

From Personal Data to Personal Health: Tools to Reduce Burden & Improve Collaboration

Sean Munson · smunson.com · [@smunson](https://twitter.com/smunson)

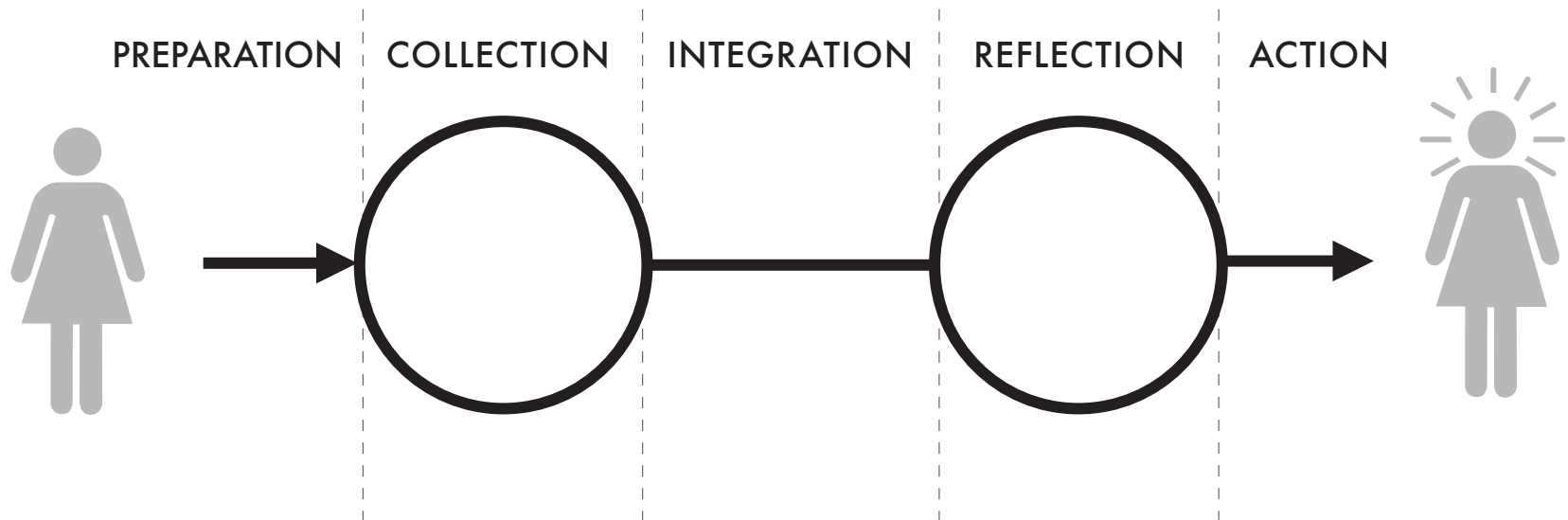


HUMAN CENTERED DESIGN & ENGINEERING
UNIVERSITY *of* WASHINGTON

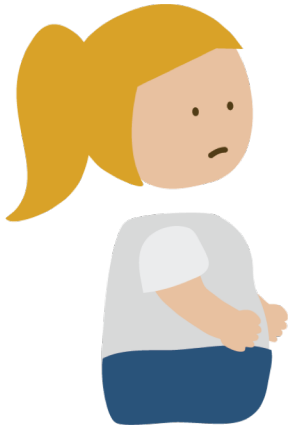




Five-Stage Model of Personal Informatics



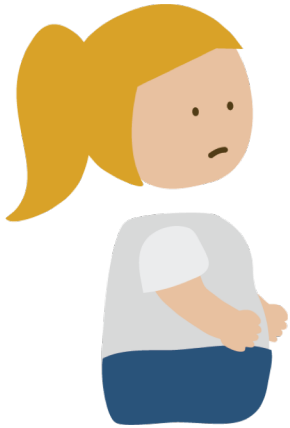
Five-Stage Model of Personal Informatics



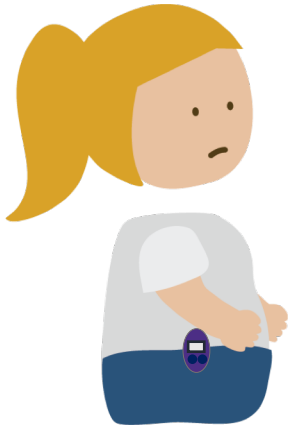
Alice

- 20 years old
- Has a family history of heart disease
- Wants to be more active
- Does not know how, because she is busy

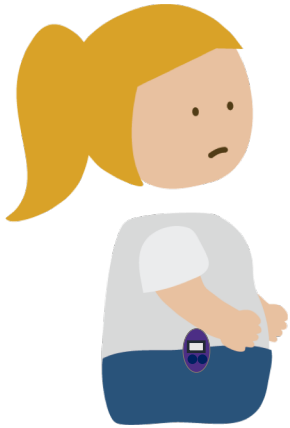
Preparation



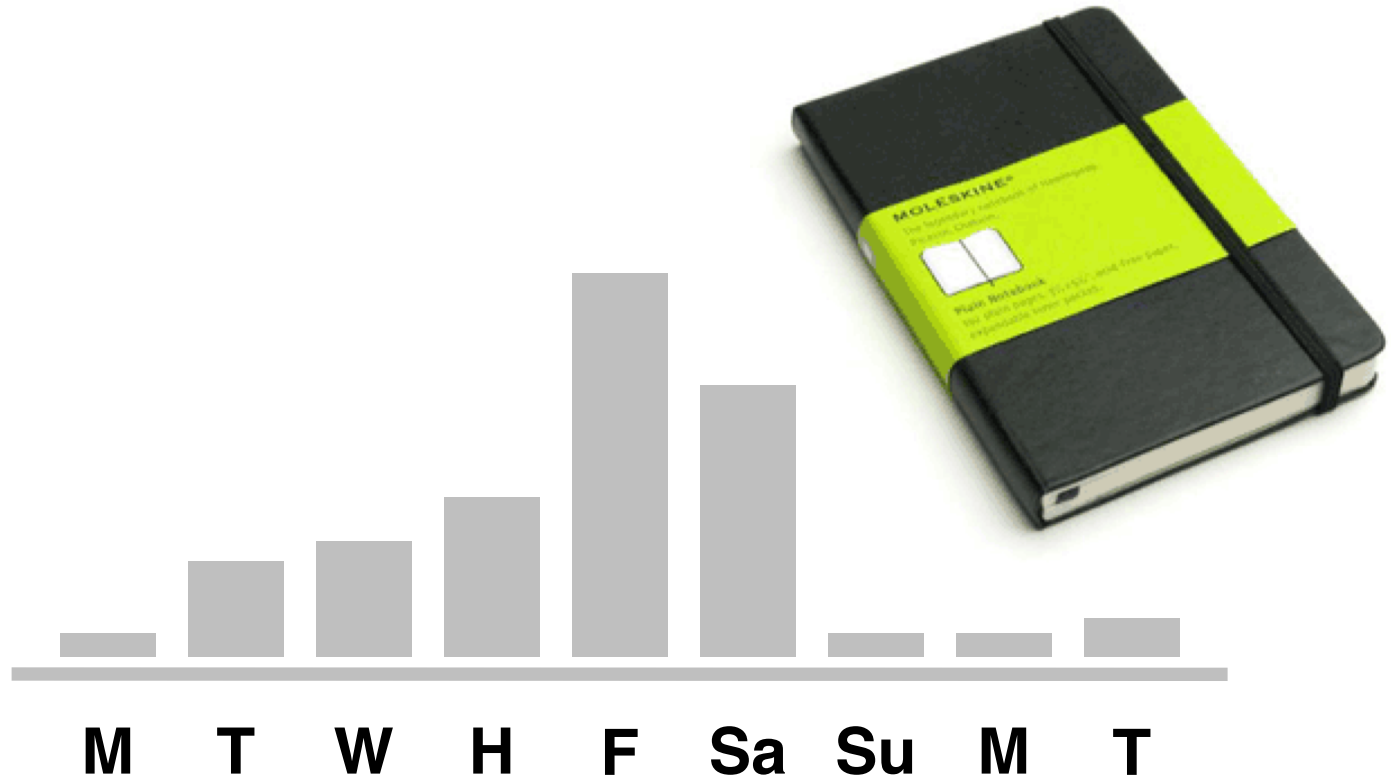
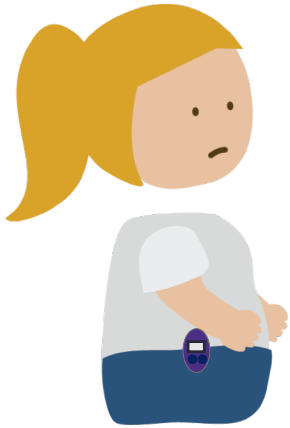
Preparation



