

Telling Stories of Transitions

A Demonstration of Nonlinear Epistemic Network Analysis

Mariah A. Knowles
ICQE • 9 Nov 2021





Hierarchical Epistemic Network Analysis

Mariah A. Knowles and David W. Shaffer

Means Rotation (MR1)

MR1 represents the maximum difference between two group means [1]. But researchers often investigate multiple variables at a time. There is no current way to define an ENA space to show the independent impact of multiple variables.

Formula Rotation (F1)

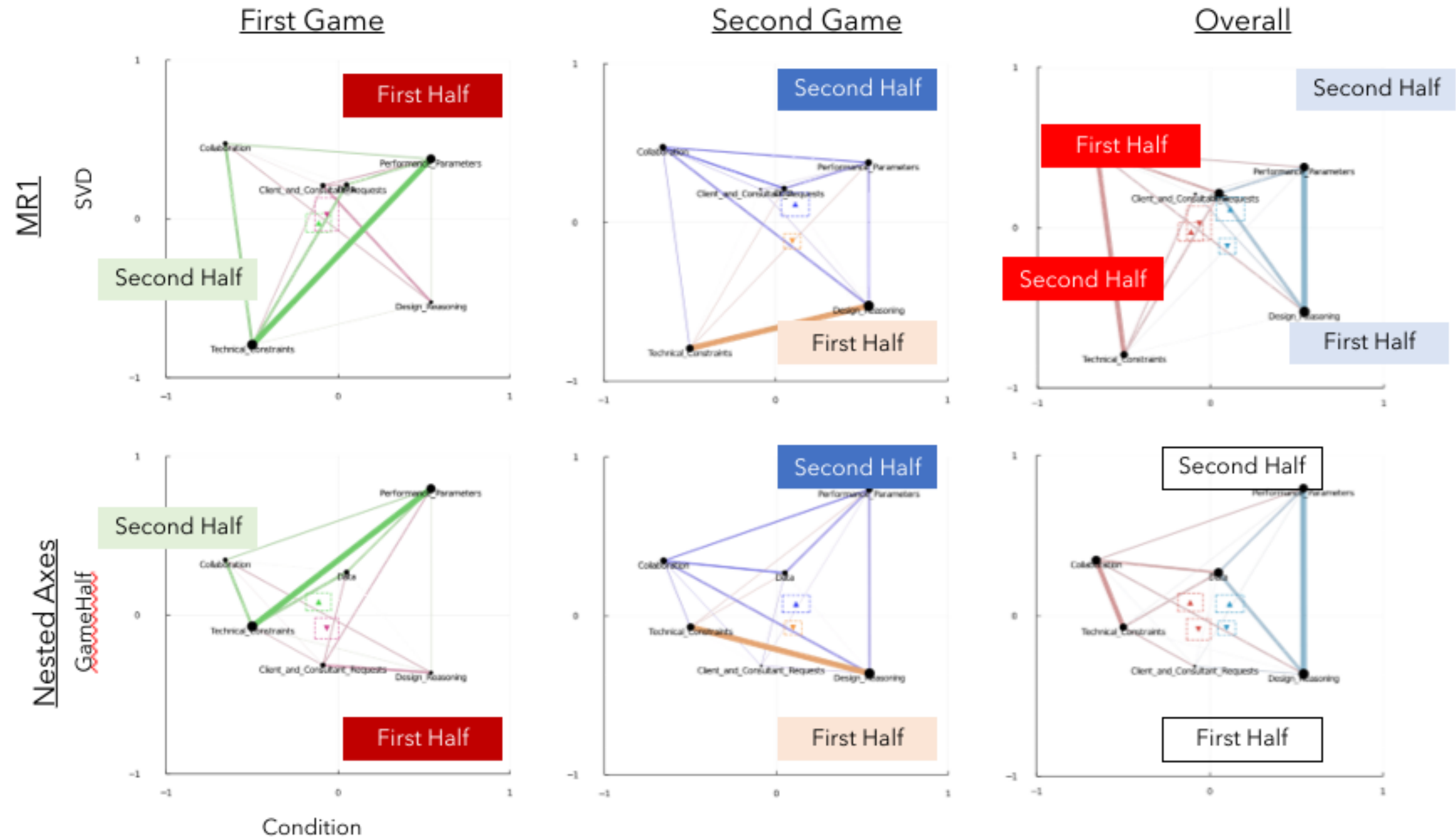
First, we generalize MR1 using a regression framework to model the direction of the effect of an arbitrary variable of interest through the high dimensional ENA space. MR1 is just a binary case of F1. In both, the y-axis is an orthogonal SVD of the x-axis. We are currently exploring uses of the F1 rotation to model continuous variables and to control for hierarchically nested data.

Nested Axes

Second, to model the independent impact of multiple variables, we choose a second direction of interest in the same manner as the first. We then reject that direction from the x-axis and use the result as the y-axis. In this way, the y-axis models the effect of a second variable of interest independent of the effect modeled on the x-axis.

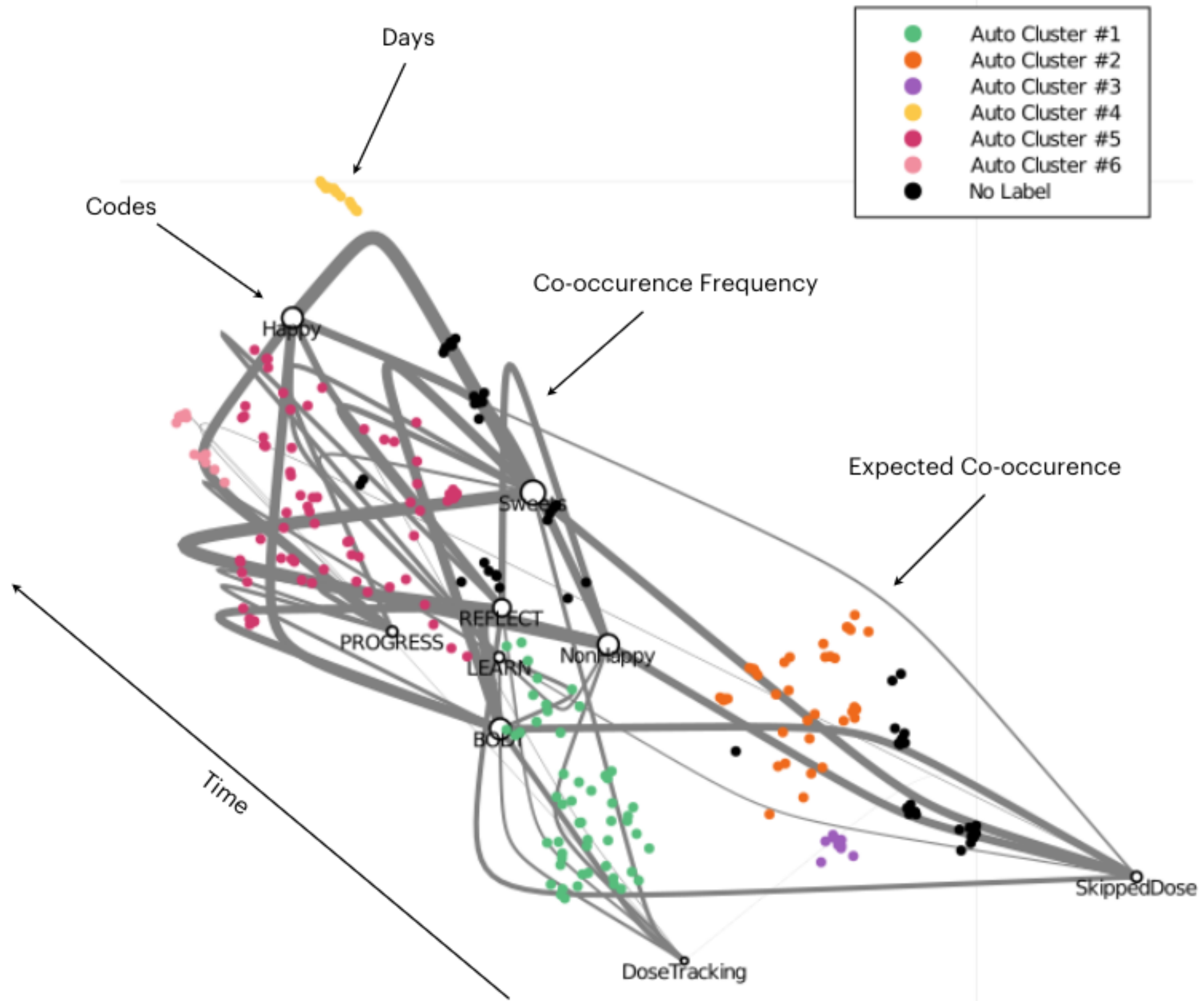
Example

In the RescueShell Virtual Internship data packaged with rENA [2] there are two grouping variables, Condition and GameHalf. Using an MR1, the SVD (y-axis) cleanly separates the First and Second halves of the game, but only for those in the Second Game, even though there were qualitative differences. Using an F1, we can: tease out a second dimension of interest (GameHalf); control the x-axis for the effect modeled on the y-axis (slight differences along x-axis); and see what appears to be a small interaction effect between GameHalf and Condition.



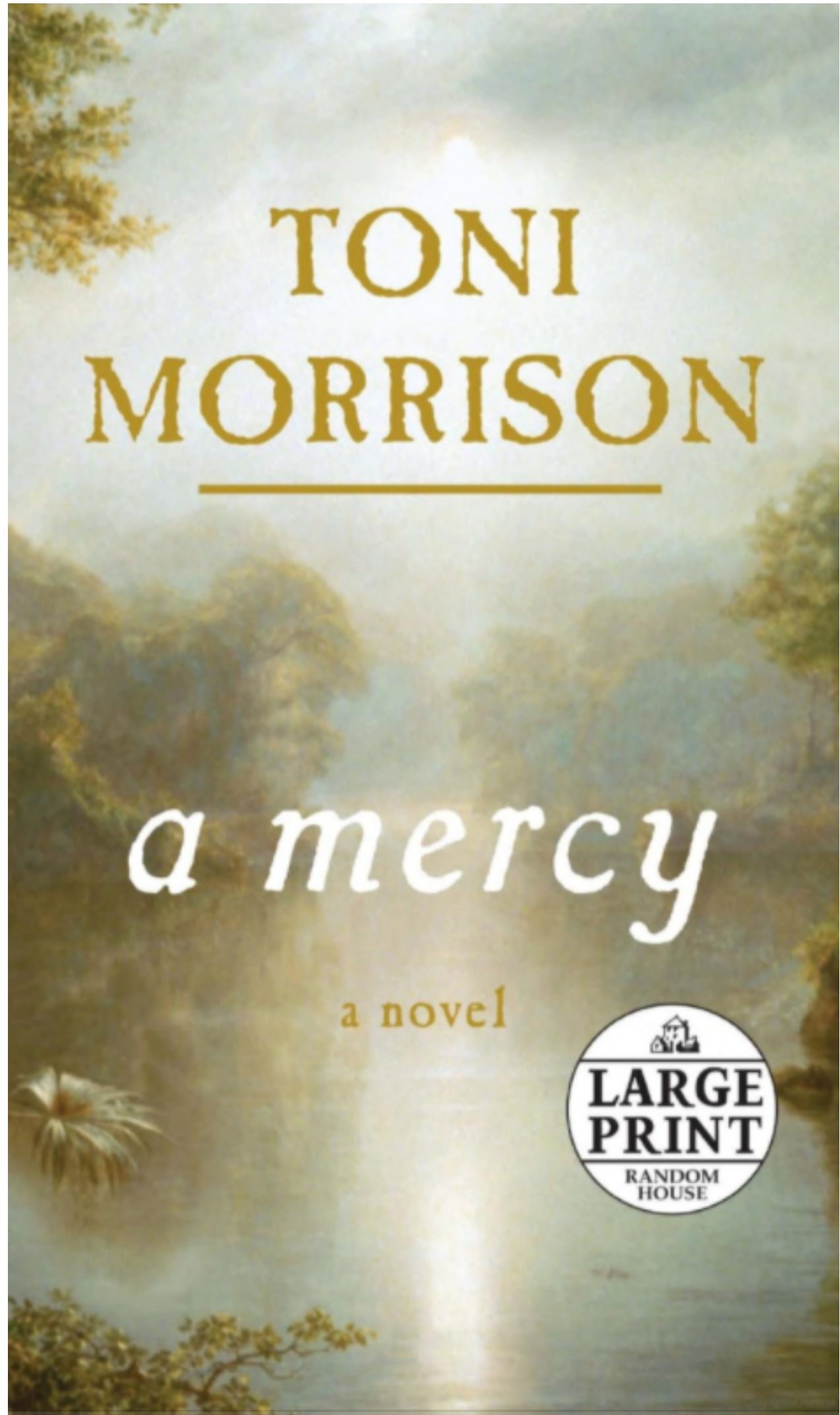
References [1] Shaffer, D.: Quantitative Ethnography. Cathcart, Madison WI (2017). [2] Chesler, N. et al: A novel paradigm for engineering education. Journal of Biomechanical Engineering 137(2) (2015)

Acknowledgements This work was funded in part by the National Science Foundation (DRL-1661036, DRL-1713110), the Wisconsin Alumni Research Foundation, and the Office of the Vice Chancellor for Research and Graduate Education at the University of Wisconsin–Madison. The opinions, findings, and conclusions do not reflect the views of the funding agencies, cooperating institutions, or other individuals.



- How can QE be used to tell a temporal story?

What is a temporal story?



Targeted

By [KATHLEEN McGRORY](#) and [NEIL BEDI](#)
Photos by [DOUGLAS R. CLIFFORD](#)
Times staff
Sept. 3, 2020

Pasco County Sheriff Chris Nocco took office in 2011 with a bold plan: to create a cutting-edge intelligence program that could stop crime before it happened.

What is a story?

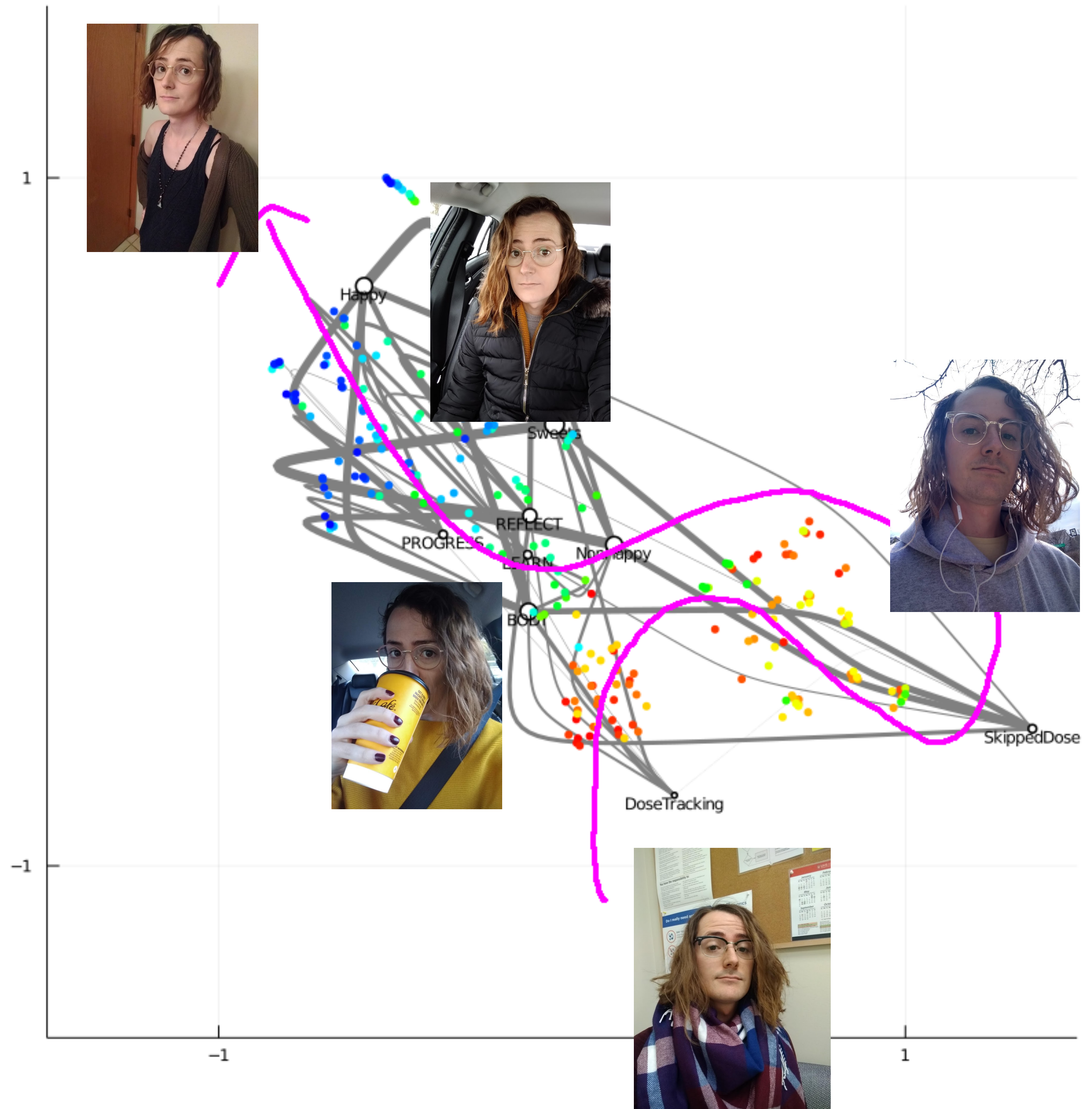
- Stories are composed of a set of phenomena and the interweaving between them.
- When we tell stories, we tell them with paragraph breaks: We make the decision to group certain events together because we believe their phenomena share some sense of similarity, and we spend time discussing that group of events's content and import before moving on.

- We hang those paragraphs together into some larger global narrative structure, and that global structure usually has analytical import: We break the story into separable themes, a before vs. after, tell it as a story that moves over time, break it into alternating accounts of two contrasting groups, or so on.
- Finally, no telling is neutral, and we deepen our analytic insight as we write, as we flesh out, investigate, and interrogate why our telling ought be the right one.

