



4-2012

## Tiny Sounds

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TINY SOUNDS

by

Valeria Ch. Jonard Perez

A Thesis  
Submitted to the  
Faculty of the Graduate College  
in partial fulfillment of the  
requirements for the  
Degree of Master of Music  
Department of Music  
Advisor: David Colson, D.M.A.

Western Michigan University  
Kalamazoo, Michigan  
April 2012

THE GRADUATE COLLEGE  
WESTERN MICHIGAN UNIVERSITY  
KALAMAZOO, MICHIGAN

Date March 20, 2012

WE HEREBY APPROVE THE THESIS SUBMITTED BY

Valeria Ch. Jonard Perez

ENTITLED Tiny Sounds

AS PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF Master of Music

School of Music

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April 2012

## TINY SOUNDS

Valeria Ch. Jonard Perez, M.M.

Western Michigan University, 2012

Our auditory system perceives sounds within a specific range of frequencies and amplitudes. It is the way we define our aural world and the sounds we are able or willing to hear. Just above the border of the threshold of human audition hearing, we find unique sounds with particular characteristics. These sometimes forgotten or ignored sounds interest me as compositional elements.

Listening attentively requires extra effort from our ears and concentration; listening to sounds that vacillate from imperceptible to audible changes how humans typically listen to sounds in their environment. Although amplifying these discreet sounds would rob them of their intimate nature and slightly modifies their timbre, part of my project necessarily implies amplifying these sounds to bring them within the human hearing range and above the noise floor of the performance environment.

With this idea in mind I created four compositions that each incorporate barely audible sounds in a unique manner. Each piece has a distinctive sound source and amplitude level. The result is a small collection of sounds that illustrates not only a palette of timbres but also a palette of dynamic ranges.

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2012

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## BRIEF DESCRIPTION AND BACKGROUND OF THE PIECES

The four pieces presented contain sounds that are within the audible range. There is a wider and unknown aural world beyond the human threshold of hearing. These pieces do not explore that world; rather they incorporate materials just above the threshold of human hearing. This is a spectrum of sound where attention is an important element.

The intention of *Lullaby for the Last Drops* is to combine a low amplitude source of sound (water drops) along with an acoustic instrument. The main role of the flute is to imitate the sound of the water drops. As the piece progresses the flute slowly establishes its own individual voice.

The amplitude of a water drop depends on three principal factors; the size of the drop, the height where it falls from, and the space and the surface where it finally lands. For controlling the frequency and size of the drops it is necessary to consider the capabilities of the object employed as a dripper. Considering this, I incorporate a valve that is part of the typical intravenous devices in order to control the frequency of dripping. This valve is generally used for medical purposes to control the supply of liquids into the body. Since the dripping is extremely precise and delicate, the size of the drops is very small, but still allows for very rhythmic effects. Due to the intention and mood of the piece, I avoided taking advantage of these rhythmic effects.

In *Susurros* (whispers), the main material occurs during the decay of the sound of the piano. When the keys are struck, the damper is raised allowing the string to vibrate and decay as long as the key is pressed. When the key is released, the damper mutes the string again. If the keys are released one by one, as some notes are being muted the chord changes and “silent” melodies emerge. The important motives are hidden in the resonance of the piano and are perceived when the keys are released. This produces two dynamic features; first, by nature the sound of the keys being released have a low amplitude; secondly, the keys are released immediately after the attack on the keys, whose amplitude is noticeably stronger. This effect provokes that the attention of the



listener focuses automatically on the attack rather than the decay. Paradoxically, the louder the attack of the piano the more notorious the release is. This should result in the listener concentrating on separating the whispers of the released keys from the sound of the piano's decay.

*The Broken Harp* and *Speaking Hearts* are different to the previous pieces in two main aspects. The pieces do not include classical acoustical instruments and both incorporate amplification and digital signal processing. Unlike *Susurros* and *Lullaby for the Last Drops*, where the listener has to attend to very quiet sounds, these two pieces bring the sound of the source into an amplitude range more typically for musical performances. Both pieces are built in a similar way: the source sounds are recording, reproduced, and mixed with themselves. This creates a continuous texture or mass of sound.

*Speaking Hearts* incorporates the quietest sounds in this collection. This piece amplifies the human heartbeat and employs it as musical material. It is integral to the concept that the heart beating is in real time. Pre-recorded samples would reduce the powerful and intimate effect of listening to someone's interior sounds performed live. It is because the intricacy of the concept that I decided to do two versions. *Speaking Hearts* involves amplifying the heartbeat of three people, with no electronic process beyond stabilizing the dynamic range. The development of the material is based on altering the heartbeat by having the performed engage in controlled breathing and physical efforts. The reason of expanding the material by using only corporal manipulation is to conserve the intimacy and human of the sound.

There is a second version of *Speaking Hearts*. It is designed within the framework of an art installation. It involves an interactive interface that allows users to alter the sound of their heartbeat electronically by clicking on different segments of the image of a human heart.

The equipment that I used for amplifying the heart is pretty frugal, but effective enough. Seeking a good resolution of the heartbeat sound I experimented with a few varieties of microphones. A basic contact microphone and a film tab contact microphone

would barely catch the sound; additionally the signal received is more the “strike” of the heart rather than the sound of resonant heartbeat. I also tried a silicone suction cup microphone, but the signal was not strong enough. Cardioid microphones placed close enough from the body can result in a pretty clean signal, but it prevents free motion of the body. My inexpensive solution was to use a tie clip microphone inserted into the tubing of a good quality stethoscope. The stethoscope amplifies the actual sound of the heart and catches the breathing, which provides additional sonic material. Even though the signal is not as clear as desired, some incidental noises add a sort of charm to the sound, similar to the noise in an old recording.

