Orchestration Strategies in Simon Steen-Andersen's *Double Up*

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ABSTRACT: This article presents an analysis of the orchestration strategies used in Simon Steen-Andersen *Double Up* for sampler and orchestra. The analysis examines the relation between the 121 samples that make up the work's electronic soundtrack and the orchestral imitation of these samples. The relation between the concept of the piece and its orchestration is summed up in six strategies: scoring the audio recordings, supplements, additive orchestration, chamber music orchestration, anonymization, and pre-orchestration. These strategies are presented as a qualification of the word "satisfactory" in *Grove Music Online*'s definition of orchestration as the art of combining instruments "to form a satisfactory blend and balance." Furthermore, *Double Up*'s contribution to the use of sampling in orchestral music is evaluated.

Introduction

[1.1] Simon Steen-Andersen's *Double Up* (2010) is written for sampler and orchestra, using the sampler not as an addition to the orchestra but rather as a kind of soloist. It is, however, by no means an ordinary concerto; there are no concertante elements or virtuosic displays in this music. There is also nothing beautiful or colorful in any traditional sense. It is a kind of anti-orchestral music; in fact, it is doubtful that many people would categorize it as orchestral music only by listening to it. On the other hand, this piece is obviously about the orchestration. The material consists solely of recordings of everyday sounds played by the sampler, combined with orchestral imitations of this material. The orchestra's imitations balance the playback of samples in such a way that they cannot be distinguished from one another. The orchestra has no material of its own. Composition seems to exist only on a less detailed level—in the selection and organization of the sound files.

[1.2] *Grove Music Online* defines orchestration as "the art of combining the sounds of a complex of instruments (an orchestra or other ensemble) to form a satisfactory blend and balance" (Kreitner et al. 2016). In this article I focus on the strategies for combining the instruments, but also to a lesser extent the use of the instruments themselves. I suggest that the composition is controlled by some pre-compositional tendencies and possibly even principles for combining the instruments.[1] In what follows, I explore how Steen-Andersen creates this unusual orchestral sound by working with a group of particular orchestration strategies. I then show how these strategies fulfill the concept of *Double Up*, and evaluate *Double Up*'s

contribution to the use of the sampler in orchestra music.

Double Up

[2.1] In general, Steen-Andersen's orchestration is experimental and full of extended techniques and unusual instrumental combinations. The composer's fascination with the relations between aural and visual elements is clear, for example, in *Next To Beside Besides* (2005–2007), where the physical gestures from an earlier piece are used to sculpt new versions of the piece for other instruments ("choreographic translations"), or in *Study for String Instrument #3* (2011), where the musician plays a "duet" with a video projection of her- or himself.[2] Although there are no visual elements in *Double Up*, the work centers on the imitation of sounds from everyday life—sounds with clear visual references. *Double Up* has achieved a certain amount of success: it has been performed by seven different orchestras,[3] and broadcast by a number of European radio stations (in Germany, Sweden, Latvia, Denmark, Finland, and the Netherlands). The work lasts for approximately 17 minutes. It is divided into two main parts separated by a "solo" for sampler, and framed by an introduction and conclusion:

mm. 1–27	mm. 28–290	mm. 291–311	mm. 312–538	mm. 539–578
Introduction	Part 1	Solo	Part 2	Conclusion

[2.2] The instrumental parts of *Double Up* comprise an orchestration of the 121 samples that make up the work's electronic soundtrack. Each sample is always scored the same way.[4] The recorded files in the sampler's sound bank have each been identified by the composer with descriptive labels; I will refer to the recordings using these names. The source material includes a wide variety of everyday sounds such as "applause," "doorbell," and "breathing." The sounds have been recorded with conventional equipment, but at various distance and positions, and thus they sound unbalanced relative to one another. Each recording focuses on a single sound type, and extraneous or ambient sounds have been avoided. The sounds have an anonymous quality—not unlike pictograms—and do not seem to have been manipulated or edited to any significant extent (an exception is the extremely time-stretched sample "gunshot-slowmotion"). Many of the samples have been recorded close to the microphone so that, for example, the beer's carbon dioxide sounds brilliant and the coffee slurp sounds "juicy."

