E
Appendix E: Design of a Tactile Semantics

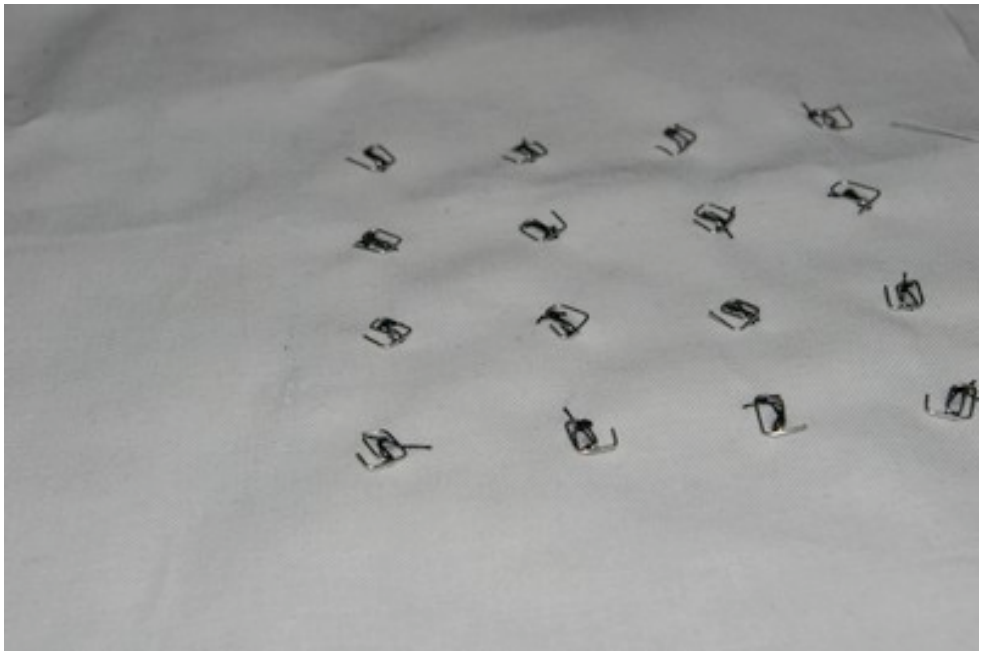


Figure II-6. soft(n) design process can be found at www.sfu.ca/~tschipho/html/artDesign.html

Appendix E outlines design development for tactile interaction as it was developed in soft(n). This research was developed with the V2_Lab in Rotterdam from 2005 – 2007.

- ***soft(n) interaction model:*** illustrates the interaction model used within the soft(n) networked installation.
- ***Use of Laban Effort/Shape in Data Recognition:*** The use of Laban's Effort Shape analysis in tactile gesture recognition of a multi-touch surface.
- ***move.me Interaction Model:*** describes the behaviours and interactions of the soft(n) installation.
- ***The Journey of a Token:*** The token ring is a network comprised of a complete logical 'circle'. A unique 'message' (light, sound, vibration) called the 'token' is passed through the ring from node (object) to note (object). The token identifies where the data is 'expressed' and who can modify the data at any

particular time. It is just ONE of a number of networked communication architectures that can be used in the system to support emergent participant behaviour.

- ***The Journey of a Thrown Object:*** This is an example of self-2-others implemented using a "broadcast" network communication mode. We could also call this "broadcast empathy" for the "thrown" path of another "soft-object".
- ***Data Flow:*** design sketch of data flow process.
- ***Self to Self Touch Response:*** state transition diagram for initial touch interaction between participant and soft object.
- ***Self to Self Sleep Call Touch Response:*** state transition diagram for sleep state.
- ***Token Ring Response State:*** state transition diagram for token ring response.
- ***Thrown Object:*** state transition diagram for object movement with accelerometer data.
- ***Resonance States:*** state transition diagram for group membership.
- ***Interaction Modes and States:*** design process discussion of modes and states.
- ***move.me Sensor Evaluation and Laban Analysis:*** a description of some of the Python structures and functions used for gesture recognition.
- ***soft(n) workshop response card:*** the design of the workshop response card enabled workshop participants to give a hand-written account of their experience.
- ***soft(n) workshop response cards:*** the hand-written response of the participants for the workshop.
- ***soft(n) workshop transcription February 1 2007:*** participant observation.

soft(n) interaction model

This technical document contains the functional specification for the software development team. It describes the interaction model for a group of networked soft-objects, and includes definitions for the software data-model (object and object hierarchy, definition for the object interaction states (active, inactive, and interactive), and definition of the interaction modes that can elicit these interaction states (self-to-self, self-to-group, and group-to-self). It shows examples of the Life-Cycle of the Object as it moves from inactive, to active or interactive.

Object Hierarchy

In order to implement a simple and effective Multi-Object Interaction Scheme, we define a hierarchy of objects, starting with the Soft-Object itself, and a set of interactions between these objects on various levels of the hierarchy. The hierarchy is a simple tree-hierarchy of nodes and parents.

Objects

The starting point for our Object Hierarchy is, of course, the physical soft object itself. Formally we'll refer to the interactive object as a Soft Object.

Soft Object
: A soft object to which input can occur, and from which output can occur. The Soft Objects are nodes in a Group.

Group
: A Group is two or more Soft Objects. A Group is the parent of its Soft Object nodes. The Groups are nodes of the Room.

Room
: A room contains one or more Groups, a central visual display and a central sound system. The Room is the parent of its Group nodes.

Object States

Each of these Objects defined above can be in one of three states:

inactive
: An inactive Object is neither receiving any input, nor producing any output.

active
: An active Object is not receiving any input, but is producing output.

interactive
: An interactive Object is receiving input and producing output.

A **Group** becomes active as soon as one of its nodes becomes active, and becomes interactive as soon as one of its nodes becomes interactive. The **Room** becomes active as soon as one of the Groups becomes active, and becomes interactive as soon as one of the Groups becomes interactive.

Interactions

Each of the Objects may interact with itself or the containing (i.e. higher-level) Object. Given the three levels of objects, we can distinguish the following interactions:

self-to-self
Interaction within the Object itself. This 'mode' only exists at the bottom level, for the Soft Objects. In essence it is a mapping from the received inputs to the objects outputs.

self-to-group
The *interactive* members of a Group communicate their received input to the Group. The Group derives its internal input-state from the total of inputs of its *interactive* members. This is the 'node-to-parent' interaction.

group-to-self
The Group's output is distributed across its *active* members. Some portion of the Group's output is also distributed to its *interactive* members. The percentage of the Group's output distributed to the *interactive* members is inversely proportional to the number of members (*active* or *interactive*) in the Group. This is the 'parent-to-node' interaction.

active Soft Object output	= Group output
interactive Soft Object output	= Own output + (Group output / number of members)

group-to-room
The *interactive* Groups in the Room communicate their internal input-state to the Room. The Room derives its internal input-state from the total of inputs of its *interactive* Groups. This is again the 'node-to-parent' interaction.

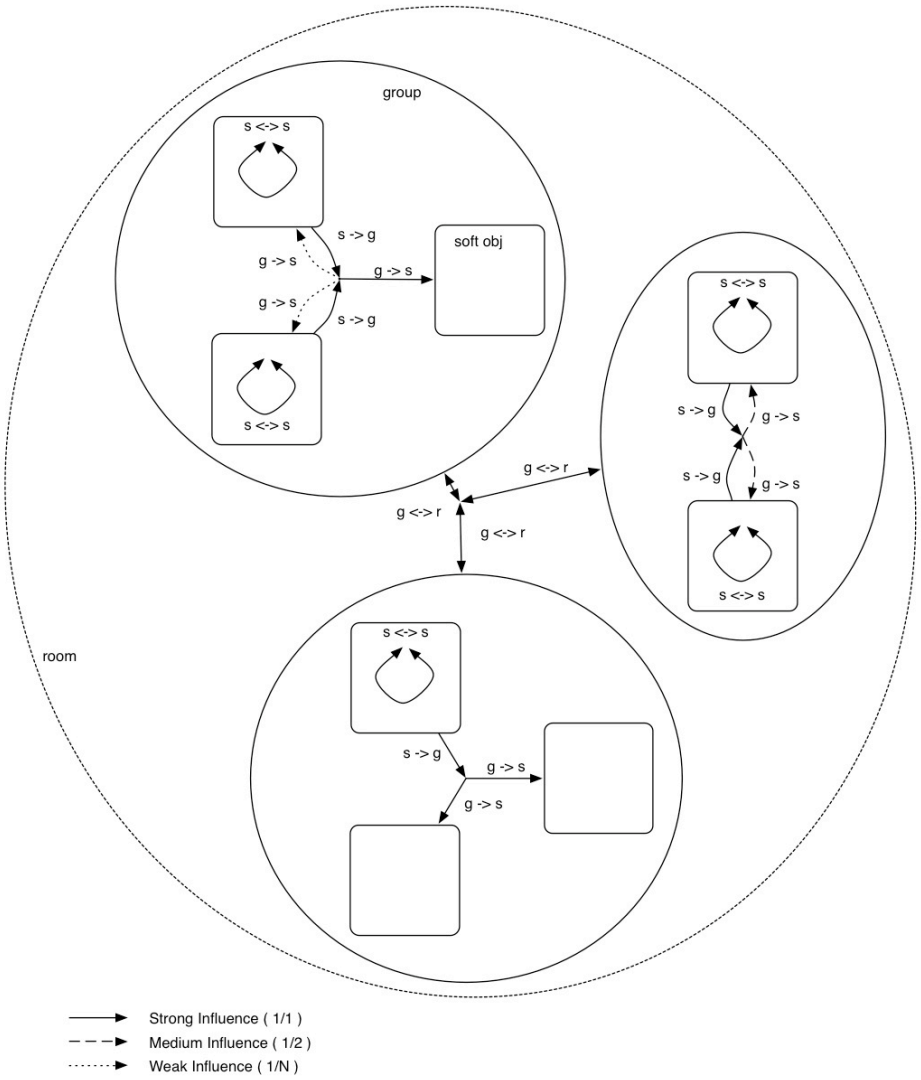
room-to-group
The Room's output is distributed across its *active* Groups. Some portion of the Room's output is also distributed to its *interactive* Groups. The percentage of the Room's output distributed to the *interactive* members is inversely proportional with the number of Groups (*active* or *interactive*) in the Room. This is again the 'parent-to-node' interaction.

active Group output	= Room output
interactive Group output	= Own output + (Room output / number of Groups)

NOTE
The 'self-to-other' and 'other-to-self' interactions are special cases of the 'self-to-group' and 'group-to-self' interactions respectively, when the Group has only two Soft Objects.

Interaction Diagram

This is a diagram showing an example situation where there are eight Soft Objects in three Groups in a Room.



One Group contains three Soft Objects; one active and two interactive. The second Group has two interactive members, and the third Group has one interactive and two active members.

Group Formation

Groups are used as an abstraction to simplify the interaction possibilities of several elements. [The relevance of groups is still not very clear.]

A **group** is a collection of elements that share one or more proprieties and/or interact with one another. There are two main kinds of group formation: **static** and **dynamic**.

The elements of a **static group** are defined *a priori* and remained unchanged.

The inclusion (or exclusion) of an element in a **dynamic group** is defined based on the element proprieties, following *a priori* rules. Since such proprieties are bound to change, the group formation will change accordingly.

The formation of a group is, so far, based on *a priori* top-down rules. Top-down rules are not in conformance with emergence or self-organization theories.

Question: Should we allow the creation of Groups with only one Soft Object?

In Group Theory context, a group must contain at least one element, with the unique (up to isomorphism) single-element group known as the trivial group. In the installation context, a trivial group represents one soft object that does not interact with other soft objects.

Dynamic group formation

One obvious and simple criterion for forming Groups is proximity. This could be proximity in space or proximity in time.

Proximity in Space

This means that Soft Objects that are 'close together' in space will form Groups. There are many ways to divide a collection of points in space into groups or sets, like the Voronoi Division, for example. An additional consideration for the spatial formation of Groups is that non-interactive Groups (i.e. Groups with no interactive members) are 'boring' (from an interaction perspective) because such Groups only function as grouped output-devices for the Room. Therefore it is desirable to distribute the available *interactive* Soft Objects into as many Groups as possible. The Group-distribution of the Soft Objects should be recalculated every time a Soft Object moves in space, or changes state from *active* to *interactive* or back.

Proximity in Time

This could also be called 'Synchronicity'. When multiple Soft Objects receive similar inputs within the same timeframe, they form a Group. This scheme has two serious drawbacks compared to the Spatial Proximity scheme:

- The Groups will be short-lived, because as soon as one Soft Object goes out of sync with the others in its Group, it leaves the Group.
- Only *interactive* Soft Objects will be Grouped, because a Soft Object without input cannot be classified.

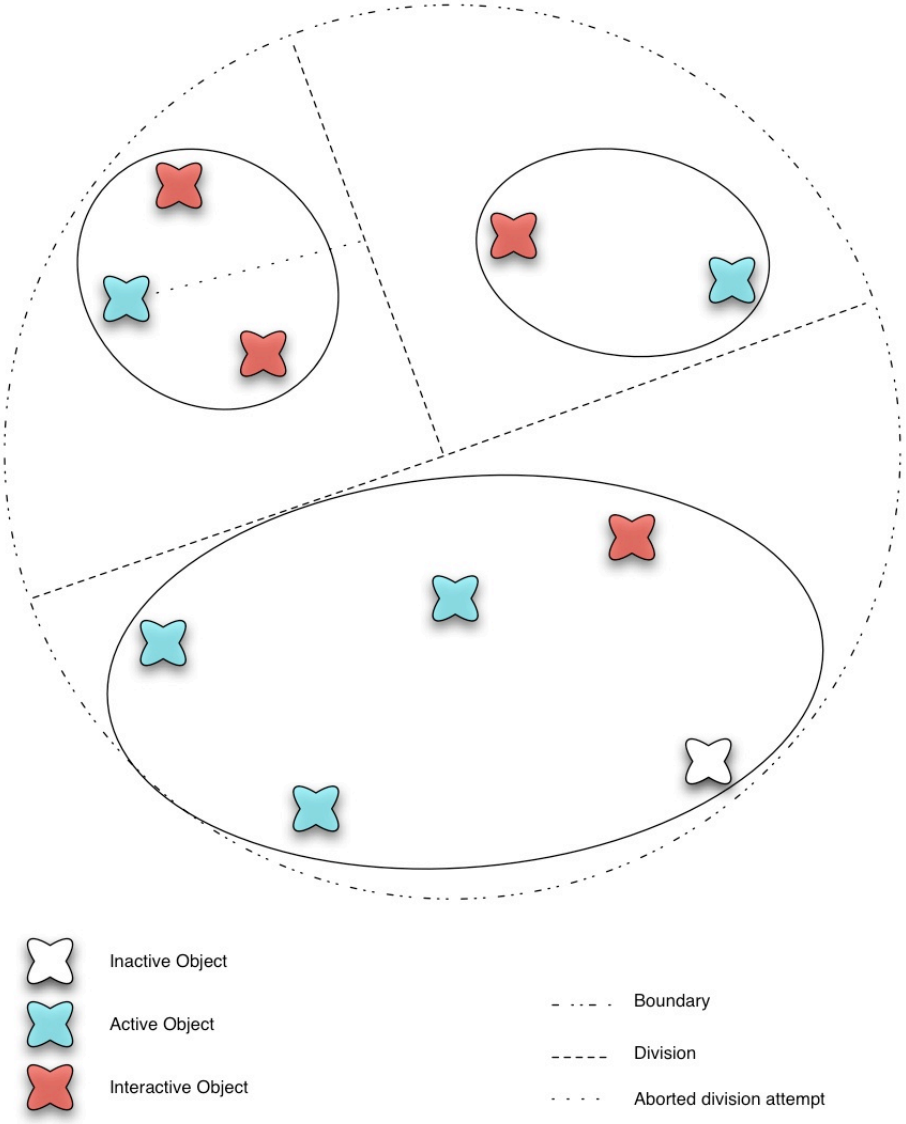
It is certainly simpler, and probably more 'obvious'' (from an interaction perspective) to implement Grouping in Space. For this we would have to implement a location-tracking system that can determine the position of the Soft Objects with respect to each other. Since we are only interested in the relative cartographic (i.e. 2D) positions of the Soft Objects, this system would **not** have to be very accurate, nor very fast.