# LULLABY FOR THE LAST DROPS

## Instrumentation and Set Up

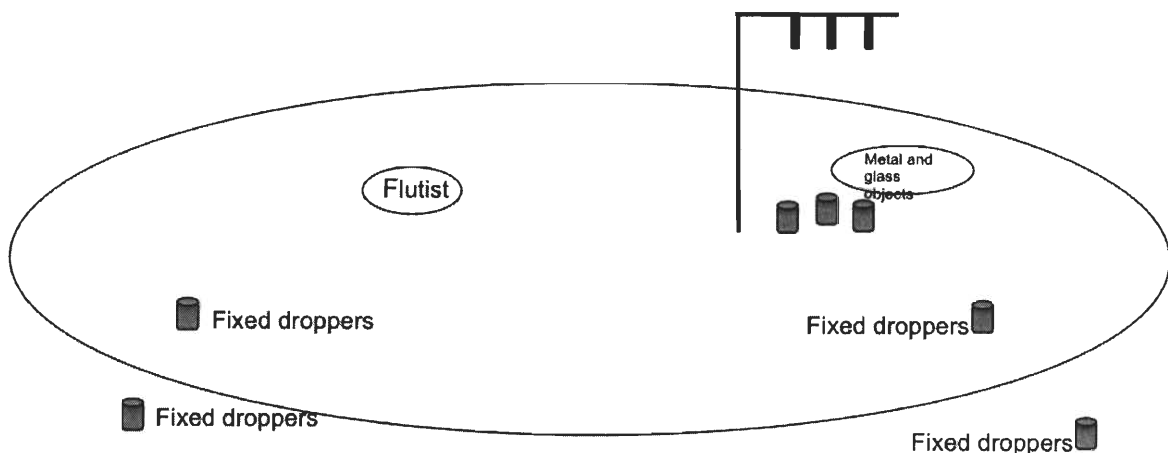
### Alto flute

#### Water drops:

There will be a set of three movable water drops. These can be built using a IV Administration set, which is used for supplying liquids with extreme measurement to the body. Each IV must be added to a bottle. If you are not using bottles designed for this specific task, you probably will need to add a hole to the bottle so there is air pressure in the inside. You must be able to use the roller clamp in order to change the quantity of drops per minute. Divide the range of dripping in 6 different levels:

| Level: | Approximated drops/ minute: |
|--------|-----------------------------|
| 1      | 4                           |
| 2      | 9                           |
| 3      | 16                          |
| 4      | 40                          |
| 5      | 80                          |
| 6      | 120                         |

In addition, there must be at least 2 set of fixed (not controlled) droppers. These must drip between 30 and 40 times per minute and will slow down by themselves. The three droppers must be hung around five feet above, and each one will have a tall pocket with 2 inches of water. The purpose of the pocket is not only to retain the water, but to amplify the drop.



## Score Instructions

The diagram at the bottom of the page represents the densities achieved with the water drops. Under this diagram it is described the actions with the water drops, while over it there are cues for the events in the flute. Each page is approximately equivalent to one minute.

The image displays three measures of a musical score, labeled 10, 11, and 12, with corresponding water drop density diagrams and flute cues.

**Measure 10:** The flute cue is marked *pp* and includes a diamond symbol. The density diagram shows a sparse distribution of water drops.

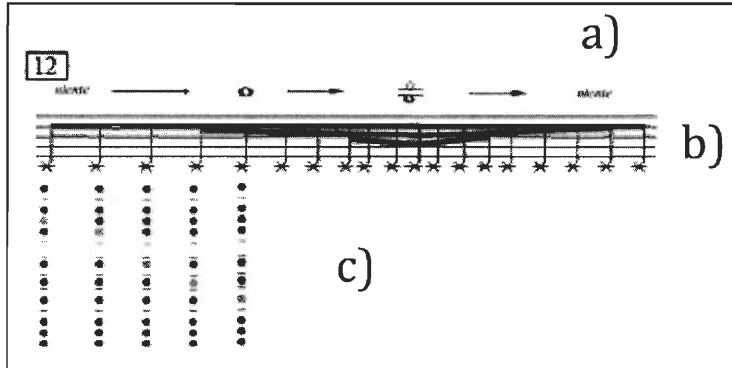
**Measure 11:** The flute cue is marked *pp* and includes a diamond symbol. The density diagram shows a moderate distribution of water drops.

**Measure 12:** The flute cue is marked *pp* and includes a diamond symbol. The density diagram shows a dense distribution of water drops.

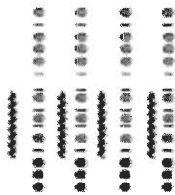
Below the density diagrams, a large rectangular box contains a detailed diagram of water drop densities. This diagram is divided into three sections corresponding to measures 10, 11, and 12. The density of water drops increases from left to right across the measures. Below this diagram, the flute cues are specified as *A) 3 — 4 — 3* for measure 11 and *A) 3 — 1* for measure 12.

# Flute

Most of the time the flute will have three main components that work independently from the others.



