Some Thoughts On The Limits Of Musical Form And The Way Children Tell Stories

David Pocknee

October 10, 2017

ABSTRACT – 150 words

This paper looks at some cognitive limitations on musical form and relates it to narrative theory: most specifically the study of the stories of children. It concludes with some practical suggestions for composers for maximizing formal comprehensibility.

BIO – 100 words

David Pocknee is an experimental composer and writer based in Manchester. He is a founding member of the New Fordist Organization artist collective (http://nfo.ricercata.org) and publishes conceptual work as Much Too Much Noise (http://mtmn.ricercata.org).

1. What is good musical form?

If music is 'organized sound', as Varese posits, then form is the 'organized' half of that phrase. If you have one job as a composer, it is arranging things in time in an interesting order. This ordering takes place at small and large scales in a musical work, and we could describe the largest scale of ordering as form.

My recently-completed PhD thesis proposed a new theory of musical form, which extrapolated many of James Tenney's ideas about the subject. However, in that document I did not discuss the *aesthetics* of form i.e. what makes a good musical form. Whilst it might seem that this would be an impossible task, given the huge stylistic range of Contemporary Music, I think there are actually a pretty fixed set of criteria we could use for assessing a given form. As a working definition, we could consider a form as being "bad" when the composer's intention conflicts with the audience's experience. Let us presume that there are three possible responses an audience can have to hearing a specific musical form:

1 Comprehension - they are able to remember the different sections of the form and their temporal relations to each other and perceive the overall narrative of the work.

2 Incomprehension - they are unable to remember the different sections of the form and their temporal relations to each other and do not perceive the overall narrative of the work.

3 Partial comprehension - a state somewhere between the two options listed above.

Neither of these options are better or worse than the others, and each can be used for creating particular affects. James Tenney was interested in the form of works being comprehensible, stating: 'I'm interested in a form that as soon as you've heard a couple of minutes of it, you get a pretty good idea of what you're going to hear later. So you can sit back and relax and get inside the sound.'[1]; Karlheinz Stockhausen created *Moment Form* precisely to make the form of the work less comprehensible and narrative, as a 'succession of self-contained sections that do not relate to each other in any functionally implicative manner'[2]; and Morton Feldman's late works are famous for sitting somewhere between

[1] François-Xavier Féron. "Could the endless progressions in James Tenney's music be viewed as sonic koans?" In: *Proceedings ICMC|SMC|2014*. 2014, p. 103.

[2] Jonathan D. Kramer. "Moment Form in Twentieth Century Music." In: *The Musical Quarterly* 64.2 (1978), pp. 177– 194, p. 179.

formal comprehensibility and incomprehensibility due to the way in which they play with time and memory. The important thing, in all of these cases, is that these composers *intentionally* aimed for one of these three options and executed their intentions effectively.

The comprehensibility or incomprehensibility of any musical form is the function of a relatively concrete set of cognitive limitations and narrative patterns. To effectively execute one of the three approaches above involves an understanding of these factors. For this essay I'll focus only on defining what a form would need to do to be comprehensible for a listener, with the idea, not that this approach makes better music, but that if you were interested in making music that was formally incomprehensible to a listener you can just do the opposite of whatever I suggest, and that if you are interested in partial comprehension, I outline where the limits are.

1.1 Perceiving musical form

How do we perceive form? James Tenney suggested that musical form was perceived through the grouping of *Temporal Gestalts*:

> '...for the musician, a piece of music does not consist merely of an inarticulate stream of elementary sounds but a hierarchically ordered network of sounds, motives, phrases, passages, sections, movements, etc. -i.e., time-spans whose *perceptual* boundaries are largely determined by the nature of the sounds and sound-configurations occurring within them. What is involved ...is a conception of distinct spans of time at several hierarchical levels, each of which is both internally cohesive and externally segregated from comparable time-spans immediately preceding and following it. Such time-spans (and the events or processes that define them) will here be called *temporal gestalt-units* (or TGs).'
>
> -James Tenney and Larry Polansky *Hierarchical Temporal Gestalt Perception in Music*[3]

At the smallest phenomenological level, a Temporal Gestalt is referred to as an *element*, groups of which then form higher-level TGs known as *clangs*, which in turn group together to form *sequences*, which then group together to form an indefinite number of hierarchical levels, eventually forming a Temporal Gestalt at the highest level which is the piece itself. This type of hierarchical, gestalt-based grouping is what might, in the current psychological literature, be referred to as *chunking*.