- How can QE be used to tell a temporal story?

- How can QE be used to tell a temporal story?
- My role as a QE researcher: Tell a rich qualitative story whose turns are guided by quantitative features

- How can QE be used to tell a temporal story?
- My role as a QE researcher: Tell a rich qualitative story whose turns are guided by quantitative features



What is a story of gender transition?

Welcome
Place a Referral
e-Consults (Internal to UCSF Medical Center only)
UCSF Transgender Care & Treatment Guidelines ▾
Introduction
Contributors
Grading of evidence
Terminology
Clinic environment
Physical examination

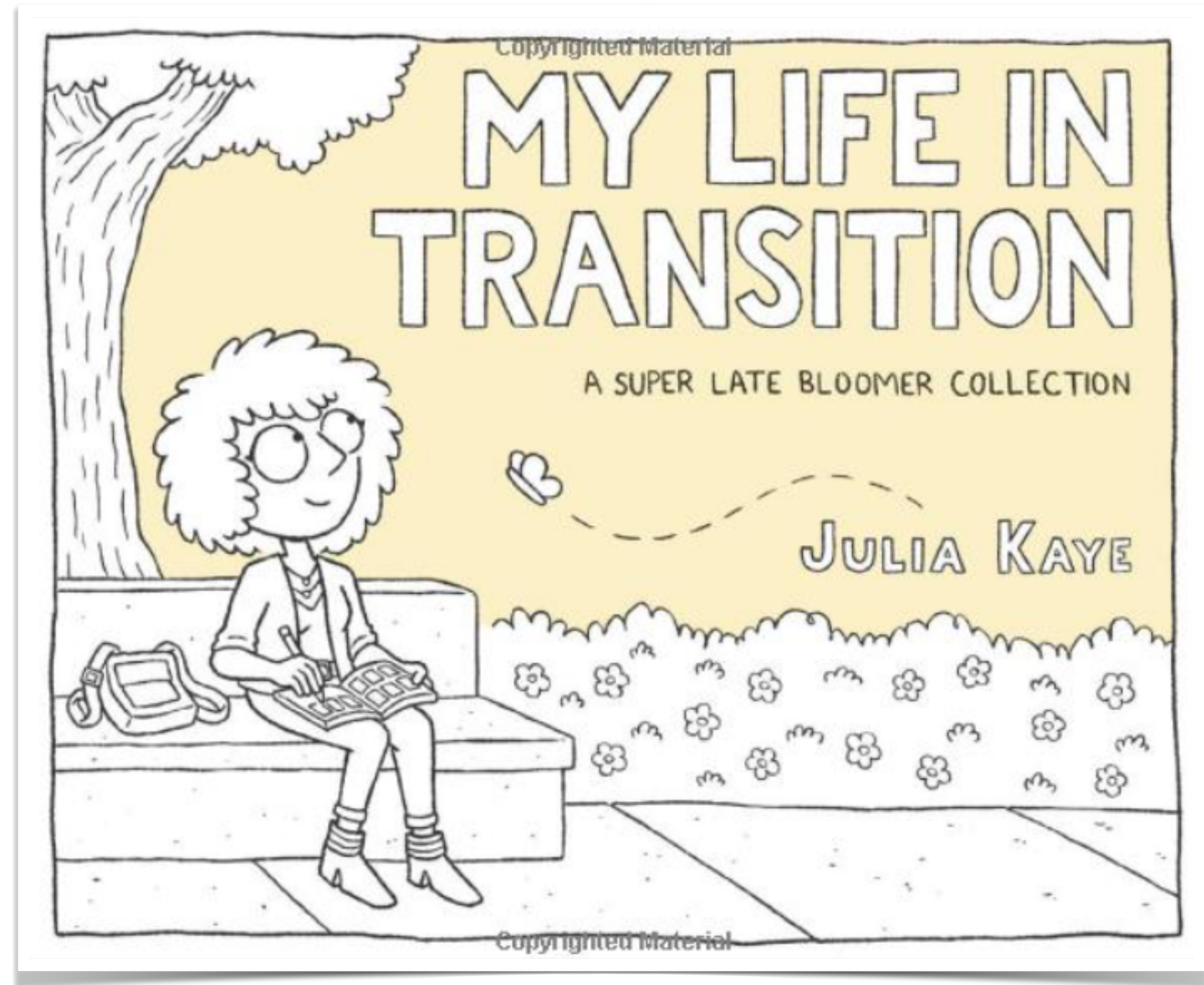
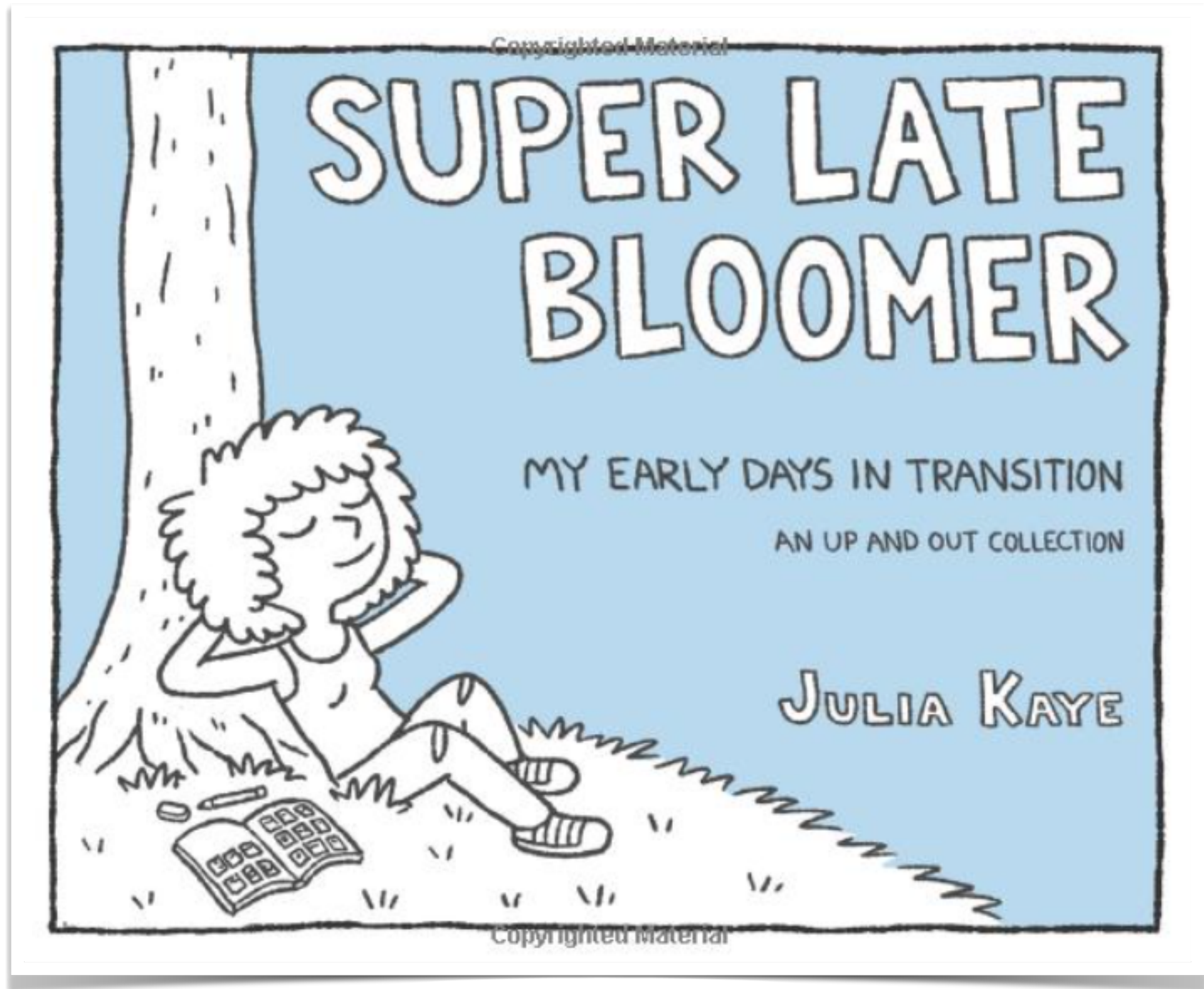
Overview of feminizing hormone therapy

Primary Author(s): Madeline B. Deutsch, MD, MPH

Publication Date: June 17, 2016

Introduction

The goal of feminizing hormone therapy is the development of female secondary sex characteristics, and suppression/minimization of male secondary sex characteristics. General effects include breast development (usually to Tanner stage 2 or 3), a redistribution of facial and body subcutaneous fat, reduction of muscle mass, reduction of body hair (and to a lesser extent, facial hair), change in sweat and odor patterns, and arrest and possible reversal of scalp hair loss. Sexual and gonadal effects include reduction in erectile function, changes in libido, reduced or absent sperm count and ejaculatory fluid, and reduced testicular size. Feminizing hormone therapy also brings about changes in emotional and social functioning. The general approach of therapy is to combine an estrogen with an androgen blocker, and in some cases a progestogen.



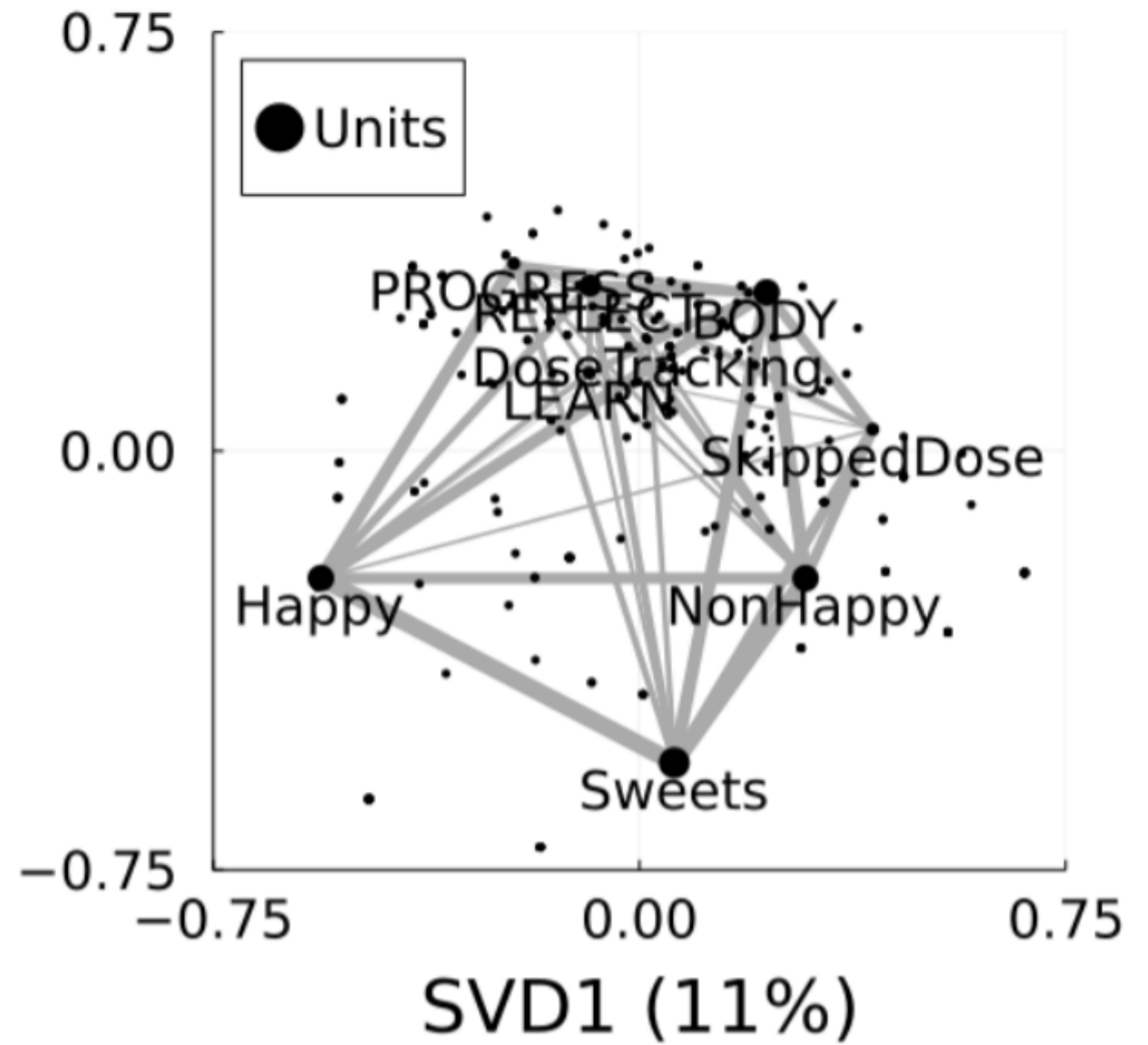
Coding

- Notes App
- A "checkbox" app
- Re-coded after one year

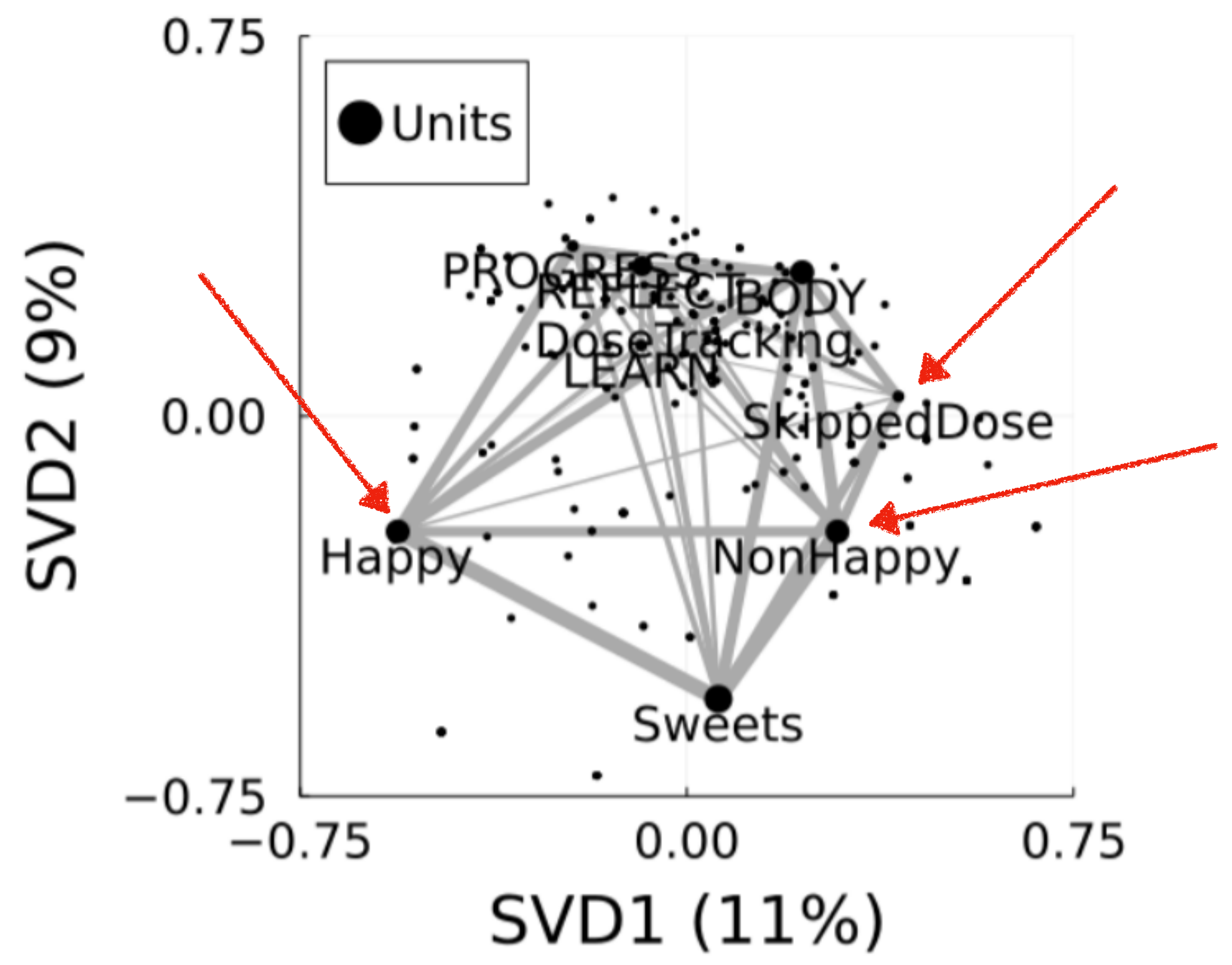
Label	N	Code
DoseTracking	42	A journal entry tracking the exact time of an HRT dose. <i>Eg.</i> "7:35a e."
Happy	136	A checkbox marking days in which I felt happy.
NonHappy	120	A checkbox marking days in which I felt a non-happy emotion, such as anxiety, depression, etc.
SkippedDose	95	A checkbox marking days on which I skipped my HRT dose.
Sweets	130	A checkbox marking days on which I craved sweets, such as chocolate or caffeinated drinks.
<hr/>		
BODY		<i>Various codes tracking changes to my body, feelings, and behaviors, either as a checkbox or a journal entry.</i>
Changes	39	A journal entry tracking changes to my body, feelings, or behaviors. <i>Eg.</i> "Haven't felt [mental] fog in a while."
Cry	11	A checkbox or journal entry making days that I cried.
Dysphoria	35	A journal entry reflecting on dysphoric experiences or gender dysphoria generally. <i>Eg.</i> "Trying to shop for primer at Target, this is just like trying to renew Rx at CVS, stressful."
Mood	34	A journal entry explaining a mood that I felt that day in more detail than a checkbox. <i>Eg.</i> "I've been on high alert."
Oily	34	A checkbox marking days on which my skin was oily.
<hr/>		
LEARN		<i>Various codes tracking my efforts to self-teach about (trans)womanhood.</i>
Experiment	29	A journal entry reflecting on my experiments with clothes, my dosage amount (under the supervision of my gender specialist), etc. <i>Eg.</i> "Tried something new with my makeup."
Recipe	5	A journal entry spelling out a "recipe" I did not want to forget from some experimentation, such as a makeup routine.
WWW	22	A journal entry containing a URL, reflecting on experiences online, or recording information collected online. <i>Eg.</i> "I like this video [URL] [on being okay with who you are]"
<hr/>		
REFLECT		<i>Various codes tracking my reflections with my identity as situated within or connected to various domains.</i>
Childhood	32	A journal entry reflecting on childhood memories.
Doubt	9	A journal entry reflecting on my doubts with transitioning.
Dream	13	A journal entry recounting and/or reflecting on dreams I had in the nights before. <i>Eg.</i> "Had a dream last night about not being able to find the right restroom."
Family	10	A journal entry mentioning a family member. <i>Eg.</i> "...looking at a photo of my grandma..."
Identity	33	A journal entry reflecting on my own identity as a transwoman. <i>Eg.</i> "'This is one of my favorite videos, [link], 'You have unconditional permission to be your ***** self' "
Letter	4	A journal entry in which I drafted a letter to a friend or family member.
Longing	17	A journal entry reflecting longing for changes to my body, feelings, or behaviors.
Name	18	A journal entry conceptualizing possible changes to my legal name.
Religion	1	A journal entry reflection on my relationship with my faith. <i>Eg.</i> "Prayed last night, asked for clarity and courage."
<hr/>		
PROGRESS		<i>Various codes tracking my progress towards my transition goals.</i>
Affirmation	35	A journal entry written as an affirmation to myself. <i>Eg.</i> "Accepting myself as a woman makes sense."
Out	18	A checkbox marking days on I came out to someone new.
Passed	11	A checkbox marking days in which I passed in public, either by accident or on purpose.
Strangers	24	A journal entry reflecting on experiences with strangers. <i>Eg.</i> "They guy at Taco Bell said ma'am."