- a) The quality of the air pressure, located at the top of the staff
- b) Rhythm / pitch, expressed in normal staff
- c) Fingering, notated under the staff



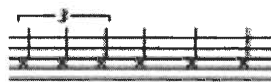
“Bisbigliando” with the right hand



Extreme pressure of air, reaching the upper harmonics, with a slower decay



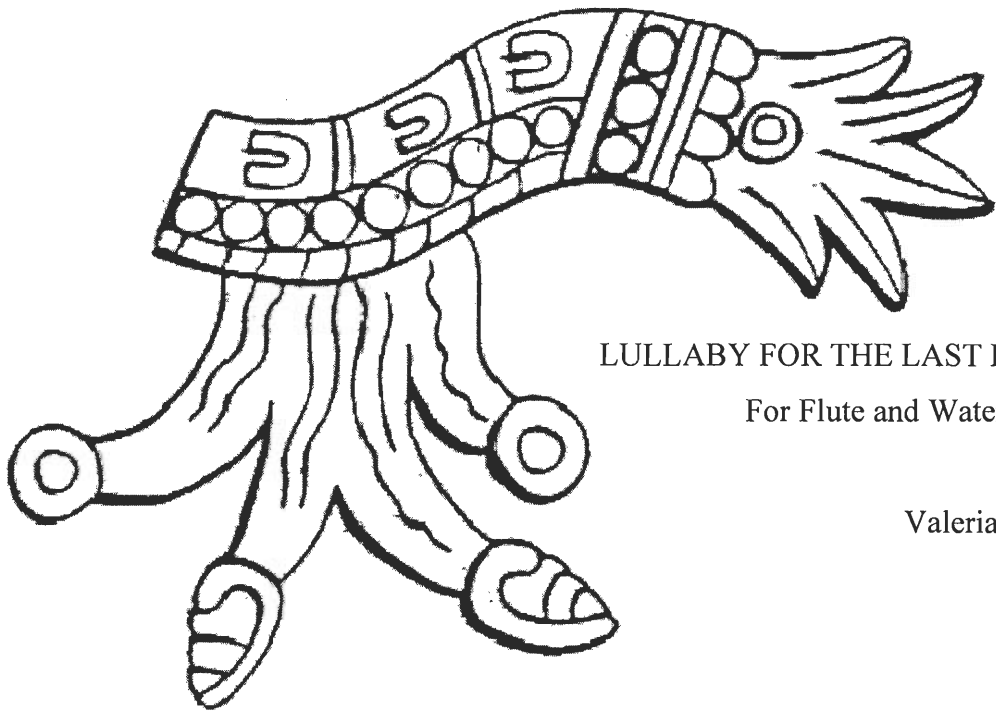
Eolic: mostly air



Sound of the keys



Transition from air to harder pressure until get first harmonic



LULLABY FOR THE LAST DROPS

For Flute and Water Drops

Valeria Jonard

“This piece was composed with the support of the  
National Fund for Cultures and Arts,  
through the program Jovenes Creadores 2010-2011”

# LULLABY FOR THE LAST DROPS

Valeria Joanrd  
2011

♩ = 60

Alto flute

1

2

3

C) 2

A) 1

B) 2

1

2

3

(60'' aprox)



4

5

Air: niente →  $\diamond$  *pp* → niente

6

niente →  $\diamond$  *pp* → niente

4

5

6

A) 1 → 2

C) 2 → 3

**7**

Air: niente → *pp* → niente

accel. rit.

**8**

Air: mouth shape: o → u → o

**9**

niente → *pp* → niente

accel. rit.

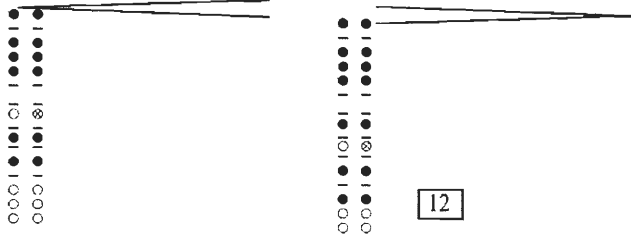
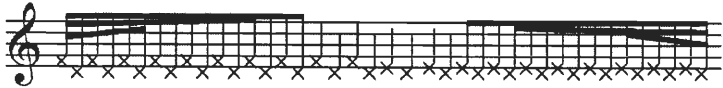
(right hand) simile

B) 2 → 3

C) 3 → 4

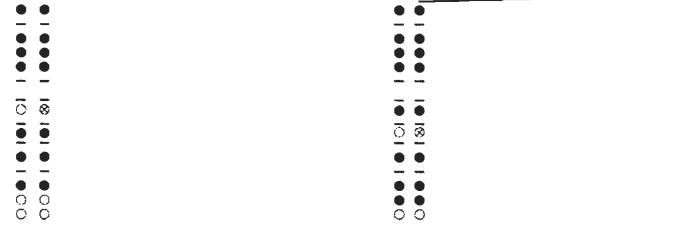
10

niente →  →  →  → niente  
*pp* *pp*



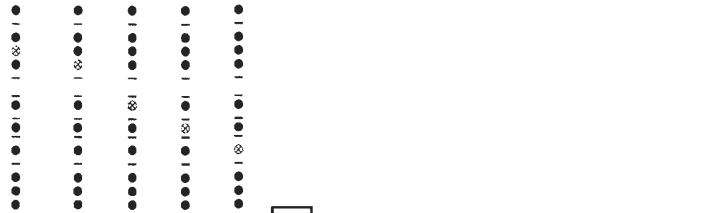
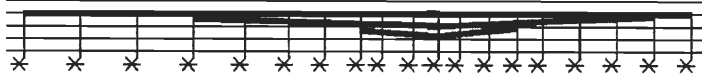
11