If we imagine any work of music as a hierarchical structure of Temporal Gestalts grouped into larger and larger collections, at the hierarchical level just below that of the piece itself are a set of sections which constitute the *structure* of the piece's form. In his writing, Tenney defines form as consisting as the interaction of *structure*, *shape* (the morphology of the form), and *state* (the statistical distribution of parameters throughout the form); structure being the 'interrelations among component parts'. [4]

1.3 Remembering Events

> 'Dantzig relates the story of a squire determined to shoot a crow that made its nest in the watchtower of his estate. He successively sent one, two, three, four, and finally five men to shoot the bird. In each case, the crow flew away and watched until all the men left. It lost count when five went in and four left. It returned to its

---

[3] James Tenney. *From Scratch: Writings in Music Theory*. Urbana: University of Illinois Press, 2015, p. 201.

[4] Ibid., p. 63.

nest only to be shot by the fifth man left behind.'[5]

Is there a limit to the number of sections that a piece can have before it becomes unintelligible to a listener?

Any understanding of the large-scale form of a musical work is related to how many of its salient features we can commit to short-term memory. Research has shown that there is a limit to the number of pieces of information that can be stored in short-term memory and that the only way this is increased is through the intelligent grouping or chunking of items.[6] In music, this chunking occurs at phrasal and sectional boundaries in a work. Chunking groups elements of the musical hierarchy into larger chunks at higher hierarchical levels. This chunking process appears to occur in a more pronounced fashion when there is contrast between two adjacent sections, with Neuhaus's experiments on **ABAB** and **AABB** structures showing that '[i]ndependent of form type, chunking tendencies become stronger whenever rhythmical contrast between A-and B-parts is sharp, and when melodic contours are upward-downward'.[7] This chunking process is accompanied by a neurological phenomenon known as Closure Positive Shift (CPS). CPS occurs in a listener's brain at sectional divisions in music, typified by a centro-parietal positivity peaking roughly 550ms after the sectional boundaries. CPS is interpreted as a marker of boundary perception.[8] However, research has shown that perception of large-scale form is probably learned, with a study by Zhang et al. showing electroencephalographic evidence of CPS in musicians at section, phrase and period boundaries, but only at period boundaries with non-musicians.[9]

Given that chunking is the main method used to both effectively store information in short-term memory, and that Neuhaus identifies CPS as part of a musical chunking procedure, it seems sensible to conclude that the maximum number of different sections that a work can have, in order for its form to be comprehensible to a listener, is the maximum number of chunked pieces of information that can be stored in short-term memory.

In 1956, Miller proposed that the storage capacity of short-term memory was only seven items, plus or minus two, though, again, this storage capacity could be increased through the chunking of information.[10] However, more recently, Cowan has written an extensive and persuasive paper in Volume 24 of *Behavioral and Brain Sciences*, claiming that '[t]he evidence provides broad support for what can be interpreted as a capacity limit of substantially fewer than Miller's 7±2 chunks; about four chunks on the average'.[11]

In music, at the highest structural level, each section with a new material type is chunked as a separate piece of information in short-term memory. When more than four of these have occurred, the listener is unlikely to be able to hold all of the material types in their short-term memory, hindering comprehension of the large-scale form. The inability to hold more than

---

[5] T. L. Saaty and M. S. Ozdemir. "Why the Magic Number Seven Plus or Minus Two." In: *Mathematical and Computer Modelling* 38 (2003), pp. 233–244, pp. 234-235.

[6] Nelson Cowan. "The magical number 4 in short-term memory: A reconsideration of mental storage capacity." In: *Behavioral and Brain Sciences* 24 (2000), pp. 87–114, p. 87.