Position Tracking

We propose to implement simple a camera-based tracking-system using one IR-sensitive web cam looking straight down from above, and IR-LEDs in the Soft Objects. The Tracking-server synchronizes clocks with the Soft Objects and allocates time-slots. Each Soft Object will only light up its IR-LEDs during its appointed time-slot. This should allow localization of each Soft Object in a 2D coordinate system (i.e. the web cam's coordinates), and a new Grouping can be calculated after each full cycle of time-slots.

Group Formation Example

An example algorithm for collecting Soft Objects into groups could work like this:



1. Find the center-of-gravity (COG) of all *interactive* Soft Objects
2. Draw a circle at COG with a radius that encompasses *all* Soft Objects. This is the Boundary.
3. Divide this circle in two with a line through the COG such that:
    - The line does not cross any Soft Object
    - A **minimum number** of *interactive* Soft Objects lies to one side of the line
4. Calculate the COG of the remaining *interactive* Soft Objects on the **maximum number** side of the line.
5. Draw a new line from the previous COG, through the new COG to the Boundary.
6. Repeat from step 4 as long as:
    - The new line does not cross any Soft Object
    - More than one (or at least one?) Soft Object lies on either side of the new line.

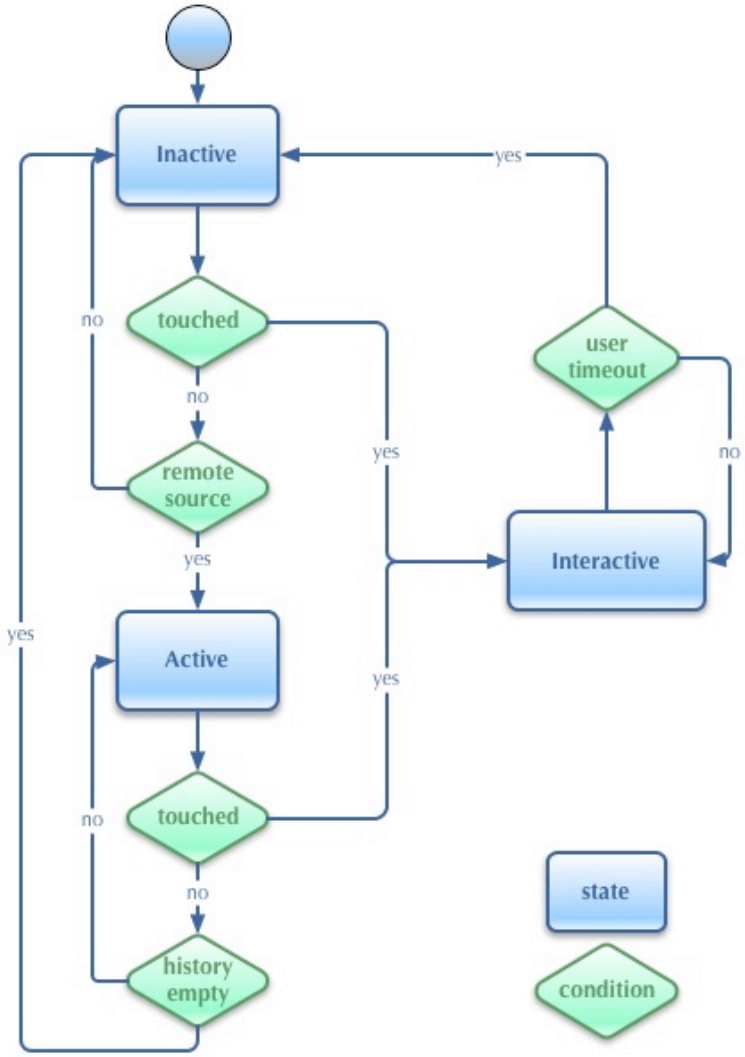
The clusters of Soft Objects divided by the lines (except the last, aborted, division-line) are the Groups.

Soft-Object life cycle

Master/Slave soft-object relation

Master soft-objects broadcast information and slave soft-objects listen to broadcast information.

- An **interactive** soft-object becomes immediately a potential master soft-object.
- An **inactive** soft-object looks for a potential master soft-object. An inactive soft-object receives a list with potential masters; if the list is not empty the inactive soft-object randomly chooses one master and becomes an active soft-object.
- An **active** soft-object listens to the information broadcasted by its master and becomes available as a master soft-object.



Use of Laban Effort / Shape in Data Recognition

"For a phenomenon to be termed emergent it should generally unpredictable from a lower level description" wikipedia

The following table makes an attempt at connecting the "Original Laban Effort Qualities" to the ways that they can be used with both the accelerometer sensors, and the way that they have been used with the touch-effort heuristics implemented in our previous systems.

- Column A lists the original 8 basic Laban Efforts: Float, Glide, Wring, Flick, Punch, Slash, Dab, Press. When there are pairs listed, this is simply because we were able to distinguish additional data from touch, and so created some refinements of qualities.
- Column B lists Efforts that would be relatively easy to implement with accelerometer data.
- Column C lists the touch-efforts that we implemented

Note the following:

1. With the Touch-Efforts we had 2 "unassigned" Laban Efforts: float and slash. These are listed in the table first.
    a. It is not possible/easy to represent "FLOAT" in touch data, but it should be fairly easy to represent "FLOAT" with accelerometer data.
    b. We did not represent Slash in touch data.
2. The Descriptions in C describe how the touch qualities operated. Please note, any mention of the 'hand' is simply historical. Originally we were working with a Tactex MTC Express, a hard graphics tablet. Most people used their hand with it. There is –no- reason that touch cannot be implemented with any body part, including sitting on, standing on, etc, or with another soft object that comes into physical contact with the touch pad.

A	B	C	
Laban Effort	Accelerometer Effort	Touch-Effort Description (these have been implemented using touch heuristics)	
Float	Float		An Object "floating" in space (approaching zero acceleration)
Slash	Slash		
Dab	Dab	Tap	A soft, short, small touch usually rendered with a single finger
Dab		Pat	A bigger version of 'tap', and a soft version of 'slap. Usually rendered with open hand or palm, or with larger area of other body part
Dab + Press		Hold	A lingering, soft, big, touch. 'hold' has an encompassing feel.
Dab + Press		Touch	'touch' is a small version of hold. It is an indication of comfort and is rendered with the fingers, hand or palm.
Glide+ Press		Stroke	A traveling touch, soft but directional, rendered with fingers, hand or palm.
Glide	Glide	Glide	A traveling meandering touch. Soft and directionless, rendered with the fingers, hand or palm
Flick	Flick	Jab/Poke/ Flick	A hard, short, small, touch. A hard poke by a finger of blunted object. Also known as a 'poke'.
Punch		Knock	A medium size, fist against, rapping hard, In our scheme it is different than "jab" and "slap" in size only.
Punch	Punch (landing from fall for eg.)	Slap/ punch	An open-handed, hard, short, touch. In our scheme, a large version of "jab" and "knock"
Press	Press	Press	This is a long, hard, touch.
Press		Rub	This is a moving, hard, touch.
Wring	Wring	Knead	Kneading involves many fingers moving in a slightly wandering fashion.

The following table shows how the touch efforts in the previous table were recognized from data parameters/attributes.

	Parameter				Modifier		
touch-effort	pressure intensity	time duration	size area	number	space (speed)	path (direction)	disposition (pressure)
tap	soft	short	small	ø	stationary	n/a	n/a
pat	soft	short	big	one	stationary	n/a	n/a
touch	soft	long	small	one	stationary	n/a	n/a
stroke	soft	long	ø	ø	traveling	straight	ø
glide	soft	long	ø	ø	traveling	wandering	ø
hold	soft	long	big	one	stationary	n/a	constant
poke/jab/flick	hard	short	small	one	stationary	n/a	n/a
knock	hard	short	medium	one	stationary	n/a	n/a
slap/punch	hard	short	big	one	stationary	n/a	n/a
press	hard	long	ø	ø	stationary	n/a	constant
knead	hard	long	ø	many	ø	ø	varying

The next table shows the original Laban Efforts on which the heuristics are based.

ORIGINAL LABAN EFFORTS: Divided into two main categories:

INDULGING (synonyms are passive or receptive)	**FIGHTING** (synonyms are active or emissive)
FLOAT – all indulgent elements: Indirect Space Light Weight Sustained Time	**PUNCH – all 'fighting' elements** Direct Space Strong Weight Sudden Time
*modifications	
GLIDE – Direct Space (Fighting)* Light Weight Sustained Time	**SLASH –** Indirect Space (Indulging)* Strong Weight Sudden Time
WRING – Indirect Space Strong Weight (Fighting)* Sustained Time	**DAB –** Direct Space Light Weight (Indulging)* Sudden Time
FLICK – Indirect Space Light Weight Sudden Time (Fighting)*	**PRESS –** Direct Space Strong Weight Sustained Time (Indulging)*

move.me Interaction Model

A pillow is a networked tangible object that 'channels' the human/body behaviour of the participants in the space. The system expresses emergent 'pillow behavior' only, but pillow behaviour requires input from bodies in the space.

Goal of Interaction Model

- Emergent behaviour of the system (which is the pillows + the participants)
- The pillows act as a conduit and it also transforms the system
- We need to allow for behaviours that are unexpected
- People explore what system does and adjust their physical behaviour to accentuate or explore/play with what they enjoy within it

System parts:

- Pillow (actuates output from input data)
- Participant (provides input and responds to output)
- Definitions of groups (defined by pillow states or proximity)
    - The pillows + participants are defined as a group by 'having' similar states. A state is the result of a set of inputs that determines a movement 'quality'. There may be other ways to define groups such as proximity etc.
- Behaviours of system
    - Isolated pillow behaviors (define the pillow state)
    - group pillow behaviors (define the group state)
    - participant behaviors (trigger state transitions)

What data is shared?

- Output data pattern is a 'representation' of effort qualities
    - Light
    - Sound
    - Vibration

Communication I/O Modes –:: Local or Remote

Input can be received:

- Locally (hand/body on or moving the pillow)
- Remotely (data pattern is passed from another pillow)

Output can be actuated:

- locally (on the same pillow where input is received)
- remotely (on a different pillow that receives input)

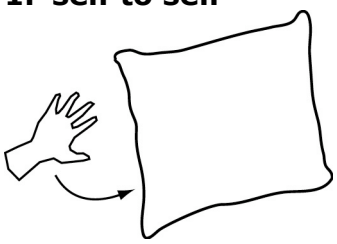
Computation can:

- occur locally (on the same pillow where input is received or actuation is performed)
- be distributed remotely (for example: in order to ask group questions, or make group decisions, or perform group actions e.g., all group members turn all the red LEDs on)
- occur locally as well remotely (vote) asking for consensus on something?

Interaction Modes

There are four primary interaction modes:

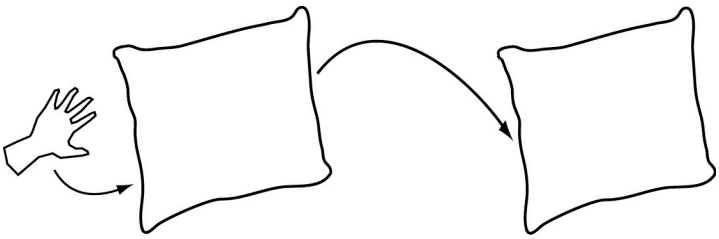
1. **self to self**



- self(hand) to self(pillow)
- local input; local output

- Interaction Metaphors include < secret; covert; mute; alone; private; journal entry; inner; nobody's business >

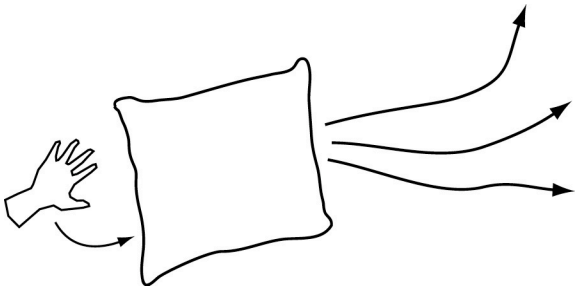
2. **self to other**



- self(hand) to other(pillow)
- local input; remote output

- Interaction Metaphors include <whisper; proximal; couple; pair; friend; buddy; need proximity or identity to pair pillows/bodies; half or full duplex connection>

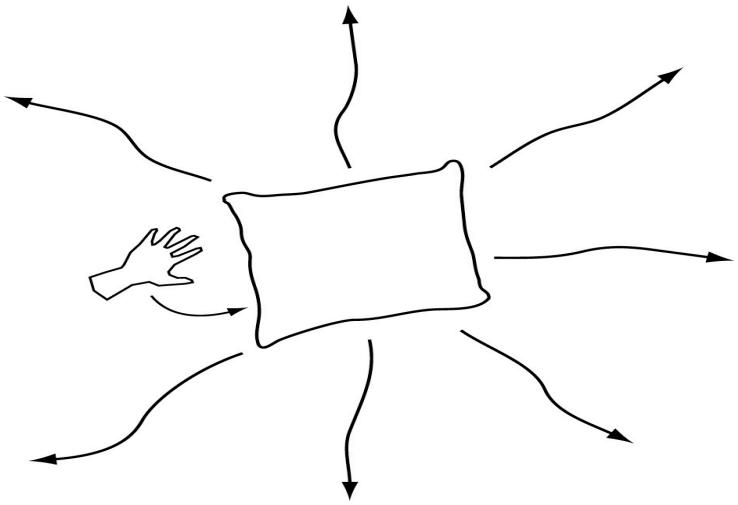
3. self to group



- self(hand) to group(pillows)
- local input; remote output

- Interaction Metaphors include <speak out loud; share; friend; circle; club; send to list; need to identify recipient's group membership, a group could be defined by similar pattern or by physical proximity>

4. self to all



- self(hand) to all(system: all pillows)
- local input; remote output

- Interaction Metaphors include <broadcasting; singing; spam; performing (playing); yelling>

Summary of Interaction Modes

Interaction Mode	i-mode expanded	I/O Mode	Some Possible Interaction Metaphors*
1. self to self	self(hand) to self(pillow)	local input: local output	secret; covert; mute; alone; private; journal entry; inner; nobody's business
2. self to other	self(hand) to other(pillow)	local input; remote output	whisper; proximal; couple; pair; friend; buddy; need proximity or identity to pair pillows/bodies; half or full duplex connection
3. self to group	self(hand) to group(of pillows)	local input; remote output	Speak out loud; share; friend; circle; club; send to list; need to identify recipient's group membership, a group could be defined by similar pattern or by physical proximity
4. self to all(system)	self(hand) to all(pillows)	local input; remote output	broadcasting; singing; spam; performing (playing); yelling;

- these interaction metaphors are listed to illustrate ***some*** ways that behaviors may be interpreted by participants and by the system. The advantages of identifying some of these metaphors are to illustrate possible relationships that may occur within the system. Disadvantages are that behaviors need to emerge from the system itself, not in a top-down definitional way.