[2.3] The same samples are re-used both between and within the different sections of the work. "Coffee machine" is used 3 times during the first part of *Double Up*, while "speedup" (presumably an accelerating car recorded from inside the vehicle) is used 18 times. The orchestration remains the same; only the length of the playback segment is varied—"speedup," for example, ranges between 0.5 to 2.75 seconds in length. The density of samples is generally quite high: in mm. 28–58, 40 samples are used, resulting in an average length of 1.3 seconds per sample in this passage.

[2.4] According to the program note, Part 1 of *Double Up* is designed as a narrative. Sample by sample, we are apparently told the story of a person who tries to contact a woman after a one-night stand. **Audio A** depicts the beginning of the story, which seems to represent a day in the life of the protagonist overs the course of 52 seconds. To help clarify the narrative, I show the names of the samples used along with the music in **Video A**. In these and the following examples, the orchestral parts are performed by Eötvös/Radio Kammerphilharmonie Hilversum."

[2.5] Part 2 of *Double Up* re-uses the same samples but combines them according to a different logic, described in the score as a "musicalization" of the material. The samples follow one another continuously in what Steen-Andersen describes in the introductory notes of the score as "musical linearity." The indexical meaning and narrative logic of the audio recordings are superseded by an arrangement of the samples based on their acoustic similarities. This results in a different organization of the material, such as the motivic structuring in **Audio B** and **Video B**.

[2.6] The shifting logic that binds the music together is also exemplified by the sampler solo. The solo consists of a spoken text broken up into 18 syllables. Played in the correct order, the 18 syllables make up a quotation from investopedia.com: "Doubling up is a risky strategy, but it can yield large returns." This quote also sums up the concept of the piece. The idea of doubling up is used in several ways in the music: (1) the samples and the orchestra's imitations of them, (2) the sound as an intrinsic musical object and the sound as a sign of an action, and (3) the samples organized in a linear narrative and in timbral groupings. In the introductory notes of the score, Steen-Andersen elaborates on possible outcomes—or "returns"—"from the drunken and sloppy but deeply felt sing-along to the more musical 'power of unison' and the potentially rewarding effect of opening up something familiar for reinterpretation and re-experience by distorting or emphasizing its different elements or by presenting it in a new context."

Twelve Examples

[3.1] Part of the problem with analyzing orchestration in detail is the overwhelming amount of information that one must take into account. Therefore, I limit my detailed analysis to the first 12 samples in Part 1 (mm. 28–36). These 12 samples represent approximately 10% of the total number of samples, and they are re-used throughout the piece. Each of the following 12 examples shows a single sample and its orchestration, followed by a consideration of their relationships. [5]

[3.2] Before discussing the orchestration of these 12 samples, I will comment briefly on the scoring of the samples. To clarify how the instruments are combined, I have re-grouped the different parts of the orchestration into segments. [6] Each segment constitutes a separate and potentially independent part of the music—like a melody or an accompaniment. I break down the piece into segments by dividing the sound picture into a foreground and a background. Furthermore, I break down the orchestration into subsegments when instruments contribute to different parts of a segment. For instance, consider the scoring of the alarm clock in **Example 1**.

[3.3] The combination of oboe, muted trumpet, and clicker is used to imitate the sound of the alarm clock. The oboe and trumpet double one another, and are therefore notated as the same subsegment, A1. The clicker, on the other hand, is a different subsegment, A2. It consists of two attacks, coordinated so that each attack aligns with the beginning and end of the alarm pulses, creating the effect of a sharp attack and decay. The subsegments A1 and A2 work together to imitate the sound of the alarm clock. In a second segment, B, are the clarinet, trombone 1, and percussion 2 (thunder sheet). There is no obvious connection between segments A and B. They do not share the same contour, pitch content, rhythm, or dynamics, and segment B seems to evoke background noises (perhaps resonance from the room or noise from the recording itself), whereas the sound source of segment A is the alarm clock. What brings the instruments in segment B together? They simply start and stop at the same time.