[7] Christiane Neuhaus. "Processing musical form: Behavioural and neurological approaches." In: *Musicae Scientae* 17.1 (2013), pp. 109–127, p. 122.

[8] Susana Silva et al. "Musical phrase boundaries, wrap-up and the closure positive shift." In: *Brain Research* 1585 (2014), pp. 99–107, p. 99.

[9] Jingjing Zhang et al. "Perception of hierarchical boundaries in music and its modulation by expertise." In: *Neuropsychologia* 91 (2016), pp. 490–498, p. 490

[10] Cowan, "The magical number 4 in short-term memory: A reconsideration of mental storage capacity," p. 87.

[11] Cowan, "The magical number 4 in short-term memory: A reconsideration of mental storage capacity," p. 88.

four chunks of information in short-term memory might explain why the vast majority of symphonic works written in the 1800s have four movements (out of a survey of 283 19th Century symphonies, 212 of them had four movements - 74.91% of the total[12]).

1.4 Processing Information Over Large Time Periods

Listening to a piece of music involves time estimation. Not only the estimation of time passed (*retrospective time estimation*) but also an estimation of time to come (*prospective time estimation*).[13] Errors in accurate estimation of time increase exponentially as the scale increases, due to the impact of Weber's law on perception:

> 'Studies in psychophysics have shown that time perception shares characteristics with other forms of perception, most notably Weber's law. The consequence of this law is that uncertainty in a time estimate scales with the magnitude of the interval, which is also called the scalar property of time estimation.'[14]

This scalar property of time estimation has enormous implications for the way in which we conceive of and execute musical form. As the interval of time increases, the error in temporal estimation *exponentially* increases, and thus, our ability to comprehend form decreases as the length of a piece increases.

2. "A and then B" is not a Story

What is *good* musical form?

In many ways, musical form is a type of narrative. Literary theory has an entire sub-field of *narratology*, dedicated to the study of narrative, and to which several journals are dedicated (*Journal of Narrative Technique*, *Journal of Narrative Theory*). Music has no comparable specialization (in fact good writing on musical form is woefully lacking), so I shall use literary theory to try find some transferable knowledge about how events can be meaningfully ordered. Rather than asking *what is good musical form?* we shall ask: *How do you tell a good story?* And perhaps the best way to answer this question is to ask another, namely: How do you tell a *bad* story?

Young children are bad storytellers, so let us try and understand their narrative failures ...Consider this real example of a child's story, taken from Arthur Applebee's book *The Child's Concept of Story*:[15]

> 'A fierce poisonous snake and he ate a monster. And then he telephoned on the telephone. He went to someone's house and he ate some dog dirty. He went in someone's car and he ate the seat off. Then he ate some bushes. Then he went some stairs and ate some stair meat. Then he ate himself.'
>
> - Larry W., [4 years 3 months old][16]

---

[12] Steven Craig Cannon. "Sonata Form in the Nineteenth-Century Symphony." In: *Empirical Musicology Review* 11.2 (2016).

[13] Niels A. Taatgen, Hedderik van Rijn, and John Anderson. "An Integrated Theory of Prospective Time Interval Estimation: The Role of Cognition, Attention, and Learning." In: *Psychological Review* 114.3 (2007), pp. 577–598, p. 577.

[14] Taatgen, Rijn, and Anderson, "An Integrated Theory of Prospective Time Interval Estimation: The Role of Cognition, Attention, and Learning," p. 579.

[15] Arthur N. Applebee. *The Child's Concept of Story*. Chicago: University of Chicago, 1978, p. 61.

[16] Applebee, *The Child's Concept of Story*, p. 61.

