomed in to see the tremolo more clearly.

At times, bow direction and its relatively small up and down motions can be harder to notice when nestled between two lines that vividly move throughout the unified staff. In Figure 3.16, above for example, the diagonal line between zone 2 and 1 is especially subtle against the jagged contours around it. Additionally, the tremolo diagonal slashed lines can sometimes appear as essentially a thick green line (such as in Figure 3.17).

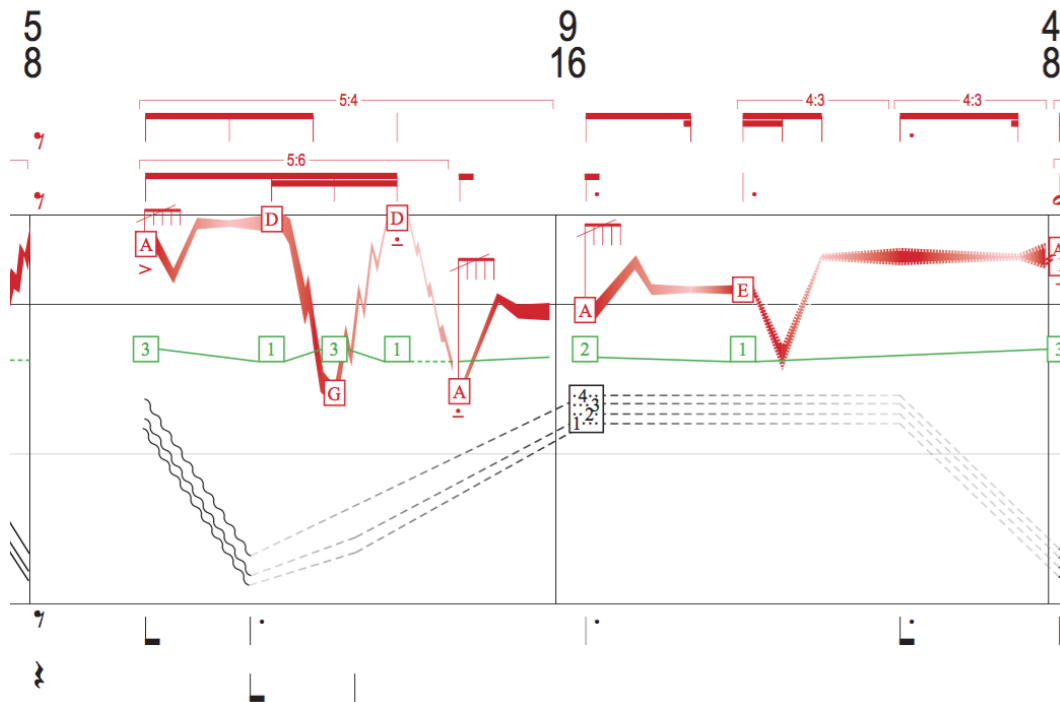


Figure 3.18: violin 2 mm. 26-27. The bow direction notation moves through the center of the other right-hand notations.

3.4 Rhythm and Indeterminacy

While there is a reduction of the importance of discrete rhythm in *Second String Quartet* as Cassidy transitioned toward a less digital, more continuous use of prescriptive notation, as discussed earlier in Chapter Two, it is still a relevant factor within the notation and performance

of the work.¹⁷⁹ Even if the rhythmic notation's beams, stems, and nested tuplets are purposely moved to the margins of the staff to indicate their lesser role, they can stand out as the most familiar information on such a score populated by so many unusual, multi-colored graphics. Because of this familiarity, casually interested performers investigating Cassidy's score will often notice the rhythms first, then apply what they generally know about New Complexity-indebted rhythmic strata rather than engage with the main focus of the notation, i.e. the experimental, decoupled counterpoint between the hands. Even in their creation, these rhythms are approached as layers of impulses carefully fit into the metric structure rather than single, discernable rhythmic lines.¹⁸⁰ With these encounters in mind, this chapter on notation and Chapter 6's performer interpretation aim to defuse these misunderstandings.

Cassidy relates in the score instructions that "there are as many as four independent rhythms at any one time, with as many as three for either the left or right hand."¹⁸¹ These independent rhythms can refer to left hand aspects such as "finger position (general gestural movement), finger width (the space between fingers), and finger pressure" and right-hand aspects such as "bow position (gestural movements up/down string), bow pressure, bow direction (up/downbow)."¹⁸² Cassidy emphasizes that "all of the various movements of the left & right hands are rhythmically independent."¹⁸³ As may already be apparent, what each of these layers may refer to is based on which elements are in motion at that time. "Because the remaining layers recombine in various permutations, there is no particular consistency to the order/position of the other rhythmic layers. It should generally be clear from the context of any given phrase

¹⁷⁹ Constraint 2

¹⁸⁰ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

¹⁸¹ Cassidy Second String Quartet score notes for performance.

¹⁸² Ibid.

¹⁸³ Ibid.

which of the three types of movement (left hand position/width/pressure; right hand position, pressure, direction) are connected to which rhythmic layer.”¹⁸⁴ In Example 3 above (Violin 1 mm. 1-2), two red rhythmic lines appear above the staff and two black rhythmic lines appear below it. As usual, the colors refer to which hand is being employed, red for right hand (bow hand) and black for left hand. In this instance, the higher red (bow) rhythmic line correlates to the green bowing zones on the staff. The lower red line matches the violin’s string crossings. Meanwhile, the higher black rhythmic line corresponds with the left hand’s small glissandi toward the violin’s nut. The lower black rhythmic layer matches the left-hand fingers’ hammer-on trills in measure 2.

In contrast, Figure 3.19 (Violin 1 mm. 11-12) shows three red rhythmic lines above the staff and a single black rhythmic line below it. As in the previous example, by matching where elements change with the headless stems, the layers reveal themselves. The highest red line follows the trajectory changes of the bow as it moves from the fingerboard to the nut and back. The middle red rhythmic line is the green bow zone, here with lateral motion (the dashes) then change from zone 1 to 4. The bottom red line traces changes in bow pressure. As a note, while the changes in bowing style (ord. to half *col legno tratto* to *col legno tratto*) are musically important and correlate to the bow pressure changes, it is important to remember that bow position (up and down a string), bow pressure, bow direction (up bow and down bow across a string) are the three kinds of information Cassidy is guiding with these rhythmic layers. Meanwhile, the single black rhythmic line indicates harmonic trills and fingering changes.

¹⁸⁴ Ibid.

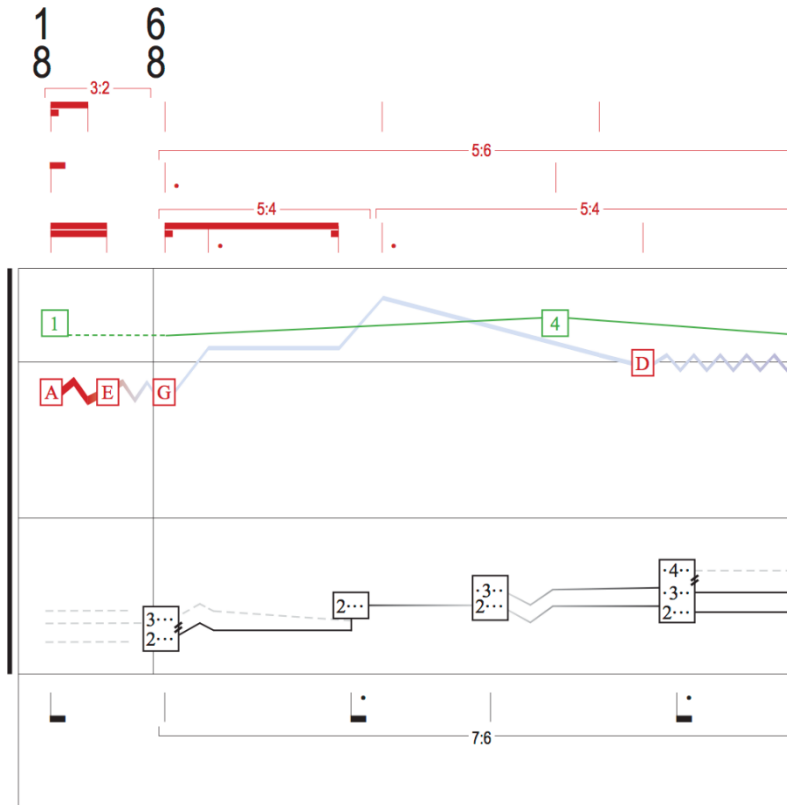


Figure 3.19: Violin 1 mm. 11-12. An example of rhythmic strata where three layers appear above the staff (high red: trajectory of the bow (moving from the fingerboard toward the bridge and back), middle red: green bowing/bow zone information, bottom red: changes in bow pressure (thickness of line). The single black rhythmic layer below the staff indicates harmonic trills and fingering changes.

The presence of rhythmic scaffolding, even at the margins of the unified staff, certainly asks for a kind of due diligence with parsing those rhythmic layers. However, this diligence is not in service of a successfully perceptible sonic realization of all of the layers, but a means to support the decoupled gestures that generate Second String Quartet’s volatile, intertwined resultant sounds. As Cassidy puts it: “the sonic results will often be highly unpredictable and will include a certain degree of indeterminacy, particularly in their details.”¹⁸⁵

¹⁸⁵ Ibid.

5
8

[NB: violins 1 & 2 should need not establish a perfect unison – some imprecision in these ‘unison’ passages is expected]

12
16

Figure 3.20: Violin 1 and 2 in m. 98. While notated in unison, Cassidy expressly indicates in the score in a written note the resulting content should not be coordinated (such as unison pitch content).

Among the clearest examples of how indeterminate outcomes of rhythmic layers are valued over mechanical exactness in Cassidy's music is in *Second String Quartet's* measure 98 (Figure 3.20), where violin 1 and violin 2 have a measure-long unison. As Cassidy notes in the score itself: "N.B. [*nota bene*] violins 1 & 2 should need not establish a perfect unison – some imprecision in these 'unison' passages is expected."¹⁸⁶ He discusses this moment further in his article *String Quartet as Laboratory and Playground*:¹⁸⁷

The more intriguing cases [of variations of material within *Second String Quartet*] are the places in which the two violins both reference identical 'solo' materials [references m. 98]. In these circumstances, the notation is identical, but because of the relative flexibility of the notation (the absence of pitch notation, the intentionally rough, imprecise notation of movement on the fingerboard), these identical images are likely to generate slightly different results. This was an entirely self-conscious nod towards the role that the rhythmic unison, and, even more, the explicit unison, have played historically in the quartet repertory. The ambiguity of foreground vs. background was similarly historical in its modelling.

While Cassidy's approach to rhythm in *Second String Quartet* does not let go of rhythmic strata nearly as much as his works since 2010, it is hope that anyone reading about this will not feel the "temptation" Kanno described as far back as 2007 to consider rhythm a primary parameter and will not be "what one hears."¹⁸⁸

3.5 Putting the Hands Together

With the individual elements that constitute Cassidy's approach in notating for *Second String Quartet* in mind, parsing the notation as the analysis proceeds will ideally be less of a hinderance for those reading about Cassidy's work and hoping to perform it. Using the following example from Violin 1's first four measures, these elements can be applied to understand what is

¹⁸⁶ Aaron Cassidy, *Second String Quartet* (Aaron Cassidy/ASCAP 2010): 22

¹⁸⁷ *String Quartet as Laboratory* 319

¹⁸⁸ Kanno 251

happening in what Cassidy considers “a typical passage from the *Second String Quartet*.”

(Figure 3.21)¹⁸⁹

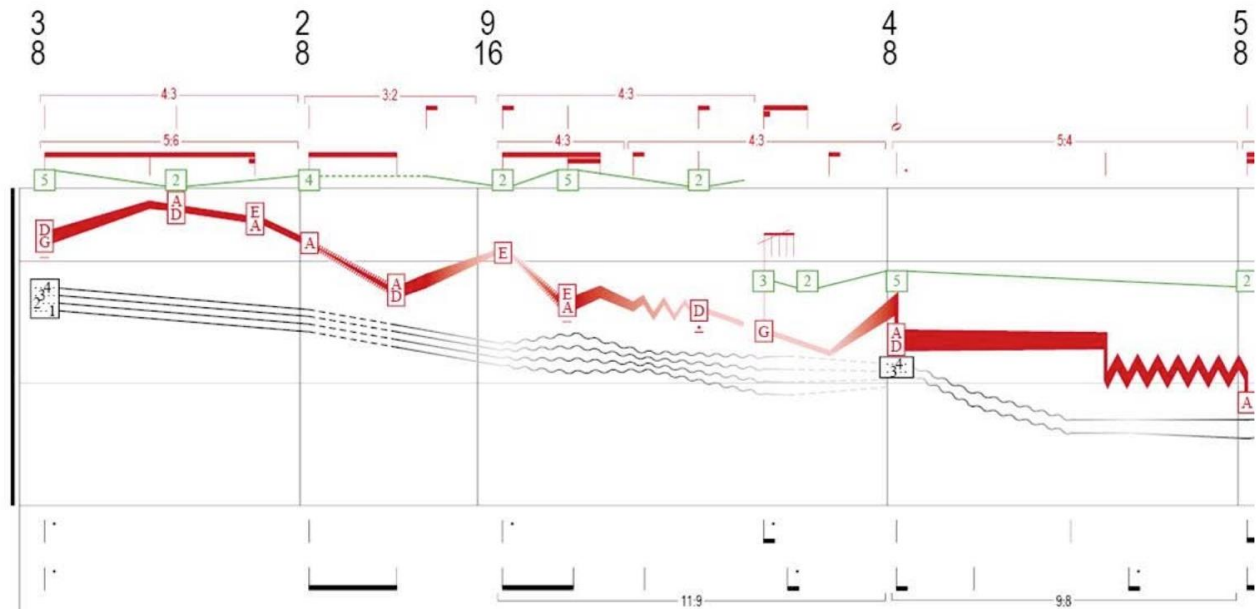


Figure 3.21: A “typical” example of *Second String Quartet* from Cassidy’s *Constraint Schemata* – Violin 1 mm. 1-4.

In measure 1 the violin’s bow position begins just before where the fingerboard begins on the D and G strings. As the bow moves back toward the bridge and switches to A and D then E and A strings, (and so on), the red line tapers, indicating a decrease in bow pressure. Bow direction, the same as in Cassidy’s diagram, indicates a down bow from zone 5 (frog) to zone 2 (the between the middle and tip of the bow) followed by an up bow to zone 4 (between the middle and the frog). These right-hand actions correspond with the red rhythmic layers above, with the bow direction matching with the upper layer and bow position and pressure mostly

¹⁸⁹ Constraint 3

following the lower layer. The change to A and D coincides with the arrival at zone two, so the upper rhythmic layer is used for that.

Measure 2 features horizontal bowing zone (the green dashed line) as the bow moves over the fingerboard and back with swelling then diminishing bow pressure. Importantly, the moment when bow direction resumes downbow corresponds with the second impulse in the upper rhythmic layer's 3:2 bracket. In measure 3, the numerous changes in bow position and strings and bowing correspond to the top rhythmic layer, while the right-hand line changes in pressure (moving between thick red heavy pressure and pink light pressure) match the lower rhythmic layer. Near the end of the measure, the change to the G string is coupled with a *jeté* (downbow) followed by a quick upbow that transition back toward red, heavy bow pressure. Examples of instantaneous transitions between materials Cassidy are seen in measure 4 when the right-hand line is presented vertically at the downbeat for a string change and later switching from heavy pressure to jagged bowing.

The left hand's finger position box in measure 1 indicates second finger on the G string, third finger on the D, the fourth finger on the A, and first finger on E. This hand shape begins high on the fingerboard near where it ends. Supported by the upper black rhythmic layer, the hand shape essentially does a single glissando until arriving at a modification of that finger position box in measure 4. Hammer-on trills, an example of finger pressure, disrupt the hand shape in measure 2. Expanding and contracting finger widths in measure 3 distort the handshape's linear trajectory alongside a combination of harmonic finger pressure and exaggerated vibrato. These changes in finger width and pressure correspond with the lower black rhythmic layer.

In listening to JACK Quartet’s Monday Evening Concerts performance of *Second String Quartet*, these layers begin with a grinding glissando that recedes into percussive interruptions.¹⁹⁰ The cross-cutting of the transition to light bow pressure, bow position with finger width, exaggerated vibrato, and harmonic finger pressure brings out a floating, cloud-like wheeze. A whispery ricochet bow arrives promptly. The following light bow pressure sweep across part of the fingerboard results in a suddenly harsh, grinding bowing. Although the precision of the many individual rhythmic layers is not audible, the culmination of those layers is. The decoupled actions bring forth this richly unstable environment made of “scraping, sliding, and sweeping” that operating in an “unstable grey zone between pitch and noise.”¹⁹¹

3.6 Additional Thoughts About the Accessibility of Cassidy’s Scores

While discussing the previously mentioned aspects of Cassidy’s notation are the main goal of this chapter, I would like to briefly add some reflections about my experiences with paper and digital forms of his scores. Throughout the time spent on this project, I have primarily dealt with *Second String Quartet*, but have also spent time with some of his other scores and the score excerpts that appear in articles about his work. This includes digital documents, print outs of scores, and scores that appear on Score Follower, a YouTube channel that specializes in posting videos of scores accompanied by recordings of contemporary classical music works.¹⁹²

¹⁹⁰ mondayeveningconcert, “Second String Quartet,” Feb. 26, 2011, video, 9:29, <https://www.youtube.com/watch?v=Pd6B5zLaHiU>.

¹⁹¹ Constraint 4

¹⁹² Score Follower, “Second String Quartet w/score,” Feb. 3, 2020, video, 8:45, <https://www.youtube.com/watch?v=I500YLLXHvI>;

Score Follower, “The wreck of former boundaries w/score,” Apr. 1, 2019, video, 7:47, <https://www.youtube.com/watch?v=dqZSFfzCoWg>

In these experiences, there were two recurring user issues. One involves color, which continues to be an important tool in Cassidy’s approach to notation. However, even when having access to a color printer, some of the color choices and transitions can be difficult to see. This is particularly the case with the light blue used for *col legno tratto* and transitions from it to other techniques. Similarly, while the way the intensity and patterning of the different black lines is used to indicate finger pressure effectively communicates Cassidy’s intentions, at times harmonic trill and gradients between normal and harmonic finger pressure have been lost while using a less than optimal printer. This loss of nuance is also seen in how the tiny white hashmarked borders of the serrated line notations, used to suggest rapid changes in bow pressures (described as if a “bowed vibrato” by Cassidy), have not always printed clearly.

These instances are further exacerbated by the other issue, the relatively small scale of the gestures on each score page. For example, in violin 2’s gesture in m. 13, *col legno tratto* and *col legno battuto* are used one after the other. When the score is printed on typical letter size paper (as someone might do as a study score), some of the nuance is lost. When viewed on a conventional laptop screen (15 inches in my case), the full score view of the pdf and ScoreFollower’s video score (presented in a two paged full score view) the details, gradients, and similar colors are particularly hard to recognize or are lost.¹⁹³

Although some of these challenges have clear solutions—using the appropriate paper size (Cassidy offers physical copies on A3 size paper on his website)—aspects of these problems remain.¹⁹⁴ How people who cannot see certain colors engage with his scores is an ongoing conversation. On the few occasions Cassidy is aware of performers encountering this, it has not

¹⁹³ Score Follower, “Second String Quartet w/score.”

¹⁹⁴ Aaron Cassidy, “Second String Quartet,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/second-string-quartet/>

affected performances.¹⁹⁵ While Cassidy would prefer a more widespread solution for aiding performers with color scores, he has signaled a willingness in some cases to return to the Adobe files he notates his scores in to create an altered copy of the part for a performer.¹⁹⁶ This would be labor-intensive, but it is heartening knowing he would consider doing this.

The combination of large paper size and small-scale nuances of his scores have similar issues but iPad score reading apps more or less solve them. Performers using forScore and similar apps can create personally sized views, allowing more opportunities than ever to see the experiences discussing the quartet casually with musicians, more than a few have not been able to see the nuances of their part as well as customize much of the score's views as they would like. This provides much more flexibility for string quartets playing Cassidy's work compared to the A3- or tabloid-sized score paper JACK Quartet uses in the video of *Second String Quartet's* American premiere.¹⁹⁷

¹⁹⁵ Aaron Cassidy, interview by author, Huddersfield, UK, October 29, 2019.

¹⁹⁶ Ibid.

¹⁹⁷ mondayeveningconcert, "Second String Quartet," Feb. 26, 2011, video, 9:29, <https://www.youtube.com/watch?v=Pd6B5zLaHiU>.

Chapter Four: Resilient Structures

4.1 On Approaching an Analysis of *Second String Quartet*

With Cassidy's aesthetics addressed and *Second String Quartet*'s substantial experimental notation explicated in previous chapters, an analysis of the quartet can proceed. This inquiry draws on the work's score, recording of its performance, existing writing about Cassidy and his music, compositional sketches, and interviews with Cassidy and others. This project's analysis is in part driven by the reticence of previous scholarship to engage the quartet and other works by Cassidy beyond aesthetic discussions and brief comments on score excerpts. While the coverage about Cassidy's ground-breaking notation and its general indeterminate possibilities draws meaningful focus to these aspects of his practice, a more complete examination of one of his compositions in full is long overdue.

This chapter and the two that follow specifically address the final score and recordings of its performance to better discuss how the overall work is structured, its choreography, and its sonic results. Cassidy's writing, interviews, sketches, and drafts are critical reference points throughout the analysis, although discussions of the manner in which Cassidy composes will be mostly used in service of better describing the realized score and their impact on the performance and listening experience. After addressing the nature of the structures in the quartet, the seven sections my analysis divides the work into and its continuity are discussed in detail.

While some readers may fundamentally disagree with an analysis that uses a composer's sketches, in this instance they are a relevant tool in better communicating about *Second String Quartet*.¹⁹⁸ For example, Ross Feller's *Multicursal Labyrinths In the Work of Brian Ferneyhough*

¹⁹⁸ Ian Pace, "Positions, Methodologies, Aesthetics in the Published Discourse about Brian Ferneyhough: A Critical Study," *Search Journal for New Music and Culture* 11, (2015): 1-6.

may have inspired much of this project, but the circumstances surrounding the composers and projects diverge considerably.¹⁹⁹ In Feller's case, Australian musicologist Richard Toop had already completed an analysis of works by Ferneyhough.²⁰⁰ Feller responds to this kind of analysis in his writing by developing his own methodologies for discussing Ferneyhough's work. Feller also brings up how relying on Ferneyhough's sketches is futile in part because "of his admitted short attention span he generally forgets what pre-compositional procedures he followed and therefore is forced to reinvent them."²⁰¹

The current circumstances with Cassidy are quite different: Cassidy's works have not yet received the kind of analysis performed by Toop that draws on Cassidy's pre-composition materials, which is strange considering his meticulous curation of them. Similarly, while Cassidy may not remember every nuance of the creative process in *Second String Quartet* ten years later, in his published writing and interviews he has made clear that the quartet is built on processes he had been using and developing in the preceding decade. This is particularly relevant because Cassidy experiments within structuring processes that he has employed consistently throughout his career. So, while there are points of difference in his approach to the quartet, much of the innovations stand on top of foundational processes with which he is well acquainted.

Without dampening the excitement and provocativeness experienced when listening to Cassidy's music or viewing his scores, so much of Cassidy's processes are as explicable as they are experimental. His sketches reveal clear structures and relationships that flow through the work underneath the choreographic notation. Although this analysis focuses on the final score

¹⁹⁹ Ross Feller, "Multicursal Labyrinths in the Music of Brian Ferneyhough" (DMA diss., University of Illinois at Urbana Champaign, 1994).

²⁰⁰ Feller 91

²⁰¹ Feller 92

and recordings, these careful, detailed sketches supplement them considerably.²⁰² By better documenting and demystifying the specifics, the stabilities and indeterminacies within Cassidy's quartet, ideally readers will find new, more musically rich experiences with it, especially when hearing or performing it.

4.2 Formative Looping Processes

As discussed in Chapter One, although Cassidy's large-scale structures may be generated via small processes, they are also stable and often identifiable on the score and in performance. Cassidy remarks "the form of a piece is not something I decide, as such – sectional divisions, durations, tempi all have a life of their own that I then have a responsibility to react to and 'articulate' through other lower-level compositional decisions."²⁰³ By allowing the deliberately chosen looping processes to run their course, they create the framing and constraints within which Cassidy can set to work. While this chapter will maintain focus on the realized score and performances of the quartet, so much of what informs the final score's distinct expression is possible because of these looping processes. Through them, the quartet's foundation is formed through collisions of structural boundaries. Once generated, these foundations are fixed and used to guide the composition process. In the final score and in performance, they are the resilient structures that the surface's attention-drawing indeterminate choreographic gestures rest upon seen in the seven large sections of the score.

²⁰² N.B. These sketches and other materials are discussed beyond the analysis of the final score and performances in Chapter 7.

²⁰³ Aaron Cassidy, "I Am An Experimental Composer," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/experimental-composer/>

Where and how Cassidy employs these loops should be clarified. They are numerical abstractions realizing important overall features of the quartet (Figure 4.1). While not obvious or audible in the way *color* and *talea* can be, Cassidy's loops realize much of the craggy terrain the rest of the work rests upon. The isorhythmic operations using these number patterns are the starting point for the work (described in further detail in Chapter 7). They spin out to generate the work's large-scale boundaries. Much of the score's general information and contrapuntal relationships rely on the mapping of these procedures. In doing so, Cassidy arrives at an initial score draft with the final number of measures, time signatures, structural divisions, and tempo changes before any specific musical gestures are realized.

These processes are, in essence, large-scale isorhythmic procedures, calling to mind the major influences on Cassidy's work, including Hübler's study of Renaissance Era practices as well as Deleuze's discussion of "The Baroque" as an "operative function" that "endlessly produces folds."²⁰⁴ Cassidy uses the word "loop" when he discusses these procedures.²⁰⁵ This is a loop in the sense of components in an isorhythm, where the *talea* (rhythm) and *color* (pitch) loop against one another.²⁰⁶ In doing so, they create new pairings of information. As such, these are quite distinct from the more familiar idea of a tape or sample loop that conspicuously repeats itself.

²⁰⁴ Tim Rutherford-Johnson, *Music After the Fall*, (Oakland, University of California, 2017) 104–105.

Gilles Deleuze, *The Fold: Leibniz and the Baroque*, trans. Tom Conley (London: The Athlone Press Ltd. 1993), 3.

²⁰⁵ Aaron Cassidy, "The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In)," *Contemporary Music Review* 32 (2013): 322.

²⁰⁶ Jared C. Hartt, "Tonal and Structural Implications of Isorhythmic Design in Guillaume de Machaut's Tenors," *Music Theory Society of New York State* 35 (2010): 58-59.

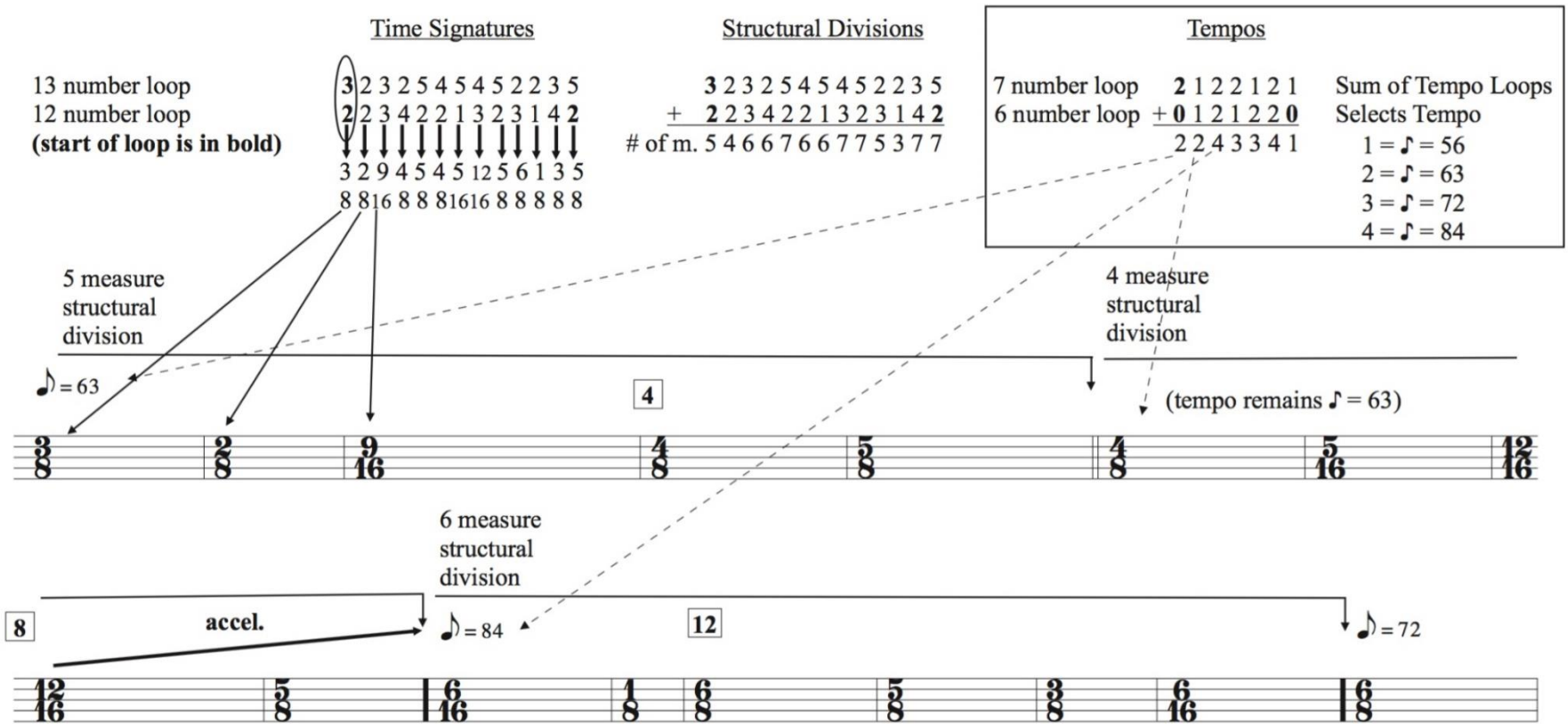


Figure 4.1: Diagram of foundational looping processes and what they generate in *Second String Quartet*.

Second String Quartet
Aaron CASSIDY

$\text{♩} = 72$

Violin I
Violin II
Viola
Violoncello

blue (3) = lay-in instr.
w/ instr. —
stretching, recombining
pitch (2) = short form,
clear instr.
sequencing, simplifying
→ various attacks

blue — add rests
for any 'unson'
subdivision (e.g. p. 20)
→ except for
accented notes

pitch of 'walk' instr.
higher, any common
subdivision split across
two parts e.g. p. 19
→ only allow subdivision
when necessary

Second String Quartet
Aaron CASSIDY

$\text{♩} = 63$

Violin I
Violin II
Viola
Violoncello

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Figure 4.2: (left) Cassidy's first draft for *Second String Quartet*, (right) Cassidy's final score for *Second String Quartet*.

With the overall boundaries neatly determined, a second set of loops is developed to run the length of the work, often deliberately across these structural boundaries and against each other. These loops that Cassidy calls “instrument roles” manage the timings and the “instrument behavior types” of the individual parts. They create segments of different lengths, setting the stage for unstable, contrapuntal relationships that draw so much of the focus throughout the quartet, i.e., its salient characteristics. In essence, Cassidy establishes a clearly demarcated container that he then contrapuntally overwrites.

Instrument Roles/Behavior Types

Number of Measures Per instrument Segment - From that instrument's specific loop (listed below in # of measures)

Violin 1: 5 6 3 4 2 3
 Violin 2: 3 6 5 2 5 7 7
 Viola: 5 3 6 7 4
 Cello: 5 3 7 5 2 4 2 3

Behavior Type (Solo, Tacet, Short-Term Variation, Long-Term Variation) - Assigned using random number generator

♩ = 63 4

V1 5 measure – Solo Segment	6 measure - Solo Seg.
V2 3 measure – Solo Segment	6 measure - Tacet Seg. (rest)
Va 5 measure - Tacet Segment	3 measure - Short-Term Variation Seg.
Ce 5 measure - Tacet Segment	3 measure - Solo Seg.

8 accel. ♩ = 84 12 ♩ = 72

V1 (6 measure Solo Seg. continued)	3 measure - Solo Segment	4 measure - Tacet Segment
V2 (6 measure Solo Seg continued)	5 measure - Short-Term Variation Segment	2 measure - Tacet Segment
Va (3 m. Short-Term cont.)	6 measure - Solo Segment	7 measure - Solo Segment
Ce (3 m. Solo cont.)	7 measure - Tacet Segment	5 measure - Solo Seg.

Figure 4.3: An example of the loops Cassidy uses to build the contrapuntal relationships between instruments. The loops are designed to avoid frequent overlaps

The way Cassidy's small loops work remains mostly consistent in each instance. He runs these pairs or groups of unevenly sized patterns against one another. The main boundaries of the work, for example, are realized by running a 13-number pattern against a 12-number pattern. While the place where they finally align again, m. 156, is those numbers common multiple ($13 \times 12 = 156$), the asynchronous patterns determine several key features.

For example, the alignments realize the quartet's time signatures, with the top number being the numerator and the bottom number being the denominator of the time signature. Similarly, the structural boundaries within the work are created by adding each of these pairings (the first column is $3 + 2$, so the first subsection is five measures long. The second column is $2 + 2$, so the second subsection is four measures long). Time signatures, which change only at the start of a structural subsection, are created using the same kind of loop process with different number choices.

The loops used for instrument roles/instrument behavior have a similar approach but diverge in execution. Since the four string parts' loops are designed to remain asynchronous, they create contrapuntal relationships that flow through the work. Their disagreement is what generally facilitates the quartet's contrapuntal surface.

Cassidy pairs each output from the four instrument loops with a randomly generated number to define the kind of instrumental behavior that occurs in that particular instrument. The four choices are solo (new material), tacet (silence) and two variation behaviors that repurpose solo segment material in specific ways.²⁰⁷ While these behaviors will be discussed further in the following chapters, the more important aspect to know is that the "new material" in each

²⁰⁷ String Quartet as Laboratory 317–319

instrument's solo is not derived from something like a motivic source. Instead, Cassidy's processes constrain the ranges of which materials are allowed in that segment.

The instrument roles/instrument behavior's loops (Figure 4.4) manage the continuity of each instrument's material. They segment groups of measures in ways that ensure there will not be frequent alignment between instruments or with their instruments and the structural divisions from the structuring loops from above. Like those structuring processes, they are created before specific notes are written. The moments where each instrument's segments align and diverge from the structural boundaries is clear (see example). As seen below, the constant, stretto-like presence of these solo segments is obvious. Variation materials, meanwhile, appear throughout, but occur in a supporting or less consistent role (they are 23.5% of the measures within the work). Moments when individual instruments' segments and structural dividers are more explicitly present in Section 1 (mm. 1–28). They are part of how the section demonstrates important features within the quartet. Beyond that point, segments that start or end together are infrequent, though sometimes produce important moments within the quartet's contrapuntal fol

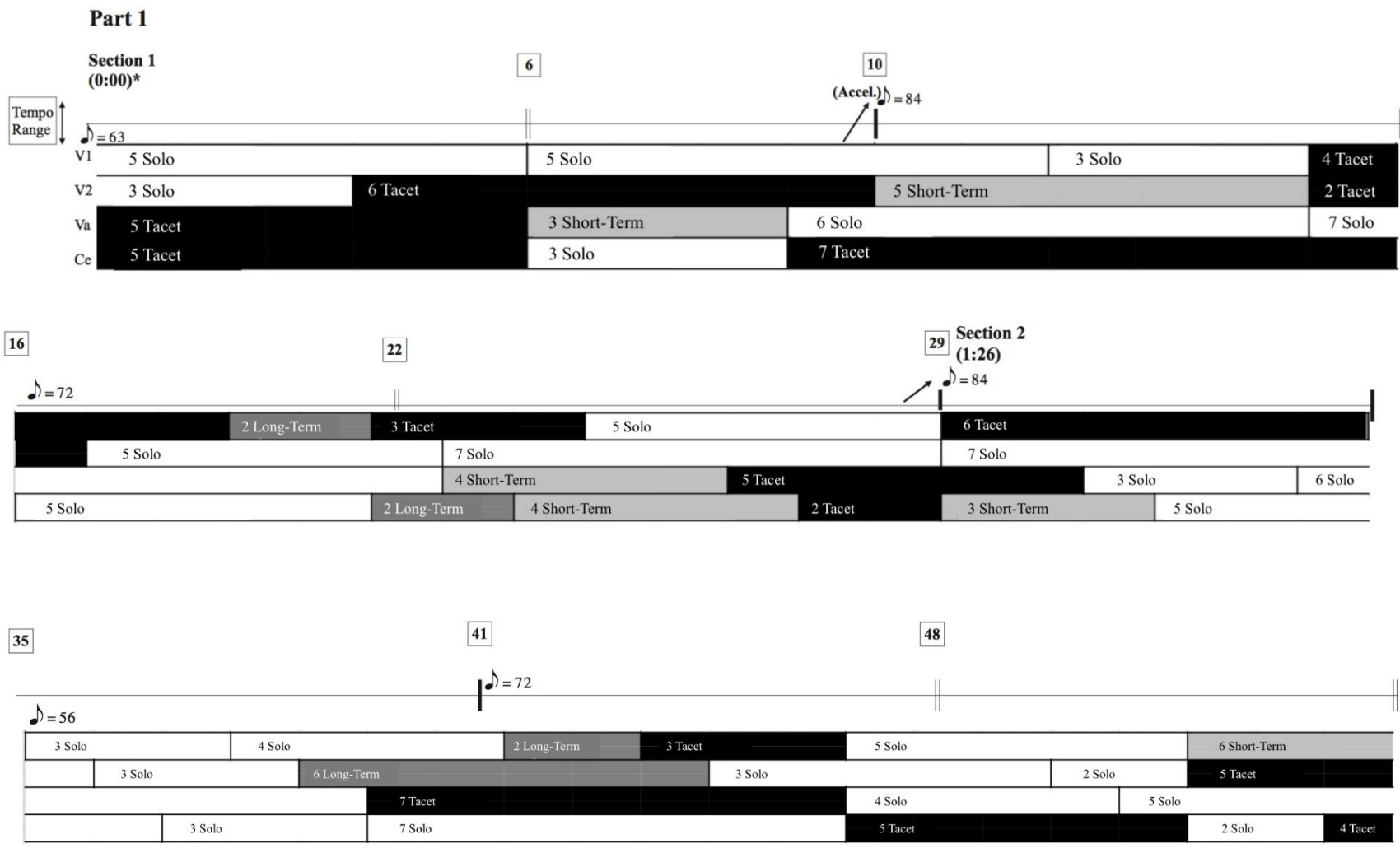


Figure 4.4: Instrumental behavior loops throughout *Second String Quartet* (made with the processes described in Figure 4.3). Segment type and number of measures are indicated. Measures with an * after m. 152 are incomplete segments (cut off by total duration of the work).

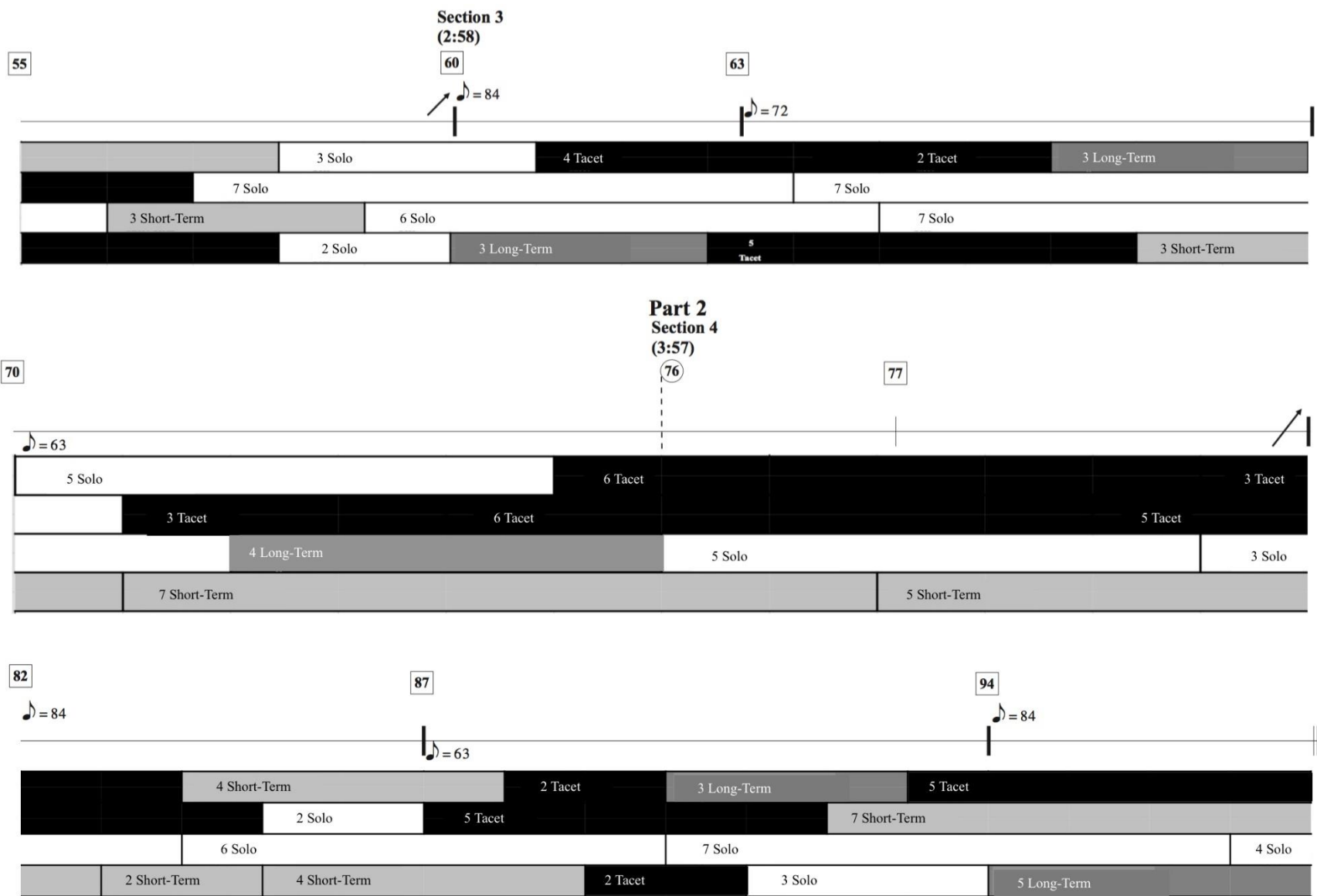


Figure 4.4, Continued.