[3.4] Many factors need to be considered when segmenting an orchestration: similarities in timbre, rhythm, duration, contour, pitch content, volume, articulation, external referent, and possibly others. The basic idea of segment analysis is to group parts according to how alike they are; this aligns with the methods for creating streams and stream segregation described in Bregman's *Auditory Scene Analysis* (1990). The challenge with segment analysis is to evaluate the different reasons for grouping instruments together or not. For example, if two instruments share pitch content but not rhythm, one needs to consider the larger context of the music to decide how closely related they are. The purpose of segment analysis is to present a particular interpretation of the orchestration and thereby provide insight into the methods used to orchestrate a work; in turn, this allows for a discussion of the work's higher-level conceptual orchestration strategies.

[3.5] For each example in the following section, I provide the score excerpt with segments labeled, an audio recording, audio of the original sample without the orchestra, and a brief explanation of the segment analysis. In the notated examples, the segments are shown with the foreground at the top, the background in the middle, and the sampler at the bottom. [7] Within each segment or subsegment, the instruments are notated in traditional score order. Resting parts have been omitted.

[3.6] **Example 2** is labeled "button-mechanical," and represents the sound of a button being pressed down. The button's double click (subsegment A1) is primarily scored as noise in the cello. [8] The pizzicatos in violin 2 and viola (A2) add a pitched quality to the first click of A1. Segment B, representing the noise on the recording, is scored as an air sound in the horn.

[3.7] In **Example 3**, which depicts the sound of an electric razor, the four instruments in segment A are integrated to such an extent that a division into foreground and background, or into fundamentally different subsegments, would serve little purpose. The same pitches are found in bassoon, harp, and violin, and the same dynamic in violin, bassoon, and percussion; furthermore, all four instruments have the same duration.

[3.8] In **Example 4,** "shower" depicts the act of showering, the splashing of water drops on the walls and floor of the shower is scored as a mass effect (segment A) with noise-producing pizzicatos in violin 2 (divisi) and viola (divisi). The acoustic resonance of the shower stall is done with the tremolo in the double bass and the snare-drum roll (B1). The subsegment B2 adds to the noisy quality of the resonance, although it could also represent noise on the recording.

[3.9] In **Example 5** the rhythmic sound of a toothbrush in action is recreated in segment A by percussion and violin in unison—the similarity between the musical gestures on the cardboard box and the "brushing teeth" is unmistakable. Segment B, representing the noise on the recording, is scored as an air sound in the clarinet.

[3.10] The brewing sequence of the "coffee machine" in **Example 6** is imitated with a soft drum roll and the noise from overpressure and slow bowing in the strings (subsegments A1 and A2). Once again the air sound, this time in a piccolo

trumpet, is interpreted as noise on the recording (segment B); however, it is doubtful that this can be separated audibly from the noise produced by segment A.

[3.11] **Example 7,** "coffee slurp," is a complex sequence of temporal events. The "CH" in the flute and the air in the trombones are dynamically scored as foreground material and are therefore not labeled as recording noise but rather as an essential part of the target sound (A1). The two air sounds may be quite difficult to distinguish from one another. Piccolo, violin 1, and violin 2 (solo) are three subsegments shown as one segment (A2) to simplify the notation. They are rhythmically coordinated and outline timbral changes that are conspicuous in the recording. The piccolo part creates a connection between the high-pitched harmonic in violin 1 and the clattering *col legno* in violin 2. The dense activity level of this segment may well cause it to stand out above the dynamically stronger segment A1. Due to their specific pitch content and use of register, the bass clarinet and bassoon can be heard as a separate segment, B. This may represent an attempt to reproduce the hum on the recording (through beats resulting from the diminished octave).

[3.12] **Example 8**, like the preceding example, is based on a sample that changes considerably over time; the imitation of a key turning in a lock starts in A1 and continues through A2 to A3. The three groups are notated as three subsegments to clarify the various doublings with in each subsegment. But this grouping is open to question: the parts within A1 and A3 are only partial doublings at best, and could be analyzed as separate subsegments. In subsegment A1, the oboe's air supports the percussion accent on the first beat. In A2, the four woodwinds and *col legno battuto* in the viola (which timbrally blends well with the key clicks in the winds) double each other's percussive accents. In A3, the snare drum (percussion 4) connects the *col legno battuto* in the double basses with the air in the trumpet. Subsegments A1, A2, and A3 are backed by a sustained sonority consisting of discreet noises in the horn and harp (B1) and a long, weak-sounding minor tenth in the bass clarinet and bassoon (B2) that adds more pitch-specific content to this subsegment.