Table 1. Codebook

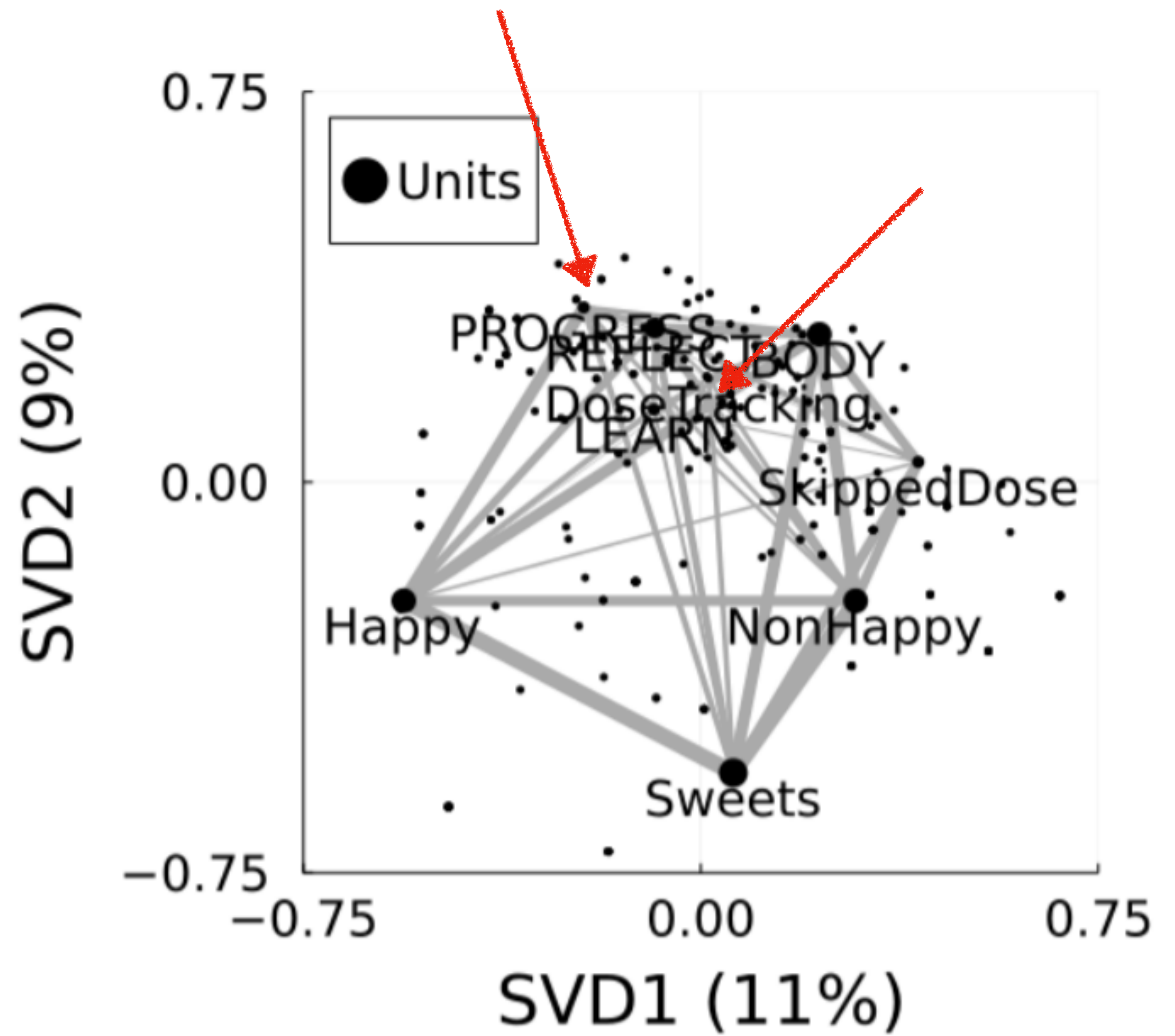
Linear ENA



Linear ENA



Linear ENA



What *is* a story of a transition?

Experiencing Transitions: An Emerging Middle-Range Theory

Meleis, Afaf Ibrahim PhD, FAAN; Sawyer, Linda M. PhD, RN; Im, Eun-Ok PhD, RN; Hilfinger Messias, DeAnne K. PhD, RN; Schumacher, Karen PhD, RN

[Author Information](#) 

Advances in Nursing Science: [September 2000 - Volume 23 - Issue 1 - p 12-28](#)

Time span

All transitions are characterized by flow and movement over time.² Bridges^{19,20} characterized transition as a time span with an identifiable end point, extending from the first signs of anticipation, perception, or demonstration of change; through a period of instability, confusion, and distress; to an eventual "ending" with a new beginning or period of stability. However, the results of the research examined here suggest that it may be difficult or impossible, and perhaps even counterproductive, to put boundaries on the time span of certain transition experiences.⁶ The stories told by parents of infants with CHD indicated that their transition did not always follow the same chronological trajectory. Migration provided another case in point.⁷ Immigrants may consider their transition as "temporary" even though they may live in another country for an extended period. Even for those who settle permanently, the migration experience may best be characterized as an ongoing, undulating, unending transition. This does not necessarily mean that immigrants or others experiencing long-term transitions are constantly in a state of disconnectedness, flux, or change. However, such states may periodically surface, reactivating a latent transition experience. In evaluating transition experiences, it is important to consider the possibility of flux and variability over time, which may necessitate reassessment of outcomes.

Experiencing Transitions: An Emerging Middle-Range Theory

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Time span

Critical points and events

Some transitions are associated with an identifiable marker event; such as birth, death, the cessation of menstruation, or the diagnosis of an illness; while in other transitions specific marker events are not as evident.^{19,20} The various studies involving multiple transitions provided evidence that **most transition experiences involved critical turning points or events.** Critical points were often associated with increasing awareness of change or difference or more active engagement in dealing with the transition experience. **In addition, there were final critical points, which were characterized by a sense of stabilization in new routines, skills, lifestyles, and self-care activities.** In each study there was a period of uncertainty marked with fluctuation, continuous change, and disruption in reality. Symptoms related to the transition might also occur. During a period of uncertainty there were a number of critical points depending on the nature of the transition. Each critical point requires the nurse's attention, knowledge, and experience in different ways.

variability over time, which may necessitate reassessment of outcomes.

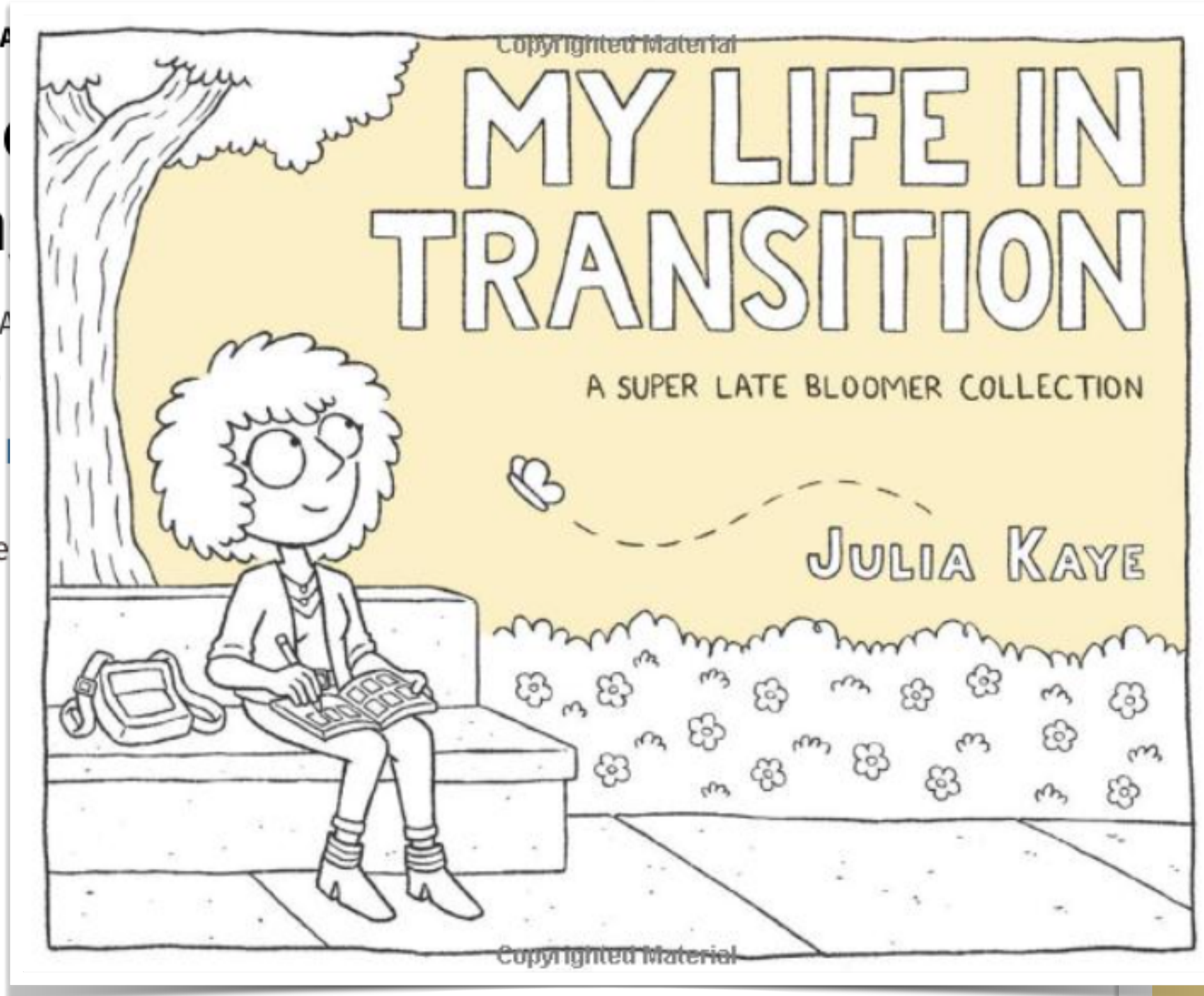
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Time span

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As the project neared completion, I thought back on how much of an impact seeing people who were transitioning and sharing the stories of their lives had on normalizing my feelings about myself. And not just stories about the **turbulent early stages of transition, but the mundane experiences of day-to-day life.** It had been so important to see that life really did go on; that we're just people with the same wants and needs as anyone else.

- How can QE be used to tell a temporal story?
- My role as a QE researcher: Tell a rich qualitative story whose turns are guided by quantitative features
- What I need is a model whose turns capture the "lumpiness" of time as a thing experienced

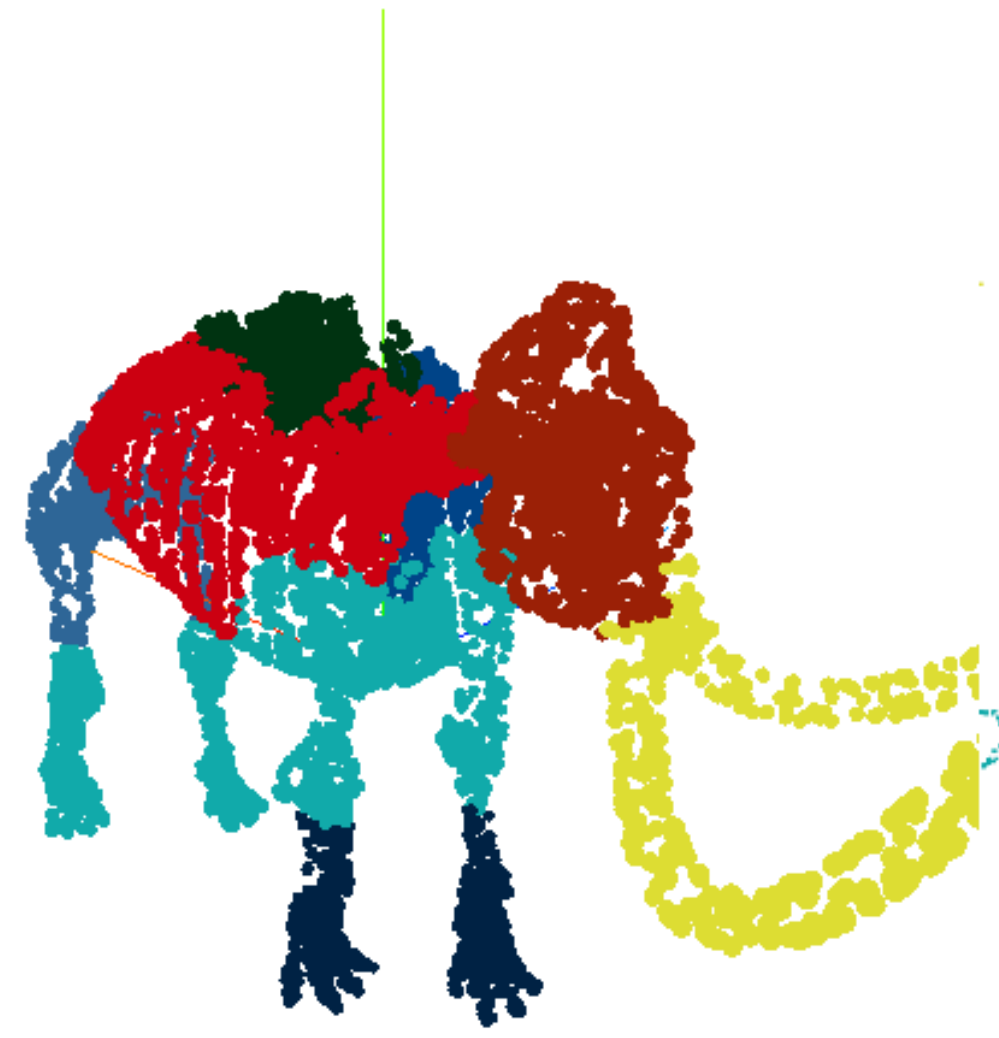
- How can QE be used to tell a temporal story?
- My role as a QE researcher: Tell a rich qualitative story whose turns are guided by quantitative features
- What I need is a model whose turns capture the "lumpiness" of time as a thing experienced
- I need (1) a global narrative structure and (2) paragraph "clusters" of events