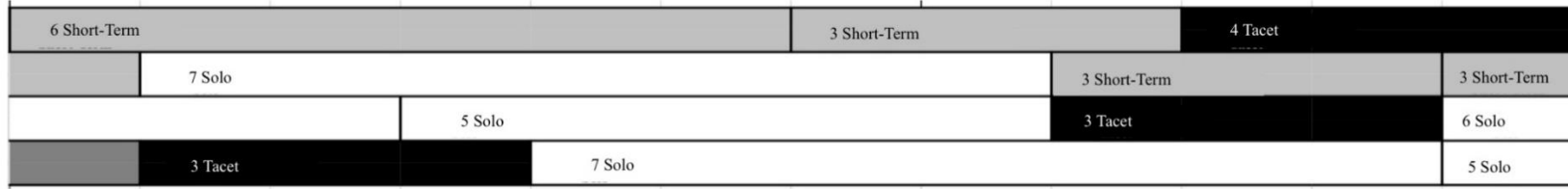
98

Section 5
(5:38)

(Rall.)

104 105

♪ = 40 ♪ = 56



110

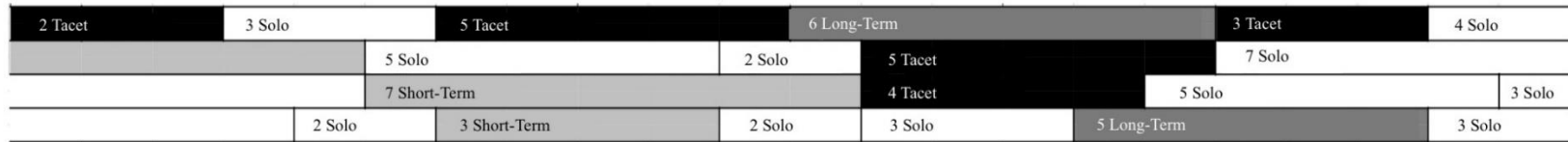
Section 6
(6:20)

♪ = 72

118

120

124



132

Section 7
(7:28)

(8:27)

135
♪ = 84

140

141

146

♪ = 63

152
♪ = 84

156
♪ = 90



Figure 4.4, Continued.

In general, Cassidy increasingly employs more volatile and uneven processes and resources the closer his materials come to the choreographic surface of the work. The complete cycles of the structuring loops give way to the more complicated ones for the instrument roles. Instrument roles' use of randomly generated numbers further emphasize the twisted landscape Cassidy forms for his quartet. Later, randomly generated numbers will iterate the parameters, constraint windows, and gestural models within narrowly defined ranges to create each solo segment. These coincidences and collisions of looping processes from Cassidy's composition processes create the fixed, torqued spaces for his choreographic gestures to proliferate within.

These resilient structures establish the contrapuntal push and pull between the structural divisions and the instruments' phrases as well as between the instruments. The consistent time signature changes, frequent tempo changes, and overlapping, randomly assigned instrument roles reliably distort and interrupt linearity. While the multi-axial surface of the quartet and its indeterminacy deserve much credit for the work's fluctuating, transient expression, these contorted foundations are equally critical. The sum effect is then the imagery of a "photograph blistering against a flame" Rutherford-Johnson uses to describe Cassidy's music.²⁰⁸

4.3 Main Sections

Second String Quartet is comprised of seven sections that group into two large parts (Figure 4.5). Part 1 (Sections 1–3) establishes boundaries and relationships between solo and variation segments that will be distorted and return throughout the work. Part 2's sections (Sections 4–7) examine particular distortions and attempt returns to Part 1's established norms (Figure 4.6). Section 4, for example, shows the ramifications of solo segments being limited to a

²⁰⁸ After the Fall 104

single instrument for an extended amount of time. Section 5, meanwhile stretches the definition of Cassidy's short-term imitative variation process, only using the increasingly distant Section 4 for its variations.

Section 6 and 7 are similarly linked. Section 6 attempts something close to a return to the normative use of solo segments and typical use of short-term variation but is ultimately a frustrated version of the climax in Section 7. Made of only solo segments, Section 7 works toward that eventual climax point and its highest tempo marking. In doing so, the final moment's full ensemble at maximum energy surges, "vanishing quite suddenly" as Cassidy indicates on the score.

This analysis's sections are made through a combination of studying the score, performance recordings, and sketches, with a deference to the listening experience when different potential answers emerge. For example, while many sections abide by the score's structural dividers (its heavy bar lines, double bar lines, and tempo changes) that were created before the notation of gestural information, some do not. Because of the interlocking, contrapuntal loops that structure the work, phrases that do not abide by these preliminary divisions at times are expected. In these cases, silences that result from the specific aspects of Cassidy's subsequent variation work (not specifically indicated as tacet segments in his original design) create distinct boundaries at the end of Sections 3 and 6 that exist between structural dividers and tempo indications. Within a work that foregrounds such intricate activity, these moments of silence weigh heavily.

Part / Section	# of Measures	Notable Features
<u>Part 1 mm. 1–75</u>		
Section 1 mm. 1–28	28	Models independent hands with multi-axial choreography within wide boundaries along string length, how the numerous solo segments instigate variation networks, and typical cadential criteria.
Section 2 mm. 29–59	31	Builds on Section 1's models, including use of more subtle/less full range constraint windows, more intricate phrase shapes from same kinds of gestural models.
Section 3 mm. 60–75	16	Codetta leads to dissipating cadence. Silence.
<u>Part 2 mm. 76–156</u>		
Section 4 mm. 76–104	29	Extensive viola solo creates limited sources for short-term variation networks, rallentando cadence.
Section 5 mm. 105–119	15	Variation segments only refer to Section 4 solo segments, cadence reuses rallentando cadence material, concluding the pair of sections' relationship.
Section 6 mm. 120–39	20	Almost a return to the model's emphasis on solo segments and its relationship to variation networks. Cadential build up is frustrated—results in dissipation. Sets up Section 7's final cadence.
Section 7 mm. 140–156	17	Only comprised of solo and tacet segments. Cadential build up succeeds in accelerating to fastest tempo of the work in its final moment.

Figure 4.5: A summary of *Second String Quartet*'s main sections and notable features.

Second String Quartet

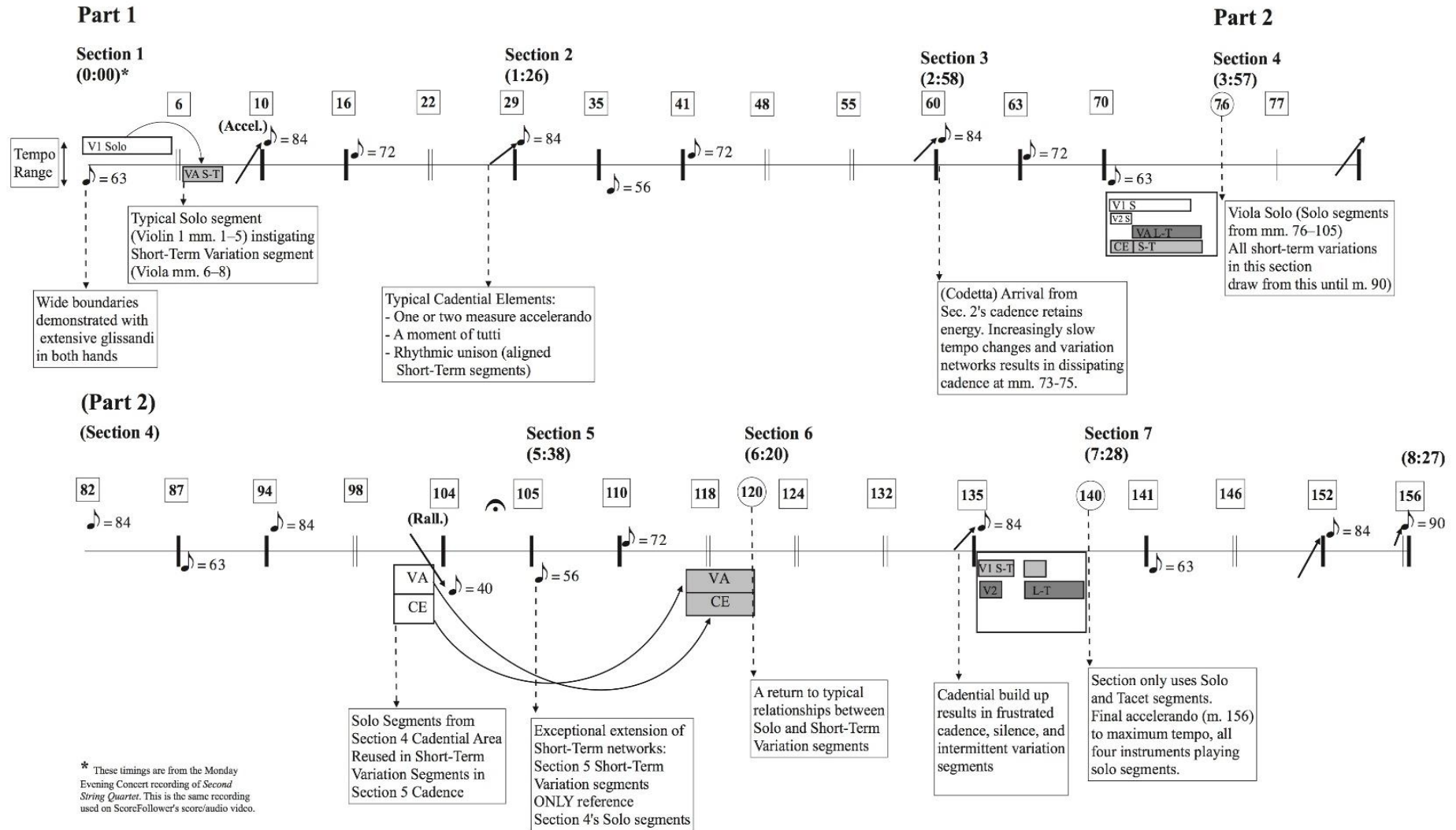





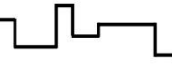


Figure 4.6: An outline of *Second String Quartet* that highlights its main sections, tempo changes, and impact of instrumental roles on the form of the work.

4.4 Part 1 (Sections 1–3)

Part 1, and in particular, Section 1 (mm. 1–28), of *Second String Quartet* establishes normative expectations and demonstrates important features found throughout the work, even if Cassidy’s structuring processes do not necessarily mandate that a first section is meant to do so. This opening section presents the wide boundaries the quartet’s left and right hands perform throughout the work, devoting many of the initial gestures to linear (though sometimes heavily embellished) glissandi.

In addition to these demonstrations of large, independent hand position sweeps, Section 1 introduces how new solo material appears persistently throughout the work, often in stretto-like fashion. While these solo segments are not motivic in a traditional sense, they have a sense of continuity as ongoing products of Cassidy’s processes. While discussed in greater detail in Chapter 6, they include constraint windows that define what areas along the string length are available throughout a segment, parametric patterns and rhythmic scaffolding that guide how many layers of independent elements are happening, and what Cassidy calls “gestural models.”²⁰⁹

²⁰⁹ Aaron Cassidy, “Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voice,” *Search Journal for New Music and Culture* 10, (2013): 15.

	flat
	micro
	up/down (max)
	steps/leaps (mechanical, vertical)
	mordent
	vibrato/vibration/pulsation

Example 15: *Second String Quartet* gestural models

Figure 4.7: Cassidy’s diagram from *Constraint Schemata* of the six gestural models used in *Second String Quartet*. They are the means through which nodes are connected, creating nuanced transitions.

These gestural models are simple abstract shapes applied to one or more parameters within a segment, such as a flat line, a small or “micro” diagonal line, a diagonal line, steps, a mordent, or a tight, continuous zigzag line.²¹⁰ Besides the constraint windows, these gestural models are perhaps the most aurally noticeable features of the quartet, despite how fleeting or ambiguous their presence is in a particular moment. Cassidy’s writing asserts that this “palette of available movements” is meant to be “repeatable, limited, and traceable” and “can easily maintain their essential character on each of the six movement planes.”²¹¹ While perceiving them may not be quite so easy upon first hearing, they are crucial to contributing to a sense of continuity within the work.²¹² A helpful, if reductive, explanation of gestural models is that they are more artful and varied versions of physical/musical material that occurs between the start and end of a glissando or another transition between indicated states. These kinds of lines are often

²¹⁰ Ibid.

²¹¹ Constraint 14

²¹² Ibid.

depicted with arrows or dashed lines in many late 20th and early 21st century scores (including some of Cassidy's earlier works such as *The Crutch of Memory*).

While gestural models may never be as traceable for a listener as perhaps intended, their contributions to a listener's experience should not be discounted. Hearing these recurring shapes in the different parameters the quartet creates competing senses of ephemerality and familiarity for the listener. The arrival, use, and disappearance of different iterations of some to all of these gestural models within a segment contribute to the transience and surface distortion Cassidy favors. A small example of this can be seen in measure 4. Violin 1's fairly linear right hand glissando has a flat, heavy pressured moment followed by a repetitive bow position wobble. Both embellishing motions come from the gestural models made available in Cassidy's sketches—"flat" and "vibrate." In performance, the right hand's twisting, wide sweep (from the micro-diagonal model) is reinforced by the similarly shaped left-hand sweep. The other embellishing gestural models appear, troubling the surface, then disappear as the glissandi continue.

Section 1 also features examples of short-term and long-term variation processes. Beginning with the viola's imitation of Violin 1 in m. 6, recently completed solo segments by one instrument are choreographically imitated by another. Their imitative presence contributes to continuity in the short-term by briefly extending the presence of material from a recent solo segment (Figure 4.9). Besides this defining imitative quality, when short-term segments happen in more than one instrument simultaneously, they are the only examples of rhythmic unison in the work (Figure 4.10). When present, these unisons frequently contribute to cadential activity.

The Crutch of Memory

for indeterminate string instrument

Normative bow positions modified by linear transitions.
Ex. Bow Positions transitions from ordinario to poco sul ponticello. Later, a transition from ord. to poco sul tasto.

The image shows a musical score for an indeterminate string instrument. It includes a tempo marking of $\text{♩} = 76$ and a 3/8 time signature. The score is annotated with bow positions: 'ord' (ordinario) and 'pst' (poco sul tasto). A red oval highlights a transition from 'ord' to 'pst' with a note: "[fragile, splintered, but with continual forward momentum]". Below the main staff, there are three staves: 'fingerings' (showing IV and I), 'finger spacing' (showing 4 and 3), and 'hand position' (showing IV and I). Dynamics include *pp*, *ppp*, and *pp*.

Second String Quartet

Normative bow position boundaries have been replaced with access to entire string length.

Transitions between nodes along string length use gestural models rather than only linear ones.

Mm. 3–4 show the bow position moving far along the fingerboard. Changes to bow position occur between indicated rhythmic attacks from that stratum layer. Between attacks, such as in m. 3's 4:3 tuplet frame non-linear gestural model movement

M. 4 utilizes the flat and vibrate gestural models as "connectors" between that layer's rhythmic attacks while continuing to change bow position.

M. 1 A near-normative application of bow position, moving linearly from a near-sul tasto, sul pont. to ord.

The image shows the Violin 1 part of the 'Second String Quartet'. It features a tempo marking of $\text{♩} = 63$ and a 3/8 time signature. The score is annotated with bow positions: 3/8, 2/8, 9/16, 4/8, and 5/8. A red line traces the bow position across the staff, with various gestural models (flat and vibrate) indicated. A blue oval highlights a section of the score, and a blue circle highlights a specific bow position transition. The score includes various rhythmic attacks and non-linear gestural models.

Figure 4.8: Examples of how the range of bow positions has been expanded in *Second String Quartet* when compared to an earlier work by Cassidy, as well as how the more nuanced gestural models offer more intricate means of transitioning from one node to another. (left) *The Crutch of Memory* (for indeterminate instrument) (right) *Second String Quartet* Violin 1 mm. 1–5

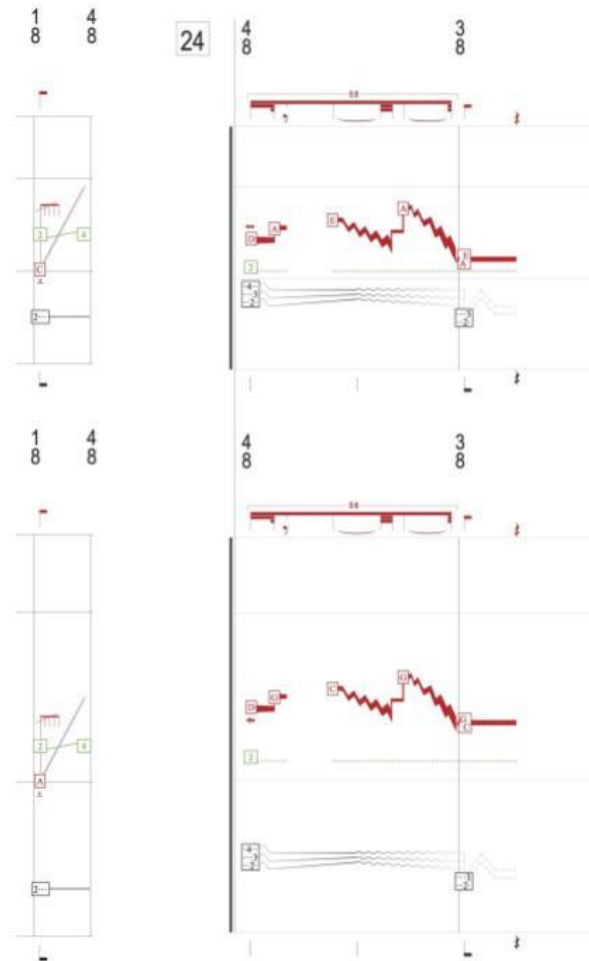
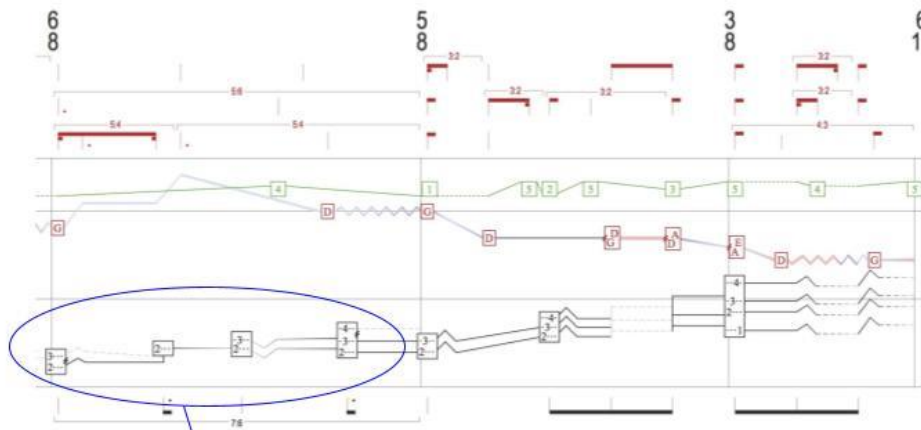


Figure 4.10: Rhythmic Unison in Viola and Cello mm. 23–25.

Long-term variation similarly extends a solo segment’s impact despite doing so in a different manner. As seen in Violin 1 mm.19–20, rather than draw attention by mimicking a recent gesture, it combines fragments from preceding and upcoming segments, such as the right-hand material in Violin 1 mm. 27–28. While they are less audibly distinct because they are not simple echoes of material, this kind of variation’s ability to more neutrally repeat moments or extend segments makes its own contributions throughout the quartet.

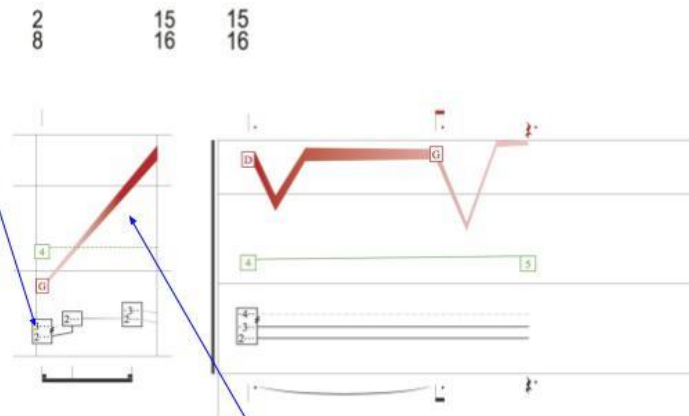
Violin 1 Mm. 12–14 (Solo segment)



**Violin 1
Mm. 19–20**

**Long-Term
Variation –**

Recombines
Previous
And
upcoming
gestures from
Left-Hand or
Right- Hand



**Violin 1
Mm. 27–28
(Solo segment)**

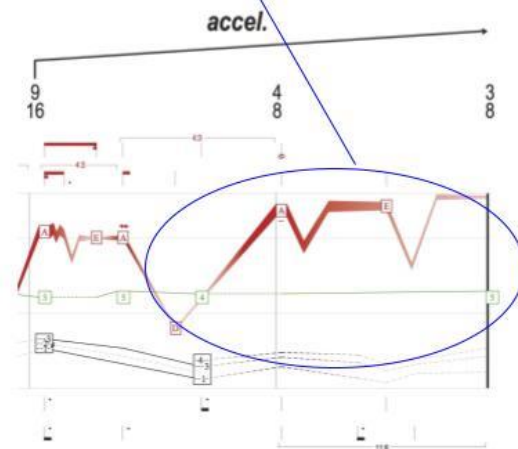


Figure 4.11: Violin 1 mm. 19–20 Long-Term segment and the Violin 1 solo segments that inform I (mm. 12–14 and mm. 27–28)

Finally, this opening section's cadential area provides a model for how most sections of the quartet will end. Components of these cadences include: a combination of the presence of two or more solo segments, a tempo shift (typically an *accelerando*), rhythmic unison, and, even if briefly, the entire ensemble playing at once to provide a surge of energy that moves the work into the next section. Section 1's ending, along with the end of the work, provides the clearest example of an end to one section and the beginning of another (Figure 4.11).

Even so, elision or some kind of crossfade between sections is typical in this work. For example, while Section 2 distinctly begins at m. 29, Violin 2 has begun playing the less boundary-demonstrating versions of multi-axial material at m. 22 (Figure 4.12). Played alongside Violin 1's slightly more linear glissandi passage, the tension the foundational looping processes is visible—a clear end and a deliberate continuation press against one another, allowing the work to move ahead. A similar blurring of this clear boundary is seen in the cello's short-term segment in m. 29–31, where it sparsely echoes Violin 1's final Section 1 passage (mm. 24–28).

While intermittently silent passages are still reserved for the variation segments in Section 2, its persistent solo segments have shifted from the broad, demonstrative sweeps of the opening into more intricate and subtle performances of the multi-axial readings of the gestural models. That is to say that these passages still employ extensive and independent hand choreography but are not constantly linearly tracing from one boundary to the other. This shift toward less boundary-demonstrating phrases begins in the middle of Section 1, but here in Section 2, it is stabilized. More nuanced uses of the notation's multi-axial possibilities are deployed, including more emphasis on passages like the initial jagged wave pattern in Violin 2. In terms of right-hand

materials, they include more gentle glissandi, flat pressures, terraced, square wave bow motion, and less audibly linear motion via pizzicato. The frequent presence of complex shapes for left hand motion and finger width are present throughout the section. Where Section 1's (still complicated) passages might have been closer to a linear shape with added distortion, Section 2's passages more fully take advantage of the gestural models used to inform them.

Section 2 invests in other precedents set by Section 1. It continues the noticeable way short-term variations imitate some of the many recent solo segments. Its cadential area at mm. 57–59 uses the same formulation of an *accelerando*, rhythmic unison in m. 57, and full ensemble (with each instrument playing its own solo material) at m. 59. Although Section 2's specific gestures differ from Section 1 due to the prominence of *col legno* and similarly quiet volume bow pressure, their overall similarities are aurally clear. Near-constant solo segment material delivered by one or more of the instruments pushes the sections ahead. Imitation remains localized and the cadential features are familiar.

Long-term variation segments, meanwhile, are applied in the same manner they will appear in for the remainder of the work. While still presented as phrases that are more intermittent than the preceding and upcoming solo segments they draw fragments from, they use more individual fragments from those sources to create more complex recombined gestures. While the networking of these variation segments is discussed more in detail in Chapter Six, the interconnection between them is increased from Section 2 onward.

In contrast to how Section 1's long-term networks are closed off and fed by surrounding segments, long-term and their instigating solo segments in Section 2 and after are often dovetailed (Figure 4.13). That is to say that after a solo segment informing one long-term segment that happens before it, the same solo segment informs a second, upcoming long-term

segment. Some non-dovetailed examples exist beyond Section 1, however, the most extensive dovetailing begins here in Section 2: Violin 1's dovetailing of solo and long-term variation segments begins with its first entrance in Section 2 and concludes with its final segment in mm. 153–156. These examples will be examined in detail in Chapter Six.

Simple Long-Term Segment Relationships in Section 1

(solo segment—>long-term segment<—solo segment)

Dovetailed Long-Term Segment Relationships in Violin from Section 2 to the end

(solo segment—>long-term segment<—solo segment—>long-term segment<—solo segment—> etc.)

Figure 4.13: Examples of simple and dovetailed long-term segment relationships.

While these long-term variation relationships are less traceable than short-term variation relationships, their sonic impact begins to be audibly noticeable in Section 2. As the section proceeds, there is a distinct transition between mm. 38–45, that coincides with the first time that long-term variations occur simultaneously (violin 1 mm. 41–42, violin 2 mm. 39–44). While a fairly continuous cello solo segment continues through that moment, coinciding elements draw attention to this. They include a shift toward *col legno tratto*, more intermittent violin 2, violin 1's extension of its gesture in mm. 38–41, and the significant silences with these segments (Figure 4.14). While not creating a full dissipation of material and momentum as seen at the end of Sections 3 or 6, the combination of the suppressed volume of *col legno tratto*-adjacent timbres and reduced activity allude to what will be heard when long-term segments persist without solo segments present.

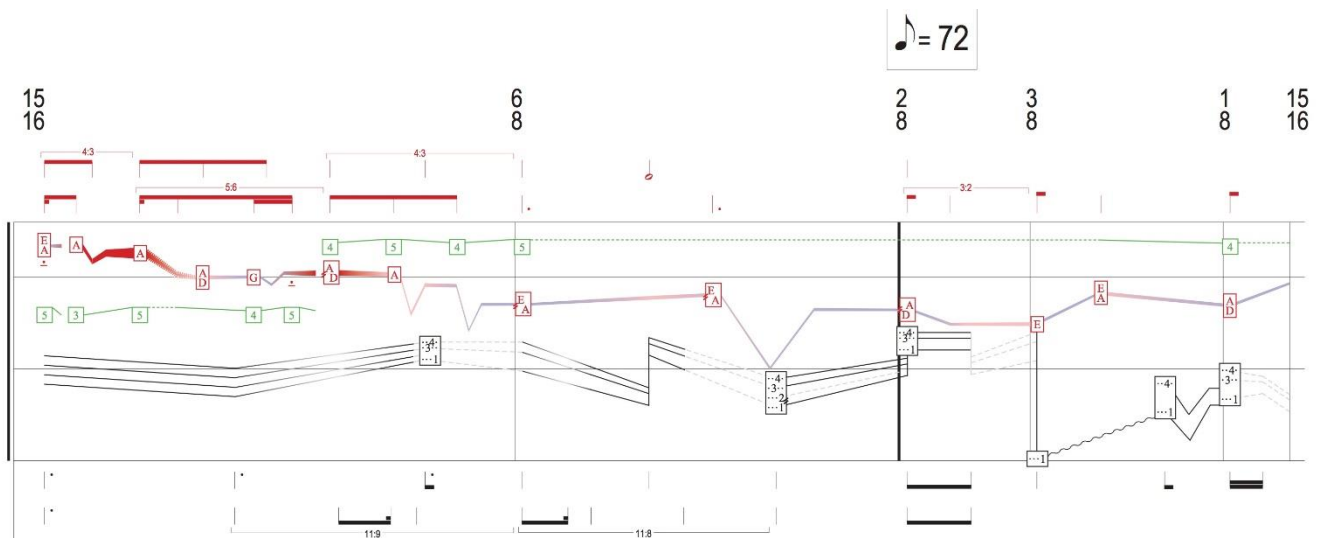


Figure 4.14: Violin 1 mm. 39–43. The long-term segment in mm. 41–43 recombine right-hand material from the immediately preceding Violin 1 Solo segment, extending the presence of this gesture.

Section 3 is effectively a codetta that receives the surging cadential energy from mm. 57–59 then tamps it down with slower and slower tempos. This leads to the dissipation in m. 75, the first full pause of activity and measure of silence of the work. This inter-reliance of sections and dissipation to silence from long-term and short-term segments are the last demonstrations of what will be used and distorted in Part 2.

Much of what establishes these larger functions in Section 3 comes from the collision of particular structural divisions, tempo assignments, and contrapuntal instrument role loops. Solo segments played by most or all of the ensemble occur between mm. 58–60, but the solo segments for Violin 2 and Viola continue on through almost the entire section. Rather than an elision of material that resets with new activity with a new tempo as in m. 29, the cadential actions at mm. 57–59 establish a brief tempo up surge to quarter note = 84 in m. 60 that almost immediately falls back to the previous tempo. While other sections feature tempo changes, this is the first space where tempo is slowed twice consecutively.

The consistent solo segments moving through these decreasing tempos funnel the quartet toward the final moments of Part 1, where Violin 1 performs another volume-suppressed *col legno*-focused solo segment against variation segments from the viola (long-term) and cello (short-term). Whether or not a listener recognizes that the viola and cello are working through material from the same recent viola solo segment (mm 59–64), these more intermittent and somewhat fragmented gestures slow the momentum of the quartet to a halt. After this silence, the defining elements of the quartet’s comparatively orderly and normative model will be withheld or stretched. While the established relationships and rules continue to matter, their applications will diverge from what has preceded it because of how Cassidy’s processes encourage variation and volatility.

4.5 Part 2 (Sections 4–7)

Part 2 is comprised of four distinct yet interrelated sections that engage with and distort the norms established in Part 1. For example, both Sections 4 and 5 use contorted applications of the work’s short-term variation network. Solo segments in Section 4 are essentially an extensive viola solo, thereby limiting or focusing the content of its short-term variation segments. Section 5, in turn, extends Section 4’s impact by relying exclusively on Section 4’s solo segments for its variation material. Sections 6 and 7 parallel one another as they attempt to use the same normative cadential actions demonstrated in Part 1 to conclude the work.

These closing efforts in Part 2 (Sections 6 and 7) contrast with how Part 1 ends with Section 3’s winding down to silence. Instead, Sections 6 and 7 ramp up at their cadential points. While they resemble the typical quality found in the quartet’s cadential areas, they attempt to push harder, toward a maximum state of activity to conclude on. Section 6’s attempt is frustrated, resulting in an awkward silence with intermittent variation segments. Section 7’s ramping up

succeeds. Its last measure's maximum effort accelerating to the fastest tempo of the work leads to "vanishing quite suddenly; turned immediately inward."²¹³

Section 4 (mm. 76–104) emerges out of silence following the end of Part 1. It abides by many of the structuring elements seen in Part 1 but does so without its signature stretto-like solo segments. Instead, these 28 measures feature six contiguous viola solo segments and numerous variation segments (especially short-term ones). While the occasional additional solo segment appears (Violin 2 from mm. 85–86, Cello mm. 91–93), it is only near the cadential area that any lengthy solo segments appear in the other instruments (mm. 99–105). While the contrasting origins of this section initially lay in Cassidy's processes, the opportunities presented are clearly invested in, with him deliberately focusing all short-term variations for about one-fifth of the total work on this single instrument.

Section 4 presents several opportunities for performers or analysts to begin understanding Cassidy's solo segments and the nature of the music they are learning. The six contiguous Viola solo segments (mm. 76–105) offer the clearest in-score picture of what continuity between solo segments looks like. While these solo segments feature fewer independent axes than usual (one left-hand and one right-hand rhythmic stratum rather than two or three per hand) and include more noticeable pauses at ends of segments, they are representative solo segments that can be compared to others throughout the work. In turn, that Section 4 almost entirely limits solo segments to the viola provides a space to examine short-term variations, especially with this section's prevalence of short-term variations that use rhythmic unison as seen during Violin 1 and Cello in mm. 84–87.

²¹³ Aaron Cassidy, *Second String Quartet* (Aaron Cassidy/ASCAP 2010): 36

The specifics of the viola's phrases progress through the section without a unified motivic relationship yet connect with each other in other ways, such as gestural models and constraint windows. In general, examining each segment through its constraint window contours clarifies the choreography within it. The first two segments (mm. 76–80, 81–83) almost emulate the opening of Part 1, where the greater boundaries are tested in almost-linear glissandi (Figure 4.15). By the end of the first viola segment, the right hand/bow has made its way to the viola's nut, with the left hand high on the fingerboard. While the first segment retains the nuanced qualities of Section 2's solo segments, the second segment rapidly works a linear path for the bow from the nut to an almost *ordinario* bow position. Throughout the passage, the left hand crosses over the right hand twice, perforating the linear bow motions with hammer-on trills.

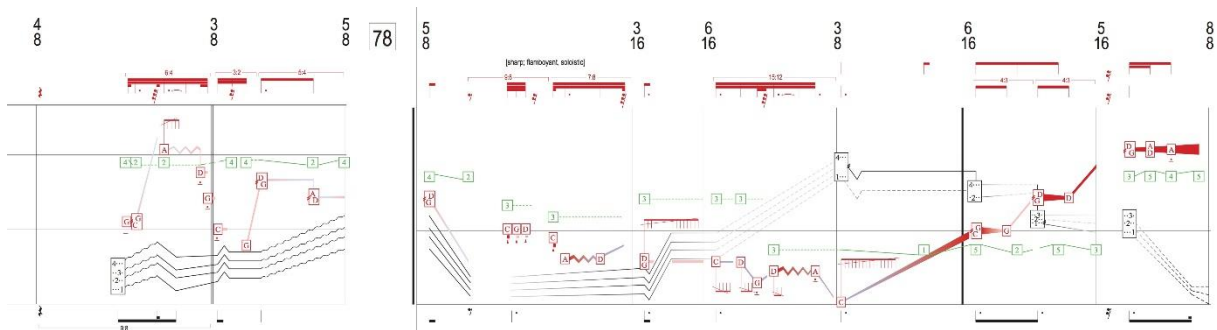


Figure 4.15: Viola mm. 76–83

In contrast, the viola's third segment (mm. 84–89) seems like more smoothed-out version of the intricate, jagged gestures from the opening of Section 2 (Figure 4.16). Despite its busy surface, this is a rare instance where the right-hand constraint window is effectively horizontal (i.e., the same space for the bow hand to move is allowed from beginning to end, rather than the typical opening or closing diagonal shapes). The number of independent axes is at a minimum. While gestural models are harder to use to categorize things, in this especially constrained space the implementation of small diagonal motion and square wave-like motion is mostly noticeable.

In contrast, the short bow gestures in m. 84 are most likely a fast, clipped square wave shapes, but as is often the case, Cassidy is creative with the exact dimensions of the basic shapes he uses. Even in this most constrained space, these solos avoid the flatness/obviousness Cassidy talks about in the close of his inaugural lecture.²¹⁴ Even the right hand's visible square wave motions in mm. 87–90 are filtered by the left hand's rhythmic stratum and right hand's *col legno tratto*, keeping them elusive.

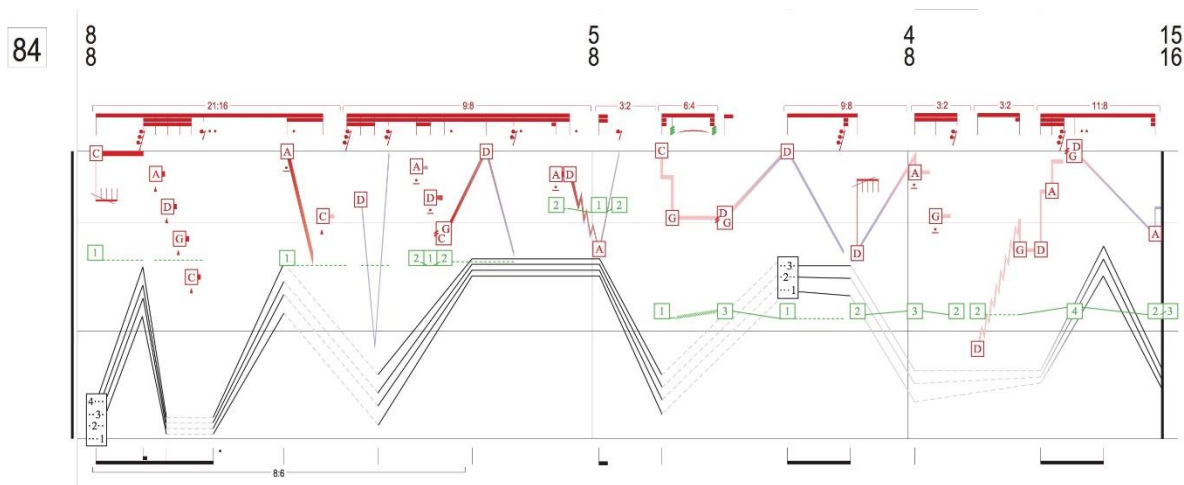


Figure 4.16: Viola mm. 84–86 (The third solo segment is from 84–89).

²¹⁴ Aaron Cassidy, “Imagining A Non-Geometrical Rhythm,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

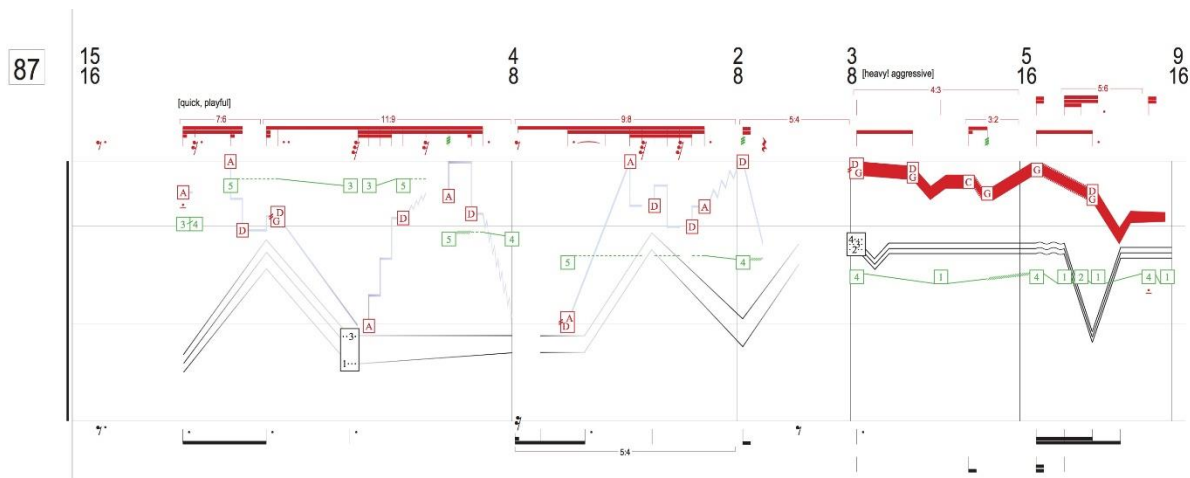


Figure 4.16 (continued): Viola mm. 87–91 (The third solo segment is from 84–89).

The following fourth, fifth, and sixth segments, provide similarly clear constraint windows and recurring yet ephemeral gestural models. The viola’s fourth segment (mm. 90–96) uses a more robust rhythmic strata to maneuver the right hand through essentially the same kind of horizontal constraint window seen earlier. The viola’s left hand, moving in small diagonal motion, almost entirely resembles the mordent gestural model. The fifth viola segment (mm. 97–100) traces an audibly broken, linear path to *sul ponticello* with bow pressure crescendo gestures, even as the left hand’s motions and harmonic finger pressure and hammer-ons obscure some elements. The sixth viola segment (mm. 101–105) removes this audible linearity, by pairing pizzicati across multiple strings from bridge to nut with wide left-hand sweeps, harmonic finger pressure and hammer-ons. As can be seen, the constraint windows (and generalized sense of constraints) guide these solo segments. The recurrence of gestural models balance variety and familiarity but are not traceable as reliable, linear motivic transformations.

As seen throughout the quartet, a sort of motivic connection between materials is instead left, at least in some fashion, to the short-term variation network. Between mm. 83–97, all short-term variation segments are in reference to the viola’s solo segments. (The cello’s short-term

segment in mm. 78–82 might seem like a likely candidate for this as well, but as is discussed further in Chapter Six, short-term segments do not physically echo solo segments that are still occurring).

The previously described first viola solo segment (mm. 78–80) is the material that informs the rhythmic unison variation phrases made by Violin 1 and Cello in m. 84 and m. 87. While each is a brief moment, that these coordinated efforts happen twice, in the same instruments, within such a short amount of time further contrasts this section with the energetic, stretto-filled earlier ones. Additional rhythmic unisons occur later in m. 98 and at m. 106 (where Section 4's short-term segments elide over the cadential boundary).

The viola's second segment (mm. 81–83) is similarly imitated via a short-term variation in mm. 92–97. While obvious on the page because of the *jete* grace notes at the viola's nut, this short-term segment is perhaps more sonically noticeable as a supportive attack behind the viola's jaggedly energetic fourth segment and the cello's brief solo segment at mm. 91–93. Interestingly, the burying of this variation segment in this rare moment of two solo segments might be purposeful beyond the percussive attack it makes. This cello solo segment (mm. 91–93) is the first of the Section 4 solo segments whose materials continue into Section 5 as short-term variation segments. While the particular material in this case (beat 3 of m. 92) is almost untraceable when it appears in Violin 1 m. 105, it is the beginning of what makes Section 5 so dependent on Section 4.

The cadence at m. 104 is both salient and incomplete. The blatant overpressure bowing in Violin 2 and Cello sustains through the work's sole *rallentando*, almost actualizing a new section by sheer force. Yet, the arrival at m. 105 is not quite as satisfying as even the dissipation in m. 75. Where Section 7's cadence ramps up the ensemble to a sudden cut off, Section 4's

rallentando cadence seems to do the opposite: it allows the music to proceed without severing ties with the previous section. Despite this, Section 4's cadence is not so different when examined closer—if this cadential area were played backwards (m. 108 or 109 to m. 102), it would fulfill all of the set-up criteria of cadences from Section 1 and 2. After arriving at m.105 through the opposite kind of tempo shift, this retrograde cadence includes all four instruments playing featuring a moment of rhythmic unison.

That Section 5 is an extension of Section 4 becomes particularly clear as its own cadential area begins (Figure 4.17). From m. 116–118, viola and cello perform short-term variations in rhythmic unison based on cadential gestures from mm. 102–104. Through the combination of context, the quartet's consistent short-term variation technique with rhythmic unison when possible, a unique moment occurs. As the two instruments double gestures from both the viola and cello parts, this is the only time in the work where a short-term variation segment references its own instrument's solo segment. This quieter cadence fixes and fulfills missing aspects of Section 4's cadence, including reuniting the viola gesture in mm. 104-105 that was bisected by m. 104's fermata.