Mirror Interaction Modes

This is state dependent, how a pillow receives a message from another depends on its state

- other(pillow[s]) to self: (this is based on group definition)
    1. requested (expected: when you have a 1 to1 communication)
    2. solicited (you are part of a group, waiting for something)
    3. unsolicited (you are not expecting it)

How to define a Group? (some ways)

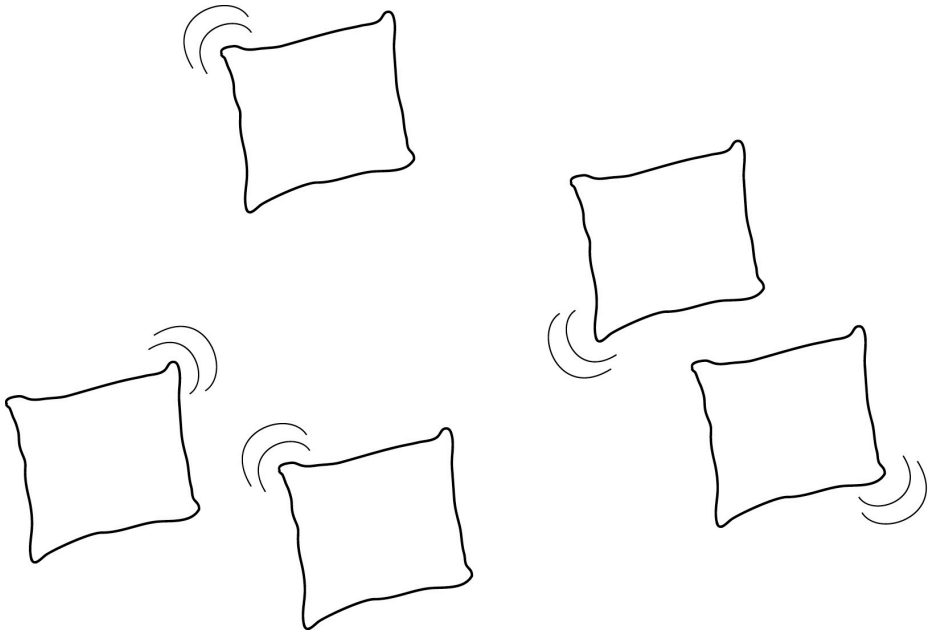
1. Detecting similar input patterns based on effort qualities or 'states'. (e.g., all "passive-listening" pillows are in a group: states are defined, but need to be tested for usefulness)
2. Detecting proximity or spatial location
3. Detecting RFID
    - Half duplex between 2 pillows
    - Full duplex between 2 + pillows

Group States/Behaviours

This section identifies some initial ways of defining group 'behaviors'. These are initial concepts for enabling 'emerging' behavior.

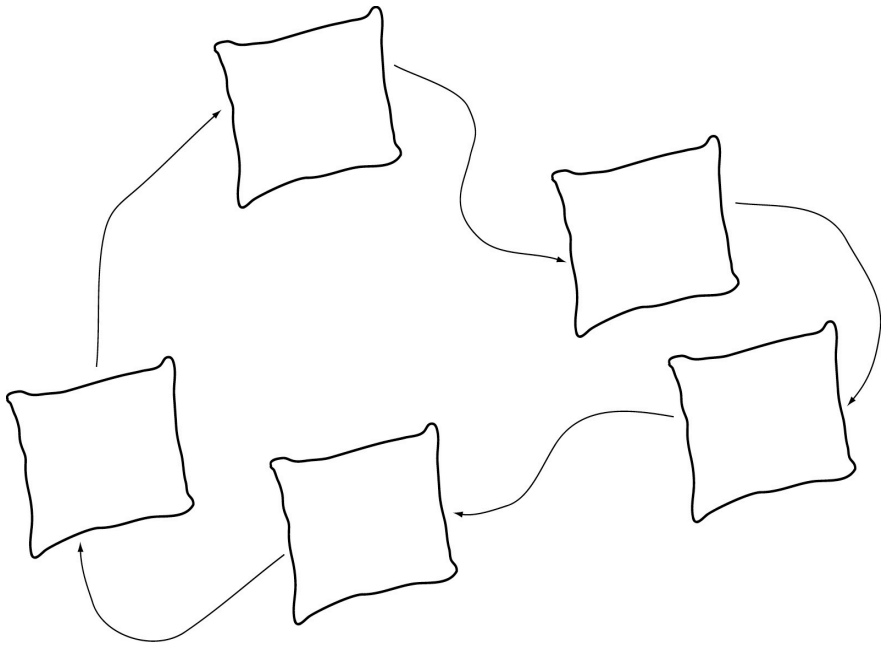
1. Resonance
2. Token passing
3. Broadcast

1. Resonance



- Similar shared patterns with 'resonant' variation or harmony
    - light
    - vibration
    - sound
- for example: all pillows vibrating, humming, shaking, 'laughing', 'singing' at once
  similar to the metaphor of everyone talking or laughing at once – there are random variations in rhythm, tone, or pattern, but they are 'of a similar' resonance

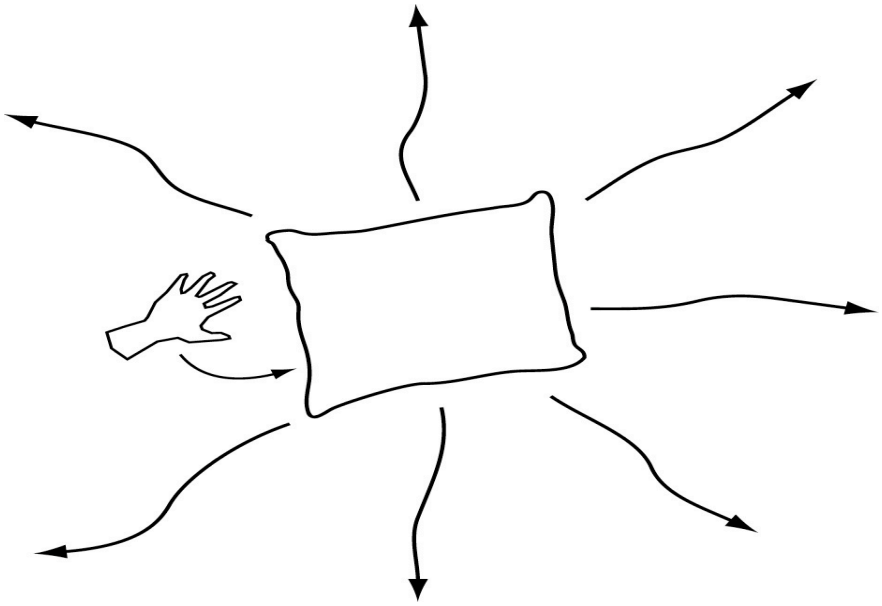
2. Token Passing



- Passing a pattern between pillows in a sequence
- The pattern passes from one pillow to and through another
- There is a timing sequence from pillow to pillow
- (this is like passing a peace pipe)
- Pattern passing can use light, sound, vibration
- The metaphor feels like a life force passing through the pillows)
- Variations on Token Passing:

    1. Light, sound, vibration can pass in 'unison' from pillow to pillow
    2. Light, sound, vibration can pass in 'canon' from pillow to pillow (same passing pattern, slight timing phase shift between light, sound and vibration)
    3. Other variations on phase shifting and direction
    4. Aggregation – the pattern is modified by each pillow in the token ring, either by extending the pattern or merging with the pattern
    5. Gating – the pattern is blocked by a pillow or 'bounced back'

3. Broadcast



This could be one or any of the following:

- pillow spam
- shared experience
- one pillow's state is broadcast to all other pillows
- for example: this could occur when a pillow is 'thrown' or let airborne, its apogee (maximum height or zero gravity-acceleration = 0) OR its "landing" (the moment of impact) is broadcast to all pillows (as sound and/or vibration and/or light pattern)

Some Additional Notes:

Polling (asking pillows question: what is your state?)

States

Laban Effort States – Active – Passive (in Effort terms: fighting/indulging)

The amount of information in input, changes a number of aspects of the state. Vector in the input or the transition from one state to another. States represent multiple values or have to be described with multiple values (multidimensional). And state is a collection of values describing a state, and input acts as a transformation of state (also called a node).

Vector has a direction of passing from one state to another state.

Possible communication mechanisms (use token, broadcast)

- Polling – asking everybody? (this does not make sense for Emergent Behavior)
- Token passing – (peace pipe passing, only 1 person speaks at once)
- Half duplex (take turns- walkie-talkies)
- Full duplex (simultaneous sending and receiving)
- Broadcast – telling everybody
    1. Broadcast with receipt – send to n people, don't do anything until you get n or n – some number (do you want majority response or all response) responses back. Example if pillows "applaud" something that happens with another pillow's input, that is broadcast with receipt
    2. Broadcast w/o receipt (like pillow spam)

Laban Effort States (Primer)

Efforts:

Weight (light <-> strong),
Space (indirect ←> direct),
Time (sustained ←> sudden)
Flow (free ←> bound).

Use the Laban Basic Action Drive:

Divided into two main categories:

INDULGING (synonyms are passive or receptive)	**FIGHTING (synonyms are active or emissive)**
FLOAT – all indulgent elements: Indirect Space Light Weight Sustained Time	**PUNCH –** all 'fighting' elements Direct Space Strong Weight Sudden Time
***modifications**	
GLIDE – Direct Space (Fighting)* Light Weight Sustained Time	**SLASH –** Indirect Space (Indulging)* Strong Weight Sudden Time
WRING – Indirect Space Strong Weight (Fighting)* Sustained Time	**DAB –** Direct Space Light Weight (Indulging)* Sudden Time
FLICK – Indirect Space Light Weight Sudden Time (Fighting)*	**PRESS –** Direct Space Strong Weight Sustained Time (Indulging)*

***** modifications indicates elements changed from most extreme contrast of 'float' 'punch', thus making all except Float and Punch mixtures of fighting and indulging qualities.

Combinations of Two Effort Qualities – these are listed as possibilities to render or 'represent' states. Some states may be easier to represent computationally than others. We can select from a simple set of representable states:

The four effort factors can be combined in two's (in six groups):

1. Space-time (AWAKE state)
2. Weight-time (NEAR RHYTHM state)
3. Weight-flow (DREAM state)
4. Space-flow (REMOTE state)
5. Flow-time (MOBILE state)
6. Space-weight (STABLE state)

NAME OF STATE	2 EFFORT Qualities	Names of Variations of Efforts
AWAKE	Space + Time	Indirect- sustained (slow) Direct – sustained (slow) Indirect – sudden (quick) Direct – sudden (quick)
RHYTHM	Weight + Time	Light – Sustained (slow) Light – Sudden (quick) Strong – Sustained (slow) Strong – Sudden (quick)
DREAM	Weight + Flow	Light – free Light – bound Strong – free Strong - bound
REMOTE	Space + Flow	Indirect – Free Direct – Free Indirect – Bound Direct - Bound
MOBILE	Flow + Time	Free – Sustained (slow) Bound – sudden (quick) Free – sudden (quick) Bound – sustained (slow)
STABLE	Space + Weight	Indirect – light Direct – light Indirect – strong Direct - strong

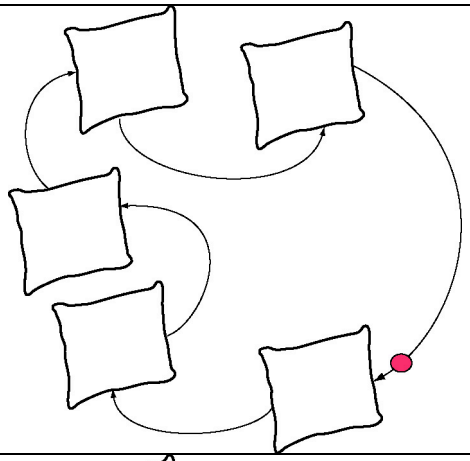
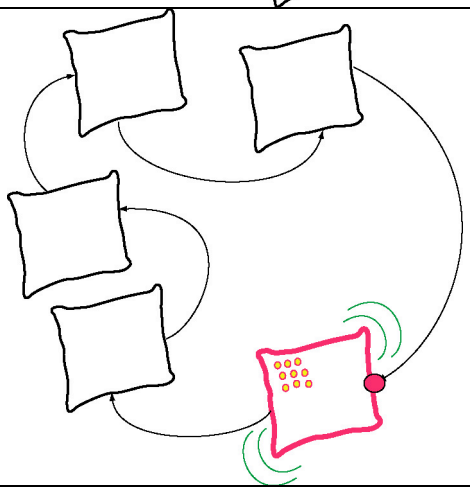
Introduction to Token Ring

The token ring is a network comprised of a complete logical ‘circle’. A unique ‘message’ (light, sound, vibration) called the ‘token’ is passed through the ring from node (object) to note (object). The token identifies where the data is ‘expressed’ and who can modify the data at any particular time. It is just ONE of a number of networked communication architectures that can be used in the system to support emergent participant behaviour.

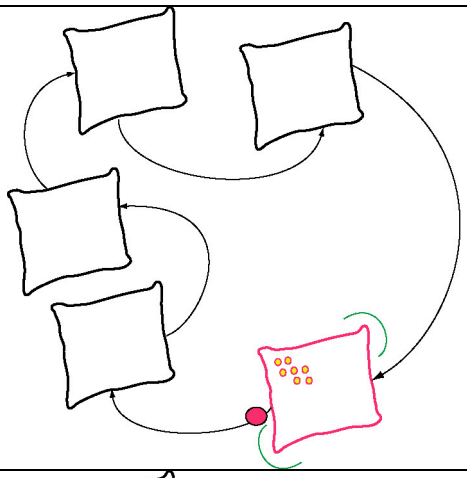
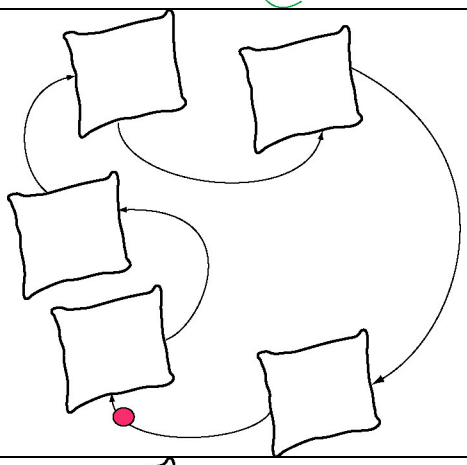
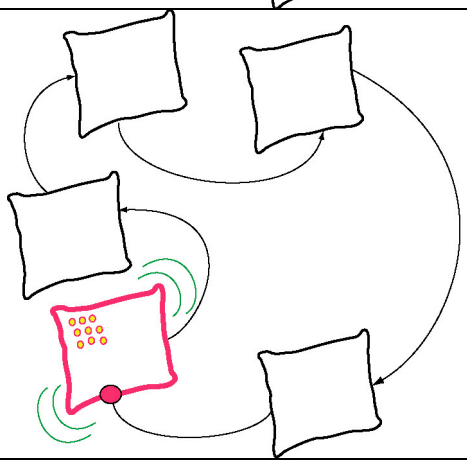
Data in the form of light, sound and vibration moves through the circle of soft-objects. This can appear or feel like the movement of energy, life-force or any other metaphor or association made by the participants during the experience. I think of experience as being an emergent property.

Each soft-object has a unique IP address within the space. In the communication of the token ring we can send the expression/mood/message through the ring in order by the IP address. This is a logical order, and the soft-objects may physically reside in the space in an arbitrary order and position. Without loss of generality, we can think of the soft-objects as having addresses starting at ‘0’ and going to ‘n’. The token is initially created by object ‘0’ and then sent to object ‘1’, eventually reaching object ‘n’, which sends it back to object ‘0’. Thus, the path that a token takes is unambiguous and is not affected by proximity – soft-objects that are in the path order can be moved near each other by participants, to emphasize the path, but need not be in order for the token to ‘get where it needs to be next’. This allows participants in the space to move and re-order the soft-objects to create emergent patterns, sound and to emphasize, speed up, or slow down, the movement of data through the token-ring. Each participant creates the whole through their input with their object, or through their physical displacement in the space.

An accompanying state diagram is included in a separate PDF document.

	The token is about to be received by the bottom-right object. The previous object, on the upper-right, has completed its response to the token, and is no longer visibly or audibly active.
	The bottom-right object has received the token, and is presenting a display of sound, light and vibration ‘moving through the object’ that conveys both the presence of the token and the ‘direction’ in which it is traveling. The token is modified by any input/touch/movement applied to the object, and the token’s timing through the system is a function of the input/touch/movement – so as to ‘speed up’ or ‘slow down’ the token’s movement through the group.

