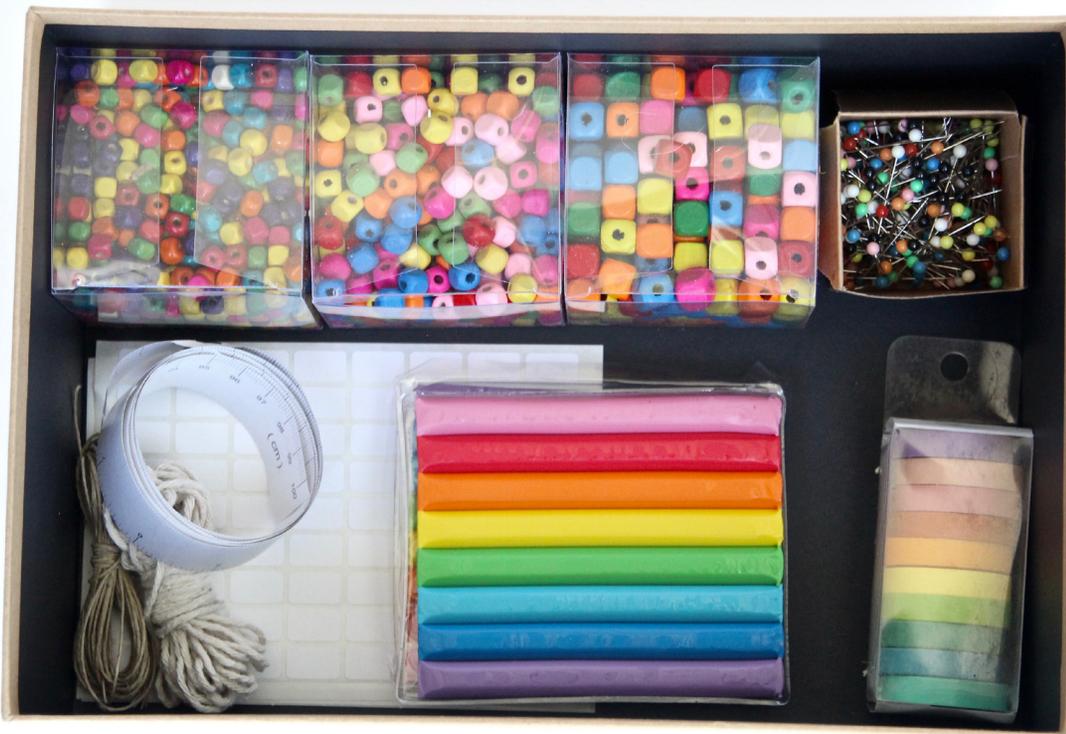


## Supplemental Material

# Self-Reflection and Personal Physicization Construction



### Index

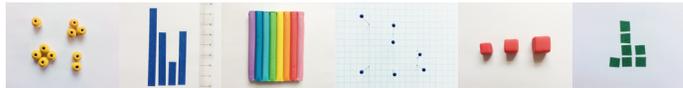
This supplemental material, provides details of:

- (i)** the study documents including:
  - recruitment poster p.2
  - email prompt for the diary study p.2
  - pre and post study interview guidelines p.3
  
- (ii)** the workshop components including:
  - summary of the workshop presentation p.4
  - all datasets used p.4-6
  - pictures of the workshop process p.7
  - resulting artefacts p.8
  
- (iii)** the construction kit p.9
  
- (iii)** additional pictures of participants' physicalisations alongside the description from the paper. p.10-18

## Recruitment Poster

### PARTICIPANTS NEEDED!

LEARN ABOUT VISUAL DATA REPRESENTATIONS BY PARTICIPATING



Help us understand how people can use physical materials to build visual representations of their personal data! We are interested in how constructing physical charts and graphs can support reflection and expression.

#### BENEFITS

- Free workshop on creating visual data representations!
- Get your own kit of materials to create visual data representations!
- Learn something about yourself by logging your own data for 2 weeks!

#### PROCEDURE

**Please only apply if you have time to participate in all four parts of the study!**

1. *Workshop on June 1<sup>st</sup> 6 pm* at the University of XXX (~120 min)

You will be invited to participate in a group workshop to introduce you to the practice of creating visual data representations. The workshop involves hands-on exercises on how to use physical materials for creating visualizations of small data sets. During this workshop we will discuss your process and design decisions.

2. *Pre-Interview (~20-40 min)*

After the workshop you will be invited back to participate in a brief interview. The interview will focus on your ideas and expectations towards visualizing data to reflect on aspects of your own life.

3. *Try it out at home! (~2 weeks, ca. 5 min per day)*

After the interview, you will receive a data visualization kit. This will help you explore an aspect of your life that you choose for at least two weeks. During this time you will use the kit to create and update a visualization of your data and document your thoughts as well as the state of your representation.

4. *Exit Interview (~60 min)*

You will be invited for a final interview where we will ask you about your thoughts, discoveries and experiences you made while documenting and visualizing your data.

#### DATES

The study will take place from **June 1<sup>st</sup> to June 30<sup>th</sup>**. The workshop will take place on **June 1<sup>st</sup> at 6 pm**.

#### DATA COLLECTION

You will be video recorded during the workshop and interviews. We will take photos of your visualizations. Parts of the video might be used in scientific publications, so your participation in the study could be recognizable.

This study has been approved by the Conjoint Faculties Research Ethics Board.

#### CONTACT

Jhon Smith, Phone: (XXX) YYY ZZZ, Email: [Jhon.Smith@gmail.com](mailto:Jhon.Smith@gmail.com)

## Email Check-ins

Hi <Participant>,

Your answers to the questions below will help us document and understand your process.

- Are you experiencing any challenges?
- Did you make any decisions to adjust your visualization design?
- Did you adjust your process?
- Did you add any materials to your visualization beyond what was provided in your kit?
- Have you identified any interesting patterns in your visualization?
- Please describe when and how you are creating your visualization?
- Please tell us about any other thoughts you have about your representation, logging or process.
- Please take some pictures of the current state of your visualization and attach them in your response!

#### IMPORTANT:

Whenever you are making any adjustments or add to your visualization please take a quick picture!

Thank you so much and happy visualizing!