niente →  →  →  → niente



12

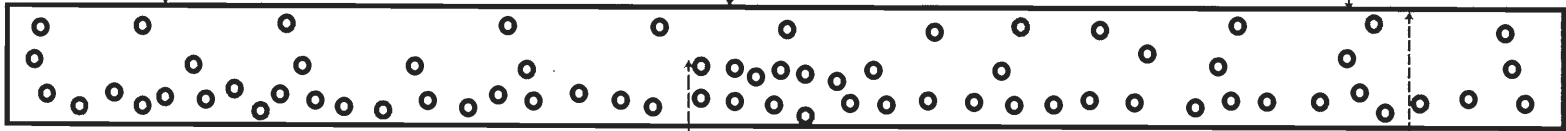
niente →  →  → niente



10

11

12



A) 3 → 4 → 3

A) 3 → 1

13

*fp*  $\rightarrow$  *pp*

14

*mp*

15

*fp*  $\rightarrow$  *pp*

16

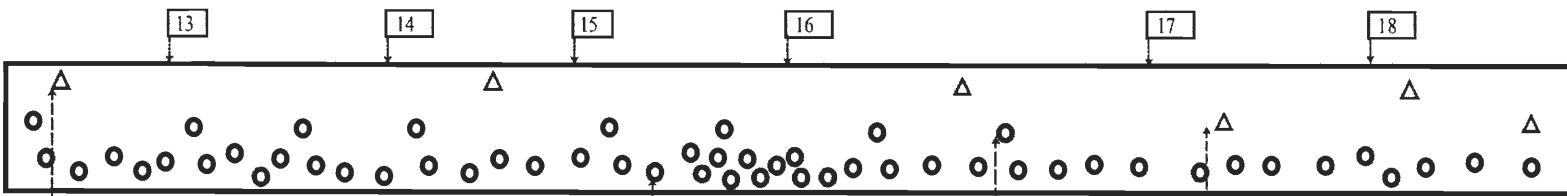
*fp*  $\rightarrow$  *pp*

17

*pp*  $\rightarrow$  *pp*

18

*mp*



A) over metal object

C) 4  $\rightarrow$  5  $\rightarrow$  4

B) 3  $\rightarrow$  2

B) over metal object

19

*ff*

Musical notation for measure 19, featuring a treble clef, a key signature of one flat, and a dynamic marking of *ff*. The notation includes a series of notes with accents and slurs.

20

*pp* *pp*

Musical notation for measure 20, featuring a treble clef, a key signature of one flat, and dynamic markings of *pp*. The notation includes a series of notes with accents and slurs.

21

*ff*

Musical notation for measure 21, featuring a treble clef, a key signature of one flat, and a dynamic marking of *ff*. The notation includes a series of notes with accents and slurs.

22

*mf* *pp* *mf*

Musical notation for measure 22, featuring a treble clef, a key signature of one flat, and dynamic markings of *mf*, *pp*, and *mf*. The notation includes a series of notes with accents and slurs.

Diagram illustrating the placement of measures 19, 20, 21, and 22 on a piano keyboard. The keyboard is represented by a horizontal bar with circles for keys and triangles for markers. Dashed arrows point from the measure numbers to the corresponding markers on the keyboard.

23

niente → *pp* → *pp* → niente

Musical notation for measure 23, featuring a treble clef staff with a melodic line and a piano staff with a dense texture of notes.

25

voice

Musical notation for measure 25, including voice and piano staves with dynamic markings (*ppp*, *f*, *mf*) and a piano staff with a dense texture of notes.

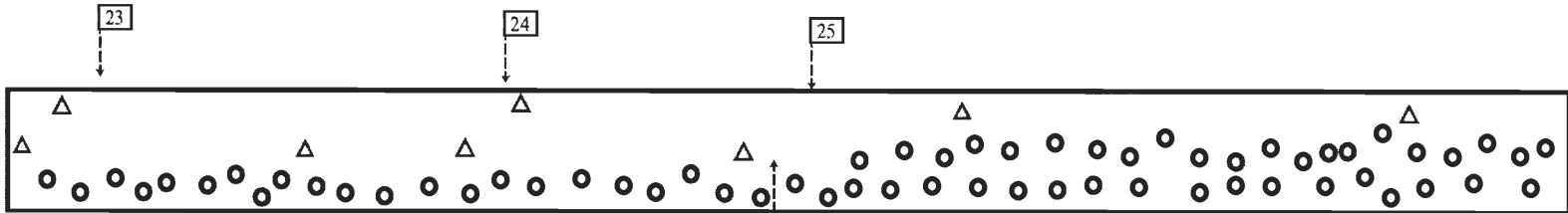
Hands:

*ppp* → *f* → *ppp*

24

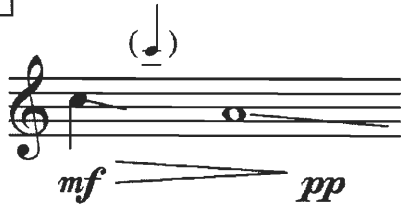
Air: niente → *pp* → niente

Musical notation for measure 24, featuring a treble clef staff with a melodic line and a piano staff with a dense texture of notes.