[3.13] In **Example 9,** "staircase" most likely
represents footsteps on a stairway. The steps are scored with a combination of percussion, cello, and double bass (segment A). They double each other, albeit not at specific intervals (unison, second, third, etc.) but rather as a mixture. The extent to which these sounds blend naturally depends on many factors, but the strings' drop in pitch is clearly imitated by the sound of the cardboard box ("edge to mid" = high to low). The use of sandpaper in segment B is interpreted as an intensification of the air sounds, potentially representing noise on the recording equipment, although it could also represent the reverb in the staircase sample.

[3.14] **Example 10** depicts the sound of a "car door" closing, scored as a combination of slap stick, tom-tom, and pizzicato strings in a complex dynamic balance (segment A). The air sound in segment B is again interpreted as representing the noise on the recording

[3.15] **Example 11** is labeled "speedup" by the composer. It is surrounded by the sounds of car doors (Examples 10 and 12) and therefore it seems reasonable to assume that the sample is a recording of an accelerating car. The pitch shift of the acceleration is made by the strings doubled in a parallel motion by the trombones (segment A). The doublings blur the tonal content: trombone 1 starts on G, and the cello begins on the same note raised by a quarter-tone, while the double bass starts on F♯. Segment B consists of sustained sounds with high noise components played by English horn, harp, and viola. It is doubtful whether they can be distinguished from each other. The viola's timbre changes from dark to light, and the harp's crescendo effectively supports the upward glissando in segment A and should perhaps be considered as part of it.

[3.16] **Example 12**, "car door from outside," is a variation of the car door depicted in Example 10, this time recorded from the outside of the car, and the orchestration is closely related to that of Example 10. The most striking difference—in comparison to the previous orchestration (and the orchestrations in general)—is the "pitched" air sounds. They were undoubtedly inspired by the sample and may be the result of the recording equipment's automatic noise reduction.

Orchestration Strategies

[4.1] The 12 samples are scored in many different ways, in terms of instrumental combinations, dynamics, playing techniques, use of register, and orchestration methods. But six basic orchestration strategies can be observed throughout.

Scoring the audio recordings

[4.2] In the examples above, I have divided most of the individual samples into two segments, one representing attacks, pulsations, or melodic gestures and the other consisting of static, sustained sounds. In many cases, the primary source is

heard in the foreground, while the background is composed of room ambience, environmental sounds, and/or recording noise. Example 1 is a typical instance of this division. The sound of the alarm clock is shown as segment A, but what is the purpose of segment B? The composer comments in the introductory notes to the score: "Many of the softer sounds, though, are orchestrations of background noises and hums and will not always be audible in the samples. These background sounds should be kept down, even if it feels as if they are not being heard, just adding a general dirtiness to the overall sound." It is not entirely clear what Steen-Andersen means when he refers to noises and hums that "will not always be audible in the samples," but I assume that he is referring to sounds that are partially inaudible as a result of the quality of the audio equipment, the placement of the speakers, and/or the acoustics of the music hall. Air sounds, in particular, are a regular feature in the scoring of these background sounds (B subsegments).[9] It therefore seems safe to assume that the air sounds represent a type of noise found on virtually all of the recordings, such as the noise, hiss, and hum typical of low-fi audio.

Supplements

[4.3] The foreground subsegments (labeled A
in the examples) are made up of multiple sound sources that double or supplement one another. In Example 11, the glissando in the strings is doubled by a glissando in the trombones transposed a quarter-tone down. In Examples 10 and 12, the pizzicato notes in the strings double the slap stick and thereby add a pitched quality to the sound. In Example 9, the palm-struck strings are supplemented by the cardboard box. Admittedly, it is difficult to define what constitutes "doubling" in *Double Up*, not least because of the many unpitched sounds. For example, when the element being doubled has no pitch content, such as in Example 9, should it still be considered a doubling? **Example 13a-c,** showing modified versions of Example 9, exemplifies the problem:

[4.4] Example 13a is a clear example of a unison/octave doubling. The pizzicato in Example 13b involves a kind of "parallel" doubling, in which the cello and double bass move in parallel fourths. But should the tom-tom also be considered part of the doubling effect, even though the pitch changes in the tom-tom do not mirror those in the strings? I argue that it should, and that doublings in this context need not necessarily involve identical pitches and rhythms in different instruments. Example 13c, an excerpt taken from Example 9, makes the issue even clearer. If the parts are to be considered doublings, they must have some aspect in common that is doubled. The common features of the three parts in Example 13c are a falling pitch, sixteenth-note rhythm, and crescendo. Doubling—in this broader sense of the term—thus requires a different evaluation of the pitch domain than in the typical usage.