# STUDY DOCUMENTS

## Semi-Structured **Pre-Interview**

### TOPIC OF INTEREST

- Are you already logging data about your life? How?
- What aspects of your life would you be interested in exploring during this study?
- What about this aspect particularly interests you?
- What is your main motivation for logging and visualizing this data?
- Do you have any specific questions you are interested in exploring?

### VISUALIZATION PLAN

- What data attributes about <aspect> would you like to log?
- Did you decide on the materials you would like to use? How?
- How do you want to represent this data using these materials?
- Do you envision any challenges or problems during the process?
- Do you think the process will fit with your daily routines?
- When were you thinking of doing the logging?
- Do you think you might discuss the representation with other people? Who? In which context?
- How long would you like to try it?
- Do you think it will be challenging for you to stick with the process? How?

## Semi-Structured **Exit Interview**

### MAPPING

- Please explain the visualization you made.

### DISCOVERIES AND REFLECTIONS

- Did you make any discoveries or learn anything from creating your visualization?
- Was anything you found surprising?

### INTEGRATION

- Where did you place the visualization? Why?
- Did the logging fit with your routines?
- What kind of habit did you create around it?
- Was it difficult to remember to update the visualization regularly?
- Did the reminder emails to take photos change anything about your process?

### COMMUNICATION

- Did you talk about the representation with other people?
- Are you planning to show it to anyone in the future?

### PHYSICALIZATION

- What are your thoughts on using physical materials to log your data?
- Do you think the physical logging has any particular advantages for you?
- Do you think it has any disadvantages?
- Do you feel like the materials gave you enough freedom to create your representation in the way you wanted to? What were you missing?
- Why did you choose material x for your representation?
- In retrospect do you think this worked for you?
- (If materials were added: why did you add x to your visualization?)

### GENERAL THOUGHTS

- Did you experience any difficulties in logging or visualizing your data?
- Are you satisfied with your visualization?
- Did it meet your initial motivations?
- Are you planning on keeping it?
- Do you want to add any other thoughts about your project or the process?

# INTRODUCTORY GROUP WORKSHOP

## Summary Sheet

Participants received this document at the end of the workshop to take home. It summarizes the material presented during the workshop.

### CONSTRUCTING VISUALIZATIONS

#### Look Up Sheet

#### MOTIVATIONS

Constructing your own visualization can help you to create awareness, address a problem, express yourself, tell stories, reminisce, motivate or reward yourself, improve a behaviour, be curious... and many more.

#### DATA TYPES

There are different types of data you can collect. Your visualization does not have to incorporate all these types. Decide on what best suits your own purpose. Here are some examples of possible data types:

#### TOPICS

Possible topics you could log include social activities, workouts, dreams, household chores, sleep, headaches, mood, compliments, acts of kindness, things you bought, expenses, complaints, drinks, saying "I love you", trying new things, reading, work hours, eating, worries, procrastination, coffees or anything else you are interested in exploring.

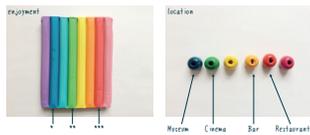
Date	How many people	Costs (\$)	Where	How enjoyable
11/03/2016	5	45	Bar	**

↑ dates & time      ↑ numbers      ↑ categories      ↑ ordered items

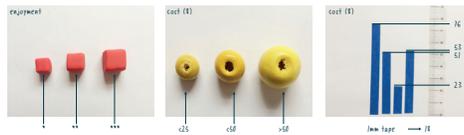
#### MATERIALS & VISUAL PROPERTIES

To create your visualization, you can map data to the visual properties of the provided materials or materials you decide to add to your kit. Here are some examples of how you can map data to different properties:

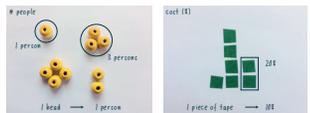
##### COLOUR



##### SIZE



##### COUNT



##### POSITION



#### STEP BY STEP

##### YOUR TOPIC

*Pick an aspect that is engaging!*  
What topic or aspect of your life are you interested in exploring, understanding, showing?  
Why are you interested in this topic?  
What is the visualization for (e.g. to discuss it friends, reflect, create something decorative...)?

##### DATA ATTRIBUTES

*Choose what to observe!*  
What questions about your chosen topic interests you?  
What aspects do you want to get an overview of or compare?  
What data would you need to collect to represent this topic?  
How will you collect this data? Is it feasible?  
Decide on categories, numbers, dates, etc. you will log!

##### MAPPING

*Decide how to show the data!*  
Which materials will you use?  
What data attributes do you want to map to which visual properties?  
How many colour/size choices do these materials provide? Do they require binning the data?  
Do you want to change your representation or is it permanent?  
Draw sketches and try out the materials! Try different mappings before deciding on one!

##### LOG & VISUALIZE

*Create a habit!*  
How can you integrate the logging into your daily routines?  
When will you record the data (e.g. after the event, at the end of the day, right after you get up...)?  
Whenever you add data, take a moment to reflect.  
Make adjustments when it is necessary.

## Workshop Datasets

These datasets, used during the workshop, were partially covered and revealed line by line to simulate a dynamic data.

### COMPLIMENTS

#### Data Attributes

- Date
- From/To
- Given/Received
- About
- How much I believed it
- Compliment

#### For?

Motivating myself to say more nice things to people.  
Noticing what people appreciate about me.

#### Setting of use

To carry with me every day and to use on the go.

#### Example

Date	From/To (Friend, Colleague, Partner, Stranger)	Given/Received	About (Accomplishments, Intelligence, Skills, Character, Looks)	How much I believed it (1-5)	Wording of the Compliment
15-Mar	Friend	Received	Character	5	"Thank you for being such a good friend."
17-Mar	Stranger	Given	Looks	5	"Those are awesome shoes"
17-Mar	Partner	Received	Looks	3	"You look great today"
19-Mar	Friend	Received	Character	5	"You are always there for me when I need you."
19-Mar	Friend	Given	Character	5	"I think you are very brave."
22-Mar	Colleague	Given	Skills	5	"You always give such thoughtful feedback."
23-Mar	Friend	Received	Looks	2	"Your hair looks good today!"
24-Mar	Colleague	Received	Accomplishment	4	"That was a great presentation."
27-Mar	Partner	Received	Intelligence	4	"You are so smart!"