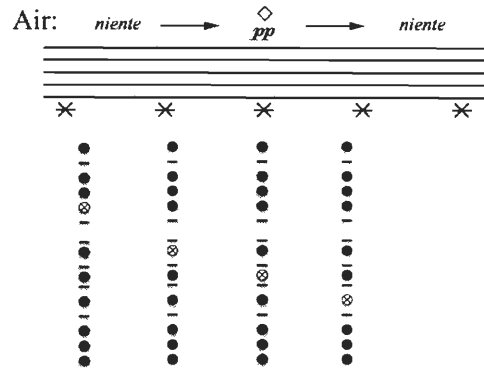


B) (Over water) 2 → 4

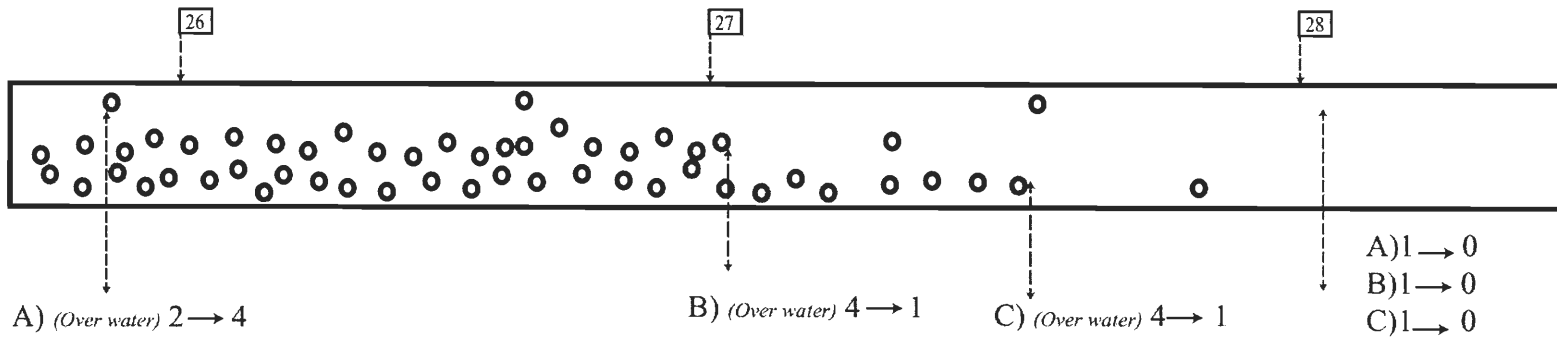
26



27



28



# SUSURROS

Valeria Jonard

♩ = 60

Piano

*mp*

Release key



Susurros

The first system of musical notation consists of two staves. The upper staff is in treble clef and contains a series of chords, some with 'x' marks above them, and a triplet of eighth notes. The lower staff is in bass clef and contains a melodic line with a fermata. Dynamics include *f* and *f*.

The second system of musical notation consists of two staves. The upper staff is in bass clef and contains a melodic line with a triplet and a fermata. The lower staff is in bass clef and contains a melodic line with a fermata. Dynamics include *mp* and the instruction *bouncing*.

The third system of musical notation consists of two staves. The upper staff is in bass clef and contains a melodic line with a triplet and a fermata. The lower staff is in bass clef and contains a melodic line with a fermata. Dynamics include *fp* and *fp*.

The fourth system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with a triplet and a fermata. The lower staff is in bass clef and contains a melodic line with a fermata. Dynamics include *fp* and *f p*.

Pressing the key silently

Susurros

The first system of music features a treble clef staff with a key signature of one sharp (F#) and a common time signature. The right hand plays a series of sixteenth-note chords, starting with a *ppp* dynamic. The left hand provides a sparse accompaniment with long, sustained notes and rests. A second *ppp* dynamic marking is present in the right hand.

The second system continues the piece. The right hand has a *f* dynamic marking followed by a *pp* marking. A *>* accent is placed over a note. The left hand continues with sustained notes and rests.

The third system shows a *f* dynamic in the right hand, followed by *fp* and *fp* markings. A triplet of eighth notes is indicated with a '3' above the notes. The left hand has sustained notes and rests.

The fourth system features a *f* dynamic in the right hand, followed by another *f* marking. A triplet of eighth notes is indicated with a '3' above the notes. The left hand has sustained notes and rests. A '3' is written below the final measure of the system.

Susurros

The first system of musical notation consists of two staves. The upper staff is in treble clef and begins with a dynamic marking of *f*. It contains a melodic line with several notes, some marked with an 'x', and a triplet of notes marked with a '3'. The lower staff is in bass clef and features a more complex accompaniment with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. A dashed vertical line is positioned between the two staves, approximately one-third of the way across the system.

The second system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. The lower staff is in bass clef and features a complex accompaniment with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. A dashed vertical line is positioned between the two staves, approximately one-third of the way across the system.

The third system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. The lower staff is in bass clef and features a complex accompaniment with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. A dashed vertical line is positioned between the two staves, approximately one-third of the way across the system.

The fourth system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. The lower staff is in bass clef and features a complex accompaniment with many notes, some marked with an 'x', and a triplet of notes marked with a '3'. A dashed vertical line is positioned between the two staves, approximately one-third of the way across the system.

Susurros

*ff*

*pp*

5 sec

4 sec      3 sec      5 sec

*f*      *rit.*

8 sec

Susurros

*mf*

The first system of the musical score begins with a piano introduction of 8 seconds, enclosed in a box. This is followed by a section titled "Susurros" in a mezzo-forte (*mf*) dynamic. The score is written for piano, with a treble and bass clef. The right hand features a melodic line with a slur and a fermata, while the left hand provides a harmonic accompaniment with slurs and ties.

*mp* *mf* *mp*

The second system continues the musical piece, featuring dynamics of mezzo-piano (*mp*) and mezzo-forte (*mf*). The right hand has a melodic line with slurs and ties, and the left hand has a harmonic accompaniment with slurs and ties.

*mf* *mp* *mf*

3

The third system of the musical score includes a triplet of eighth notes in the bass clef, marked with the number "3". The dynamics are mezzo-forte (*mf*) and mezzo-piano (*mp*). The right hand has a melodic line with slurs and ties, and the left hand has a harmonic accompaniment with slurs and ties.

*mf* *mf*

The fourth system of the musical score features mezzo-forte (*mf*) dynamics. The right hand has a melodic line with slurs and ties, and the left hand has a harmonic accompaniment with slurs and ties.