Appendix E The Journey of a token through the soft-object networked circle

	The token is about to leave the bottom-right object. The sound, light and vibration display is reduced in intensity, to signify the 'passing-on' of the token.
	The token is about to be received by the bottom-left object. The bottom-right object has completed its response to the token, and is no longer visibly or audibly active.
	The bottom-left object has received the token, and is presenting a display of sound, light and vibration that conveys both the presence of the token and the 'direction' in which it is traveling. This is the 'feeling' of energy (light/vibration/sound) moving through an object.

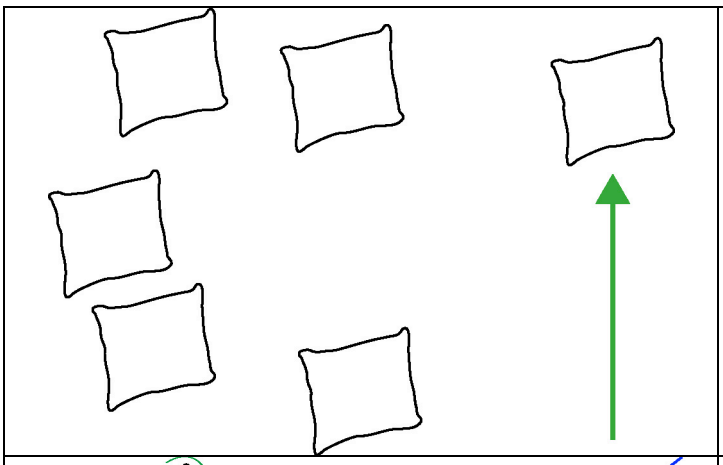
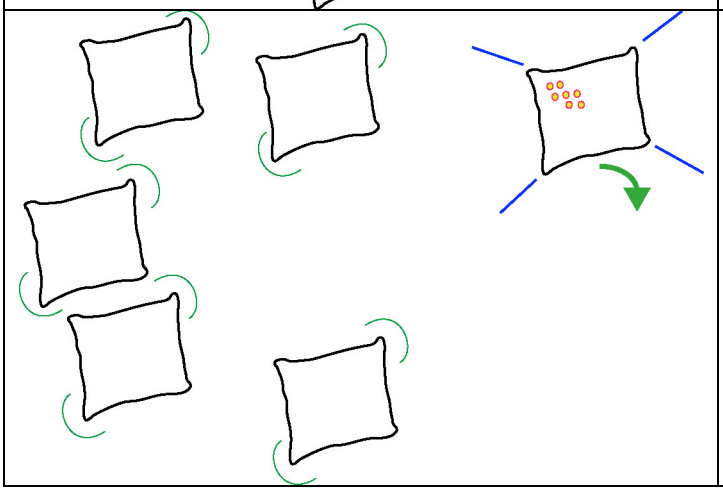
The Journey of a Thrown Object

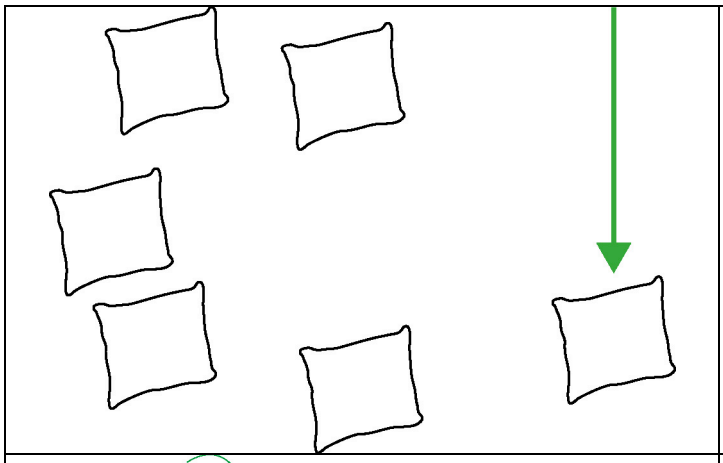
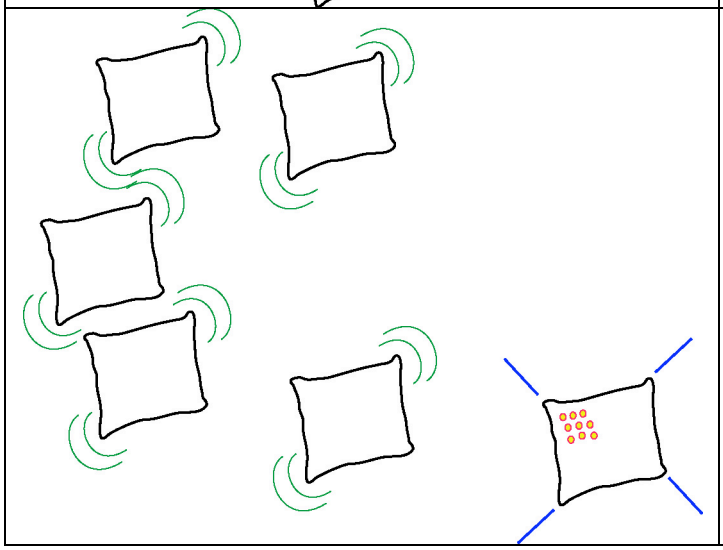
This is an example of self-2-others implemented using a “broadcast” network communication mode.

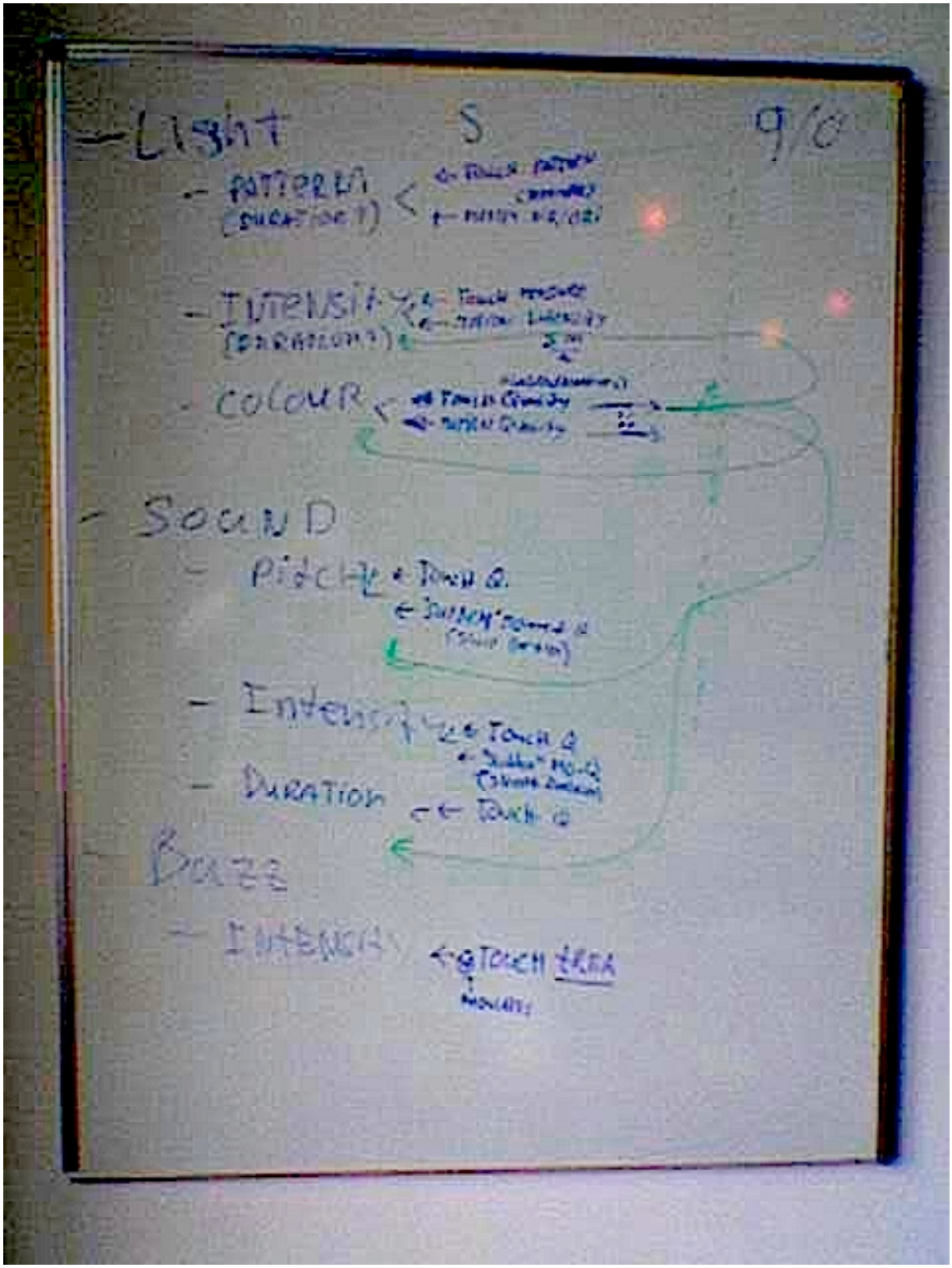
We could also call this “broadcast empathy” for the “thrown” path of another “soft-object”.

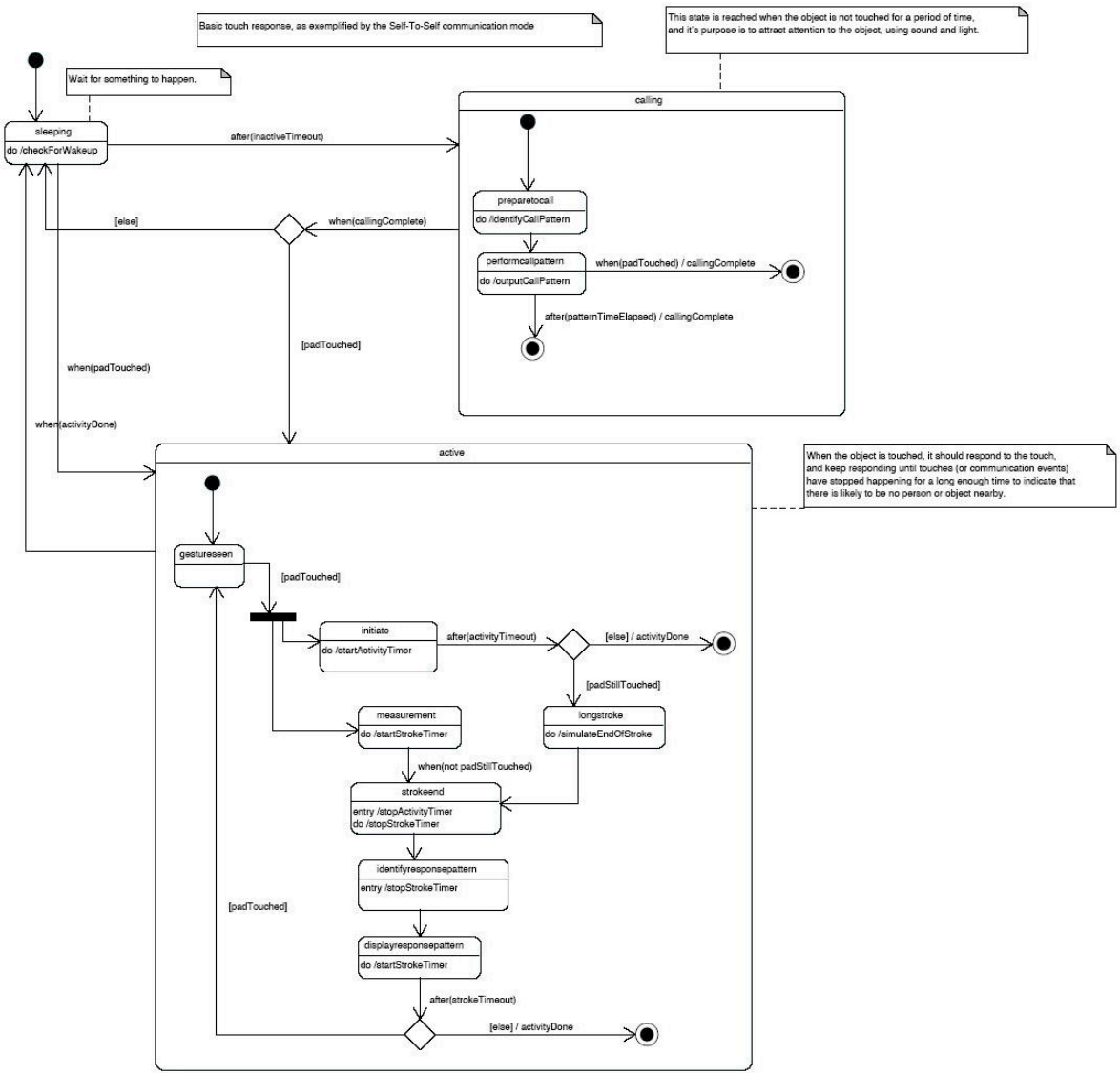
Description:

- When a ‘soft-object’ is thrown up in the air, at the moment when it reaches ‘zero’ gravity, it ‘broadcasts to all the other ‘soft-objects’ in the space, and all the ‘soft-objects’ respond with a ‘sigh’ sound at the apogee of the throw or toss (speaker output).
- When the same ‘soft-object’ lands after the ‘fall’ (after being thrown up in the air) all the soft-objects’ respond with a strong vibration actuation (vibration output)
- In Laban terms it reaches the “Float” effort (all ‘indulging’ qualities), followed in succession by reaching the “Punch” effort (all ‘fighting’ qualities). These two efforts are on ‘opposite’ sides of the effort scale.

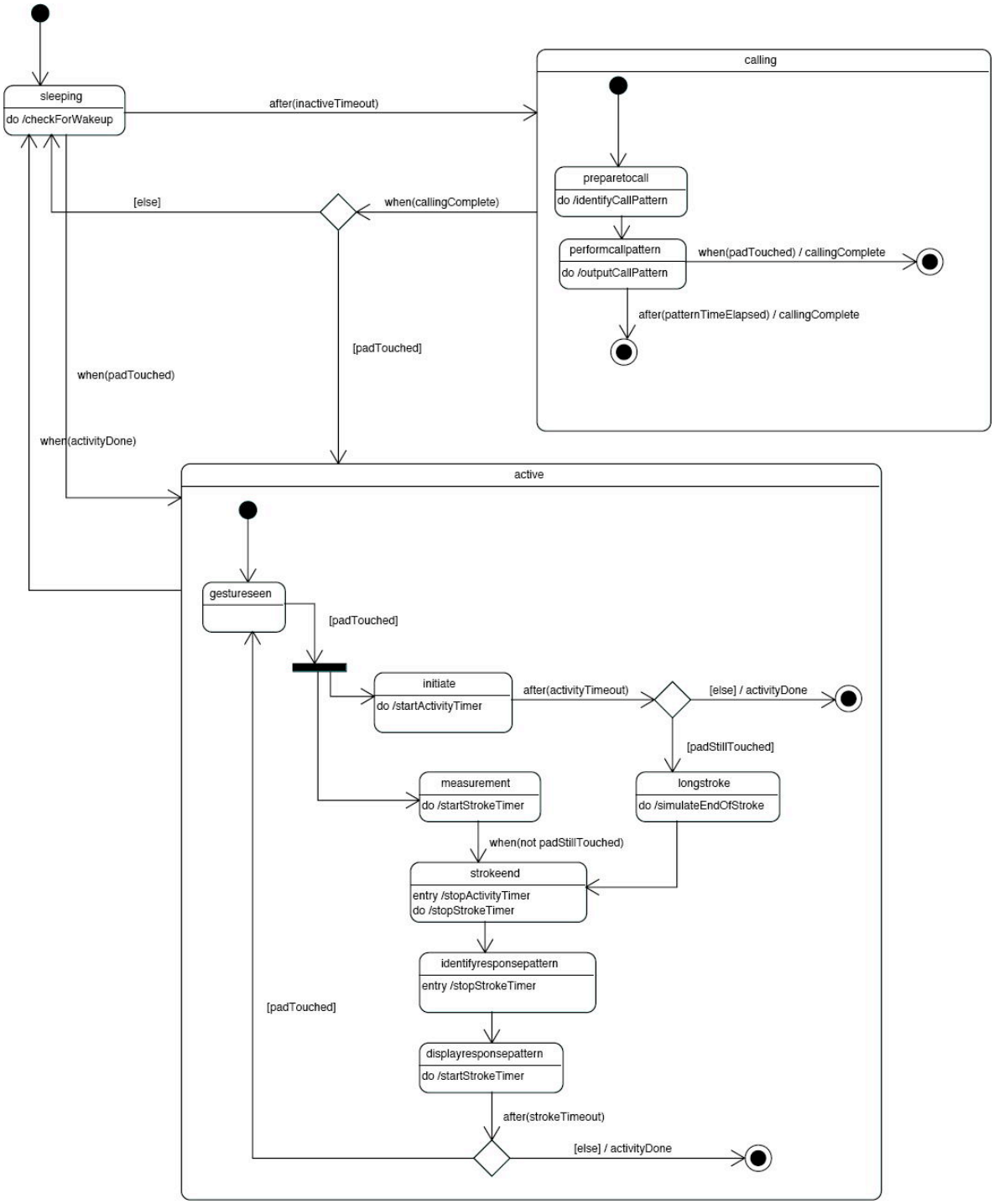
	A ‘soft object’ is thrown up into the air. As it slowly decelerates due to the force of gravity, it prepares for its ‘top’ broadcast.
	When the object reaches the zenith of its flight, its vertical velocity becomes zero. At this point, the object broadcasts to all the other objects in the space, and they all respond with a ‘sigh’ sound.