# INTRODUCTORY GROUP WORKSHOP

## EXPENSES

<b>Data Attributes</b> <ul style="list-style-type: none"> <li>• Date</li> <li>• Amount</li> <li>• Category</li> <li>• Necessity</li> </ul>	<b>For?</b> Reflecting on my spending and trying to be more mindful about my expenses.	<b>Setting of use</b> To use in personal office space.
--	---	---

### Example

Date	Amount in \$	Category <small>(rent, groceries, utilities, phone/internet, going out, clothes, other)</small>	How Necessary <small>(very, kind of, not at all)</small>
01-Mar	1000.00	rent	very
02-Mar	189.20	groceries	very
02-Mar	53.56	going out	kind of
03-Mar	78.56	clothes	not at all
04-Mar	23.67	going out	kind of
05-Mar	35.99	other	not at all
07-Mar	56.18	groceries	very
09-Mar	37.20	going out	very
12-Mar	67.89	going out	kind of

## PLACES I VISITED

<b>Data Attributes</b> <ul style="list-style-type: none"> <li>• Date</li> <li>• Place</li> <li>• Category</li> <li>• Enjoyment</li> </ul>	<b>For?</b> Storytelling and Reminiscing. Creating a souvenir of a trip.	<b>Setting of use</b> To tell my friends about a recent trip over dinner and as a decorative piece in my living room.
---	---	--

### Example

Date	Place	Category <small>(restaurant, landmark, museum, bar, outdoor)</small>	Enjoyment <small>(1-5)</small>
15-Mar	MoMa	museum	5
15-Mar	Rockefeller Center	landmark	5
15-Mar	Ming	restaurant	3
16-Mar	Fat Cat	bar	5
17-Mar	Roebing Tearoom	restaurant	4
18-Mar	Central Park	outdoor	5
18-Mar	Punk Pub	bar	2
19-Mar	Brooklyn Passenger Ferry	outdoor	4
19-Mar	Pizza Pizza	restaurant	3

# INTRODUCTORY GROUP WORKSHOP

## HEADACHES

<b>Data Attributes</b> <ul style="list-style-type: none"> <li>Date</li> <li>Time</li> <li>Duration</li> <li>Pain Level</li> <li>Type</li> <li>Stress Level</li> </ul>	<b>For?</b> Identifying whether my headaches are stress related	<b>Setting of use</b> To show to my doctor during my next visit.
---	--	---

### Example

Date	Time	Duration (in h)	Pain Level (1-5)	Type (Throbbing, Piercing, Pressing, Other)	Stress Level (1-5)
15-Mar	2:40 PM	2:30	3	Piercing	4
18-Mar	7:45 PM	2	4	Pressing	5
20-Mar	8:25 PM	1	2	Pressing	3
23-Mar	11:00 AM	3	5	Piercing	4
24-Mar	9:00 PM	2:30	3	Throbbing	2
25-Mar	8:30 PM	2	2	Pressing	3
27-Mar	6:00 PM	3	4	Pressing	5
28-Mar	9:30 AM	2:30	2	Piercing	3
29-Mar	8:45 PM	1:30	3	Pressing	4

## DREAMS

<b>Data Attributes</b> <ul style="list-style-type: none"> <li>Date</li> <li>Emotion</li> <li>Intensity</li> <li>Location</li> <li>Themes</li> </ul>	<b>For?</b> Increasing awareness of my dreams and chance of lucid dreaming.	<b>Setting of use</b> To place on my nightstand and use every day after waking up.
---	--	---

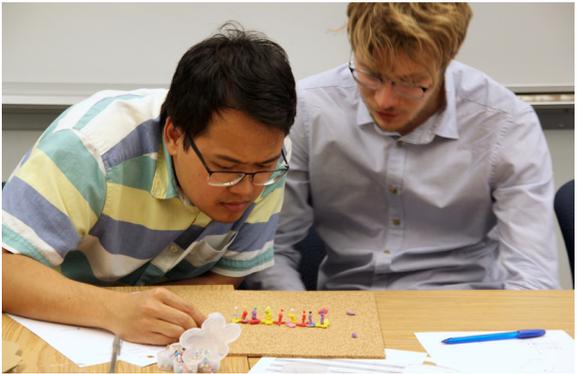
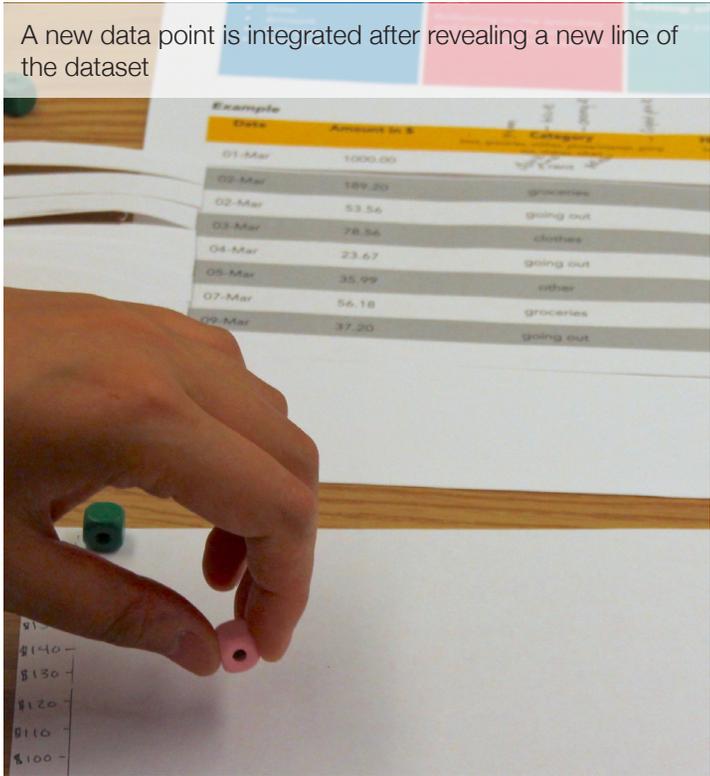
### Example

Date	Emotion (joy, fear, anger, stress, sadness, neutral)	Intensity (1-5)	Location	Themes
15-Mar	fear	2	Forest	Relationships
16-Mar	joy	3	My House	Friendship
18-Mar	fear	5	Top of a building	Loss of Control
20-Mar	anger	2	Store	Loss of Control
21-Mar	neutral	0	A House	Relationships
22-Mar	stress	5	Workplace	Failure
24-Mar	stress	3	Workplace	Failure
26-Mar	joy	4	A House	Family
27-Mar	fear	5	A Hospital	Courage