The problems with this type of story-telling were acutely summarized by the writers of the television show *South Park* in a lecture they gave to a screenwriting class at New York University:

> **'TREY PARKER:** ...We found out this really simple rule that maybe you guys have all heard before but it took us a long time to learn it. But, we can take these beats, which are basically the beats of your [story] outline, and if the words "and then" belong between those beats, you're f***ed. Basically. You got something pretty boring. What should happen between every beat you've written down is either the word "therefore" or "but".
>
> **MATT STONE:** ...You see movies that are like "this happened and then this happens and then this happens" and that's when you're like 'what the **** am I watching this movie for?' ...that's not a movie, that's not a story. Like Trey said, it's those ..."but", "because", "therefore" that gives you the causation between each beat and ...that's a story.'[17]

Aristotle shares a similar contempt for this type of writing, which he refers to as 'episodic' narrative construction, where 'episodic' refers to those plots with an absence of probability or necessity in the sequence of episodes which make up the plot. He claims that 'of simple plots and actions the episodic are the worst'.[18] This is not just a way of writing confined to children's stories. We can also see it in medieval *annals*, which are typically a vertically-ordered list of years, with a short description of the important events of that year written next to it).[19]

So what is so unsuccessful about these narratives?

2.1 Applebee and Vygotsky's Children's Story Typology

Applebee locates the success of children's stories in two mechanisms:

1 *Centering*: The ability to centre the story around a central concept.

2 *Chaining*: The ability to causally link elements of the story together

The development of childhood storytelling between the ages of two to five moves through a series of six stages, each defined by the level of ability and integration of these two areas. This model can be seen in Figure 1 and is based upon Vygotsky's stages in concept development.[20]

For Applebee, a formally successful story, one that occurs at the final stage of the model, is what he refers to as a *narrative*. A *narrative* is a story in which 'the center or situation around which the story is built is developed over the course of the narrative', and in which 'its plot has in a sense become reversible: the ending is entailed within the initial situation. At this stage the incidents are linked both by centering and by chaining and are thus more fully controlled.'[21] This is similar to the way in which the *history* supplanted the *annal* by narrativizing the sequence of events and placing them into a context in which they could gain more

---

[17] MTVU. *Writing Advice from Matt Stone & Trey Parker @ NYU | MTVU's "Stand In"*. 2011. url: https://www.youtube.com/watch?v=vGUNqq3jVLg.

[18] Arnold Whittall. "Form." In: *The New Grove Dictionary of Music and Musicians*. Ed. by Stanley Sadie. 2nd ed. Vol. 9. New York: Grove, 2001, pp. 92–94, p. 93.

[19] White, Hayden. 1987. *The Content of Form*. Baltimore: Johns Hopkins University Press.

[20] Applebee, *The Child's Concept of Story*.

[21] Ibid., p. 69.

meaning than they would as isolated facts: 'the events must be not only registered within the chronological framework of their original occurrence but narrated as well, that is to say, revealed as possessing a structure, an order of meaning, that they do not possess as mere sequence.'[22] [23]

2.2 Chaining in Musical Form: Sequences, Heaps and Primitive Narratives

Let us use *chaining* and *centring* as tools for understanding the aesthetics of musical form. More specifically, how musical form can tell successful or unsuccessful stories – which in our case will be synonymous with comprehensibility and incomprehensibility. I would contend that a lot of Contemporary Music compositions use forms analogous to the *heaps* or *sequence* type of storytelling ('An organization of narrative that is syncretistic, rooted in the child's perception and essentially unrelated to the characteristics of the material to be organized.'[24]):

> 'A girl and a boy, and a mother and maybe a daddy. And there is a piggy. And then a horse. And maybe a cow. And a chair. And food. And a car. Maybe a painting. Maybe a baby. Maybe a mountain stone, somebody threw a stone on a bear and the bear's head broke right off ..'.
>
> - Extract from a story by Warren P. (3 Years 7 Months)[25]. An example of the *heap* type of storytelling.