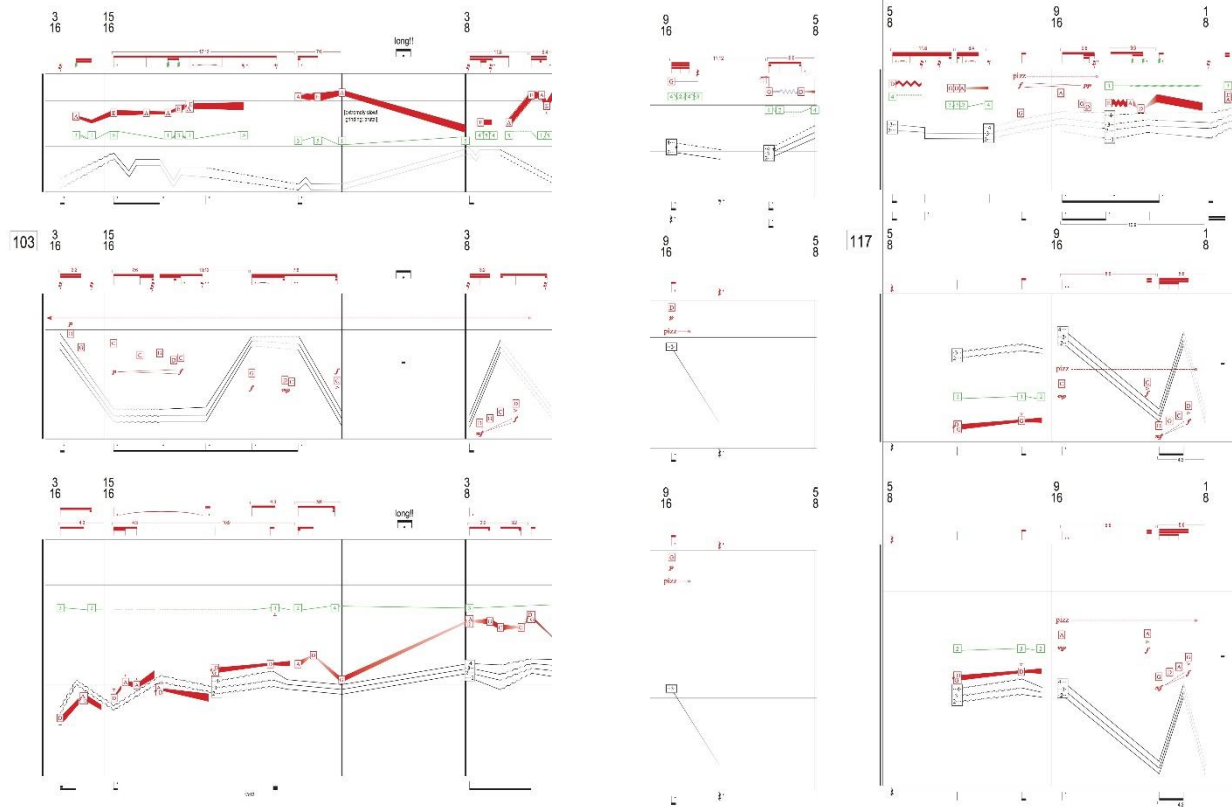


Figure 4.17: From Violin 2, Viola, and Cello Left: mm. 103–105 Violin 2, Viola, and Cello Solo segments at Section 4’s cadence. Right: mm. 116–119 Viola and Cello reference and align Short-Term variation materials at Section 5’s cadence. In addition to visibly sharing many features, the fermata gap (on the left) created by the pressure-aspect of the Section 4 is fixed in the variation version at Section 5’s cadence Viola’s broken “V” is made into a complete “V”-shape.

Interestingly, although Section 5's cadence may be a small cadential moment of silence, it is not one of stillness. While this effect could most likely be achieved in a number of ways, the smooth connection between Cassidy's solo segment constraint windows enables this moment to be so seamless. Violin 2 references its own role in Section 4's cadence (overpressure glissando) here by performing a similar interrupted pressure and position glissando from m. 104 at m. 120–121 (Figure 4.18). Although this is a solo segment and is not written with direct reference to that earlier moment, the similarities when viewed alongside the closing gestures from the viola and cello are blatant. In these measures, it is as if Violin 2 is recreating the same kind of glissandi on a smaller scale. Notably, while m. 120 is silent until Violin 2's pickup to m. 121, its left hand continues moving through the entire measure.

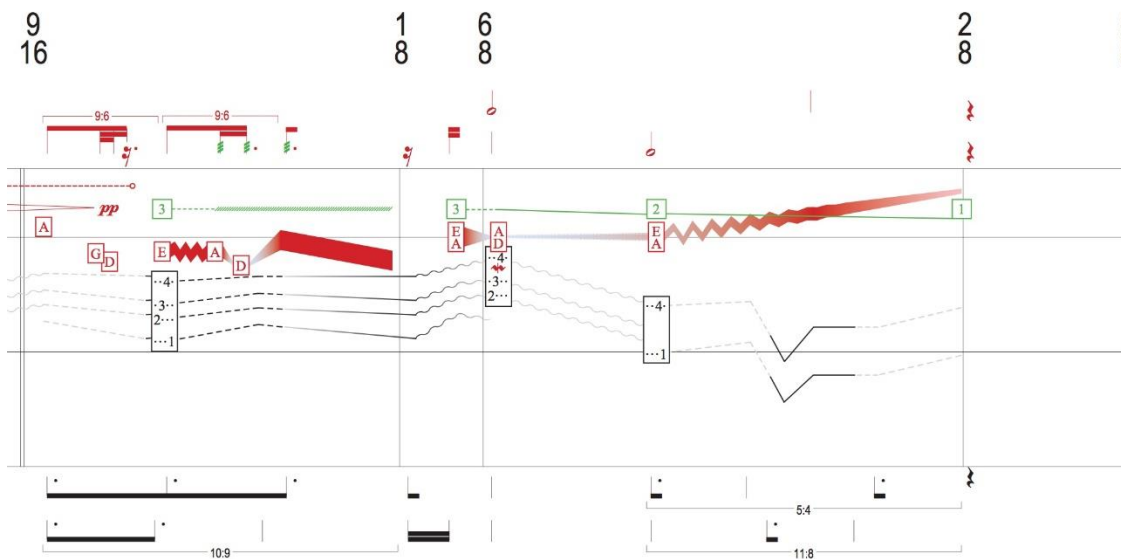


Figure 4.18: Violin 2 mm. 118–121

The conclusion of the delayed closure from Sections 4 and 5 results in Section 6 (mm. 120–139) and Section 7 (mm. 140–156) attempting to return to the contrapuntal solo segment presentation that constituted Part 1 (Figure 4.6). While the short-term networks do not occur much in these 36 measures, they are applied in the normative fashion and contexts established at the start of Section 2 and the end of Section 3. Long-term variations, although still rare, are present, with a notable one happening alongside a short-term segment to create a similarly dissipating cadential area (mm. 134–139) at the end of Section 6. After the ramp up in mm. 125–133 and the brief pause at m. 134, intermittent short-term and long-term variations flicker in a fashion similar to Section 3’s cadence, until the beginning of Section 7 in m. 140. This stalled-out moment is a product of only having variation segments being present in those measures—a rare occurrence throughout the work.

Section 7 (mm. 140–156), some elided segments from Section 6 aside, is a simple, more focused version of Section 6’s ramping up of energy through using only solo segments. While the tacet segments continue to govern how often these solo segments happen in this section, there are no echoes, continuations or recombinations of material. Instead, it is a growing mass of the quartet’s continuous, energetic solo materials exerting energy until the *accelerando*’s vanishing point in m. 156.

In this final moment, the ensemble is given written instruction, the only one indicated as *tutti*, rather than characterizing a particular solo segment’s character: “*tutti*: vanishing quite suddenly; turned immediately inward.”²¹⁵ This cadence and its instruction are not just a culmination of resulting sound, but a conclusion to physical activity. This end to physical activity, however, bears a distinct quality—even silence and stillness are arrived at through

²¹⁵ *Second String Quartet* score: 36

transitory states. Notably, this tempo assignment (the fastest employed in the whole work) and tempo shift were added by Cassidy after the sketch processes—a poetic fulfillment of the duty he has written about realizing what his processes present to him.²¹⁶

4.6 Summary of Large-Scale Resilient Structures

As can be seen throughout this chapter, the large-scale structures and the looping processes that create them deeply impact the physical choreography and sonic results of *Second String Quartet*. By approaching Cassidy's work in this manner, readers can better understand how these meaningful boundaries and reliably unstable features bring greater definition to its indeterminate localities. They are resilient structures in how they are fixed and yet deeply provocative—they maintain important specific musical qualities and trajectories within the structure while continually disrupting and destabilizing what is contained within.

This includes how the more immediately apparent outcomes of the loops (tempo shifts and time signature changes) heighten the already transitional, unstable qualities of the physical choreography in performance. Similarly, the purposeful conflict the foundational loops create between the work's sectional boundaries and the contrapuntal lines that flow across them manages the placement of the individual gestures in a way that supports Cassidy's interest in non-hierarchical structure.²¹⁷ While listening to the initial moments of the quartet will most likely create linear formal expectations for audience members, the work presents itself as one focused its unfolding continuities and using web-like, non-linear variation networks. Familiarity,

²¹⁶ Experimental Composer

²¹⁷ Ibid.

flatness, and easy traceability are evaded in favor of speed, friction, and a passing, incomplete recognition of recurring elements.

Despite the specific differences within the quartet's sections, they are united in how they are constituted out of reliable yet provocative structures that hold up even with the distortions constantly occurring within the multi-axial choreography and localized indeterminacy. String quartets performing this composition can rely on these determinate divisions, cadential activities, and the relationships throughout it. While not traditionally hierarchical in its final score, the work provides clear models that can be applied in understanding the rest of the work.

For example, Section 1 demonstrates how most musical material in the work is comprised of solo segments—small parts of ongoing processes rather than explicit motivic transformations. It introduces the imitative and recombining variation elements in their roles as subordinate segments that briefly extend the impact of one of these solo segments. It establishes the typical elements associated with cadential activity within the work. In doing so, the seemingly surprising, twisting, and changing elements are the reliable products of its resilient structures.

Chapter Five: Indeterminate Localities

With the quartet's resilient structures understood as determinate yet destabilizing entities, this chapter can focus on the indeterminate localities situated within them. As discussed in Chapter Two, the kind of indeterminacy found within *Second String Quartet* and other works by Cassidy is one created by "prescribed actions and varied consequences."²¹⁸ After discussing the general impact of the quartet's fluid yet decoupled tablature on sound production, specific examples that highlight the nuances of their application in the quartet will be discussed.²¹⁹

5.1 Location and Context

To better discuss indeterminacy within *Second String Quartet*, the segments from Chapter Four's instrument roles process will be used (Figure 4.4). Although the quartet's indeterminacy could be discussed with references only to the final score and recordings, these instrument role segments (drawn from Cassidy's sketches) are the unit in which each phrase works. They can help clarify when and why a particular activity is happening. Because of this, examples will be identified by both their context in the final score (section and measure numbers) and by the segment they are in. The segments' well-defined boundaries frame the choreographic movement and resulting indeterminate outcomes. So, while the overall work and the relationship between segments is coordinated and orderly, the contents of any segment have the opportunity to be as disjunct or varied as Cassidy's unfolding processes allow.

²¹⁸ Jennie Gottschalk, *Experimental Music Since 1970*, (New York, Bloomsbury Academic, 2016)

²¹⁹ Aaron Cassidy, "Determinate Action/Indeterminate Sound Tablature and Chance in Several Recent Works," in *Facets of the Second Modernity* eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2008), 17-32.

Within these local spaces, phrases employ several features from Cassidy's ongoing research into choreographic tablature that enable this indeterminacy. In addition to the obvious lack of specific pitch content, phrases in the quartet retain a relationship with the parametric contingencies and pursuit of physical action as a musical morpheme from Cassidy's previous projects.²²⁰ Similar to other works for string instruments by Cassidy, the quartet uses left-hand position, finger widths, and finger pressure and right-hand bow position. Bow direction and bow pressure are significant layers for physical action that interrupt, distort, and contradict each other's sonic properties.

Building on previous experiences drawing indeterminate results from decoupled notational tablatures, *Second String Quartet* brings a more fluid approach to Cassidy's use of the topography of the instrument (Figure 5.1).²²¹ The use of the unified staff allows the strands of left-hand and right-hand information to be presented as independent yet simultaneous forces. By removing noteheads, choreography and transitions are emphasized, further departing from implications of rhythmic/coordinated exactness in earlier works toward a "smooth, continuous notational space."²²²

This more "smooth, continuous notational" approach's wider transitional space and less normative reference positions further support the choreographic qualities of Cassidy's writing.²²³ For example, rather than use the more typical, trinary 20th century boundaries for bow position

²²⁰ Ibid.

²²¹ Aaron Cassidy, "The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In)," *Contemporary Music Review* 32 (2013): 305.

²²² Aaron Cassidy, "Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voice," *Search Journal for New Music and Culture* 10, (2013): 2.

²²³ Constraint 2

(from *sul tasto* to *sul ponticello*), bow positions in the quartet range any place on the string from nut to bridge.

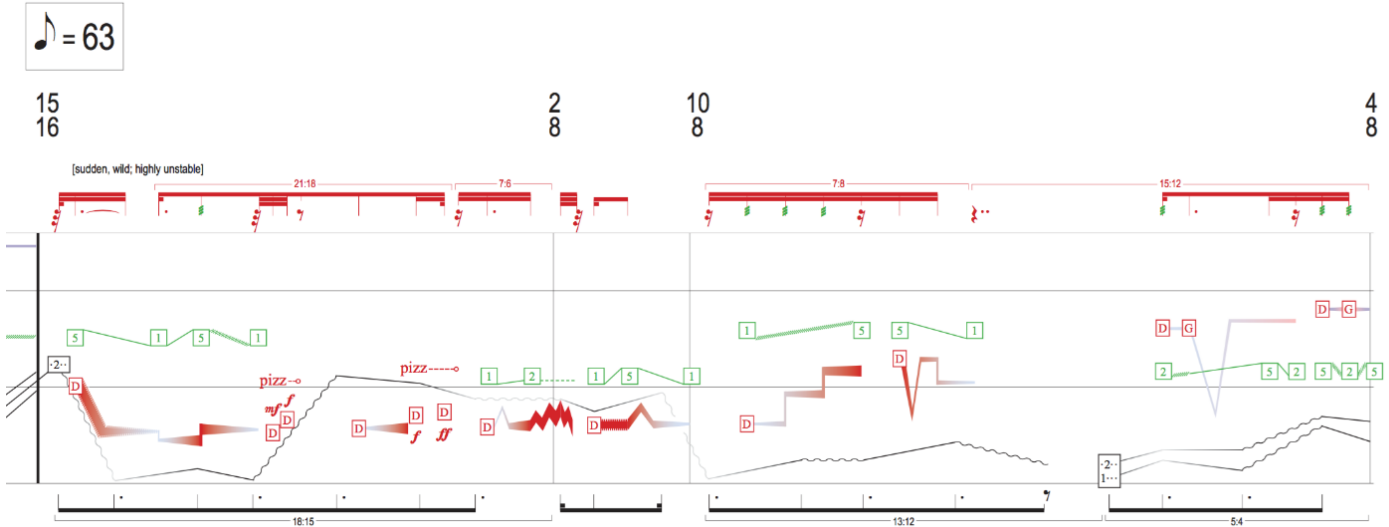


Figure 5.1: Violin 1 mm. 70–72. Graphics do correlate with rhythmic strata of each hand, but the specific rhythmic accuracies are secondary to the fluid, choreographic movements.

The quartet’s bow pressure receives similar treatment. While Cassidy’s earlier composition *The Crutch of Memory* offered five degrees of bow pressure from *molto flautando* to *molto pesante*, the notation Cassidy allows a more fluid movement between these states (as seen above in m. 70 and 72 as the bow transitions between the blue *col legno tratto* to thick red heavy pressure). Additionally, the presence and purpose of *col legno tratto* is integrated into *Second String Quartet*’s bow pressure range rather than remaining another parameter or feature.

The notation for left-hand parameters such as finger spacing and hand position is approached similarly. Building on their less normative presentation in *The Crutch of Memory*, the hand position moves along the length of the string and the finger spacing contracts and expands without an emphasis on specific, arbitrary positions. While Cassidy’s compositional process for *Second String Quartet* used clear divisions of the string length to help orient specifics within his constraint windows (what he calls this kind of localized workspace), they are

purposely occluded in the final score and in performance. When this approach to finger spacing and hand position in the quartet is combined with the work's many glissandi, trills, and hammer-ons, reference pitches, exact finger widths, and traditional hand positions are beside the point (as seen above in m. 72).

The way in which Cassidy approaches transitional states is also affected by the more fluid tablature. While he had employed gestural models in previous works, their impact on transitions is increasingly noticeable and varied thanks to the unified staff (Figure 5.2). Cassidy's earlier works for strings, for example, specify transitional states with a typical dashed line above the staff. The gestural models replace that simple, usually linear transitional state, allowing for a number of different pathways between a starting and ending state. In the context of a typical phrase in *Second String Quartet*, two or more of these gestural models happen concurrently, further drawing out possibilities in these small spaces.

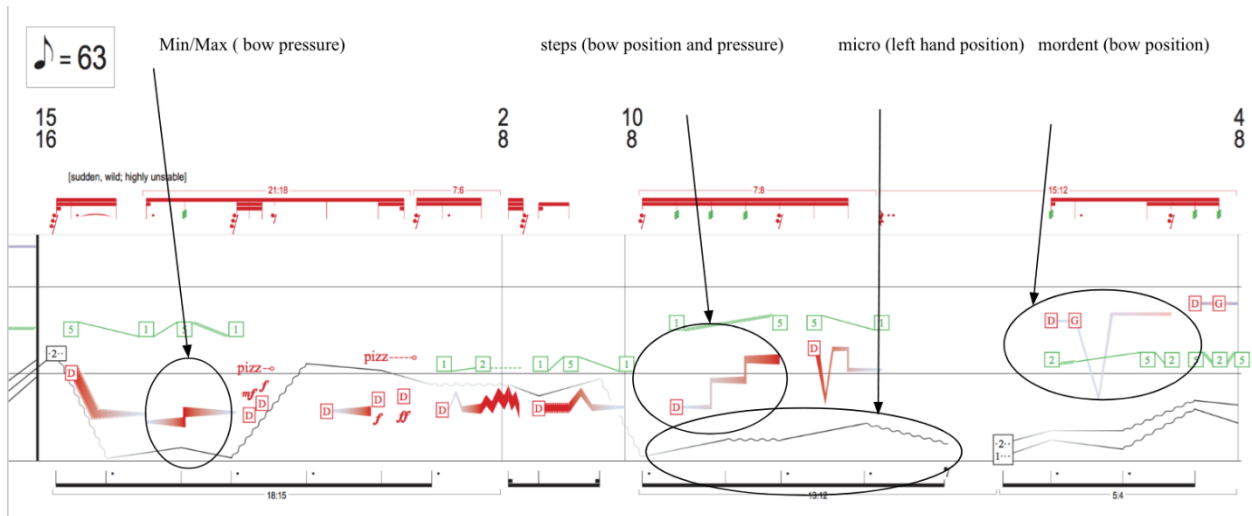


Figure 5.2: Violin 1 mm. 70–72. Gestural models in each hand happening concurrently.

The indeterminacies in Cassidy’s earlier projects are enlarged through the opportunities presented by the unified staff and related notations. They allow for a more fluid approach to the topographical spaces of the instrument that avoid normative reference points and trinary boundaries (i.e., *sul tasto*, *ord*, and *sul ponticello*), as well as a means to embrace more varied transitional motions between these points.

5.2 Right-Hand Sonic Components

Although the choreographic implications of the quartet’s tablature have been examined in Chapter Three, their musical outcomes require further discussion. The basic sonic components of the parameters and how they generally interact will be discussed here using specific examples for the remainder of the chapter, beginning with the right-hand parameters: bow position, bow pressure, and bow direction.

Bow position (up and down the length of the string) filters the amplitude of the bowed string’s partials (Figure 5.3). When at the bridge, nut, or stopping finger, higher partials are more audible than in the *ordinario* position. The string writing frequently operates beyond the location of traditional *sul tasto*, creating “weak overtone content” the closer the bow is to the middle of the string.²²⁴ Similarly, during gestures such as Violin 2 mm. 1–3, the position does not simply travel the full length of the string but from one ponticello area to the other at the nut (Figure 5.4).

²²⁴ Ellen Fallowfield, “Plucking, Striking and Bowing the String: Where? II,” CelloMap, Accessed Feb. 10, 2021, <https://cellomap.com/point-of-contact/>

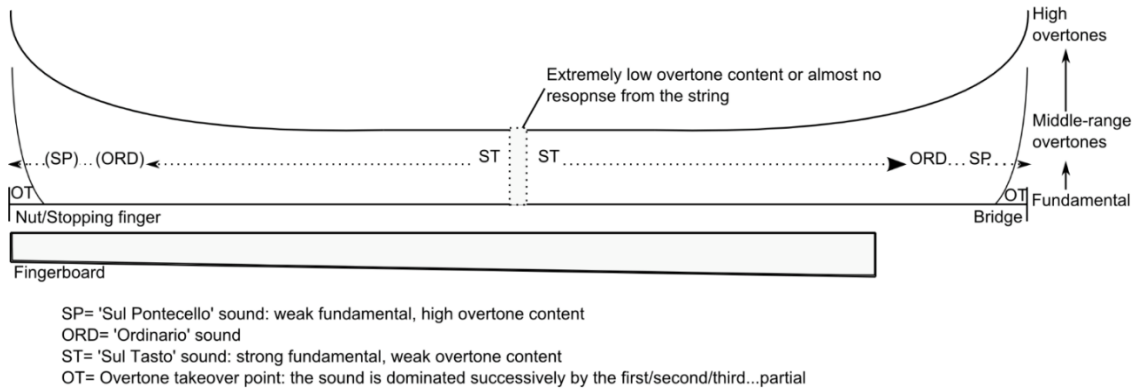


Figure 5.3: This graphic shows the amplitudes of fundamental and overtones along a string's length. Source: <https://cellomap.com/point-of-contact/>

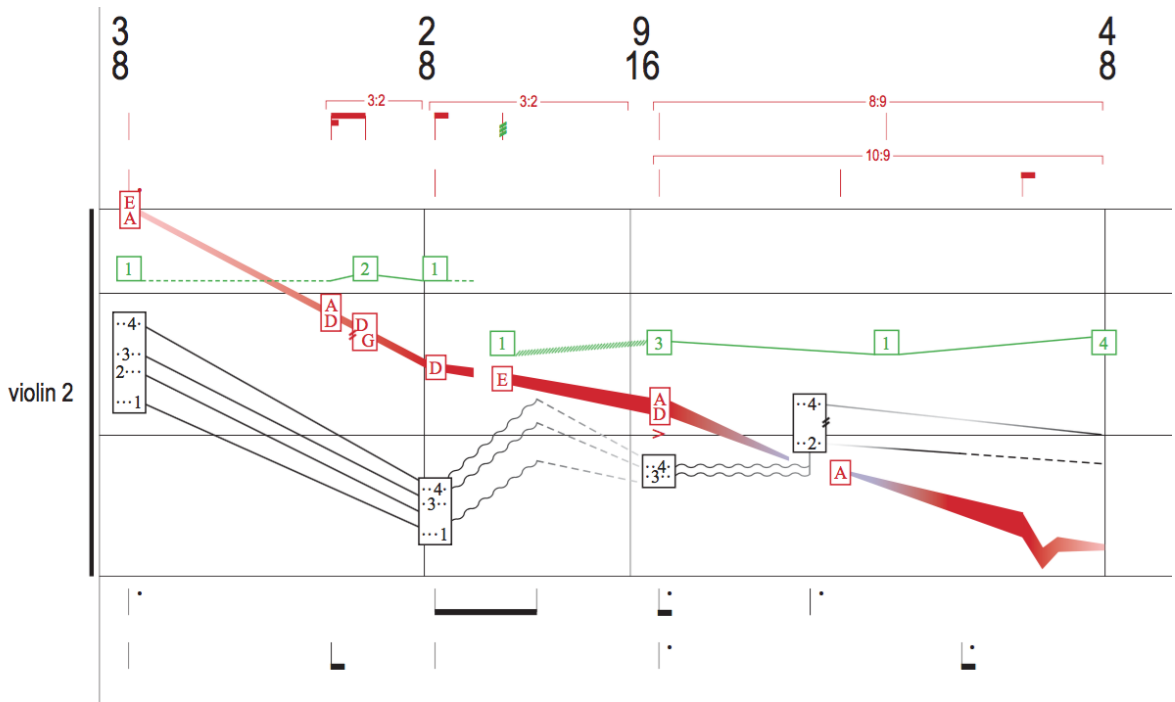


Figure 5.4: In Violin 2, mm. 1–3, a linear path from bridge to nut is traced by the violin's bow, the area shown in Figure 5.3. In doing so, the bow enters the portion of the string with the weakest overtone content from the middle of m.1 to the middle of m. 3. It continues on to the equivalents of ord. and *sul ponticello* at the violin's nut.

Bow pressure in *Second String Quartet* is a continuum that runs from *col legno tratto*, bowing with the wood (the back of the bow), a “1/2 *col legno tratto*” that combines hair and

wood (side of the bow), a light bow pressure (*flautando*), all the way to a heavy overpressure. While pressure is the ostensible commonality, the way the pressure allows or disallows the bow to grip the string links the *tratto* positions with the others. At the light pressure side of the continuum “both the fundamental and the high partials are weak.”²²⁵

As the bow moves beyond normative pressure, heavier pressure “produce[s] distorted sounds, low pitches and clicking sounds.”²²⁶ Cassidy specifically refers to these kinds of sonic outcomes in his article *Constraint Schemata* when talking about a passage from *Second String Quartet* that exemplifies the musical outcomes of his notation (Figure 5.5): “the resulting sound is something quite fascinating, with skittering, unstable crackles and clicks, particularly at the beginning of the second bar through the combination of heavy bow pressure that rapidly shakes up and down with quick, spasmodic, pressurized pulses on the string without up-/down-bow motion along with independent, flickering, hammered-on glissandi in the left hand.”²²⁷

²²⁵ Ellen Fallowfield, “Plucking, Striking and Bowing the String: How? I,” CelloMap, Accessed Feb. 10, 2021, <https://cellomap.com/how-i-how-far-how-hard-how-fast/>

²²⁶ Ibid.

²²⁷ Constraint 15

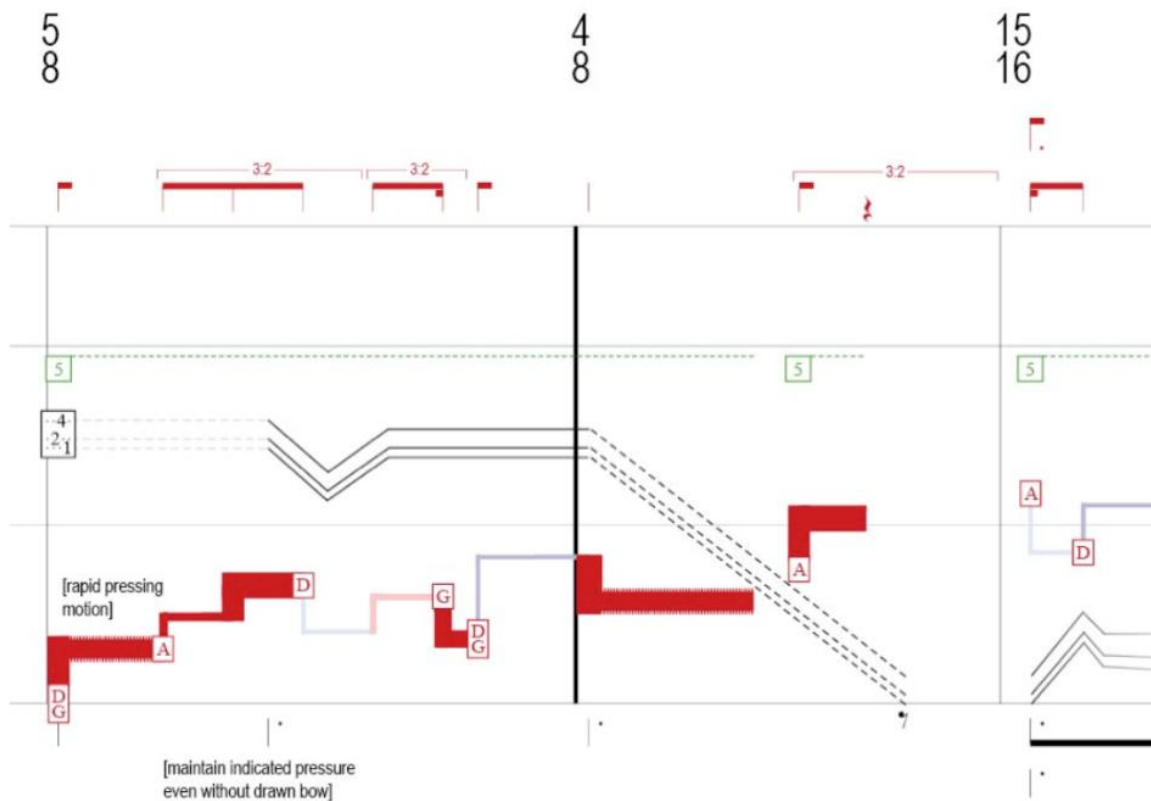


Figure 5.5: Viola mm. 109–110, the passage Cassidy highlights in Constraint Schemata because of how the actions indicated draw forth unpredictable, flickering and clicking sounds.

Bow direction is approached in a similar fashion, dividing it into zones from tip (Zone 1) to frog (Zone 5). In specifying these zones, the score uses Zone 1 and 2 (tip and between tip and middle) to avoid the dynamic contrasts that would be available at the frog (Figure 5.6). Additionally, the recurrence of tremolo and more broadly speaking, of string changes, contribute to the indeterminate results of this piece. The “mordent” string changes, where a string is momentarily left for another, is a frequent feature throughout the quartet and impacts the continuity of the bow on a particular string.

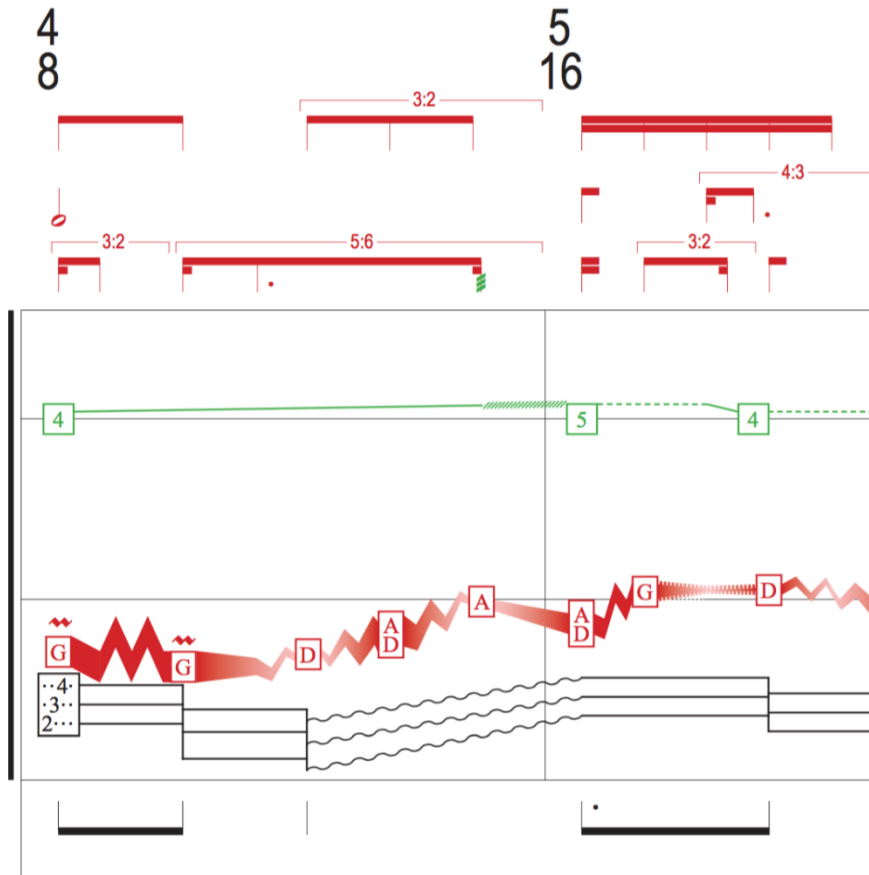


Figure 5.6: Violin 1 mm. 6–7. Mordent signs above the G in m. 6 indicate a quick crossover to an adjacent string. The green boxes indicate bow zone. At the bar line between mm. 6 and 7, the slashes on the line indicate tremolo (and are reinforced with the green tremolo mark on the stem above it in the right hand).

Before continuing to the left-hand parameters, one might take a moment to consider the implications of these right-hand parameters in combination. There are so many moments when bow position is moving (to limit frequency ranges and isolate different bands of partials, i.e., affecting the harmonic information within the sound) while conversely, bow pressure moves at a different rate to introduce more inharmonicity. This includes the “*flautando sul ponticello*” played with the tip of the bow (Zone 1) in measure 1 of Violin 2 of the quartet that “brings out

the quartet does so without specifying traditional positions or reference pitches, often using glissandi to access the different parts of a string's range. Accessing the higher end of the strings (closer to the end of the fingerboard) allows access to higher pitches and their correlated greater intensity. When this motion is combined with different kinds of finger pressure, the ordinary correlation of low to high along the length of the string is disrupted. While *Second String Quartet* does not employ extensive harmonic passages that highlight clear overtones, the many brief moments of harmonic pressure provide motion amid the less clear spaces between harmonics (sometimes momentarily engaging them without highlighting them).

Finger widths (and the finger/hand shapes they are based off of) further distort the already non-normative hand positions. As seen above in Figure 5.7, even as the violin's left-hand glissandos, the finger shapes expand and contract independently. In addition to further emphasizing the physical elements over traditional pitch systems, these changing widths create small and momentary distortions that disrupt linear or static pitch content from left-hand movement. The distortions from finger widths and finger pressure perforate what would otherwise often be a sound world of aurally clear, consistent glissandi.

5.4 Indeterminate Outputs

In practice within *Second String Quartet*, these six parameters and the two or more gestural models contouring them create the unstable, sometimes unexpected musical outcomes Cassidy pursues. Although the quartet's phrases vary considerably, three general kinds of phases offer insight into the indeterminacy within all of them. The opening gestures demonstrate boundaries of the notation, and in turn, more easily explicable indeterminate paths. While not the dominant kind of phrase in the work, extensive, linear glissandi are present throughout the quartet. More typical gestures utilize multiple independent parameters that trace more nuanced

versions of the gestural models in various spaces within an instrument's boundaries. A third type occurs where parametric independence is reduced, usually to one rhythmic stratum per hand. They are usually accompanied by a line of written text, describing what to focus on while enacting the choreographic notation.

In more linear passages such as Violin 1 m. 1–5, changes in parameters tend to move along more overt paths. In the diagram below (Figure 5.8), the changes in bow position, pressure, direction, and left-hand finger pressure, position, and width demonstrate overlapping means of sound production.

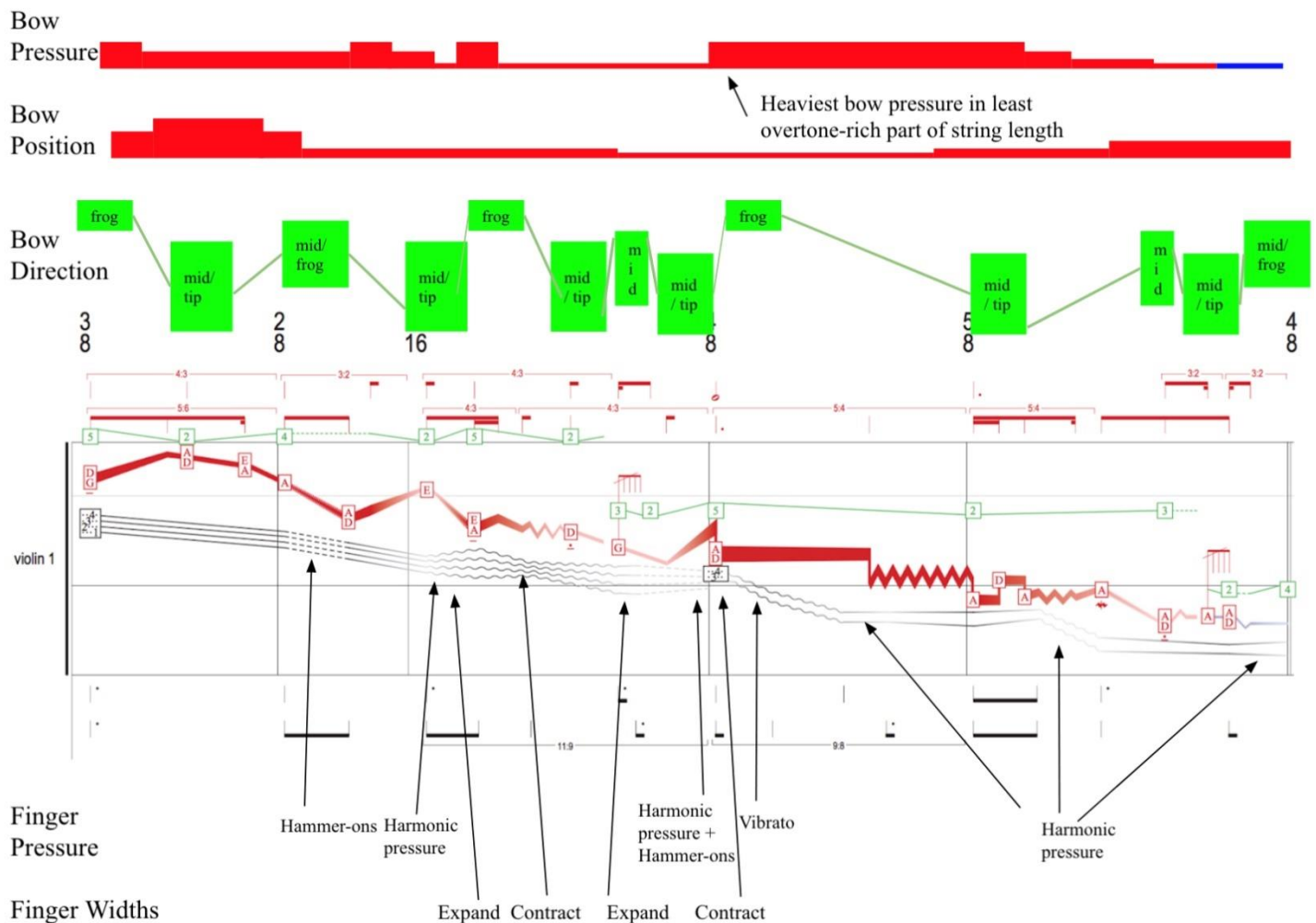


Figure 5.8: Violin 1, mm. 1–5, comparing the overlap between parameters, such as bow pressure and position, that create unstable, transient contours for the right-hand gestures.

Even with bow position and pressure using the same rhythmic stratum, the way the parameters move is distinct from one another. The bow position essentially glissandos from around *sul tasto* and *ordinario* down through the midpoint (the most overtone-restricted point on the instrument) in mm. 3–4. From there, it continues toward the more *ordinario* area where traditional left-hand first position is. (This *ordinario* area is also indicated and explained in Figure 5.3). Bow pressure meanwhile backs off from an initial heavy indication, then is deployed in its heaviest setting when the bow comes to the midpoint of the string.

In the recordings of this opening gesture, the individual moments are distorted and unsteady, flickering in and out of focus due to the layers of independently changing parameters. What appears as a linear left-hand glissando in the score is audibly disrupted by string changes, *jete*, and the finger pressure patterns. The sudden presence of the even, sustained heavy bow pressure in m. 4 is the first moment that one of these opening gestures appear in full focus. In the Monday Evening Concert recording, the disruption that follows this is especially noticeable: an even-grained pressure noise with a periodic vibration created by the right hand performing a bow position vibrato. The glissandi in both hands continue, resulting in a quieter, lower pitched arrival point. While the passage is essentially a linear one, the layers of choreographic motions disrupt, congeal, and modulate the sound each individual layer produces.

Although linear passages are present throughout the work, after initial demonstrations of the work's boundaries are concluded, many passages have less overt dimensions. For example, in mm. 29–35 (starting at 1:28 in the Monday Evening Concert/ScoreFollower recording), Violin 2 performs what sound like complicated gestures (Figure 5.9). On the score, it becomes clearer that the left-hand material uses a number of mordent shapes that have some variance in finger pressure. Cassidy has instructed that the left hand be “fast, methodical.” Against this, the right

hand performs zigzagging bow position motion, with bow position vibrato, pressure fluctuations and *jete* attacks in m. 29 and mm. 31–34.

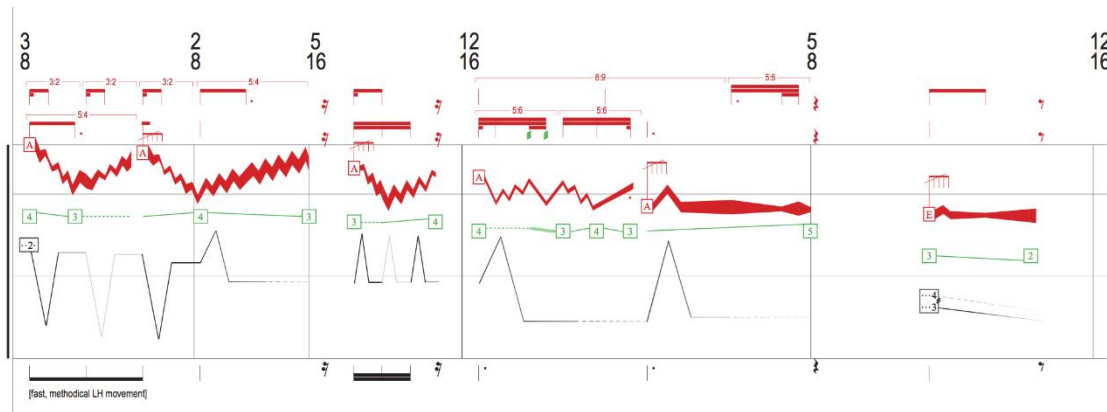


Figure 5.9: Violin 2, mm. 29–33

In performance, this collection of several individual shapes results in an uneven, undulating phrase punctuated by the *jete* attacks. The left-hand mordents may be visually clear on the score, but in combination with the right-hand patterns, the variety of sizes, directions, and different left-hand pressures aurally persist more than the actual shape. The *jete* attacks interrupt any of sense of patterning from these parameters.