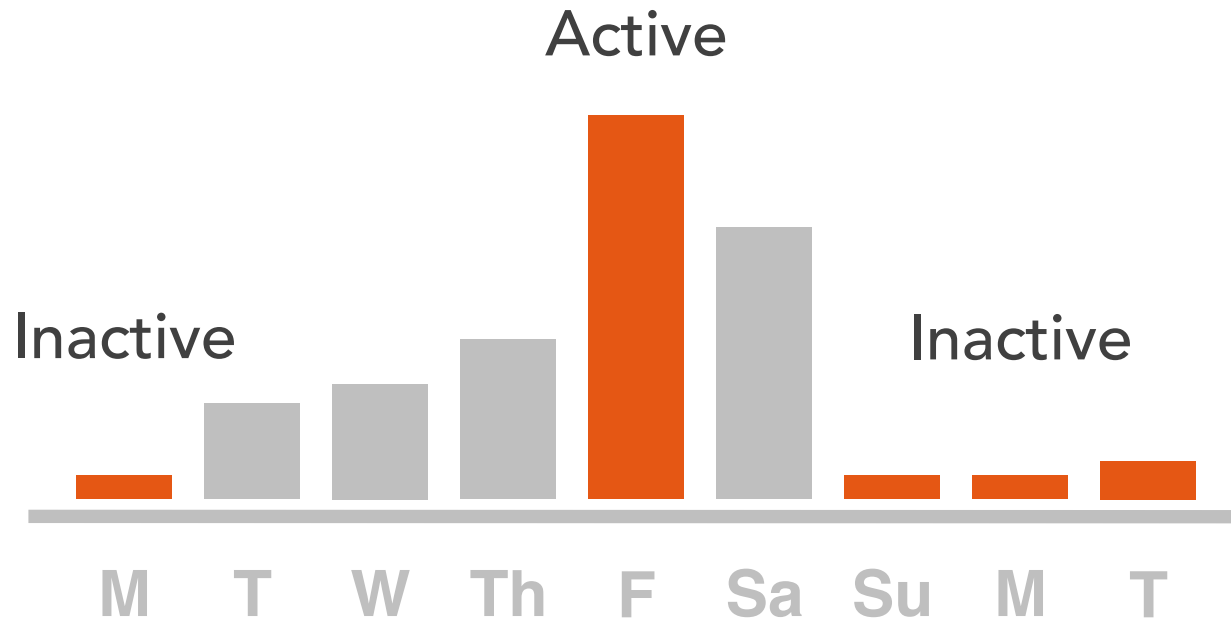
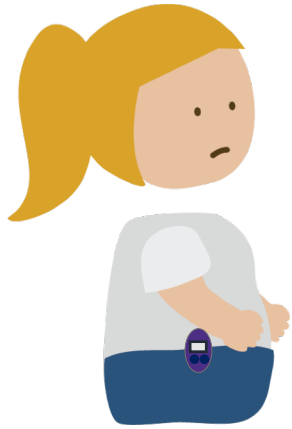
Preparation