In music, this type of form is *Moment form* a term coined by Karlheinz Stockhausen, discussed in his articles *Momentform* (1960) and *Erfindung und Entdeckung*, and utilised in works such as the electronic piece *Kontakte* (1959-60) and *Moment*.[26] Moment form is a 'succession of self-contained sections that do not relate to each other in any functionally implicative manner'[27], what Dahlhaus refers to as *musique informelle*[28] or what A. B. Marx refers to as *Gang*[29]. Moment form consists of an *n-ary*[30] structure of four or more sections: **ABCDE...*n***. In relationship to our discussion of the connections between musical and narrative forms, Stockhausen specifically defines moment forms as opposed to 'dramatic' or 'closed development' form. This is partly due to the inability for moment form to create large scale narrative:

> 'Since moment forms verticalize time, render every Now, avoid functional implications between moments, climaxes, they are not beginning-middle-end forms. piece must start for simple practical reasons, it may must stop, but it may not end. ...'[31]

Essentially, Moment form solely uses *Chaining* to tell its story, but chaining can be used narratively in a musical work for a number of reasons:

1 Create coherence (unsuccessfully)

---

[22] White, *The Content of Form*, pp. 4-5.

[23] Interestingly, the linguist George Lakoff sees this divide as partly leading to the dominance of political conservatism in the United States, as he states that "conservatives use stories, the left use facts and statistics". https://www.berkeley.edu/news/media/releases/2003/10/27_lakoff.shtml

[24] Ibid., p. 58.

[25] Applebee, *The Child's Concept of Story*, pp. 58-59.

[26] Kramer, "Moment Form in Twentieth Century Music," p. 179.

[27] Ibid., p. 179.

[28] Whittall, "Form," p. 93.

[29] A. B. Marx. *Musical Form in the Age of Beethoven*. Cambridge: Cambridge University Press, 1997, p. 67.

[30] See my PhD thesis for more information about *n-ary form*.

[31] Kramer, "Moment Form in Twentieth Century Music," p. 180.

2 Create contrast to illuminate the main material

3 Manifest concatenationist ideology

2.2.1 Creating Coherence

Much Contemporary Music is in *Moment Form*. Whilst the changeover of material in these pieces might not be as fast as that in the Stockhausen works which give this formal type its name, the use of a series of sections, each using a different sectional material type, mark them out as being part of the same formal category. How can a form like this, which is based upon the idea of constant difference achieve any type of large-scale coherence?

One of the main ways of achieving the illusion of coherence in *moment form* is by applying an old rhetorical strategy known as *post hoc, ergo propter hoc*, (after this, because of this) 'an informal fallacy which occurs when the reasoner concludes that event A caused event B merely because event A preceded event B'.[32] [33] This is a fallacy clearly at work in a lot of stories by young children; consider the child's story presented at the beginning of this section and its lack of causality. It featured some loose centring around the idea of a snake and eating but the events seemed to be arbitrarily chained together. Applebee would classify this as the *sequence* stage in which 'Event A is said to happen after Event B, without any discernible causal link between them. Instead, the events are linked together on the basis of an attribute shared with a common *center* or core of the story'.[34]

By relying upon an audience's rhetorical ignorance, a composer can project a coherence that is actually lacking from the piece. In contemporary composition, consistency in instrumentation is often used as a way of uniting disparate and unrelated pieces of formal material, bringing to mind Vygotsky's assertion that, in a *sequence* the bonds between elements are '*concrete and factual* rather than abstract and logical'.[35]

This *post hoc, ergo propter hoc* fallacy can be combined with other informal fallacies such as the *fallacy of composition* in which the reasoner illicitly moves from a premise asserting that the parts of an object individually have a certain property to the conclusion that the object as a whole has that same property; or the *fallacy of division*, wherein the reasoner illicitly moves from a premise asserting that some object, as a whole, has a certain property, to the conclusion that the parts of the object have same property individually.[36] We can posit, then, that the appearance of coherence in Moment form is the result of fallacious thinking.

2.2.2 Contrast to illuminate main material

Some musical works are created by chaining contrasting sections together. Schoenberg sees contrast as key to illuminating the main idea of a work, stating that '[l]arge forms develop through the generating power of contrasts. There are innumerable kinds of contrast; the larger the piece, the more types of contrast should be present to illuminate the main idea'.[37] Works with a series of disparate contrasting sections can be seen as a way of highlighting a central idea. Schoenberg's assumption is that the 'main idea' gains definition through contrast. Abstracting this concept, we can see this 'main idea' as a type of *category* (in the abstract, logical sense) and Schoenberg's assertion is that contrasts allows for optimal *category definition*. But contrast is not the only way in which a category can be defined, comparison can also be used:

---

[32] Roy T. Cook. *A Dictionary of Philosophical Logic*. Edinburgh: Edinburgh University Press, 2009, p. 225.