While most passages have multiple independent parameters (easily locatable because of the multiple rhythmic strata used to guide them), others have the minimum of one stratum for each hand. In one such example, the solo segment in Violin 1 mm. 70–74 (3:30 on the ScoreFollower recording), independence of parameters is restricted, with all right-hand materials moving with one rhythmic stratum and all the left-hand material moving with the other (Figure 5.10). The text “sudden, wild; highly unstable” accompanies the passage. Although the passage initially melds into the ensemble’s gestures in m. 70, the frequent transitions to *col legno tratto* help realize the unstable aspects of this gesture. The limited partial content from this passage allows the violin to provide motion behind the viola’s loud, sustained bow pressure during m. 72 and m. 74 without drawing focus away from it.

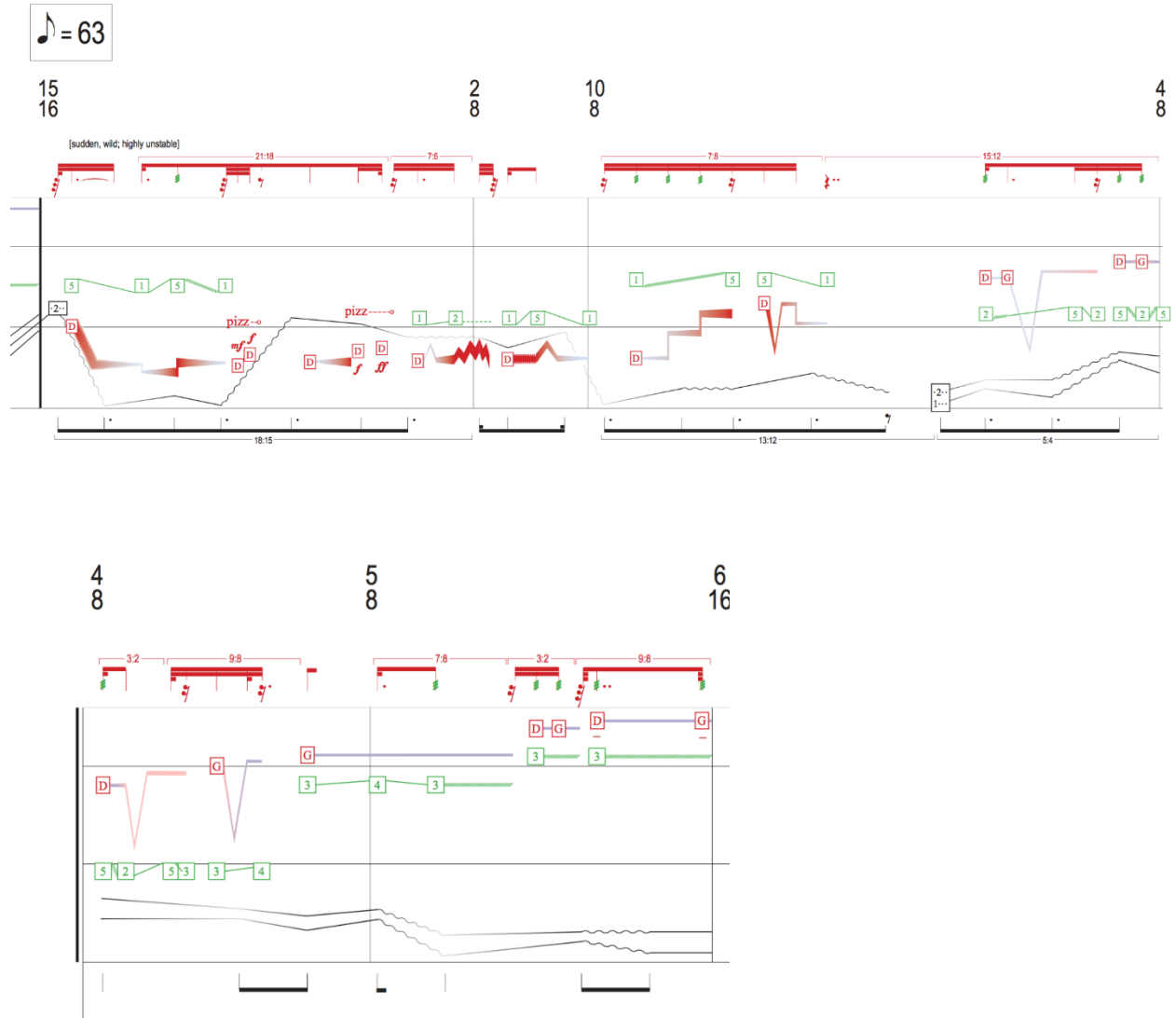


Figure 5.10 Viola, mm. 70–74

5.5 Sonic Results and Possibilities

Second String Quartet's phrases may exist within a defined, reproduceable structure, but the phrases themselves are decoupled physical gestures that move fluidly throughout the string instruments to create overlapping, indeterminate sonic results. Previous works by Cassidy have engaged in these kinds of indeterminate localities, but with the quartet's unified staff, more fluid motion without typical reference positions is employed.

While general consequences of these parameters overlapping each other can be discussed and specific examples can be indicated in the existing recordings, future performances will undoubtedly present varied musical possibilities of *Second String Quartet*'s indeterminate localities. As John Pickford Richards relates, these indeterminate localities are not simply about learning rote actions, but about the possibilities and choices they contain.²²⁹

²²⁹ John Pickford Richards, interview by author, New York City, New York, Feb. 13, 2020.

Chapter 6: Solo Segments and Variation Networks

6.1 Summary of Instrument Roles

As described in Chapter Four, the structures that undergird Cassidy's string quartet are comprised of contrapuntally arranged loops, including ones that specify the duration and kind of material each instrument will perform. These "instrument roles" loop segments align with or press against each other. They introduce new material, initiate silence, imitate recent gestures by another string instrument, or reconstruct fragments of faraway/long-term material they have played or will play.²³⁰ In doing so, they realize the boundaries for the many indeterminate localities discussed in Chapter Five, as well as establish networks between them.²³¹

This understanding of each segment's task is the next step toward examining Cassidy's multi-axial choreographic gestures, how they relate to one another, and how they are realized as indeterminate musical gestures in performance. A substantial way to frame discussions about Cassidy's gestures emerges when examining these roles in tandem with the constraint windows and gestural models that will be discussed below.

6.2 Constraint Windows

As Cassidy composes, "constraint windows" are assigned to each solo behavior loop segment, defining what portions of the string instrument are available to each hand at the segment's start and end. These constraint windows are assigned early on and are situated deep within his compositional process, yet they impact the score and performance in clear ways. They outline the routinely expanding or contracting diagonal paths for each hand, often crossing each

²³⁰ Aaron Cassidy, "The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In)," *Contemporary Music Review* 32 (2013): 317-319.

²³¹ Ibid.

other's paths as they move from one extreme side of the instrument to the other. These windows set the stage for the kinds of parametric conflicts that generate unexpected sonic results Cassidy delights in, such as the viola in mm. 109-110:²³²

[Figure 6.1] shows my favorite example of this kind of conflict from the work. Here, there is a highly unlikely combination of prescribed movement types and available spaces in which that movement can take place. In the right hand, the bow is constricted to zone 5, locked near the frog without up- and down-bow movement. The right hand's available space is initially limited to small space near the top of the string near the nut, well behind the left hand's fingered pitches, encroaching on that space in the second bar. And the right hand has a vast range of bow pressures required (from minimal to maximal, or pressures 1–6) but only one movement type up and down the string [type 4 – steps] and, simultaneously, a “bowed vibrato” gesture in the right hand pressure layer [type 6 – vibration]. Coupled with the left hand's pressure type gestures...the resulting sound is something quite fascinating, with skittering, unstable cracks and clicks...

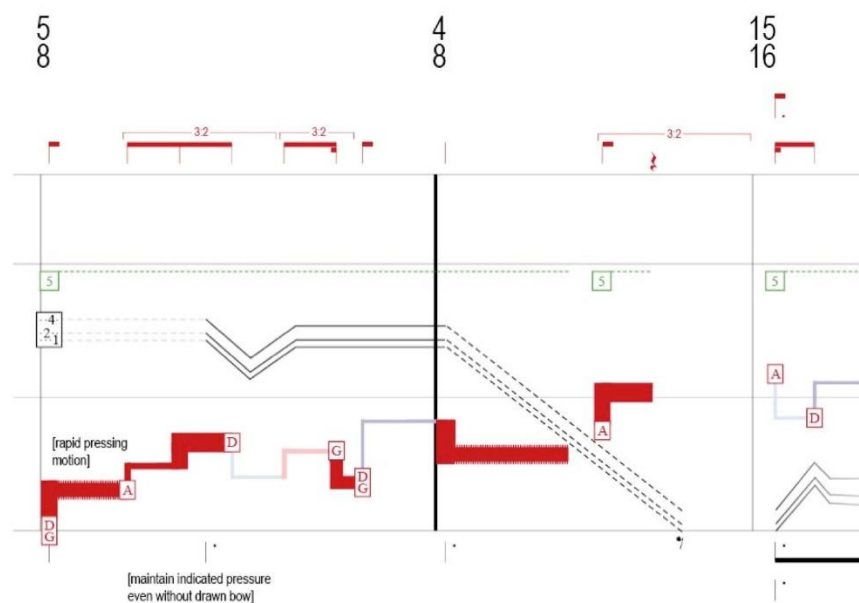


Figure 6.1: Viola mm. 109-110

²³² Aaron Cassidy, “Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voice,” *Search Journal for New Music and Culture* 10, (2013): 15.

Whether the hands are directly crossing over one another as in that example or are simply moving through divergent parts of the instrument simultaneously, they explain so much of the choreographic action within each gesture.

For example, Violin 1's right hand in mm. 1–5, works its way from just beyond the end of the fingerboard toward the top of the instrument (Figure 6.2). While it moves toward this destination, it noticeably weaves up and down on its way there, a product of gestural models articulated within a constraint window, which will be discussed more in the following section. The left hand, meanwhile moves in a more tightly linear fashion, going from high on the fingerboard to approximately first position.

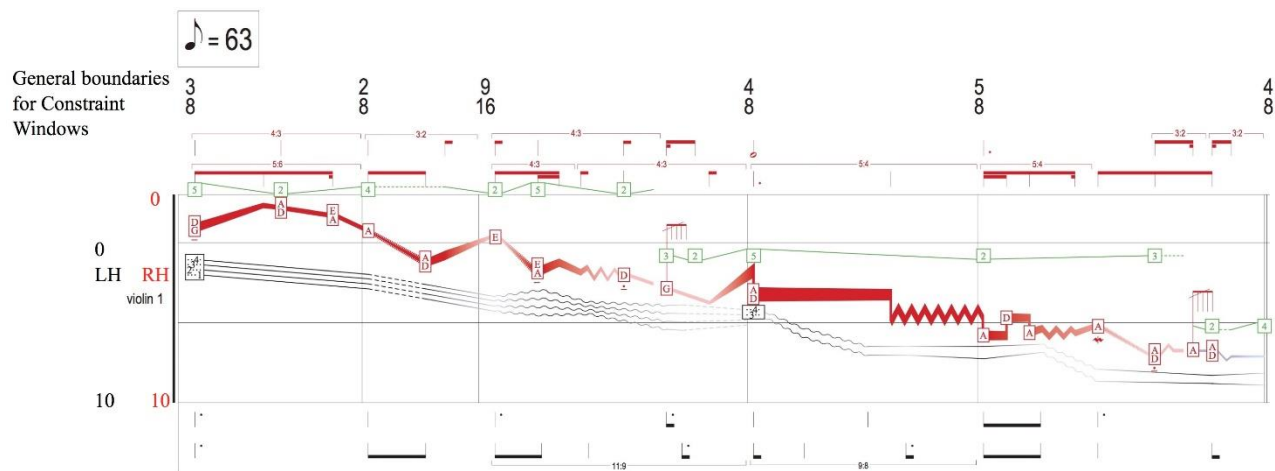


Figure 6.2: Violin 1 mm. 1–5. On the left of the staff, the number ranges Cassidy uses in drafts for each hand's constraint windows. The red right-hand (RH) range extends from the bridge (0) to the nut (10). The left-hand (LH) range extends from the end of the fingerboard (0) to the nut (10). Two numbers are generated for each hand at the start of each segment to specify the location and range along the instrument a hand can use. When combined with the next Solo segment's pairs of numbers, the allowed areas for activity swell or contract within the duration of a segment.

While focus remains on the realized work, how this signature compositional constraint is generated and applied to the score can help better understand Cassidy's gestural expression as a whole. For the purposes of sketching, he assigns numbers to places along the playable length of

the instrument. Because the bow can play the entire length of the string the range of right-hand numbers has 0 indicate the bridge and 10 indicate the nut. The left hand can only act on the fingerboard, so its 0 is where the fingerboard stops and its 10 is the nut (Figure 6.4).

In his Excel sheet sketches, he assigns two random numbers to the beginning for each hand. These coordinate with the constraint window numbers that begin that instrument's next solo segment. In drawing lines from these assigned starting points to the next solo segment (or to the approximate place where the next segment's window would begin), Cassidy defines diagonal, sometimes overlapping areas along the instrument's range that are allowed to be used.

In this case with Violin 1 mm. 1-5, the right hand begins from the bridge (0) to beyond the top of the instrument body (8) and concludes in a tighter pace between the top of the instrument and nut (7-9) (Figure 6.3). What is important to notice is that while the location available to the violinist changes, the width of the range does as well. As is hinted at by the ever-reduced right-hand zigzag, the right-hand wide space available at the start of the gesture is squeezed tighter.

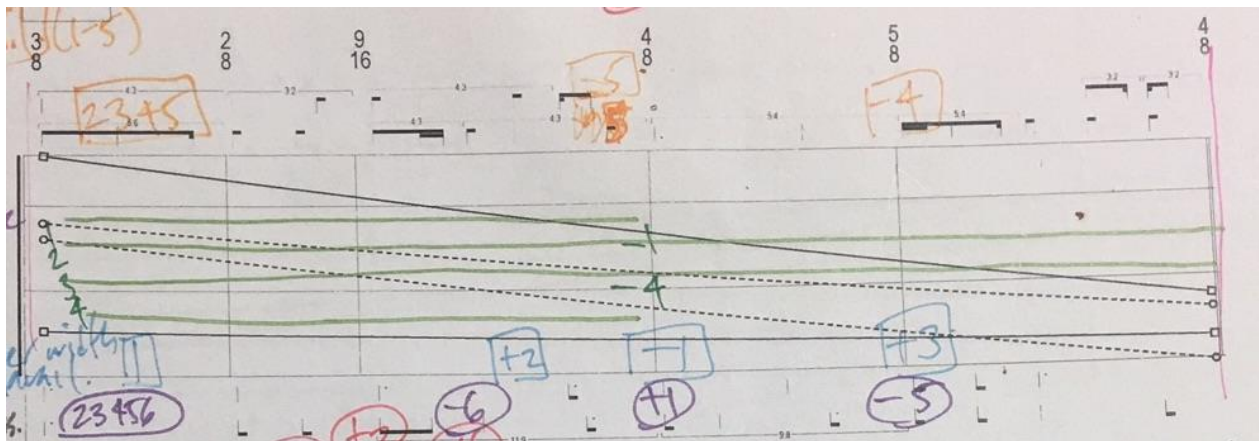


Figure 6.3: Violin 1 mm. 1-5. Cassidy's third draft shows the specific constraint windows, with right-hand constraint window indicated with a solid line, the left-hand constraint window indicated with a dashed line.

The violin's left hand in this solo segment goes through a similar trajectory, from a tight space near the end of the fingerboard (1–2) to down by first position (7–10). However, because the space between those indicated portions of the instrument is smaller at the start compared to what the right hand is allowed to use, wide zigzags as seen in the right hand would not be possible.

The way Cassidy works out what can fit in these spaces is particularly visible in his early drafts. The constraint windows (two dotted lines for left hand, two full lines for right hand) happen early on in the process, coming after the rhythmic strata was generated but before any corresponding notated gestures are made. The wide starting point for the full lines results in a right hand that wobbles with great latitude along its trajectory. This contrasts with the distinctly restricted dotted lines that lead to a much more linear left-hand path. Although these guiding lines and the specific numbers that set them up disappear as the fluid notation overwrites them, the boundaries they set up remain.

In outlining these constraint windows' paths of various angles and widths across instrument bodies, the windows provide the containers where Cassidy's gestural models to come to life. How central this is to Cassidy's expression cannot be overstated. As he describes to Daryl Buckley about this same kind of relationship between constraint windows and gestural models (in this case a "maximal up-down figure) in *The Pleats of Matter*:²³³

So for example, if I had something really simple like a maximal say UP– DOWN ... and we took the guitar fingerboard; if I have the entire space that is available that movement generates one particular kind of energy, but when I think about that movement in a small space, in a constricted space. It's an energy. And so the gesture is different if it happens at the top of the fingerboard or the bottom of the fingerboard because of how it relates to the center of the body, changing those energies.

²³³ Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015: 23.

In relating this back to the constraint window examples from *Second String Quartet*, one can begin to imagine a similar sort of constriction of a gesture in Figure 6.3, where the space between the solid diagonal lines (the space available for the violin's right-hand actions) draws tighter over time. This approach sets up the kinds of diagonal, conflicting hand trajectories that often occur in Cassidy's instrumental choreography, including in the example used above.

As suggested by the previous quote from Cassidy, while constraint windows are present throughout the string quartet and define so much of it, they continuously create distinct new contours for Cassidy to work within. Because of these ever-changing boundaries, his limited group of gestural models are perennially distorted. And while the gestural models often remain among the most distinguishable features when listening to the string quartet, the persistently varied trajectories keep the gestural models transient and integrated within Cassidy's sound.

As one of Cassidy's generative processes that occurs before gestures are formed, the constraint windows' information is also responsible for the smooth connections between solo segments. So, while the way in which material is applied within the windows may differ, the amount of space allowed where one segment ends is where the next begins. This is most noticeable in adjacent solo segments of the same instrument, such as in Violin 1 mm. 5–6, (Figure 6.4) where one segment ends and the next begins. While the string being played is different, the bow position and hand position are the same.

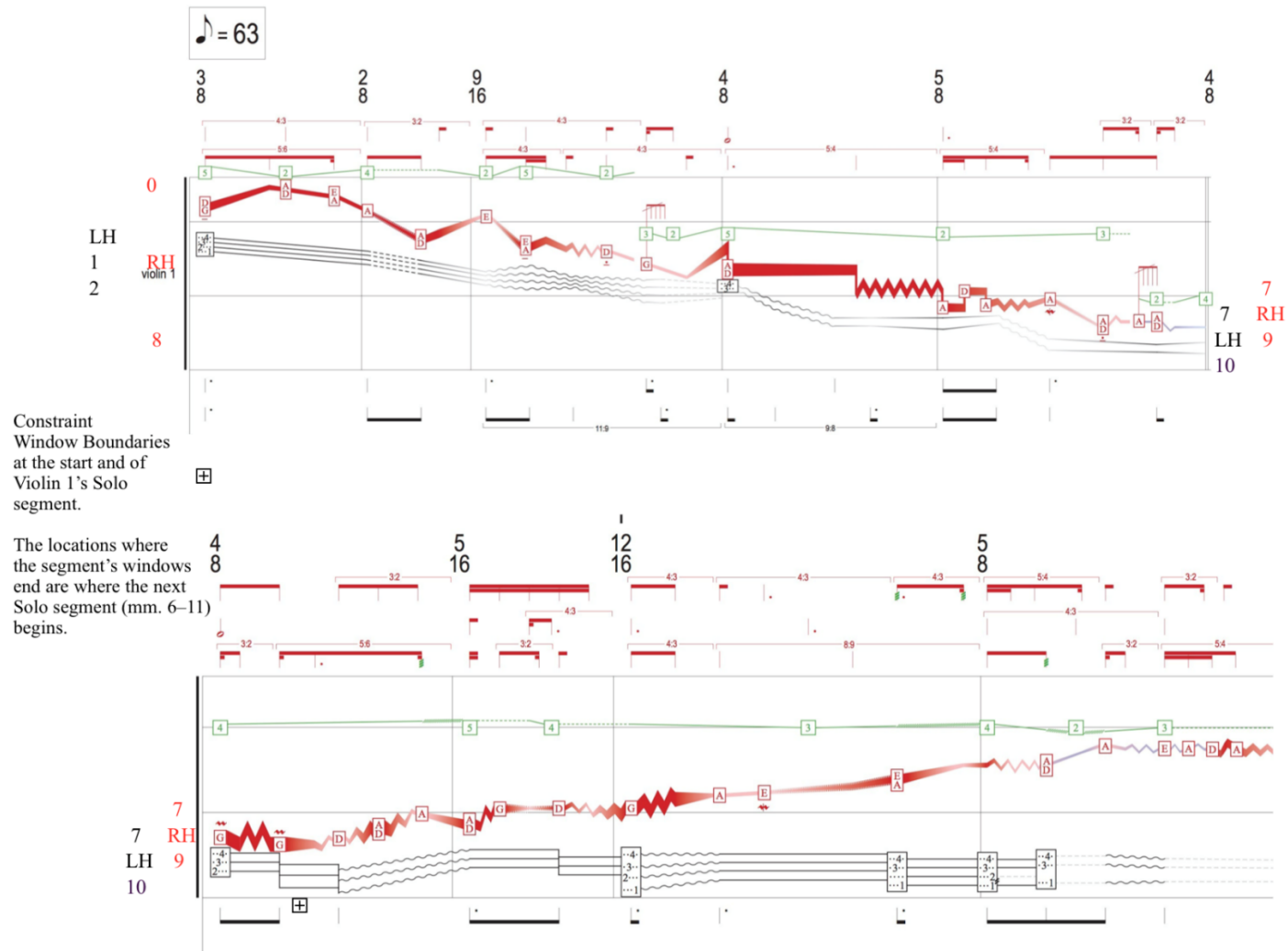


Figure 6.4: Violin 1 mm. 1-9, with each solo segment's left-hand and right-hand starting number pairs indicated. They indicate the locations and ranges Cassidy can compose that hand's gesture. Noticeably, many like the first right-hand segment create diagonal pathways.

While not as audible, non-adjacent solo segments also pick up where the last one left off, as seen in Violin 1 m. 14 and m. 24 (Figure 6.5). In m. 14, the left hand's fingers are spread wide, with 3rd finger right along the top of the instrument. In m. 24, this 3rd finger occurs in the same spot. While the bow changes location, it is still within the same window. An even more visible example of this is when comparing Violin 2 m. 3 and m. 17. The left hand heads for the top of the instrument in the first segment and stabilizes there in the next. The right hand's bow position glissando arrives at the nut in m. 3. Both the pizzicato and initial bowing in m. 17 begin in this same location.

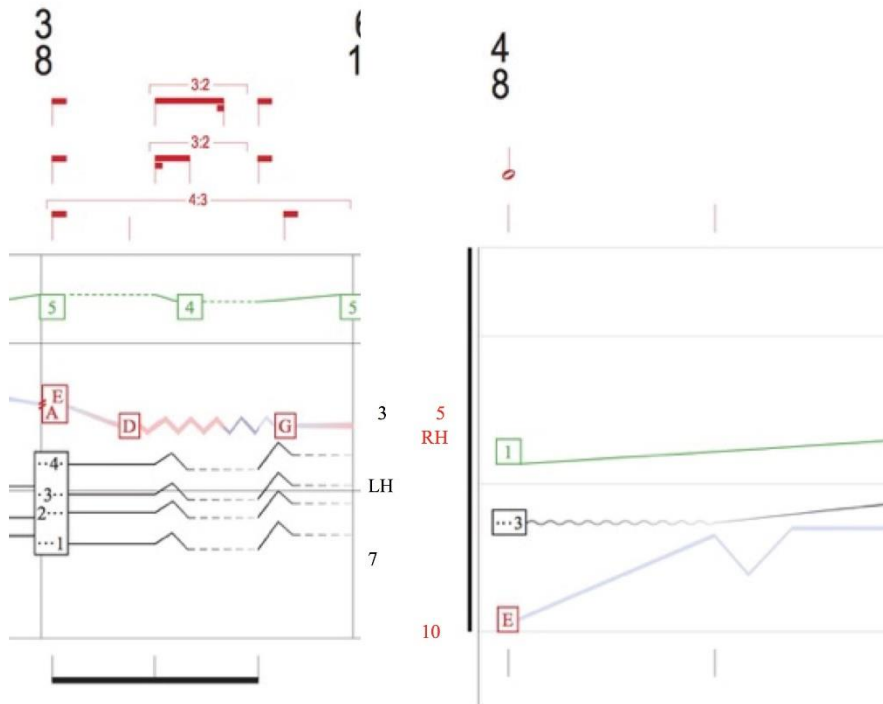


Figure 6.5: Even when not adjacent, subsequent Solo segments use the same final/initial window information that adjacent Solo segments use. (N.B. Using the same window size does not require starting the next segment from the exact placement at the end of the previous one.

Although hearing the exact connection between these non-adjacent solo segments as the quartet plays on is most likely beyond an expectation to place on listeners, they are relevant in showing what kinds of continuity exists within the quartet's volatile surfaces. In effect, the solo

segments are essentially parts of interrupted and displaced solos in each instrument. So, while not bound by a typical motivic connection, these segments from ongoing processes are connected through these boundaries. In turn, the recurring gestural models are kept unstable and alive by these distorting windows. In doing so, the constraint windows promote a physical continuity on the instrument that is often visible and audible throughout the quartet.

6.3 Gestural Models

Throughout *Second String Quartet*, Cassidy uses a limited set of six gestural models (or figures). Seen below in Figure 6.6, they are: a flat line, “micro” (a line that changes in a minute way), “up/down (max),” “steps/leaps (mechanical, vertical),” mordent, and “vibrato/vibration/pulsation.”²³⁴




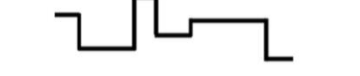


	flat	Type 1
	micro	Type 2
	up/down (max)	Type 3
	steps/leaps (mechanical, vertical)	Type 4
	mordent	Type 5
	vibrato/vibration/pulsation	Type 6

Figure 6.6: Cassidy’s gestural models graphic from *Constraint Schemata* with types labeled for reference.

²³⁴ Constraint 15

In his article *Constraint Schemata*, he describes his intentions for how the gestural models would work inside the constraint windows: “within these constriction spaces, all physical movements on all six movement planes draw on a collection of extremely simple gestural models. They are intentionally reductive, almost childish in their simplicity. The goal was to construct a palette of available movements that are repeatable, limited, and traceable and that can easily maintain their essential character on each of the six movement planes.”²³⁵

These “six movement planes” are the parameters that have been discussed since first addressing Second String Quartet’s notation in Chapter Three: (right hand) bow position, bow direction, bow pressure, (left hand) arm position, finger width, and finger pressure.²³⁶ Cassidy describes how the abstracted notion of these gestures could be applied in these different spaces: “The sixth model, for example, would include fingered trills and tremolos, subtle vibrato, rapid zigzag left-hand movement up and down the string, bowed tremolos, bowed tremolos alternating between adjacent strings, finger pressure trills, bow pressure trills, etc.”²³⁷ Applying the gestural models to different planes create more or less immediately recognizable iterations that further distort and embed them within the work.

In Figure 6.2 (Violin 1 mm. 1-5) there are four gestural model types present according to Cassidy’s materials: type 1 (flat), type 3 (maximum up/down), type 4 (steps/leaps, mechanical vertical), and type 6 (vibrato/vibration/pulsation). Although their application can at times be subtle, nuanced, and polyvalent, noticeable use of gestural models stand out. For example, type 3 is seen and heard in how the bow position zigzags widely in the initially broad constraint window, only to get tighter and closer (still effectively doing the “maximum” movement in the

²³⁵ Ibid.

²³⁶ Ibid.

²³⁷ Constraint 14

window's final, small operating space around where typical left-hand first position occurs (the 7–9 space discussed in the previous section).

Similarly, type 3 is also visible and audible in how bow pressure transitions maximum and minimum all throughout the segment. Type 6 contributes to this as well with the serrated outlines around the bow information in mm. 2–3. This, an indication of a “bowed vibrato” by quick pulses of pressure, is a recognizable example of what Cassidy discusses about how type 6's zigzags can be applied with the parameter of bow pressure.²³⁸

Some applications of gestural models are more incidental, such as how type 4 appears in the left-hand finger pressure hammer-ons in m. 2 and the steps-like bow position changes in mm. 4–5. Type 1's flat line shapes appear in tandem with those terraced bow positions. (More overt flatness from type 1 can be seen on the left hand of the following Violin 1 segment in mm. 6–11). Type 6 appears in mm. 3–5, in exaggerated finger width vibrato, bow position rapid back and forth motion.

Throughout the string quartet, gestural models tend to appear within solo segments three or four at a time within segments, with minimum of two and maximum of six available. While some blur or fuse together in realization, overall, the gestural models visually and audibly persist throughout the work. As such, they are a mostly discernible set of repeated models even through distortion and variation. Even so, because the models are so generic and appear in changing contexts, discussing their presence and application directly, as in Cassidy's *Constraint Schemata*, significantly helps center the listening experience on them.

²³⁸ Ibid.

6.4 Solo and Tacet Behavior Segments

With constraint windows and gestural models explicated, realizations and relationships of the four behavior segments can receive closer scrutiny. Segments assigned the “solo” and “tacet” behaviors, as Cassidy calls them, heavily populate the score. Solo behavior segments occur in at least one instrument from the first to the last measure with rare, intermittent exceptions. They are the only sources of new information in the score as all other choreographic/notated information is a variation of a solo segment. Tacet segments are similarly ubiquitous. Although they rarely silence the entire ensemble, they frequently create moments where only one, two, or three instruments are used.

While maintaining focus on the final score and performances of this material, the nature of these solo segments helps clarify so much of the performance and listening experience. As mentioned in the constraint windows section above, the solo segments are, effectively, displaced continuous passages for each instrument. Each of the many solo segments are composed in reference to what subset of information is indicated for it in Cassidy’s sketches’ ongoing looping processes and randomly generated numbers. This information spells out the constraint window, six parameters, and gestural models and is combined with the rhythmic strata already written on the score draft. Because the solo segments are not written with traditional motivic correspondence between one another, these localized results generate a musical landscape pockmarked with unique choreographic and sonic moments.

Each subset allows Cassidy to compose individual yet similar physical expressions on the score. While the differences between solo segments are easily noticeable in both the score and performance, pointing out the cause for these difference remains important: the numerous loops and layers of parametrical information that lay under the surface of the score create many

opportunities for the six gestural models to be deployed over and over again. The constant reuse and reinterpretation of the gestural models, even amid the distortion of ever-changing constraint windows, creates this balance.

These circumstances are also where much of the “prescribed action, varied consequences” kind of indeterminacy lays within the work. The ever-competing planes and changing constraint windows ensure transient sounds that are grounded by actions that alter and modulate each other. This kind of “poetic precision,” as Daryl Buckley describes it, keeps the musical performance unstable and alive.²³⁹ For example, when comparing the two readily accessible audio recordings of *Second String Quartet*, the opening gestures have distinct differences (beyond some differences due to each recording’s microphone placement).

On the Los Angeles Philharmonic-sponsored Monday Evening Concert recording of the quartet’s US premiere, the disjunct right-hand string changes in Violin 1 are more distinct.²⁴⁰ They more comprehensively alter what the left hand’s glissando is after. While the larger shapes in the segment are similar in repeated performances, the exact pitches, impact of the *jete* attacks in measures 3 and 5, and graininess from bow pressure are subject to change. Left-hand finger width changes, such as in measure 3, are another recurring means through which quartet’s material can be altered. Additionally, while these layers of information are using the four detached rhythmic strata around the Violin 1 part to coordinate, the body’s actions within the time signatures come first. Rather than worry about doubling in a conventional sense, Violin 1

²³⁹ Daryl Buckley, interview by author, Melbourne, Australia, January 18, 2021.

²⁴⁰ mondayeveningconcert, “Aaron Cassidy: Second String Quartet,” Feb. 26, 2011, video, 9:29, <https://www.youtube.com/watch?v=Pd6B5zLaHiU>
JACK Quartet–Topic, “Second String Quartet,” Feb. 13, 2015, video, 9:09, <https://www.youtube.com/watch?v=AKMg1iZW3hc>

coordinates with the other performers through the time signature and listening for the entrance, trajectory, and exit of the other part, in this case Violin 2.

The Violin 1 solo segment that follows the opening (mm. 6–11) offers similar instability in its nuances. For example, measure 6 features a jagged bow motion along the string while dealing with a handful of bowed mordents (this is Cassidy’s notation to do a fast alternation to the string above or below), fluctuating bow pressure, and, eventually, tremolo near the end of the measure. In combination with the left hand’s wide vibrato and glissandi, exactitude within the segment beyond the basic trajectory is obliterated. In its place, a distinctly transient, modulated sonic envelope is rendered.

Even when a number of events are aligned, such as in the second eighth note of measure 9, the consequences are deliberately destabilizing. In this moment, a string change, a change in bow direction, a switch to “*1/2 col legno tratto*,” and light finger pressure hammer-on trills coordinate in terms of choreography. Yet, a contrapuntal introduction of tremolo is introduced before the beat is done, disrupting what in another work would have been a stable moment.

While most solo segments enter and exit with no further iteration, a portion of these highly defined local sites are used to instigate “more traditional” variations that appear in the short-term and long-term variation segments (discussed in detail below). Even in this case, however, the proliferation of a specific segment or gesture is short-lived. These “instigating” solo segments generally inform one to two individual variation segments, briefly extending the presence of some aspect of the choreographic or musical moment. In the chart below (Figure 6.7), the many moments of where solo segments instigate extensions can be seen distinctly shaping the quartet. Red outlines indicate solo segments that instigate short-term variation. Blue

outlines indicate solo segments that instigate long-term variation. Purple indicates solo segments that participate in both kinds of variation.

While this “instigating” type of solo segments occurs close to one-third of the time, it cooperates with the localized nature of the solo segments as a whole. The richness of the quartet’s expressive language comes in part from the intersection of how many gestures draw from an unfolding set of processes, while others use more traditional, yet choreographically-focused variation techniques. Much of the performance of Cassidy’s music is rooted in the choreography of the moment. These instigating solo segments are part of extending a moment, yet never rupture it completely.

While individual solo segments can vary considerably, as can be seen in comparing the earlier Violin 1 mm. 1–5 example and Violin 2 mm. 57–59, they share a number of physical and audible features. One feature is that solo segments are relentless within the measures they occupy when compared to short-term and most long-term segments. That is to say, if the instrument is moving and making sound consistently (even as parameters and constraint windows are persistently in flux), it is usually performing a solo segment. In contrast to this, both variation-based segments effectively produce infrequent punctures of sound amid silence, even though they employ different means to do so.

Second String Quartet – Instrumental Roles

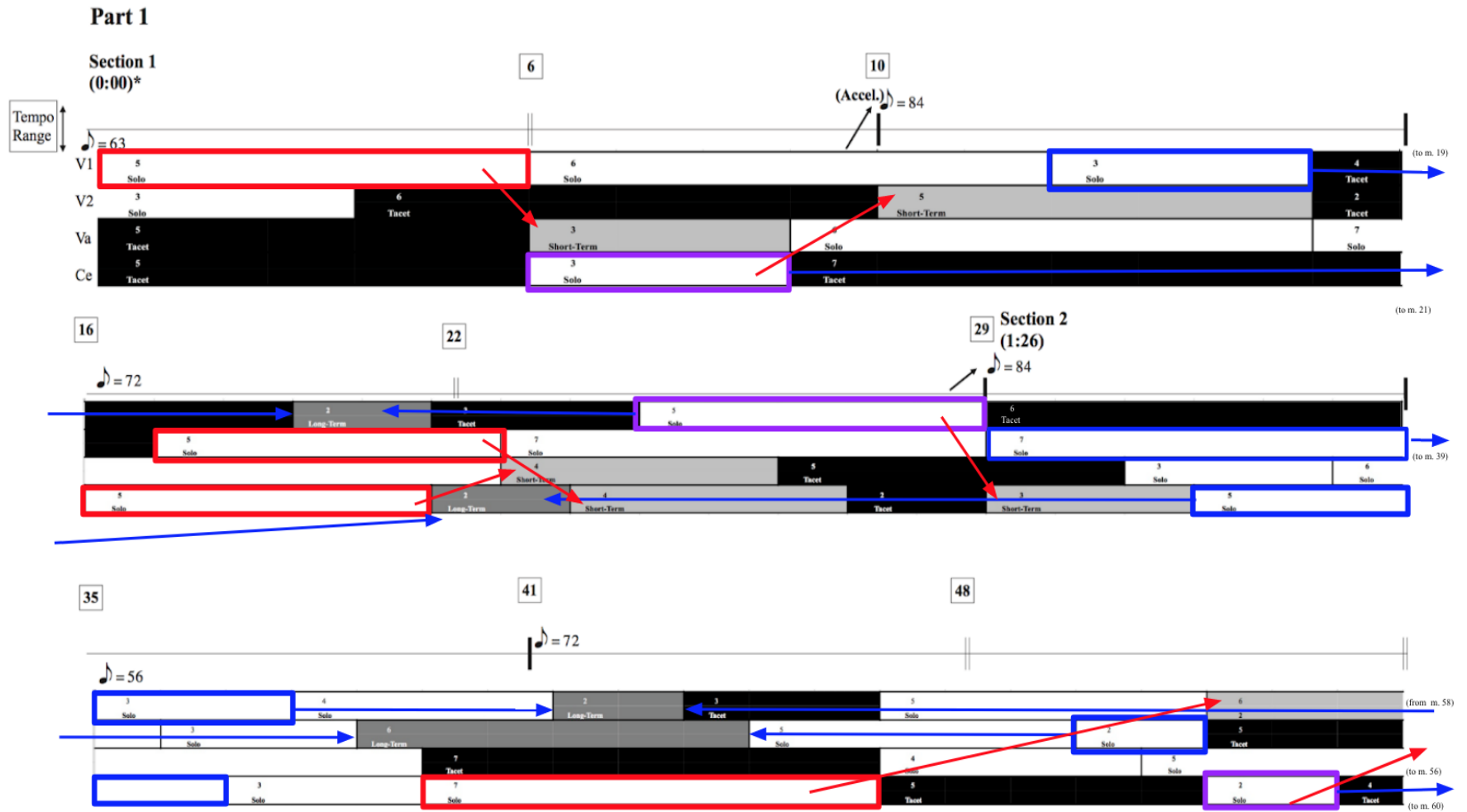


Figure 6.7: Solo segments (white) and the short-term and long-term networks they instigate. Short-term relationships are represented with red outlines and arrows across instruments. Long-term relationships are blue and horizontal (same instrument) arrows. Purple indicates solo segments that do both kinds of networks.

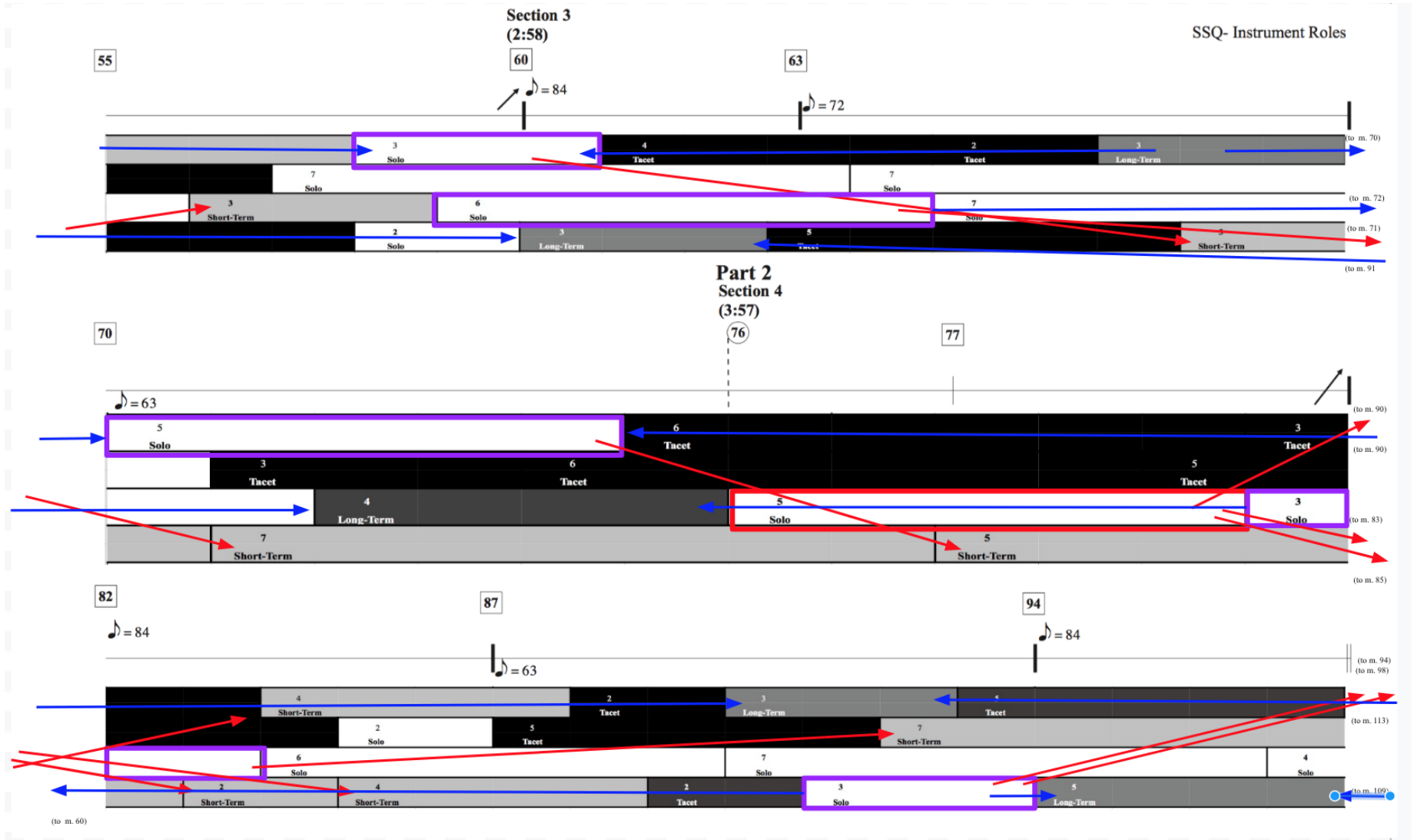


Figure 6.7, Continued.