Susurros

The first system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with various dynamics: *mf*, *p*, and *mf*. The lower staff is in bass clef and contains a bass line with a dynamic of *mf*. A fermata is placed above the first measure of the upper staff.

The second system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with a dynamic of *mp*. The lower staff is in bass clef and contains a bass line with a dynamic of *mp*.

The third system of musical notation consists of two staves. The upper staff is in treble clef and contains a melodic line with dynamics of *p* and *f*. The lower staff is in bass clef and contains a bass line with dynamics of *p* and *f*. The system concludes with a double bar line and a repeat sign.

# THE BROKEN HARP

## Patch Map

For performing this piece, the patch can be run as an application or as a normal Max/msp file. Once the patch is open, all information necessary for the performance is featured in the *presentation mode* of the patch. All you have to do is press “Start.” The space bar or the arrows keys serve to move the cues forward.

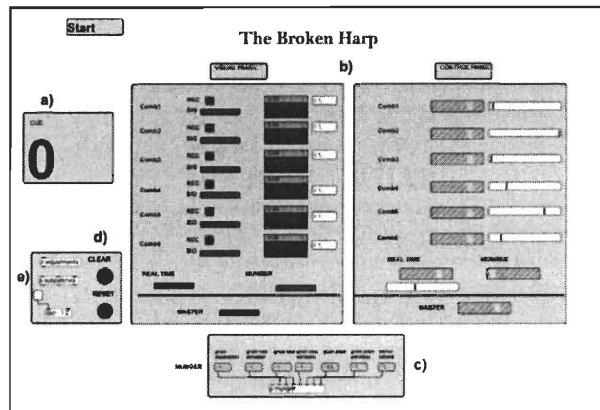


Figure 1. Main patch for *The Broken Harp* (Patching mode)

The patch in *patching mode* does not differ significantly from the patch in *presentation mode*. The main difference is that you have access all aspects of the program when you are working in patching mode; in presentation mode you only have access to features necessities during a performance. The elements on the main patch (*figure 1*) are:

a) *Cue*: Indicates the current cue. The cues move forward by pressing the space bar, or the arrows. Each cue triggers an action or a specific interactive state of the computer.

- b) *Visual and Control panel*: The *visual panel* is a visual guide for the performer to check if the samples are being recorded, as well as the status of the audio signal. In the *control panel* you can manipulate the volume and the panning. Since the parametric changes facilitated by this patch are automated, the *control panel* is to be used only if necessary.
- c) *Munger Parameters*: you can manually change the parameters for the granulator. It is automated as well.
- d) *Clear and Reset Buttons*: Clear button erases recorded samples and some data. Reset button erases and restarts the counter.
- e) *Patches menu*: provides access to principal subpatches such as the *adjustments* patch (basic microphone adjustments), and other *subpatches* (Figure 2.)

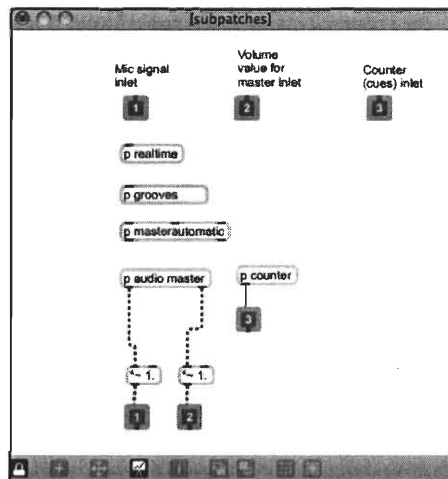


Figure 2. Access to principal patches for *The Broken Harp*.

In the interior of this patch there is quick access to the principal patches: “P realtime:” in this patch the signal from the microphone receives panning and gain information. The resultant signal is sent to “P audio master” patch. “P grooves:” Buffers, an object that stores recorded audio signals, and grooves, an object that plays recorded audio signals, are located here. It is organized in two



sections: "Layer 1" (samples from comb 1, 2 and 3) and" layer 2 "(samples from comb 4, 5, and 6).