[33] Notably, Roland Barthes also identifies this as a narrative problem in his *Introduction to the Structural Analysis of Narratives* (H. Porter Abbott. *The Cambridge Introduction to Narrative*. 2nd ed. Cambridge: Cambridge University Press, 2008, pp. 42-43).

[34] Applebee, *The Child's Concept of Story*, p. 60.

[35] Ibid., p. 59.

[36] Cook, *A Dictionary of Philosophical Logic*, p. 116.

[37] Nick Collins. "Musical Form and Algorithmic Composition." In: *Contemporary Music Review* 28.1 (2009), pp. 103– 114, p. 107.

> ‘Comparison and contrast provide different information about categories. Comparing multiple members of the same category provides information about “category membership’. For example, comparing multiple members of the category “red” (e.g. a red ball, a red fire truck and a red apple) provides information about the shared and unshared features between category members. However, contrasting a category member against a non-category member (e.g. contrasting a red object with a yellow object) provides information about “category boundaries”. That is, contrast provides information about what distinguishes category members from non-members.’[38]

So, contrary to Schoenberg’s assertion, contrast does not provide information about the idea *itself*, but only about its relationship to that which it is not. In fact, whether a category is *high*-or *low-density* seems to have more impact on category definition than either the comparative or contrastive approaches:

> ‘· *High-density* categories have category members that share many common features relevant for category membership and have less variation in features that are irrelevant for category membership.
>
> · *Low-density* categories have category members that share fewer common features relevant for category membership and have more variation in features that are irrelevant for category membership.’[39]

This seems to imply that, to define a category, it makes more sense *doubling-down* on similarities by increasing the commonalities between category members and reducing their irrelevant features. This may explain why *variation form* has been so historically successful. Research has shown that ‘the statistical density of categories affected the ease of acquisition, such that more features jointly predictive of category membership made categorization easier. Higher density categories were more readily acquired, whereas lower density categories posed a greater challenge to learners.’[40]

2.2.3 Contrast for Concatenationist Principles

Concatenationism is a term used by the musicologist Jerrold Levinson in his book *Music in the Moment* (1997), to describe the way in which large-scale organisation of a piece of music is meaningless to the listener, who only apprehends things on a small scale, meaning ‘that we simply hear musical sections in succession by remaining in the musical present, and that large-scale musical form has no conscious influence on the listening process at all’.[41]

In his book, Levinson defines *concatenationism*’s opposite as *architectonicism*, a belief that a listener *can* comprehend large-scale form. There is some research that backs up Levinson’s ideas: ‘Tillmann and Bigand (2004) reported that untrained musical listeners can easily grasp small-scale musical structures within the time span of 30s but seem completely unaware of structural change when dealing with large-scale musical forms, for instance a sonata movement.’[42]

Taking Levinson’s idea of concatenationism on board might be one reason why *sequence* or *heap* forms might be used in a musical work. Concatenationist aesthetics have been adopted, unconsciously or not, into much contemporary music-making, of which there are two different types, both defined by forms of structures involving large numbers of sections

---

[38] Amber A. Ankowski, Haley A. Vlach, and Catherine M. Sandhofer. “Comparison Versus Contrast: Task Specifics Affect Category Acquisition.” In: *Infant and Child Development* 22 (2013), pp. 1–23, p. 2.

[39] Ankowski, Vlach, and Sandhofer, “Comparison Versus Contrast: Task Specifics Affect Category Acquisition,” p. 4.

[40] Ibid., p. 4.

[41] Neuhaus, “Processing musical form: Behavioural and neurological approaches,” p. 125.