	As the object begins to accelerate to the ground, it ceases its 'top' broadcast and the other objects resume their previous activities.
	When the object makes contact with the ground and its velocity again returns to zero, it sends a 'bottom' broadcast to all the other objects, and they respond with a strong vibration.

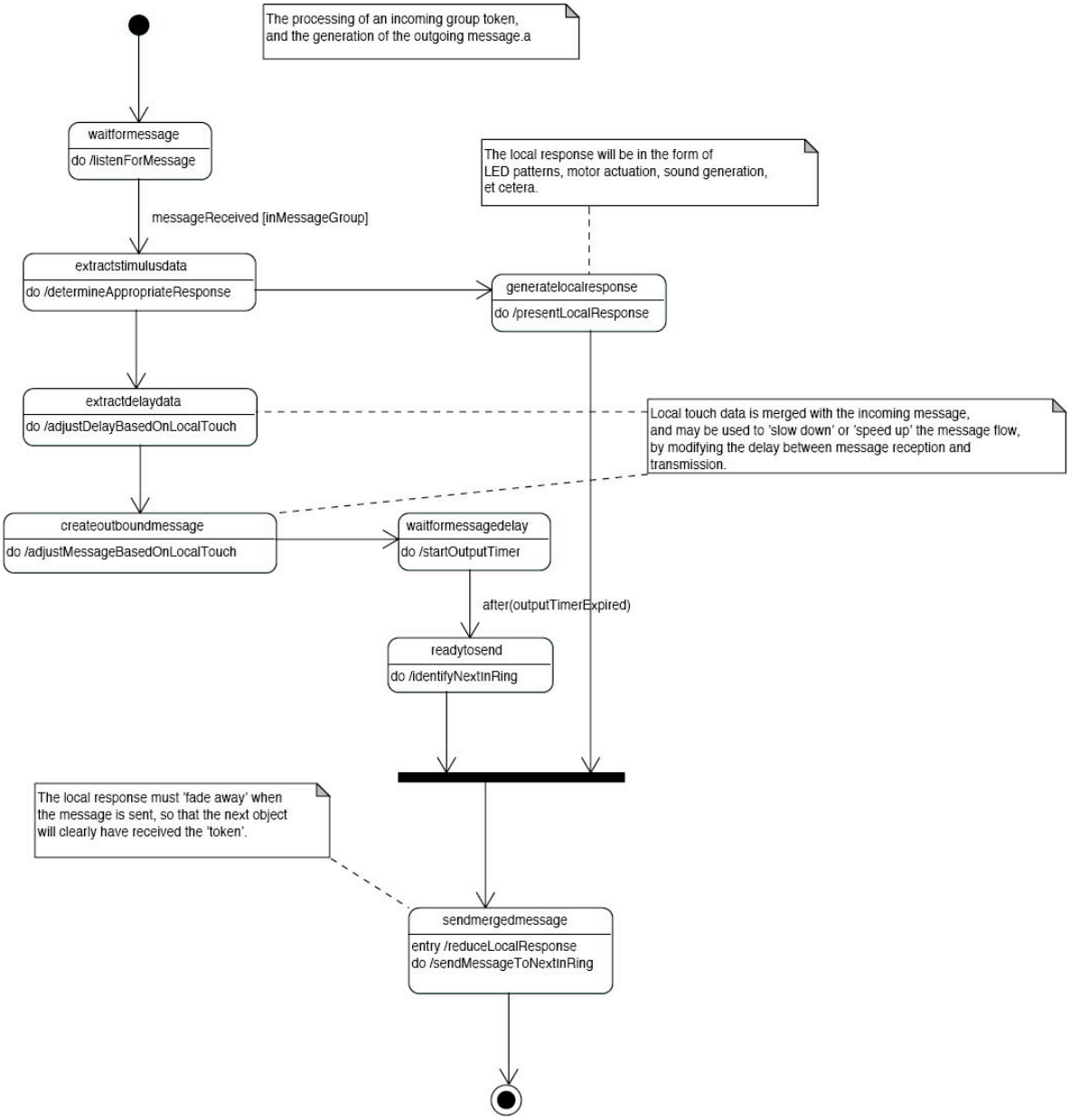

Light
S
9/0
PATTERN
INTENSITY
COLOUR
SOUND
Pitch
Intensity
Duration
Buzz
INTENSITY
TOUCH TREA

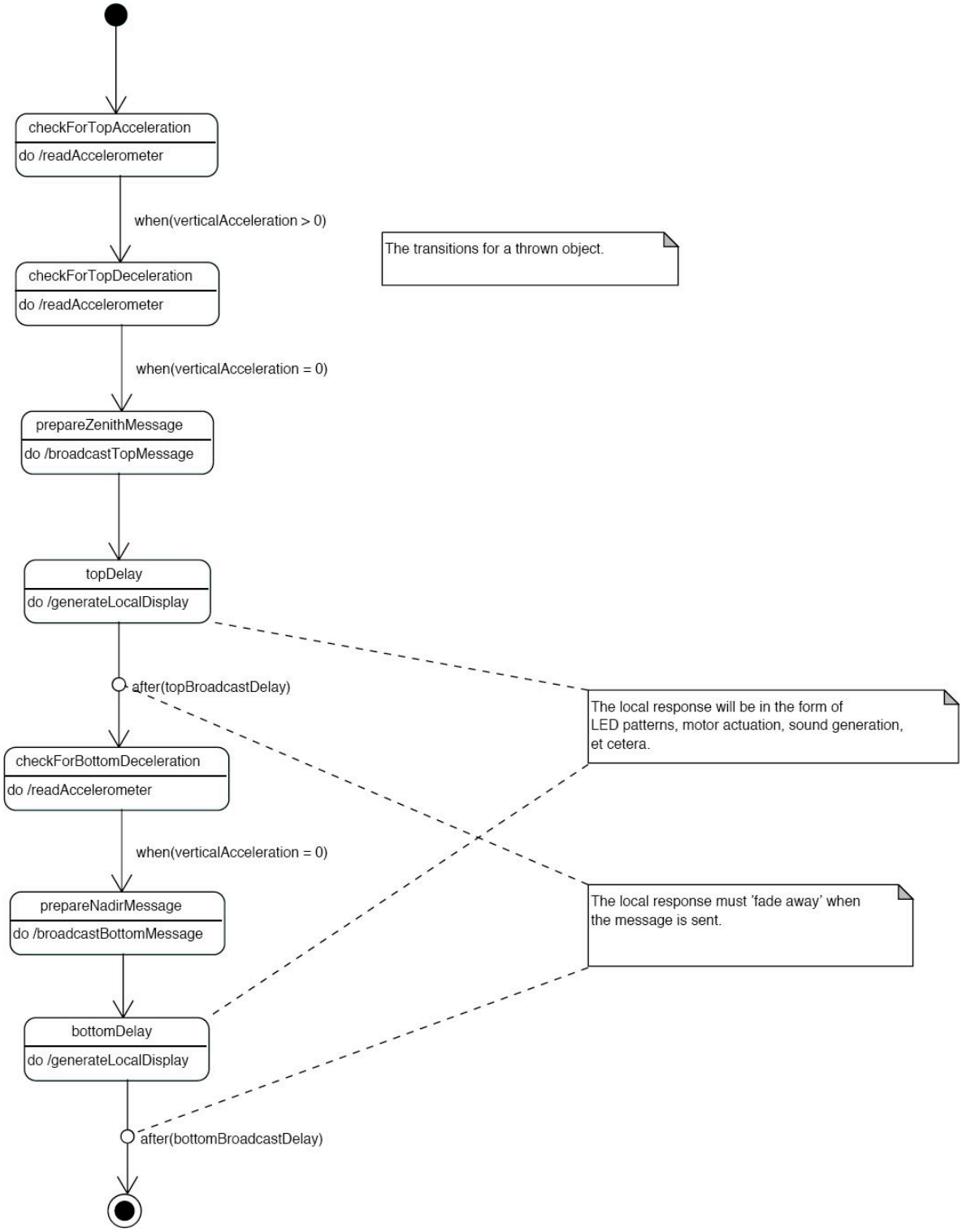

Basic touch response, as exemplified by the Self-To-Self communication mode
This state is reached when the object is not touched for a period of time, and it's purpose is to attract attention to the object, using sound and light.
Wait for something to happen.
sleeping
do /checkForWakeup
after(inactiveTimeout)
calling
preparetocall
do /identifyCallPattern
performcallpattern
do /outputCallPattern
when(padTouched) / callingComplete
after(patternTimeElapsed) / callingComplete
[else]
when(callingComplete)
[padTouched]
when(padTouched)
when(activityDone)
active
When the object is touched, it should respond to the touch, and keep responding until touches (or communication events) have stopped happening for a long enough time to indicate that there is likely to be no person or object nearby.
gestureseen
[padTouched]
initiate
do /startActivityTimer
after(activityTimeout)
[else] / activityDone
[padStillTouched]
measurement
do /startStrokeTimer
longstroke
do /simulateEndOfStroke
when(not padStillTouched)
strokeend
entry /stopActivityTimer
do /stopStrokeTimer
identifyresponsepattern
entry /stopStrokeTimer
[padTouched]
displayresponsepattern
do /startStrokeTimer
after(strokeTimeout)
[else] / activityDone

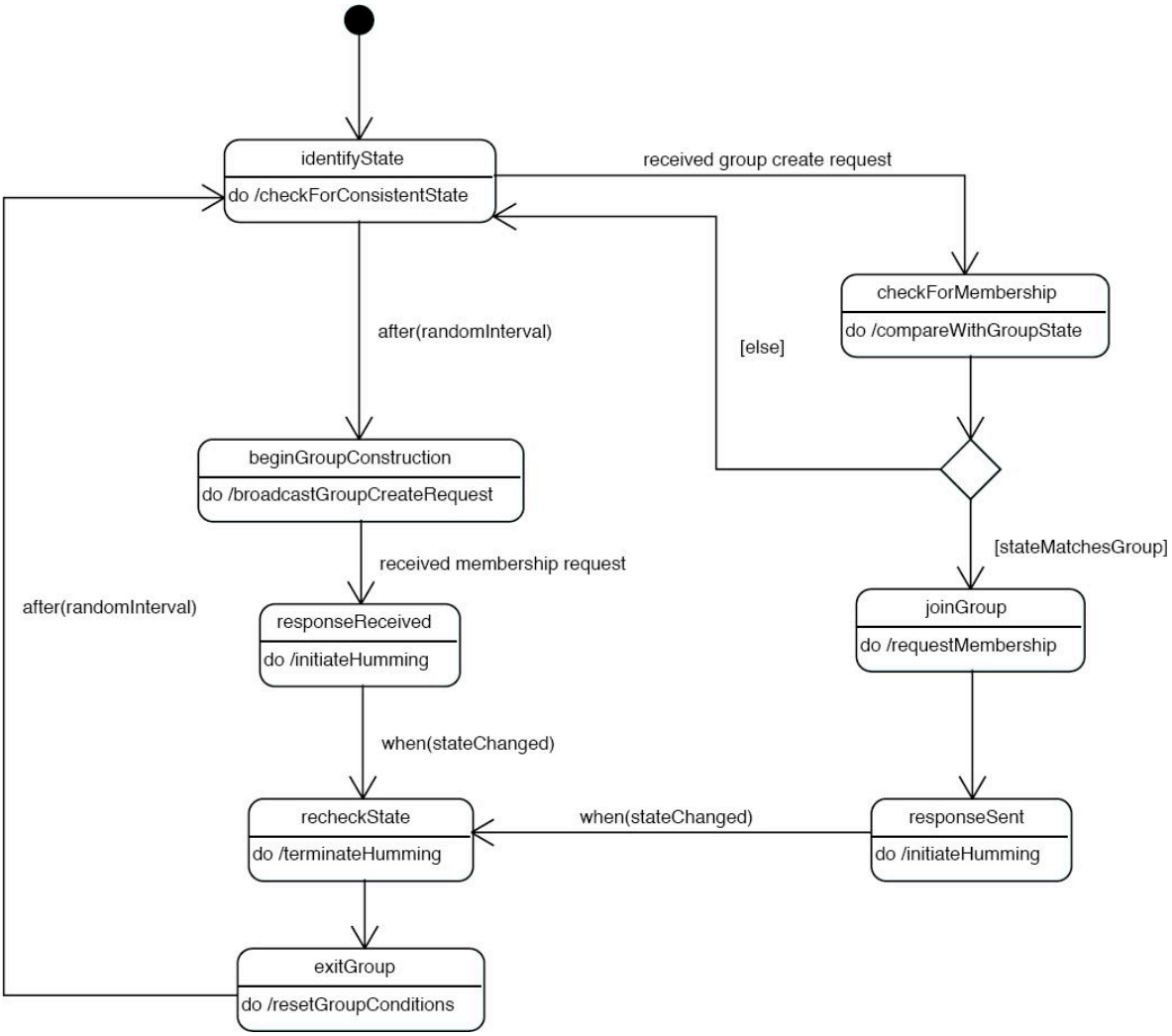
Appendix E Self to Self Sleep Call Touch Response



Appendix E Token Ring Response State




checkForTopAcceleration
do /readAccelerometer
when(verticalAcceleration > 0)
checkForTopDeceleration
do /readAccelerometer
when(verticalAcceleration = 0)
prepareZenithMessage
do /broadcastTopMessage
topDelay
do /generateLocalDisplay
after(topBroadcastDelay)
checkForBottomDeceleration
do /readAccelerometer
when(verticalAcceleration = 0)
prepareNadirMessage
do /broadcastBottomMessage
bottomDelay
do /generateLocalDisplay
after(bottomBroadcastDelay)
The transitions for a thrown object.
The local response will be in the form of
LED patterns, motor actuation, sound generation,
et cetera.
The local response must 'fade away' when
the message is sent.


identifyState
do /checkForConsistentState
received group create request
checkForMembership
do /compareWithGroupState
after(randomInterval)
[else]
beginGroupConstruction
do /broadcastGroupCreateRequest
[stateMatchesGroup]
received membership request
after(randomInterval)
responseReceived
do /initiateHumming
joinGroup
do /requestMembership
when(stateChanged)
recheckState
do /terminateHumming
when(stateChanged)
responseSent
do /initiateHumming
exitGroup
do /resetGroupConditions

Interaction Modes and States – Possible Restructuring of Interaction Mapping Diagram

In the system that we are designing, composed of multiple 'soft objects' and people, there are, effectively, four forms of state:

1) the very low-level input state, which is distinct for each 'soft object', and corresponds to the algorithm which interprets the touch pad and accelerometer inputs and generates the Laban Effort Shape data which is used throughout the system;
2) the low-level communication state, which is the aggregate of the various simultaneous 'interaction modes' that are active for each 'soft object';
3) the mid-level communication state, which is the aggregate of the 'interaction modes' that are active over all 'soft objects' and
4) the high-level system state, which is the 'emergent structure' that is perceived by the participants in the system.