Modeling "Lumpy" Time

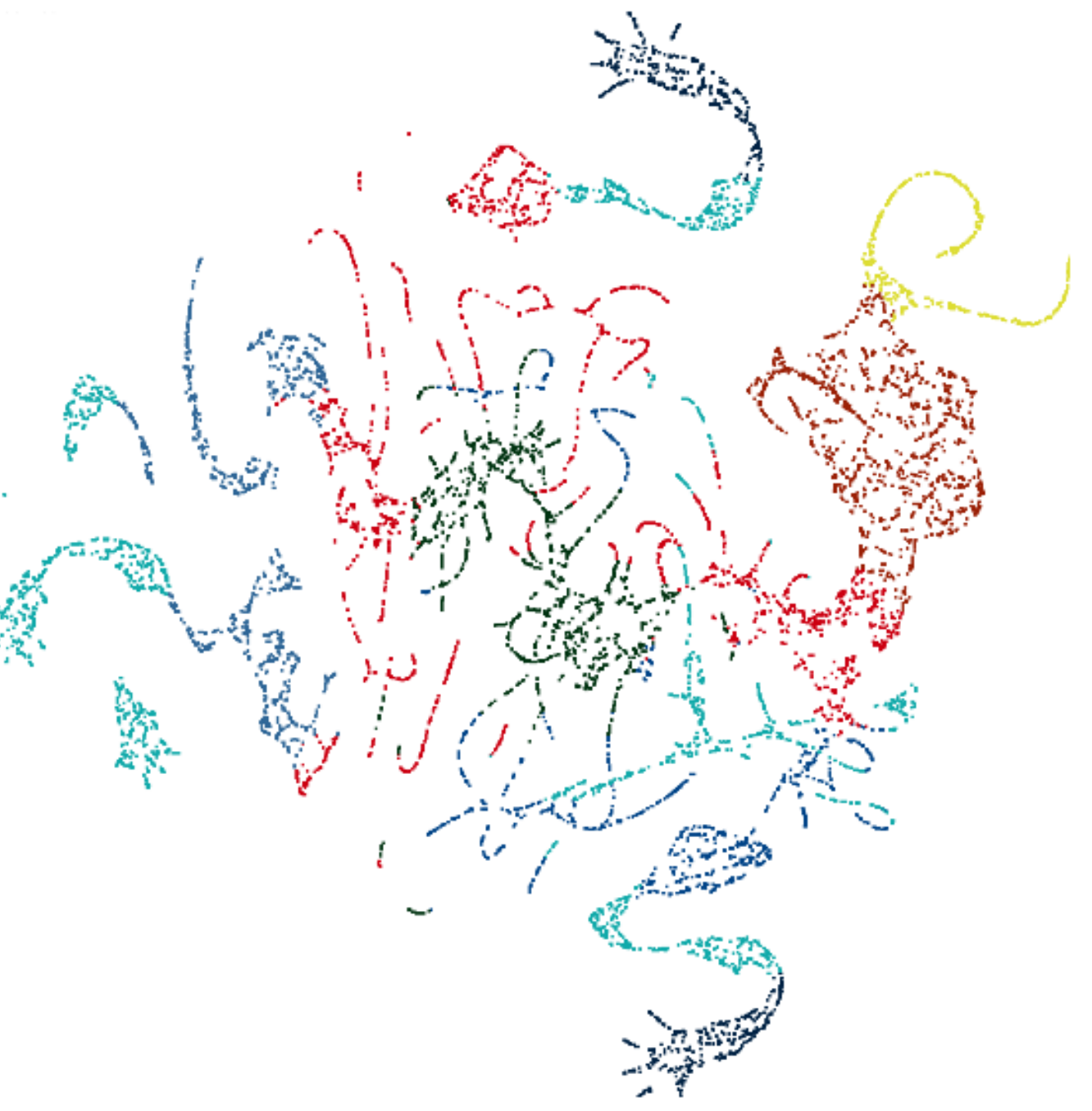
$$X = \begin{bmatrix} & & & & & & \text{Column 1} \\ & & & & & & \text{Column 2} \\ & & & & & & \vdots \\ & & & & & & \text{Column N} \\ & & & & & & \text{day \#} \\ \text{day 1} & \text{day 2} & \dots & \text{day N} & & & \end{bmatrix}$$



Original 3D Data



2D UMAP Projection

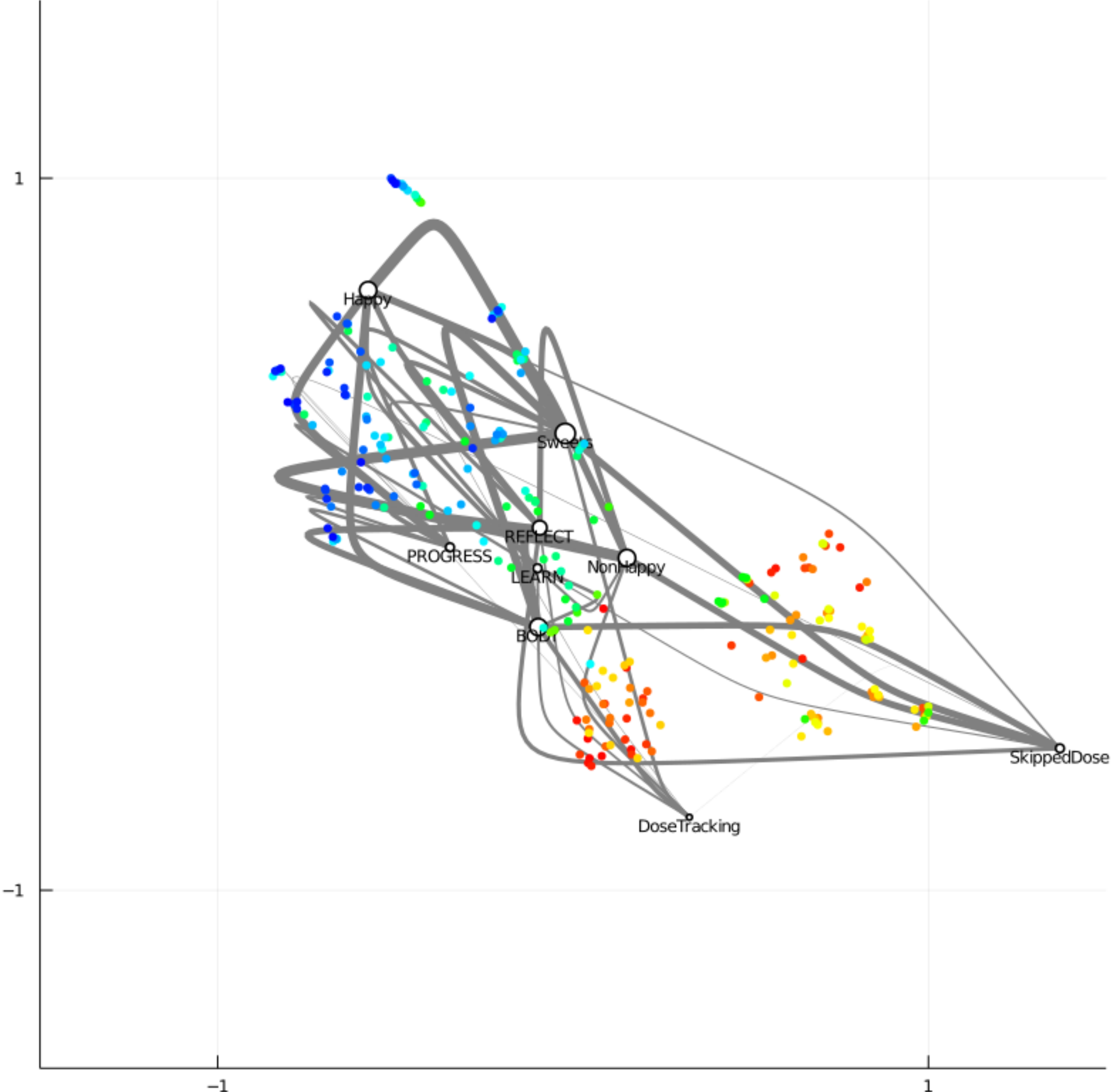


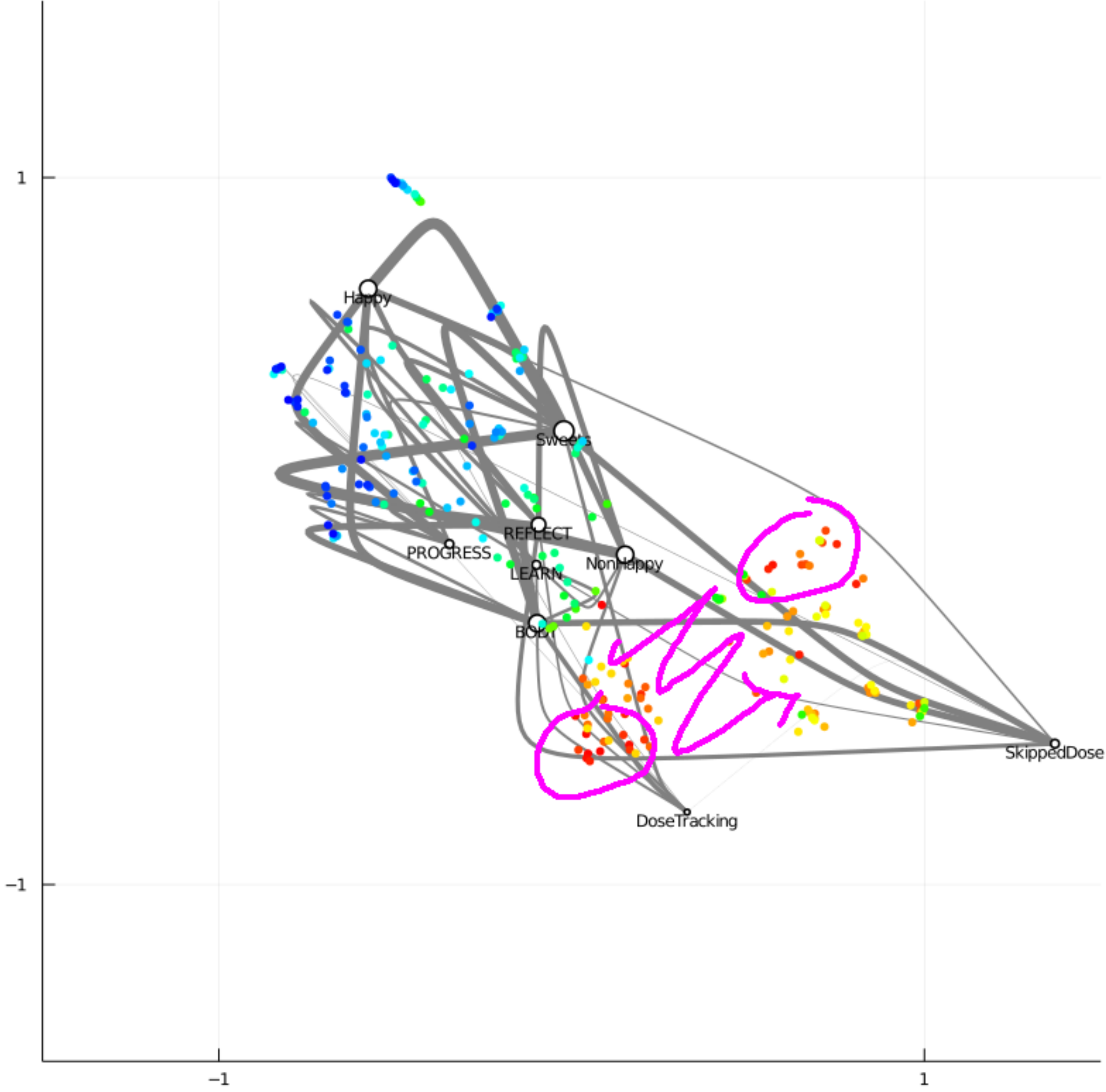
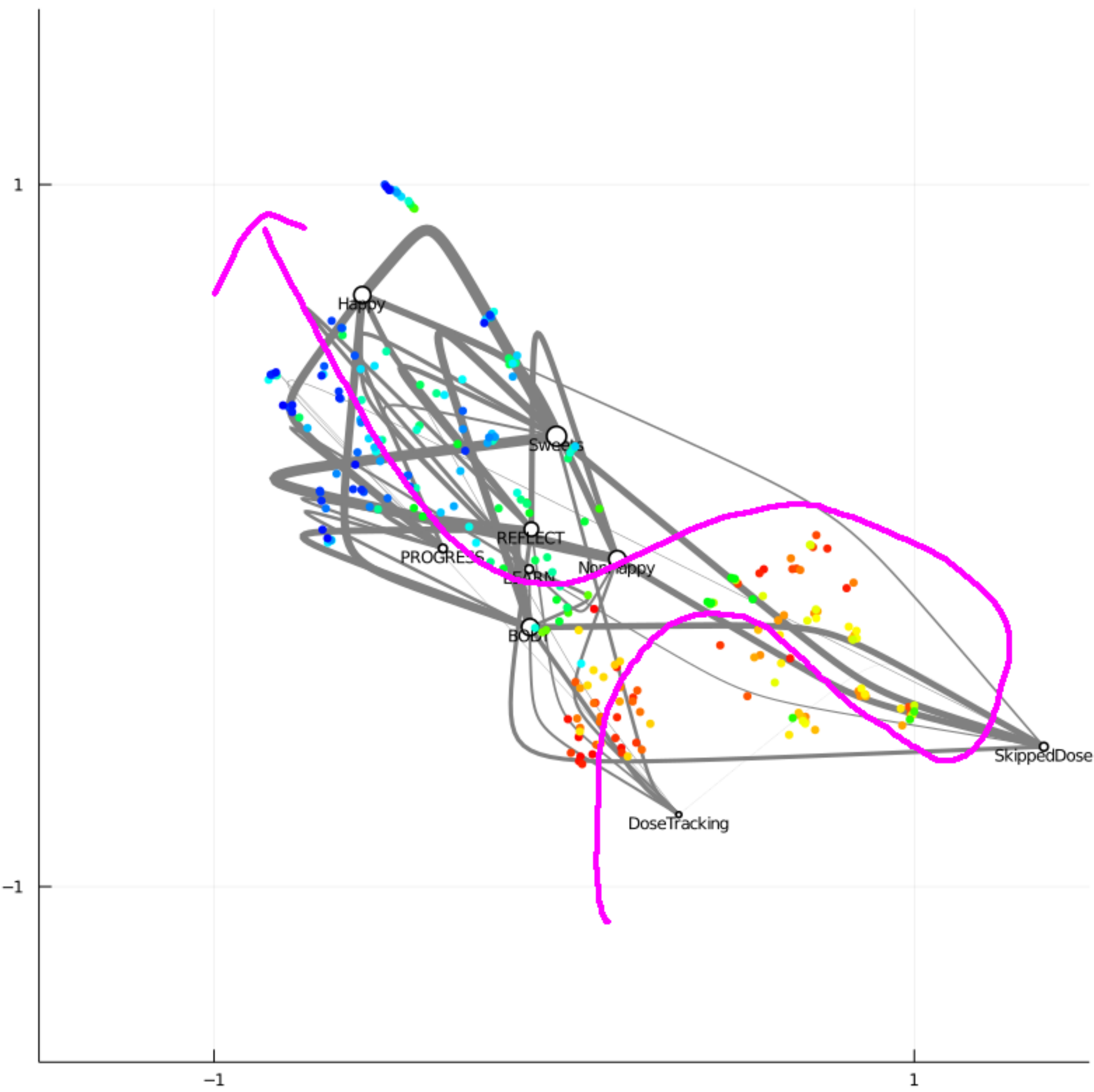
n_neighbors: 15

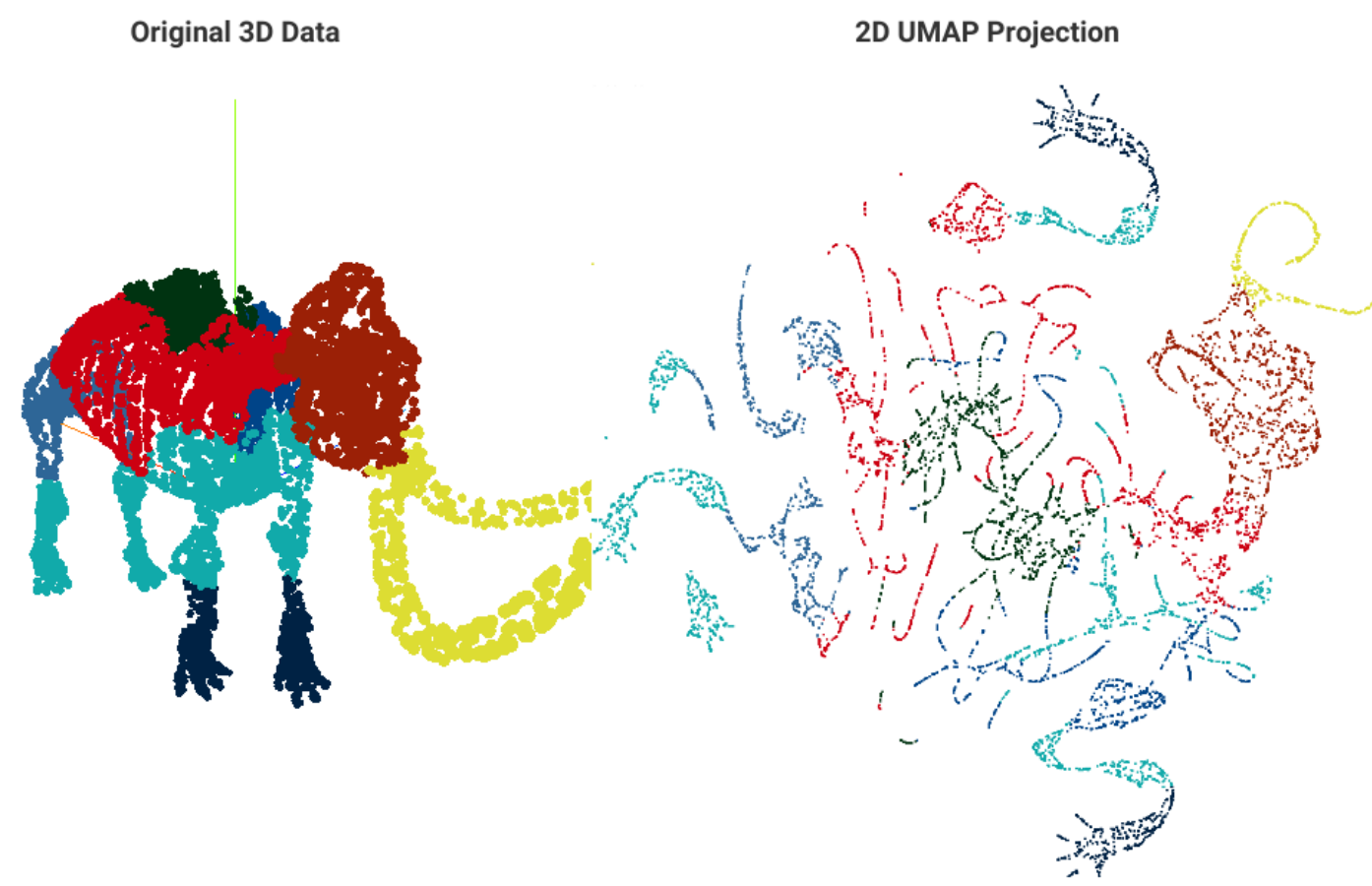
min_dist: 0.1



- Embed "elbows" with one-hot encoding: They go in the neighborhood where we expect a unit that *only* has that one connection to go
- Embed the nodes to give *some* sense of global structure, using same optimization algorithm already used in linear ENA