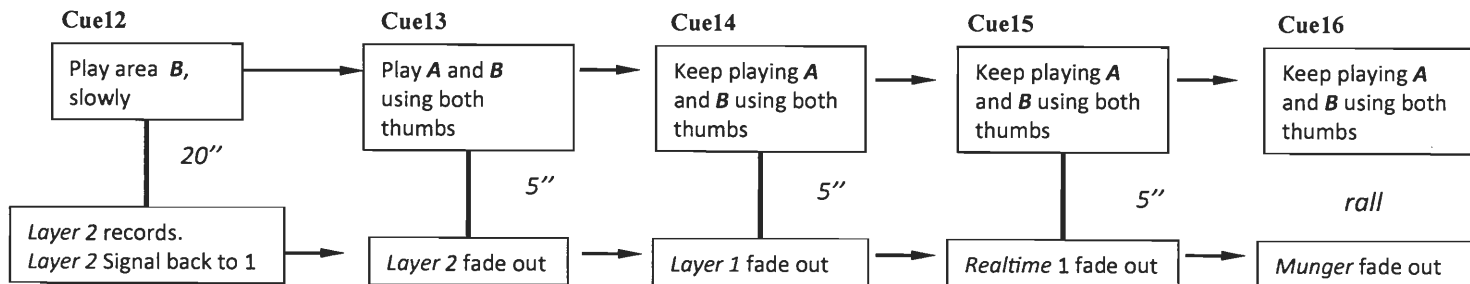
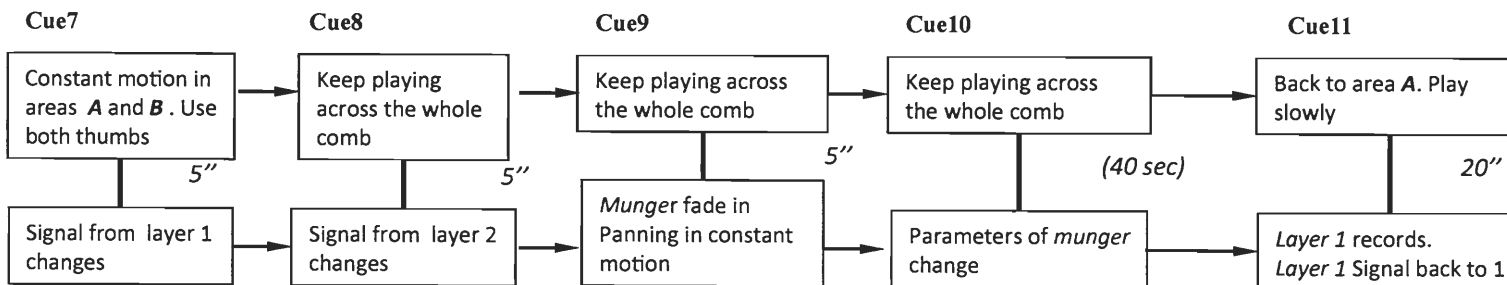
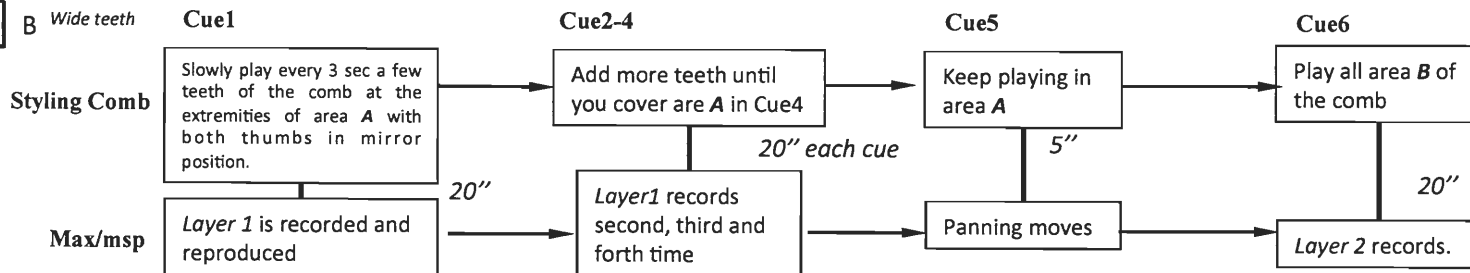
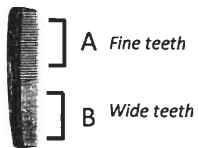
"P masterautomatic": All automation information for each cue are situated here. It is organized in sixteen steps or cues. A main counter triggers each cue.

"P audio master: " The audio from all buffers (layer 1 and 2) and real time mic is received here and sent to a single digital audio convert, which is a device that outputs the audio from Max/MSP.

"P counter:" Triggers the cues. Cue 0 resets all parameters.

# THE BROKEN HARP

Valeria Jonard



# SPEAKING HEARTS

## Patch Map

The individual-installation version of *Speaking Hearts* consists in a sort of interactive visual interface. The sound of a person's heartbeat is transformed by clicking over the different parts of the image of the heart (see *figure 3*). The interface is built in a Max/MSP patch, which works similar to the *Broken Harp's* patch in the sense that density varies by overlapping layers of samples recorded from the live heartbeat.

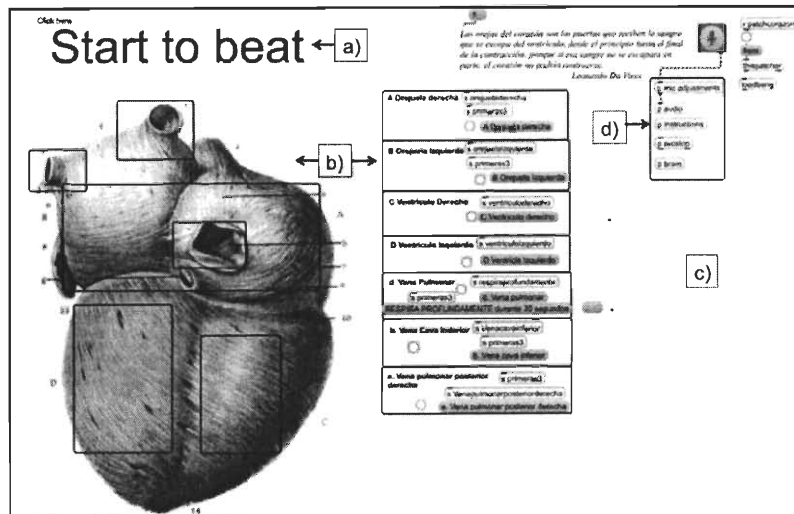


Figure 3. Main patch for *Speaking Hearts* (patching mode)

The elements on the main patch (patching mode) are:

- a) "Start to beat." Turns on the audio and begins recording samples of the heart.
- b) "Heart Section Selector." When one clicks on the image, a message is sent to a sub-patch and triggers a specific action.

c) The names of the parts of the heart are received here and shown in the screen in presentation mode.

d) Main Patches Menu. Quick access to principal patches:

“Instructions:” This patch contains indications for the participant about how to place the stethoscope on their body and how to interact with the patch. This window will pop up automatically when the participant has finished the interaction

“Audio:” The three buffers and grooves are located here. Each one has an assigned name: Heart1, Heart2, and Heart3.