[4.5] The problem of doublings in *Double Up* can be exemplified in another way: when a chord stands by itself, the chord tones are not considered as doublings of the chord root. Only if the chord moves in parallel motion does it become a kind of doubling, in which the other chord tones are perceived as subordinate to the chord root because of their lack of independent motion. This kind of hierarchy can also be implied using dynamics. For instance, in **Example 14a**, the chord tones are of equal loudness (albeit in a somewhat unusual voicing, with the chord seventh doubled at the octave). But in **Example 14b**, the soft notes in the violin 2 and viola function more as a coloration of the cello's attack than as independent chord tones. In **Example 14c**, an excerpt from Example 2 ("button-mechanical"), a few pitches are added to the cello's noisy attack at a much quieter dynamic. These pitches seem to function as neither chord members nor doublings, but instead as a supplement to the texture. Similarly, in Example 13c, "supplement" may be a more suitable term than "doubling."

[4.6] I suggest "supplement" as a term for describing situations in which two voices are regarded neither as doublings nor as different (sub)segments. A particularly complex instance of this is demonstrated by Example 11. The division into two segments was made with reference to pitch-versus-noise and glissandi-versus-stationary sound. But the relationship between the three voices in segment B is difficult to explain. The voices do not double one another, since they are not the same type of noise, and they are not unique enough to be interpreted as individual subsegments, since they are temporally aligned and difficult to perceive as separate streams. The border between supplement and sub-segment is probably impossible to define in the abstract, and considering the complexity of the topic, this brief overview is in no way intended to be exhaustive, but hopefully it provides an idea of how the orchestration in *Double Up* arises as a sum of different parts.

Additive orchestration

[4.7] The issues discussed in Examples 14b and 14c above largely centered on different simultaneous dynamic levels. In classical orchestral music, the dynamic balance between multiple simultaneous segments is often achieved via the doubling of individual segments. Instruments or instrumental groups that double one another are usually notated with the same dynamic. Typically, simultaneous segments also share the same dynamic notation, possibly differing by a single dynamic degree (e.g.,

foreground *f* and background *mf*). This use of dynamics started to change around the beginning of the twentieth century, and individual dynamics among simultaneously sounding parts have become more established in orchestral composition.

[4.8] *Double Up* combines the techniques of doubling and supplementation within individual segments with different levels of dynamic balance. In Example 11, the foreground consists of cello and double bass playing *ff*, while the first trombone plays at a somewhat weaker *f* and the second trombone at an even weaker *mf*. The primary sound is that of the strings, colored by the trombones. A similar situation is found in Example 10: the slap stick dominates the overall sonority with an *ff* dynamic, colored by *mf* in the tom-tom and more subtly by a *p* pizzicato in the strings. Since dynamics are not an objective parameter (i.e., an *f* marking does not always indicate the same dynamic level), they are always played in relation to the instruments involved, making the use of individual dynamics both complicated and risky: how do the musicians find the right dynamic balance without knowing what dynamics the other musicians are playing? However a skewed balance between different instruments is not a problem in itself, and it offers opportunities to create colors that go beyond conventional instrumental combinations with an equally weighted dynamic balance. And some of the balance issues in *Double Up* can be resolved by the principle of imitation. At least in theory, the musicians are able to hear the desired balance in the sampler's audio files (from the score: "If you recognize the sound you're playing in the sample played at the same time, you may adjust or intonate to the sound to make it melt together better").