[42] Neuhaus, “Processing musical form: Behavioural and neurological approaches,” p. 110.

and material types. What distinguishes them is their existence at two polar ends of parametric density states. A good comparison would be between the music of *wandelweiser* composer Antoine Beuger, and Jennifer Walshe's recent work, such as *ALL THE MANY PEOPLS*. Both create work which embraces a concatenationist structural aesthetic that focuses upon listening in the moment. However, each operates in a different way - Beuger by creating a music so slow and spaced out that it is difficult to effectively chunk and organize the isolated elements, and Walshe with an overabundance of material that prevents hierarchical listening through a too-muchness. Importantly, both of these musics *intentionally* pursue a concatenationist approach for an aesthetic/affective purpose; to focus the listener towards moment-to-moment listening.

2.4 Focused Chains and *It Was All A Dream...* Form

A *Focused Chain* involves the processes of chaining and of centering around concrete attributes that are joined within one narrative.[43] In its most typical form, the center is a main character who goes through a series of events linked one to another. This is similar to the medieval *Chronicle* which 'is marked by a failure to achieve narrative closure. It does not so much conclude as simply terminate. It starts out to tell a story but breaks off *in media res*, in the chronicler's own present; it leaves things unresolved, or rather, it leaves them unresolved in a storylike way.'[44]

A focused chain could be characterized as a *The Continuing adventures of...* type of story. It is often the case that works of Contemporary Music will use this type of narrativity, with the 'character' of instrumental forces going through a series of events of varying causality. In the worst of these works, there is an attempt to compensate for the lack of overall formal control by inserting the material from the beginning of the piece at the end. This results in a form usually looking something like **ABCDEFG...A**, or what I call *It Was All A Dream ... Form*, as it uses a similarly unsatisfying and acausal fracturing of narrative as seen in works such as the 'Who shot JR' storyline in the television show *Dallas*.

However, this way of working does have some important historical precedents, such as the unexpected perfect cadences that appear suddenly at the very end of the wandering, modulatory development sections in Bach's fugal work. Or, even more disappointingly, at the conclusion of Miguel de Cervantes's incredible and lengthy *Don Quixote*, in which after hundreds of pages following the supposed knight-errant and his psychological delusions, a mere eighteen paragraphs from the end of the work he becomes suddenly and unaccountably physically ill and, approaching death, makes an inexplicable mental recovery.[45]

3 Statistical morphology

Since the 1980s there has been an increasing body of psychomusicological literature dealing with the perception of large-scale musical form (see especially [46] and [47] for an overview of this research). These studies have frequently shown that both musicians and non-musicians are unable to follow large-scale formal changes, especially harmonic ones – a fact which is surprising, since this is often seen as one of the primary characteristic of the historically popular sonata-allegro form.

Granot and Jacoby's two 2011 jigsaw-puzzle style studies ([48] and [49]) tasked musicians and

---

[43] Ibid., p. 64.

[44] White, *The Content of Form*, p. 5.

[45] Miguel de Cervantes Saavedra. *Don Quixote*. Ed. by David Widger. 2004. url: http://www.gutenberg.org/cache/epub/996/pg996.html.

[46] Roni Y. Granot and Nori Jacoby. "Musically Puzzling I: Sensitivity to overall structure in the sonata forn?" In: *Musicae Scientiae* 15.3 (2011), pp. 365–386.

[47] Lalitte and Bigand, "Music in the moment? Revisiting the effect of large scale structures."

[48] Granot and Jacoby, "Musically Puzzling I: Sensitivity to overall structure in the sonata forn?"

non-musicians with re-ordering two Classical piano sonatas which had been chopped into sections and scrambled. The two works were Mozart's piano sonata *K. 570/I in B flat major* and Haydn's piano sonata *Hob: XVI-34/I in E minor*. Both of these works are in sonata-allegro form, and the results led the authors to conclude that: 'As in previous studies, we found no evidence for integration of the harmonic information into a global structure. Therefore, the conceptually appealing idea that one can recursively apply the rules of harmonic syntax to larger and larger units may not be perceptually valid — at least for the large majority of listeners, both musically trained and untrained.'[50]

One of the most interesting elements of the discussion in these papers was the suggestion that the ability of 'participants to "recompose" structures which, although different in detail, share the general A–B–A' structure in an above chance manner'[51] was due to a 'convex contour of tension, proposed by a number of theorists as one important defining feature of the sonata form'.[52] It seems that, rather than the *structure* of the works (i.e. its *exposition – development – recapitulation* sections), it is the arch-like shape of their morphologies, moving from stability to instability and back again that is the primary feature of the formal comprehension of *sonata-allegro* form.