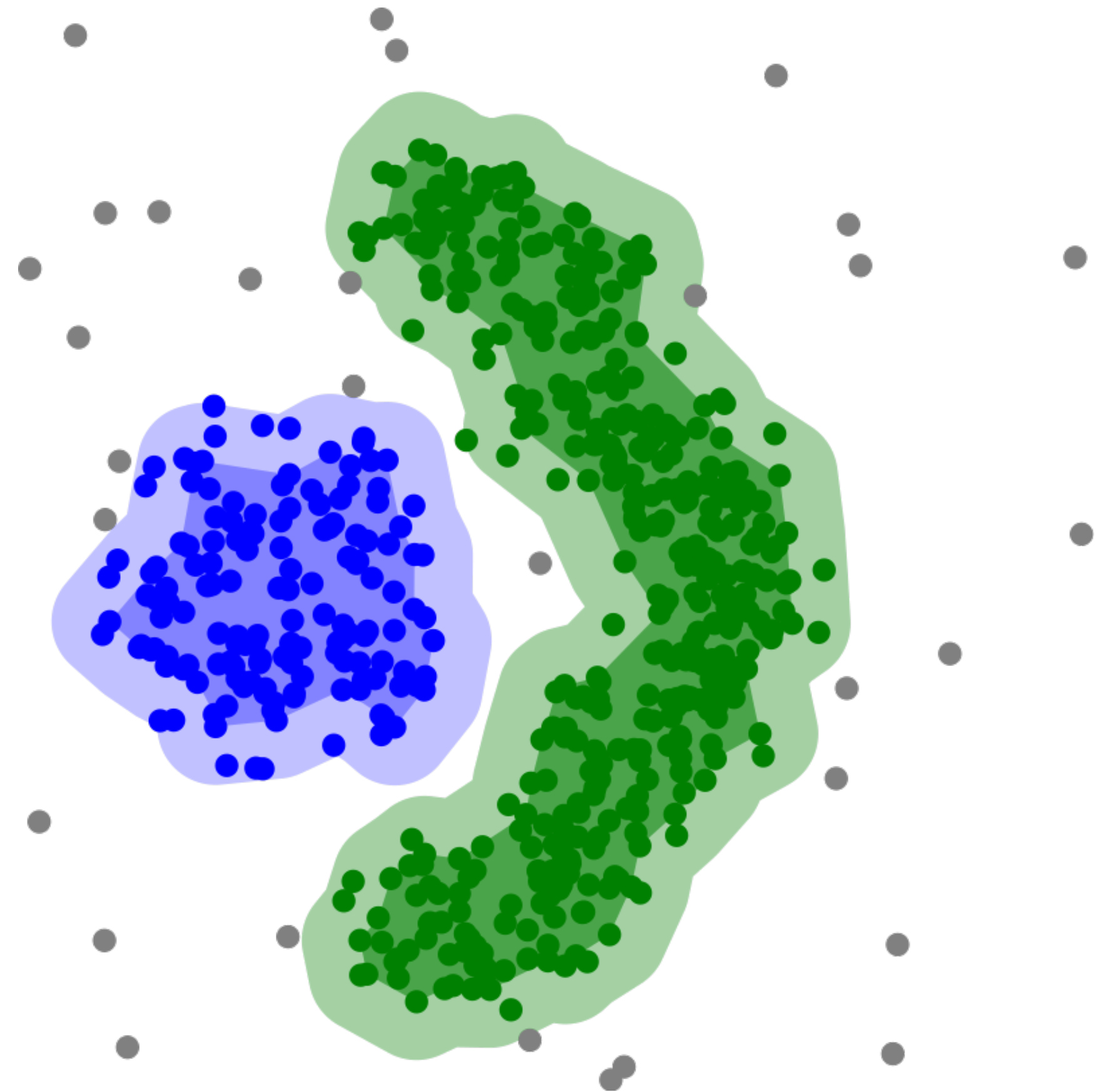


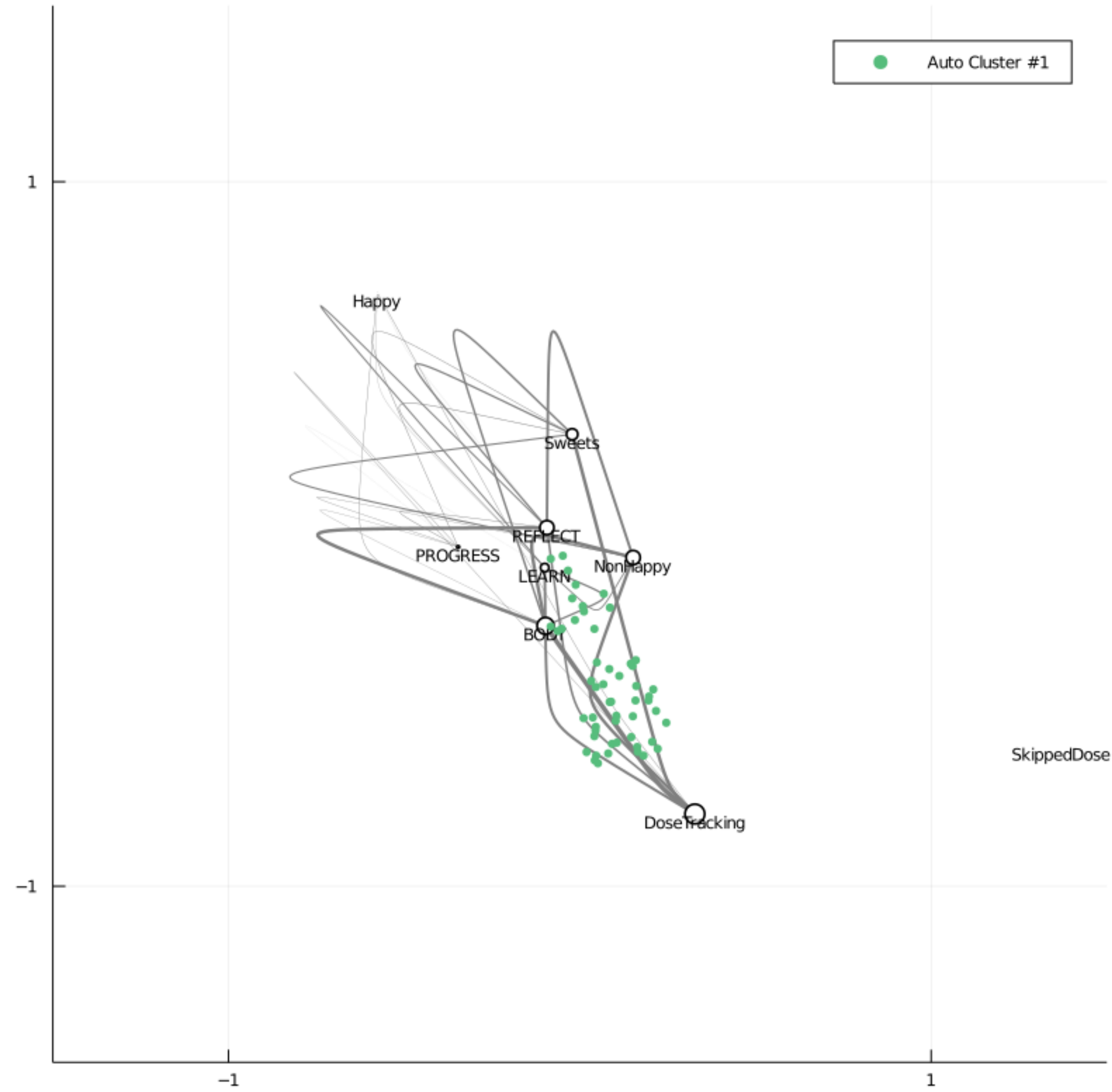
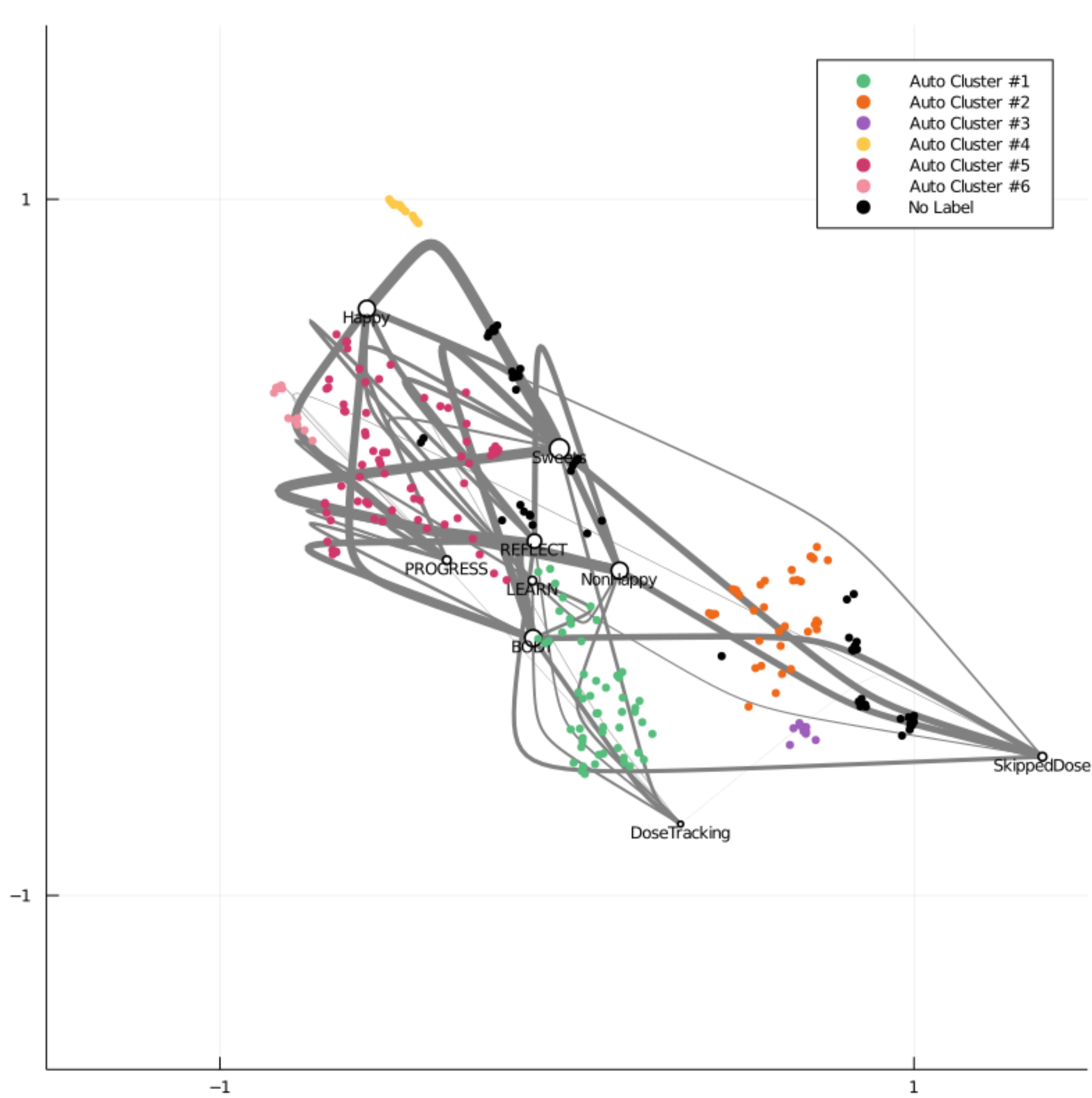




n_neighbors: 15
min_dist: 0.1

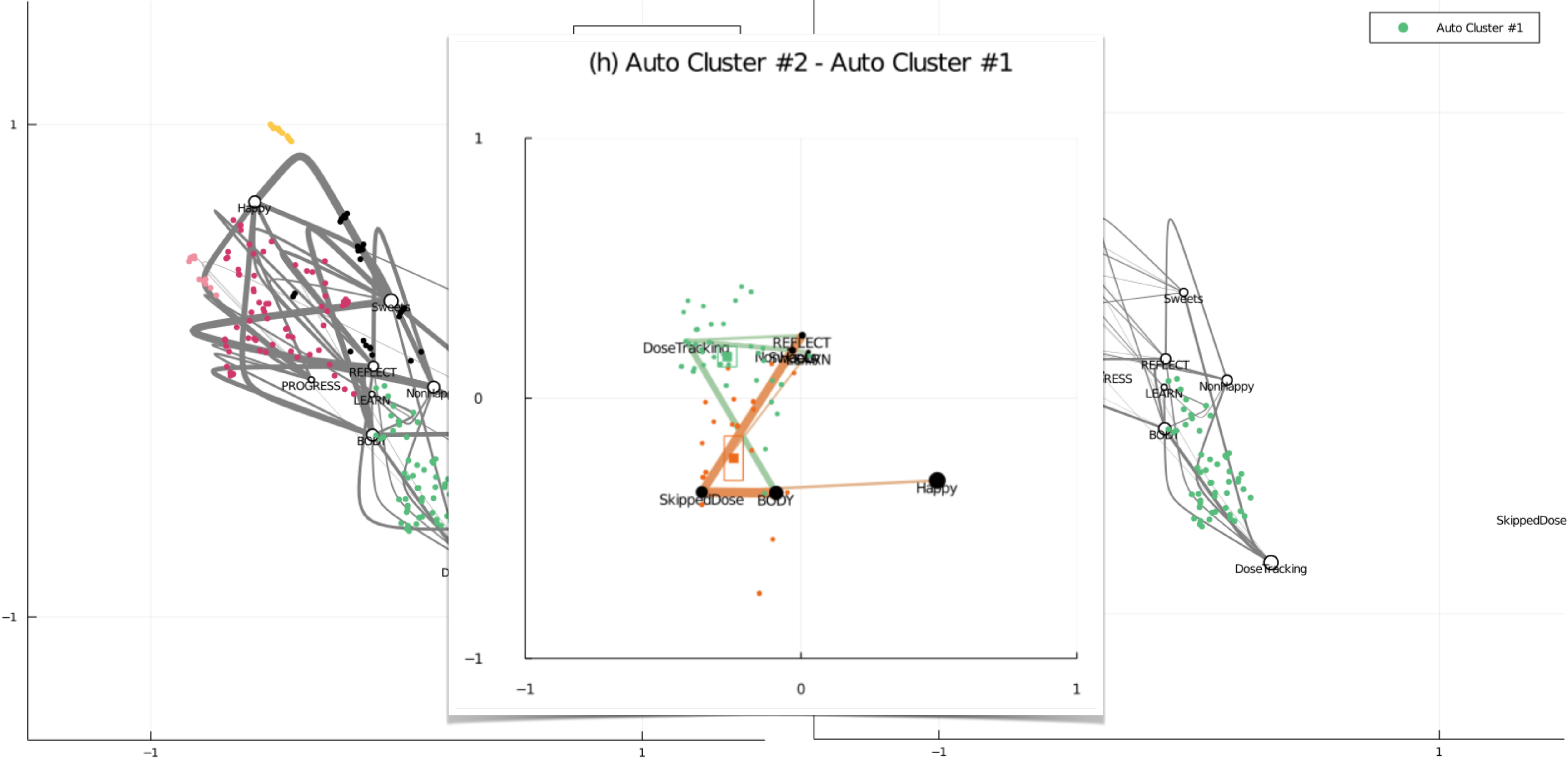
A diagram illustrating the parameters n_neighbors and min_dist. It shows two horizontal lines representing the neighborhood size. The top line has a blue dot at its right end, and the bottom line has a blue dot at its left end. The distance between these two dots represents the min_dist parameter.





Auto Cluster #1

(h) Auto Cluster #2 - Auto Cluster #1



Telling Stories of Transitions

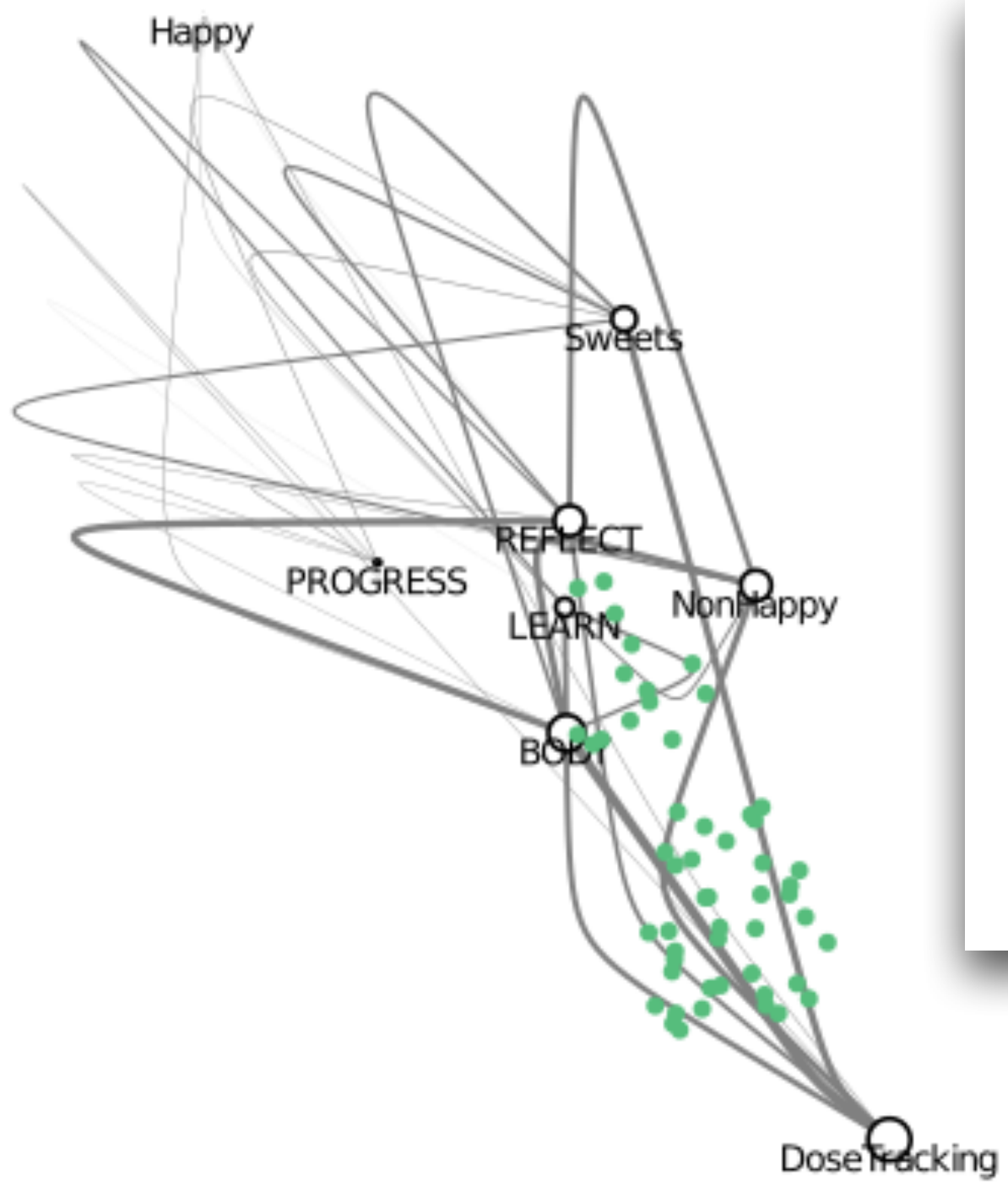
Telling Stories of Transitions: A Demonstration of Nonlinear Epistemic Network Analysis