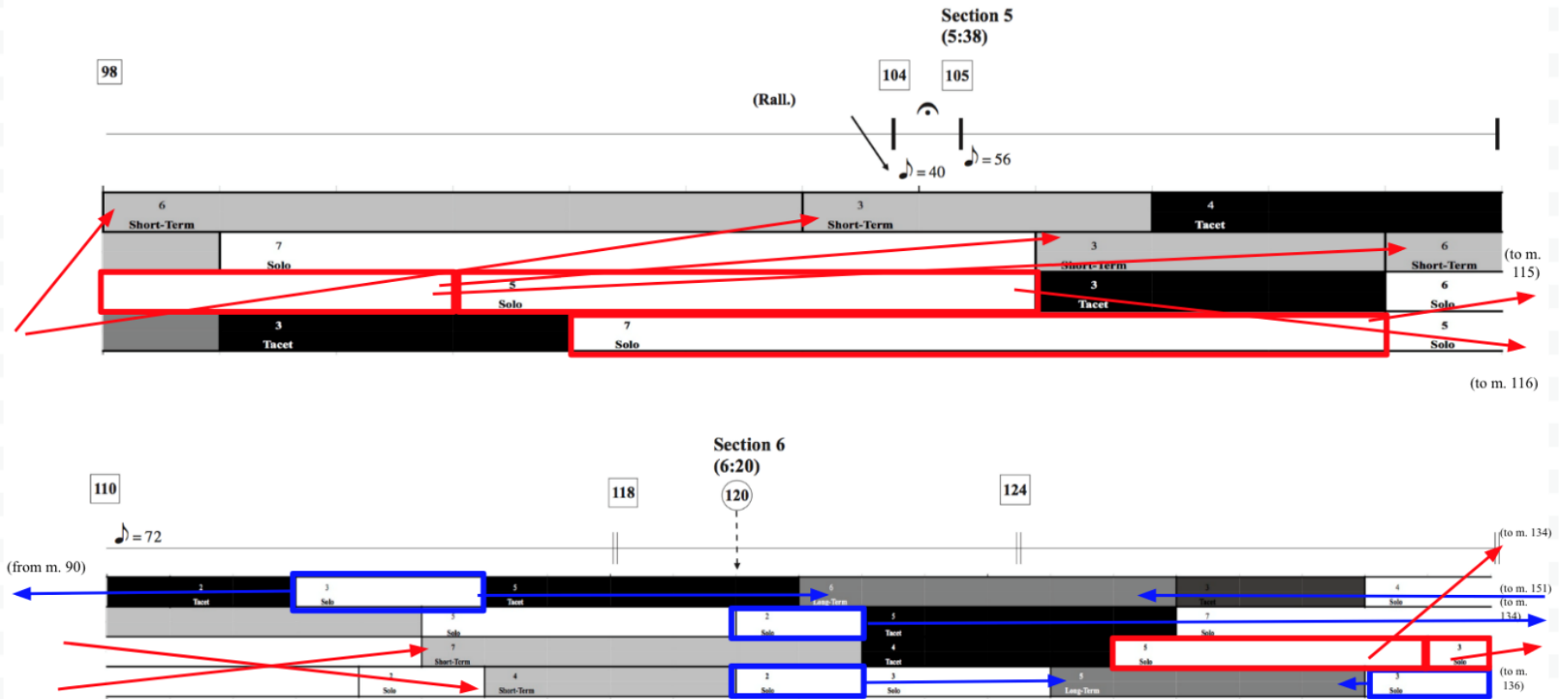


Figure 6.7, Continued.

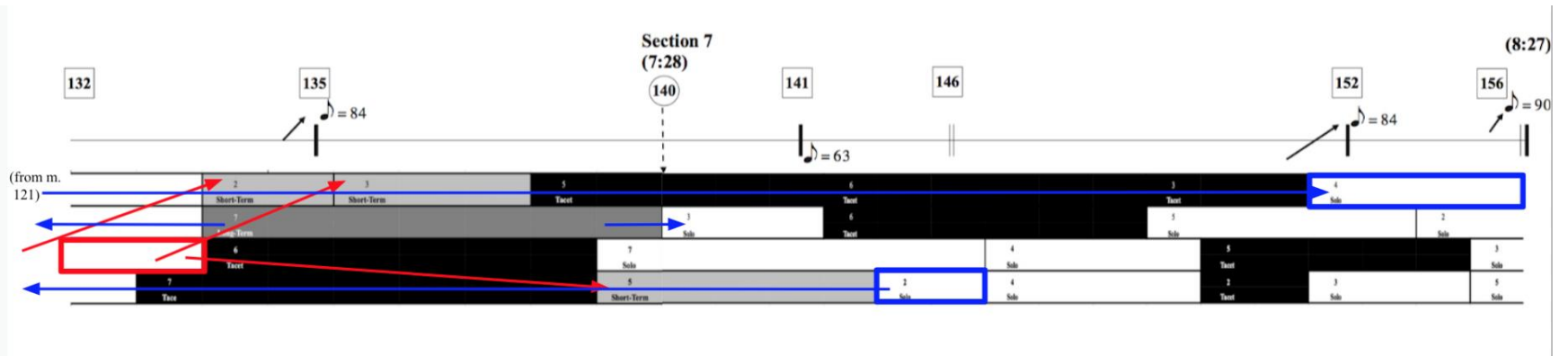


Figure 6.7, Continued.

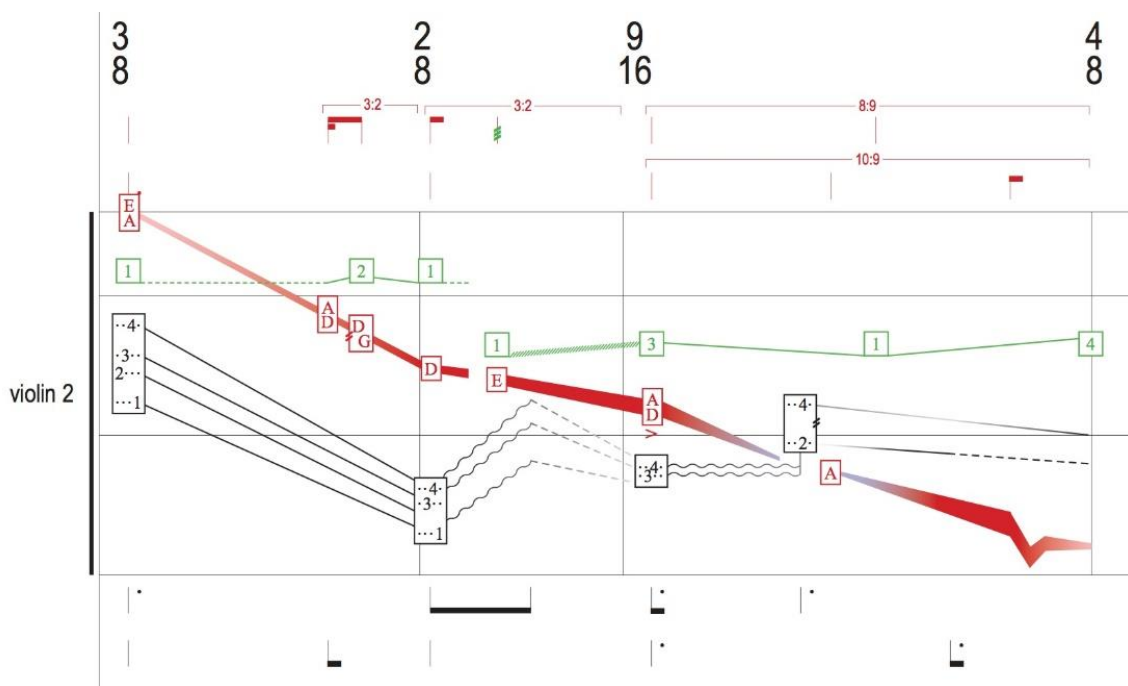
While more about how the short-term variation behavior segments also contribute to the indeterminacy of *Second String Quartet* will be discussed below, they are an excellent foil for considering the challenge of reproducing solo segments' exact details in repeated performances. For example, consider the relationship between Violin 1 mm. 1–5 solo segment and the short-term variation segment it instigates in Viola mm. 6–8. The viola's reproduction of the Violin 1 segment retains the distinct opening but presents it in a simplified version without the extensive contrapuntal layering. Silence replaces the intricate trajectories, the rich, twisting elements, and the constant pacing of the solo segment. In performance, these differences in reproducibility are especially noticeable, even if they are somewhat obscured by additional parts happening at the same time. While listening to the work, these filtered imitations of solo material stand out as deliberately clear aberrations from the quartet's many unique local sites.

6.5 A Summary of Solo Segment Physical and Sonic Characteristics

Distinct features recur throughout solo segments, offering a means to define some of *Second String Quartet*'s significant physical and sonic characteristics. Although the actions in the work's numerous solo segments are drawn from Cassidy's unfolding processes rather than from explicit motivic relationships, this is a closer examination of what a segment's resulting combinations can be.

By employing knowledge of the six gestural models, constraint windows and the number of independent planes at work, similar and recurring choreography and sound can be identified. In pursuing this, it is important to note that while some details relating to this are expressively blurred in performance, the score, Cassidy's sketches and drafts, and generalities from recordings are sufficient resources in addressing this topic.

Section 1 (mm. 1–28) introduces some basic examples of the kinds of physical gestures seen throughout the work. Within them, the basic sense of what can occur within a solo segment’s constraint window is established, particularly that their access to the full playable range of each instrument’s body is intrinsic to the work’s material. The first four solo segments (Violin 1 mm. 1–5, 6–11, Violin 2 mm. 1–3, Cello mm. 6–8) each feature a sizable, linear glissando in one more both hands (Figure 6.8). While these constraint window ranges are products of Cassidy’s looping processes, the manner in which these opening gestures have leaned into these sweeps distinctly recalls Cassidy discussing how “the form of a piece is not something I decide, as such – sectional divisions, durations, tempi all have a life of their own that I then have a responsibility to react to and ‘articulate’ through other lower-level compositional decisions.”²⁴¹



The opening section's big glissandi stand out when considered against gestures in the following sections of the quartet. While transient movement is frequently featured in the work, less linear gestures are used even when the "max up/down" gesture model and a wide constraint window is available. Similar sweeps in those contexts often appear as more subtle, interrupted, or incomplete versions of this shape.

A contrasting shape that appears early on is seen in the Viola mm. 15–21 solo segment. As a flat, horizontal line in a work that favors diagonal motion, it draws focus to grinding bow sounds and away from bow position filtering in mm. 15–17. While the flat line eventually incorporates some micro-scale motion, it is noticeably different from the huge glissandi around it. By removing the filtering from how the bow moves along the string in that moment, the full sonic effect of heavy bow pressure is inescapable. Although solo segments are always subject to change, this focus on pressure is particularly noticeable as part of the terraced gestural models, such as in Viola mm. 59–64 and mm. 97–100.

The Viola's left hand position mordents in mm. 15–21 are another distinct shape (see Example Figure 6.9). While left hand position is not the only plane that mordents are employed in, their disjunct interruptions of a steady pitch heard throughout the quartet's recordings is noticeable. While similarly divergent shapes happen in the cello left hand at mm. 6–8 (Figure 6.10), this example from the viola's left hand shows how a composite or recurring model is being employed rather than simply navigating along the boundaries of the constraint window.

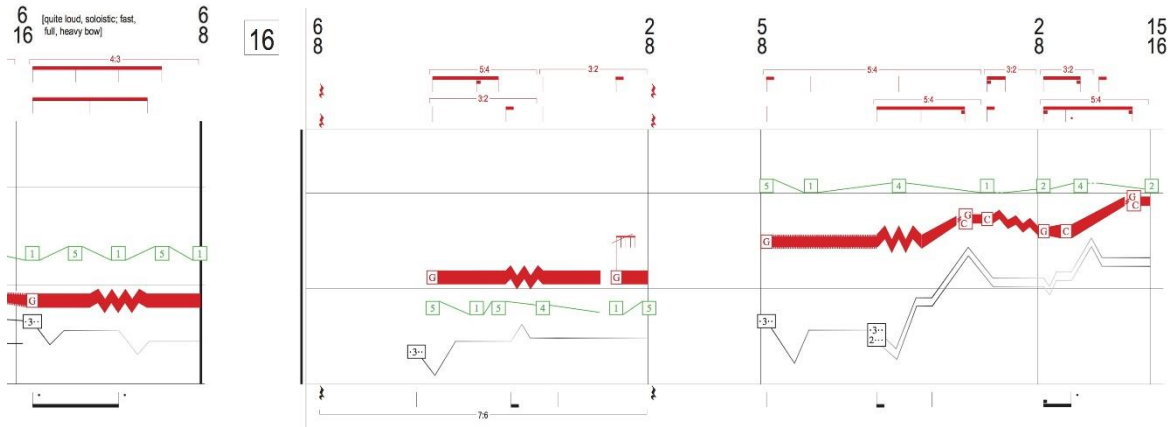


Figure 6.9: Viola mm. 15–19 features substantial use of Type 5 gestural model (mordent)

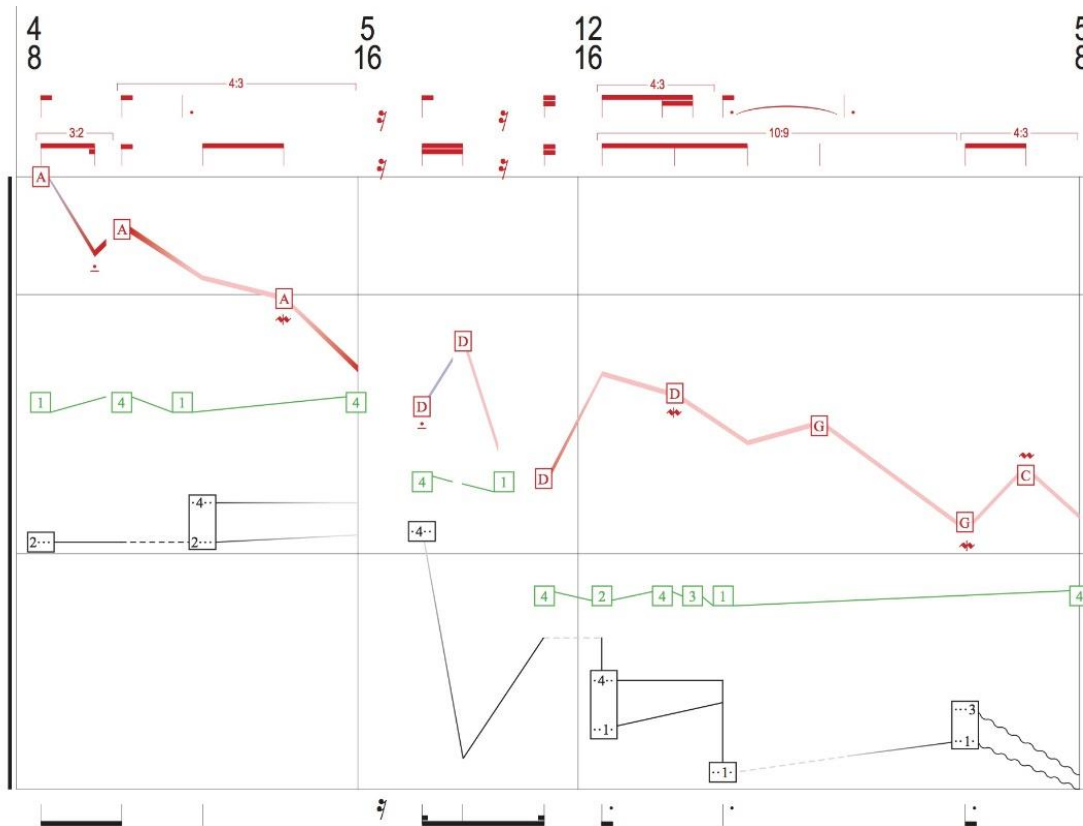


Figure 6.10: Cello mm. 6–8 demonstrates a more abstracted use of gestural model shapes.

Although they draw on the same gestural models as Section 1, gestures in Section 2 and the following sections more subtly work within the constraint windows they inhabit. While

Cassidy's processes are not especially precious about saving physical/sonic resources, Section 2's increased use of pizzicato and half- and full- *col legno tratto* further occlude gestures, including familiar sweeps. Even so, mainstay actions including left hand position mordents, bow pressure-focused moments when bow position is flat or terraced, and short, direct glissando are recognizable throughout.

While new formulations of the gestural models continue to be squeezed and stretched in different parametrical planes and constraint windows, the simpler, demonstrative iterations in the beginning of the quartet introduce how to listen for the more nuanced ones that follow. Because of these opening extremes, the right-hand bow positions' constant motion is normalized, allowing for more unique, non-linear filtering. Similarly, the left hand frequently occupies the area near the top of the instrument and the middle of the fingerboard. Rather than being in a space on a string instrument where scalar passages and intonation are risky, they are transformed into something normative that is accessed repeatedly with distorting glissandi, barre-chord-like grips, and finger width distortion.

6.6 Short-Term Variation

In contrast to how solo segments continuously reveal new configurations from the quartet's ongoing loop processes, both short-term and long-term variations respond and reuse this generated material. In doing so, short-term variation occupies a peculiar role within the fluctuating, indeterminate surface of the quartet. As the sole kind of behavior segment that focuses on something like motivic imitation, it teases at the reproducibility of Cassidy's unstable materials. Similarly, as the only behavior segment that employs doubling or rhythmic unison, it tests coordination while embracing inexact results.

Short-term variation segments occur often within the quartet, but in comparison to the solo and tacet segments they are less ubiquitous. Their relative presence amid the constant flow of solo segments creates variety from section to section, sometimes defining the nature of a section. Section 4, for instance, stands out as employing a number of variations of the same solo segment. Section 5, meanwhile, tests the temporal boundaries of what “short-term” means by using increasingly distant solo segments as their reference point, ignoring the solo segments that arise after that. While the typical relationship between instigating solo and short-term segments eventually returns in mm.126–144, the final 11 measures of the quartet employ no variation behavior.

Cassidy describes short-term behavior segments as “copied physical gestures: simplified, condensed; independent layer is condensed into single strands. Directional, left to right, across instruments only.”²⁴² Importantly, because they are based on the physical contours for another instrument, they create “altered sonic contours,” especially when the cello is involved.²⁴³ As was discussed in the earlier notation chapter, each instrument’s strings are notated from left to right as they would be perceived by their player, so for example, Violin 1’s right-most string is its highest–E. The Cello’s right-most string is its lowest–C. So, if an imitation moves from a middle string to a further right string, the violin would be moving to a string with a higher register. The cello would move to a lower register. An example from mm. 84–87 of this divergent imitation is highlighted in the paragraphs below that describe the use of rhythmic unison (Figure 6.11).

²⁴² String Quartet as Laboratory 317

²⁴³ Ibid.

Figure 6.11: Violin 1 and Cello perform rhythmic unison during mm. 84–87. This occurs because they are short-term variation segments that are happening simultaneously. Cassidy has paired them, so they each imitate the Viola’s solo segment in mm. 76–80.

This performance of physically copied gestures on these different set ups leads Cassidy to describe the short-term variation process as something that “generat[es] entirely different results.”²⁴⁴ However, the overt positioning of the short-term segments after their imitating material as they emphasize prominent physical movements allows for observable if fragmented bonds. Similarly, by only referencing recently completed solo segments, short-term variation segments stand out as something imitative even when less obvious in their specifics. In a terrain of raucous, unfolding actions, these brief imitative actions reflect back the most prominent

²⁴⁴ String Quartet as Laboratory 317

physical characteristics and then sit patiently in silence. While Cassidy's notation is of physical gestures, the effect of the short-term segments on material resembles something like a noise gate set to a high threshold, removing all audio material below a particular amplitude. Physically, it almost recalls someone learning a new choreography, repeating the big movements with few retained nuances, and many pauses. In Figure 6.12, Violin 1 solo segment (mm. 1–5) instigates the material in Viola's short-term segment (mm. 6-8). The short-term segment's rhythmic strata are simpler and its shapes are similar, but only retain some of the most physically (and sonically) present aspects. Although much of the detail is now gone, an imitative essence remains.

The image displays two musical staves. The upper staff is for Violin 1, labeled 'violin 1', and covers measures 1 through 5. It features a tempo marking of $\text{♩} = 63$ and various time signatures: $\frac{3}{8}$, $\frac{2}{8}$, $\frac{9}{16}$, $\frac{4}{8}$, $\frac{5}{8}$, and $\frac{4}{8}$. The notation includes notes with stems, fingerings (e.g., 5, 2, 4, 3, 5, 2), and bowings (e.g., 54, 32, 43, 43, 54, 54, 32, 32). The lower staff is for Viola, labeled '6', and covers measures 6 through 8. It has time signatures of $\frac{4}{8}$, $\frac{5}{16}$, and $\frac{12}{16}$. The notation includes notes with stems, fingerings (e.g., 5, 2, 4, 2, 5, 1), and bowings (e.g., 54, 32, 43, 43, 54, 54, 32, 32).

Figure 6.12: Violin 1 mm. 1–5 (Solo segment) is physically imitated by Viola mm. 6–8 (Short-Term Variation segment). The Short-Term segment simplifies the multiple layers of the Solo segment. (N.B. An incorrect string for Viola is listed in m 7—it should be an A (the Viola’s right-most string) to match the way the Violin in m. 2 is playing its right-most string).

The manner in which these imitative fragments are employed significantly affects the music’s terrain. Where solo segments are robust, constant, and shifting, short-term segments are silent other than their brief presentation of one or more fragments. Despite the amount of new soloistic material within the quartet, these focused stabs of physical imitation briefly extend the

relevance of the imitated gesture, tantalizing listeners with suggestions of something akin to traditional motivic relationships.

Through this balance of short, imitative gestures and long silences, short-term behavior segments deliver some of the clearest musical information in the work while allowing the solo segments to remain in focus. While often providing brief bursts of imitation as solo segments continue to emerge, the quartet feature some sections that put the short-term segments' quiet nature to special use. For most of Section 4, for instance, only viola has solo segments. As this prolonged viola solo passage plays out, its segments are the only source for the short-term segments around it.

A related instance occurs in Section 6 during the flickering outcome of the frustrated cadence in m. 133. Throughout mm. 134–139, Violin 1's short-term segments create a sporadic yet tense moment of stasis alongside a similarly terse Violin 2 long-term segment (mm. 135–140). While this has been shaped to anticipate the *accelerando* in the final measure of the work, the material from the short-term segments references the viola solo segments in mm. 126–130 and mm. 131–133. (Figure 6.13)

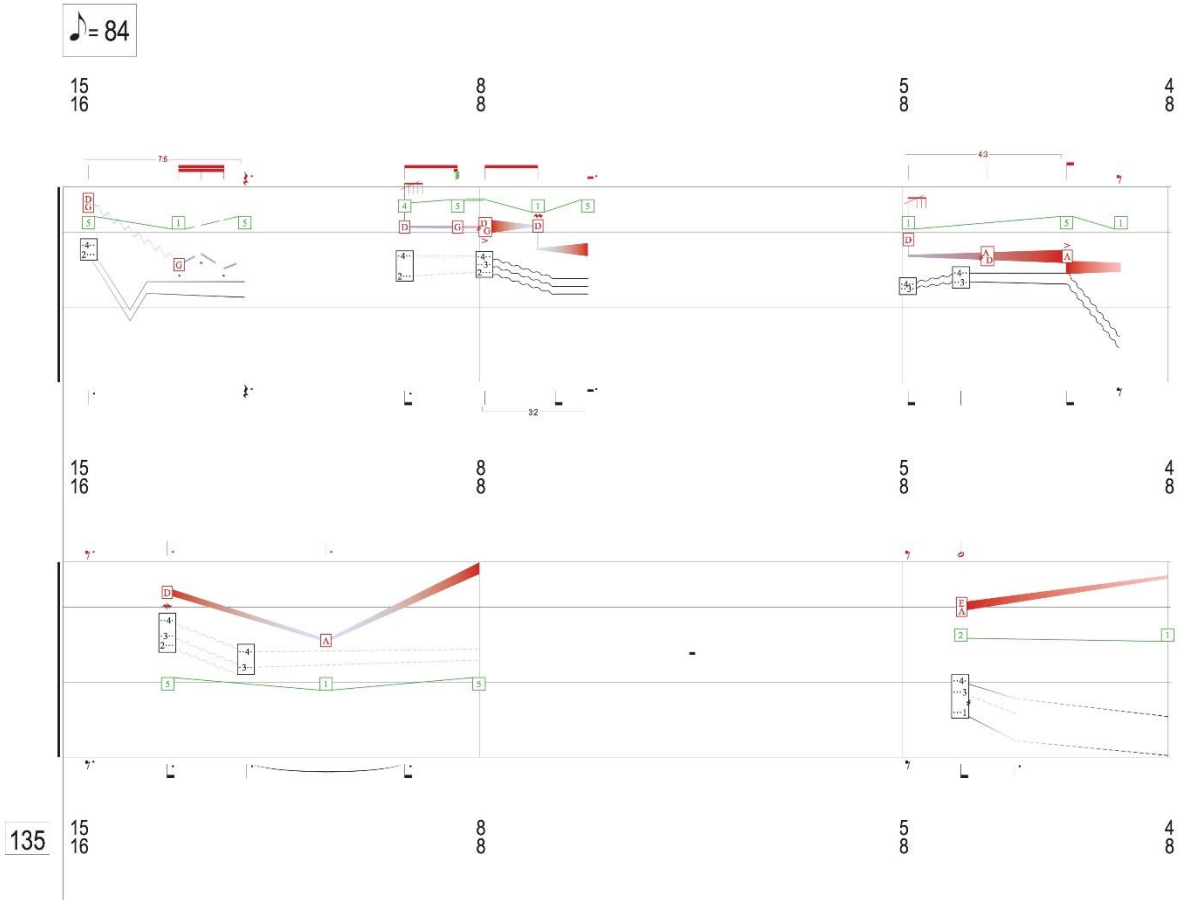


Figure 6.13: After the frustrated cadence and silence in m. 134, Short-Term segments in Violin 1 (mm. 134-135, mm. 136–138) and a Long-Term Segment in Violin 2 (134–140), provide a sense of tense stasis until the quartet returns to a final, Solo segment-centered push to the final accelerando in m. 156.

Rhythmic unison within the string quartet is another feature only found within short-term segments, or more precisely, the alignment of two instruments' short-term segments. They are still brief, simplified physical gestures copied from a solo segment made to fit a different instrument. So, when Violin 1 and Cello imitate the viola together in mm. 84–87, (Figure 6.12), they do so by moving the same left-right-up-down and in doing so, play differently pitched strings. They both start with their instruments' two middle strings then move to the two strings closest to their right side. This has the effect of contrary motion sonic results.

Even with these differences in how each instrument will realize these physical movements, it is a distinctly rhythmically coordinated event amongst solo segments if the sonic results of short-term segments is a focused echo, these doublings with their more precise rhythms and indeterminate pitches are a sort of chorus effect. While distinct silences are a feature of these short-term segments, this quality in combination with doubled, more rhythmically exact gestures enables punctuating, percussive moments from the strings.

Another of these rhythmic unisons, Violin 1 and 2 in m. 98, (discussed in Chapter Three) is an example of a moment where though exactitude is most possible, Cassidy still defers to a more poetic sense of precision, writing: “violins 1 & 2 should need not establish a perfect unison—some imprecision in these ‘unison’ passages is to be expected.”²⁴⁵ It is a small testament to the potential inexactitude of live music. So, while JACK quartet’s performances achieve this short-lived coordination, they still retain some aspect of pitch and rhythmic indeterminacy.

About half of the rhythmic unisons throughout *Second String Quartet* appear in the section’s concluding measures, such as in Section 1 (viola and cello mm. 25–26), Section 2 (Violin 1 and viola m. 57), Section 4 (Violin 1 and Violin 2 mm. 106), and Section 5 (viola and cello mm. 116–119). While they do not necessarily always signify a close of section, they contribute to an increased emphasis on rhythmic drive that pushes into the next section’s gestures when paired with non-instigating solo segments happening at the same time, an *accelerando*, or other elements.

²⁴⁵ Aaron Cassidy, *Second String Quartet* (Aaron Cassidy/ASCAP 2010): 22

6.7 Long-Term Variation

As discussed above, long-term variation segments are part of a larger strategy to reuse material from the quartet's solo segments. While they are similar to short-term segments in this respect and how they often feature short gestures amid silence, long-term segments are distinctly different. One important way they differ from short-term variation is that these segments and the solo segments they reference only occur on the same instrument. How they reference solo segments is also distinct—each long-term segment mixes and matches fragments from solo segments before and after it. In doing so, the recombined fragments of recent and upcoming gestures lack the short-term's more obvious rhythmic and gestural connection with its source. Cassidy describes the presence of long-term behavior segments as places where “the referenced material becomes even more distended, more dim and hazy, and compressed through the simplification of memory. Complex, multivalent, twisted gestures become simple, unified, primary ones, fleeting micro-gestures become clumsy, brutish macro-gestures.”²⁴⁶

Compared to the reliable definition of how short-term segments employ “obvious,” linear imitation, uses and definitions for long-term segments are more generalized. Depending on where they are situated in the score, they can provide a sudden change, an extension, or an introduction of one of its instigating solo segments. Long-term behavior segments' intermittent activity and purposeful blurring of existing physical material makes them useful throughout the string quartet. In some cases, they are the means by which a solo segment is extended or gets a head start. Other times, they are an isolated, flickering gesture. More importantly, their non-imitative, intermittent qualities are how the final parts of Section 3 and Section 6 dissipate. Rather than clearly echo material, these more generalized extensions of material tensely struggle

²⁴⁶ String Quartet as Laboratory 322

against silence until succumbing to it (See Continuity Chart (Figure 4.4), Formal Chart (Figure 4.6), and Figure 6.12 above).

Long-term segments are constructed from fragments of one preceding solo segment and one upcoming segment. Fragments are chosen from the left-hand or right-hand information from one solo segment and the opposite hand from the other. (See Figure 4.11 as an example of a long-term segment in Violin 1's mm. 19–20). When more than one set of fragments is used in a long-term segment, the sources for each pairing of left and right alternates between preceding and upcoming solo segments.

While simple networks of long-term segments occur in each part, more complicated ones appear after Section 1. From Section 2 to the end of the work, long-term segments dovetail with their solo segments in Violin 1 and Cello. The most extensive example, found in the Violin 1 part, links five solo segments and four long-term segments. Starting with the solo segment beginning in m. 35, these pairs of mostly non-adjacent solo segments influence the long-term segments they surround until Violin 1's final entrance in m. 153.

Importantly, this interlocking of materials still fit the previously explained model of a single pair of preceding and upcoming solo segments being used for a long-term segment. This dovetailed set of connections is one in which the upcoming segment of one long-term becomes the preceding solo segment for the next long-term segment, creating fragmented aspects of continuity.

As mentioned above, long-term variation segments are more subtle, flexible materials that can work alongside short-term variations as in m. 134 and extend solo segment material as in mm. 42–43. Especially from Section 2 onwards, the dovetailed chain of segments in Violin 1 provides a creative means to repurpose material while not drawing attention to the relationships

in an audibly motivic manner. While they lack as clear of a profile as solo or short-term variation segments, long-term variation segments are a versatile aspect of Cassidy's processes.

6.8 "Local" Networks as Distended Moments

In proceeding toward conclusions about these networks of segments, it is important to mention that Cassidy's sketches and drafts played a significant role during this analysis in locating connections between segments, especially long-term segments. In acknowledging this, I hope this takes a performative burden off of other scholars reading this who might otherwise think all of these elements are easy to find from the score alone. Through the charts and descriptions of notational and sonic characteristics I have included in these chapters, readers should be able to quickly locate examples as they examine these connections.

The amount of rich detail and contrapuntal relationships in Cassidy's scores cannot be denied and will most likely always hinder analysis in some capacity. However, by better understanding the string quartet's sturdy yet twisting foundation created by his looping processes, the indeterminate, multi-axial performances that arise from them are clearer. Understanding that solo segments unfold almost constantly yet are connected through Cassidy's processes fundamentally changes the listening experience. Rather than only focusing on what is new, the question may often be how long can this moment persist? And in what ways? How long can a particular energy last before it surges or breaks?

As performers appraise this analysis, relationships between instigating solo segments and the variation networks offer a means to embrace what are effectively either local networks or distended moments throughout the quartet. While keeping focus on the continual upheavals from solo segments, the ways instigating solo segments' materials are physically imitated, extended,

reconfigured, or dissipated allow performers to further invest in the quartet's engrossing moments. Instead of a motivic experience, the quartet members can focus on the brief distention of passing moments and the atemporal recombination of their bodies' motions (especially for Violin 1 in the latter case).

When this is combined with an understanding of *Second String Quartet's* resilient structures and indeterminate localities, the work and expressive stakes of the quartet become clear. The structures are sturdy and provocative, meant to draw attention to the indeterminate localities. As string quartet members engage with Cassidy's tablature and its resulting overlapping modulatory processes, they can more readily connect seemingly isolated, unstable musical gestures with their knowledge of these local networks and distended moments.

Chapter Seven: Composition Methods and Timeline

When Cassidy writes about *Second String Quartet* in journal articles such as *Constraint Schemata* and *String Quartet as Laboratory and Playground*, he often shares small examples of pre-compositional materials to further explain his creative process and the completed quartet. While some of the examples provide a snapshot of the way his detailed sketches in Excel translate to the final score (as in Examples 13 and 14 in *Constraint Schemata*), others allude to less discussed parts of his practice.²⁴⁷

For instance, Cassidy intriguingly quotes guiding principles he wrote in his early planning notes in *String Quartet as a Laboratory and Playground*: “very much about the quartet / about strings, bows / about the chamber music interface of string quartets—constant shifting between solo & ensemble roles (as in earlier works) / some clear interest in the contrapuntal/polyphonic opportunities of the ensemble.”²⁴⁸

While this particular quotation serves the article’s goal as Cassidy talks about the historical elements of his approach to string quartet writing, it also reveals a small part of the many questions and considerations that initiated Cassidy’s creative process.

This chapter aims to give a more comprehensive look at the larger context of these materials and compositional activities that were part of creating *Second String Quartet*. This inquiry directly benefits from my interviews with Cassidy and him allowing me access to his paper and digital materials during my trip to Huddersfield. These resources in combination with

²⁴⁷ Aaron Cassidy, “Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voice,” *Search Journal for New Music and Culture* 10, (2013):12–13

²⁴⁸ Aaron Cassidy, “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” *Contemporary Music Review* 32 (2013): 317

Cassidy's published writings and Tim Rutherford-Johnson's 2011 coverage of *Second String Quartet* make it possible to discuss Cassidy's creative timeline and processes in detail.

Each of the three main documents he uses throughout the process occupy distinct modes of creativity within the compositional timeline for the quartet: aesthetic brainstorming and questions about the tablature in a notebook, local processes and the large-scale plans they make are worked out in Excel sheet sketches, and a cycle of drafts that are worked out on the most recent print out and then finalized using Adobe InDesign (Figure 7.1). While these general steps do indeed resemble many composers' approaches in the late 20th and early 21st century, Cassidy's particular uses of them are highly informative when investigating his music. This includes how he allows questions to frame his compositional pursuit, specifics about the foundational loops used to create the quartet, how he generates rhythm in his initial drafts, and how he examines and reconciles the dense, multi-parametric Excel sheet information to create the solo segments throughout the work.

A fourth element, Cassidy's research trip to New York City to investigate potential notation, is also discussed. While the first three modes of work are usual ways he worked in the first decade of the 2000s, this kind of research trip or on-site testing does not typically happen in Cassidy's projects. Even so, it proved to be an important moment of research that allowed him to proceed forward with the yet to be finalized tablature used in the quartet.

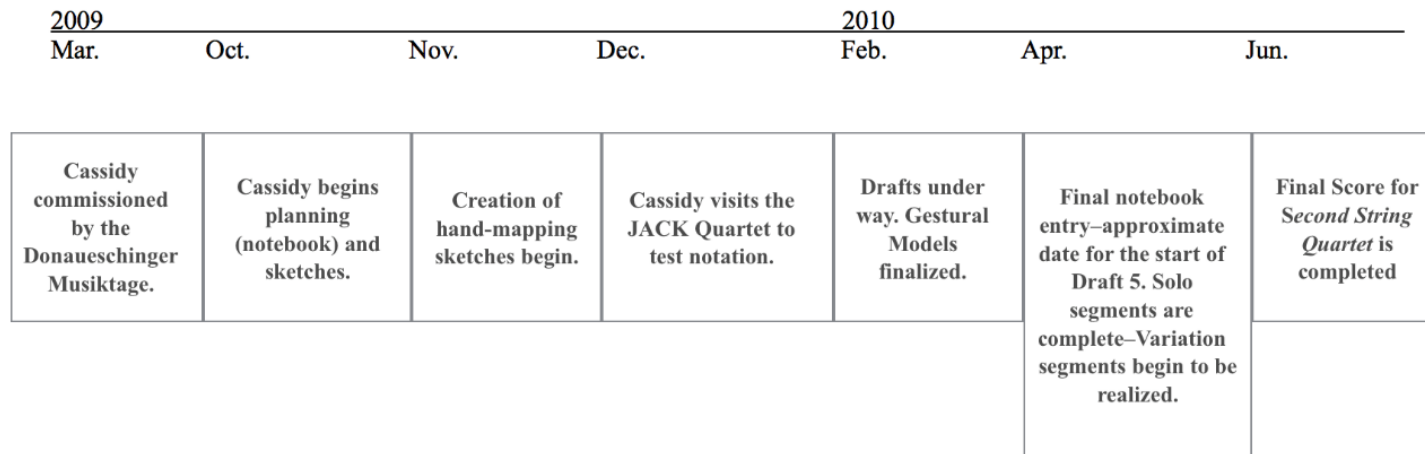


Figure 7.1: Creative Timeline for Second String Quartet

Before discussing these creative processes and materials in depth, it seems important to call attention to the archival quality of *Second String Quartet* pre-compositional materials and the manner in which I received them from Cassidy during my time in Huddersfield. Cassidy handed them off to me at the university in a cloth bag with each binder-clipped draft and the blue notebook secured by another enormous binder-clip. The Excel sheet had already been shared digitally with me some time before the trip. These materials are legible, extremely well preserved, and offer much in terms of explicable information. The writings in the notebook capture the experimental, curious spirit of the work and in some small ways prefigure where his music would head after 2013. Similarly, while great effort or impressive processes do not necessarily equal excellent music, these materials reflect a clarity of purpose and care taken in securely building the purposely unstable, experimental elements of the quartet.

7.1 Considerations, Questions, and Planning (Blue Notebook)

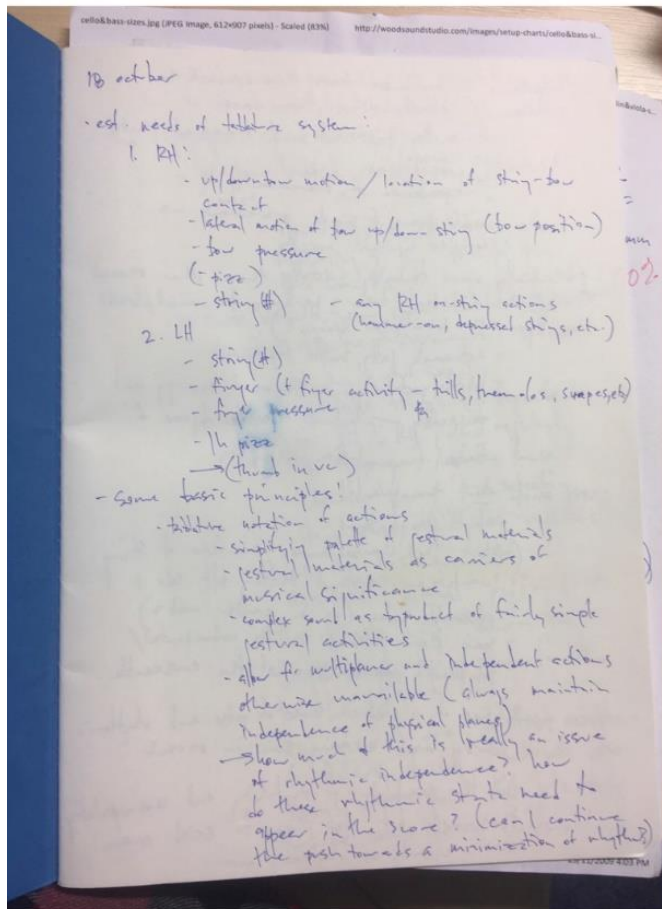
Work on *Second String Quartet* began with Cassidy writing considerations and questions about it in an unlined blue notebook. The entries span the entire planning phase, starting October 18, 2009 and continue through Cassidy generating the large-scale structures. The last entry on April 8, 2010 reassesses the tempo options he used initially, noting that slower tempos than ♩ = 96 were needed to make performing the work's left-hand gestures more possible. This occurs about two and a half months from the completion of the quartet on June 28, 2010.

The notebook's first page explores the basics of the quartet in two different ways. It begins with an estimation of the kinds of actions Cassidy wants from string players' left and right hands and what kind of tablature best serves those motions. (Figure 7.2) It is followed by the previously mentioned list of "basic principles." They broadly define the tablature, how its physical gestures

are multi-planar and independent, and that simple gestures used in those ways should generate complex sounds. Additionally, the way Cassidy writes this list of tablature concerns interestingly continues his tendency to notate right-hand information above and left-hand information below, as seen in *Second String Quartet* and his earlier *The Crutch of Memory*.

In discussing this notebook with Cassidy, he related that this was a space for him to ask himself questions and that these questions drove his creative process.²⁴⁹ Throughout its pages, Cassidy is especially interested in developing a tablature for the quartet that allows for creative interactions between physical elements he is foregrounding. While these experimental ideas led to the contrapuntal tablature, the “basic principles” list also indicates questions about what to value and what to exclude. This includes the rhythmic strata that exists on the quartet’s score in a less central fashion and has been further reduced in works that follow it.

²⁴⁹ Aaron Cassidy, interview by author, Huddersfield, UK, Nov. 5, 2019.



- est. needs of tablature system
1. RH:
- up/down bow motion/location of string-bow contact
 - lateral motion of bow up/down (bow position)
 - bow pressure
 - pizz
 - string # - any RH on string actions (hammer on depressed strings etc.)
2. LH
- string #
 - finger + finger activity - trills, tremolos, snaps etc)
 - finger pressure
 - lh pizz
 - >thumb for cello
- Some basic principles!
- tablature notation of actions
 - simplifying pallet of gestural materials
 - gestural materials as carriers of musical significance
 - complex sound as by product of fairly simple gestural activities
 - allow for multiplanar and independent actions otherwise unavailable (always maintain independence of physical planes)
 - >how much of this is really an issue of rhythmic independence? how do these rhythmic strata need to appear in the score? (can I continue to push towards a minimization of rhythm?)

Figure 7.2 (left) The first page of Cassidy's planning notebook. (right) A transcription of that page.

In later entries, Cassidy continues to think through these issues, as in the many questions he writes on October 19th:

- how to control/implement these ‘speeds’? Are these parameters of their own right or are they results of constraint in other parameters?
- is tempo static, or can tempo changes be superimposed to clarify/distort structure?
- what is the role of rhythm in this work? rhythm so far has been defined here negatively - what it is not, or as a simplification/reduction?
 - what is it? how does it function?
- do I maintain the effort at sidestepping ties? are the rhythms still the result of the “sampling method of other recent works or could I perhaps implement something closer to the ensemble tutti attacks of scream?
- in the earlier mention of repetition/patterning, are these results or are there internal structures/controls that force the appearance of this sort of patterning?

As these questions linger, Cassidy plans and draws initial versions of what the quartet’s tablature could be. Although they do not directly translate into the final notation, each drawing he makes of them includes diagonal lines and speculative multi-axial notation.