The lowest level is handled by independent software that uses a rule-based strategy to identify the efforts. The highest level will develop through interaction between the 'soft objects' and the participants.

Any individual 'soft object' can be involved in multiple independent 'interaction modes'. For example, 'soft object' A can be exchanging data with both 'soft object' B and 'soft object' F, while participating in a group with other 'soft objects'. As well, it can be receiving unsolicited messages from 'soft object' M, for which it has no formal relationship – if 'soft object' M is broadcasting to all other 'soft objects'.

A particular 'soft object' will, initially, be 'idle', waiting for something to happen – movement, touch, messages, et cetera. Once it is 'active', it will participate in the 'interaction modes' that have been set up for it – relationships, such as group membership, that may be predefined, or dynamically determined relationships that are established by proximity. The mid-level is, basically, a means of recording all the parallel 'interaction modes' that have active 'soft objects'.

In essence, a 'soft object' is not 'idle' for an 'interaction mode' – it must be 'idle' or 'active' for all 'interaction modes'; whether the 'soft object' participates in a particular conversation is dependent on the established flow of an 'interaction mode'. Thus, the state of a 'soft object' consists of the various 'interaction modes' for which it is active, along with data that is particular to each 'interaction mode'.

This viewpoint results in a restructuring of the 'Interactions Mapping' table, placing the 'soft object state' in the leftmost column, with the 'interaction mode' to the right. This will provide a first approximation to the state transitions of the 'soft objects', but it omits interactions between the communication paths represented by the 'interaction modes', such as the situation where 'soft object' A is in a group with 'soft object' B, as well as in a direct, self-to-other relationship with 'soft object' B – and then 'soft object' B is thrown in the air, and broadcasts it's status to all other 'soft objects'. In this scenario, 'soft object' A may receive three distinct messages from 'soft object' B, and must properly respond to all three.

If we view the system as communicating ‘soft objects’, with independent state, then this is not difficult to do. ‘Soft object’ A is in a well-defined state – or else we can’t reliably write code for it – and sees three distinct messages. Each message will transform the communication paths that they arrived on:

1) the group message from ‘soft object’ B is forwarded to the next member of the group, with possibly some transformation of the message;
2) the self-to-other message from ‘soft object’ B is replied to with a new message, which can supply data based on the state of ‘soft object’ A and
3) the broadcast message from ‘soft object’ B may result in a transformation of the state of ‘soft object’ A, but no reply from ‘soft object’ A is expected.

Note that the messages can be processed in any order.

Sensor Evaluation and Laban Analysis

The Laban recognition will be partly based on the Laban research already done for the Whisper / Exhale project by Norman Jaffe and Thecla Schiphorst.

Evaluator Class

A routine checks if the pillow is being touched or not. It is based on the older signal analysis in Move Me/Sensor Evaluation/Event Detection. If it is being touched, this is an 'event' and an event is either

- started,
- finished or
- somewhere in between.

This is received by the current evaluator, together with the pressure data (a dictionary).

```
def evaluate(self, event_state, pressure_dict):
 …
```

The evaluator manages the current gesture and stores a previous one (to see if a gesture is repetitive). It also stores some threshold values that can be changed realtime from the GUI. Each time a gesture is created the current set of thresholds is passed to it. Something like this:

```
self.thresholds = { 'noise_threshold':0.4, 'stationary_moving':
0.01, …
```

Gesture Class

The PressureGesture keeps track of the touch data and time:

- for event start: __init__() and start()
- in between: process() and updateLabanParameters()
- event end: end() and getLabanShape()

The updateLabanParameters() function uses Norman Jaffe's 'laban_matrix' to fill out the 'laban_shape' of the gesture (globals). This is done with various basic categorize<param>() functions. To make this mapping possible, some extra functionality was implemented to convert the pressure format into more abstracted parameters.

Center Of Gravity Path

A vector is constructed that traces the path of the center of gravity. A convex hull algorithm is now able to draw a polygon around and a diameter algorithm uses the hull to calculate the points that are furthest away from each other.

Convex Hull

Polygon Area

http://mathworld.wolfram.com/PolygonArea.html

Laban Mappings

These are the mappings:

- primary:
  - intensity: mean pressure intensity,
  - time: duration of a gesture,
  - area: a hull centerpoint / area function,
  - number: number of fingers on the touchpad,
  - speed: average center-of-gravity speed,
  - direction: relative angle the center-of-gravity moves in,
- secondary (function of another parameter):
  - space: center of gravity displacement
  - path: center-of-gravity path + angles
  - disposition: ...,
  - pattern: relation between current and previous Laban shape.

Some parameters are calculated on-the-fly, that is, every time new data arrives. Others are calculated at the end of the gesture. In this case, often an average is kept of the values for that particular parameter. The averaging is done using a running average.

Intensity

Range

Soft-hard.

Description

The intensity of the touch, how hard or soft.

Time

Range

Short-long.

Description

The length of time a gesture takes.

Area

Range

Small-medium-big.

Description

The area of the part of the interaction object that touches the pad. Note: this parameter is called *Size* in Thecla Schiphorst's papers.

Speed

Range

None, slow-fast.

Description

The speed of a touch-effort. This is the overall velocity of movement. This parameter is not used directly to distinguish efforts, but is used to determine space.

Space (Speed)

Range

Stationary-traveling.

Description

Secondary; is a function of speed. If speed is (near) zero, then the gesture is stationary, otherwise it's traveling.

Path (Direction)

Range

Straight-wandering.

Description

Secondary; is a function of direction. If the speed is not zero, and there are no more than one direction registered, the gesture is straight.

Pattern (Gesture)

Range

Continuous-repetitive.

Description

If a gesture is unique in relation to the gesture immediately before and after, it is continuous. Any repeated action or gesture is classified as repetitive.

Unused Parameters

These parameters appear in Thecla's paper but were not implemented in ebrain, although some of them, such as number and intensity disposition, do appear in the Laban matrix (see source:passepartout/trunk/src/MoveMe/SensorEvaluation/pressure_gesture.py).

Number

Range

One-many.

Description

The distinction between one finger or object and many fingers.

Direction

Range

None, left, right, up, down, and four diagonals.

Description

The direction of movement. This parameter is not directly used to distinguish efforts, but is used to determine space and path.

Disposition (Pressure)

Range

Constant-varying.

Description

If the pressure maintains a single value after an initial acceleration, the gesture is constant, otherwise it’s varying.

Disposition (Size)

Range

Constant-varying.

Description

No description yet.

Disposition (Number)

Range

Constant-varying.

Description

No description yet.

Completed Gesture

A completed gesture will contain:

- classified laban shape (if any), which can be:
  - 'tap'
  - 'flick'
  - etc., etc. (they can be found in the laban matrix).
- a dictionary with the numeric Laban values plus the thresholds that they were determined with,
- data such as the c.o.g. path, convex hull and diameter of hull.

Laban Matrix

```
['tap',         ['soft', 'short', 'small', 'any', 'stationary', 'continuous', 'na', 'any']],
['tapping',     ['soft', 'short', 'small', 'any', 'stationary', 'repetitive', 'any', 'any']],
['flick',       ['soft', 'short', 'small', 'any', 'travelling', 'continuous', 'na', 'any']],
['flicking',    ['soft', 'short', 'small', 'any', 'travelling', 'repetitive', 'any', 'any']],
['pat',         ['soft', 'short', 'medium', 'one', 'any', 'continuous', 'any', 'any']],
['patting',     ['soft', 'short', 'medium', 'any', 'any', 'repetitive', 'any', 'any']],
['pat',         ['soft', 'short', 'big', 'one', 'any', 'continuous', 'any', 'any']],
['patting',     ['soft', 'short', 'big', 'any', 'any', 'repetitive', 'any', 'any']],
['touch',       ['soft', 'long', 'small', 'any', 'stationary', 'continuous', 'na', 'any']],
['touches',     ['soft', 'long', 'small', 'any', 'stationary', 'repetitive', 'na', 'any']],
['hold',        ['soft', 'long', 'big', 'one', 'stationary', 'continuous', 'na', 'any']],
['holds',       ['soft', 'long', 'big', 'one', 'stationary', 'repetitive', 'na', 'any']],
['glide',       ['soft', 'long', 'any', 'any', 'travelling', 'continuous', 'wandering', 'any']],
['glides',      ['soft', 'long', 'any', 'any', 'travelling', 'repetitive', 'wandering', 'any']],
['stroke',      ['soft', 'long', 'any', 'any', 'travelling', 'continuous', 'straight', 'any']],
['stroking',    ['soft', 'long', 'any', 'any', 'travelling', 'repetitive', 'straight', 'any']],
['jab',         ['hard', 'short', 'small', 'one', 'stationary', 'continuous', 'na', 'any']],
['jabbing',     ['hard', 'short', 'small', 'one', 'any', 'repetitive', 'na', 'any']],
['cut',         ['hard', 'short', 'small', 'one', 'travelling', 'continuous', 'na', 'any']],
['knock',       ['hard', 'short', 'medium', 'one', 'stationary', 'continuous', 'na', 'any']],
['knocking',    ['hard', 'short', 'medium', 'one', 'any', 'repetitive', 'na', 'any']],
['slice',       ['hard', 'short', 'medium', 'one', 'travelling', 'continuous', 'na', 'any']],
['slap',        ['hard', 'short', 'big', 'one', 'any', 'continuous', 'na', 'any']],
['slapping',    ['hard', 'short', 'big', 'one', 'any', 'repetitive', 'na', 'any']],
['knead',       ['hard', 'long', 'any', 'many', 'any', 'continuous', 'na', 'varying']],
['kneads',      ['hard', 'long', 'any', 'many', 'any', 'repetitive', 'na', 'varying']],
['press',       ['hard', 'long', 'any', 'any', 'stationary', 'continuous', 'na', 'constant']],
['presses',     ['hard', 'long', 'any', 'any', 'stationary', 'repetitive', 'na', 'any']],
['rub',         ['hard', 'long', 'any', 'any', 'travelling', 'continuous', 'any', 'any']],
['rubbing',     ['hard', 'long', 'any', 'any', 'travelling', 'repetitive', 'any', 'any']],
['presses',     ['hard', 'long', 'any', 'one', 'stationary', 'continuous', 'na', 'varying']],
['knead',       ['hard', 'long', 'any', 'many', 'stationary', 'continuous', 'na', 'varying']],
['kneading',    ['hard', 'long', 'any', 'many', 'stationary', 'repetitive', 'na', 'varying']],
['unknown',     ['hard', 'short', 'small', 'many', 'stationary', 'any', 'na', 'any']],
['unknown',     ['hard', 'short', 'small', 'many', 'travelling', 'repetitive', 'any', 'any']],
['unknown',     ['hard', 'short', 'medium', 'many', 'stationary', 'any', 'na', 'any']],
['unknown',     ['hard', 'short', 'medium', 'many', 'travelling', 'repetitive', 'any', 'any']],
['unknown',     ['hard', 'short', 'big', 'many', 'stationary', 'any', 'na', 'any']],
['unknown',     ['hard', 'short', 'big', 'many', 'travelling', 'repetitive', 'any', 'any']],
```

['unknown', ['soft', 'short', 'small', 'one', 'travelling', 'continuous', 'straight', 'any']],
['impossible', ['soft', 'short', 'small', 'one', 'travelling', 'continuous', 'wandering', 'any']],
['impossible', ['soft', 'short', 'small', 'many', 'travelling', 'continuous', 'straight', 'any']],
['unknown', ['soft', 'short', 'small', 'many', 'travelling', 'continuous', 'wandering', 'any']],
['impossible', ['soft', 'short', 'big', 'one', 'travelling', 'continuous', 'straight', 'any']],
['unknown', ['soft', 'short', 'big', 'one', 'travelling', 'continuous', 'wandering', 'any']],
['impossible', ['soft', 'short', 'big', 'many', 'stationary', 'continuous', 'na', 'constant']],
['unknown', ['soft', 'short', 'big', 'many', 'stationary', 'repetitive', 'na', 'constant']],
['unknown', ['soft', 'short', 'big', 'many', 'stationary', 'continuous', 'na', 'varying']],
['unknown', ['soft', 'short', 'big', 'many', 'stationary', 'repetitive', 'na', 'varying']],
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['unknown', ['soft', 'short', 'big', 'many', 'travelling', 'continuous', 'wandering', 'any']],
['impossible', ['hard', 'short', 'small', 'any', 'travelling', 'continuous', 'straight', 'any']],
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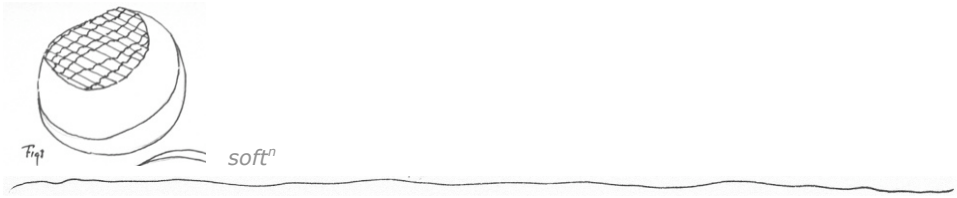
soft(n) Workshop Response Card



describe your sensory impressions

impressions

touch
sound
light

look

feel

describe the behavior of the soft objects

between objects

life
intelligence
response
sense

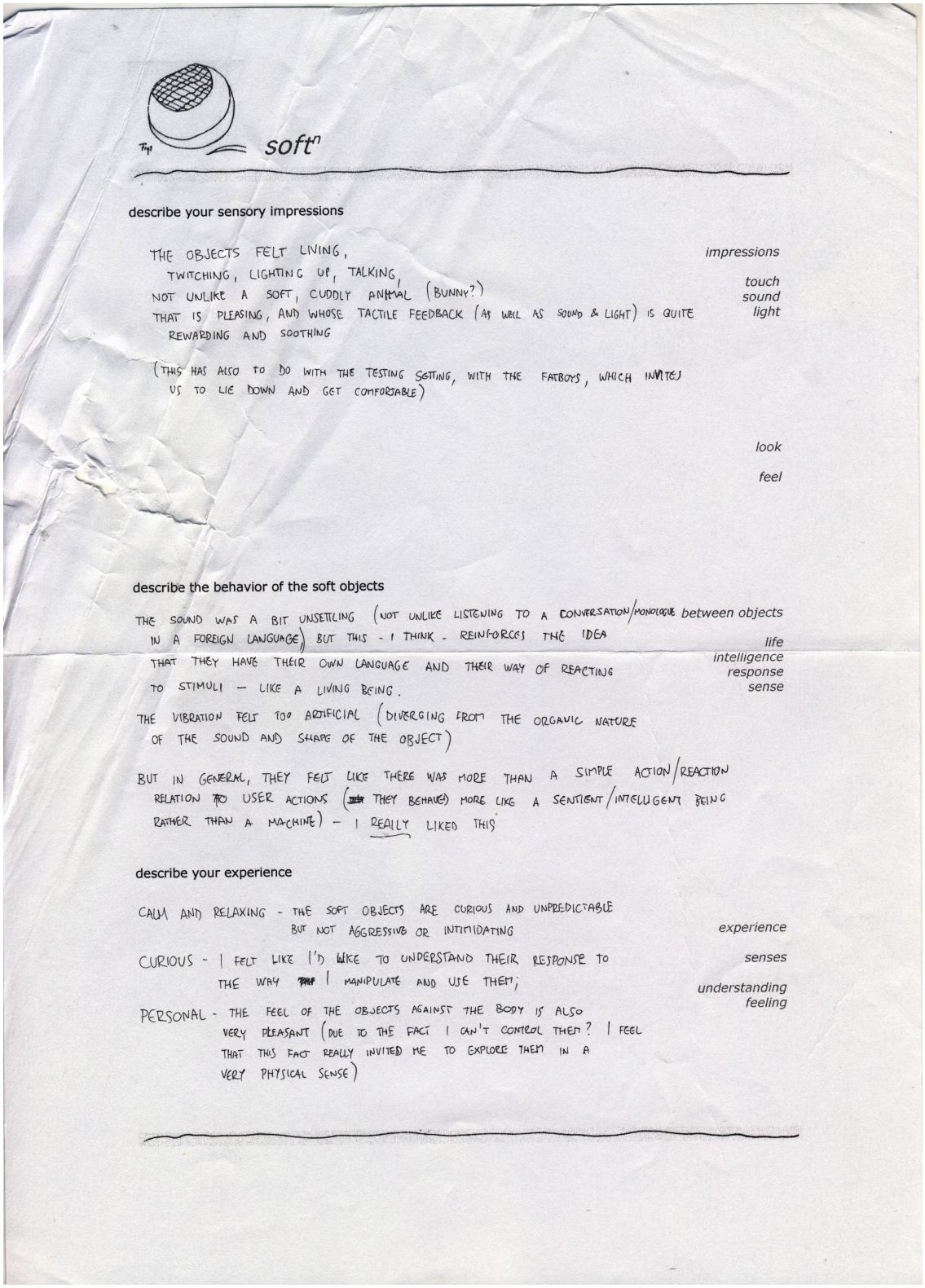
describe your experience

experience

senses

understanding
feeling

soft(n) Workshop Response Cards



soft^n

describe your sensory impressions

THE OBJECTS FELT LIVING,
TWITCHING, LIGHTING UP, TALKING,
NOT UNLIKE A SOFT, CUDDLY ANIMAL (BUNNY?)
THAT IS PLEASING, AND WHOSE TACTILE FEEDBACK (AS WELL AS SOUND & LIGHT) IS QUITE REWARDING AND SOOTHING