[4.9] The term "additive orchestration"—which refers to the combination of doubling and supplementation in an uneven dynamic balance—is inspired by the technique of additive synthesis. In additive synthesis, a timbre is produced by summing several sine waves at different dynamic levels. In additive orchestration, the sine waves are replaced by instruments, and because the instruments are difficult to mask, the result of additive orchestration is more like a coloration of a dominating timbre. In contrast to this, we traditionally expect doublings in equal dynamics to blend into one another, though this might not always be the result. [10]

Chamber-music orchestration

[4.10] The orchestration of *Double Up* can hardly be called orchestral in the traditional sense. The orchestra is used as a steady stream of chamber groups. In the subsection at mm. 28–58, each sample is scored for a small selection of instruments consisting of six players on average. [11] No two samples are scored for the same combination of instruments. The chamber-music quality results not only from the rapid changes in instrumental combinations but also from the general avoidance of octave doublings. In traditional orchestral music, the orchestra's sonority, volume, and register are greatly affected by octave doublings. However, *Double Up* contains hardly any octave doublings. The division of the orchestra into small ensembles and the avoidance of octave doublings lend a chamber-music quality to the orchestration.

Anonymization

[4.11] As mentioned in the introduction, only rarely do the instruments in *Double Up* come forward to let themselves be heard, in no small part because the simultaneous playback of samples partially covers the orchestration. In general listeners tend to identify the instruments playing based on many different factors like spectral shape, onset and offset transients, pitch features, multiple pitches vs. isolated pitches, blending qualities, and knowledge of the listener (Eronen 2001). Therefore, when the intention is to anonymize the instruments playing, several aspects need to be considered and modified. One way that Steen-Andersen does this is by frequently using extended playing techniques. 56% of the woodwind entrances in mm. 28–58 consist of air sounds, clicks, and key sounds. In the brass, 66% of entrances in the same section are air sounds, clicks, and "palm hit mouthpiece," while 31% of the playing techniques in the strings consist of "hit strings with palm," "along the string," "slow bow," "col legno battuto," and "clicker." [12] Extended techniques do not necessarily anonymize the instrumental sound, but the differences in sonority between wood and brass instruments, for example, are considerably reduced when playing air sounds in comparison with conventional playing. Still, even when the instruments in *Double Up* are used conventionally, they are often difficult to recognize. This may be due to the use of relatively unusual instrumental combinations with unequal dynamic balancing, as well as to the fact that an instrument is often assigned just one note, thereby reducing the sound of the instrument to one sound.

[4.12] The masking of instruments is also a consequence of the high density of musical information. As previously mentioned, each sample in the section at mm. 28–58 has a mean duration of 1.3 seconds, using an average of six instruments per imitation. The wealth of variation and information is also exemplified by the extensive use of percussion. Over the course of these 30 bars, the four percussionists make use of 14 different instruments and an even greater number of playing techniques. In short, there are several ways in which the instruments are anonymized, some of which have to do with the

density of information, while others result from the ways in which the instruments supplement and thereby cover each other.

Pre-orchestration

[4.13] Generally speaking, a composer uses orchestration to clarify, optimize, or underline the music from moment to moment, and changes in the orchestration often happen in a high pace to optimize the outcome. But the orchestration of *Double Up* does not adjust to the context. The orchestration of a specific sample—just like the sample itself—is always the same. Once the orchestration has been worked out, the remainder is a matter of copying and pasting. It must be assumed that the orchestration was prepared in advance of the final composition but after the samples were recorded—resulting in a kind of "pre-orchestration,". [13]

Exceptions

[4.14] There are certain exceptions to these general principles. One of them is found in mm. 272–280 (**Example 15**), where the night sleep of our protagonist is disturbed by a neighbor's quarrel. The muffled voices on the audio recordings are scored as plain solos alternating between trombone and clarinet/bass-clarinet.

Conclusion

[5.1] In this article I have identified several orchestration strategies in *Double Up*, based on a number of examples from the score. My focus has been on the segmentation; the use of doublings, dynamics, and tempo; the variation of instrumental combinations; and the use of common and alternative playing techniques. The results can be summarized as follows: in *Double Up*, the imitation of a given sample divides into two segments (foreground and background), each scored in chamber-music style, making extensive use of doublings and supplements with individual dynamics in an effect similar to additive orchestration. The individual instruments and instrumental combinations are difficult to identify by ear, and the orchestrations remain constant regardless of the specific context within the work.