In the following weeks’ entries (on October 24th, 25th, and November 5th, 2009), many of these questions begin to be solved. Not coincidentally, October 24th is also the date when Cassidy begins working in Excel to sketch out processes that will realize the work. In these notebook entries, Cassidy lists several key features:

- maintain extremely high level of energy throughout -> largely dense, fast, layered
- no effort to clarify form, to est. clear points of contrast, no points of obvious pause/stasis
- piece is reasonably short (ca. 8’) – keep level of activity fairly constant across the ensemble (though also w/ clear fore/middle/background controlled by topographical mapping of instrument movements
(NB– each layer of mapping gets its own submetrical division)

This listing distinctly resembles the quartet in its final score. The subsequent entries discuss solo passages, which are the instigating means for the variation networks discussed in the previous

chapter. Gestural models also begin to be sketched, even if they largely resemble those applied in earlier works.

Entries on November 8th and 13th focus further in, examining ways to apply these ideas to a more realized notation. The November 8th entry examines different ways to indicate left hand techniques with a left-hand finger position box very close to the one used in the final score. Glissandi, hammer-ons, and more are considered in these entries alongside drawing of their potential notations. The November 13th entry sorts through and averages out the lengths of the instruments, using data from printouts from www.woodsoundstudio.com. (The printouts were still inserted next to the relevant notebook page when I reviewed these materials in 2019).

One small but intriguing detail in these entries is how the printout's 17-inch viola is circled. While Cassidy makes the point to write in a footnote in *Constraint Schemata* about how he compared and generalized results for imagining the string and body lengths for his tablature, it appears that he was aware that John Pickford Richards plays a 17-inch viola.²⁵⁰ Although Cassidy seems to have moved beyond imagining the viola part as one solely for Richards' arm length in the final notation, it speaks to the level of investigation Cassidy brought to the process.

²⁵⁰ John Pickford Richards, email message to author, Mar. 18, 2021.

VIOLIN SIZES						
MENC Designation	4/4	3/4	1/2	1/4	1/8	1/16
Body Length, Nominal	356	335	310	280	255	230
String Length, Nominal	330	310	285	260	235	215
Bow Length, Nominal, Overall	745	690	630	550	500	450
Bridge Blank Width at Feet	41	38	35	32	29	27
Bridge Thickness at Feet	4.2	3.9	3.6	3.3	3.0	2.8
Bridge Thickness at Strings	1.3	1.2	1.1	1.0	0.9	0.9
Sound Post Diameter	6.0	6.0	5.0	5.0	4.0	4.0
Bar Length	277	260	241	218	198	179
Bar Width	5.5	5.1	4.7	4.3	3.9	3.6
Bar Height at Bridge	12	11	10	9.4	8.6	7.9
String 1-4 Spacing at Nut	16.3	15	14	13	12	11
String 1-4 Spacing at Bridge	33.5	31	29	26	24	22
String 1 FB Clearance, Gut	3.5	3.2	3.0	2.7	2.5	2.3
String 1 FB Clearance, Steel	2.5	2.3	2.1	1.9	1.8	1.6
String 4 FB Clearance, Gut	5.5	5.1	4.7	4.3	3.9	3.6
String 4 FB Clearance, Steel	4.0	3.7	3.4	3.1	2.9	2.6
FB Height Projected to Bridge	27	25	24	22	20	19
Fingerboard Length	270	250	230	210	195	180
Tailpiece Length	112	105	95	89	82	75
Pegbox to Peg Thumbpiece	16	15	14	13	11	10
Peg Thumbpiece Width	22	21	20	19	18	17

Suzuki 1/10, 1/16, approximate the traditional 1/16, 1/32.

VIOLA SIZES						
MENC Designation	LARGE	MED.	SMALL	3/4	1/2	1/4
Body Length, Nominal	430	410	390	356	335	310
String Length, Nominal	390	375	355	(See)	(See)	(See)
Bow Length, Nominal, Overall	750	740	740	4/4	3/4	1/2
Bridge Blank Width at Feet	50-52	48-50	46-50	vn.)	vn.)	vn.)
Bridge Thickness at Feet	5.5	5.3	5.0			
Bridge Thickness at Strings	1.5	1.5	1.4			
Sound Post Diameter	7.0	7.0	6.0			
Bar Length	334	319	303			
Bar Width	6.6	6.3	6.0			
Bar Height at Bridge	15	14	13			
String 1-4 Spacing at Nut	17	17	16.5			
String 1-4 Spacing at Bridge	38	37	36			
String 1 FB Clearance, Gut	4.5	4.3	4.0			
String 1 FB Clearance, Steel	3.5	3.3	3.0			
String 4 FB Clearance, Gut	6.5	6.3	6.0			
String 4 FB Clearance, Steel	5.0	4.8	4.5			
FB Height Projected to Bridge	32	31	30			
Fingerboard Length	305	300	290			
Tailpiece Length	135	130	125			
Pegbox to Peg Thumbpiece	18	17	17			
Peg Thumbpiece Width	25	24	24			

May be 4/4, 3/4, 1/2 violins specially strung. True violas (wider and deeper bodies) are preferable.

not +
fp =
130 mm
.402

.202

not to
fp =
? (144)
(145?)
170

.78

01
(147)
17"
38%

Figure 7.3 Cassidy used information about typical measurements of string instruments to design the unified staff

The December 13th entry begins with a new set of “questions/issues to address” (Figure 7.4). They consider the ramifications of bowing on the other side of the left hand, how the bowing will be notated (a fairly continuous concern throughout the notebook), and whether coloration of bow pressure choices is useful. He questions how to notate fast passage work, drawing different possibilities for it. Indications for up and down bow are also considered, and the solution is circled on the page. He continues on with questions about the relative size of the notations he will be using, whether scordatura is necessary, how pizzicato will be notated, and a continuation of considering how to indicate strings and string crossings.

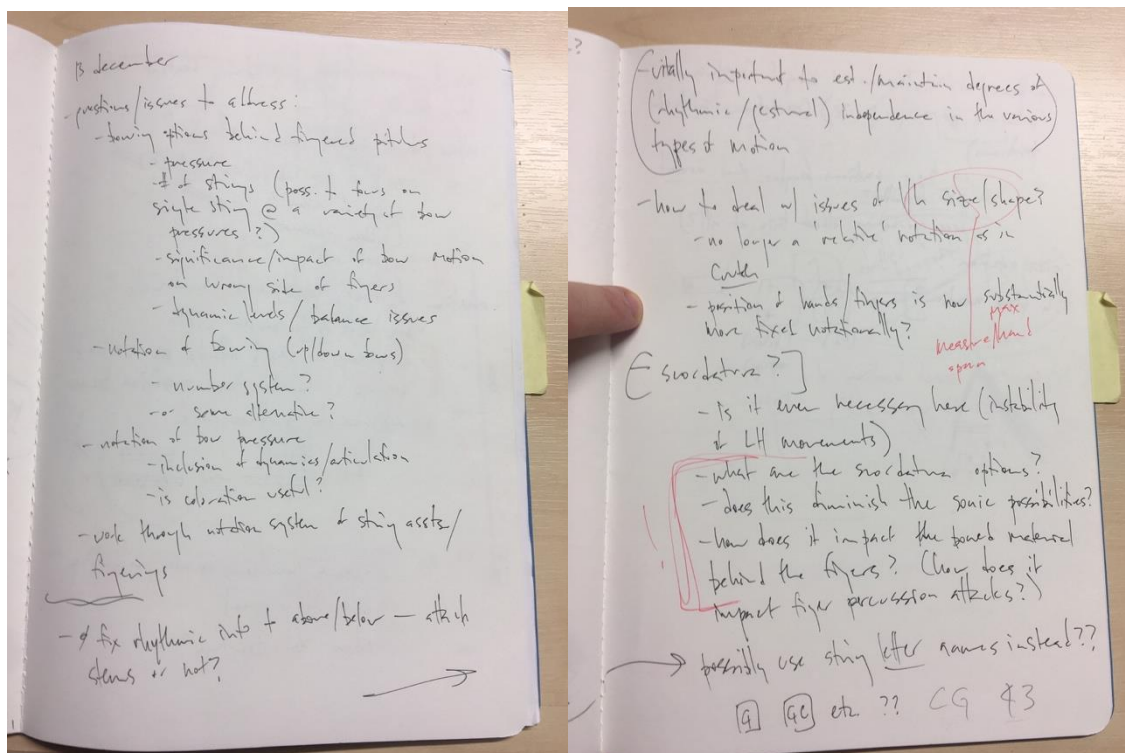


Figure 7.4: December entries from Cassidy’s notebook

While no entry for it is directly in the notebook, Cassidy’s visit to New York City to test notations with JACK Quartet happens on December 20th, 2009. During this time, Cassidy appears to have used the score structure generated in his Excel sheet as the template to freely

imagine example notations. A page of this is in the notebook, with approximations of what the notation would perhaps look like (Figure 7.5). The material focuses on how to coordinate string changes, finger widths, and does not use nested tuplets.

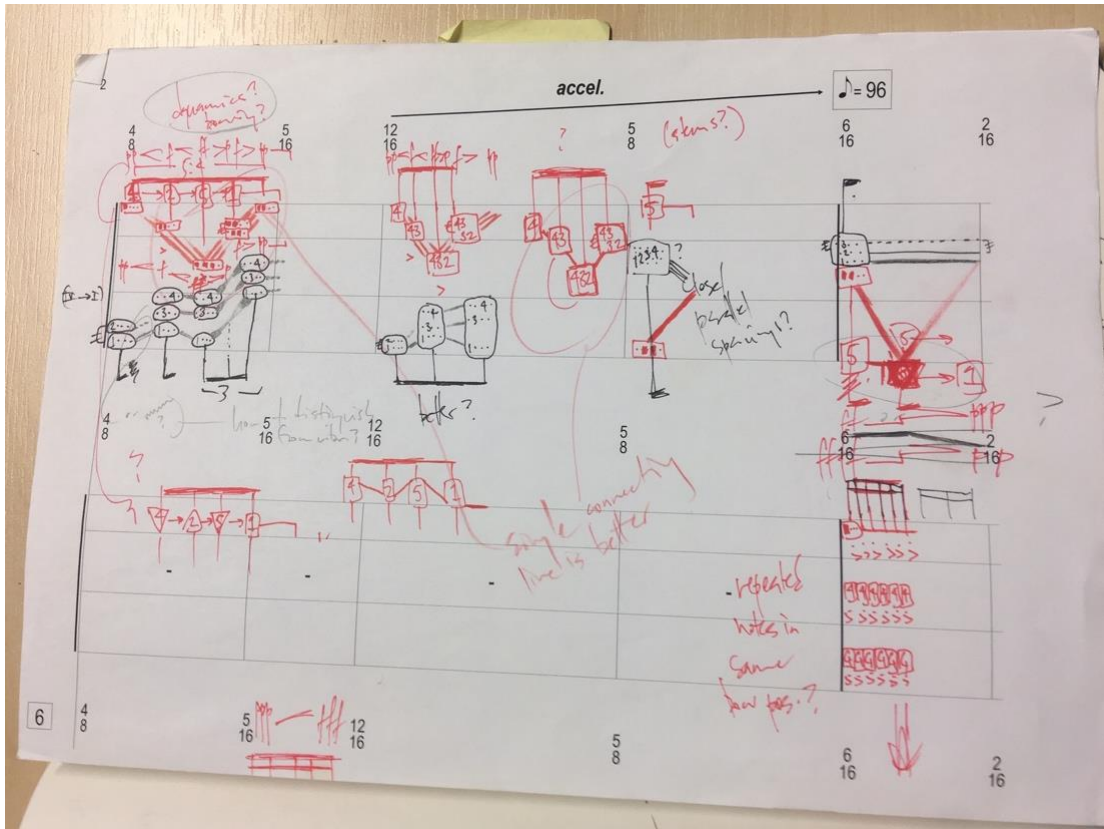


Figure 7.5: Cassidy explores notation possibilities. Note how while it does not reflect musical material that will be eventually used, it is almost identical to the final score's page 2 (mm. 6–10), besides the tempo in m. 10 that is changed at a later date.

The entries resume in February 2010. They are particularly focused on finalizing the gestural models and establishing the values assigned to them. The February 2nd entry, for example, continues to affirm the rhythmic independence of lines. The two entries from the week of February 20th stand out as active planning sites in how Cassidy returns, with different colored pens, to group, comment on, and mark up previous ideas (Figure 7.6). They clarify the continuum of choices for parameters, including bow pressure and finger widths. They also serve

Speculation about resulting sounds continue in the February 21st entry, even before Cassidy finalizes gesture models in a following one on the 25th. He writes, “multi-layered material in LH will likely simply generate complex zigzags– ind. mvt up/down fingerboard + ind. mvt of finger width.” He also continues to consider the impact of rhythmic information: “it’ll almost certainly be much less rhythmic than it presently looks (another reason to eliminate rhythmic notation?)”

Cassidy finalizes the gestural models on February 25th. While an earlier set of them is included in previous entries, this entry includes questions about how to apply the mordents, tremolos, and more in the different layers of the work.

With many questions answered and drafting underway, Cassidy’s entries in March and April are short and specific. He contemplates final aspects about the left hand’s general hand shapes and how fingers for strings not assigned can be used for trills. He observes (most likely from a clear understanding of the piece’s left-hand constraint windows) that much of the left hand’s parts are above the instrument’s body rather than in a lower position on the neck. He also makes notes to push the dynamics in the final measures of the quartet, wanting the moments to crescendo to “*fff* pressure throughout.” As mentioned at the start of this section, the final entry on April 8th, 2010 details a need for the tempos to be “slowed slightly – 96 is too fast for mapped LH material.” This change occurs between draft 4 and the finalization of draft 5, as the solo segments are completed and the variation networks’ notation is being realized.

These brainstorming and planning notes display Cassidy’s curiosity about what the nuances of notation can draw out of choreographic gestures. This space is a reservoir of concerns and potential solutions, noting problems and newer attempts to solve them, such as what approach to use for rhythm in the piece. It helps better characterize what Cassidy means when

says he takes a long time to write a piece—much of it is considering the basic principles and tablature of it. While Cassidy often characterizes his process as one driven by questions and, at times, even a sense of “not knowing what he’s doing,” these notes communicate the patient investigating qualities of his compositional process.

7.2 Sketches and Structures

Soon after Cassidy starts contemplating the questions discussed in the previous section, he begins using an Excel sheet to sketch processes and form on October 24th, 2009. While exploration of notational principles, specifics, interactions, and outcomes remain ongoing, Cassidy uses the foundational loops processes discussed in Chapter Four and related means to generate large-scale information, the instrument roles network, and the specific materials for solo segments. Its four pages are titled “initial metrical sketches,” “bar subdivisions,” “hand-mapping,” and “rhythm.” While the Excel document appears to have been updated throughout the compositional process, some discarded attempts (the “bar subdivisions” page), and unused continuations of processes remain.

Cassidy’s sketches work through several important aspects of *Second String Quartet*. For example, the first page shows how he creates the quartet’s framework out of small structuring processes. While these processes have been discussed generally in Chapters Four and Six to aid the analysis of the completed work, additional information and examples of how Cassidy goes about using them may help clarify less performance-focused questions about this part of Cassidy’s craft.

The workspace on the first page (“initial metrical sketches”) is noticeably ordered, color-coded, and is where the earliest date is listed (Figure 7.7). The page uses some Excel functions to

add the initial metrical process's number pairings to create the number of measures in each phrase and to check timing of each those phrases. Cassidy uses a small, interlocked looping process (similar to an isorhythm) that generates all of the measures and their time signatures: this, in turn, defines the duration of the whole work. This interlocked looping process and a related looping process subsequently group the measures into phrases and tempos.

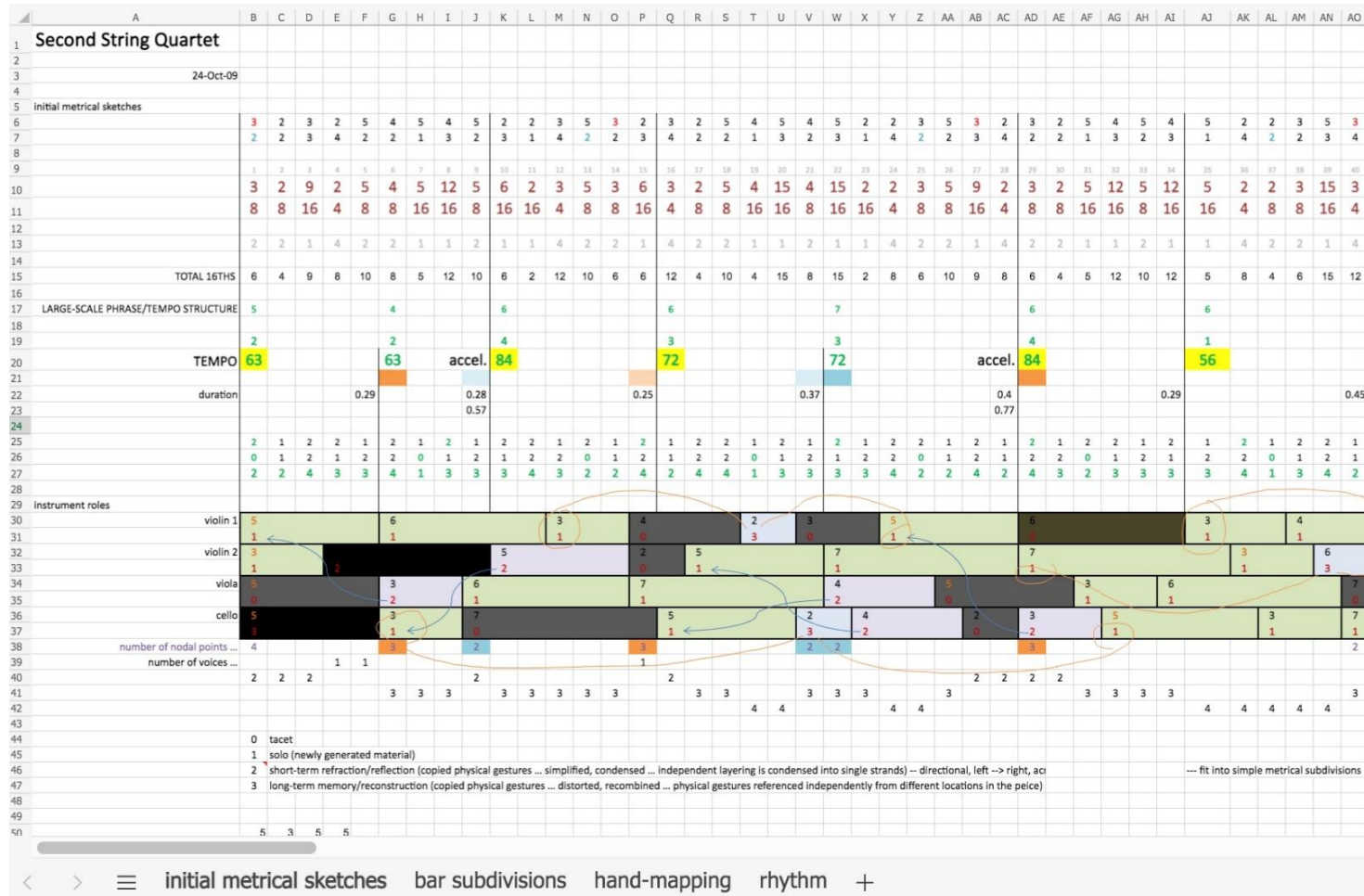


Figure 7.7: A screen capture of the main page of *Second String Quartet*'s Excel Sheet Sketches

The impact of these processes can be seen in this side-by-side comparison of the first page of his first draft and the final version of the quartet's score. These large-scale frames created early on in the sketches are relatively unmodified after they are created.

The image shows a handwritten musical score for "Second String Quartet" by Aaron Cassidy. The score is divided into sections for Violin 1, Violin 2, Viola, and Violoncello. The top section shows early draft sketches with various annotations and a tempo marking of $\text{♩} = 72$. The bottom section shows the final score with a consistent structure. Three yellow sticky notes provide explanations for the processes used:

- Top sticky note:** "blue (3) = long-term, v/in instr. — sketching, recombining pink (2) = short-term, across instr. — frequent simplifying → union attacks" (dated 3/5/2010).
- Middle sticky note:** "blue — add rests for any 'union' subdivision (e.g. p20) → except for consecutive rests".
- Bottom sticky note:** "pink — mult instr. layers, any 'common' subdivision digit overrides both parts e.g. p19 → only allow statements whenever in 'common' subdivision".

Figure 7.8: An example of how Cassidy's Excel sheet processes generate structures early on (above) that are consistent with those found in the final score (below).

Second String Quartet
Aaron CASSIDY

$\text{♩} = 63$

3/8 2/8 9/16 4/8 5/8 4/8

violin 1

violin 2

viola

violoncello

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Figure 7.8, Continued: (first page of the final score of *Second String Quartet*.)

The specific patterns made of number loops are shown below. For the one labeled “initial metrical sketches,” the 13-number group and 12-number group loop until they finally meet at their common multiple (m. 156). In addition to being how Cassidy finds the total number of measures in the work, the vertical alignments made from those two loops (such as the column of 3 2 at the start of pattern) is used to realize several key features. These vertical pairings transliterate into time signatures for each measure (3 2 becoming 3/8, 2 2 becoming 2/8, and 3 3 becoming 9/16) as seen in the first three measures of the score.

Initial Metrical Sketches Loops

Tempo

3 2 3 2 5 4 5 4 5 2 2 3 5

2 1 2 2 1 2 1

2 2 3 4 2 2 1 3 2 3 1 4

0 1 2 1 2 2

Initial Metrical Sketches (used to make time signatures)

3	2	3	2	5	4
2	2	3	4	2	2
$\frac{3}{8}$	$\frac{2}{8}$	$\frac{9}{16}$	$\frac{4}{8}$	$\frac{5}{8}$	$\frac{4}{8}$

Initial Metrical Sketches (used to make structural divisions (bold and double bar lines))

	3	2	3	2	5	4	5	4
+	2	2	3	4	2	2	1	3
Structural Divisions	5 m.	4 m.	6 m.	6 m.	7 m.	6 m.	6 m.	7 m.
mm #.	1–5	6–9	10–15	16–21	22–28	29–34	35–40	

Figure 7.9: Examples of how the loops in *Second String Quartet*'s sketches generate time signatures and structural divisions.

As seen in Figure 7.9, The vertical pairings are also added together to generate the structural divisions on the score. (3+2 = mm.1–5, 2+2 = mm. 6–9, 3+3 = mm. 10–15). These structural divisions are paired with tempo changes made from a similar pattern of looped numbers. While perhaps a bit more abstracted than even the main pair of loops, the tempo loops are added in vertical pairs, with their sum referring to a prescribed tempo 0+0 = 0 ($\text{♩} = 56$), 1+1 = 2 ($\text{♩} = 84$). Besides the later addition of the *rallentando* in mm. 103–104 and the final measures' *accelerando* to $\text{♩} = 96$, all tempos are assigned using this process.

While these processes may seem intensive or arbitrary to someone unfamiliar with them, they are a powerful, reliable part of Cassidy's process. So much so that, with regard to his notebook and compositional timeline, these processes happen early and receive no particular

attention as he works through compositional questions. They lay the track for the resilient structures that tightly define so much of the quartet's turbulent performance.

An additional reason for discussing these process-generated boundaries is to dissuade future performers and researchers from ascribing special authorial intent to moments such as mm. 49–50, where Cassidy's loops happen to match up in that moment, two consecutive measures have the same time signature. Readers will recall from Chapter Four how sectional division from double bar lines similarly do not render clean, exact sectional breakdowns.

Inside the mockup of the quartet measures on this first page, Cassidy uses similar local processes to create contrapuntal networks of behavior types (kinds of material/variation) in the form the instrument roles discussed in detail in Chapter Six. Their loops are designed to not coincide easily or often, as can be seen in the chart below (Figure 7.10). These segments push against each other and the indicated boundaries of the other structuring process. They are the spaces that Cassidy's indeterminate localities are eventually situated. Cassidy uses randomly generated numbers to seed the behavior types, sowing the curious and contrasting amassments of solo and variation materials. Cassidy does this in pursuit of a non-hierarchical structure and an unpredictable surface area.

With this kind of information assigned, Cassidy applies a few rules as he intuitively constructs the network of variation segments: 1. short-term variations must reference another instrument's completed segment 2. long-term variations used are surrounded by solo segments from the same instrument (even if those solo segments are not adjacent to the long-term segment). This approach follows the general trend Cassidy speaks of in "I Am An Experimental Composer," when he writes: "critically, the form of a piece is not something I *decide*, as such – sectional divisions, durations, tempi all have a life of their own that I then have a responsibility to react to and 'articulate' through other lower-level compositional decisions."²⁵¹

In doing so, he also silences a long-term and a short-term segment at the start of the piece and a number of long-term segments throughout. These segments at the beginning do not fit the first rule, coming in immediately or not before another instrument's completed solo segment (Violin 2's silence from mm. 4–9 is initially designated for a short-term segment, which is impossible within the context). The long-term segments from the initial processes that are made tacet in the drafts and final score seem to obstruct particular formal aspects, such as the proposed long-term segment in Violin 1 mm. 29–34. This follows the solo segment that conclusively ends Section 1's long-term networking.

In considering the successful and discarded attempts at these processes, commonalities and preferences emerge. One tendency that particularly stands out is how Cassidy's approach is more focused on the sonic results of the processes he uses rather than treating them as a holistic, theoretical system. Aside from completing a full cycle to realize the total duration of the work,

²⁵¹ Aaron Cassidy, "I Am An Experimental Composer," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/experimental-composer/>

number pattern loops are used without necessarily completing them or fulfilling other obligations to some larger pattern. They are used to realize the whole and its parts, nothing more.

In conversation with Cassidy at Huddersfield, some preferences about these initial number patterns were mentioned.²⁵² Specifically, the following pattern (4 3 1 2 4 2 3 1 4) was material used as a placeholder to help test out notation approaches with JACK Quartet during the New York City trip (Figure 7.22)²⁵³ While never intended for use in the actual realization of *Second String Quartet*, Cassidy still found the pattern aesthetically dissatisfying, ostensibly because of the more obvious patterning within the range of numbers. Still, the pattern did the job Cassidy set out for it in helping him find better ways to notate his ideas for JACK Quartet. Although this may seem as though it is just a matter of taste, there are clear musical consequences from the patterns Cassidy chooses at the sketching stage. They are the starting point for what becomes the resilient, twisting structures of the work.

Cassidy's practical approach to processes also appears in how he moves from using interlocking patterns to randomly generated numbers to manage the behavior types in the "instrument roles." As described earlier in Chapter Four, these behavior types are more immediately noticeable or audible elements in the final composition compared to the structuring elements above. Because of this, Cassidy seems to embrace the unstable, unpredictable benefits of the randomly generated material.

Another example of Cassidy's practical considerations when choosing processes is the second page of the Excel sketches document: "bar subdivisions." While intended to create bar subdivisions with the information on this page, he writes to himself on that page "abandon ...

²⁵² Aaron Cassidy, interview by author, Huddersfield, UK, Nov. 5, 2019.

²⁵³ Ibid.

use RNG [Random Number Generator] instead ... creates a more unpredictable set of alignments between instruments.”

In its place, the process in the Excel sheet’s “rhythm” page is used (Figure 7.11).

Randomly generated numbers are used to create two sets of numbers for each basic rhythm entered during Draft 1. One number for the available subdivisions and another one for those available subdivisions’ internal rhythms. The Excel sheet “rhythm” is used as a key of rhythmic impulses to insert into them. Like the subdivisions page before it, the rows of rhythms are adds: with one choice for 1, one choice for 2, three choices for 3, six choices for 4, and fifteen choices for 5.

	8th				dotted 8th -->									
3														
4														
5	16th													
6		1		2						5				
7	1	1	1	1	1	3	1		1	3	2			
8					2	1	3		2	2	3			
9					3	2	1	1	3	4	1			
10					4	1	2	1	4	1	4			
11					5	1	1	2	5	3	1	1		
12					6	1	1	1	1	1	3	1		
13									7	1	1	3		
14									8	2	2	1		
15									9	2	1	2		
16									10	1	2	2		
17									11	2	1	1	1	
18									12	1	2	1	1	
19									13	1	1	2	1	
20									14	1	1	1	2	
21									15	1	1	1	1	1

Figure 7.11: A screen capture of the “rhythm” page of *Second String Quartet*’s Excel Sheet Sketches

While the application of this is discussed more below in the First and Second Draft section, a practical example of this can be seen in Violin 1’s measure 5 (Figure 7.12). The 5 is written on the basic rhythm duration, so it is made into a quintuplet. The 13 indicates the 13th choice in the chart for 5-based impulses. It indicates “1 1 2 1” rhythm. The resulting rhythm realizes this, with sixteenth note as the “1” and eighth note as the “2” because they are twice as long as sixteenth notes.

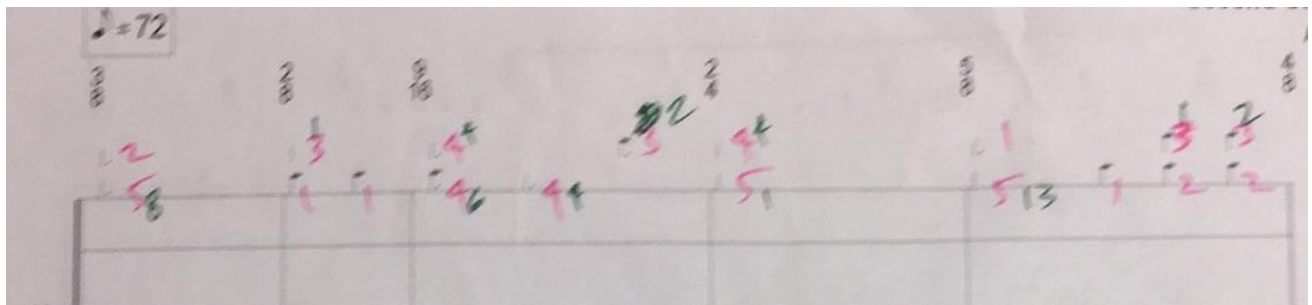


Figure 7.12: A comparison of Cassidy’s rhythm generation in Draft 2 (top) and the results (bottom) for Violin 1 mm. 1–5.

The remaining page, labeled “hand-mapping” on the Excel sheet’s tab (and “LH/RH Hand-Restrictions” on the page itself), is by far the most detailed of the sketches and most important

after the realization of the structure, its division, and the instrument roles. A small portion of it is shared in *Constraint Schemata*, showing Violin 2 mm. 17–28.²⁵⁴ Cassidy’s article thoughtfully follows it with an example of the final score’s mm. 17–21, yet perhaps more could be said about this workspace and its immense impact on everything that follows it in the quartet.

Dated November 15, 2009, this page is essentially a zoomed-in version of the first page’s mockup of structural divisions and the instrument role network, color coding and all. This page exclusively fills in the solo segments (marked green) (Figure 7.13).

LH/RH mapping-restrictions														
15-Nov														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	3	2	9	2	5	4	5	12	5	6	2	3	5	3
	8	8	16	4	8	8	16	16	8	16	16	4	8	8
TEMPO	63					63			accel.	84				
LH/RH available strings/hand positions														
violin 1														
rhythmic independence - RH														
bow position	1					1						2		
bow direction	3					3						3		
bow pressure	3					2						1		
rhythmic independence - LH														
arm position	6					6						6		
finger widths	4					6						6		
finger pressure	4					6						6		
bow availability (1-5)														
bow - 1	2				2	4				1		0		4
bow - 2	6				3	5				2		4		6
bow pressure availability (1-6)														
pressure - 1	4				1	6				2		2		1
pressure - 2	5				6	3				4		1		3
string availability (I-IV)														
string - 1	4				2	4				0		4		0
string - 2	1				3	2				3		5		5
finger width availability (1-4)														
fw - 1	1				2	2				3		1		4
fw - 2	1				3	3				3		3		4
finger pressure availability (1-7)														
fp - 1	2				1	4				2		1		4
fp - 2	6				4	3				5		5		5
rh - 1	8					9						1		5
rh - 2	0					7						3		10
lh - 1	2					7						9		3
lh - 2	1					10						8		7

Figure 7.13: A screen capture excerpt of the hand-mapping page of *Second String Quartet*’s Excel sketch sheets.

²⁵⁴ Constraint 12

The quartet's distended and disconnected solo segments are planned extensively here. This is where the number of rhythmically independent layers is generated (top six rows), which guide the seeding of the rhythmic layers in the first two drafts. Constraint windows, discussed in the previous chapter extensively, are also generated and input here in the bottom four rows. Attention is spent on each of the instrument's six "planes of movement" and the number of available options within each of them is allowed at the moment.²⁵⁵

These are an example of a "constraint scheme" referenced in the full title of Cassidy's "Constraint Schemata, Multi-axis Movement Modeling, and Unified, Multi-parametric Notation for Strings and Voices." Cassidy provides a short definition: "These notational principles establish three planes of movement for both the right and left hands. Figure 7.11 outlines the available movement planes for each hand, including "horizontal" movements up and down the fingerboard, "vertical" changes of finger or bow pressure, and "lateral" movement across the strings and across the bow."²⁵⁶

On the "hand-mapping" Excel page, this corresponds to the six elements are grouped around "Right Hand Rhythmic independence" (Bow position, Bow direction, and Bow pressure) and "Left Hand Rhythmic independence" (Hand position, Finger widths, and Finger pressure). Cassidy manages them with additional Excel rows that track Bow availability, Bow pressure, String availability, Finger width availability, and Finger pressure availability.

These rows support and keep track of the boundaries of phrases on each of the planes. As Cassidy describes, "gestural movements are enacted on these six planes, but those movements

²⁵⁵ Constraint 7

²⁵⁶ Ibid.

are not boundless. These each undergo independent, dynamic constraint schemata that restrict the available movement space for each of the six planes. These constraint schemata are linked to phrases...each of the six planes maintains its own constantly shifting constriction space, moving from one available window of motion at the beginning of the phrase to another at the end.”²⁵⁷

When combined with six simple gestures Cassidy designs in his blue notebook, these six planes and the constraint windows that shape them realize the solo section materials seen in the third draft. This use of the “hand-mapping” page to realize the third and fourth drafts is the high point of interaction between the sketches and drafts, even though the short-term and long-term behavior types remain to be filled in until later. Those later tasks are done mostly using the score drafts (and general networking outlined on the Excel’s first page for general guidance).

7.3 Drafting

With substantial amounts of planning accomplished in the blue notebook and sketch Excel document, Cassidy begins the drafts by notating the composition’s framework (the initial metrical structure materials) in Finale. While some small changes occur, the structuring processes’ results (measures, time signatures, phrases, tempos) from the sketches inform a layout that essentially remains the same from initial draft until the final version of the score. This stands in contrast to the mixture of handwritten notes and in-progress Adobe Illustrator and InDesign notations that are layered, edited, and sometimes removed throughout this vigorous drafting process. Typical features seen throughout the drafts include how handwritten aspects in each often give way to a further realized version of it in computer notation in the next draft.

Additionally, handwritten aspects appear in an increasing number of colors over time as new

²⁵⁷ Ibid.

layers and considerations first appear. Finally, Cassidy may work on the scores in color in Illustrator, but his printout drafts are consistently in black and white.

While an extensive discussion of each of the six drafts Cassidy works through on that framework might be excessive, clarifying when materials are transferred from the sketches, how Cassidy interacts with them on the score, and how Cassidy finally begins realizing the variation networks in Draft 5 will help further explain his process. Until he begins Draft 5, Cassidy is only concerned with the solo segments, using the “hand-mapping” Excel sheet to guide the process.

Drafts 1 and 2 develop the rhythmic strata for each hand, using the rhythmic independence layers generated in the Excel sheet. In Draft 1, he uses addends to specify basic attack/durations. These addends are effectively the different number groupings that add up to a small number such as five in the “rhythm” chart. For the first page of the quartet, addends of 5 are used. One layer for the first page of Violin 1 m. 1–5 specifies “3 11 12 2 2111,” for example. Each of single unit of impulses is matched with the denominator of the particular measure’s meter. (As in that first measure of $3/8$, the 3 Cassidy writes in is three eighth notes long) (Figure 7.8).

With these basic impulses for the independent layers in place, Draft 2 is used for inputting subdivisions and impulse patterns inside them, as described in the “rhythm” section of the Excel sheet sketches above. First, subdivisions are assigned randomly, then a set is randomly chosen from the list of impulses available for that subdivision. As can be seen in Figure 7.12 (from the first page of Draft 2), Cassidy handwrites these pairs of numbers next to computer notated duration stems. Violin 1’s top right-hand layer in m. 1 sole rhythmic duration is assigned a 2, so only one set of addend impulses is possible (1 1). The lower layer specifies 5 and a green 8 is written next to it specifying that option from the chart. The 8th choice in the 5 list on the “rhythm” Excel sheet is (2 2 1). Because of this, that layer’s rhythm will be a triplet where the

first two impulses are twice as long as the last one. When consulting the final score, this lower right-hand layer is in fact a 5:6 tuplet that has two eighth notes followed by a sixteenth note (Figure 7.12).

While Cassidy's notebook entries continued to question whether these rhythmic strata would appear in the final score, how they help direct the graphic notations of the choreography cannot be denied. When considering the direction Cassidy takes with regard to rhythm following the completion of this work, the questions Cassidy has about them in this work resemble his relationship with the temporary notation of constraint windows on his score in Drafts 3 and 4 that he removes when solo segments are fully realized.

Drafts 3 and 4 are the particular spaces where the compositional conflicts and solutions Cassidy often discusses in his writing occur. They continue to develop the quartet's solo segments and draw extensively from the "hand-mapping" Excel spreadsheet (Figure 7.15). Draft 3 is where Cassidy inputs the constraint windows and changing availability of the parameters he is using. It is also the example of rare changes to the score's framework, with the fermata measure extension of m. 104 stretched out (to accommodate the constraint windows), and the addition of the final *accelerando* in mm. 155–156. Draft 4 is where he works to fit them into a preliminary graphic form that can fit directly inside the windows. Gestural models appear as part of this.

Draft 3 features computer-drawn lines to indicate constraint windows. (In Figure 7.14 below, the pair with a square on each end are for the right hand. The pair of lines with a circle on each end is for the left hand). Cassidy uses a different-colored pen for each kind of parameter that is being used and applies the number or amount available throughout each passage. For example, Violin 2 mm. 1–3's green straight lines indicate string availability. This solo segment

begins with all four strings being available, but by the end of the segment only string 2 (A) is available to be played. While this does not mean all four strings are played simultaneously, doubles of each adjacent pair of strings appears in mm. 1–2 in the final score. It also is represented in the left hand where fingerings are notated.

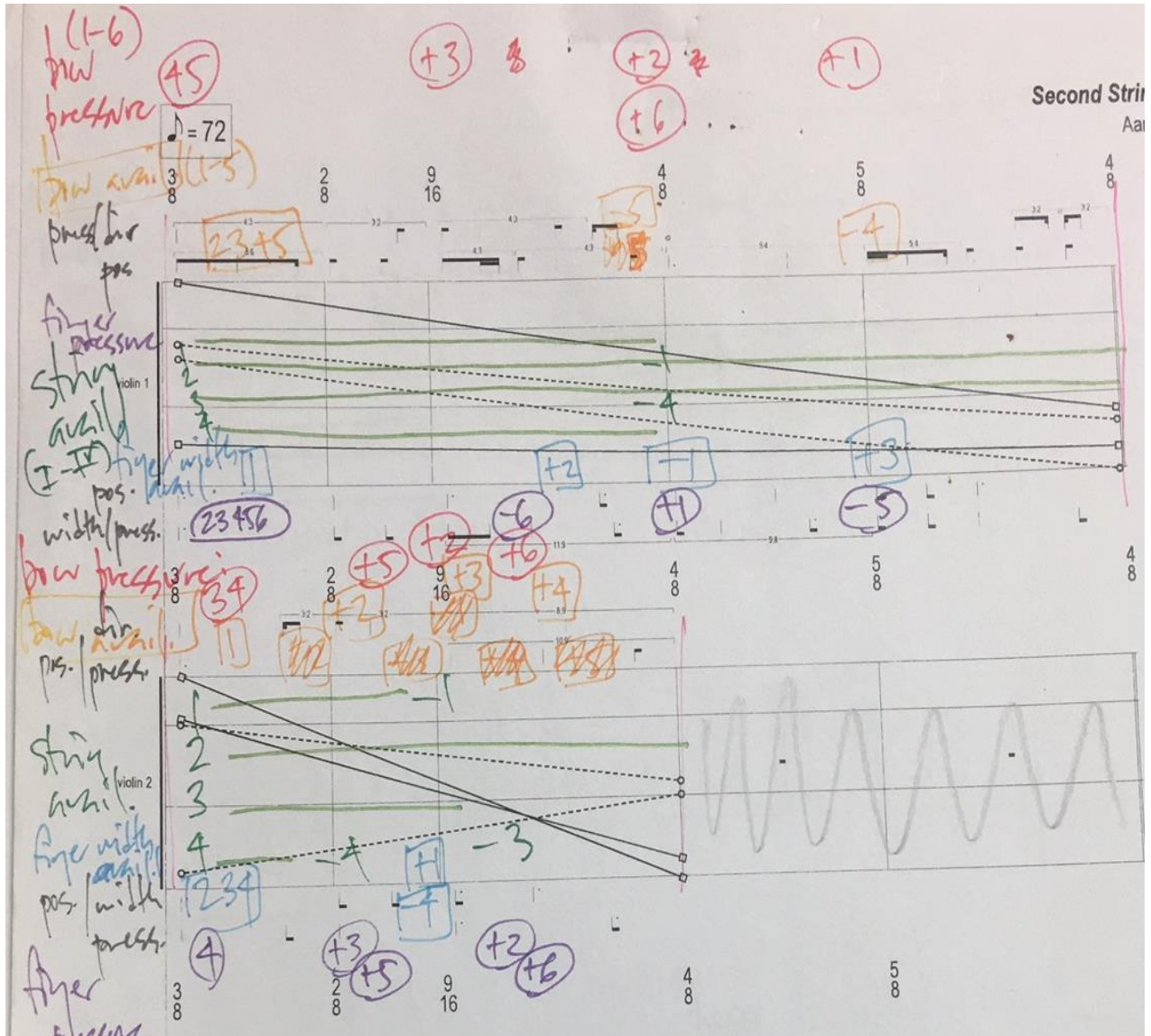


Figure 7.14: Draft 3 mm. 1–5, Violin 1 and 2

violin 1			
rhythmic independence - RH			
bow position	1		
bow direction	3		
bow pressure	3		
rhythmic independence - LH			
arm position	6		
finger widths	4		
finger pressure	4		
bow availability (1-5)			
bow - 1	2		2
bow - 2	6		3
bow pressure availability (1-6)			
pressure - 1	4		1
pressure - 2	5		6
string availability (I-IV)			
string - 1	4		2
string - 2	1		3
finger width availability (1-4)			
fw - 1	1		2
fw - 2	1		3
finger pressure availability (1-7)			
fp - 1	2		1
fp - 2	6		4
rh - 1	8		
rh - 2	0		
lh - 1	2		
lh - 2	1		
violin 2			
rhythmic independence - RH			
bow position	3		
bow direction	1		
bow pressure	3		
rhythmic independence - LH			
arm position	6		
finger widths	6		
finger pressure	5		
bow availability (1-5)			
bow - 1	1	0	
bow - 2	1	4	
bow pressure availability (1-6)			
pressure - 1	4	2	
pressure - 2	3	6	
string availability (I-IV)			
string - 1	4	2	
string - 2	1	2	
finger width availability (1-4)			
fw - 1	2	3	
fw - 2	4	1	
finger pressure availability (1-7)			
fp - 1	4	2	
fp - 2	4	6	
rh - 1	2	9	

Figure 7.15: Hand-Mapping Excel Sheet for Violin 1 and 2 mm. 1–5

Similarly, above the staff the bow pressure parameter is indicated in red ink, following the lower right hand rhythmic stratum (Figure 7.14). Beginning with a circled 3 4 at the start of m. 1, the bow pressure increases to +5, +2, and +6 in the following measures. This indicates the inclusion of lighter and heavier bow pressure to available options. In Draft 4's version of this (Figure 7.16), these same numbers are employed now along hand-drawn paths that work within the printed constraint windows. Written in red ink with each number circled, Violin 2's m. 1 begins with 3-pressure near the bridge, 4-pressure at the start of m. 2, and 5-pressure to 2-pressure to 6-pressure to 3-pressure in m. 3.