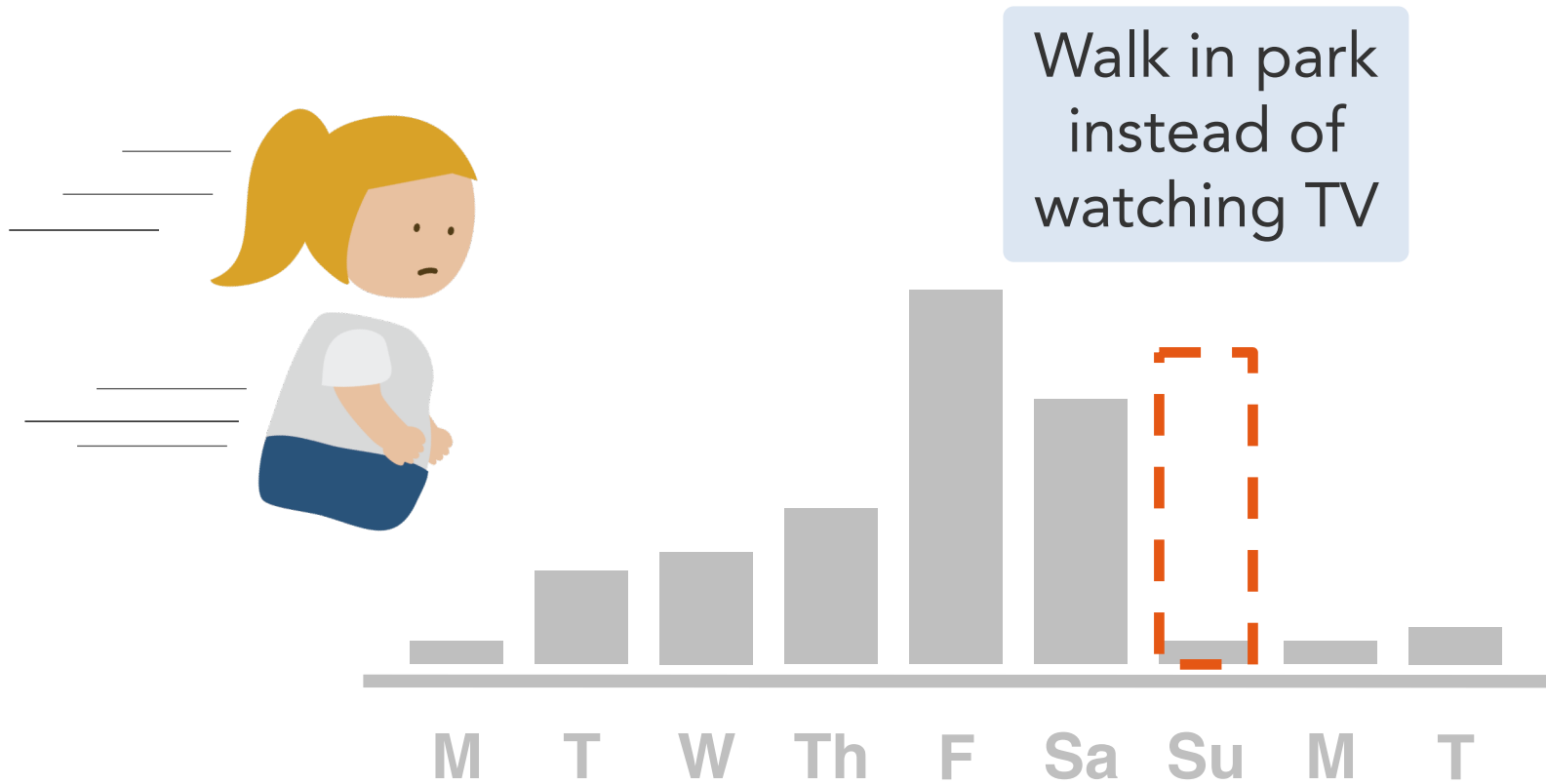
Integration



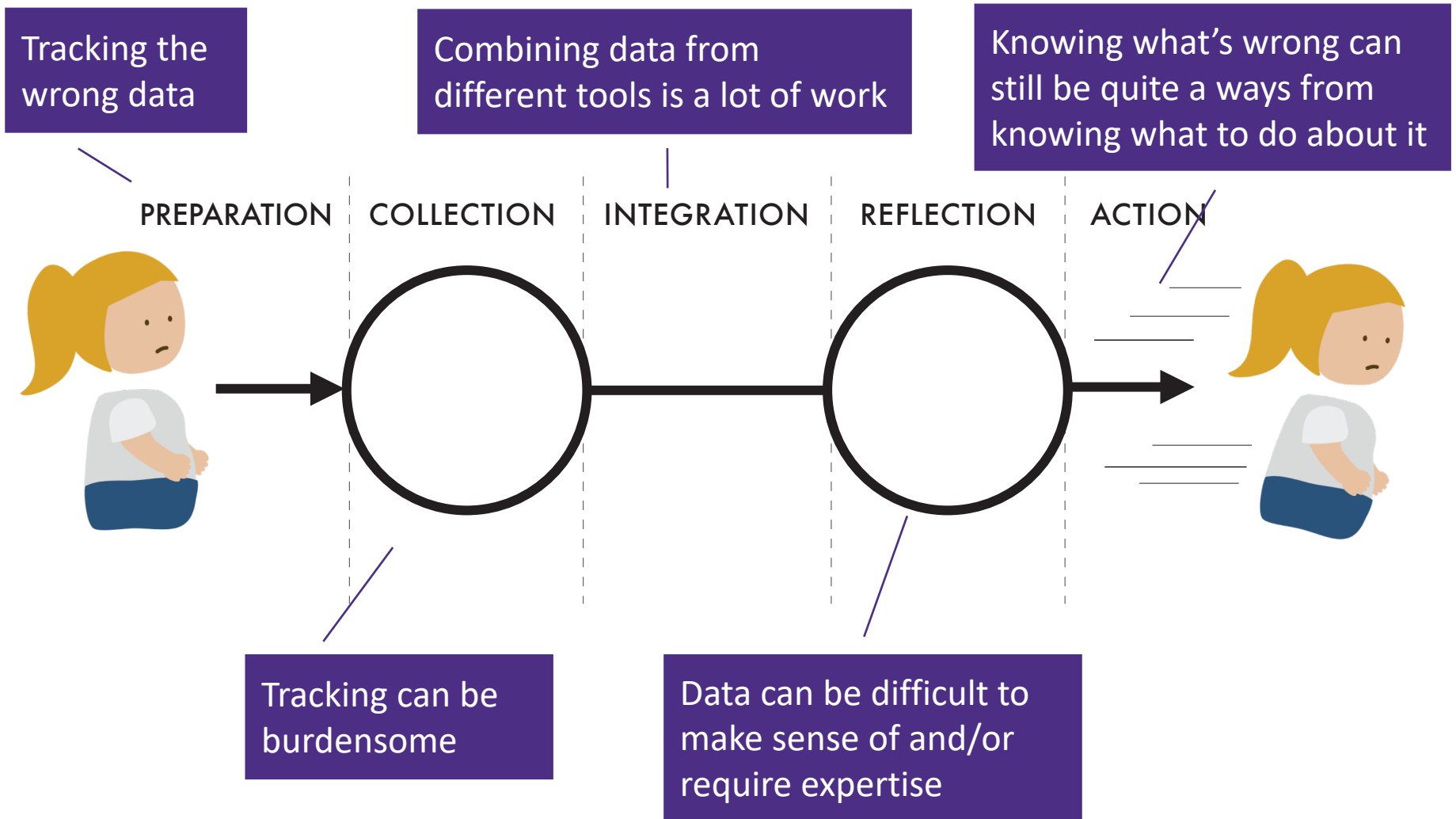
Reflection



Action



Reality is often far from the ideal



Can we design tools that reduce the burden of tracking and that help people enlist the help of others in tracking?



two contexts

Healthy Eating

- Weight management, chronic disorders, and preventive care
- Goal: identify strategies for achieving desired outcome
- Track food, exercises, mood, stress, sleep

Irritable Bowel Syndrome

- Episodic abdominal pain associated with diarrhea and/or constipation
- Affects 20% of US population
- Goal: identify individualized triggers and manage symptoms
- Track food, symptoms



Healthy Eating

Food journals can help people monitor what they eat and tune their behavior.

NAME: Chloe Day 08/18/14
 DATE: 8-18-14
 DAY: M T W Th F Sa Su

FOOD JOURNAL

TODAY'S GOAL AND/OR AFFIRMATION:

TIME	FOOD AND QUANTITY	DP	B/MP	F/V	G	O	HUNGER SCALE	MOOD, THOUGHTS AND/OR FEELINGS
							0 1 2 3 4 5 6 7 8 9 10	
8:30	1 egg, scramble w 1 tsp of oil 1/2 c. salsa 1 sm mango		80	30			4	
12:00	Grilled chicken lettuce wraps w/ 1/2 c onion, tomato, & mustard fruit cup (apple, pineapple, strawberry) 1/2 c.		135	120			5	
6:15	2 chicken thighs baked mixed veg 1/2 c Salsa 1/2 c	472		50			4	
8:00	1/2 c Salsa 1 raw zucchini			50			4	Hungry between lunch & dinner
TOTALS		472	215	375				
RECOMMENDED								

0 = Empty
 5 = Neutral
 10 = Stuffed

Graph hunger level from start to end of meal

EXERCISE:
 30 min on tread mill
 strength training / trx rows / cable pull / planks / ball sit ups

DP = Dairy Protein
 B/MP = Bean / Meat Protein
 F/V = Fruit / Vegetable
 G = Grain
 O = Others

© Copyright 1993 Karin Kratina, PhD, RD • For copies, visit www.NourishingConnections.com
 Reflective Image, Inc., Publishers

Diary				
TODAY				
1,210	1,077	285	792	418
GOAL	FOOD	EXERCISE	NET	REMAINING
Breakfast				500 cal
Strawberries - Raw				49
1 cup, halves				
1 Scrambled Egg White				17
1 egg white				
Honey				304
100 g				
Nonfat Greek Strained Yogurt				130
Fage, 1 cup (227 g)				
Lunch				577 cal
Cilantro Lime Vinaigrette Dressing				180
Nordstrom Cafe, 2 TBSP				
Beans - Black, cooked, boiled, with salt				227
1 cup				
100% Apple Juice				120
Old Orchard, 8 oz				
Guacamole Medium				50

Food journals can help people monitor what they eat and tune their behavior.



High burden
to keep



Often feel judgy



Nudge people
to exactly the
wrong foods



Summaries &
designs assume
certain goals

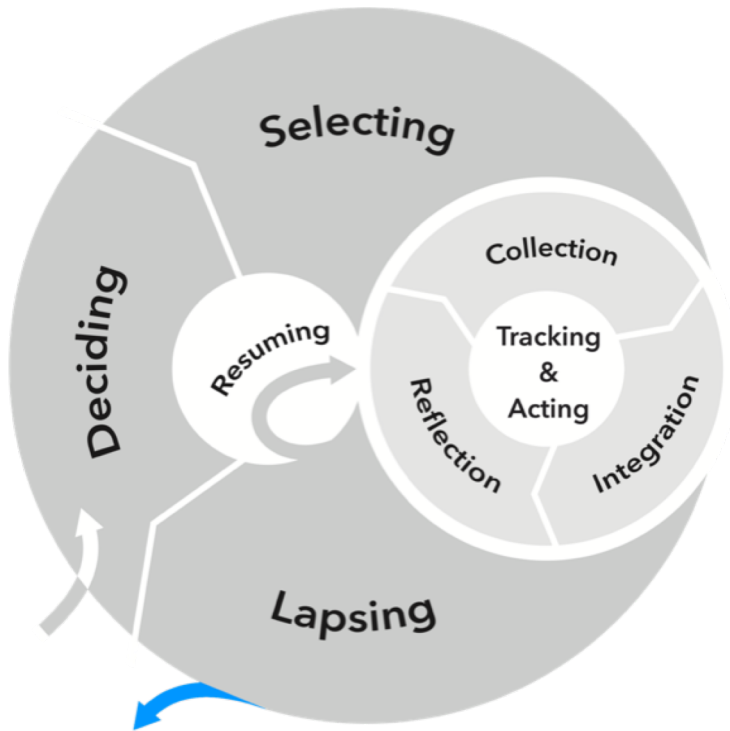


Not designed
to support
collaboration



Risk of a
data fetish

People will lapse. Design for it.





Diary				
TODAY				
1,210	1,077	285	792	418
GOAL	FOOD	EXERCISE	NET	REMAINING
Breakfast		500 cal		
Strawberries - Raw		49		
1 cup, halves				
1 Scrambled Egg White		17		
1 egg white				

Is there another way?