# INTRODUCTORY GROUP WORKSHOP

## Group Exercise

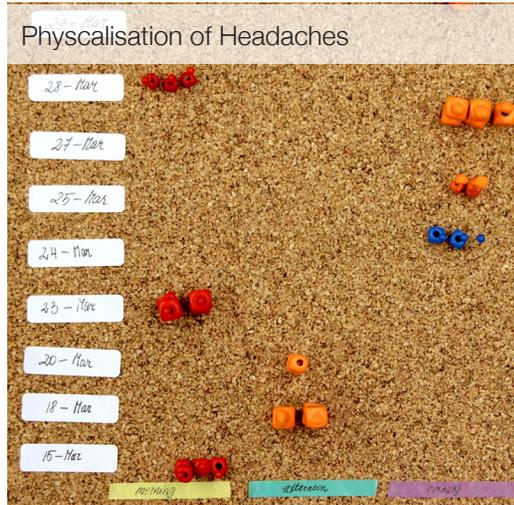
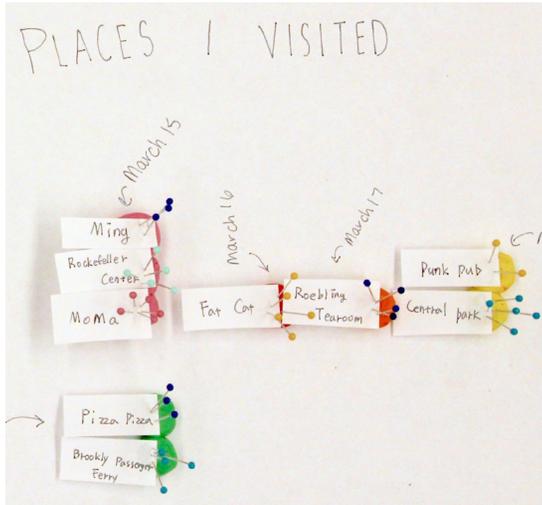
These pictures illustrate the group exercise activity during the workshop. Participants physicalized data in groups of 2-3 by revealing the datasets line by line. This simulates the ongoing physicalization process later implemented by participants at home.



# INTRODUCTORY GROUP WORKSHOP

## Workshop Physicalizations

These physicalizations were created by participants during the group activity of the workshop.



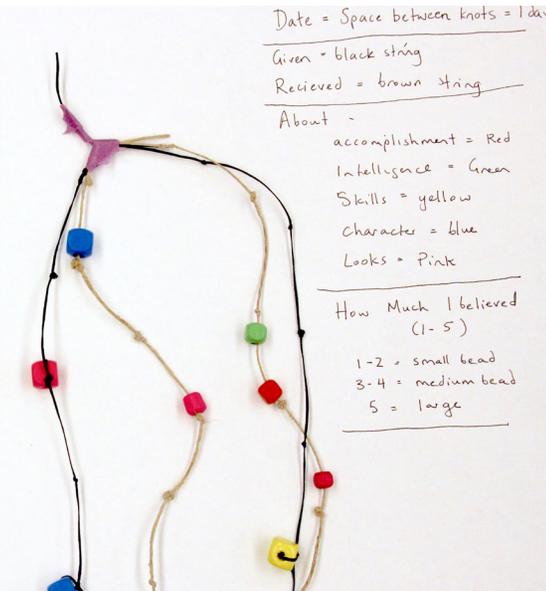
**COMPLIMENTS**

Data Attributes	For?	Setting of use
<ul style="list-style-type: none"> <li>Date</li> <li>From/To</li> <li>Given/Received</li> <li>About</li> <li>How much I believed it</li> <li>Compliment</li> </ul>	Motivating myself to say more nice things to people. Noticing what people appreciate about me.	To carry with me every day and to use on the go.

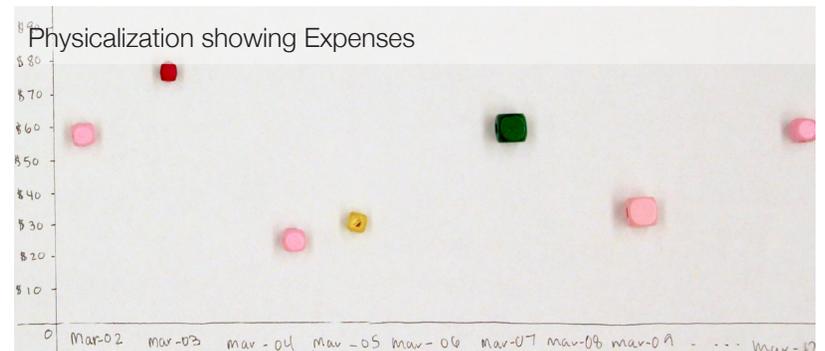
  

**Example**

Date	From/To (Friend, Colleague, Partner, Stranger)	Given/Received	About (Accomplishments, Intelligence, Skills, Character, Looks)	How much I believed it (1-5)	Wording of the Compliment
15-Mar	Stranger	Received	Character	5	"Thank you for being such a good friend."
		Given	Looks	5	"Those are awesome shoes."
			Skills	5	"You always give such thoughtful feedback."



Physicalisation of Compliments as a Necklace.



# PHYSICAL CONSTRUCTION KIT



Construction kit in a box as handed to participants

After the workshop, the participants received this construction kit. The kit contained beads (8 colours, 3 sizes), plasticine (8 colours), pins (8 colours), tape (10 colours), thread (2 colours), labels, measuring tape, and a foam core board. Alongside the kit participants were handed a summary of the presentation (see page 4) to take home.



Beads in 8 colours and 3 sizes: (~80-100 small, 50-60 medium, 20-30 large beads per colour)



Approximately 200 pins in 8 different colours.



Rolls of tape in 10 different colours.



Two packs of plasticines in 8 different colours.

