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This paper presents a discussion of the motivations and techniques used in the author's electroacoustic work *Sju*. The piece is based on digital recordings of a Swedish word that, in daily Swedish, is pronounced in two distinctive ways, thereby presenting a real-life sonic opposition ready for musical exploration. This is related to the concept of sonological competence (drawn from soundscape studies) since in both versions the word is awkward to pronounce for non-Swedish speakers, an issue stemming directly from the composer's first-hand experience with Swedish. The approach used in the manipulation of these sounds is outlined, especially the development of material around the variations in noise attack which define the different 'versions' of the word, and the extrapolation of the play between noise and speech into the larger formal structure of a work.

component of the word, and I recorded the different versions with the assistance of a number of Swedish people. Five of these are grouped in this sound example, and the sonogram is displayed in fig. 1. The defining polarities of the 'sju' phenomenon are heard in the distinction between the 'shh' and 'whh' attack transients, most clearly typified by the first and last in this sequence, though several versions are bracketed here to indicate the variance within that basic distinction.

Ex. 1

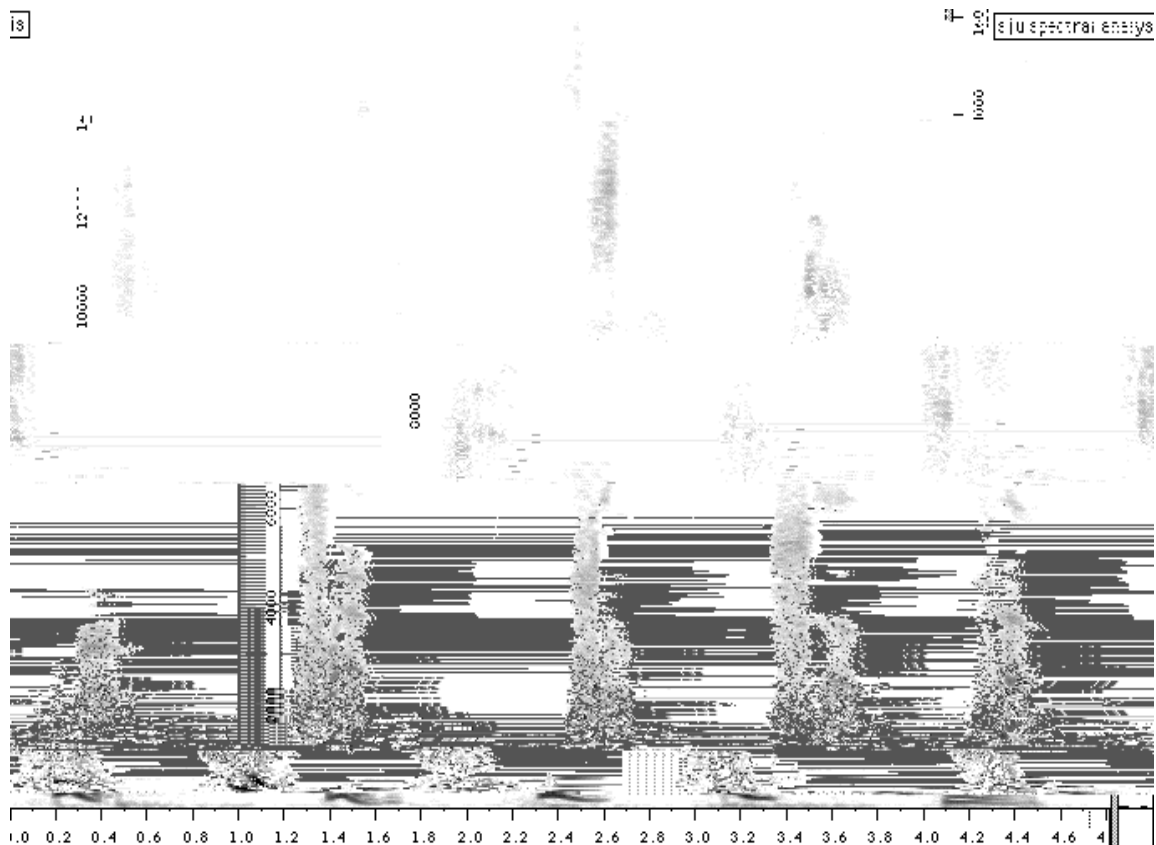


Fig. 1 Spectrogram of five versions of the Swedish word 'Sju'.

Early on I had the idea that I may want to contextualise whatever electroacoustic extensions of the sound that might become possible with a sense of personalities recurring or clustered through the work, and to that end I ensured that I had a range of voice types, genders and ages. In the recording sessions I asked each of the participants (most of whom were musicians) to speak the word in their own natural version, and a number of them became absorbed in repetition of the word, which also extended to some improvised play on it, one instance of which is retained in the work (at 1'28"). One subject, a young boy who, when invited to play with the word, produced a startling cadenza of speech-song (discussed later). Overall, repetitions of this kind provided me with a large number of minute sonic variations for the word as produced by each speaker, underlining a pre-

compositional strategy which can assist in giving suppleness and realism to repetition in acousmatic music.

being drawn to the way unvoiced noise is modulated across the versions of the word, its melding into a voiced pitch and the contradiction inherent in its pronunciation by the Swedish people, I was prompted to explore the qualities of these sounds given the linguistic challenge it represented. That is to say: this sound, beautiful in its fusion of noise and pitch, seemed to hold an unattainable sonic essence, and attempts to reproduce it simply produced even more variants of it.