Mariah A. Knowles^[0000-0002-1798-4830]

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mariah.knowles@wisc.edu

Abstract. I demonstrate nonlinear modeling and clustering in extension to existing Quantitative Ethnography methods as an approach to telling stories of transitions. The Epistemic Network Analysis (ENA) algorithm is a three step process: it represents qualitative data as a high dimensional space that models the connections between qualitative codes; it uses multidimensional scaling to reduce the dimensionality of that space while highlighting features of interest; and it projects a network representation that could be used to illustrate the transition

● Auto Cluster #1



April 27, 2020

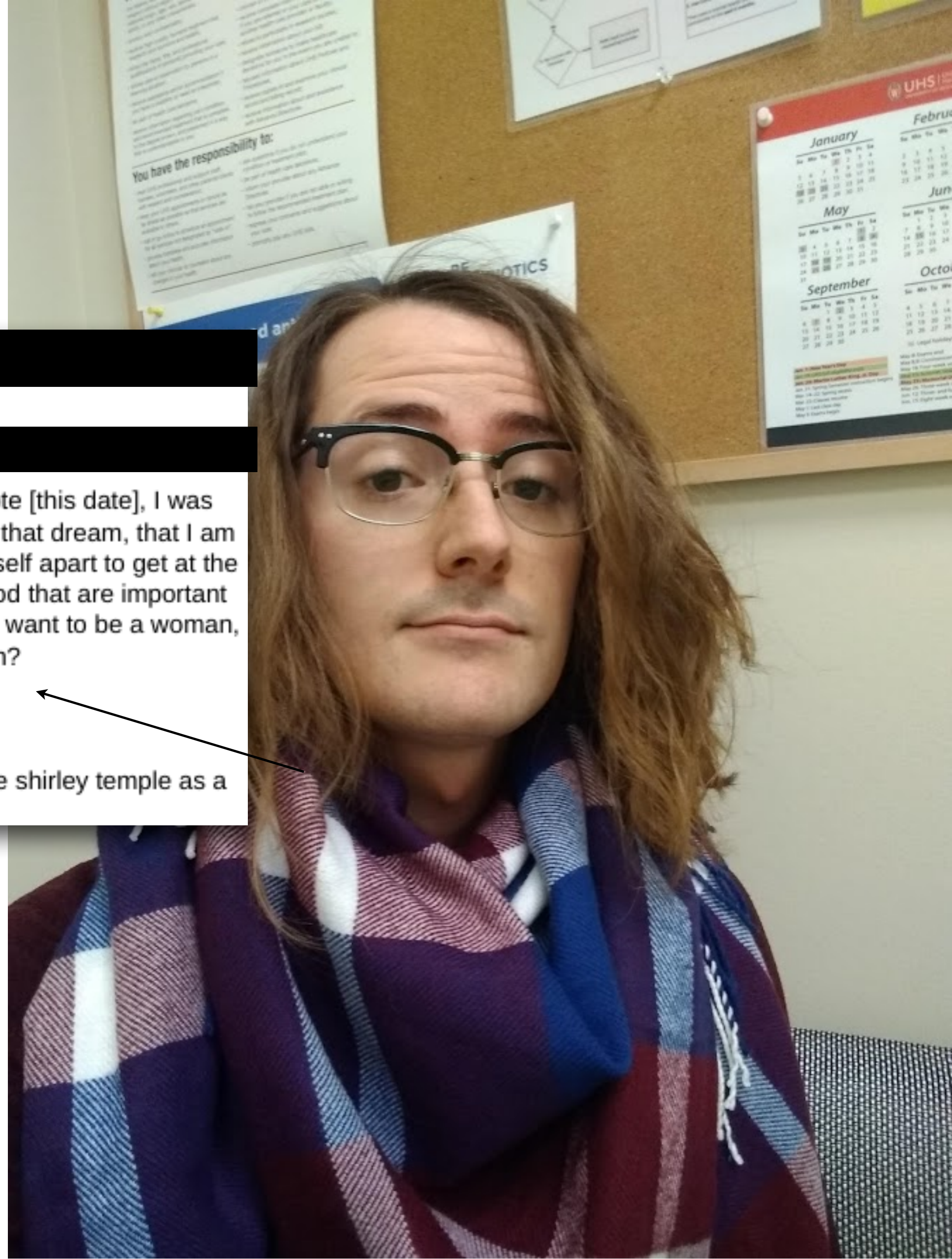
[Redacted text]

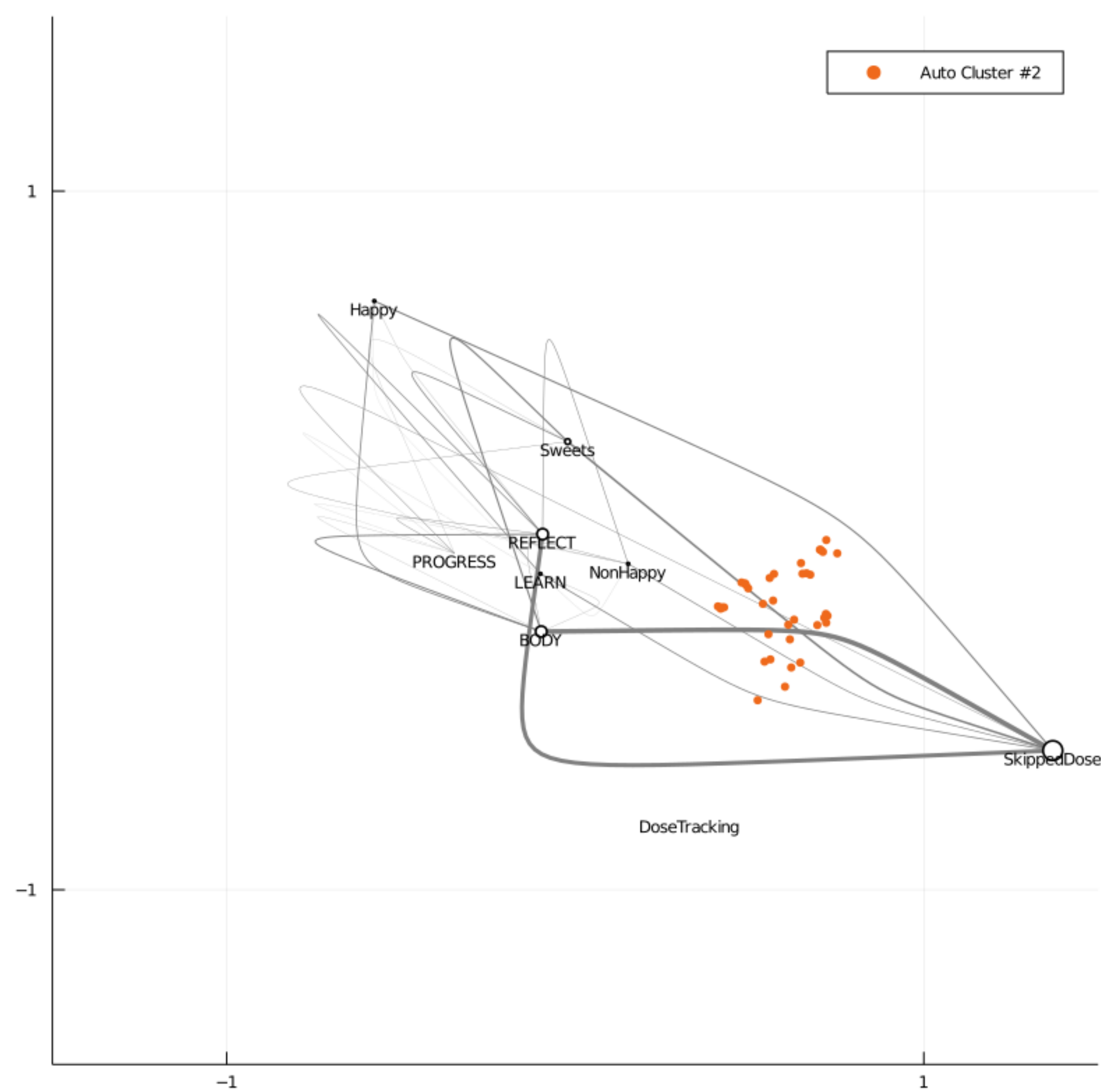
9:10p in my last note [this date], I was also thinking, from that dream, that I am tired of picking myself apart to get at the kinds of womanhood that are important to me. can't I say, I want to be a woman, and that be enough?

e -s

10p did i want to be shirley temple as a little kid?

SkippedDose

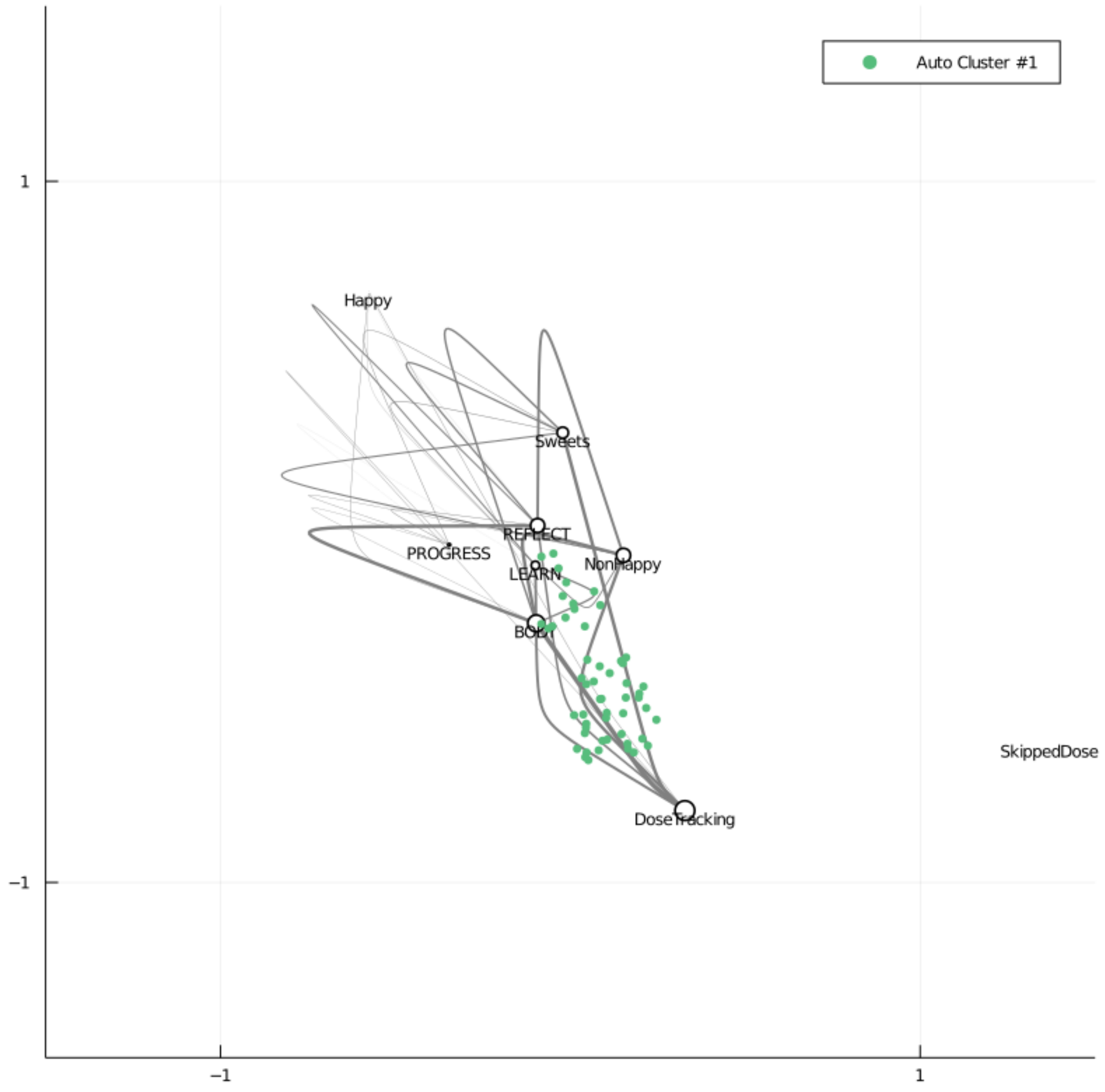


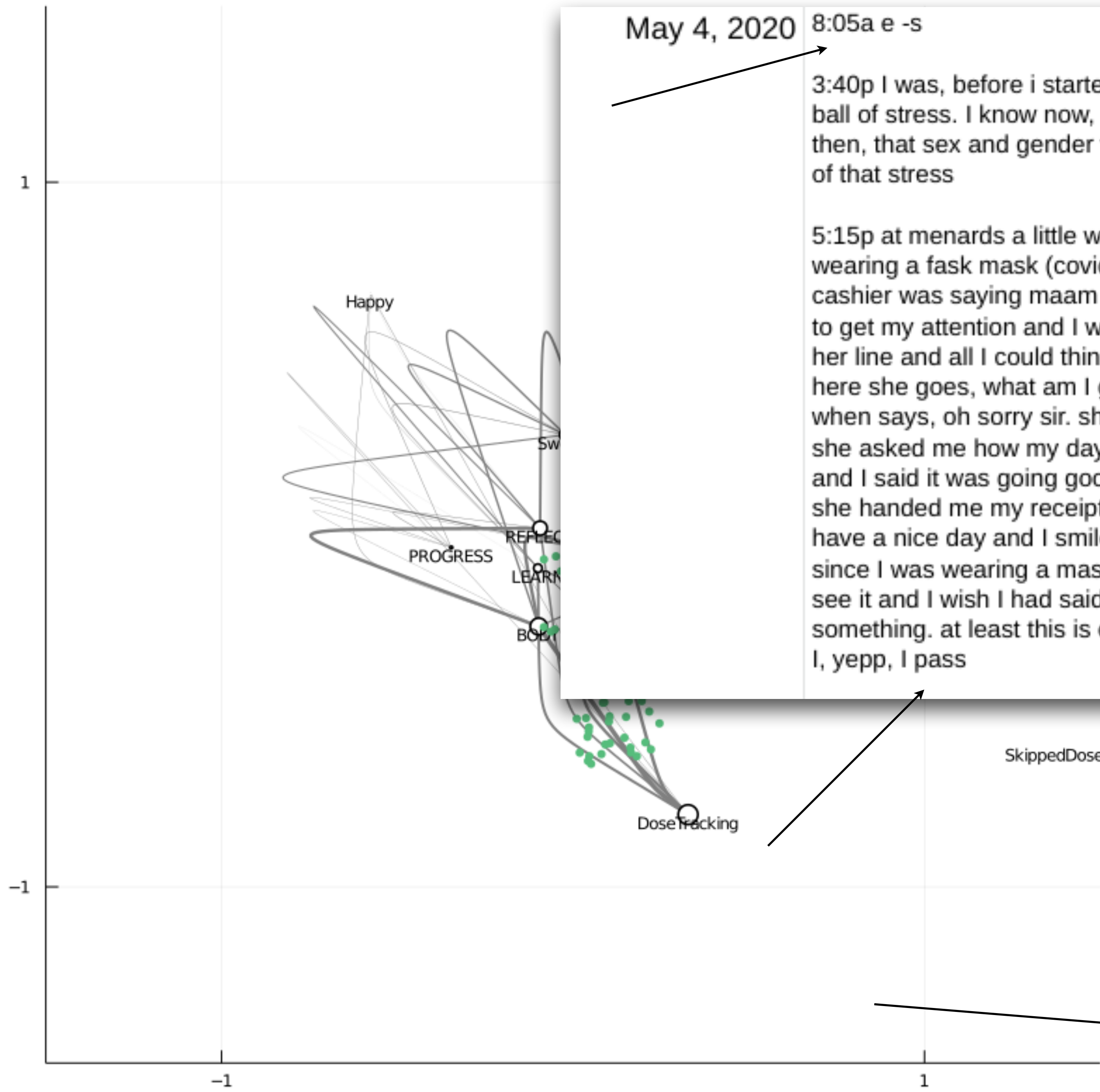




Day	Date	Note	SkippedDose
87	May 11, 2020		1
88	May 12, 2020		1
89	May 13, 2020		1
90	May 14, 2020		1
91	May 15, 2020		1
92	May 16, 2020		1
93	May 17, 2020	10:45a been *angry* the past few days. be	1
94	May 18, 2020		1
95	May 19, 2020		1
96	May 20, 2020		1
97	May 21, 2020		1
98	May 22, 2020		1
99	May 23, 2020		1
100	May 24, 2020	11:45a my face has been oily the past few 12:35p i want a kid 1:10p i want the bougsie life i saw my aun 1:45p rodney mullen 9:30p the thought of going through anothe ████████████████████ ████████████████████	1
101	May 25, 2020	7:25a i want to be happy, as dumb and as	1
102	May 26, 2020		1
103	May 27, 2020		1
104	May 28, 2020		1
108	June 1, 2020		1
109	June 2, 2020		1