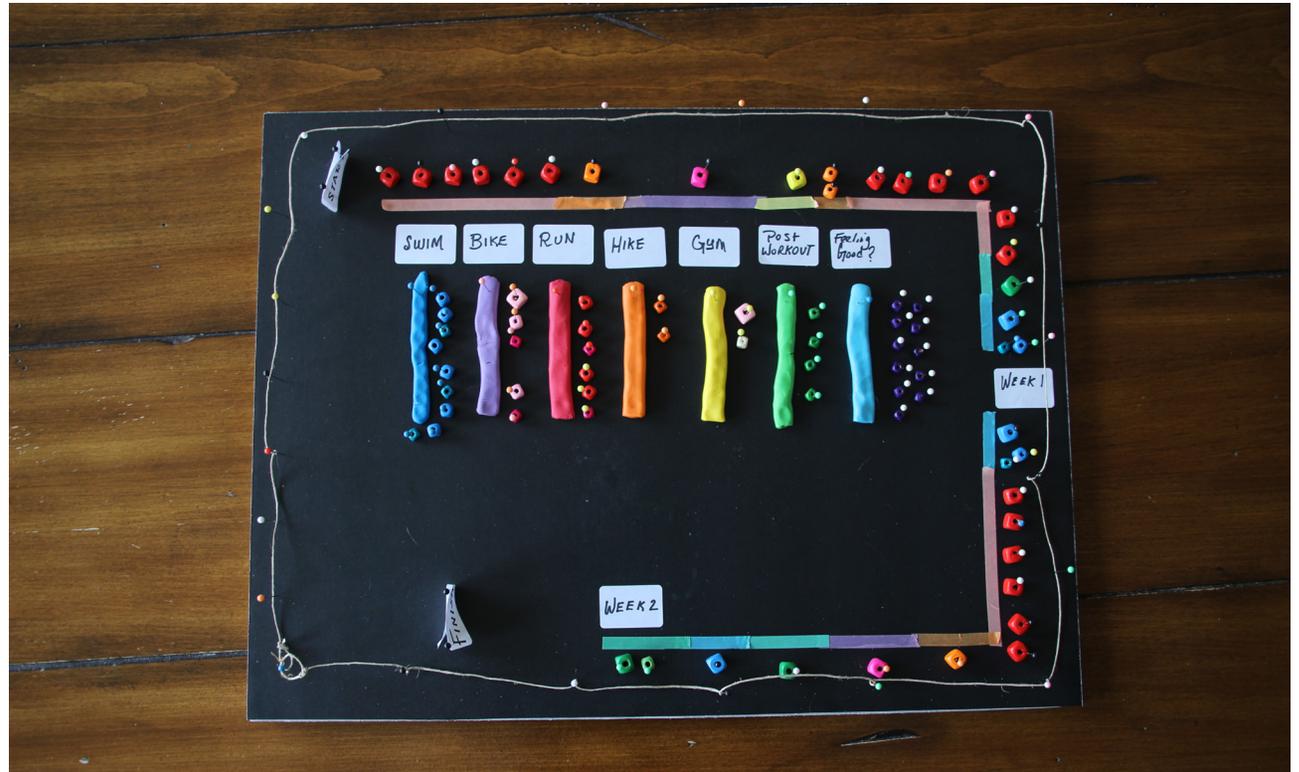


Measuring tape, labels in two sizes, thread in two colours

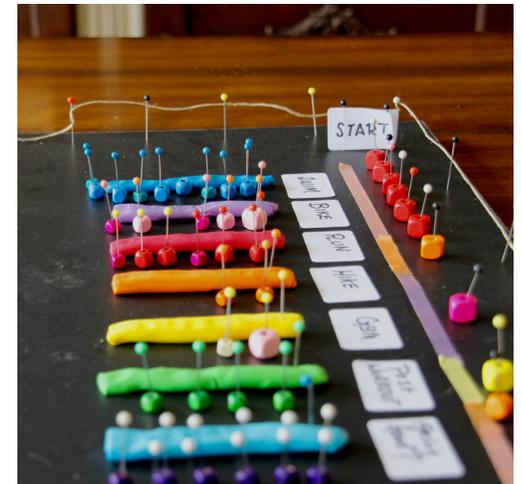
# STUDY RESULTS

## Participant 1 Workouts

P1 wanted to create a “sport autobiography” of his workouts that adequately “portrays” this central part of his identity. He also aimed to use the physicalization to develop a workout routine that contributes to his well-being while facilitating his ambitious fitness goals. He used colours to represent his physical activities (e.g. running, swimming, biking; see on the right side). Intensities of workouts are marked with tape around the board and durations are shown using beads next to the tape and in the centre of the board. The physicalization is laid out as a stylized “race track” with start and finish flags. Through this visual analogy, P1 aimed to emphasize his “story”. He found that the manual construction brought out “the human experience” of the topic and fostered “deep thinking”. The process paired with his knowledge on athletic training let P1 develop a workout routine that allowed his body to recover.



Physicalisation on the kitchen table where it was made



# STUDY RESULTS

## Participant 2 Hip Pain

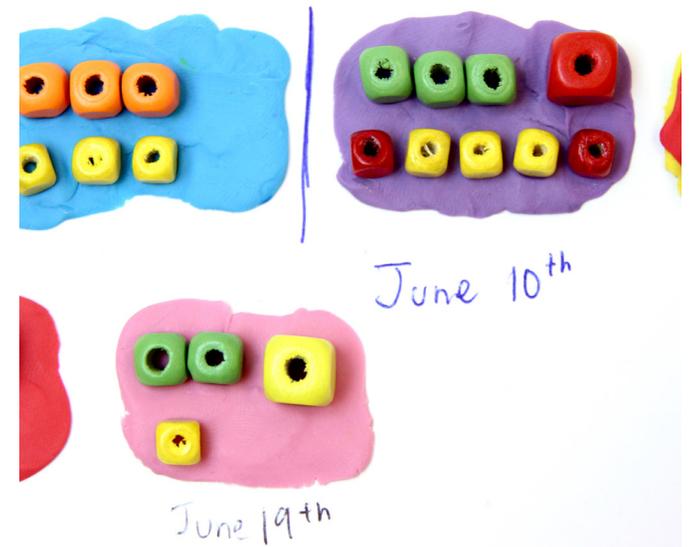


P2 is experiencing severe hip pain and wanted to create a physicalization to see how his pain progresses. His physicalization shows the intensity of the pain in the number of medium sized beads, the "walkability" in their colour and his pain killer intake in the small beads for each day grouped on a piece of plasticine (see above). After 5 days P2 noticed that his pain is "very complex" and thus decided to add "difficulty of changing position" as an additional attribute (shown in the colour of a large bead) to more fully describe his experience. He stated that while he did not use his physicalization directly in communication with a medical specialist it helped him to become more aware of the intricacies of his condition.