[5.2] The orchestration seeks to achieve an acoustically inspired imitation of the electronic samples. Each sample is scored with a unique instrumental combination, just as each audio recording has a unique perspective. The comprehensive effort to conceal the characteristic qualities of the individual instruments may be seen as an attempt to prevent the listener from identifying them at the expense of identifying what is being imitated (i.e., the samples). At the same time, the orchestra provides, according to the score, a "potentially rewarding effect of opening up something familiar for reinterpretation and re-experience by distorting or emphasizing its different elements or by presenting it in a new context."

[5.3] None of the orchestral strategies in *Double Up* are entirely new; they all have some roots in earlier compositional traditions. Doubling is of course inscribed into the DNA of the symphony orchestra—the chorus effect of the string section is made by multiple strings doubling one another. Chamber-music orchestration is often used for brief contrasting passages in the symphonic literature, although using it consistently throughout a piece is rare. Likewise, the anonymization of instruments, such as concealing one instrument behind the tone of another as in a scored sforzando, or instruments within one another as in a perfect blend or a mass texture is common within the literature. [14] In this work it is the overall anonymization of instruments that is unusual.

[5.4] Additive orchestration does not share similar historical precedents. In Mahler's orchestral music, however, there are many examples of individual dynamics; mixtures of sounds such as those used in Ravel's *Bolero* could also be seen as early traces of this concept. The technique is strongly represented in more recent works, such as the opening of Gérard Grisey's *Partiels* (1975). Here, the opening chord is orchestrated based on a frequency analysis (Rose 1996). Grisey calls it "instrumental synthesis," referring to the practice of working with additive synthesis in electronic music (Fineberg 2000; O'Callaghan 2015). The strategies of pre-orchestration and orchestration without regard to context have a much shorter history. They might be seen as an extension of similar predetermined compositional algorithms such as those in Babbitt's *Composition for Four Instruments* (1948), in which the instruments are combined in a systematic way, or as inspired by automatic orchestration like that in Peter Ablinger's *Quadraturen V* (2000), in which any given recording is analyzed by a computer program and the result is sent directly to a music-notation program creating the parts for the orchestra to play (Ablinger 2006).

[5.5] The main issue in *Double Up* considered here does not center on these strategies, but rather on their use in connection with imitation. In contrast to the imitations in *Double Up*, imitations of sounds in earlier music are highly stylized by tonal, rhythmic, and orchestration conventions. More recently, however, acoustic imitation of recordings has become noticeably

more widespread. Some of the more well-known examples are Clarence Barlow's *Im Januar am Nil* (1984), discussed in Poller 2015; Peter Ablinger's *Drei Minuten für orchester* (2003); and Jonathan Harvey's *Speakings* (2008), discussed in Nouno et al. 2009. In each case the orchestration strategies as well as the intentions of the imitations are very different. But what they have in common is the use of imitation based on sound recordings, and computer-assisted orchestration relying on frequency analysis.[15] O'Callaghan (2015) presents a brief survey of this topic, describing a "growing body of works" using frequency analysis to explore "extra-musical" source materials and engaging in a mimetic discourse with the ethos of soundscape music. *Double Up* only shares some of these qualities. There is no use of computer-assisted orchestration in *Double Up*. This kind of scientific approach, the objectivity and safety it brings into the orchestration, is not a part of *Double Up*. But it is certainly possible to see *Double Up* as part of a mimetic discourse, although a more humorous one than the other works mentioned.

[5.6] The fact that the imitations in *Double Up* do not work on their own, but only together with the sampler, is important for the understanding of the piece: *Double Up* focuses neither on a stylized nor acoustic reality but rather on a mediated reality—the recordings are a replacement of reality, or what spectromorphology (a theory of electroacoustic music) refers to as surrogacy (Smalley 1997). The work suggests no illusions about a meeting between art and reality but nevertheless offers a twist on this duality in that the orchestra is imitating sampled sounds. Viewed in this way, the orchestra is "sampling" the samples by dividing the sound picture into a foreground and background. It recreates the samples and their different recording perspectives through supplemental sounds, additive orchestration and unique combinations of instruments. Ultimately the orchestra behaves like a sampler, being undefined and repeatable through anonymization and pre-orchestration.

