The Aggregate Principle and the Principle of Order in Webern's Early Twelve-tone Sketches

by Brian Moseley

Arnold Schoenberg unveiled his nascent ideas about twelve-tone composition to friends and disciples just over one hundred years ago, in January 1922.[1] Anton Webern attended that gatherings and eventually embraced twelve-tone composition, though his conception of the technique changed markedly over the course of the 1920s. One significant change, written about by Anne Shreffler, involved Webern imagining the row less as a specific musical gesture and more as an abstract model.[2] Less established, however, are the specifically musical principles that informed Webern's sense of abstraction and how those principles influenced his composition with classical formal structures.

In a group of recent articles, I suggested some of these principles, and in this essay, I will show how they developed in his sketches during the mid-1920s. Those earlier essays suggested that these abstract principles were outgrowths of two basic properties of the twelve-tone row, the *aggregate* and *serial order*.[3] The "principle of the aggregate" reflects the notion of a "whole," broadly speaking. Webern's works often articulate formal processes involving "aggregates" not just of pitches, but of intervals, pitch-class sets, and even rows.

The "principle of order" mirrors a twelve-tone row's serial ordering of pitches by endowing order to row forms and their successions. Around the time of Schoenberg's 1922 gatherings, Felix Greissle reported Webern saying that he "never knew what to do after the 12 tones."[4] The principle

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1 See Anton Webern's letter to Heinrich Jalowetz of January 7, 1922, in Anton Webern, *Briefe an Heinrich Jalowetz*, ed. Ernst Lichtenhahn (Mainz: Schott, 1999), p. 499.

2 Anne C. Shreffler, "'Mein Weg geht jetzt vorüber': The Vocal Origins of Webern's Twelve-Tone Composition," *Journal of the American Musicological Society* 47, no. 2 (1994), pp. 275–339.

3 Brian Moseley, "Cycles in Webern's Late Music," *Journal of Music Theory* 62, no. 2 (2018), pp. 165–204; "Transformation Chains, Associative Areas, and a Principle of Form for Anton Webern's Twelve-tone Music," *Music Theory Spectrum* 41, no. 2 (2019), pp. 218–43.

4 Joan Allen Smith, *Schoenberg and His Circle: A Viennese Portrait* (New York: Schirmer Books, 1986), p. 199.

of order could be understood in part as a response to that concern. While a twelve-tone row specifies an order which pitches should follow, there were at first no such principles guiding row successions themselves. Webern's eventual solution, which characterized his approach from about 1928, was to order twelve-tone rows by linking them together.

The Aggregate Principle

Webern's sketches suggest the "aggregate principle" developed in spring 1925 as he worked on a String Trio (M. 273).[5] In this work, and many others from these early years, the "aggregate" in question is the collection of twelve distinct members of interval class 1 (ic1: C–C♯, C♯–D, D–E♭, and so on). But Webern only gradually discovered how to produce such an intervallic "aggregate" through experimentation with *even* and *odd* transposition patterns. In his first two sketches of the String Trio's row, shown with annotations in *Figure 1*, Webern writes tetrachords made of major sevenths and minor ninths – the first two of which are related by transposition. Notably, the *odd* transposition (down three semitones, or T_{-3}) of his first row shown at *Figure 1a* forced a change in pattern at the row's eighth note (note the added bar line): the transpositional pattern would have required a F♯, duplicating the row's first pitch. Therefore, Webern "replaces" that F♯ with a B.

Likely after this row was sketched, Webern wrote a "chordal aggregate" to its side (diagrammed at *Figure 1c*), which is the most fascinating portion of this page. Its vertical orientation suggests that he did not intend it as a row, but perhaps as a set of registral relationships. This is corroborated by a revision of the first row, which I have diagrammed at *Figure 1b*. Its registral distribution of pitches as P4/P5s reflects the chordal aggregate's registral organization, and this new row's central tetrachord matches the intervallic structure of the chordal aggregate's central tetrachord as well. Webern's draft of the Trio on the next sketch page began with this row, but he quickly ran into trouble. Once again, the row's *odd* transpositional pattern would not allow for six ic1s without forcing a duplicate pitch.

Webern altered the row a final time, producing the version annotated in *Figure 2a*. He labels this version "T" for "Tonika," and like earlier rows it projects non-overlapping ic1 dyads oriented within registrally distributed P4/P5s. A significant change is created when the tritone that had *separated* tetrachords previously is now used to relate ic1s *within* each tetrachord. As the unshaded nodes of *Figure 2b* show, this *even* transpositional value allows

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5   For other discussions of these sketches, see: Shreffler, "Mein Weg geht jetzt vorüber" (see note 2), pp. 315–18; Felix Wörner, *"… Was die Methode der '12-Ton-Komposition' alles zeitigt …": Anton Weberns Aneignung der Zwölftontechnik 1924–1935* (Bern: Peter Lang, 2003), pp. 70–95; Sebastian Wedler, "Rethinking Late Webern," in *The Cambridge Companion to Serialism*, ed. Martin Iddon (Cambridge: Cambridge University Press, 2023), pp. 87–107, esp. pp. 93–96.