Date: June 8th, 2016; Pain:3; Walkability:Yellow; Drug:A|A  
 Date: June 9th, 2016; Pain:3; Walkability:Orange; Drug:A|A|A  
 Date: June 10th, 2016; Pain:3; Walkability:Green; Difficulty of Changing Position:Red; Drug:T|A|A|A|T  
 Date: June 11th, 2016; Pain:2; Walkability:Yellow; Difficulty of Changing Position:Yellow; Drug:T|A  
 Date: June 12th, 2016; Pain:2; Walkability:Yellow; Difficulty of Changing Position:Orange; Drug:AA|T|A|A  
 Date: June 13th, 2016; Pain:2; Walkability:Yellow; Difficulty of Changing Position:Orange; Drug:AA|T|A|A

Digital log file, containing colour words to describe aspects of P2's hip pain.



# STUDY RESULTS

## Participant 3 Mood

P3 wanted to understand how being active affects her mood and to create a decorative artefact that positively affects her mood: "you can actually look at it and be in a good mood if it looks nice". P3 created a small bead ornament each day that she used to decorate branches in her kitchen. She logged her data in 4-hour intervals, each represented by one bead with its size showing P3's mood and colour showing whether she was active, social or home. P3 took the physicalization materials with her while on-the-go which allowed her to log her mood throughout the day. Constructing her physicalization continuously helped P3 gain an awareness of her mood which in turn positively affected her reflections in the evening when hanging her day's ornament into the branches: "Instead of going to bed thinking ok it's been a bad day, nothing extraordinary, you can see 'Ok, I've put a lot of big beads on, so it must have been a good day.". Contrary to P3's expectation her activities did not have "any influence on the mood".



P3 made this small kit to physicalize on-the-go.



Domestic Context

# STUDY RESULTS

## Participant 4 Nutrition

P4 wanted to explore how her 4-year-old daughter's (P4c) nutrition affects the child's bowel movements. The project was motivated by P4's worry that her daughter's diet might lead to constipation. The physical approach allowed P4 and her daughter to engage in the process together. Their shared physicalization shows an overview of food servings (each shown with one bead coloured according to the type of food) across 27 days (marked with tape; see on the right side). The plasticine sculptures created by P4c mark days when she had bowel movements. This activity "motivated" P4c to go to the bathroom more frequently, thus mitigating the previous problem of constipation. The physicalization reduced P4's worries of having to eliminate specific food from P4c's diet. P4 describes their collaborative construction as a "bonding experience" and as a way for P4c to become "more body aware".



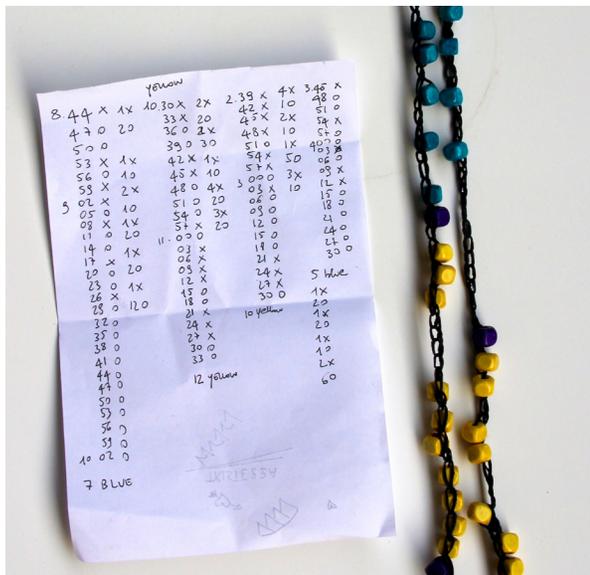
Physicalisation was regularly created on this coffee table.



# STUDY RESULTS

## Participant 5 Distractions during Writing

P5 created wearable physicalizations of distractions during her thesis writing. She anticipated that wearing them would motivate her to be focused. She made one bracelet/necklace for each work day with one stitch representing 3 min of work and beads showing times of distraction (see on the right side). Work sessions are separated with purple beads. The colour of other beads shows whether tasks for each working session were accomplished. Because "the process has not been as motivational as expected" P5 started using the physicalization "in an explorative way". This approach helped her develop more productive work strategies. The process further encouraged her to become "more compassionate" with her own ways of working.



Translating logs into a pattern for creating the necklace/bracelet.

Physicalisation in P5's living room



TOE-DONE

8.46  
8.53  
8.59  
9.01  
9.04  
9.07  
9.19  
9.27

10.31  
10.35  
10.42  
10.45  
10.49  
10.57  
11.03  
11.06-11.12  
11.22-11.27  
11.36