(THIS HAS ALSO TO DO WITH THE TESTING SETTING, WITH THE FATBOYS, WHICH INVITED US TO LIE DOWN AND GET COMFORTABLE)

impressions
touch
sound
light
look
feel

describe the behavior of the soft objects

THE SOUND WAS A BIT UNSETTLING (NOT UNLIKE LISTENING TO A CONVERSATION/MONOLOGUE IN A FOREIGN LANGUAGE) BUT THIS - I THINK - REINFORCES THE IDEA THAT THEY HAVE THEIR OWN LANGUAGE AND THEIR WAY OF REACTING TO STIMULI — LIKE A LIVING BEING.

between objects
life
intelligence
response
sense

THE VIBRATION FELT TOO ARTIFICIAL (DIVERGING FROM THE ORGANIC NATURE OF THE SOUND AND SHAPE OF THE OBJECT)

BUT IN GENERAL, THEY FELT LIKE THERE WAS MORE THAN A SIMPLE ACTION/REACTION RELATION TO USER ACTIONS (~~THEY~~ THEY BEHAVED) MORE LIKE A SENTIENT/INTELLIGENT BEING RATHER THAN A MACHINE) — I REALLY LIKED THIS

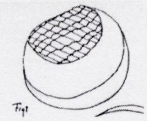
describe your experience

CALM AND RELAXING - THE SOFT OBJECTS ARE CURIOUS AND UNPREDICTABLE BUT NOT AGGRESSIVE OR INTIMIDATING

CURIOUS - I FELT LIKE I'D ~~LIKE~~ TO UNDERSTAND THEIR RESPONSE TO THE WAY ~~THAT~~ I MANIPULATE AND USE THEM;

PERSONAL - THE FEEL OF THE OBJECTS AGAINST THE BODY IS ALSO VERY PLEASANT (DUE TO THE FACT I CAN'T CONTROL THEM? I FEEL THAT THIS FACT REALLY INVITED ME TO EXPLORE THEM IN A VERY PHYSICAL SENSE)

experience
senses
understanding
feeling



soft(n)

describe your sensory impressions

impressions

EXPRESSIVE AND SOFT "FEMINIE" FEEL
IRRITATING
SOFT AND SENSUAL MOOD

touch
sound
light

ORGANIC & "ALMOST-NATURAL"
FEMININE AND SENSUAL

look
feel

describe the behavior of the soft objects

between objects

HAS ITS OWN LIFE
AN INDEPENDENT MINDSET
NOT WHAT I EXPECT
I CAN OBVIOUSLY FEEL IT HAS ITS OWN WORKINGS
WHICH ~~[illegible]~~ INVITES MY "SOFT" SIDE WHEN APPROACHING IT

life
intelligence
response
sense

describe your experience

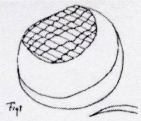
WIERD – I WAS WONDERING WHY I FELT SENSUAL WITH THESE "SOFT-OBJECTS"

INVITING MY SENSUAL AND OFTEN PERVERTED SIDE

JUST KNOWING THAT THESE OBJECTS COULD CONTROL MY EMOTIONS IS BOTH A THRILL & FEAR

SENSUAL, ORGY AND SOMETIMES PORNOGRAPHIC SENSE.

experience
senses
understanding
feeling



soft^{n}

describe your sensory impressions

I felt them as pets, some fantastic creatures I wanted to hug or/and play with.

impressions
touch
sound
light
look
feel

describe the behavior of the soft objects

Quite unpredictable and behaving in their own manner - I was happy not to find certain ways of controlling them, autonomisy and individual characters distinguishes the „objects" from just „things"

between objects
life
intelligence
response
sense

describe your experience

I felt like playing, throughing the objects, petting them and getting comfortable lying in between.

experience
senses
understanding
feeling

soft(n) workshop February 1 2007 - V2lab Rotterdam

PART I Summary of Workshop Results

This is a summary of observations of workshop for soft(n) conducted on 2 feb 2007. The entire transcription of the workshop follows this summary, so you can read it all if you wish.

Soft Object Design

A number of aspects of the soft object design iteration was clarified or illuminated during the workshop.

The summary is divided into

1. FORM of the SOFT OBJECTS
2. ENVIRONMENT for the SOFT OBJECTS
3. ACTUATORS
4. BEHAVIOURS

1. FORM of the SOFT OBJECTS

This section primarily affects the construction of the soft objects. Bonana and Thecla have discussed these aspects and Bonana is using these as guidelines in her construction work. For the electronics construction, the key is that some of the soft objects will be bigger than the original 3 that Bonana made for the 2 Feb 2007 workshop.

SIZE

- the group of 10 – 12 soft objects should be BIGGER in general. The size should be somewhat closer to human scale (but not human size! That would be too big): a reasonable reference is that the biggest soft object would be no more than about 2 to 3 feet. The smallest soft objects we now have can be the smallest ones of the group
- the group should be able to 'stand alone' without the necessity of sofas, chairs or fatboys.

SHAPE

- The shape of the soft objects should remain 'non-literal': the organic feel of aspects of the body works well. No obvious circles, squares or rectangles at all – nothing reminiscent of a pillow.
- Shapes that are organic like kidney shapes, some aspect of simple curves but no perfect geometric shapes.
- The group of 10-12 should look somewhat like a collection of abstract garden-like or family-like, or ecology-like, or organ-like shapes, some 'fat' some 'thin' some 'short and squat' some 'round and full' some 'taller and shrub like'

TOUCH PAD areas

- It works well to have each touch pad in a different area on the soft object and be well defined through the material that is used
- The softness of the suede and the more vinyl type of fabrics both worked well
- We need to be able to come up with a way to attach the touch pads with the rest of the soft object that allows cleaning of the soft object – Bonana and I talked about zippers for the soft objects to enable this

CLEANING

- Soft object covers need to be able to be cleaned

STUFFING and INSIDES

- The stuffing should 'protect' the inside electronics
- The soft object should feel 'soft' and 'squeezable' and a body should be able to hold it, sit or lie on it or with it comfortably
- The electronics needs to be encased in something without edges (nothing rectangular) – just like the body has hard and soft bits in it, but you never feel any corners in it when you squeeze

FABRIC

- White, cream or neutral that can be drycleaned
- Touch pads with alternating textures where necessary
- Inviting fabrics

2. ENVIRONMENT FOR THE SOFT OBJECTS

- The environment should invite participants to move soft objects around in relationship with one another
- A white or cream short ply carpet that is comfortable and that marks an area for the soft objects to be placed upon will invite participants to sit, or squat or lie comfortably
- Soft ambient low lighting that enables the environment to be demarcated and also enables a low enough light for the soft objects illumination to be visible when walking by

3. ACTUATORS

VIBRATION

- Vibration needs to be more continuous, with greater increase and decrease (as if the vibration has a tonal quality, think of the way that breath increases in 'gain' and then decreases in a rhythmic 'in and out' way) – one could say that vibration should map to the light pattern we now have in terms of rhythm and pace

LIGHT

- More LED arrays in each soft object utilizing the same light emissive "light bleeding" property of emergent behaviour

SOUND

- The sound was the most 'problematic' of the outputs, simply because it has not been designed to respond to behaviours yet in any real way
- I have a sound designer named Marc Brady from Vancouver who will do the sound design for our circuit. We need to get him the information for the sound circuit and our algorithm so he can work on sounds that support the emergent behaviours. Marc wants the objects to LISTEN as well. Can we put a very small mike in them?

4. BEHAVIOURS

- we were only able to test very simple behaviors in the 2Feb2007 workshop, but we were able to assess that the group of 3 soft objects did invoke a sense of 'connection', 'communication', and 'community' (see transcript for more details). The most striking characteristic of the workshop results was the level of intelligence that was read into the interaction simply by allowing people to explore and play.
- we will use the Feb 22nd workshop to test the emergent behaviour properties of the soft objects based on the Laban quality recognition

PART II Transcription of video interview

Thecla: I am going to record this for the conversation.

Rui: Tell me what was going on in your heads when you first were alone with the pillow, or with the soft object?

Thecla: we are calling them soft objects instead of pillows

First Workshop Participant: yah, I guess, I was just trying to get some kind of meaningful response to understand, how, well, what was really going on with the object, and I got really comfortable when I got it just lying like a regular pillow because

Since the shape is also irregular and not just like a normal I just feel compelled to find the best position and that it also gets on speaking and vibrating so that

Its pretty much like when you are trying to fall asleep and then you just change your position, it actually got me like, hey this way works, this way doesn't work now its shut up, and (moving hands over his head) and now it works, and now it doesn't

I really couldn't understand what was really making it work, I just could figure out that if I just treated it like … a pillow, a soft object, it did work somehow, and I really was just trying to figure out what was going on …

Rui: do you think that if you understood clearly what was going on, that would make it better?

First Workshop Participant: no…. no…. I think it would be much less fun

That is what happens usually, Usually when you get what is going on behind the scenes its, well [its not so good] …. So I really like the fact that you cannot understand how this mechanism is going on

Rui: you don't have to wait, you can all talk at the same time.

Third Workshop Participant: for me it was quite surprising when after I was trying to put it under my head lying, the moment that I stopped moving, the object stopped doing anything as well, so it kind of synchronized to my intentions, because I was trying to shape it and then leave it, as if I would be sleeping, and it was very nice to see this relation, it kind of understood what I wanted from it, it was probably a coincidence, but it felt really nice that it kind of felt my … mood in a way, that was nice to feel, because if I was using the object as a pillow its nice that it measures, like the moment I freeze then its stops, and it leaves me to sleep or to watch TV, for instance, or do something else, that it kind of recognizes the situation as I felt it … that was nice

Second Workshop Participant: when I came in at first, I thought, wow, just pillows? I mean, I didn't want to look like a retard, just playing with pillows, I mean just holding the pillow, I didn't know what to do with it.

But ok, alright, lets try it, lets try to sleep with it …
So … I keep on listening to it, and then its, anytime I changed position then it was making another sound, but the sound is also a bit irritating,

But eventually I did find one position between here and here (pointing to front of pillow) and I felt that was a great place to sleep

I really liked the vibration, for me I think that you should put more vibrations, especially when it is in between, you know, your thighs, it gives you a really nice feeling, not in a perverted way, it does give you some kind of really nice feeling, like you are not alone, but if you saw from the other one, I also put 2 pillows because I realized one was too small, and then you kind of feel like you are with a Workshop Participant, and you feel like to you don't want to be with a very small Workshop Participant, its feels kind of pedophelic

First Workshop Participant: yes that is what happen, putting them together, trying to get a bigger mass just to feel like there is something there, and trying to get a fuller response

Bonana: and what about did you notice the 'selection' touch pad, and did you do something with it?

First Workshop Participant: I found myself always trying to put that part against my head … so I wouldn't, because I didn't want to …

Third Workshop Participant: I tried pressing it [the touch pad], and tried holding it down and pressing it ***in*** there, because at some point, well I was doing like this, and I was pressing it down because I thought that it actually has to do with the sound somehow, when I was pressing it, after I was just pressing it, I was trying to calm it down somehow, like press it, like make it stop in a way, and I was inviting, and it was reacting and it was really going down and the sound it was getting less, and there was no vibration at the time, but I felt somehow that I could really communicate with it, that I could give it some ….

Bonana: about the size, should it be bigger, or smaller

Well I think the size could be a little bit bigger

Third Workshop Participant: If its bigger its fine you know really, with this particular size I put it underneath my stomach if you noticed, because after the couple of times of throwing them around and feeling them I felt that this portion really felt very sensitive, and I thought, oh, why not try from different angles then also, that one together with the vibration does give you a very comfy feeling, like, again, you are not … alone.

But I think, if it was bigger, it would be really great, it would feel … you know … and also the mood, because the place was dark, and you could see the "glowing", it also gave it … ah … a romanticized feeling.

Yah … it does "tune" your mind, I wasn't even thinking anything technical in any way .. I was just thinking how it feels, you know

And it does feel a little bit sensual you know, for me it feels a little bit sensual, plus the 'red', and the 'glowing', but, but I am disappointed about the vibration, because … it is just gives you just a little vibration, and then it goes off.

No but not that short

Thecla: are you saying that you would like the vibration to last longer and to have more qualities to it, so that you could control it more …

A continuous rise and fall of vibration

First Workshop Participant: yes, yes, at this point it just feels like a cell phone

It needs to be various strengths, it felt like a cell phone, it starts and then it stops, it feels like something arbitrary is activating the vibration and then it stops

Thecla: a continuous strength of gain in volume, a feeling of strength and going down

Third Workshop Participant: I would gladly trade sound for vibration actually,

Second and first Workshop Participant: yes, yes, yes

Third Workshop Participant: because sound was tonations, so that vibration going in a similar ways could have difference tonations, and you get different frequencies from it, and different strengths, it would be really interesting

Second Workshop Participant: And I like what you did with the two sides (talking about kidney shaped soft object) with this part being a bit more

Third Workshop Participant: … Lower …. … it looks like a heart

Second Workshop Participant: yes, and in the darkness when you touch it, you feel it's almost close to a bit natural

Third Workshop Participant: Because of the inconsistent surface, it has a bottom side and an up side

Second Workshop Participant: and it looks and feels very grabby …

Rui: if you have to talk about the parts of that object, or if you had to make a metaphor with the human body, what would you call that?

Second Workshop Participant: I would call that "the perfect bum" (the kidney shaped soft object)

Rui: Is that one also the same (speaking of the other soft objects)

Second Workshop Participant: no I would not call that one the same, because I did have some very nice experiences with that one …

Bonana: is it because of the texture?

Second Workshop Participant: yes, it is because of the texture, because the thing is that you do set the **mood** here, so for me I have a different mood with this one than (suede bottom touch pad) with that one (kidney shape) … and that one does sort of tickle my mind to be more "grabby" or to grab it

Third Workshop Participant: this is like a different kind of animal or like some kind of … like an agorant alien

First Workshop Participant: I just noticed that they were different, I just noticed that this one is in the base and this one is in the side and I didn't notice that before …

Second Workshop Participant: this one (kidney) feels different from that one (bottom touch), this one (kidney) feels a bit, just slightly plasticky,

[all passing the others around]

Third Workshop Participant: [holding touch pad bottom one] this is leather though …

I think that leather also gives some certain quality of tactile feeling and I find it also quite animalistic, you get more careful when you feel this kind of material, and it gives you this idea that it brings you something more alive, that you have got to be more careful probably. This is the one that I smashed against the wall … but I would not do that if I would feel this material, because it gives me some kind of feeling that I have to like grab it or like really [he is squeezing it tight in both of his arms]

Second Workshop Participant: it does tickle your mind to want to do grabby, want to grab it.