Lunch		577 cal		
Cilantro Lime Vinaigrette Dressing		180		
Nordstrom Cafe, 2 TBSP				
Beans - Black, cooked, boiled, with salt		227		
1 cup				
100% Apple Juice		120		
Old Orchard, 8 oz				
Guacamole Medium		50		



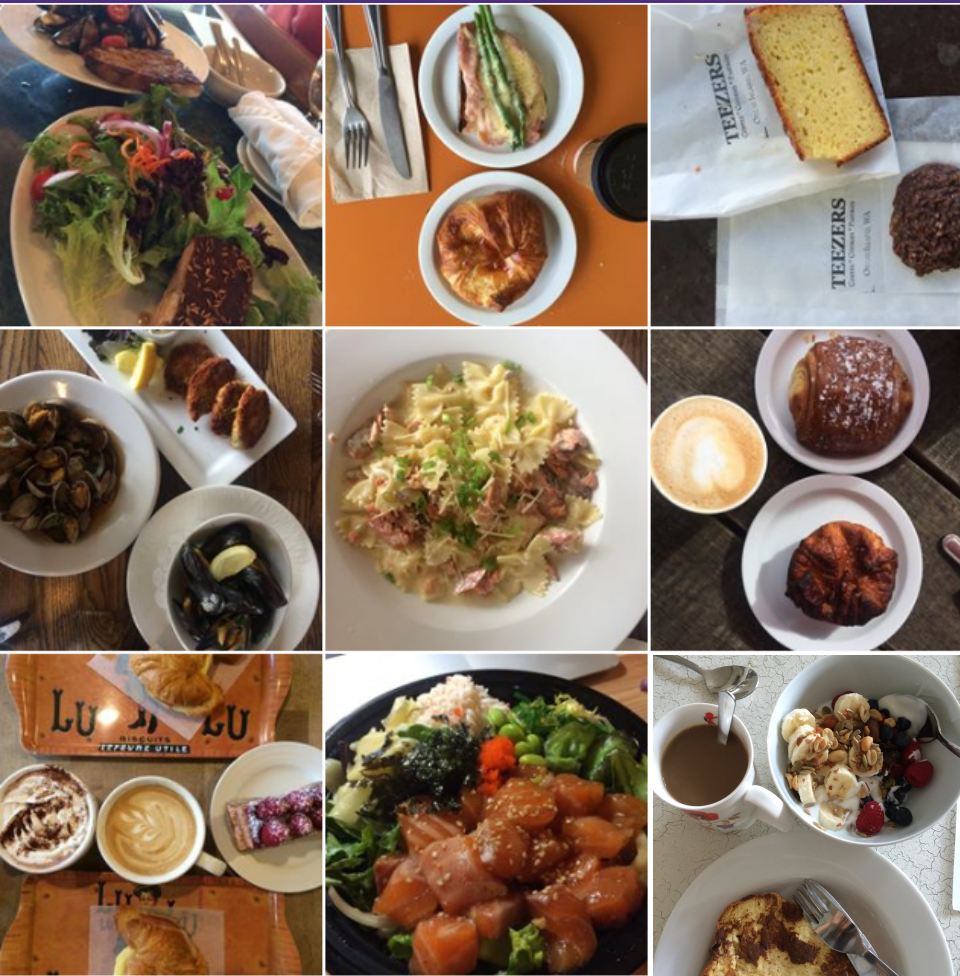
Photo-based food journals

Lower burden than traditional food journals.

More socially acceptable.

Capture more context.

Avoid many of the "negative nudges."

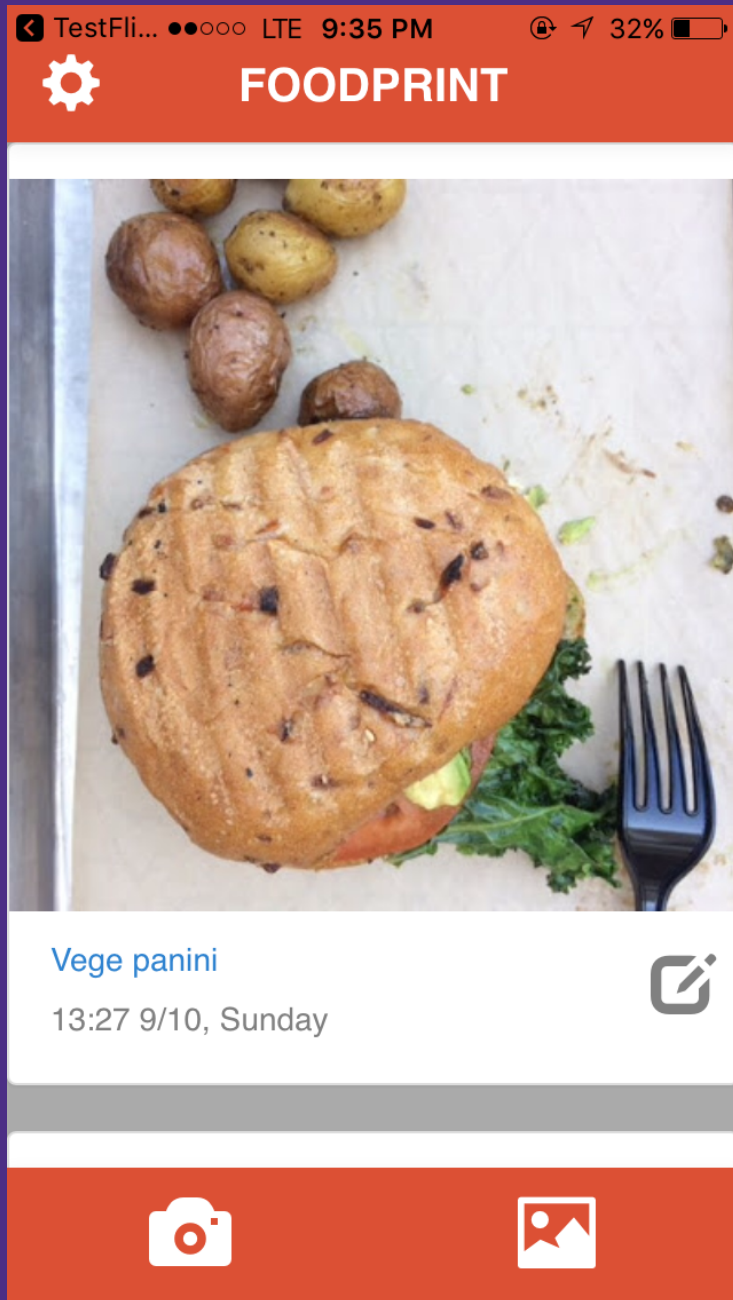


Some people already use Instagram this way

Creates opportunity for accountability to followers.

Creates ability to learn by following others.






FoodPrint:
A mobile, photo-based
food journal, designed
for flexible goals and
collaboration.

support for a variety of goals

●●●● AT&T LTE 21:15 89%

FOODPRINT



Next, please tell us more about your food.

Are there other things you would like to say about this food or meal? (Optional)


e.g., What was the occasion? ...

What was in your foods?

Grains	Protein	Oils
Vegetables	Fruits	Dairy
N/A		

●●○○ T-Mobile 10:00 PM 29%

FOODPRINT



more about your food.

Are there other things you would like to say about this food or meal? (Optional)

e.g., What was the occasion? ...

How much sugar was in your food?


None Some A lot

I don't know

+ Add additional info about your food

●●●● T-Mobile 11:49 PM 9%

FOODPRINT



Does the food belong to the same meal as the previous photo? (Required)

Yes No

Are there other things you would like to say about this food or meal? (Optional)

e.g., What was the occasion? ...

How did you feel when you eat the food?

☹️ 😐 😊

How stressed were you?

☹️ 😐 😊

◀ Back Balanced Diet

Ingredient monitoring

◀ Back Stress & mood ▶

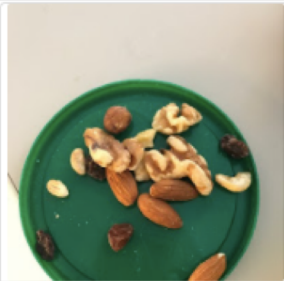
web app supports review by goal

I want to see my when I ate

Or, from to



Milktea
08:15 10/7, Saturday



Nuts
13:11 10/7, Saturday



Please input the caption!
08:14 10/7, Saturday



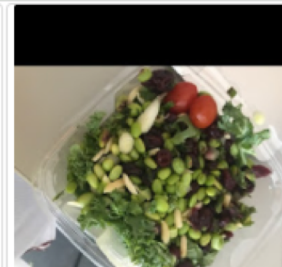
Oatmeal
08:09 10/8, Sunday



Thai
18:09 10/7, Saturday



Thai
18:10 10/7, Saturday



Food eaten
in a bad mood

Food eaten
in an okay mood

Food eaten
in a good mood

Pre-visit notes

Encourage explicit communication about goals

Goal

1. Goal of the visits

I would like to get a sense of my overall diet and whether it is sufficient and healthy. I also wanted to discuss ways to manage over-snacking and stress eating.

Summary

2. Summaries to the doctor or dietitian

(a) Have you found any patterns about your eating?

I tend to overeat at night - sometimes I'll continue eating second portions or snacking after dinner even if I'm full. I tend to snack more when I am stressed and there is easy access to food. If I don't prepare food ahead of time, I am likely to go to things that are less healthy. Sometimes, I felt my stress level was different than how I felt while eating the food.