2.40-2.50

2.55  
2.58  
3.00  
3.03-3.05

Digital log, created during writing



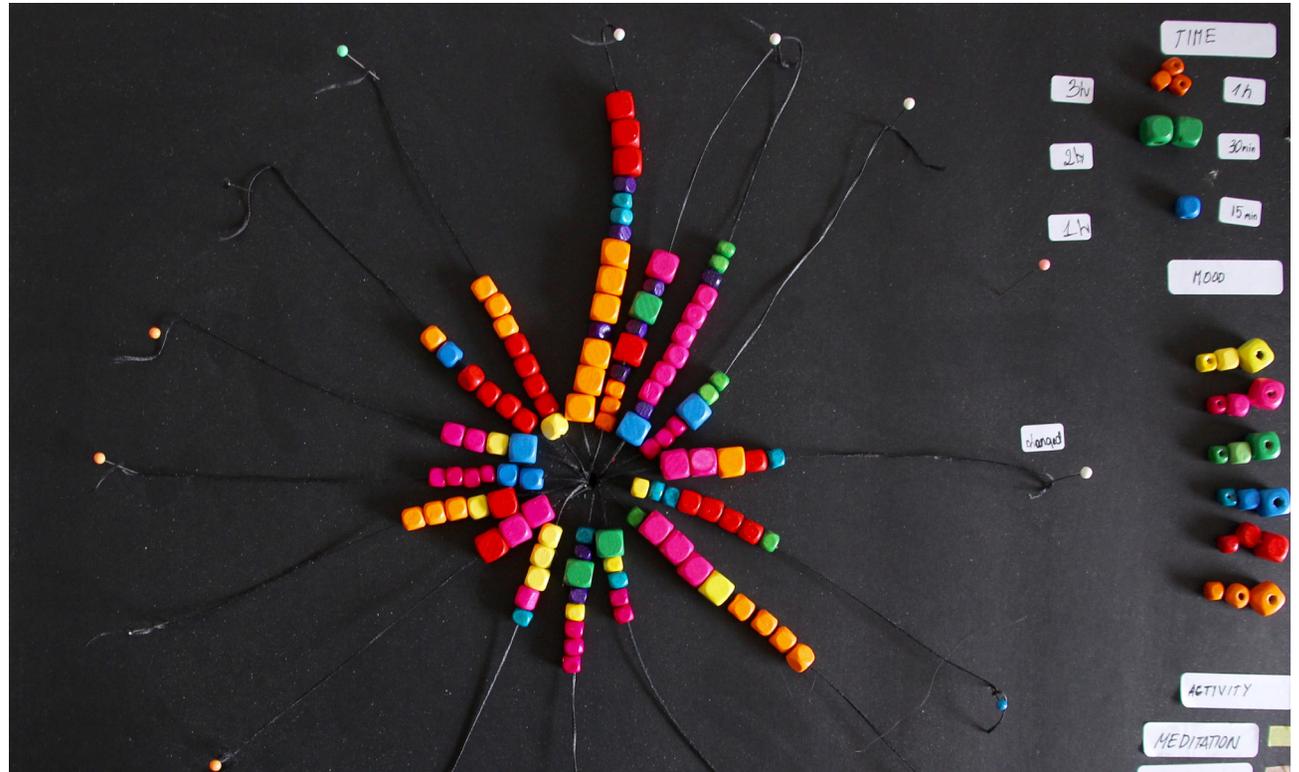
Overview of necklaces/bracelets on a board with additional information about times of work sessions, marked with tape.



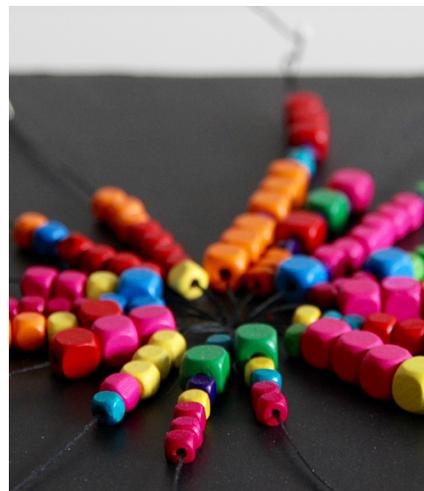
# STUDY RESULTS

## Participant 6 Activities and Enjoyment

P6 wanted to understand “where [her] time goes”. She logged 6 different activities (e.g. meditation, work, etc.) shown as different coloured beads, each representing one hour, with their size showing enjoyment (see on the right side). Aesthetic appeal was a central goal in P6’s design and is reflected in the circular layout of strings that each represent one day. P6 sometimes experienced the manual construction process as “tedious”. However, the invested effort made P6 feel “attached” to her physicalization.



Physicalisation on the desk where it was created

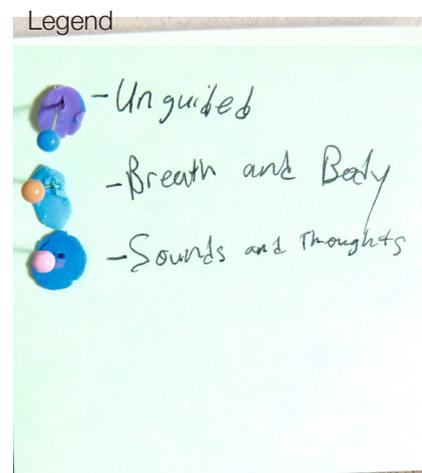
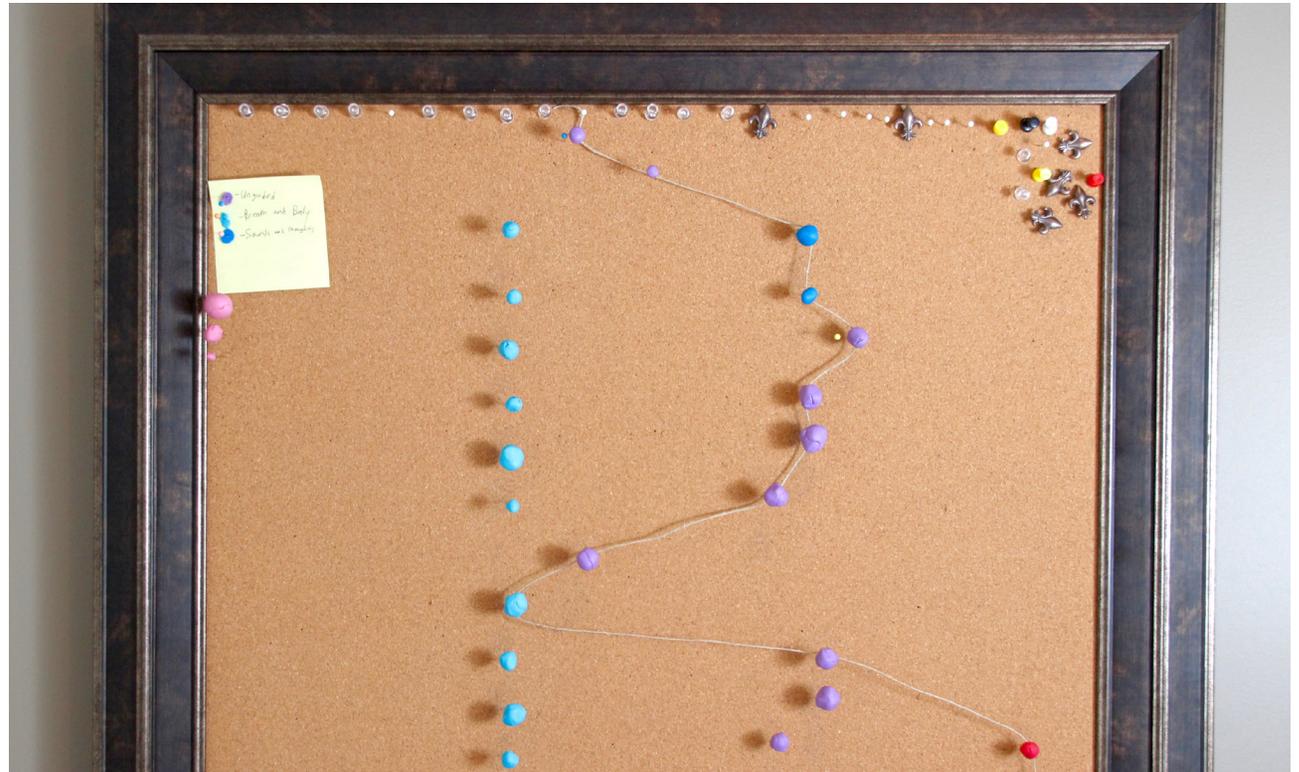
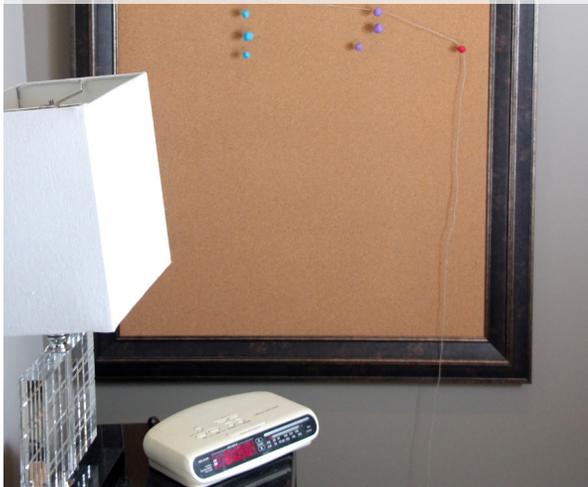