Third Workshop Participant: and it is nice that you can like ***shape*** them [he is squeezing and forming it into a smaller area], that you can like ***press*** it, and I was trying to press it because I was thinking that it might change the mood somehow, I was like trying to press it … if I would like "ooooooooh" [pressing it and saying ooooooh] … it was reacting on pressing …

First Workshop Participant: I was wanting hold it and just do stuff, when I was testing I was thinking really …

I thought I should be doing something more active, but most of the time I really just wanted to go around like this, [holding different parts of the soft object and turning it and squeezing it]

Third Workshop Participant: I also wanted to fight it somehow all the time, I don't know why, I am not really an aggressive type Workshop Participant, it was like, ok, ok, I am [ill?] with you ….

Rui: I think the sound might somehow trigger that …

[laughter all around]

Third Workshop Participant: yah, yah, that is true …

Second Workshop Participant: I am more tolerant, … I really would be tolerant if any, if somebody was lying by me, and was making lots of noise, I could tolerate it, but up to a certain point, and then just, ok, ok, just be there, and it really feels at some point, because I really felt very comfortable when I was lying on the side and I could grab it and it felt really very fine, and I could feel the vibration and everything, so it felt much more, and whilst I was feeling this very sensual feel, then there was this very irritating noise, and so I like, will it calm down? Will it just shut up so that I could just concentrate?

So the sound should be really very mellow … very groovy … so it would be difficult for you to tell me time is up, I would just be here fondling this, stay awake …

Whoever … designed this, is a little perverted parts .. because I swear I can feel it … it has very special parts

Rui: can you throw me that one?

Bonana: so you prefer that kind of shape?

Second Workshop Participant: It is not about preference at all. If there was a way in which: one, two, three would combine, then that would be swell: that would be just funky.

Thecla: when you say that, when you say combine: are you talking about the size, the shape, that they can be put together and taken apart, or if there is one object that is a perfect combination of all three. And what if there were 10 or 12 objects?

Rui: or are you meaning that each soft object will fit perfectly a different part of the body?

Third Workshop Participant: well, without experience that, that is probably hard to ask for, but can I mention that …

Second Workshop Participant: for me to issue if it was a bit bigger, and if it had that feel, and that feel, now that would be really nice …

Third Workshop Participant: I guess size really determines the mood somehow, because the bigger you get, if it is bigger, somehow, its not quite that you feel more respect to it, but you are not going to do some crazy things with it I guess

Thecla: it is more equality or something like that …

Third Workshop Participant: that it gets closer to you size so that you are more touching it and less throwing it like a small size gives you the feeling that you can do anything with it, because I was throwing it in the air, and seeing how it behaves, but if it would be bigger it would be more pushing it down and trying to press it and maybe kick it but I would not throw it up,

First Workshop Participant: one thing I felt it was that , in some occasions I could rally feel that there was something inside the pillow , that I mean you have this mass, and then you have some hard part, and especially with the vibration in one case, it was in the first one, I could really feel the vibration and what was making it, well I am not sure, but I am wondering it you could just feel it as one object and not as like a shell, like a soft shell, I am just wondering if you can get more soft stuff around the circuits, maybe then you cannot then just grab them and find the shell.

Bonana: maybe if it is bigger

Rui: or maybe if you can find something, you do not find a box but something more round, like a harder knot of something that it can

Thecla: if you held a body for example, a body has things in it, like bones and organs, some are hard and some are soft, but the shape is not a box

Rui: there are no corners in it, that would be nice if

Third Workshop Participant: it would be nice if it could be embodied in something, if it could be surrounded by something. ..

Second Workshop Participant: or even placed within it so that you could placed inside here to shield it in some way, it would do some real good, and then the SIZE and then the VIBRATON, that would be really nice

And then the MOOD, you could do some more stuff with the mood, because …. this RED is really funky, but the thing is that it is also too hard, so it, then there is a contrast, because if you notice what I did the first time, I kept tossing it here and there because this (squeezing it together) gives you a different feel, and then you have to lie on this HARD thing, and there is just too much contrast.

TAPE 2

First Workshop Participant: there was something when I got in and that I was just remembering, the whole, shake and then the light, it just reminded me of that iPod feeling, and when you talked about the white carpet and then the lounge thing, I mean I really felt like this kind of iPod feeling, like an object, that is made just touch it like it is supposed to, that is why at the beginning I was just like, you know I would **never** throw it against a wall even if you would just if you told me, it just seemed so pristine and so nice and so white, and it is there, so careful and direct you also don't want to wreck it

Rui: its because it is white …

First Workshop Participant: yes, and that is just the association that I was making, but on the other hand, this fabric [the cotton] and the whole thing [the touch pad], takes a little out of it and well I guess that is good, and then you can feel that you can touch it, and go around and feel this, instead of just treating it like a design piece, so

Third Workshop Participant: it doesn't give you this … at least that it is meant for …robust …

Thecla: well an iPod is hard and these are meant to be soft

Rui: what is your opinion about their weight? Are they too light? Should they change weight? Are you expecting that one should be heavier than another? Did you sort of get a surprise?

Second Workshop Participant: I think that if it was too heavy that it wouldn't get the,

Third Workshop Participant: I think it is a comfortable weight, I think that it is

Second Workshop Participant: if it was too heavy then it wouldn't trigger any of the things that is happening how, I think that also there is a mental part that is going on; that is why we prefer it bigger, is that there is a mental, because it is so …. Because it is so, so feminine … that's how I call it

[laughter]

sorry, may I could call it … but it is so feminine for me, and you know, you would like to, you know, nicely,

Thecla: feminine and female are not necessarily the same thing, feminine is allowing certain qualities to be present, like the softness for example

Rui: which kind of objects did you have in front of you, like did you thought it was like a technological object or if you had to place this in a category like or some quality thing,

Third Workshop Participant: … an artificial pet, I think it would be something similar to iBo, but not really iBo, but something that sits in the corner of your room, and that you can interact with when you feel that you can get, that you can also, if you are pissed off you can bring your anger out, or if you feel low, you can just hold it and you can pet it, or you can just get comfortable with it, and you can relax and you can use it as a cushion, I think, for me it feels like a small artificial animal I would say …

First Workshop Participant: I think that they look pretty organic but the light, I think that it gives it pretty much saying this is technological

Second Workshop Participant: but for me, for me, I am able to kind of separate it, and say ok look, the lights and the stuff, is on this side, and the (I don't call it a pillow) the comfort is on this side, because it isn't very, I didn't see it as a "technological" something or an "artificial" something, even though the shape does give you an "unreal" shape for a pillow, I think that is also the idea, but for me, I felt that it is something, it is supposed to bring you comfort, for me

Second Workshop Participant: I think that if you are trying to set a particular type of mood, I think that there is some sort of a conflict and that should be resolved between the light and the sound.

Rui: so if you had to interact with the three of them, what did you think of that

Second Workshop Participant: there is a conflict, there the color red, there is the color white, there is a bluish … I think that the diffused light and the sound are contrasting, the diffused green is supposed to set a mood that is – the light is very continuous and the sound is very …

Third Workshop Participant: at some points I would like them to match I guess the sound and the vibration, at some points I would like them to be together to be in the same mood, at the same time at some times it would be nice if they were in contrast, maybe interesting if sound and light would swap, and sound would go really low, or in

Thecla: but what I heard you say before was what you are doing in relationship to what you are doing, or you don't mind if it is doing something else …

Third Workshop participant: Well, I think that these qualities, these dynamic qualities that it does have already, it gives you different, it enlightens you for different actions somehow … I find when it has sound, and when it gives out sound, it is more like a bat I find, and it is more dynamic in the mood giving effect, it is quite unstable I would say, I don't find it as an object that gives me certain feeling, I find it is an object that triggers my mood to change

Second Workshop Participant: For me it does trigger me to feel something, for me it does, for me it is contrasting with the sound and the light because the light is a very calm light, and the sound is a very irritating thing, ultimately if the whole effect is to bring you comfort or to trigger some feel then it is working.

But not optimally
They are contrasting things

And the vibration, if the vibration could be timed in a way, and if it is dropped very beautifully it goes up to a certain level, and it drops, and you could see that it is dropping very nicely, then you would, you would achieve this very nicely,

because this whole object starts you from some point

Rui: can you talk a bit about how you felt with three pillows at once, did that change anything?

Second Workshop Participant:

I have perverted thoughts with all three pillows, for me, straight up, it was just straight up, oh wow!

Rui: so having one or three it was just a number, that was the difference for you

Third Workshop Participant: oh no, it does make a difference

First Workshop Participant: it was just nice to see, that they, well you could feel sometimes, I was just putting one away, and then I was just applying pressure to the other two, and then the other one was answering, and so I could expect something different

They would react to one another: I really like the SoundScape of 3 pillows.

Third Workshop Participant: I was trying to get them to socialize somehow, when I had all three I was trying to build a pyramid, or I or put them together, or was trying to get them to turn their sides to one another, I was trying to get them to communicate.

Thecla: So when you say socialize, do you mean physically socialize? Or in some other way?

Third Workshop Participant: well, socialize, I was trying to get them to interact with each other. I was trying to figure out if there were certain positions that if they were like if they can communicate, not exactly communicate, or interact between, or somehow influence each other, I was hoping maybe if one was giving sound that maybe another one would get that sound I was expecting this social exchange of the sound, or of the light, or maybe if one vibrates and you bring another and they start vibrating and they would still vibrate for awhile and then maybe they would stop for awhile, and things like this, and they give each other example of behaviour, that is what I was thinking

Second Workshop Participant: well, don't you think that you are also influenced by the fact that you have for example, unlike me, I don't have the information that they are "wireless" ….

Third Workshop Participant: isn't that on the website ?

Second Workshop Participant: well, the whole idea is to test these pillows, so taking technology –out- for me, is just taking technology out and put it on the side, it is not about the technology, whether it is "wireless" or not wireless

Thecla: what are your sensory responses, because you have talked about it being sensual for example, all of you have talked about that, is there one of the senses that was more prevalent, or how for example, can you say something about what that felt like, if one took over from the other, or if they worked together, if you noticed from the other one different situations, made you interact with it, because there are different senses going on: you have different senses and the pillows have different senses.

Second Workshop Participant: for me, like I am, subconsciously you always have this us, … it doesn't matter what I say right?

For me, it is about, uh, the, unnatural, or natural desire, how would it be like to have 2 or 3 women in a room, well, of course, they are women, but you know what I mean?

Intimate, intimately, then you think about it, but you know that it is one of the biggest things that you don't want to risk, having 3 women in one room, so for the first time, as these things begin to trigger, I will speak for myself, as these things begin to trigger my feeling of comfort and of being with something very feminine

Third Workshop Participant: like a simulation?

Second Workshop Participant: yes, like a simulation, more like a simulation, then I begin to feel like, oh. then I am comfortable with these "women", and they are not fighting with each other, nothing is happening, I can feel the others ..

Rui: did you notice that the objects were influencing you more than you were influencing the objects?

Second Workshop Participant: yes, yes, for me, the objects were influencing me, more than I was influencing them, and if you notice also with the last one, I really brought all of them together close. I really felt … oh wow! …. Wow! They can be close.

First Workshop Participant: I also wanted to bring everything closer together, and then, being in contact with everything, and then …

Second Workshop Participant: I also, I also, unconsciously, I realized that it is also a bit of a control as well. That I could have you know, oh wow, these three women together, nothing is happening, but you could still feel them

Third Workshop Participant: I felt, I felt, I recognized them as a material somehow, I wanted to build some kind of a nest from them, I wanted to put them around, and then I wanted to lean somehow on this construction afterwards, that it was some kind of a, not a building material, but something that may be more like a, kind of a smaller angels that would make me a company that I could be with together like harvest or

Rui: were there any kind of questions that it triggered you, did any kind of question mark come up, in your head when you were playing with them?

First Workshop Participant: I was actually trying to, well I just got technical and I was trying to figure out, ok, what is making this work, what is going on here? And from your whole suggestion of the whole sensual and the whole sexual, I really think, and this is based on the whole idea of the sound and the light and the vibration not being totally understood, it is pretty much like you are not in power, you are not controlling them, they are actually having their own way, they have their own life, and it is pretty much like when you are with another person and they say "well I need to go now!"; it

is not like you don't understand or anything like that, it is just that somehow, they have their own life! So it is not about needing to understand them, it is about working with their own life, and so this looked pretty much that, I have this object and I am with it, but on the other hand, it has this life and I cannot get in, and so far I am just restricted to a physical relationship and trying to understand what this is all about, but on the other hand it keeps showing me that I am not in control, because all of its mechanisms are so different than me, I mean … I think if the light and the sound and the vibration were in a place that I could feel that ok, pressure (pushes) its living and pressure (releases) its dead; and I like the way that, for example if you get with (using your example –looks at workshop participant two) a lot of women, and they can talk on the side you can be with two of them and they are talking with a third, and all of a sudden, they can make this collusion, and all of a sudden you are out of it: well that is pretty scary if you see it from a sensual and from a social point of view, just like this whole fantasy [of yours] of being with three women and they, they just start having fun without you , and that is the kind of thing that came up for me, and I just like the fact that you cannot get hold and control these objects and go away and say, ok, I totally got this, and this experience is finished

THE NEED FOR QUESTIONS/QUESTIONNING TO BE A PART OF EXPERIENCE

Second Workshop Participant: for me, it is **not** the desire to control, the desire to control has nothing to do with they themselves, having their own minds as they are themselves, of course it doesn't change the fact that you would want some form of control, but … on the other hand, my question would be, if the whole of this, test and this whole soft object is to trigger a sensual mode, invite a sensual feel, from us, if that is the whole idea, then it does work, it does work on me, but then, it does become somewhat confusing for me, it does become, almost in some ways pornographic, there you have – cameras, also looking at me trying to get deep into what I think about these pillows

Thecla; we are trying to understand – is this idea that we have – does it work

Rui: I think I can explain this – something has been worrying me, I have been working on these pillows as well, and what I have been worrying about is that they have been controlling me, so what I notice that the way that I touch them is not normal, is because I know what is inside, and this is what I want to see, because someone whose is not being manipulated by pillows for 2 months already or half a year, they have been manipulating me, so I am a slave by now, so like all my behaviour is just controlled by them, so we just wanted to see the behaviour of someone who was not manipulated before

Bonana: I think that any objects makes you a slave if its comfortable, you get a slave with the objects

Rui: I have been working for quite long with them, and I didn't do like 2% of the kinds of things that you did with them, I never did it, I most of time, touch it with one finger,

First Workshop Participant: because you know that is the soft spot with them and that there is no point to just start pinching them …

Rui: so this is really great. This is why we need this test, to see like what real people do to the pillows, because I don't consider myself a real person.

Second Workshop Participant: no, but there are also other things that people would like to do with pillows, if there weren't cameras and other people watching

Bonana: yes, you have 3 different individuals, I mean your mood is very different from his, and from yours again, but all of the soft objects that trigger in your mood

Thecla: why did you fight when you were together the 3 of you. Do you think it was because you were 'guys'? or another reason?

Second Workshop Participant: well, Three different people getting together, the first thing they are going to do is fight.

The only thing, we are not going to be sitting here touching pillows.

Rui: there is something that we have to take into account, they were invited to come in and interact with them. Would you be so compelled to play with them for so long.

It depends on the environment, with the carpet and the mood that you are thinking about

First Participant: will the pillow fighting, was actually just a part of being fun, it was playing, I was thinking if I went to the MacDonalds place alone, I would try to look for a play experience, invite different feelings, double constraint of the situation being recorded I felt more compelled to just play and have more fun, trying to find an excuse to have fun.