(b) Write down three or more major things you found in your data

- a. I usually eat 2 or 3 times more than what I take the picture of (and sometimes snack on the meal as I prepare it, without taking accurate pictures of quantity)
- b. I was more conscious of what I was going to eat when I started taking pictures, and I became better at waiting until I was genuinely hungry to eat
- c. Eating with other people seemed to improve my mood.

Questions

3. Questions to the doctor or dietitian

Write down three questions or more you would like to ask your doctors or dietitians

- a. What are ways to control over-snacking when I get home?
- b. Are there certain categories of food I'm missing? Or are there times of day I should eat certain categories of food?
- c. What are generally good tips to maintaina a heahthly diet?

Onboarding

Interview
installation



Data collection

30 days



Exit interview

Individual interview
Collaborative interview

17 Patients

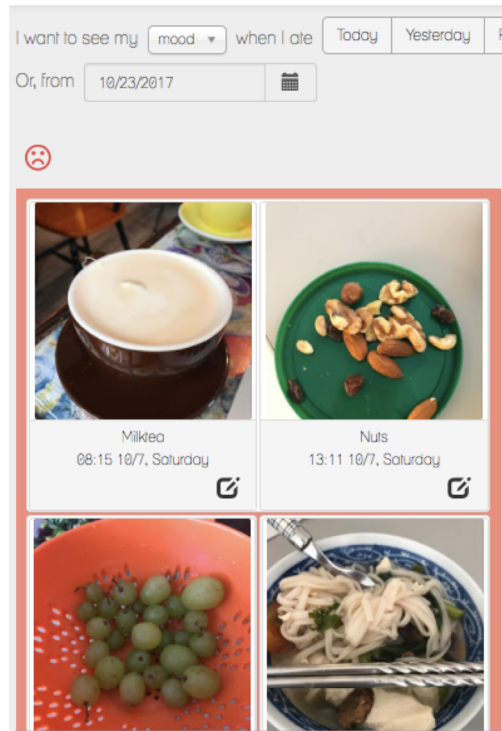
- 13 females and 4 males
- Goals included: balanced meal, ingredient monitoring, stress/mood

7 Providers

4 dietitians, 2 nutritionists, 1 health coach

Photo-based visualizations provided more details about eating habits

Diary				
TODAY				
1,210	1,077	285	792	418
GOAL	FOOD	EXERCISE	NET	REMAINING
Breakfast 500 cal				
Strawberries - Raw 49				
1 cup, halves				
1 Scrambled Egg White 17				
1 egg white				
Honey 304				
100 g				
Nonfat Greek Strained Yogurt 130				
Fage, 1 cup (227 g)				
Lunch 577 cal				
Cilantro Lime Vinaigrette Dressing 180				
Nordstrom Cafe, 2 TBSP				
Beans - Black, cooked, boiled, with salt 227				
1 cup				
100% Apple Juice 120				
Old Orchard, 8 oz				
Guacamole Medium 50				



You get more information of what their meals look like.

It's interesting to have the information of how were they feeling when they ate it, how did they prepare it? I think that, to me, is more useful than how many calories or grams of fat were in something.

Dietitian

Pre-visit notes kept the focus on patient goals during collaborative review

Because I could see her goals and so I had an idea of what I was going to talk about. And fit the session within the timeframe that we had. It's nice to be able to see what the client wants to go over, and things that you're gonna plan on talking with the client on.

Dietitian

**Numbers are alluring,
but they are also reductionist.**

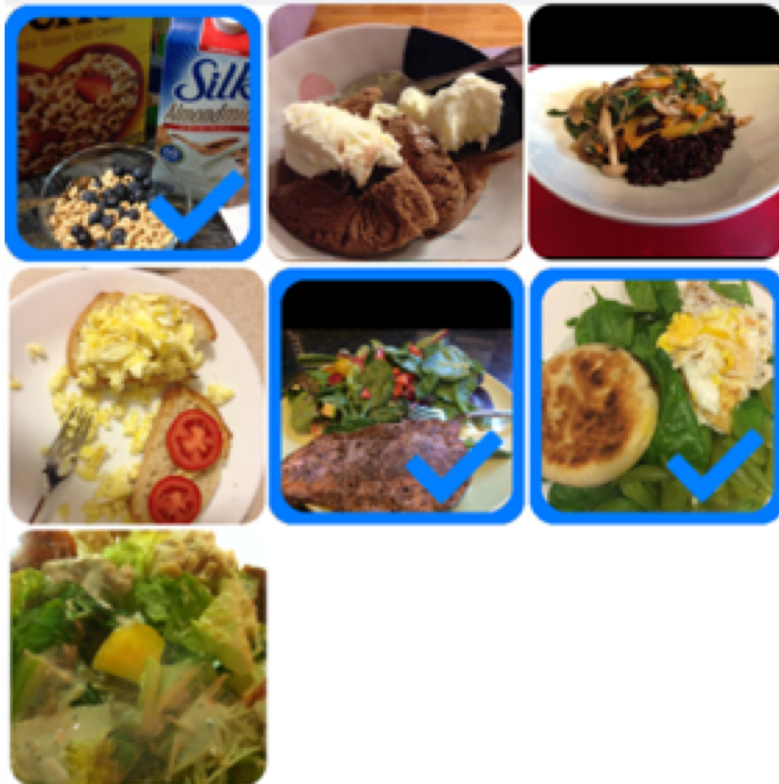
**Apps should assess people's goals and
configure tracking accordingly.**

**Design to give patients a space to react to
their data and plan for their visit.**

**Can we further lower barriers
and still deliver benefits?**

History

Week of Monday, July 21, 2014



Food4Thought



I Am Eating



History



FB Group



Settings

History

Thursday
July 24

Eat something that is good
for your eyes.



Wednesday
July 23

Eat something containing
no carbs.

Tuesday
July 22

Eat something cooked in a
healthy oil.

Monday
July 21

Eat something that is good
for your immune system.

Sunday
July 20

Eat something high in
vitamin D.

Saturday
July 19

Eat something that
contains monounsaturated
fat.



I Am Eating



History



Settings

Four Versions



Social features



No social features



Nutrition challenges



Non-nutrition challenges



Nutrition challenges

Nutritionally prescriptive, serious, conventional

- Eat something high in fiber
- Eat something with at least 20 grams of protein
- Eat something that is good for your eyes



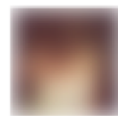
Non-nutrition challenges

fun, curiosity inspiring, random, varied

- Eat something that is yellow
- Eat something that an elephant would eat
- Eat something that reminds you of your high school years



Social features



shared her photo.

Food4Thought

Arugula!



Todays Challenge: Eat something that starts with the letter 'A'.

Like · Comment



and like this.

✓ Seen by 21



Nice! I was getting bored of the apples 😊 I'm trying to think of something else A-related for my post!

Like



Haha, we (including myself) have all been quite creative with our apple submissions.