# STUDY RESULTS

## Participant 7 Meditation

P7 wanted to create his physicalization to monitor and improve the “consistency” of his meditation practice and understand which forms of guidance improve his experienced “quality” of meditations. He represented the duration of each meditation in the horizontal position of pins on a board in his meditation space (see on the right side). The aggregated duration of all meditations per day is marked with a thread connecting consecutive days. Hand-rolled plasticine balls attached to the pins represent P7’s experienced quality of each meditation (size) and the type of guidance (colour). The sensual aspect of the plasticine fit well with P7’s mindfulness practice and allowed him to apply a “continuous” scale for meditation quality. He describes the visualization as a way to “keep [him] honest”, a reward for his consistency, and as prop to have an “open dialogue” with friends about meditation.

Physicalisation on a pin board in P7’s bedroom



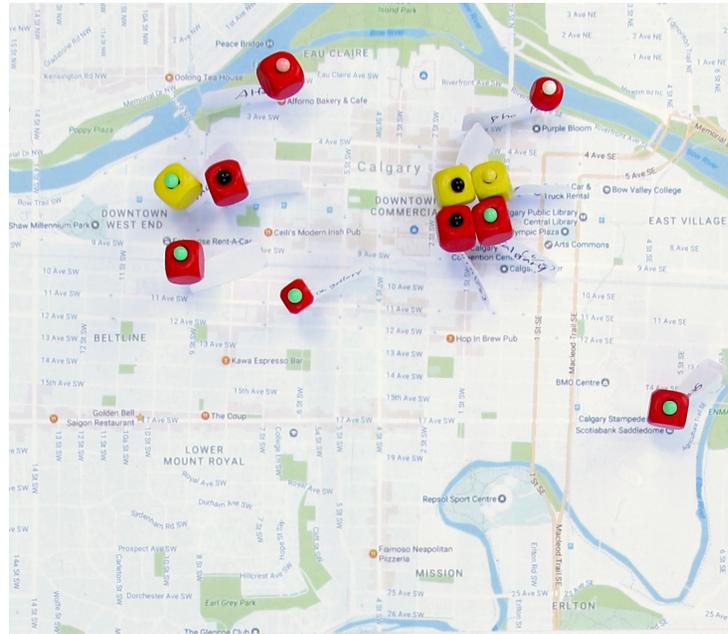
# STUDY RESULTS

## Participant 8 Places Visited

P8 designed her physical-ization as a memento of her time in the city she just moved to. She marked visited places with pins on two maps (city overview and detail of downtown; see on the right side). Pin colours represent types of places (e.g., restaurant or bar) and beads on the pins show how much she enjoyed each place (colour) and how long she stayed there (size). P8 took time reflect back on her day during construction and decide "if I like the place and I want to keep that memory in my life". P8, who describes her- self as "very neutral", found it difficult to rate her enjoyment. For her, the process was "helpful" in becoming more decisive. It further motivated her "to go out more" but also to "throw away my great expectation to do many things per day but I will at least do something new. One thing per day".

Enjoyment	- a lot / so so / not at all
	(Red) / (yellow) / (white)
Time	- less than an hour / hour ~ 2 hours / more than 2 hours
	(small) / (middle) / (large)
Kind	- store / <del>activity</del> activity / Restaurant / Bar / Caffe / (wines)
	(yellow) / (green) / (white) / (black) / (pink) / (red)
0/6 (Sun)	University → Pho Kim Vy → saweway → Home
1/6 (Tue)	University → Bangkokmai Thai → Rotary Park → Aspen Wash Lake
2/6 (Wed)	Uni → Freedom mobile (not mall) → Wal-Mart (H.S.)
3/6 (Thu)	Uni → Contemporary Calgary (Nathan. 70) → The Unicorn (Pia)
4/6 (Fri)	Uni → Market mall → Gym → Market mall (Pia)
5/6 (Sat)	Uni → Coop Boardgame → Bakus Karaoke (so so)
6/6 (Sun)	Uni → Starbucks → <del>Franchise</del> <sup>at the</sup> Mill (so so)

Specification of mapping and paper log



Physicalisation in P8's bedroom



# STUDY RESULTS

## Participant 9 DIY Care Products

P9 creates her own recipes for care products and wanted to use her physicalization to keep track of her recipes. She mapped different colours of beads to ingredients and sizes to their ratios in each recipe (see . P9 used the beads to experiment and plan out the recipe and “actually play with them a bit more [...], sort of like Lego and just build [the recipe]”. P9 used the finished “bead recipe” for making the product and to “label” its container. The physical construction has since replaced her previous approach of planning recipes on paper.

Physicalisation as labels for DIY Care Products



Beads label the ingredients.



Following a “bead-recipe”