The notion of sonological competence was a formative factor in the approach taken to the conception and development of this piece, encouraging me to retain a certain amount of source and contextual coherence throughout. I was aiming to encourage a listener to gain some sense of my confrontation f0 12 Tithj 0 -13.92

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variance amongst the noise attacks. But as 'mixing', this approach also was catalyst for the interleaving of the original vocal sounds with processed versions. The generating morphology of the granular process is, in effect, separate from the sounds themselves (defined by the limits and density of grain length). Thus the textural patterns created by this process can project into wider forms of musical development when transformational variants are injected into the mixing/editing process (in this case the 'flutter' sounds previously described). Some of the clearest examples of material developed in this way are found in the work at 4'12"-4'52" and 5'05"-6'11".

Ex. 9

This concentration of different noise spectra led to mixing these with other sounds that had relatively superficial relationship with the vocal sounds at the purely sonic, rather than the contextual or even transformational level. In this example, the 'sju' attack transients are mixed with samples from ice skaters recorded in Stockholm's Kungsträdgården (from 6'12"), again mixed and edited using asynchronous grains of up to 350ms. The sonic 'links' which guided me in this case were the dynamic surges and the spectral shaping of the ice skating sounds (which can easily be imitated through shifts in vowel formant), and this is anticipated at 6'00" in the lengthening of the 'flutter' envelopes at that point.

Ex. 10

Another instance of this kind of sonic free association is in the use of a sample of whispering resonated (physically) through a flute, for example at 3'07". Here the flute/voice sound is used to add spectral complexity to a granular mix similar to the example above, by imposing the granular mix's amplitude envelope onto that of the voice/flute. This process of allowing a dynamic pattern to function as a transferable rhythmic identity through a structure is one I have used extensively in acousmatic composition.

Ex. 11

One of the consequences of intensive studio listening is a heightened sensitivity to the character and subtleties of materials constantly being re-auditioned, which can result in a tendency to begin hearing sounds developed in the studio 'inside' sounds encountered in day-to-day experience, and vice versa. In making the sorts of sound links outlined above I was to a large extent attempting to objectify sound associations of that kind.

A synchronous granulation variant of 'sampling within the sample' was also used in *Sju*, with comparatively long grain lengths, reconstructed at low density, producing a reconstituted sound file that resembles 'snapshots' of the file's evolution in time. It was used to process the entire word 'sju', as performed by the youngest of my participants in the recording sessions, a small boy named Fivos. Fivos's extraordinary extemporisation on the word was textured using a gradual increase in 'grain' density. The morphology of the transformation is such that the word is disjointed to begin with, becomes more coherent, and then

overlaps to produce a tight delay/phase effect. The key idea for me here is that of coherence: there is level of continuity within the vocal sound that a listener (drawing on their general experience of vocal sound shapes) might vicariously interpret as 'whole' or 'truncated' (in *Sju*, this would also hopefully be confirmed by context, since the word has already been presented in its entirety several times). In this example, that aspect of contextual meaning gives the dynamic shape of the transformational morphology an additional significance beyond that of simply an 'accelerating rhythm approaching iteration'. In the context of the work (2'44") this acceleration heralds a new version of the 'flutter' morphology, emphasising the gathering of momentum.

Ex. 12

I use what are essentially algorithmic procedures like this to construct new sound formations for which I could not necessarily predict the outcome. However,

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a generative model was also a consideration, for example at 1'39" - 2'08" where the mixing of many noise-bands might be thought of as a highly embellished version of the noise-pitch transition. Pitched resonance provides more long-range underpinning of texture, and also articulates phrase structures in conjunction noise-based rhythmic and textural play, for example at 4'48".

Ex. 13

At the end of the work, the vowel-like resonances and attack transients are reintegrated to some extent. I found that 'flutter' noise attacks developed from one person could be edited alongside the purely vowel component of the word as spoken by another, allowing the word 'sju' to be resynthesised from two processed components (6'56"-7'06"). In fact this kind of mix and match reconstruction is quite plausible even with unprocessed components.

14

Throughout *Sju* the original context is reinforced through the statements of the complete word, which are constructed to highlight the contradictory pronunciations, as well as some of the sense of 'play' with the sound of the word that was captured in recording. Examples are found in the passages at 39"-45", 1'21"-1'32", 2'44"-2'53", 4'05"-4'12" and 6'56"-end.

While *Sju* attempts to evoke and musically amplify aspects of a very specific linguistic encounter, it also underlines fundamental aspects of the innovative potentials of the electroacoustic medium itself. Since sound recording has provided us with the resources to capture real-world sounds intact, study and manipulate them in a state suspension out of real-time (or, perhaps more significantly, out-of 'performance') we have a means of investigating, through sound, something of the substance of our experience in a very direct way—the ways we listen as well as the ways we communicate. The sheer act of turning the microphone towards cultural and environmental phenomena can provide the materials which, by virtue of their permanence as sound documents, may encourage ever more intense and questioning listening—both in and out of the studio. While the many facets of computer-enabled transformation are fundamental to the development of digital sound art, the groundwork formed by natural sounds themselves and the networks of representation and association we derive from them must constitute one of the strongest forces underlying electroacoustic music's potential as vibrant and meaningful sonic art.

*Sju* is dedicated to everyone at EMS Stockholm, with special thanks to Inger, Göran, Paulina and her composition class, Perikles and Fivos.

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