Like



Nutrition challenges

- Higher engagement
- More judgy



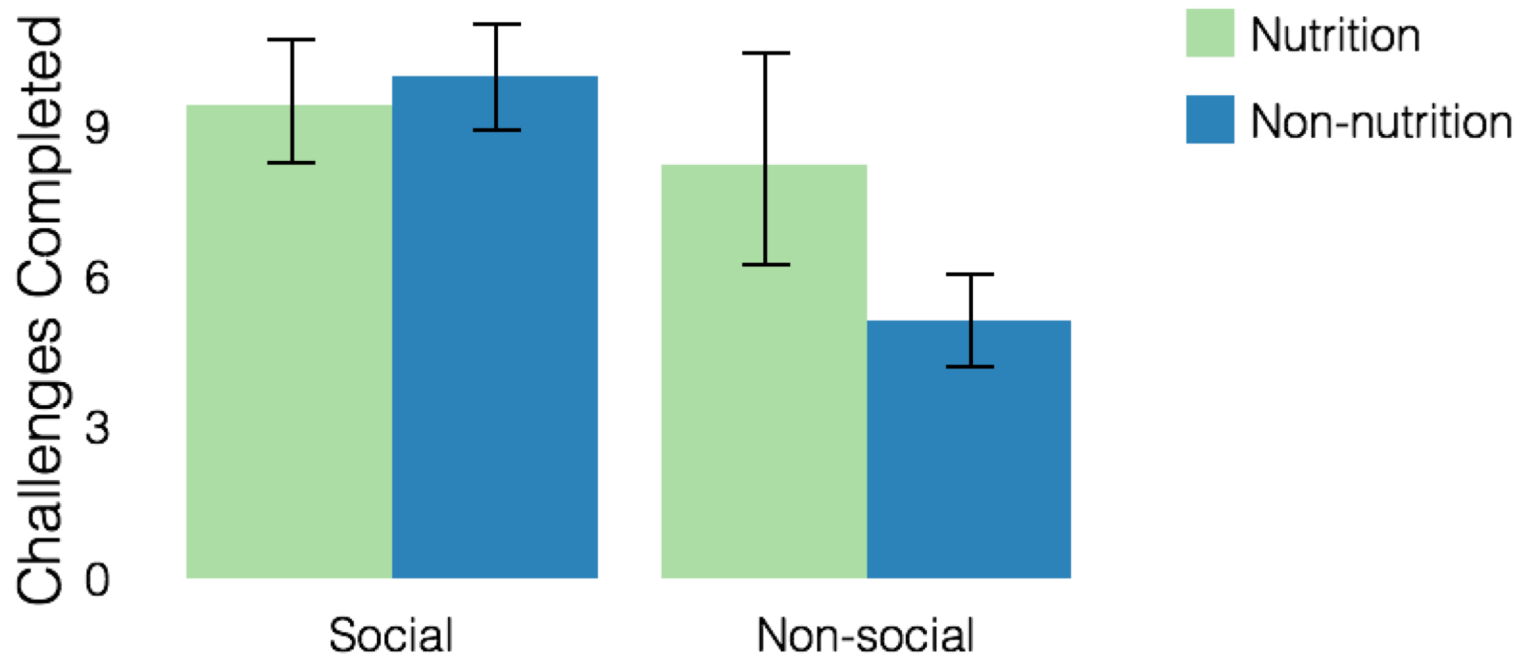
Non-nutrition challenges

- Greater gains in food mindfulness
- Challenges and activity felt more arbitrary



Social features

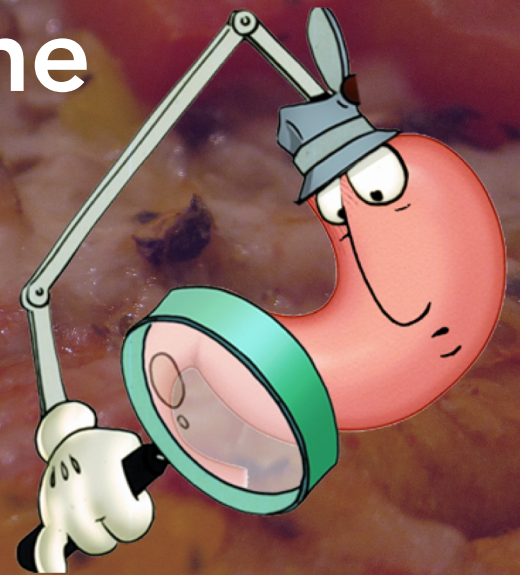
- Completed more challenges
- Less likely to use the app to record other foods

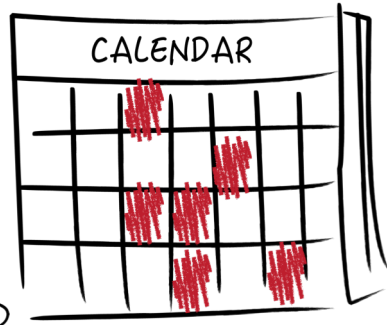


“Minimum viable data”

Design for experiences, not just data.

Irritable Bowel Syndrome





Severe Symptoms

Missing Work

Needs Help

Preparation

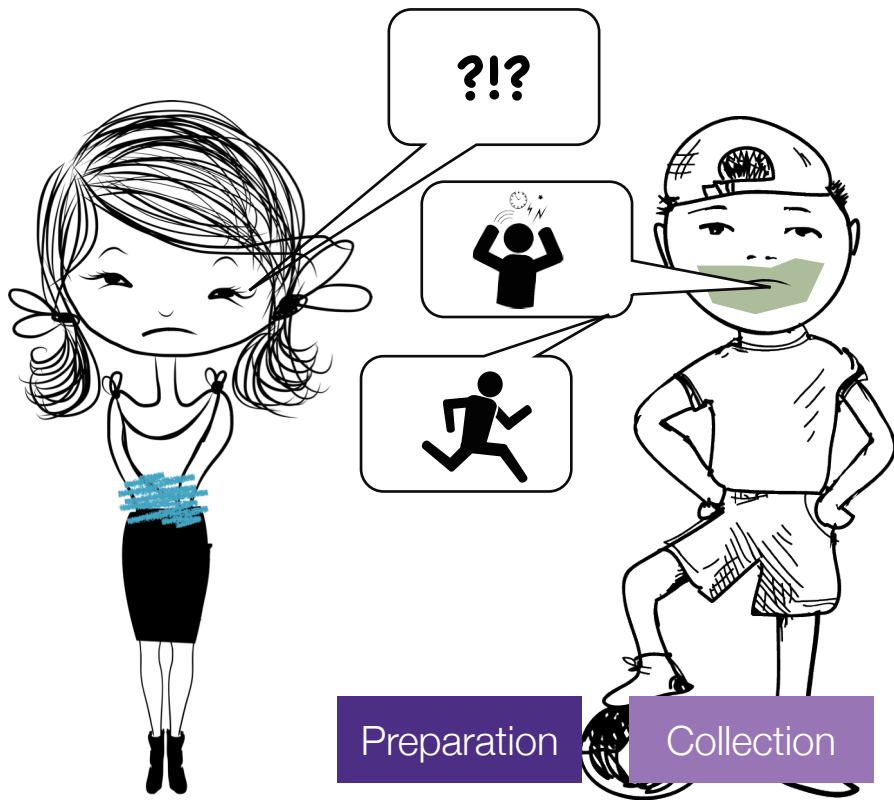
Collection

Integration

Reflection

Action

Jane



unsure what to do

Consults Brother

Had Similar Symptoms

Shares his Triggers

Stress & Exercise

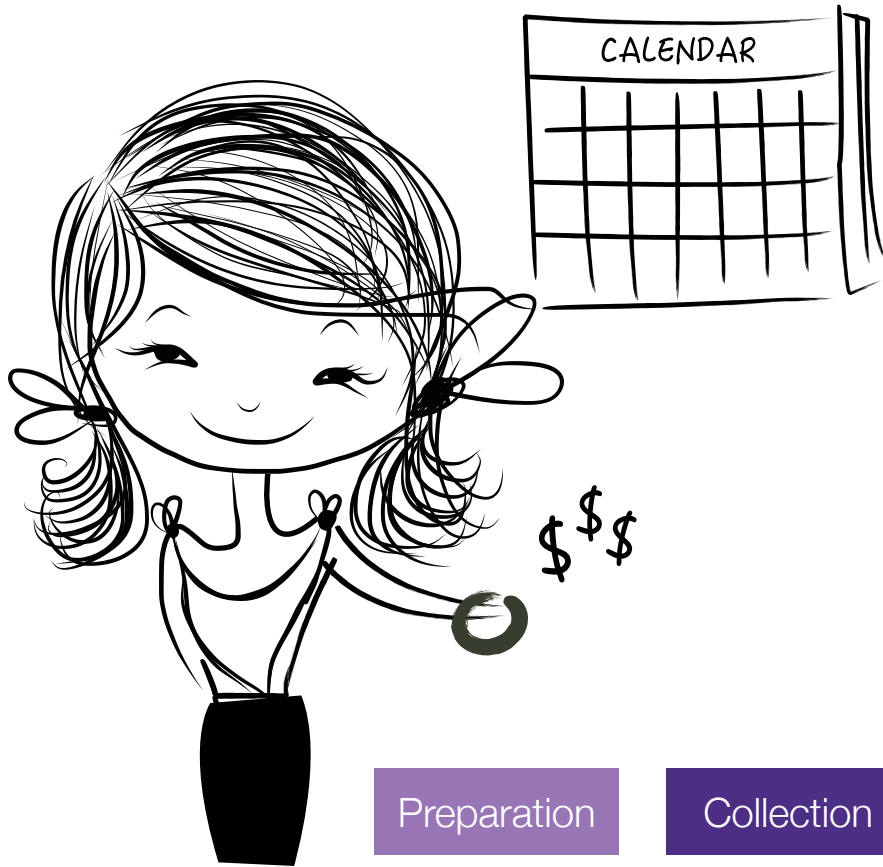
Preparation

Collection

Integration

Reflection

Action



tracks stress & physical activity

Buys a Fitness Band

Tracks Mood

Tracks Physical Activity

Preparation

Collection

Integration

Reflection

Action



(tries to) make
sense of the data

Lots of Data

Mood Over Time

Activity Over Time

But No Understanding

Preparation

Collection

Integration

Reflection

Action



maybe her doctor can help?