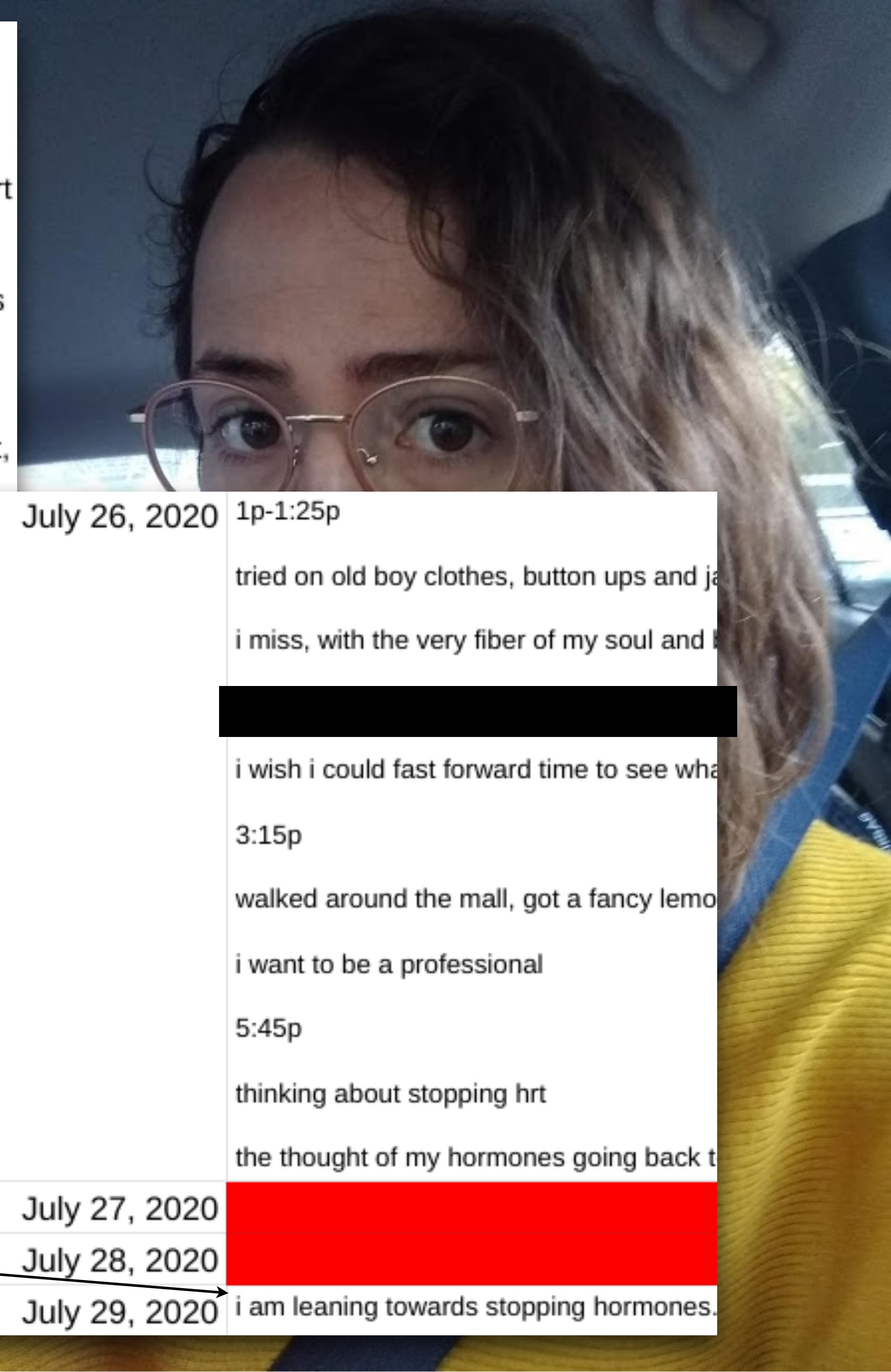




May 4, 2020 8:05a e -s

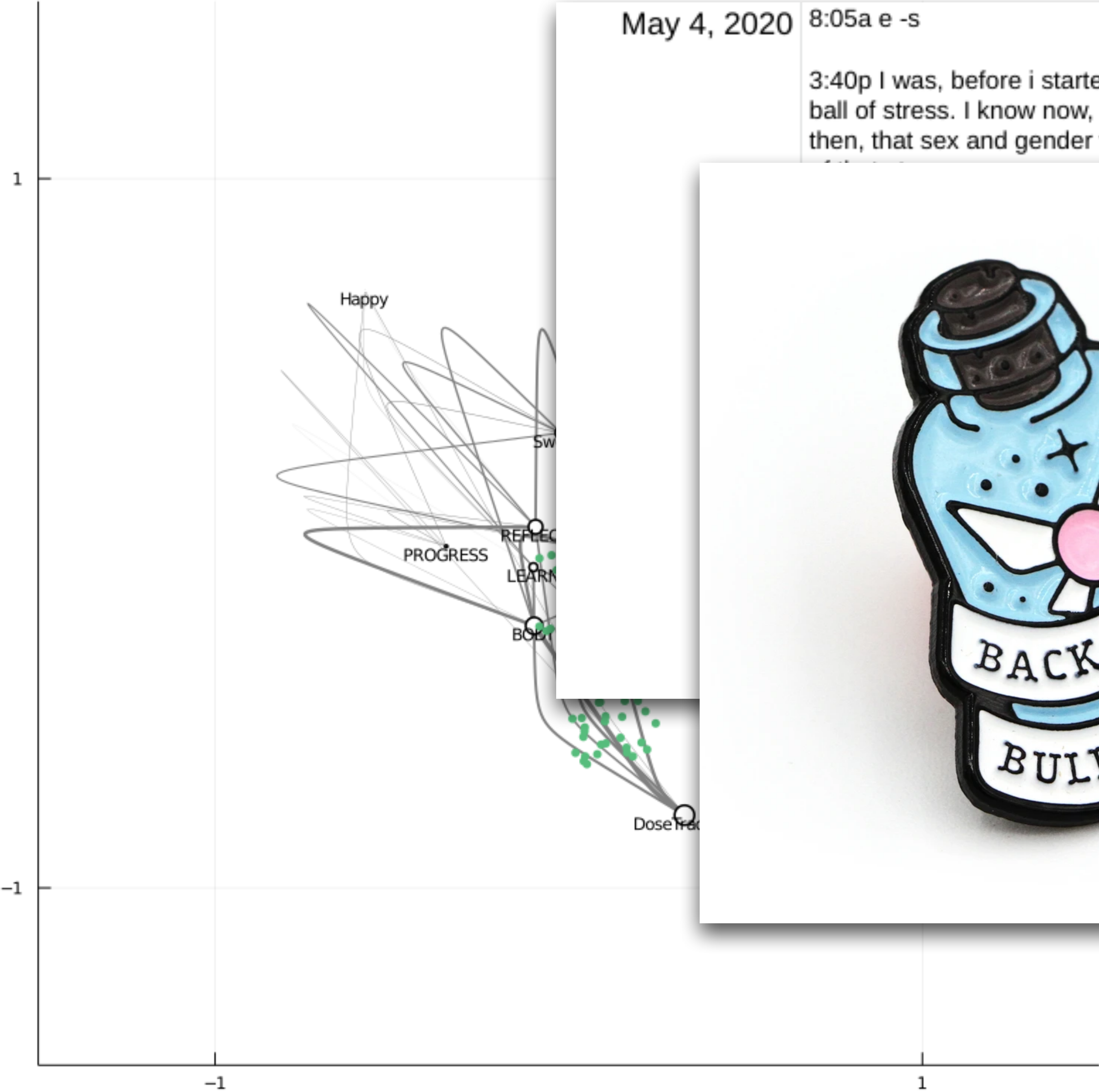
3:40p I was, before i started therapy, a ball of stress. I know now, and knew then, that sex and gender were both part of that stress

5:15p at menards a little while ago I was wearing a fask mask (covid) and a cashier was saying maam maam trying to get my attention and I went through her line and all I could think was, oh shit, here she goes, what am I going to say when says, oh sorry sir. she never she asked me how my day was g and I said it was going good. at th she handed me my receipt and sa have a nice day and I smiled at h since I was wearing a mask she c see it and I wish I had said you to something. at least this is evidenc I, yepp, I pass



July 26, 2020 1p-1:25p
 tried on old boy clothes, button ups and ja
 i miss, with the very fiber of my soul and k
 [REDACTED]
 i wish i could fast forward time to see wha
 3:15p
 walked around the mall, got a fancy lemo
 i want to be a professional
 5:45p
 thinking about stopping hrt
 the thought of my hormones going back t

July 27, 2020 [REDACTED]
 July 28, 2020 [REDACTED]
 July 29, 2020 i am leaning towards stopping hormones.



May 4, 2020 8:05a e -s

3:40p I was, before i started therapy, a ball of stress. I know now, and knew then, that sex and gender were both part



o-1:25p
 ed on old boy clothes, button ups and ja
 miss, with the very fiber of my soul and k

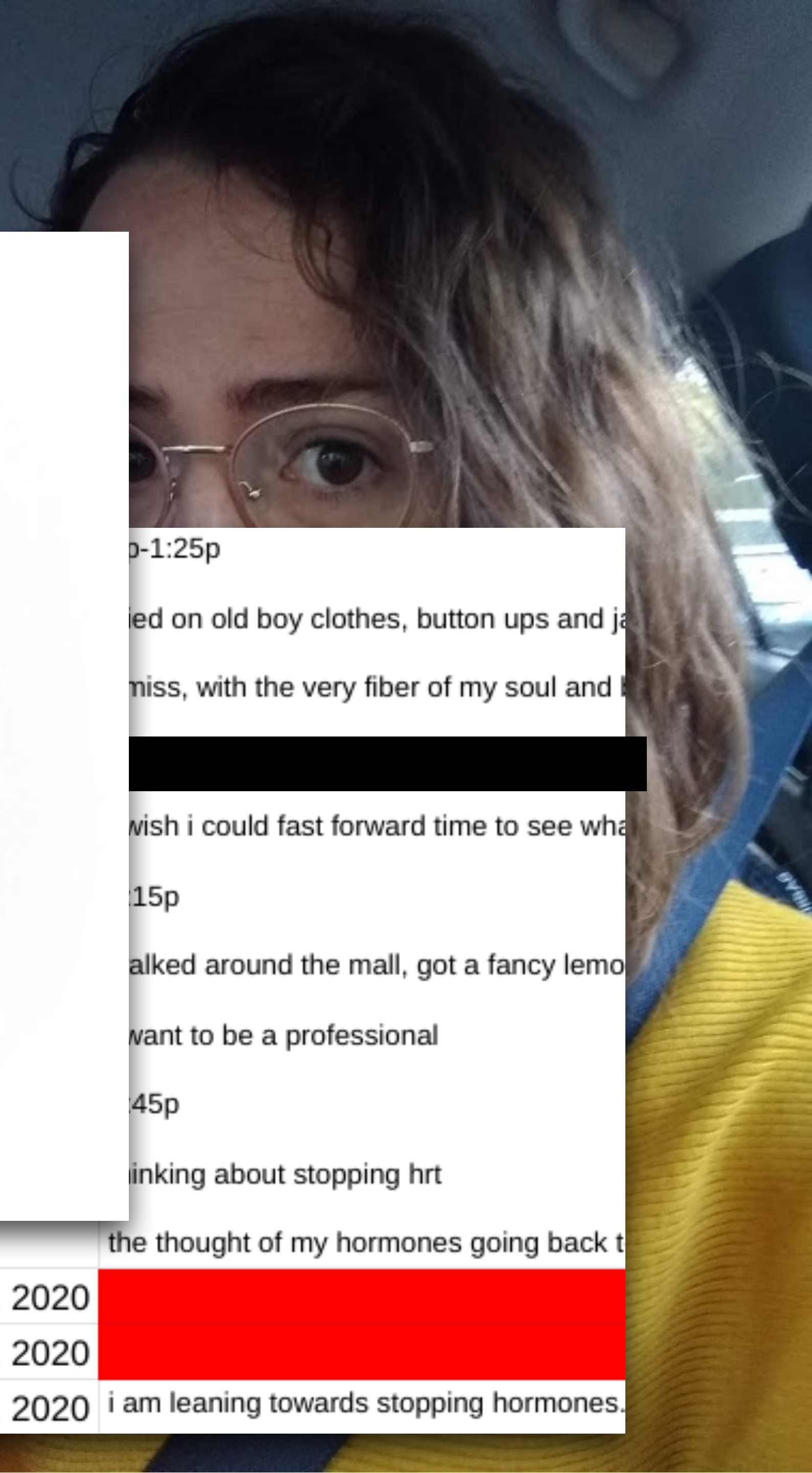
wish i could fast forward time to see wha
 15p
 alked around the mall, got a fancy lemo
 want to be a professional

45p
 inking about stopping hrt

the thought of my hormones going back t

July 27, 2020
 July 28, 2020
 July 29, 2020

[Redacted]
 [Redacted]
 i am leaning towards stopping hormones.



May 4, 2020 8:05a e -s

3:40p I was, before i started therapy, a ball of stress. I know now, and knew then, that sex and gender were both part

Happy

From: [REDACTED] PA

To: KNOWLES, [REDACTED] ("Mariah A.")

Message Type: Communication

Priority: Normal

Date: Tuesday, September 15, 2020 9:40 PM

Subject: prescriptions

Attachments:

Message Text:

Hi [REDACTED]

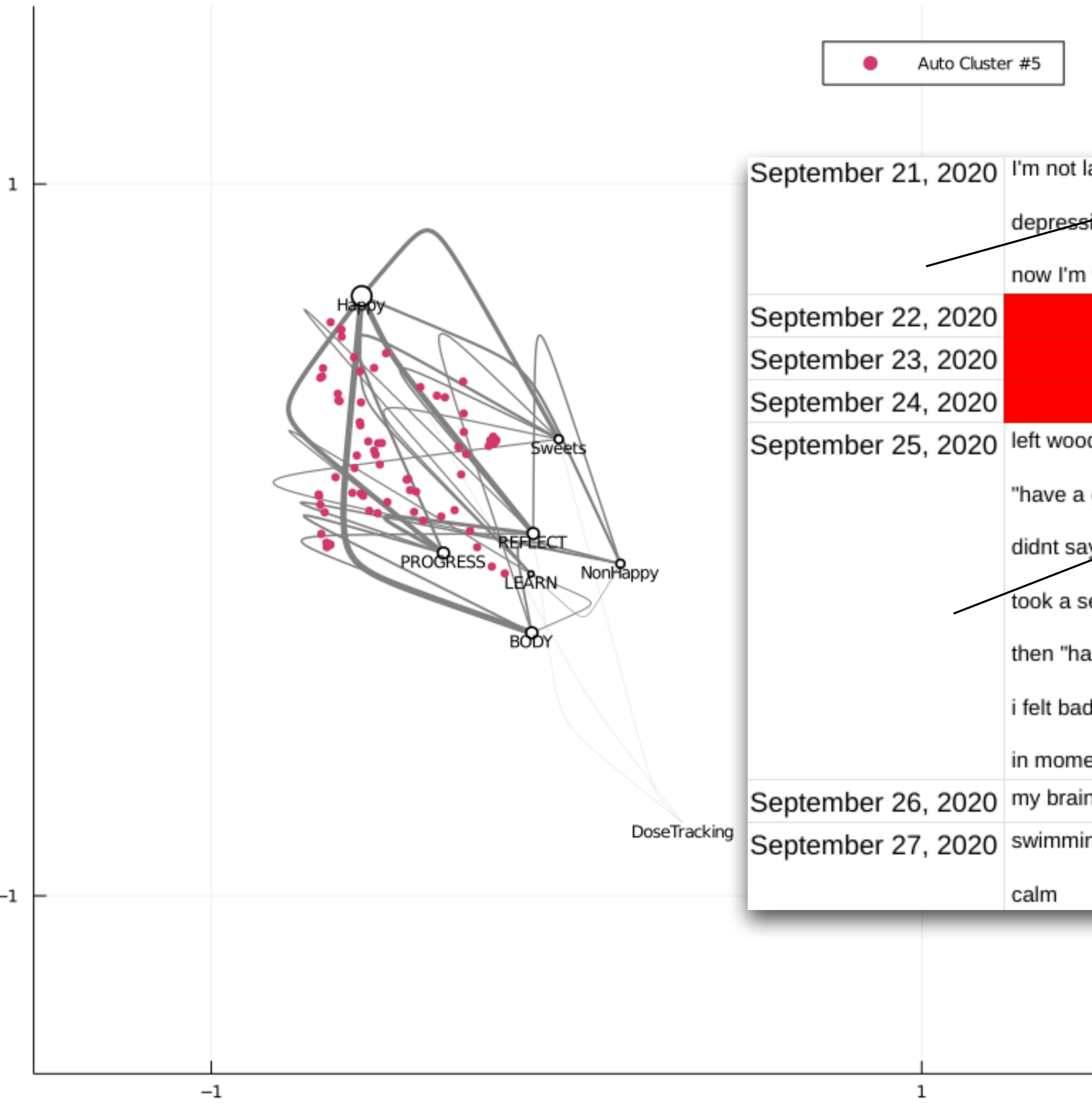
I just thought of something that I wanted to touch base on during the appointment today but it slipped my mind.