[5.7] Returning to the definition of orchestration from *Grove Music Online*—"the art of combining the sounds of a complex of instruments (an orchestra or other ensemble) to form a satisfactory blend and balance"—I hope to have clarified what a "satisfactory blend and balance" could be in relation to *Double Up*, and that we can to a certain extent explain how to combine the instruments through several strategies. But the strategies described only narrow the choices of orchestration rather than defining them completely, leaving compositional choices still to be made by the composer. In my opening statement, I called *Double Up* anti-orchestral. This is at best a problematic description, because while *Double Up* might sound unusual in its departure from traditional precepts of "good" orchestration as presented in textbooks like Adler's *Study of Orchestration* (1989), it is certainly valuable as an example of alternative orchestral possibilities. The main reasons *Double Up* sounds so unusual are (1) the combination of orchestration strategies and (2) the fact that the imitations are combined with the original samples, thereby becoming a distortion.

[5.8] As a piece of music, *Double Up* is poised between clarity and identifiability on one hand and incomprehensibility and abstraction on the other. Had *Double Up* consisted of samples alone, the work's first half would have given the impression of a somewhat overstated piece of radio theater. If, on the other hand, the work had consisted of the orchestral parts alone, it would have seemed abstract and incomprehensible. *Double Up* achieves a balance whereby the electronic soundtrack loses some of its indexical clarity, while the orchestra in turn gains some of these qualities. *Double Up* can thus be seen as a response to two pronounced trends in the field of acoustic and electronic music: the tendency of electronic music to manipulate specific recordings virtually beyond recognition, and the attempt of acoustic music to evoke associations and meanings beyond the explicit acoustic signal.

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Footnotes

1. An earlier example of a piece strongly relying on such a strategy is Ravel's *Bolero*. To create the overarching crescendo, Ravel had to organize his use of the instruments with regard to their dynamic possibilities. This strategy did not completely establish the orchestration for Ravel, but it restricted his choices.
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2. For more information about Simon Steen-Andersen, see the following sites: http://www.simonsteenandersen.dk/eng_CV.htm, http://multimedia.swr.de/steen-andersen-piano-concerto, and http://seismograf.org/en/fokus/simon-steen-andersen-eng
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3. Kaspszyk/Warsaw Philharmonic (2015), Ollu/Deutsches Symphonie-Orchester Berlin (2015), Brönnimann/West Australian Symphony Orchestra (2014), Brönnimann/Danish Radio Chamber Orchestra (2013), Brönnimann/Helsinki Philharmonic Orchestra (2013), Stockhammer/Essener Philharmoniker (2012), Eötvös/Radio Kammerphilharmonie Hilversum (2010).
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4. At the beginning and at end of the work, many samples are used simultaneously, and parts of the orchestration are omitted for practical reasons—one instrument can only take part in a single sample at a time.
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5. The sixteenth-note overlap between "coffee slurp" and "key" has been omitted. None of the other samples in the selected passage overlap.
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6. Segment analysis is introduced in www.theidiomaticorchestra.net, an online textbook about orchestration by Rasmussen and Laursen (2014). A precedent to segment analysis is the analysis of elements (and sub-elements) as explained by Walter Piston (1955).
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7. The score includes no dynamic markings for the sampler part, as the balance between sampler and orchestra is adjusted from the mixing board during performance.
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8. An artificial harmonic on an augmented fourth will not result in a specific pitch. The following quadruple stop is produced by slapping all four strings with the palm.
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9. Nine of the twelve sample imitations discussed in the previous section include sustained air sounds. In Example 9, the air sound is replaced by sandpaper (although the effect is very similar), and in Example 12, the air sounds include changes in "pitch" (but still consisting only of air sounds). The only true exception, therefore, is Example 3.
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10. Sandell 1995 investigates the possible outcomes of doublings with different instruments at equal loudness.
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11. The subsection at mm. 28–58 uses an average of six players per sample.
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12. A clicker, as its name suggests, makes an unpitched clicking sound, with no dynamic variation.
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13. The predetermination of the orchestration is comparable to Messiaen's predetermination of durations, articulations, and dynamics prior to composing *Mode de valeurs et d'intensités* (1949, in the preface of the score).
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14. Boulez 1987 elaborates upon the general techniques of anonymization that—in his opinion—are typical for the orchestra.
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15. For more about computer-assisted orchestration, see Carpentier and Bresson 2010.
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