Did not track symptoms

Did not track food

Elimination diet

Difficult to follow

Difficult to interpret

Lengthy process

Possibly inconclusive

Preparation

Collection

Integration

Reflection

Action

alternative: paper diaries

Tracks foods and
symptoms on paper.

Plan to review together
in a month.



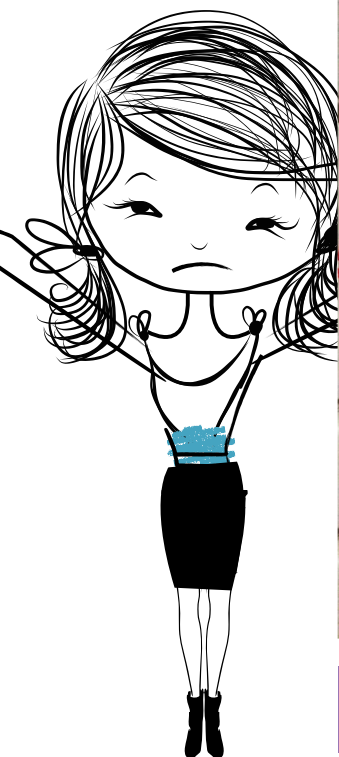
Preparation

Collection

Integration

Reflection

Action



5/21/12 - WOKE AT 6:30
- BM AT 6:32
(low back ache)
(woke with low back ache
through the night)
- BM AT 7:10
- BREAKFAST AT 8:00
- SNACK AT 9:30
- SNACK AT 11:15
- SNACK AT 1:45
(all symptoms passed)
- SNACK AT 3:00
- DINNER AT 5:30

5/22/12 - AWOKE AT 12:30
(low back pain, abdominal cramps,
right knee ache, right foot tingling, gas,
mild nausea)
- SNACK AT 2:00
- WOKE AT 6:30
- BM AT 6:35
- BM AT 6:40
- BM AT 6:50
- BM AT 7:30
- BREAKFAST AT 8:00
(still have low back pain)
- BM AT 10:45

- TOOK SYNTHROID
- TOOK M.V.
- 2 EGGS POACHED
- WATER
- 3 MEDJOL DATES W/
NATURAL PEANUT BUTTER
- KEFIR
- HAND FULL OF SESAME STICKS
- WATER
- APRICOT
- 3 MEDJOL DATES W/
NATURAL PEANUT BUTTER
- HANDFUL OF MIXED NUTS
- LASAGNA W/ ARTICHOKE & AVOCADO
- 1 STICK APPLE CHW
- WATER

- KEFIR
- BROWN RICE CRISPS
- RICE MILK
- HALF BANANA
- KEFIR
- 2 MEDJOL DATES W/
NATURAL PEANUT BUTTER

Some FODMAPs
Not watery, loose
Stanford Hospital and Clinics
Digestive Health
Food/GI Symptoms Record

Instructions: Please record everything you eat and drink (including ice and water taken with your medications).
Circle your symptoms if any as they occur after meals and snacks.

Date: 6/22
Food & Beverages and Amount
Symptoms if any (circle).

Breakfast Time: 11/4 c oatmeal w/ 1/2 Trice milk
CA fortified - 1/4c sugar
1/2 Tr. Toss wheat-free waffle
100Z. Peppermint tea
Nausea Vomiting
Heartburn Stomach Pain
Diarrhea Constipation
Sense of Urgency Gas
Bloating Cramping
Other: before breakfast

Snack Time: 11:00 - 1 slice French toast egg white, milk
Lunch Time: 12:30 3 oz fresh cold broiled salmon
4oz cranberry juice
flour tortilla, roasted - avocado, olives
lemon, lowfat dressing - warm rice 1T.
1/2 ginger cookie whole foods
Snack Time: 3:00 rice crisps, rice milk, blueberries
Dinner Time: 6:00 1c chicken broth 1 Trice
4oz organic broiled chicken breast
Baked sweet yam, steamed carrots,
Zucchini, cranberry sauce, tes, raspberry
sorbet, homemade cake
Snack Time: 9:30 crackers, reduced sugar jam
Nausea Vomiting
Heartburn Stomach Pain
Diarrhea Constipation
Sense of Urgency Gas
Bloating Cramping
Other: after dinner

Date: 6/25
Food & Beverages and Amount
Symptoms if any (circle).

Breakfast Time: 9:30 11/4 c oatmeal w/ Trice cereal,
3 Trice milk - CA enriched - Traden's
wheat-free waffle, maple syrup 1T.
Peppermint tea
Nausea Vomiting
Heartburn Stomach Pain
Diarrhea Constipation
Sense of Urgency Gas
Bloating Cramping
Other:

Snack Time: 11:00 1/4c Soy Yogurt, fr blueberries,
mashed strawberries (yellow) cracker
Lunch Time: 1:00 Toast - 3oz Roast Turkey Breast
1/4 avocado, mustard, romaine
hardboiled egg white, baked potato
chips - tea, 2oz cranberry juice
Nausea Vomiting
Heartburn Stomach Pain
Diarrhea Constipation
Sense of Urgency Gas
Bloating Cramping
Other:

Snack Time: 4:00 Pretzels, 1/4t peanut butter, crackers
Dinner Time: 6:30 Flour tortilla - 4oz Tilapia pan
seared, lemon, olive oil, edamame
Israeli, green beans fresh, carrots +
peas, apple sauce 1/4cup, blueberries
1/2 ginger cookie
raspberry sorbet, small piece yellow cake (I baked)
Snack Time: 9:30 water 100mg gabapentin - every night
align probiotic - 4-6 times a week after lunch

Preparation

Collection

Integration

Reflection

Action



review of paper diaries

Inconsistent recommendations from provider to provider.

Bias in provider recommendations

Patients and providers leave frustrated.

Integration

Reflection

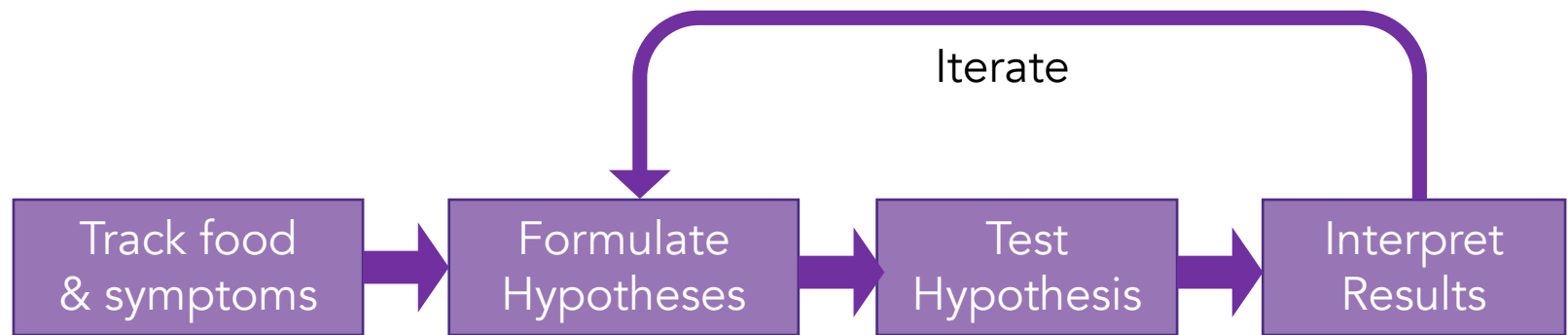
Action

C Chung, K Dew, A Cole, J Zia, J Fogarty, JA Kientz, SA Munson. *CSCW 2017*.
Boundary Negotiating Artifacts in Personal Informatics: Patient-Provider Collaboration with Patient-Generated Data.