Conclusion

Given the information I have outlined in this paper, we can enumerate several practical suggestions for making a musical form to be comprehensible to a listener:

- There cannot be more than four sections of different material.
- There must be maximal contrast between sections in order for closure positive shift to occur and a section to be chunked effectively.
- The longer a piece of music is, the more inaccurately an audience will perceive its temporal proportions (Weber's law).
- Narrative coherence in a musical work occurs through centering and chaining.
- Avoid *post hoc, ergo propter hoc* and other rhetorical fallacies.
- Instead of using contrast to illuminate the main musical idea, create a high-density musical work in which common features for category membership are emphasized and irrelevant features are de-emphasized.
- Avoid concatenationism and simplify your form to help aid the implicit difficulties of large-scale musical comprehension.
- Avoid *It Was All A Dream …* Form.
- Use simple formal morphologies to help listeners track the form of a work (e.g. move between stability and instability).

---

[49] Roni Y. Granot and Nori Jacoby. "Musically puzzling II: Sensitivity to overall structure in a Haydn E-minor sonata." In: *Musicae Scientiae* 16.1 (2011), pp. 67–80.

[50] Ibid., p. 75.

[51] Ibid., p. 79.

[52] Ibid., p. 75.

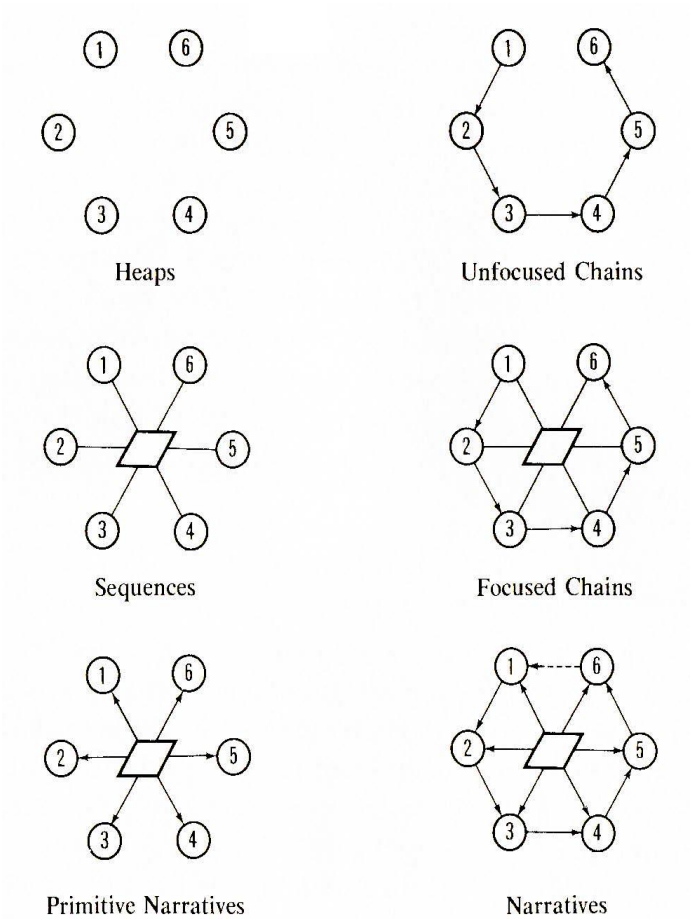

Figure 1: Vygotsky's stages in concept development.[53]

[53] Applebee, *The Child's Concept of Story*, p. 58.