Figure 1: Anton Webern, String Trio fragment (M. 273), sketch (Anton Webern Collection, PSS). Transcription with dotted annotations added by the author.
a: Annotated transcription of row.
b: Annotated transcription of revised row.
c: Annotated transcription of chord.

"T" to divide the twelve members of interval class 1 in half. As a consequence, Webern's sketched inversion "TU" (shown at the bottom on the sketch below "T") produces "T's" six complements – the shaded circles in *Figure 2b*.

"T" and "TU" therefore together produce an *aggregate of ic1s*. (In fact, they create an *aggregate of (0167)s* as well; see *Figure 2c*.) Any transposition or inversion of "T" or "TU" will create a row with precisely the same ic1s as one of these two rows. Webern realized this row class has an abstract, two-part structure, perhaps only after writing out a few additional rows or sketching more of the Trio draft, because at some point he enclosed only "T" and "TU" in red pencil. In the two continuity drafts for the Trio, these are the only rows used, and each acts as the single source for a formal section.
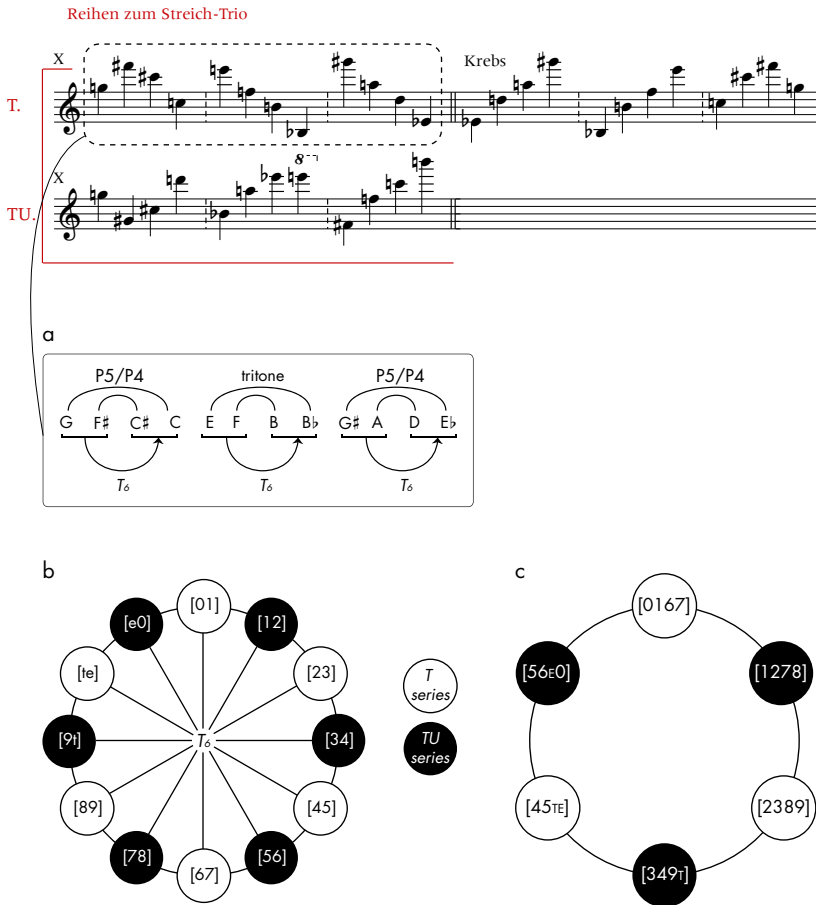
Figure 2: Anton Webern, String Trio fragment (M. 273), sketch (Anton Webern Collection, PSS). Transcription with dotted annotations added by the author.
a: Annotated transcription of final row.
b: Aggregate of semitones, shaded according to series form.
c: Aggregate of (0167) tetrachords, shaded according to series form.

The timing of this discovery could not have been better. The aggregate property provided an abstract means to align twelve-tone composition with the polarity typical of tonality and of classical formal structure, which was clearly of interest to Webern at this time. With the sort of structure shown in *Figure 2b* and *c*, "T" and "TU" are not arbitrary representatives for tonic and dominant. Rather, much as tonic and dominant share a special relationship within the tonal system, "T" and "TU" share a special relationship within this row class.