The image shows a handwritten musical score for Violin 1 and Violin 2, measures 1-5. The score is written on a grid with five measures. The Violin 1 staff is on top, and the Violin 2 staff is on the bottom. The score includes notes, stems, and various annotations in red and blue ink. Annotations include circled numbers (1-6) indicating bow pressure, arrows showing bow direction, and notes like 'ADA' and 'steps'. Marginal notes include 'Bow gesture models', '# RH position posture types', and 'LH pos. posture types'. A 'Second String C' label is visible on the right side.

Figure 7.16: Draft 4 mm. 1-5, Violin 1 and 2.

The translation of these choices is noticeable in the final score, especially where the pressure reduces to a $1/2$ *col legno* then expands to the widest red line yet seen in the passage (heaviest bow pressure) on the final eighth of measure 3's 10:9 triplet. Importantly, the use of +2 and +6 for that measure does not indicate a removal of the initial bow pressures, which appear again after that surge in bow pressure.

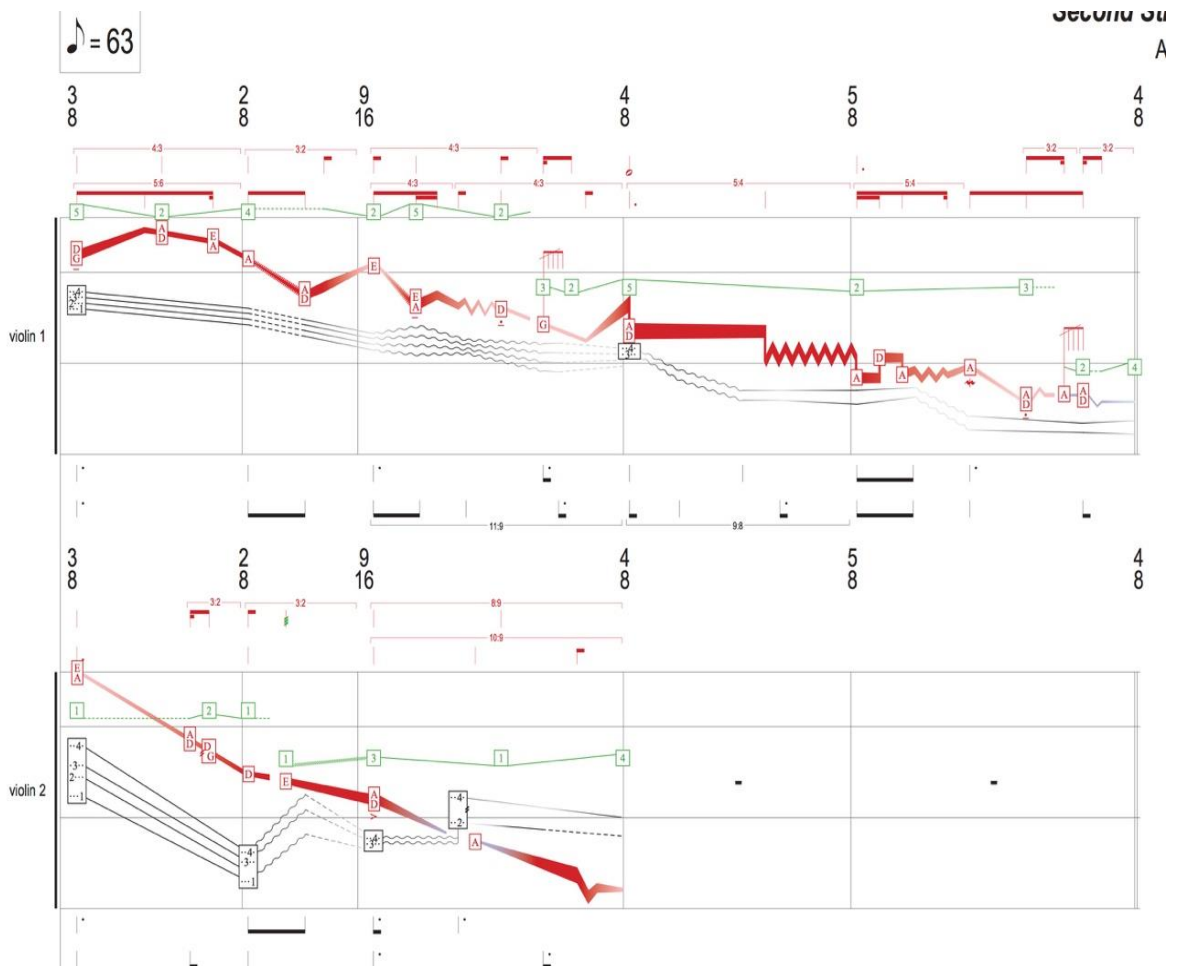


Figure 7.17: Final Score mm. 1–5, Violin 1 and 2.

While perhaps more subtle than some other changes in bow pressure on the page, the transition in Violin 2's m. 3 6-pressure back to a 3-pressure in m. 3 noticeably has a mordent-like arrow shape. This is visible both in Draft 4's handwritten copy and the final score (Figure 7.17).

This is an example of how Cassidy applies his gestural models throughout the work's solo segments. They effectively define the connections between discrete points in each parameter. Violin 2's left hand position in Draft 4's m. 1–3 further shows how the gestural models are used as connectors. Using each rhythmic impulse in the upper left hand rhythmic stratum, it is clear that the maximum diagonal shape is being applied within the ever-tightening left hand constraint window. It begins with a long diagonal line from the fingering box to m. 2's arch shape, then m. 3 with its flat (vibrato added) followed by a glissando trill.

The variability of how these six gestural models are applied across the six parameters is noticeable just above this in Draft 4's Violin 1 mm. 1–5. Across the bottom of the staff, in coordination with the lower left hand rhythmic stratum, he handwrites a mixture of regular and harmonic (diamond) noteheads. Some are connected by straight arrows, as in, the flat (horizontal line) gestural model. Others are connected by a vibrating line, the sixth gestural model. In realization, these vibrating lines are visible in the score as hammer-ons in m. 2.

The outcomes from Drafts 3 and 4 result in essentially a finalized version of all of the solo segments in the quartet. They sort and shape available parameter options within the confined, changing constraint windows. They use the gestural models as connectors between discrete nodes throughout the phrase. These choices overlap and contrapuntally move against one another to produce Cassidy's indeterminate localities.

Draft 5 features distinctly different compositional activity. With the solo segments completed and tacet segments in place, he uses this draft to take on the remaining 23.5% of the score that has not yet been notated by applying the variation networking from the "initial metrical sketches" Excel page. As Cassidy hand-draws connecting arrows from solo segments to the variations they are instigating, he brackets and numbers what elements of those solo

segments will be repurposed. As with previous drafts, these handwritten selections help Cassidy sort and are then worked through on his computer. Additionally, somewhere between completing Draft 4 and working on Draft 5 is when Cassidy's last notebook entry (April 8, 2010) is made. He writes about how the tempos need to be reduced to accommodate the left-hand material, which is particularly timely because this is the moment when he is able to see the fully realized solo segments. This results in all tempo indications being adjusted to slower tempo in a somewhat proportional manner.

Throughout Draft 5, Cassidy operates with the general variation rules discussed in the previous chapter (Figure 7.18). He tends to almost always choose the first gesture from an instigating solo segment to apply in a short-term variation. Exceptions tend to choose gestures that have the kind of dynamic, obvious, or expression as many of these initial gestures. When more than one gesture is selected for a short-term variation, they tend to be applied sequentially, such as in the ten individual gestures from cello mm. 40–46 applied in Violin 1 mm. 52–57. In practice, it reinforces the previously mentioned sense that short-term filters reveal the more physically demonstrative/louder elements.

Marking up solo segments for long-term variation information uses a similar bracket and numbering of gestures approach. They also specify whether Cassidy is referring to the bracketed materials' left-hand or right-hand material by where the numbers are placed by the staff. As the atemporal, recombination-focused variation type, a long-term segment is fed information from before and after it. While the long-term variation itself is marked with sequential gestural numbers (for example, LH 1 and RH 1, LH 2 and RH 2, etc.), Cassidy more freely picks and labels from within an instigating solo segment to fill those roles.

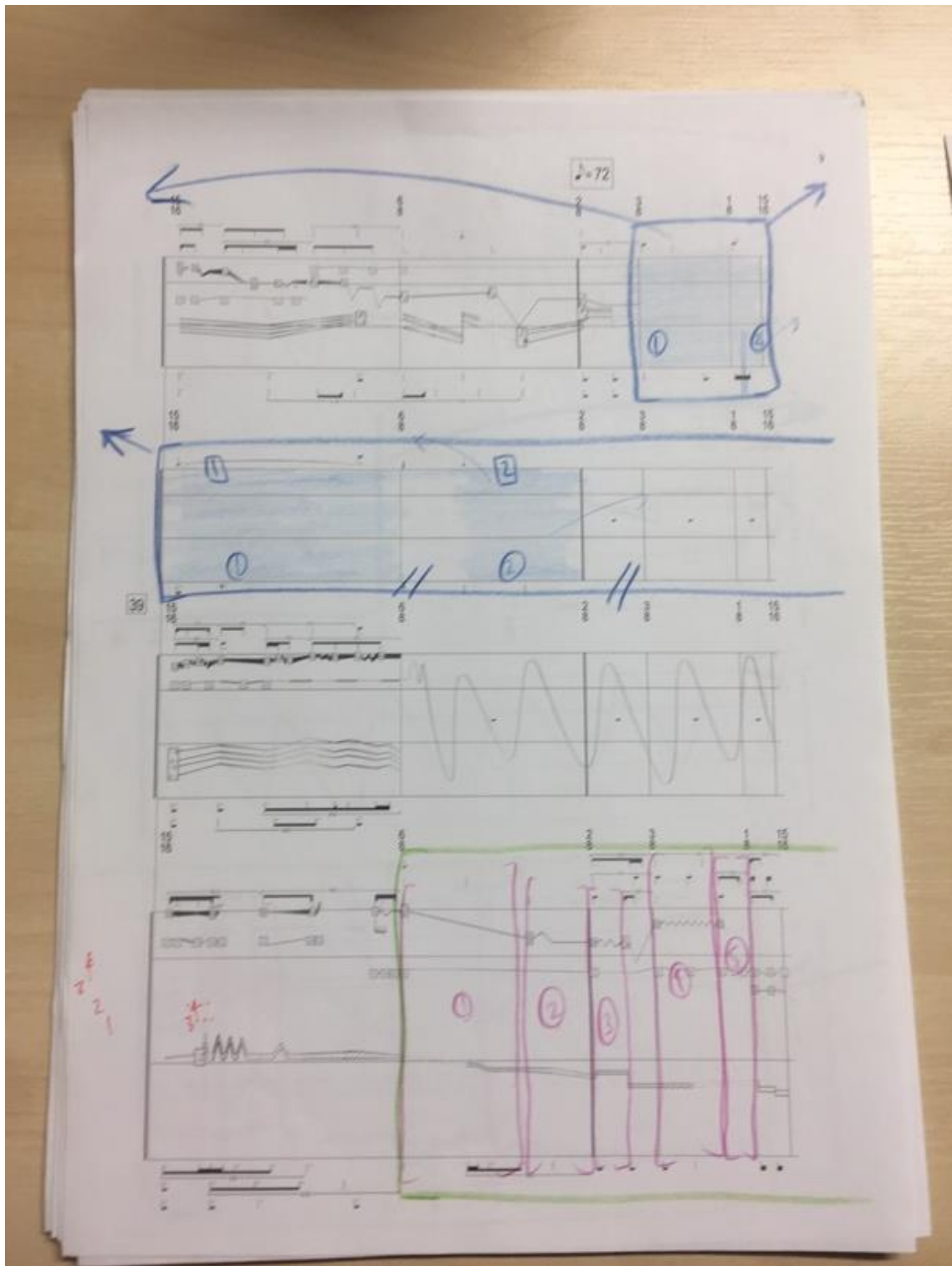


Figure 7.18: Above: Draft 5 mm. 40–43 (Cello Solo Segment gestures numbered and selected)
 Below: Draft 5 mm. 52–56 (Violin 1 Short-Term Segment with corresponding numbers from mm. 40–46 Cello Solo Segment).

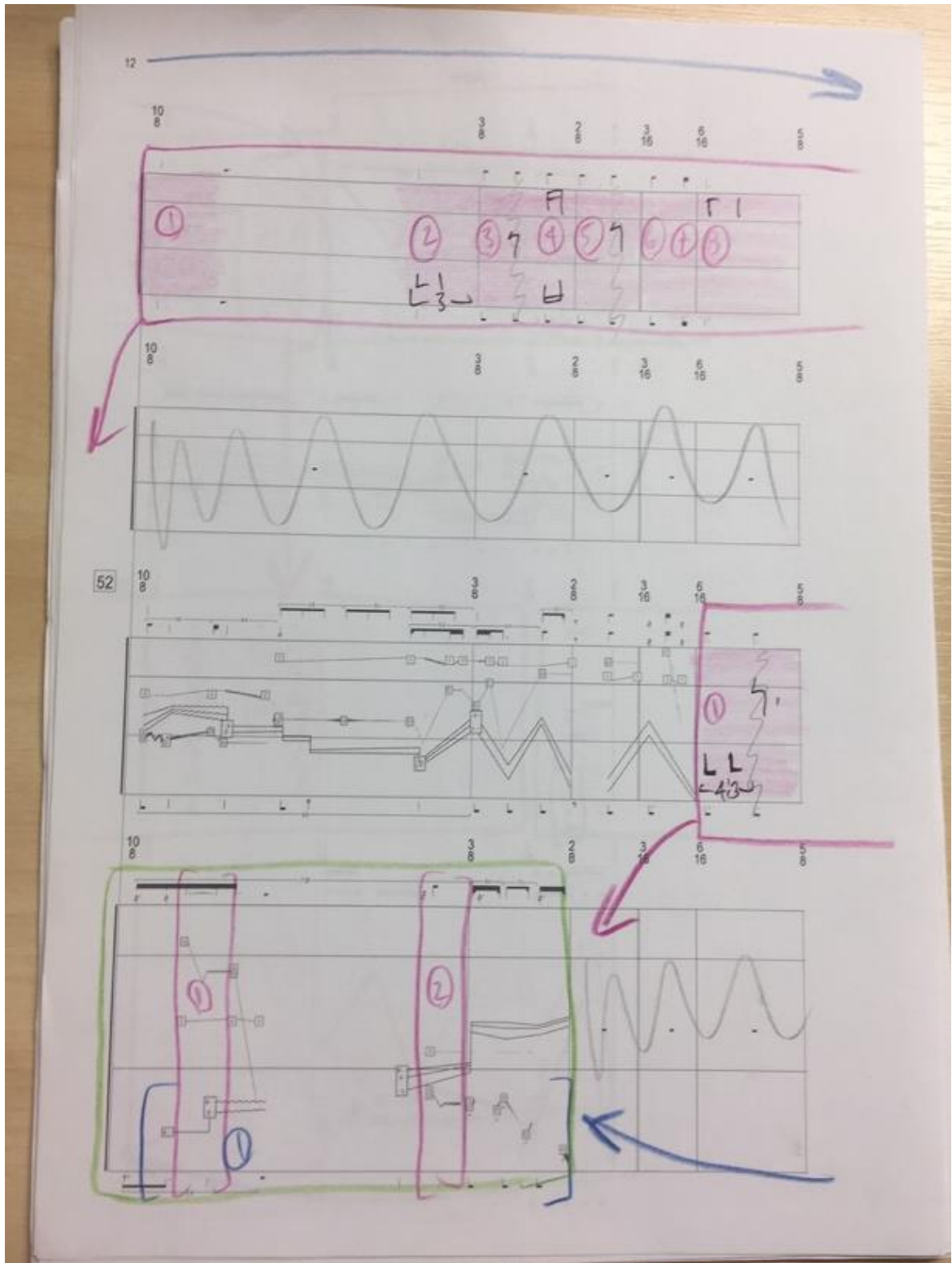


Figure 7.18, Continued.

For example, the long-term variation segment in Viola mm. 72–75 is marked with 1, 2, and 3 (Figure 7.19). However, the following solo segment that feeds it (Viola mm. 81–83) has a gesture in m. 81 labeled “2,” then gestures in m. 82 and 83 labeled “3” and “1” (Figure 7.20). In practice that means that the same mordent-shaped, hammer-on trill from the start of the solo segment m. 82 is reused to make the middle of the long-term segment in m. 73. Specifically, m. 73 features the left-hand mordent-shaped, hammer-on trill from m. 82 and m. 64’s final right hand bow position mordent/transition to *1/2 col legno* (Figure 7.21).

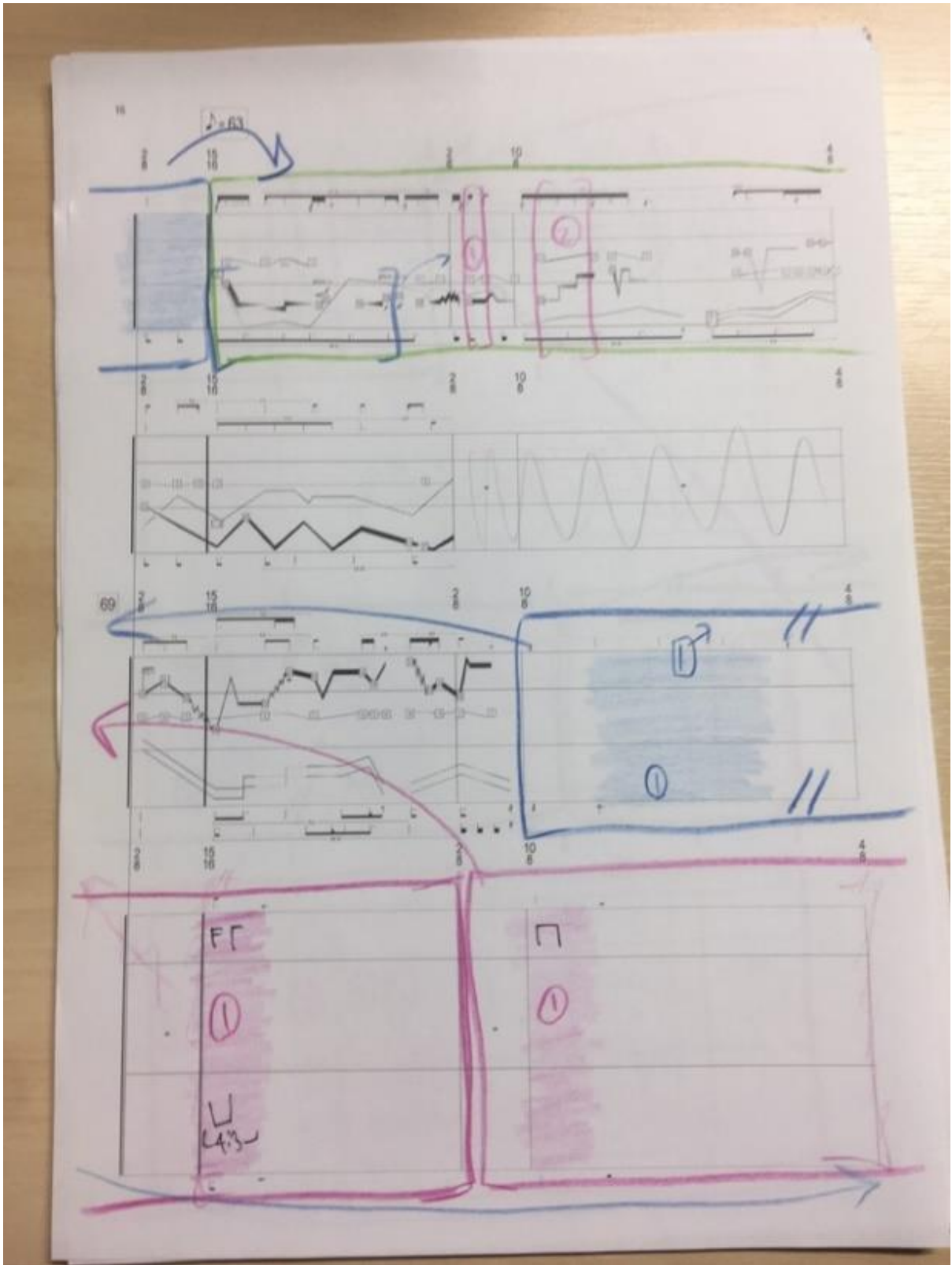


Figure 7.19: Draft 5: Viola mm. 72–75 Long-Term Segment (numbered spaces and arrows indicate which source that material is from).

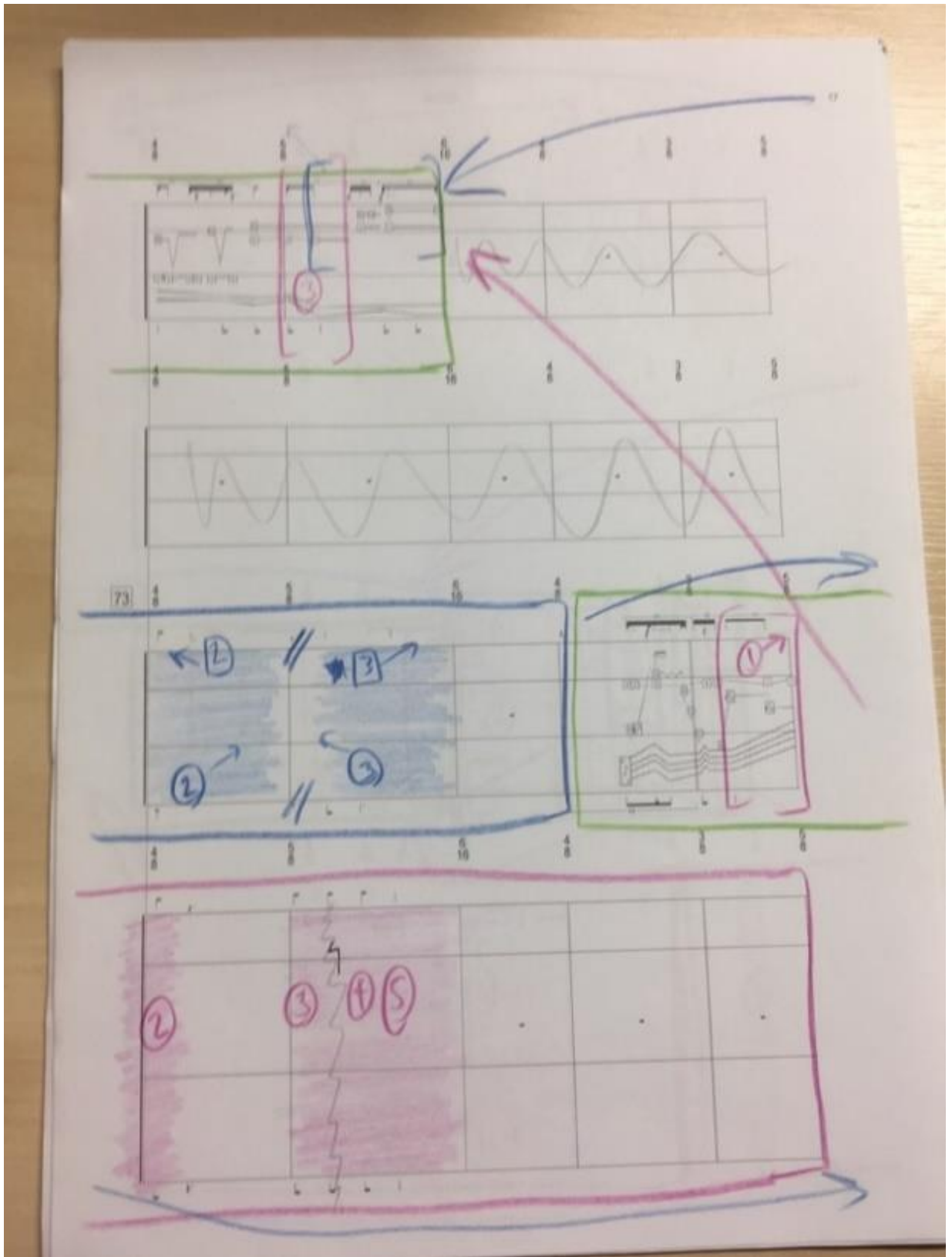


Figure 7.19. Continued.

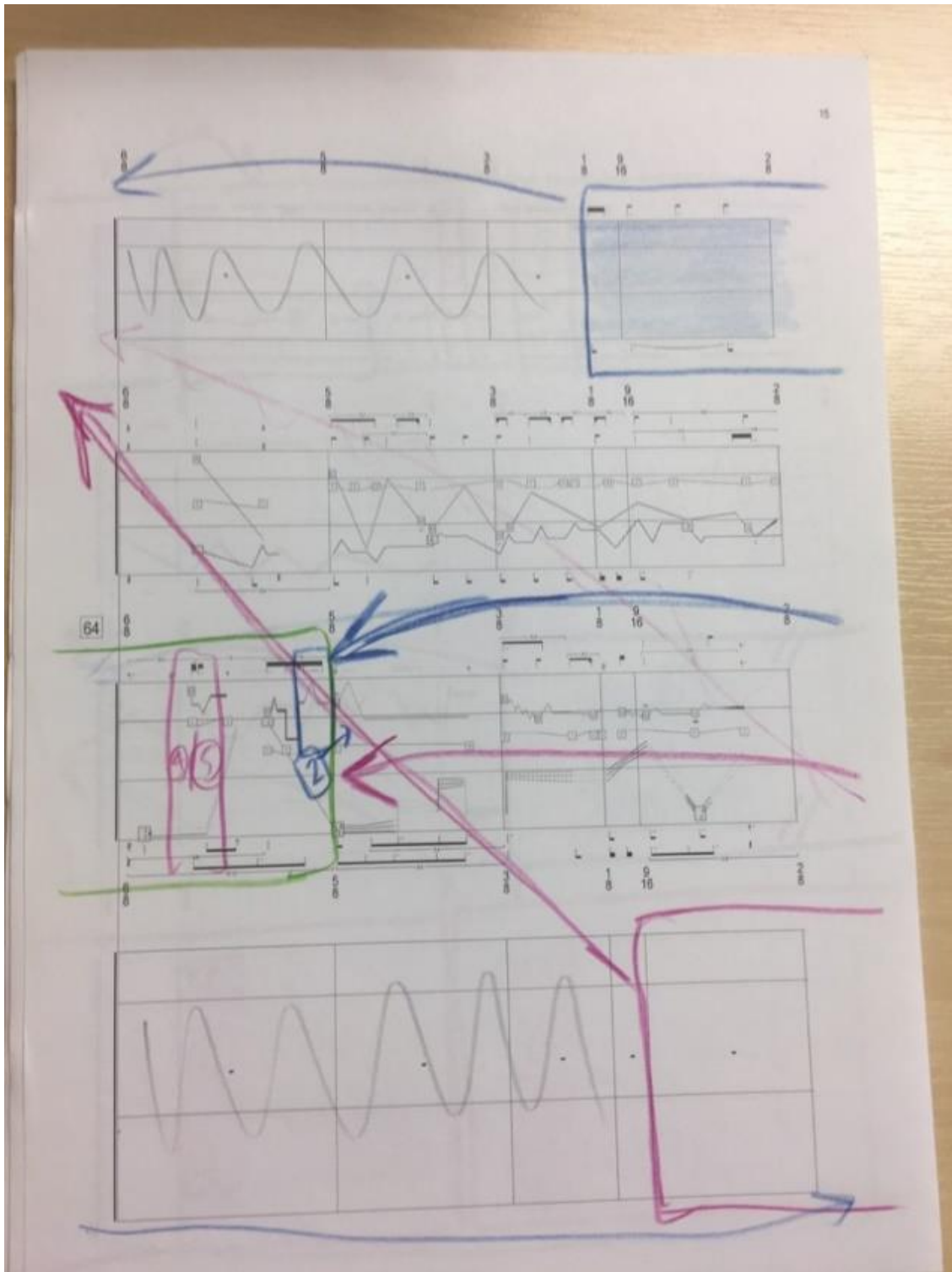


Figure 7.20: Solo segments that inform the long-term segment above. Above: Draft 5 end of Viola Solo Segment m. 64 (blue circled 2). Below: Draft 5 Viola Solo Segment mm. 81–83, gestures circled in blue.

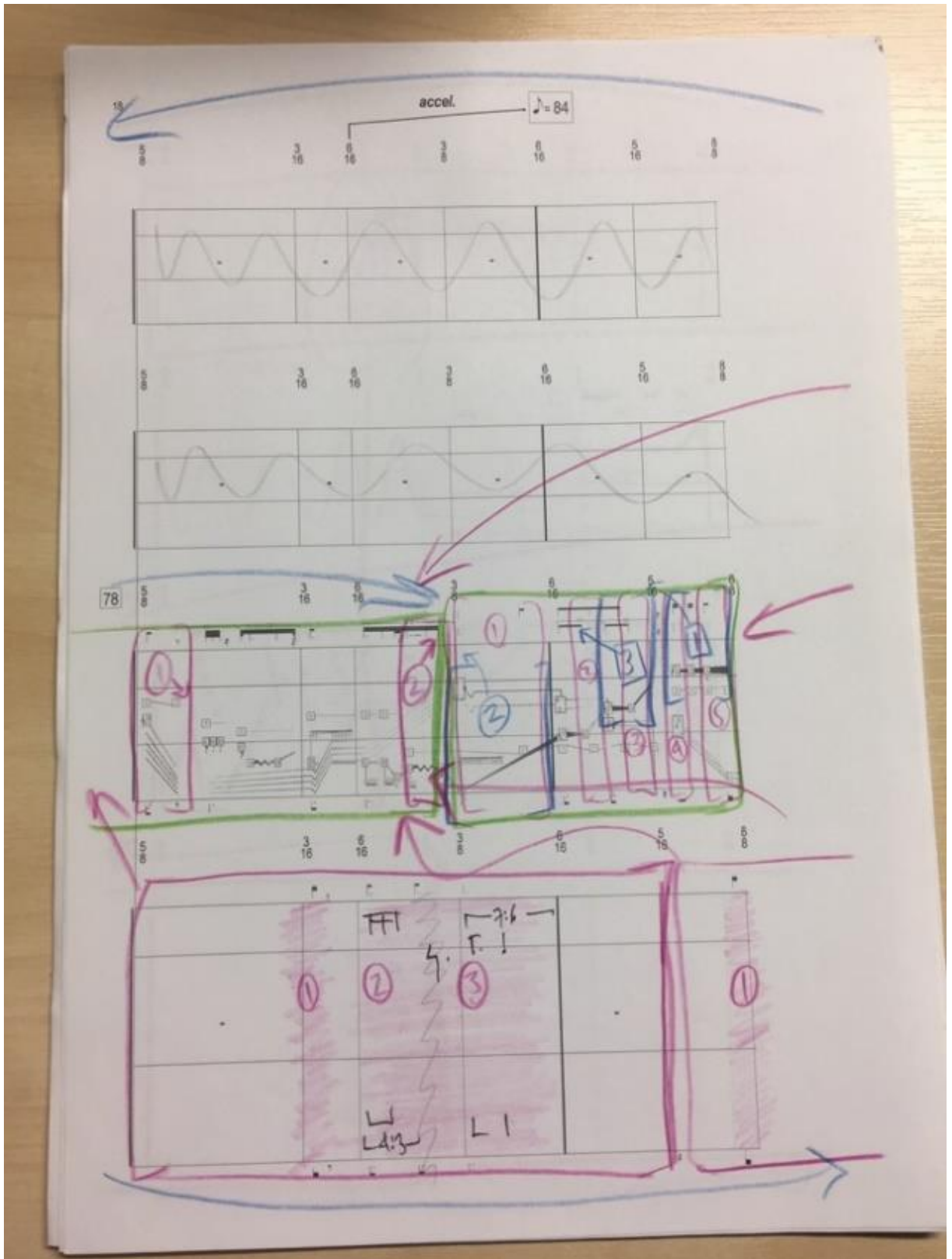


Figure 7.20, Continued.

73

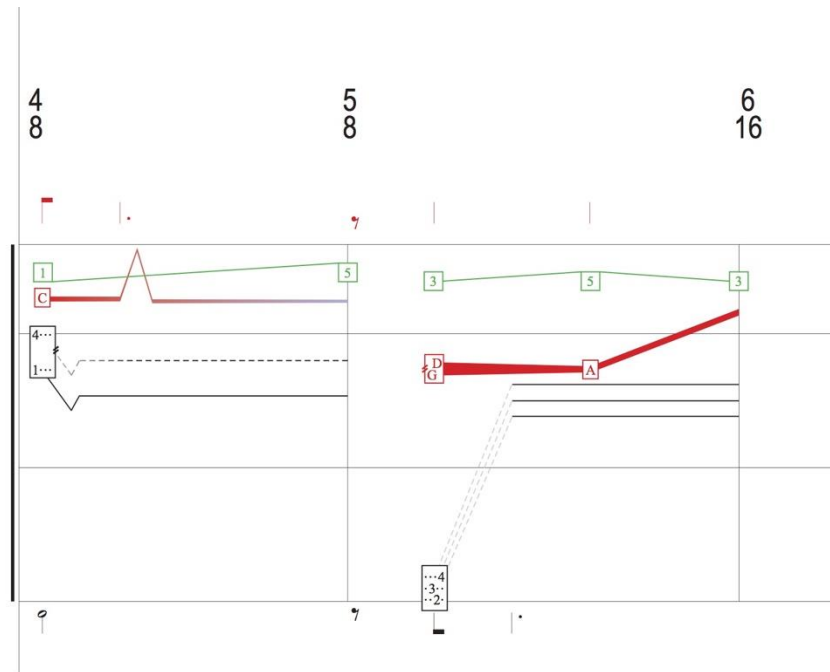


Figure 7.21: Final Score Viola m. 73–74. M. 73 combines left-hand gesture from m. 81 and the right-hand gesture from m. 64.

With much of the work already composed and these variation processes applied to the existing solo segments, the work is close to its final form. Throughout Draft 6, he performs a variety of copyediting tasks. This includes adding descriptive text throughout the work, marking in accents and dynamics for the pizzicati, catching accidents such as a forgotten bow layer in a measure, what string is being played in a few places, and editing out vertical lines most likely used to align starting points for the glissando-like diagonal lines throughout the quartet.

Although this discussion of Cassidy’s drafts does not capture every nuance of the time and energy spent creating and inputting this score, it does clarify the steps taken to create it. He relies heavily on the processes he curates in his Excel sketches to create constrained local spaces within the score. The processes he employs allow him a clear understanding of the work’s framework and the general relationships between segments, including solo segment to variation

network ones. The constraint windows and rhythmic strata provide scaffolding that aid him in working through what is available and usable at each moment in the quartet's solo segments.

This balance between the intensive level of detail and how it is contained within such confined spaces appears to be another example of Cassidy willingly experimenting and being open to finding new solutions while applying a sense of practicality to the process. Rather than having to track the evolution of these processes as one large, ongoing structure, Cassidy composes the material segment by segment, richly informed by the processes.

7.4 A Rare Use of Collaborative Testing

Many of the organizational and creative practices discussed in this chapter are similar or the same as ones Cassidy developed throughout the first decade of the 2000s.²⁵⁸ A notable exception to this is the extensive testing with collaborators on the notation of *Second String Quartet*.²⁵⁹ While accurately reported on within Rutherford-Johnson's NewMusicBox article, this kind of activity is not typical practice for Cassidy.²⁶⁰ According to Cassidy, although this experience was an outlier in his practice over all, he considers his visit to New York City on December 20th, 2009 an important and helpful one. As discussed further in Chapter Six, Cassidy's interactions with performers and new works tends to be one where he delivers the score and provides a warm, hands-off presence that deeply respects the autonomy of the interpreter. (A more recent example of this mode of Cassidy's support was how when delivering the score for *A republic of spaces* to line upon line, he provided extensive pictures and links to

²⁵⁸ String Quartet as Laboratory 305–323

²⁵⁹ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

²⁶⁰ Ibid.

the unusual percussion instruments he was asking for. He also made videos to demonstrate the particular techniques and unstable sounds he was after).²⁶¹

While Cassidy was aided in making this trip with a research grant from the Arts and Humanities Research Council, his interest in this exceptional testing of notation for the quartet emphasizes how much of a shift in practice Cassidy was encountering as his experimentation (the composing of the quartet) continued. While JACK was already booked as part of the commission from Donaueschingen to be the first performers of the work, involving them in this early planning stage was also based on their particular familiarity with Cassidy's work. (Otherwise, a local professional quartet or a group of contemporary specialists nearby in the United Kingdom could have perhaps been considered). As Rutherford-Johnson explains:²⁶²

The group were already comfortable with Cassidy's style and methods—they've played his first string quartet enough times for it to become almost repertory, and their familiarity is such that violist John Pickford Richards was a seamless last-minute replacement when Cassidy's extremely demanding ensemble work *And the scream, Bacon's scream*, is the operation through which the entire body escapes through the mouth was given its premiere last year [2010].

JACK's previous experiences with Cassidy's music allowed Cassidy to investigate fully as he sought out better ways to notate decoupled physical information on *Second String Quartet's* integrated staff. Rutherford-Johnson continues, bringing up one of the most frequently used notations in the work:²⁶³

Cassidy prepared several alternative notational systems for his *Second String Quartet*, and spent sessions with the players trying out what did and didn't work well with each. A lot of this time was spent trying to devise intuitive ways to

²⁶¹ line upon line, interview by author, Austin, TX, Jan. 23, 2020.

²⁶² Tim Rutherford-Johnson, "A Journey to Aaron Cassidy's Second String Quartet," NewMusicBox, Accessed January 20, 2020, <https://nmbx.newmusicusa.org/a-journey-to-aaron-cassidys-second-string-quartet/>

²⁶³ Ibid.

notate certain physical actions, such as left-hand finger placements. The players would test out the different notational options Cassidy presented, and the one that they could figure out fastest and most intuitively made it into the score.

While “intuitive” may not always be the way to describe some elements of Cassidy’s notational choices for *Second String Quartet*, these testing sessions allowed Cassidy to better meet the challenges presented in his new notational practice and do so with JACK’s support and insights. Rutherford-Johnson highlights how “in the case of the finger placements, the solution arrived at was a small box with four columns for the strings and numbers to indicate the finger to be used on each string, a big advantage of which was being able to indicate the spacing between fingers by the vertical space between the numbers.”²⁶⁴ After these interactions, this approach was retained through the drafting and is part of the final score.

The testing during this research trip provided Cassidy clarity about the notation and allowed him to proceed toward completing the quartet. As seen in the timeline earlier in this chapter, by this point Cassidy had constructed extensive pre-compositional materials including the large-scale form and the “hand-mapping” sketch that facilitates the compositional windows he works in once the larger structures have been generated.

²⁶⁴ Ibid.

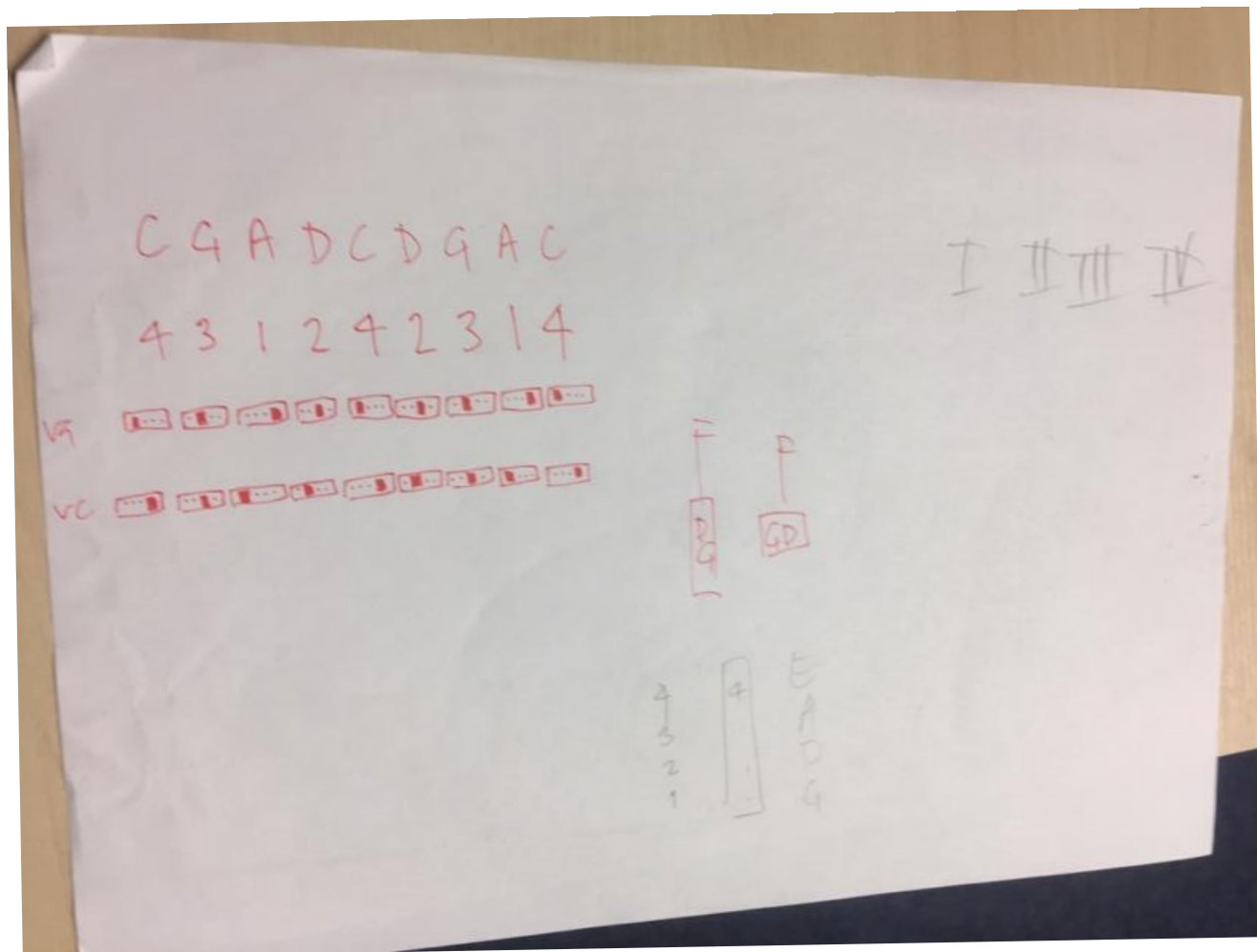


Figure 7.22: Above: Some preliminary left-hand notation, the number loop Cassidy use during testing. Below: Example notation during the New York City trip.