If you would be interested, I could put in 3-month supply worth of the medications for you to pick up at once. This

July 27, 2020 [REDACTED]

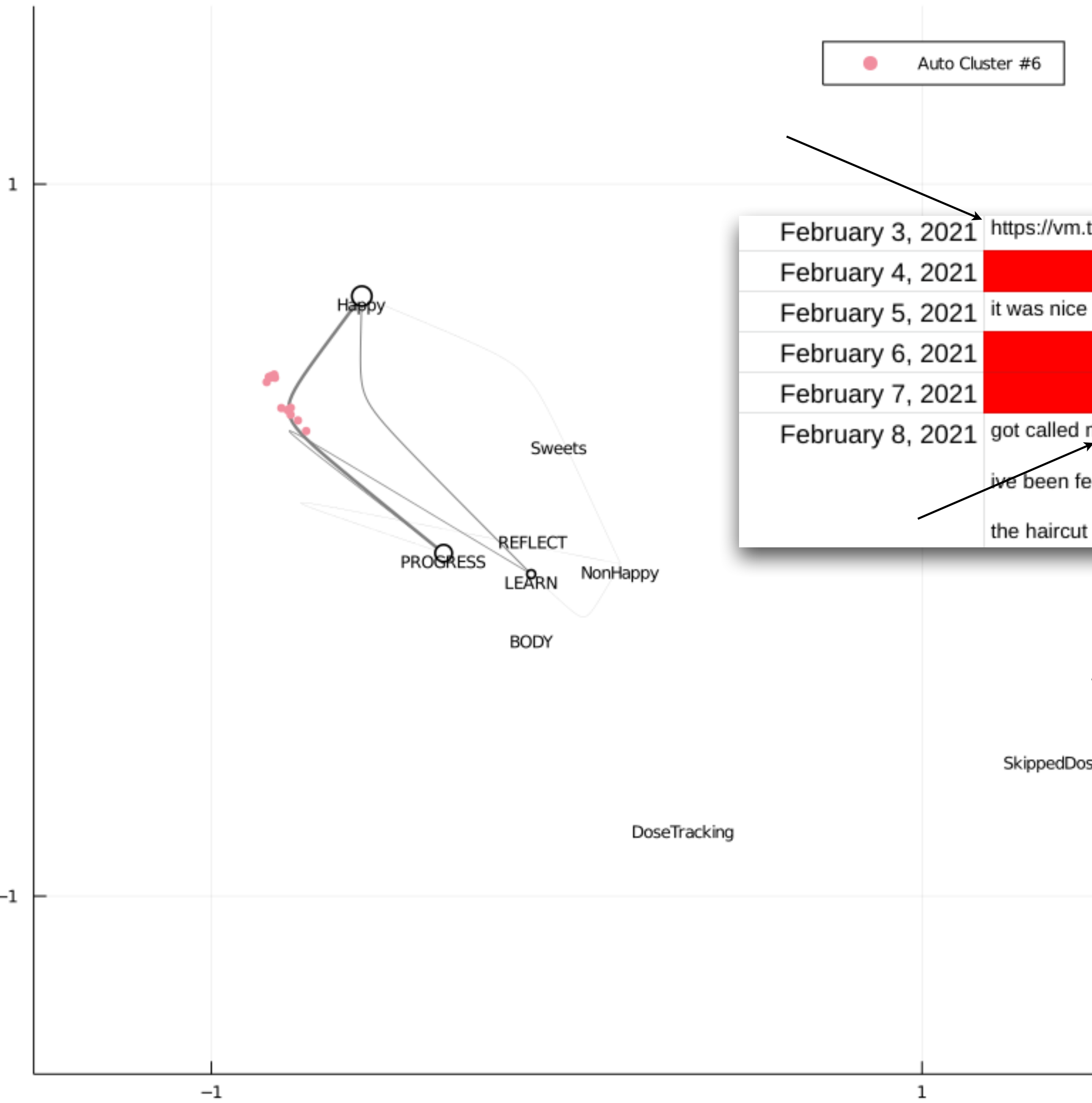
July 28, 2020 [REDACTED]

July 29, 2020 i am leaning towards stopping hormones.



September 21, 2020	I'm not late onset I'm late opportunity depressive yesterday, was overwhelmed a now I'm wide awake at 2am thinking about
September 22, 2020	[REDACTED]
September 23, 2020	[REDACTED]
September 24, 2020	[REDACTED]
September 25, 2020	left woodmans "have a good day maam" didnt say it with a tone or correct himself took a second to realize he didnt say "ma then "have a good day sir" so much on the i felt bad that i didnt know how to respond in moments like this i feel guilt and shame
September 26, 2020	my brain fog is gone, but since Sunday my
September 27, 2020	swimming in the watering hole as a act of calm

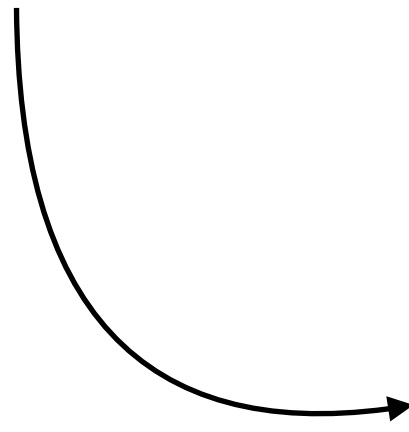
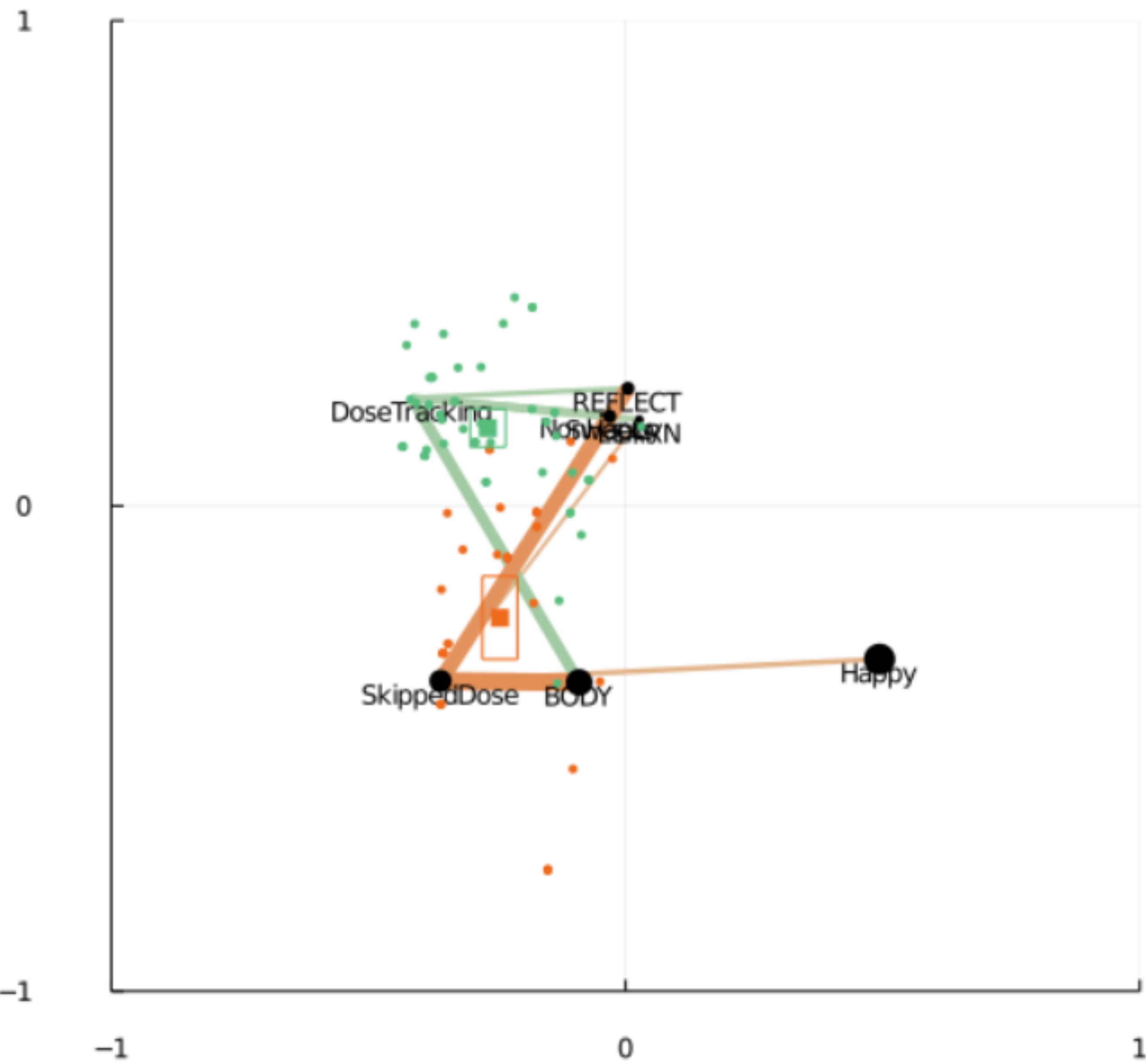




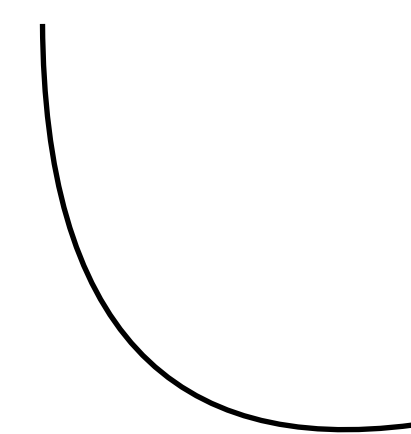
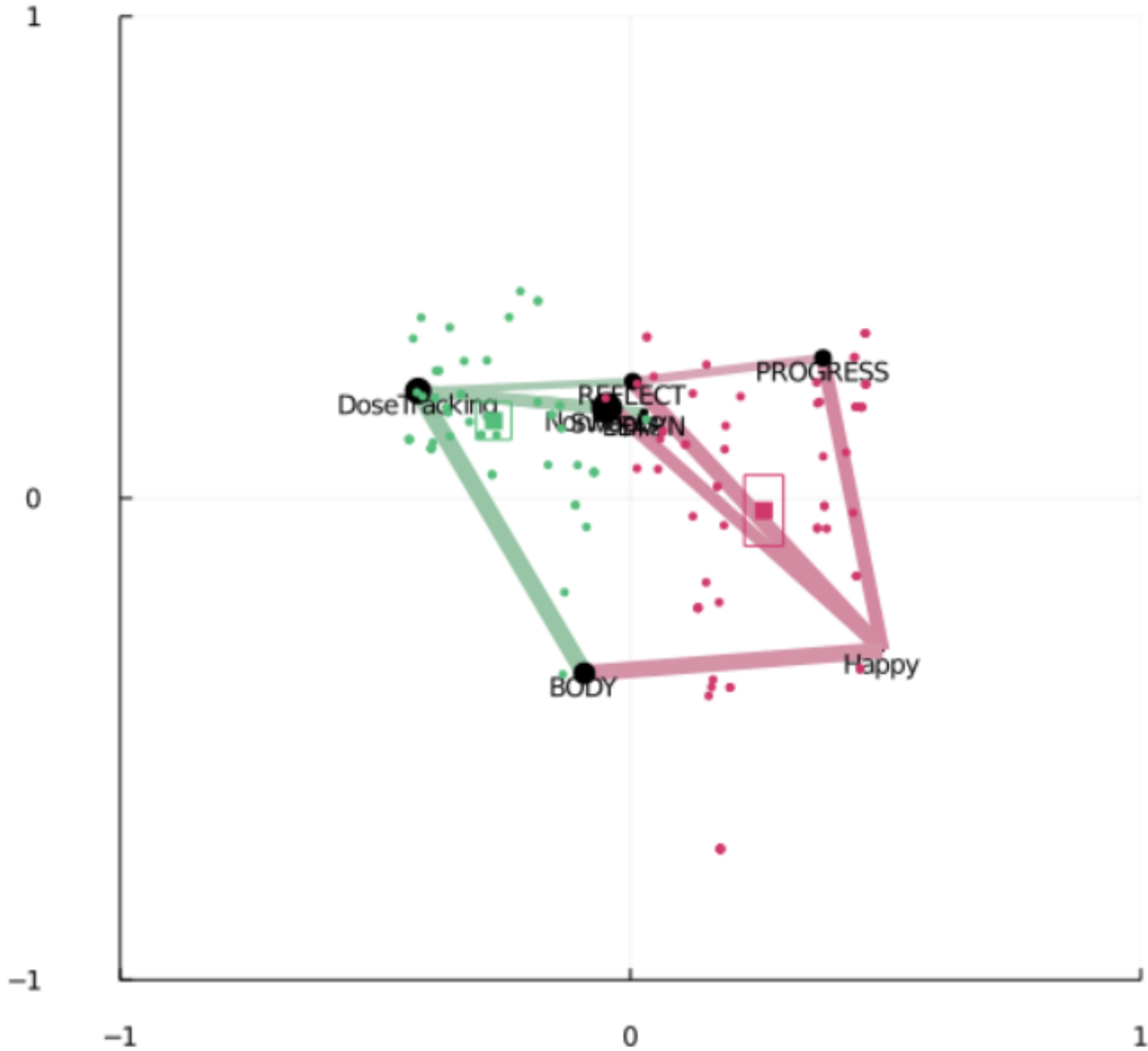
February 3, 2021	https://vm.tiktok.com/ZMeJqdpFx/ [on con
February 4, 2021	[REDACTED]
February 5, 2021	it was nice being out today and being resp
February 6, 2021	[REDACTED]
February 7, 2021	[REDACTED]
February 8, 2021	got called maam on the phone when talkin ive been feeling really good about myself the haircut really helps ❤️



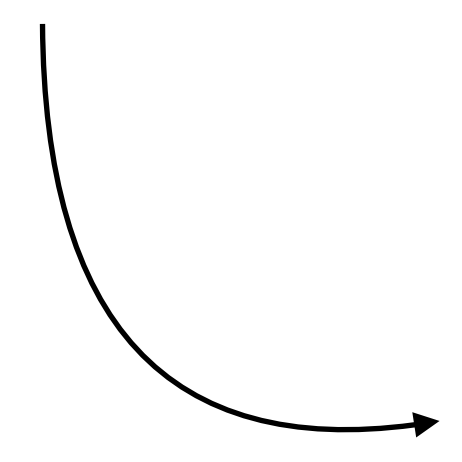
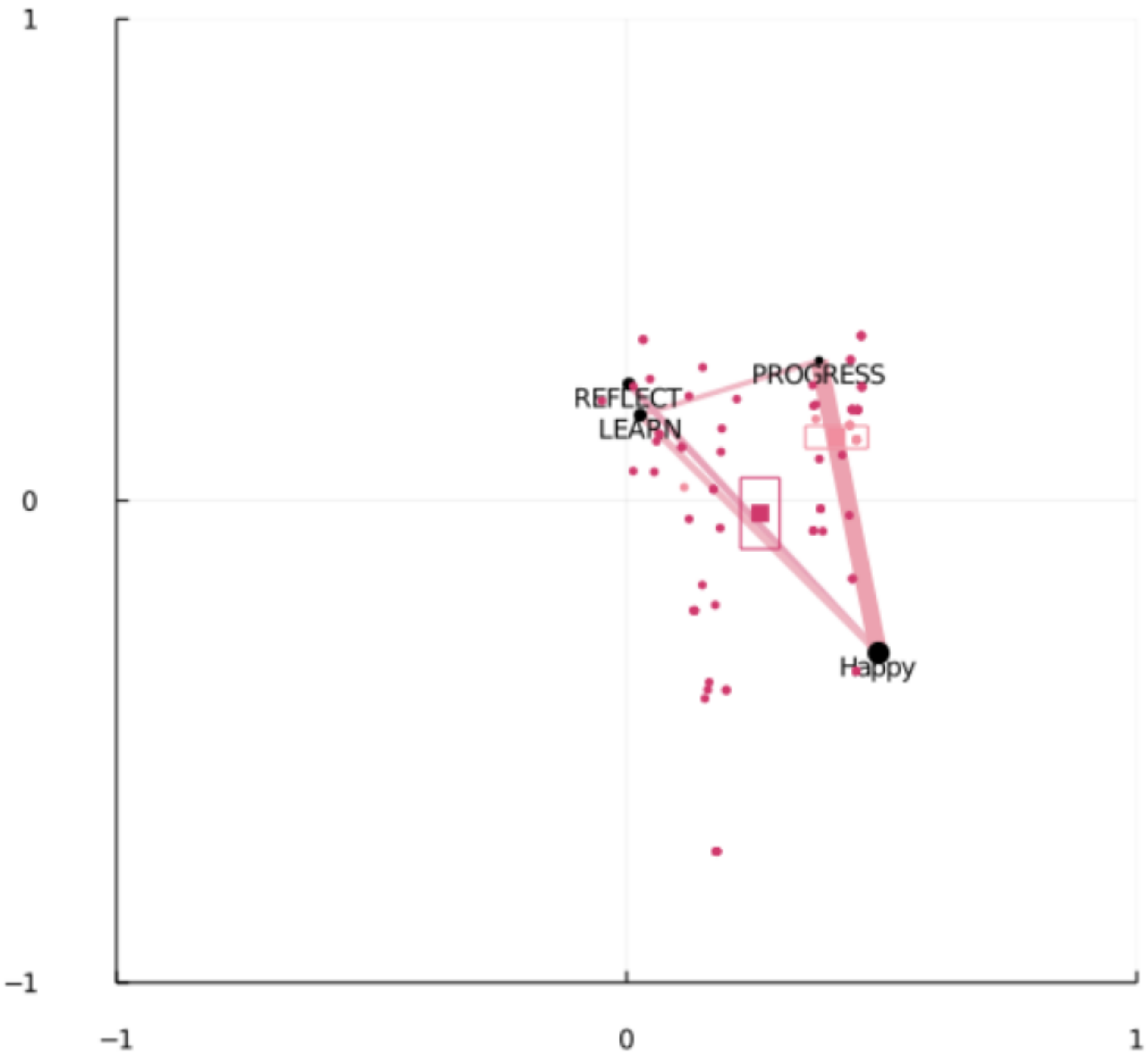
(h) Auto Cluster #2 - Auto Cluster #1



(i) Auto Cluster #5 - Auto Cluster #1



(m) Auto Cluster #6 - Auto Cluster #5



- How can QE be used to tell a temporal story?
- My role as a QE researcher: Tell a rich qualitative story whose turns are guided by quantitative features
- What I need is a model whose turns capture the "lumpiness" of time as a thing experienced
- I need (1) a global narrative structure and (2) paragraph "clusters" of events
- Transitions are "lumpy" experiences, and Nonlinear ENA can capture that

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