This abstract structure of this row class proved persistently appealing to Webern. Over the next year he sketched four instrumental works, three of

27

which are explicitly related to the ic1 structure from the String Trio. Both the *Klavierstück* fragment (M. 280) and the String Trio, Op. 20 copy the abstract intervallic paradigm of *Figure 2b*. I will show later that it plays a role in his Symphony, Op. 21, and Webern used this paradigm as late as 1938, when he was writing his final String Quartet.[6] The String Trio, Op. 20, underscores the principle's close alliance with tonal relationships linked to classical formal structure. Its final movement is a large sonata form. Following the plan foreshadowed in M. 273, the exposition's primary and secondary theme groups begin with rows projecting complementary ic1 dyads that together produce an aggregate of ic1s. When recapitulated, the secondary theme group's transposition up a perfect fourth (an *odd* transposition) matches the transposition typical in classical sonata forms while bringing its ic1 dyads into "alignment" with the primary theme:[7]

Exposition

Primary Theme   Secondary Theme

A♭ G, D C♯, F♯ F, A B♭, E♭ E, C B   F E, B B♭, E♭ D, F♯ G, C C♯, A G♯
⑦   ①   ⑤ ⑨   ③   ⑪   ④   ⑩   ②   ⑥   ⓪   ⑧

                        ic1 aggregate

Recapitulation

Primary Theme   Secondary Theme

A♭ G, D C♯, F♯ F, A B♭, E♭ E, C B   B♭ A, E E♭, A♭ G, B C, F F♯, D C♯
⑦   ①   ⑤ ⑨   ③   ⑪   ⑨   ③   ⑦   ⑪   ⑤   ①

                        ic1 alignment

The Order Principle

This String Trio, Op. 20, was a breakthrough. Not only was it Webern's first completed twelve-tone work for instruments alone, it was his first completed instrumental work in thirteen years. And as I have shown, it shows a particular understanding of the abstract possibilities of twelve-tone composition that is foreshadowed in earlier fragments. In those works, however, Webern struggled to use more than one or two row forms, and that restriction clearly eased with Op. 20. We can conjecture, I think, that while the aggregate principle provided Webern a means for large-scale organization, it did not solve a more immediate problem, one he was grappling with in Op. 20: which rows should follow one another?

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6   See Moseley, "Transformation Chains" (see note 3), pp. 4–6.
7   Andrew Mead begins his analysis of this movement by discussing this transposition in particular. See his "Webern, Tradition, and 'Composing with Twelve Tones …'," *Music Theory Spectrum* 15, no. 2 (1993), pp. 173–204, esp. pp. 196–204.
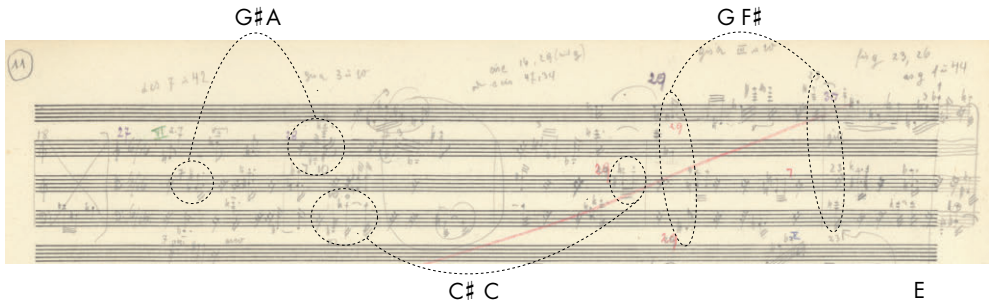
28

Figure 3: Anton Webern, String Trio, Op. 20, sketch for an abandoned third movement in Sketchbook 2, p. 11 (Anton Webern Collection, PSS). Dotted annotations added by the author.

While the sketches for Op. 20's published movements are lost, in the extensive materials we have for an abandoned third movement, this concern for row ordering is conspicuous and sets the stage for what becomes a more common practice – a "principle of order." *Figure 3* shows one fascinating passage from those sketches, all of which are littered with the marginalia like that here at the page's top. Webern's notes highlight particular row forms *beginning* with a specified two-note pitch segment: for example, "d es 7 u 42," written at the top left, indicates that both rows 7 and 42 on his row table begin with the segment <D, E♭>. These segments were seemingly used to judge the desirability of a particular row succession. Here, as an example, the four rows follow a pattern wherein the third and fourth notes of a row become the first and second notes of the row that follows: in *Figure 3*, the viola's <G♯, A>, as the third and fourth note of row "7," becomes the first dyad of row "10," indicated by Webern above the score. That row's third and fourth note, <C♯, C>, then begins row "29." And so on.