In a strange way, this seems to be both the right amount of experimentation but also not enough. Cassidy thrives when writing for colleagues, friends, and longtime musical partners. That this piece was commissioned to be played by JACK Quartet and was designed with their input paid off in the group's outstanding premiere and subsequent tour of the work. The piece and its notation were feted throughout contemporary music circles. Cassidy certainly more than successfully completed his commission and JACK performed it more often in more contemporary music hotbeds than most works.

And still, ten years later, no other string quartet has performed *Second String Quartet* since JACK played it at the Miller Theater in October 2011. While merely speculation, one might wonder what the notational outcomes would have been if additional groups were included in this kind of intensive research. Would this, for instance, create more personal stakes that might connect those quartets with it? Or would this have muddled this work and slowed composition or preparation time? For example, Rutherford-Johnson's text about JACK and Cassidy discovering that excellent solution for left-hand fingerings, he does not bring up the hard-to-find, hard-to-see green bow direction notations that remained troublesome for members of JACK. Freely fit in where it can on the score, this notation's inconsistent location was one issue. Similarly, its bow direction lines are small and too subtle compared to the explosively expressive qualities of the other notation.

As has been discussed earlier in Chapter One, *Second String Quartet* was intended to be a culmination of a decade of experimental practice but became part of a deeper catalyst for Cassidy to self-reflect on his work.²⁶⁵ Perhaps in its own way, the entire experience from the

²⁶⁵ Aaron Cassidy, "Imagining A Non-Geometrical Rhythm," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

research trip to New York, through the premiere at Donaueschingen, to the American premiere in Los Angeles US tour was the testing process Cassidy needed. In any case, 2016's *the wreck of former boundaries* shows significant changes in writing for strings, including how bow direction is notated. While still smaller on the page than other kinds of information, blue diagonal lines indicating frog, mid-bow, and tip are nested between the proportionally notated rhythmic strata.²⁶⁶

7.5 Conclusion—Components of an Experimental Process

The components used to create Second String Quartet each play a role in Cassidy's distinct compositional expression. Spurred on by self-driven questions about aesthetics and guiding principles, Cassidy experimented to find the best ways to fit the physicalities at the center of his expressive practice into the project's goal: a more integrated notational context for decoupled materials. While working through those things, Cassidy applied organizational strategies he developed throughout the first decade of the 2000s to realize the work's structure, instrument role network, and the "hand-mapping" Excel sheet's parametric information. In contrast, Cassidy continued to experiment with how to best capture the increasing fluidity of his tablature, even flying to New York City to work through early versions of it with JACK Quartet.

They cast a light on a creative process that values planning, processes, and experimentation. Cassidy's brainstorm sorts lingering questions, returning and attempting to solve them with renewed clarity with each entry. Within the foundational processes (in the Excel sheet sketches), a distinct practicality emerges where they serve an end rather than perfect, wholistic, explicable ideals. This practical application of a variety of processes allows Cassidy to

²⁶⁶ Aaron Cassidy, *The wreck of former boundaries* (Aaron Cassidy/ASCAP 2016) vii, 1.

take on the intensive considerations and potential solutions within the quartet's solo segments, a three, four, five, six, or seven measure segment at a time.

Additionally, for a composer often challenged (in informal conversations and in absentia) on the explicability of his music by less experimentally-inclined musicians, his blue book's questions and considerations, Excel sketches, and drafts are notably fastidious, sequential, and are kept in a neat collection by Cassidy. While his pre-compositional material has not been frequently used as a tool by interpreters, the clarity they offer analysts and performers alike makes them a powerful resource for seeing the pressurized, oppositional structures and other important elements within his works. Through them we can better see the resilient structures that so strongly define the constraints of the work and the indeterminate localities bursting from inside them.

Chapter Eight: Preparing and Performing *Second String Quartet*

In the two decades in which Aaron Cassidy has focused on the kind of decoupled, experimental work he is known for, a steady stream of collaborators has premiered and performed it around the world. These performers, including members of JACK Quartet, ELISION Ensemble, and Ensemble Musikfabrik, have become recurring or long-term collaborators performing on subsequent projects. Some, including violinist Mieko Kanno, guitarist Daryl Buckley, and clarinetist Carl Rosman have also written about their experiences with Cassidy's works.²⁶⁷ Bassist Kathryn Schulmeister and other more recent collaborators have developed a relationship with his work through his new projects as well as with those from the preceding decade. For example, Schulmeister actively performs Cassidy's new works as a member of ELISION Ensemble, but also performed the US premiere of *The Crutch of Memory* (2004) in 2014 before joining the ensemble.²⁶⁸

Despite this growing number of musicians programming Cassidy's music, information about preparing and performing his work has tended to remain in the realm of individuals working in isolation, within a particular ensemble, or in direct communication with Cassidy. While Cassidy would be the first person to bring up trusting and respecting an individual performer's approach to preparing his works, even the most self-sufficient performer could benefit from having access to resources that clarify fundamental aspects about the work, point

²⁶⁷ Mieko Kanno, "Prescriptive notation: Limits and challenges," in *Contemporary Music Review*. Vol 26, (2007): 231-254

Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015.

Carl Rosman, "Emergent behaviours in five long-term collaborations for clarinet," dissertation, University of Huddersfield, 2021

²⁶⁸ Aaron Cassidy, "The Crutch of Memory," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/product/the-crutch-of-memory/>

out other interpreters' strategies, and acknowledge potential hang-ups and dead ends. This is especially so with contemporary works such as *Second String Quartet*, where knowledge about the music is often informed by casual notions about its general stylistic practice.

As I learned during a previous research project, these casual notions can have consequences. When I interviewed violists about how they learned Luciano Berio's virtuosic viola solo *Sequenza VI*, the assumptions coming from these kinds of sources dramatically impacted how the violists practiced, whether they repeatedly staged the work, and in some cases, their physical health. This "viola world" mythology of Berio's *Sequenza VI* as an unrelentingly athletic work led to passing comments from a number of violists saying they would have to create a specific workout routine just to be athletic enough to start in on this hard bowing, "heavy metal"-sounding work.

The commonalities for people who repeatedly played the *Sequenza VI* turned out to be the opposite approach: a light, relaxed approach to *bariolage* that John Pickford Richards learned from Christophe Desjardins and Stephen Upshaw learned from Garth Knox allowed for successful repeated performances of the solo. Similarly, Rudolf Haken and Hannah Levinson each separated themselves from the sonic and studio assumptions about Berio's work and paid attention to how they supported and relaxed their bodies as they played. Although Cassidy's work is distinctly different than Berio's, the mythologies about preparation and performance aesthetics bear similarities due to the virtuosic nature of their works and how their performance practices are less established and discussed.

Talking about these issues within Cassidy's music is important because his works are situated at the crossroads of American Experimentalism, New Complexity, and the expanded timbral palette of late 20th century/21st century contemporary music. While performers' initial

thoughts upon seeing *Second String Quartet*'s score about how preparing may take some time is accurate, they often do so with a less than full understanding of New Complexity and other complicated or experimental music. In doing so, they mistakenly think that a mechanical exactness of *Second String Quartet*'s rhythmic strata is required. Instead, the hard work toward achieving these rhythms enables the indeterminate, contrapuntal distortion of decoupled layers to create the dynamic, unstable sounds found in Cassidy's music. The quartet's relative newness (completed in 2010) and short performance history adds to potential confusion and uncertainty about proceeding with the work.

The aim for this chapter is to put aside the casual assumptions about preparing Cassidy's music and focus on information from interviews with some of the premiering artists of *Second String Quartet*, relevant recurring interpreters of Cassidy's works, and Cassidy himself. My experiences in the United Kingdom observing the rehearsals and recording of Cassidy's *A republic of spaces* will also be used as a reference point. While not a step-by-step guide, ideally this will allow performers interested in *Second String Quartet* to create their own safe, aesthetically aware approach to the work.

8.1 Preparations

A point Aaron Cassidy is firm about is that preparing *Second String Quartet* or his other works is the performer's "turf."²⁶⁹ Whatever means the performer needs to use to access the piece are welcome. When considering Cassidy's background as a composer and a conductor, this openness is remarkable, especially when compared to the experiences and stories about many 20th century composers being exactingly in control in rehearsal and demanding a mechanical and

²⁶⁹ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

minimal interpretation from performers. This is not to say Cassidy is aloof—during my time observing line upon line and him rehearsing *A republic of spaces*, he capably supported the trio as needed with structural insights, affirming specific preparations they had made, and by providing nuanced demonstrations of bowing techniques used throughout the work.

When addressing starting points for learning *Second String Quartet*, Cassidy and JACK Quartet violinist Chris Otto generally agreed about each quartet member practicing individually and starting with one hand's information. However, each had a different reasoning for what hand a performer would learn first. Otto viewed the left-hand information as more accessible and idiomatic for string players.²⁷⁰ The hand shapes and glissandi it uses are clear on the page and their corresponding rhythms are generally easier than the right-hand ones. As an amateur violist and guitarist myself, the way the left-hand shapes almost move like barre-chords also jumped out to me when initially examining the score.

Cassidy has important aesthetic reasons for recommending beginning with the right hand. It is important to him to stress that the quartet is not a traditional pitch-based work where the left hand dominates a performer's focus.²⁷¹ Instead, this experience focusing on the bow position, bow pressure, bowing, and string changes is much closer to the work each hand does in the quartet. Cassidy brings up an additional reason for focusing on the right hand. Run-throughs that use only right-hand material can be an effective means of initial rehearsals with quartet members. Broadly speaking, the occasional similarity of a particular facet in Cassidy's notation to something more generally used in music notation may help a performer connect with the work. However, it may not be helpful in seeing how this familiar facet (e. g. readable but

²⁷⁰ Christopher Otto, interview by author, New York City, New York, Nov. 7, 2019.

²⁷¹ Aaron Cassidy, interview by author, Huddersfield, UK, Nov. 5, 2019.

complex rhythmic strata) fits with the larger aims of the work (e. g. the multi-axial choreographic movements that supersede those rhythmic strata in importance).

In discussing preparation for *Second String Quartet* from a wider lens, Otto brought up how the usual kinds of positive feedback when starting a new work are not as present with *Second String Quartet*. “You have to learn to enjoy the feeling of being a complete beginner,” he explained.²⁷² This particularly relates to his experiences working through the different parametrical layers of the work. In our first interview, he went into detail about this aspect of preparing the work in depth:²⁷³

There’s a phase of learning the piece where you’re trying to engage with all the pieces of the puzzle—separately. Where you’re playing with the pieces of the puzzle you’re dealing with. You’re getting to know things measure by measure—how I have to rotate my wrist while moving my arm down, while doing a down bow and changing strings et cetera with my right hand. The second stage is putting it together into a piece and feeling comfortable. When you’re doing the first stage, a lot of it is really uncomfortable especially when you start putting things together. You’re focusing on this [one layer of information] and missing that [another layer of information] and when you’re thinking about this, you’re missing that. You go through a lot of frustration and feel uncomfortable, feel like a beginner, feel very uncoordinated and awkward. Having played his first quartet, I already knew that was a feeling that had to be accepted and dealt with and you get past it to some extent. In the second quartet it was even more so because there were more simultaneous things to think about.

Otto’s comments speak to the experiences and feelings a performer can encounter when beginning to learn a work by Cassidy. However, they also outline distinct strategies for overcoming those initial hardships and moving toward a more complete, interpretive performance space. Otto’s take is especially interesting because in addition to being part of the premiering ensemble, his work with JACK Quartet has him consistently learning and performing

²⁷² Otto

²⁷³ Ibid.

many contemporary music works of different styles. Work through the ensemble also has him frequently mentoring emerging performers as the quartet-in-residence at Mannes School of Music as well as teaching at prestigious summer programs such as Banff Centre for Arts and Creativity's Evolution: Quartet and New Music on the Point.²⁷⁴

Daryl Buckley's eloquent doctoral thesis discusses his own experience approaching Cassidy's work in similar ways, writing from philosophic and practical vantage points that reflect his long-time specialization in the music of Richard Barrett, Cassidy, and related composers:²⁷⁵

From the outset, this lack of specification and the resulting disconnection between physical action and sonic result constituted a huge challenge to my learning of the work. If a set of gestural movements can have almost any sonic outcome then how can specific sonic meaning reside within the choreography? In my own personal history I have tackled hugely complex repertoire. Here, however, this piece [*The Pleats of Matter*] required not only a radical re-learning of instrumental technique (always an extraordinarily difficult challenge), but what seemed to be a total divestment of the performer's need for causality or necessity between action and resultant sound. The work countermanded the way in which I would usually sense or understand physicality and require related sonic feedback from the material with which I am engaged in real-time.

This "radical re-learning" Buckley describes is for an earlier work, but certainly applies to *Second String Quartet*. Beyond suggesting taking on one hand at a time, Otto described finding ways to consolidate the rhythmic strata as a means to engage with his part. In doing so, he was able to see how each stratum fit together and apply it as he was combining layers for a single hand's information. In doing so, it can be helpful to be reminded how a particular rhythmic stratum can be reassigned as needed throughout the quartet. In doing so, Cassidy can use them to

²⁷⁴ JACK Quartet, "Interested in studying with JACK?," Aaron Cassidy JACK Quartet, Accessed Feb. 12, 2021, <https://jackquartet.com/teaching>

²⁷⁵ Buckley Thesis 20

represent one to all of that hand's parametrical information, as previously discussed in the chapter about the quartet's notation.²⁷⁶

Otto's approach to dealing with the rhythmic strata reflects a practical, expressive approach a performer can take to unpacking these intimidating support systems for Cassidy's musical choreography. Other practitioners shared personal approaches to this issue, including Weston Olencki who related how he calculated the relative tempos represented by the tuplets in each phrase, sometimes inputting them into a playback notation software to check on things.²⁷⁷ Buckley cited ELISION Ensemble-founding member percussionist Peter Neville's emphasis on being comfortable and fluent with different tuplet possibilities. Regardless of what approach a performer takes to it, it is important to be reminded of Mieko Kanno's early description of how the product of this music that rhythms' explicability is replaced with the vivid enmeshment of layers—the indeterminate localities discussed in an earlier chapter in this document.²⁷⁸

On the other hand, the “containers,” to borrow a favored metaphor from Cassidy and Buckley, that these rhythmic layers exist in deserve attention. The quartet's resilient structures, including time signatures and tempo changes, provide a stable but provocative terrain for these indeterminate localities. JACK quartet uses a technique that is visible in their Los Angeles Philharmonic-sponsored Monday Evening Concert to attend to these elements—quartet members conduct each other as needed. This appears to be an effective means to maintain the rigid framework that underpins the distorted surfaces of the music.

²⁷⁶ Aaron Cassidy, “The String Quartet as Laboratory and Playground for Experimentation and Tradition (or, Opening Out/Closing In),” *Contemporary Music Review* 32 (2013): 305-323.

²⁷⁷ Weston Olencki, interview by author, Brattleboro, Vermont, Oct. 3, 2020.

²⁷⁸ Kanno 19–24

Importantly, while this kind of physical action might suggest a choreography of its own, Cassidy's interest is in a musical choreography, not a theatrical one. This is a notable example of the "turf" the Cassidy welcomes to the production of his works that be seen in rehearsal and concerts. As usual, he considers it not his business to tell an ensemble what they absolutely need to do to learn or realize the piece. However, he does continue to try to delineate the difference between these kinds of choreographies. While I was observing the dress rehearsal for *A republic of spaces*, Cassidy did have a note for one of the line upon line percussionists who added a reasonable, dramatic flair during a sustained egg shaker gesture. Cassidy was not particularly interested in how many performers (including percussionists, harpists, and more) use physical choreography to increase an audience's ability to read their gestures. In viewing the premiere a few hours later, nothing was lost in the performance because of this scaling back of theatrical choreography.

The kind of patience that Otto suggests in working through *Second String Quartet* was also considered valuable by other musicians who were interviewed. By working in less immediately demanding situations, it allowed Schulmeister to consider and implement an inhabitation strategy.²⁷⁹ She would pick a section of Cassidy's *The wreck of former boundaries* and develop her understanding of it through improvising with it, in addition to the means listed above. Schulmeister's approach and the improvisation-minded way Olencki relearned Cassidy's works emphasize the qualities of Cassidy's music that focus on being live and in resisting acousmatic ideals.²⁸⁰ This approach also allows time to better embody how Cassidy's works for strings let go of normative reference points for left-hand fingers and bow placement. Her mixture

²⁷⁹ Kathryn Schulmeister, interview by author, San Diego, CA, Sept. 28, 2020.

²⁸⁰ Ibid.
Olencki

of purposefulness and playfulness recalls the title of Cassidy’s article “String Quartet as Laboratory and Playground,” suggesting that preparation time is not just a time to embody the choreography, but a time to hone a personal understanding of the interpretive opportunities within the indeterminate localities of Cassidy’s work.²⁸¹

While being interviewed for this project, JACK Quartet’s violist and executive director John Pickford Richards similarly describes how Cassidy’s upfront discussion about kinds of musical results have guided his performances of *String Quartet* and *Second String Quartet*.²⁸² Richards also related that in learning the choreography it was not just learning the actions but the sonic possibilities they generate as well, intimating how Cassidy’s choreography is after specific, unstable musical results.

Many of these preparation issues are specific to Cassidy’s work, but others fall neatly into ones that being a contemporary music generalist or working with one can solve. For example, the general sense of the instrumental techniques he employed in the score (gradations of bow position, bow pressure, and so on) are ones that most if not all contemporary music performers would have a clear understanding of. Although the tablature and combining these layers may be a challenge, the individual layers of techniques are reasonably accessible.

In addition to the aesthetic elements within this document, the analysis-focused chapters will ideally inspire better, more personal preparation plans. For continuity-seeking performers, perhaps their practice timeline could trace the instigating solo segments and the variation segments they network with as described in Chapter Six. For people that are still grappling with aspects of explicability in the work, cadential area’s rhythmic unisons and the limited

²⁸¹ String Quartet as Laboratory

²⁸² John Pickford Richards, interview by author, New York City, New York, Feb. 13, 2020.

parametricism of Section 4's Viola solo could provide a way toward more complicated portions of the piece. Similarly, as the performer or quartet in question moves toward putting the work together in performance, a personal balance of how much of an awareness of the formal boundaries and cadences laid out in Chapter Four are compared to the line and continuity-focused quality of the variation networks in Chapter Six.

8.2 Interpretations

Although discussing interpretive issues in *Second String Quartet* is an important aspect of working to create clearer pathways to understanding or performing the work, doing so quickly encounters several problems for both reader and writer. One obvious issue is that Cassidy is a living composer who is continuing to create music, so what is stated here may be out of date with his current practices in five, ten, or twenty years, depending on where his experiments and interests take him. One such shift has already occurred in Cassidy's career and is featured prominently in the aesthetics section of this dissertation. As Cassidy transitioned to creating the multi-color tablature he continues to be known for, he also clarified his compositional intentions in his 2012 *I Am An Experimental Composer* lecture. In it, he stressed the foundational experimental tendencies within his music's composition and performance. In this case, these interests and inspirations were always there, but were often shared in ways that differ from the more blatant pronouncements from the 2010s.

These interests and this shift in how he communicates about his work have not always been addressed by otherwise meaningful scholarship. Compounding this problem is what appears to be a trend among some scholars to emphasize the notion of complexity before the musical content—to the extent that some use derivations of the word complexity when explaining Cassidy

and adjacent composers so frequently that these words become the article's favored adjective, adverb, and noun.²⁸³ Even so, these writings can still be tremendously valuable, especially in the case of Liam James Hockley's 2018 thesis entitled "Performing Complexity: Theorizing Performer Agency in Complexist Music."²⁸⁴

While these comments may read as somewhat of an adversarial take on scholarship with similar aims to this dissertation, the overuse of complexity in these texts are context clues that the writing has not yet encountered or engaged with the clarified ways Cassidy has acknowledged the influence of New Complexity, as well as emphasized the impact of Klaus K. Hübler's innovative decoupling and American Experimentalists (or those inspired by the American tradition such as Peter Ablinger). Hockley's work, for instance, builds on Frank Cox and Stuart Duncan's writing to provide helpful frameworks for how communication chains between composer, text (score), performer, and performance as he discusses performer agency within music associated with New Complexity.

Even so, Hockley does not factor in the experimentalism that weighs so heavily on Cassidy's practice while acknowledging that he is discussing older clarinet-centric works by Cassidy: *Metallic Dust* (1999) and *Being itself a catastrophe, the diagram must not create a catastrophe (or, Third Study for Figures at the Base of a Crucifixion)* (2007-09). He also admits that newer works such as *The wreck of former boundaries* "introduces several other major

²⁸³ Stuart Duncan, "Re-complexifying the Function(s) of Notation in the Music of Brian Ferneyhough and the 'New Complexity.'" in *Perspectives of New Music*, Vol. 48, (2010): 136-172;

Stuart Duncan, "The Concept of New Complexity: Notation, Interpretation and Analysis," dissertation, Cornell University, 2010;

Liam James Hockley, "Performing Complexity: Theorizing Performer Agency in Complexist Music," Thesis, University of British Columbia, 2018.

²⁸⁴ Hockley

concerns are ultimately outside the bounds of this thesis.”²⁸⁵ Hockley’s concerns are ultimately focused on seeing through his proposed ideas about these communication chains than venturing further into Cassidy’s aesthetics. While this approach retains many of the same issues that come from examining Cassidy’s work through his associations rather than the ongoing research questions he examines, Hockley concludes his section about Cassidy acknowledging that “both *Metallic Dust* and *Being itself a catastrophe* probe the liminality of the performer’s body and, in doing so, the resultant sonic outcome from these interactions very nearly transcends the paradigm that I proposed in Chapter 3.”²⁸⁶ All of this is to suggest to readers that when beginning to delve into *Second String Quartet* or another work by Cassidy, consider skimming Cassidy’s own writings and notice the general absence of these terms or need to demonstrate affiliation with the notion of complexity.²⁸⁷

A final important concern to consider when discussing interpretive issues with *Second String Quartet* is how, as of 2021, JACK Quartet is the only ensemble to have performed *Second String Quartet*. Thus, specifics about performing the work will at times be based on their performances have to be supported with general information from other performers of Cassidy’s music, recent scholarly writing, and analysis.

With these concerns raised, the discussion of interpretive issues with Cassidy’s music can begin with examining the score for additional information. In doing so, it begins to appear that his general approach to the quartet as a non-hierarchical entity seems to extend to how he

²⁸⁵ Hockley 216

²⁸⁶ Hockley 135

²⁸⁷ Aaron Cassidy, “Determinate Action/Indeterminate Sound Tablature and Chance in Several Recent Works,” in *Facets of the Second Modernity* eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2008), 17-32.

Aaron Cassidy, “I Am An Experimental Composer,” Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/experimental-composer/>

annotates his scores. Tempo markings eschew any description, while written descriptions appear on particular gestures throughout the work. The tempi are generally simply metronome numbers. However, the final moment of the work offers some contradictions: all of the tempi are standard metronome numbers in the work except this last tempo (♩ = 90).²⁸⁸ This last tempo marking also features the sole text in the score directing all of the quartet: “tutti: vanishing quite suddenly; turned immediately inward.”²⁸⁹

More typically within the quartet, Cassidy adds text above certain gestures, such as at the Viola’s m. 16, where he writes: “quite loud, soloistic; fast, full heavy bow.” Throughout the score, he writes notes including descriptors such as “manic, wild,” “strangely stable.” The performance note at m. 98 clarifies that while seemingly identical, the violins’ doubled gesture “need not establish perfect unison.” Similar notes exist in earlier and later works, such as *The Crutch of Memory* and *The wreck of former boundaries*, including performance notes in the final measure about the last gestures of the works.

In addition to clarifying important or curious moments in the piece, these performance notes in *Second String Quartet* also appear to serve as a means for Cassidy to further bring out the musical instabilities he prefers when the independence or number of contrapuntal layers is at a minimum. For example, at m. 40 in the cello’s part, he writes “wispy, light, brushing” as it performs bow position motions with $\frac{1}{2}$ *col legno tratto* and harmonic hammer-ons. The contrasting notes in Violin 1’s m. 67 (“strangely stable”) and m. 70 (“sudden, wild, highly unstable”) amplify Cassidy’s intentions when multiple layers are not available.

²⁸⁸ Robert Paterson, “Standard Metronome Timings and Ratios,” ISSUU, Accessed March 1, 2021, <https://issuu.com/robertpaterson/docs/standard-metronome-timings-and-rati>

²⁸⁹ Aaron Cassidy, *Second String Quartet* (Aaron Cassidy/ASCAP 2010): 36

In these moments that risk the accidental flatness Cassidy worries about in the Non-Geometrical Rhythm lecture discussed in the earlier chapters, Richards' comments in the previous section about learning the choreography's sonic possibilities is particularly meaningful.²⁹⁰ Through experimentation and playfulness, a performer can engage the defamiliarized string length, the polyphony of arms, hands, and fingers, and better participate in the contradictory sound-distorting processes. In doing so, performers should know that their careful, studied inexactitudes in repeated performances are a place of expression and performer's stakes. This is music that is about the physicality of the body and not music designed for the perfect and non-corporeal computer music realization.²⁹¹ While the quartet is part of the larger "struggle idiom" that has persisted in Post-War music, especially within New Complexity, it is not a place for mechanized realization.²⁹² Instead, as Ross Feller says about Ferneyhough's music in this regard, "in fact it is designed to *maximize* ambiguity and imprecision, two components which require interpretation."²⁹³ Rather than just an arduous problem to solve during each night's performance, an increased intimacy and familiarity with the quartet has the opportunity to exact new indeterminate nuances on a phrase by phrase level within the work. With this in mind, while Tanja Orning's dissertation "The Polyphonic Performer" does not cover Cassidy specifically, it offers a significant, contemporary account of the history, aesthetic issues,

²⁹⁰ Aaron Cassidy, "Imagining A Non-Geometrical Rhythm," Aaron Cassidy Personal Website, Self-Published, Accessed September 6, 2020, <http://aaroncassidy.com/imagining-a-non-geometrical-rhythm/>

²⁹¹ Cox 78

²⁹² Tanja Orning, "The Polyphonic Performer," dissertation, Norwegian Academy of Music, 2014: 219–221

²⁹³ Ross Feller, "Strategic Defamiliarization: The Process of Difficulty in Brian Ferneyhough's Music" Ross Feller Personal Website, Self-Published, Accessed Feb. 2, 2021, http://www.rossfeller.com/yahoo_site_admin/assets/docs/StrategicDefamiliarization_copy.30294224.pdf

and practical solutions to these issues, in this case while examining works by Hübler, Feldman, Lachenmann, and Steen-Andersen from her vantage point as researcher and cellist.²⁹⁴

She cites Ross Feller's "Strategic Defamiliarization" paper, discussing how "Feller views ambiguity and imprecision as two positives, two resources that liberate the performer and give her scope for interpretation."²⁹⁵ She also draws from composer (and Cassidy's colleague) Liza Lim's discussion about how her "instrumental exploration tends always to look at areas where [she] feel[s] there's a lot of ambiguity and flux in the quality of sounds—inbetween states like between 'solid/'liquid' or 'granular/gaseous.'"²⁹⁶ Orning concludes that:²⁹⁷

It is time to leave the linear and transparent performance practice where the paradigm of *a perfect rendering of a score*, exists, and to move towards a performance practice embracing the ambiguity and the critical and performative potential therein. Accepting and embracing the ambiguity in the work's notation and performance opens a creative space for the performer, a space where several areas are yet to be explored.

Hockley's discussion of communication chains, especially the different opportunities two kinds of "performance scripts" generally support these goals as well. He describes them as "*translation scripts (t-scripts)* that emerge between the score and the performer" and "*enactment scripts (e-scripts)* that emerge between the performer and their performance."²⁹⁸ These continued dialogues between performer and score and performer and their performance are distinctly relevant to performing *Second String Quartet* from a position of agency. This directly recalls comments from Cassidy's *I Am An Experimental Composer*, including where he outlines the performance

²⁹⁴ Orning Dissertation

²⁹⁵ Orning Dissertation 230

²⁹⁶ Ibid 230

²⁹⁷ Ibid 231

²⁹⁸ Hockley 92-94

as an experiment as much as the score is.²⁹⁹ These communication chains support the importance of Cassidy's anecdote during this lecture where he celebrates a performer's particular realization in the middle of a rehearsal, embracing the meticulous yet ephemeral discovery process performers can embark upon because of his detailed tablature.³⁰⁰

In pursuing these performance experiments with *Second String Quartet*, performers should also be aware of discussions of accuracy and success concerning Cassidy's works and adjacent practices. Hockley and Orning both use Cox's "Notes Toward a Performance Practice for Complex Music" to set up the paradigm shift regarding performance practice that embraces the broader collection of music associated with Mahnkopf's Second Modernity or complexism.³⁰¹ Despite Cassidy's inclusion in this group, his thoughts on performance practice diverged from Cox's "High-Modernist Model of Performance Practice" during our interviews in 2019.

Cox's three points defining this model are:³⁰²

1. notation, as indicating responsible technical mastery.
2. What the author will call an adequate "realization," in which all the notes are correct, all the rhythms are accurately realized, all the dynamics, phrasing marks, etc., are audibly projected, and so on, and
3. Ideal perception, which should be able to measure, based on the score, the correspondence of the former two aspects, and even more importantly, perceive composed relationships from responsible realizations.

²⁹⁹ Experimental Composer

³⁰⁰ Ibid

³⁰¹ Frank Cox, "Notes Towards a Performance Practice for Complex Music." in *New Music and Aesthetics in the 21st Century Vol. 1 Polyphony and Complexity*, ed. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2002) 116.

Claus-Steffen Mahnkopf, "Second Modernity—An Attempt at Self-Assessment," in *Facets of the Second Modernity*, eds. Claus-Steffen Mahnkopf, Franklin Cox, and Wolfram Schurig (Hofheim, Germany: Wolke Verlag, 2008), 9-16.

³⁰² Cox 70-71

Of Cox's three points, Cassidy is still somewhat aligned with the first. Cassidy's tablature embraces radical aspects, but also expects technical facility in taking on the notation's challenges. Even so, the recurring notion of a performer's "turf" is a mediation of this expectation, allowing space for interpreters who prefer to model their performances off of existing recordings or going in their own way. As Cassidy's choreography's graphical nature has loosened normative reference points on the instruments and let go of what remained of traditional western notation in his scores, this correspondence between this High Modernist model and Cassidy's work decreases.

Cassidy's outlook on the issues raised in Cox's second and third points, meanwhile, were particularly divergent in the 2019 interviews with him. Cassidy was deliberately evasive and open about notions of accuracy, success, and correct performance in performing his works.³⁰³ This is not to suggest Cassidy is passive or indecisive about these issues, but that he seems more interested in seeing out or supporting a collaborator's work—embracing and enhancing the outcomes of that performer or performers' experiments.

While observing his rehearsals with line upon line, it often appeared accuracy was about better embracing the particular technique or the mode of instability within the particular gesture as much as more it was about typical concerns with tempo changes. Similarly, fluency in moving from gesture to gesture was a priority in feedback he gave the ensemble, which has to contend with the constantly changing graphical tempo bars that have been present in his work since *The wreck of former boundaries*. Buckley described this as a "poetic precision."³⁰⁴

³⁰³ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.
Aaron Cassidy, interview by author, Huddersfield, UK, October 29, 2019.

³⁰⁴ Daryl Buckley, interview by author, Melbourne, Australia, January 18, 2021.

In applying these questions of accuracy and success to *Second String Quartet*, some goals are apparent: the tempi and time signatures can be consistently rehearsed and reproduced. The contents within them, especially when reflecting on Hockley's performance scripts, are the means toward performance-based experimentation. The independence of the hands' actions should be something emphasized, whether as a continual process of improvement or, perhaps less interestingly, one solely focused on consolidation. The hands' roles in using the defamiliarized string-length, bow pressure, finger pressure, and more supersede rhythmic accuracy in favor of the overlapping distorted envelopes they create. They acknowledge the literality of the rhythms and bypass them. The brief rhythmic unisons from aligned short-term segments is a potent means to draw contrast with the more intricate Solo segments that make up the majority of the work.

In closing, Tim Rutherford-Johnson's coverage of JACK Quartet's performances of *Second String Quartet* reflect the considerations, questions, and opportunities the work presented:³⁰⁵

Neither Cassidy nor the players can know in advance exactly what sound will result from the various interacting movements that are prescribed. Ari Streisfeld, first violin with the JACK Quartet, says that "when we play this piece, we aren't necessarily thinking about each individual sound as it is happening, we are thinking about the exact actions that Aaron has notated on the page. While we were learning it we worked to hone each gesture and make each action as elegant as we could. Of course, we are listening to the resulting sound and most definitely reacting to it; however, we don't really know what the sound is going to be until we start playing it.

By sorting through the explicable aspects of *Second String Quartet*'s resilient structural elements, future performers can further experiment within the many indeterminate localities of

³⁰⁵ Tim Rutherford-Johnson, "A Journey to Aaron Cassidy's Second String Quartet," NewMusicBox, Accessed January 20, 2020, <https://nmbx.newmusicusa.org/a-journey-to-aaron-cassidys-second-string-quartet/>

the work. With the mythologies about Cassidy's practice and previously applicable ideas addressed, performers can better embrace the quartet's deliberate, uncertain choreography with a better sense that doing so is powerful interpretive work and is supported by its creator. Rather than obsess over perfectly performed rhythms, now the performers can get to the exciting musical possibilities they can discover through the collision and overlapping of the contrapuntal choreography.

Chapter Nine: Conclusion—*Second String Quartet* as Culmination and Instigation

Throughout this project, I have sought ways to approach Aaron Cassidy's *Second String Quartet* that will aid listeners, performers, scholars, and other people interested in this music. In doing so, the interactions between the quartet's fixed yet provocative large-scale structures and the indeterminate localities within them emerged as a significant source to address several aspects about the work. These interactions are visible in how Cassidy describes his experimentalism during the compositional process, in the final score, and in the work's performance practice. Rather than discussing the score as if it were a set of short, detached excerpts of experimental notation, this approach clarifies how these extraordinary moments exist within the quartet's structures and networks, even if a sense of living in the moment remains a vital part of the work.

In the same way, understanding the composer's attitudes toward preparation, interpretation, and performance are relevant to string players seeking out new and different opportunities. In a musical culture where many are taught to aspire toward a more determinate or mechanical reproduction of a score informed by historically-derived approaches to interpretation, this quartet and other works by Cassidy put the skills developed by performers into new, living contexts. Its notation draws indeterminate, unstable sonic outcomes from independent actions of each string player's hands. The hands modulate each other in the way simultaneous, independent changes of tongue position, lip shape, and air flow modulate sound production in a human voice.

The quartet places these choreographic activities in an ever-unreliable yet fixed structure where starts, transitions, and ends are clear but the exact realization of each composite gesture can vary in performance. The detailed choreographic gestures are pushed and pulled by formal features (including ever-changing time signatures and tempo shifts) and how they are placed

alongside other quartet members' material. Cassidy supports variance in performance as well as in a player's preparation method, which creates important avenues for an engaged musician to embark on an experimental inquiry of their own. While performances and recordings of this quartet do exist, there is still much to find with one's own hands, learning it on one's own "turf," or in repeated performances, even if total durations of the sections and work remain relatively the same.

Although Cassidy makes it generally clear in his written articles how his physical musical materials were developed, this project has further examined the presence and impact of the materials and the networks they exist in. New material, created by Cassidy's confining constraint windows and other processes, is ubiquitous throughout the quartet. In addition to new gestures contrapuntally appearing alongside one another, variations in the forms of physical imitations (effectively echoes) and repurposed physicalities occur around them. While these new material gestures (called solo segments) almost continually fill the musical space with their multi-layered choreography, the manner in which Cassidy's processes and other compositional work apply the two variation techniques to them is significant to the quartet.

Identifying these segments, their relationships in the score, and the intriguing consequences of Cassidy's approach allows for a much more informed listening or performance experience. Among the most important is how the structural divisions in the score predate the contrapuntal continuity of these segments—while they are musically meaningful, their double bar lines are as much boundaries for the segments and their material to flow through as they are to contain them. Because of this, formal boundaries do not necessarily align with these markings that usually indicate them in a score.

Similarly, understanding the relationships exacted on these segments by the variation strategies creates opportunities for a performer to investigate what materials are being recombined from different segments on their part and what gestures they are physically echoing from another instrument. Through this or a general understanding of the different kinds of behavior types, a listener can better orient themselves, such as in knowing that unisons between instruments only occur in those physical echoes (short-term variations). On a formal level, this better understanding of how Cassidy's segment-making processes generate extreme possibilities allows for a deeper appreciation for the volatile sonic world they persist in, even while following clear rules on variation. More individualized performance approaches and more nuanced scholarship are possible through applying the aesthetics information throughout this text, the analysis of the structure and networks of the piece, and in mixing and matching the interpretation suggestions from the longtime Cassidy interpreters interviewed for this project,

As I conclude writing about *Second String Quartet*, my curiosity about Cassidy's music and the direction his approach to composition has taken since 2010 has only increased. While it is still relevant that *Second String Quartet* is a sort of culmination of Cassidy's labor researching the possibilities of decoupled physical action as musical material in the first decade of the 2000s, the quartet may well become known more for how it has instigated his experiments in the following decade. With this sense of culmination still in mind, today the quartet seems as much a crossroad between his more "digital," multi-stave decoupled works and a more experimental, emancipated outlook that draws greater focuses to his persistently choreographic approach. The remnants of pre-21st century New Complexity that casual observers might overemphasize in epitomizing his practice have been digested and replaced with abstractly graphic "non-geometrical rhythms" of force and friction and include increased amounts of improvisation and

electronics.³⁰⁶ Similarly, if there is a third string quartet, time will tell if it will be a part of this current post-*Second String Quartet* notational practice, be a specific critique of *Second String Quartet* (as *Second String Quartet* was of the first one, *String Quartet*), or something else.³⁰⁷

In any case, according to Cassidy, these changes in his practices in the first half of the 2010s were instigated from his reflections on *Second String Quartet* and works from that time.³⁰⁸ As someone who loudly embraces the notion of experimentation in his compositional practice, Cassidy has proceeded onward to these new approaches. Some of the experiments with them have been immediately fruitful, such as *The wreck of former boundaries*, and *Self-Portrait, Three Times, Standing (15.3.1991–20.3.1991)* from *A way of making ghosts*.

A republic of spaces, meanwhile, has required attention and revision after its premiere in Austin in 2018. My visit to the United Kingdom was planned to coincide with Cassidy's time with line upon line and the revised work's premiere at the University of Liverpool's Open Circuit Festival. Cassidy's experience and comments about *A republic of spaces* showcase his candidness about how he felt about the original version ("It wasn't very good!") and the lengths to which he went to learn from that experience in writing the heavily revised version.³⁰⁹ This kind of self-reflection, sense of responsibility, and camaraderie appear to be part of how Cassidy continues to create and maintain meaningful partnerships with musicians around the globe.

A republic of spaces is particularly relevant to my ongoing interest in demystifying Cassidy's work and focusing on the sounding results of his choreographic notation. It catches Cassidy's practice in a unique position where much of Cassidy's post-*Second String Quartet*

³⁰⁶ Non-Geometrical

³⁰⁷ String Quartet as Laboratory 305–323

³⁰⁸ Aaron Cassidy, interview by author, Huddersfield, UK, October 24, 2019.

³⁰⁹ Aaron Cassidy, interview by author, Huddersfield, UK, Nov. 5, 2019.

approaches are used while the prescriptive notation that is synonymous with his work is put aside. Even though this is a one-time solution to compositional experiments he was attempting to solve, the piece still provides a rare opportunity to look at how he approaches expressing himself with descriptive, sound-based notation.

While my experiences with *line upon line* and *A republic of spaces* have been highly informative in addressing Cassidy's music and his collaboration with performers, I intend to write more about that work within itself in the near future. As a sort of descriptive notation foil to his usual prescriptive notational practices, this newer work offers an analytically rich space to take on the sonic dimensions of his current experimentation, even while admitting its singularity within Cassidy's output in its blatant use descriptive notation.³¹⁰

In addition to this document ideally supporting musicians as they engage with Cassidy's work, I hope that this project inspires people to continue exploring different perspectives to do so. While much can be gained from early writings by Mieko Kanno about prescriptive notation, Daryl Buckley's 2015 Ph.D. thesis *From body schema to score: creating spatial grammars in contemporary electric guitar practice* is an excellent recent example of how new and different kinds of research can reveal so much about Cassidy's ongoing musical practices.³¹¹

Similarly, an article written by a performer/researcher about one of the handful of his larger ensemble works that excerpt portions into solos would significantly augment scholarship about his work, especially when combined with experiences playing that same part in solo and ensemble contexts. Cassidy's tendency to create these excerpt solos or smaller chamber pieces is visible as early as "*the green is either*" (2002-2003), which is billed as "three trios for seven

³¹⁰ Kanno 232–234

³¹¹ Daryl Buckley, "From body schema to score: creating spatial grammars in contemporary electric guitar practice," thesis, RMIT University, 2015.

players” in a single work, and as recently as *The wreck of former boundaries*, which has an additional six subset pieces offered on his website besides the ensemble work of the same name.³¹² Although *Second String Quartet* does not offer excerpted solos, I am especially interested in what the experiences have been like for performers in interacting with one or more of these excerpted versions of his works.

In the coming years, I hope to hear this quartet in-person. While I am glad to have both the Donaueschingen album recording and the Monday Evening Concert live video performance to listen to, I want more experiences like the concert in Liverpool. While *A republic of spaces* is noticeably different from *Second String Quartet* in the ways mentioned above, being present for the trio’s premiere helped me understand that hearing Cassidy’s music in a live space rather than a recording space was indeed a rewarding experience. Even after working on this project on and off for three years now, I restlessly look forward to hearing *Second String Quartet* live. I look forward to when many interpreters of *Second String Quartet* are comfortable learning it on their turf. I hope they revel in how the fragile, contorted outcomes from its choreographic movement have yet again made the night’s performance that much more arresting.

³¹² ELISION Ensemble, “The wreck of former boundaries for electric lap steel guitar (2015) Aaron Cassidy,” Apr. 4, 2021, video, 7:09, <https://www.youtube.com/watch?v=bLKRJ2GfFEY>

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