“P Recstop:” This patch is in charge of sending the “on” signal to the audio and recording buffers. It also changes the message on the “start to beat” button.

“P Brain:” This patch is responsible for all the automation. It contains 8 sub-patches; seven of them correspond to an individual part of the heart. The eighth corresponds to the two first clicks in any part of the heart when starting to interact with the patch. In the interior of each sub-patch there is an internal counter between one and four steps that triggers different actions.

Brain Patch:

“P one and two:” The first two clicks done anywhere but “Ventrículo Izquierdo” and “Ventrículo Derecho.”

1. - Fade in of “Heart1.”
2. - Changes signal for “Heart1”

“P Orejuela derecha:”

1. - Changes panning for “Heart1” and 2

“P Orejuela Izquierda:”

1. - Changes panning for “Heart1” and 3

“P Ventrículo Derecho:”

1. - “Heart2” fades in.
2. - Accelerates signal from “Heart2.” Signal from “Heart1 and 3” goes from 4 to 1.
3. - “Heart2” fades out

“P Ventrículo Izquierdo:”

1. - "Heart3" fades in.
2. - Accelerates signal from "Heart3." Signal from "Heart2 and 1" goes from 4 to 1.
3. - "Heart3" fades out.

"P Vena Cava Inferior:"

1. - Accelerates all signals.
2. - Shapes a short duration beat by creating an envolvent

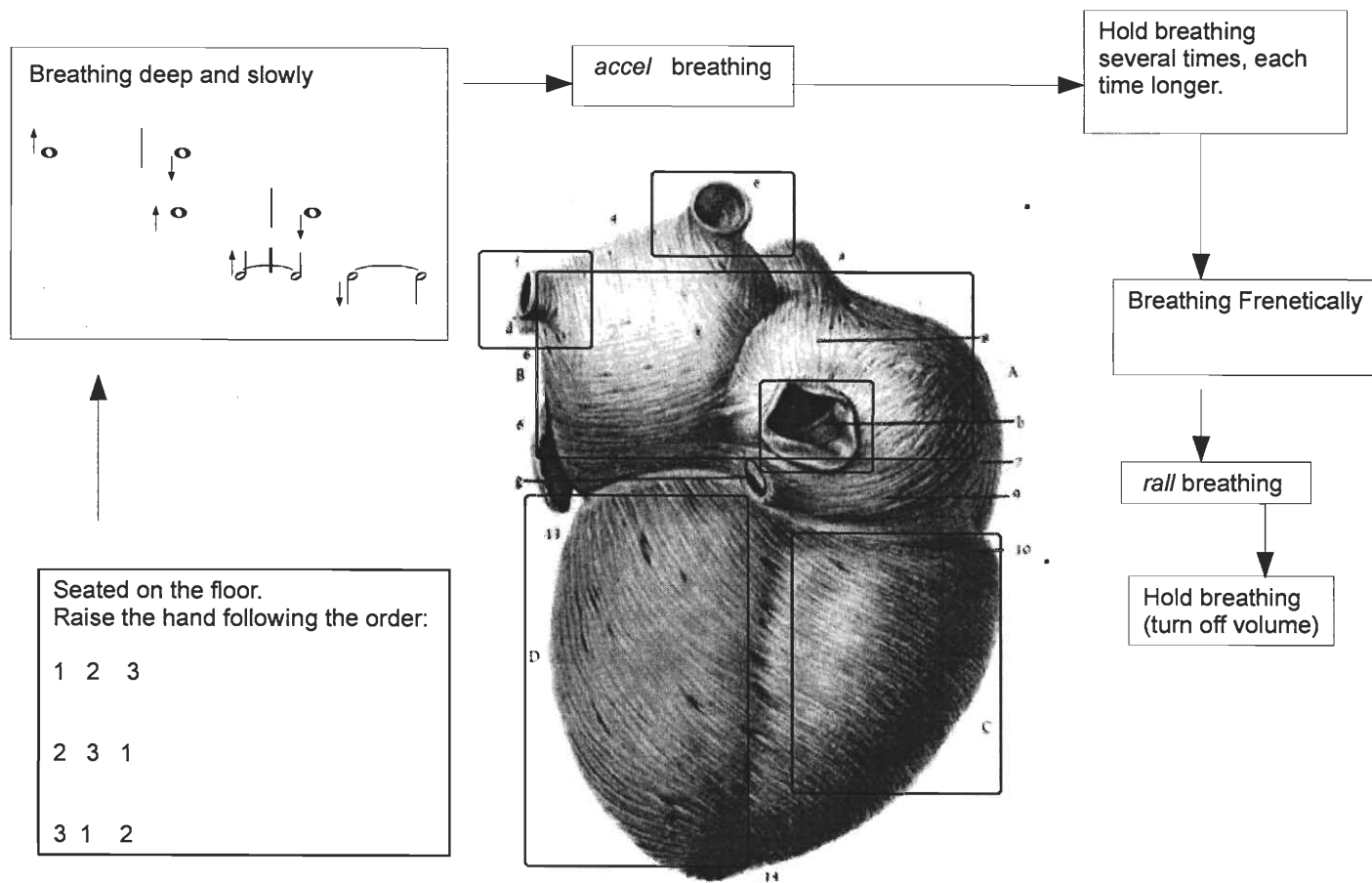
"P Vena pulmonar posterior derecha:"

1. - Slows down all Hearts

"P Vena pulmonary anterior Izquierda:"

1. -Records again, demanding a deep breathing.

# SPEAKING HEARTS (stage version)



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