His interest here in using row segments to suggest "what row should come next" foreshadows the "linear" row orchestration, as Kathryn Bailey calls it, that we find in all of the works he composed after Op. 20.[8] The row forms in these works are consistently "chained" together through shared segments, a practice that seems to emanate from the concerns we witness with the Op. 20 sketch.

His sketches for the Symphony, Op. 21, beautifully demonstrate the first instance of this principle of order coming into contact with the principle of the aggregate. *Figure 4* shows the first three groups of row forms Webern noted in his row table for the Symphony. My dotted annotations and diagram at *Figure 4* show that the four discrete ic1 dyads at the row's center

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8   Kathryn Bailey, *The Twelve-Note Music of Anton Webern: Old Forms in a New Language* (Cambridge: Cambridge University Press, 1991), pp. 30–93.
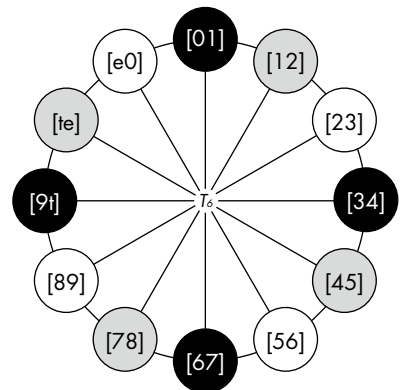
Figure 4: Anton Webern, row table for the Symphony, Op. 21 (Anton Webern Collection, PSS). Transcription with dotted annotations added by the author.
a: Aggregate of semitones created from the three row groups and their tritone transpositions.

form a "diminished seventh chord" of ic1 dyads. Thus, combining a single row form from each of these groups (or their tritone transpositions) will create an *ic1 aggregate*. At the same time, the first and final dyad of each
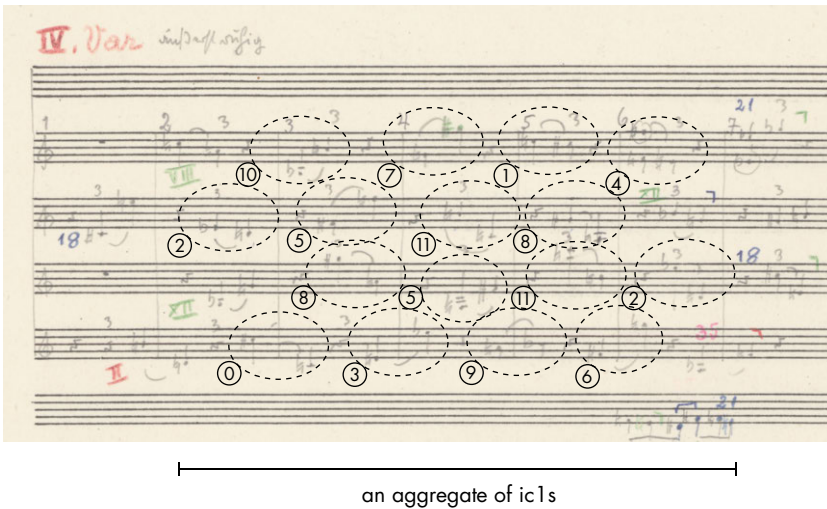
Figure 5: Anton Webern, Symphony, Op. 21, first sketch of the 4th variation in Sketchbook 2, p. 30 (Anton Webern Collection, PSS). Dotted annotations added by the author.

group belong to interval class 3 and are related by T_3, allowing rows to chain together while maintaining their ic1 structure.

An ic1 aggregate culmination is precisely what occurs at the climax of the second movement, a sketch of which is shown in *Figure 5*. From early on in the sketch process, Webern noted in a formal diagram that the fourth variation would be a place of special significance:

Thema, | 1. 2. 3 | (4.) | 5. 6 7 | Coda.[9]

And when his sketches reached this moment, he combines four rows that produce an ic1 aggregate, highlighting the aggregate with two-note rhythmic groupings. As those rows come to their end, Webern's beamed indication just below the passage (in m. 6) indicates how row "VIII" chains to row "21." That linkage, and three others indicated in mm. 6 and 7, orders the row forms in this central passage with another group producing a second ic1 aggregate. This significant joining of two abstract principles initiates the movement's large "structural retrograde," and it marks the first of many moments in Webern's compositional history where these two principles work together.

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9   Anton Webern, sketch for the Symphony, Op. 21, in Sketchbook 2, p. 21 (Anton Webern Collection, PSS).

31