J Zia, C Chung, K Xu, Y Dong, JM Schenk, K Cain, SA Munson, MM Heitkemper. *J Clinical Medicine*.
Inter-Rater Reliability of Provider Interpretations of Irritable Bowel Syndrome Food and Symptom Journals

recasting self-tracking

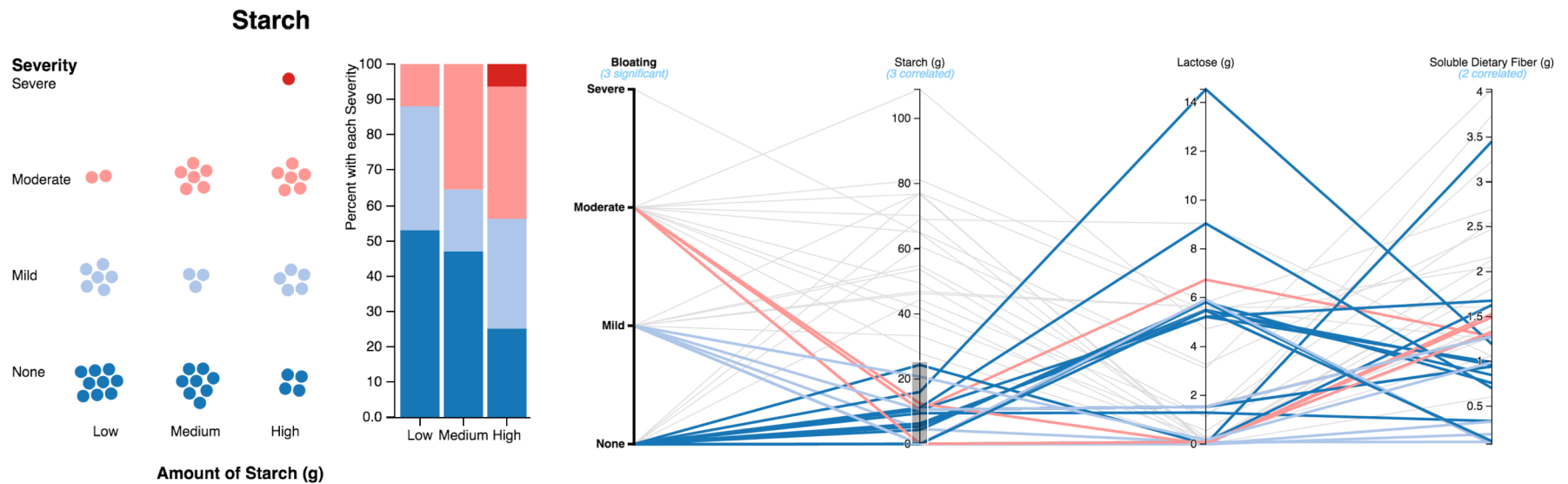
- Hypothesis formation based on journals
- Rethinking trigger detection to rigorously test hypotheses while reducing patient and provider burden.



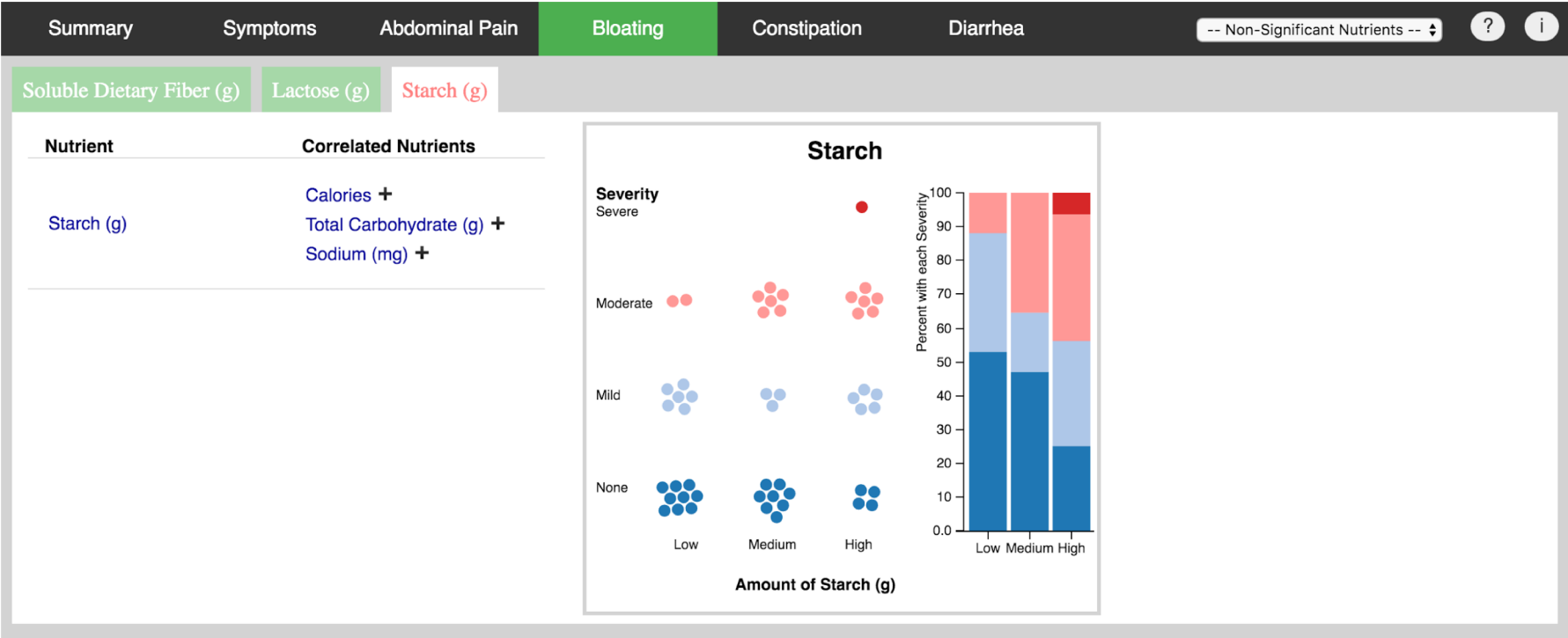
recasting self-tracking

- **Hypothesis formation based on journals**
- Rethinking trigger detection to rigorously test hypotheses while reducing patient and provider burden

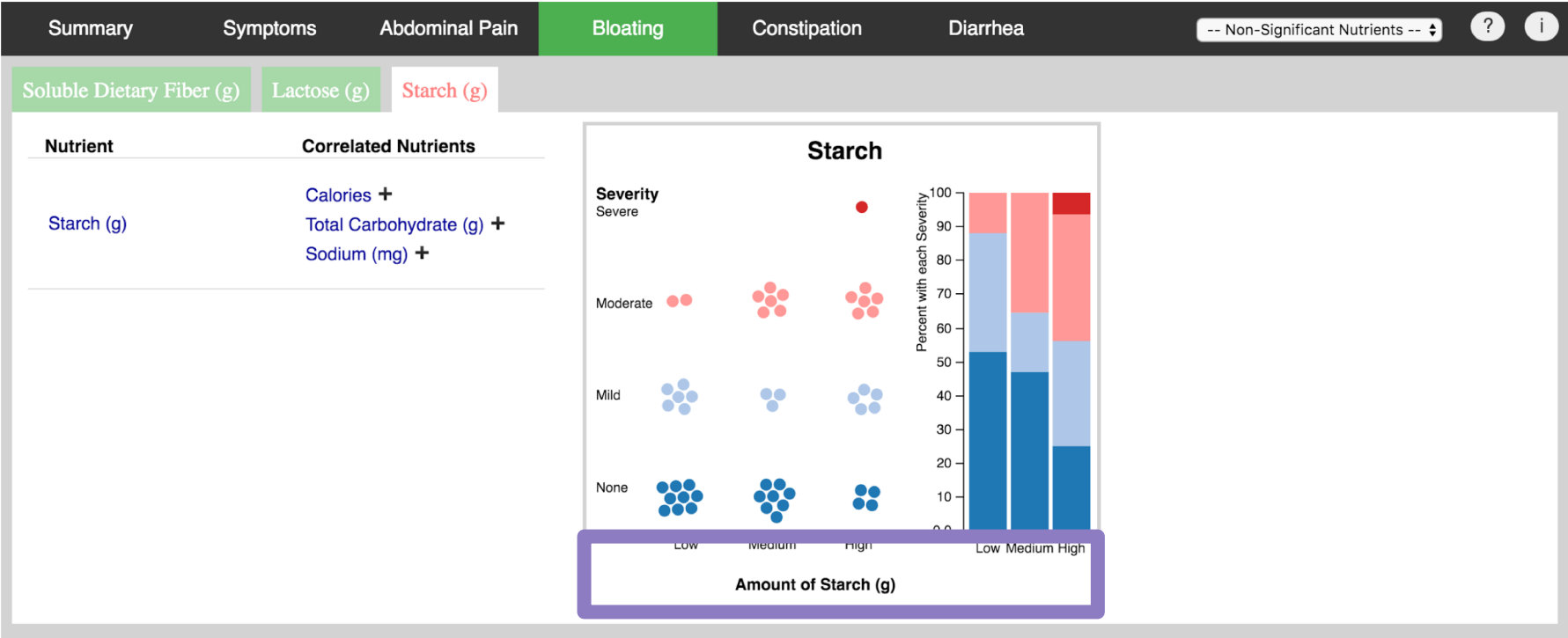
visualizing results



visualizing results: bubble and bar chart



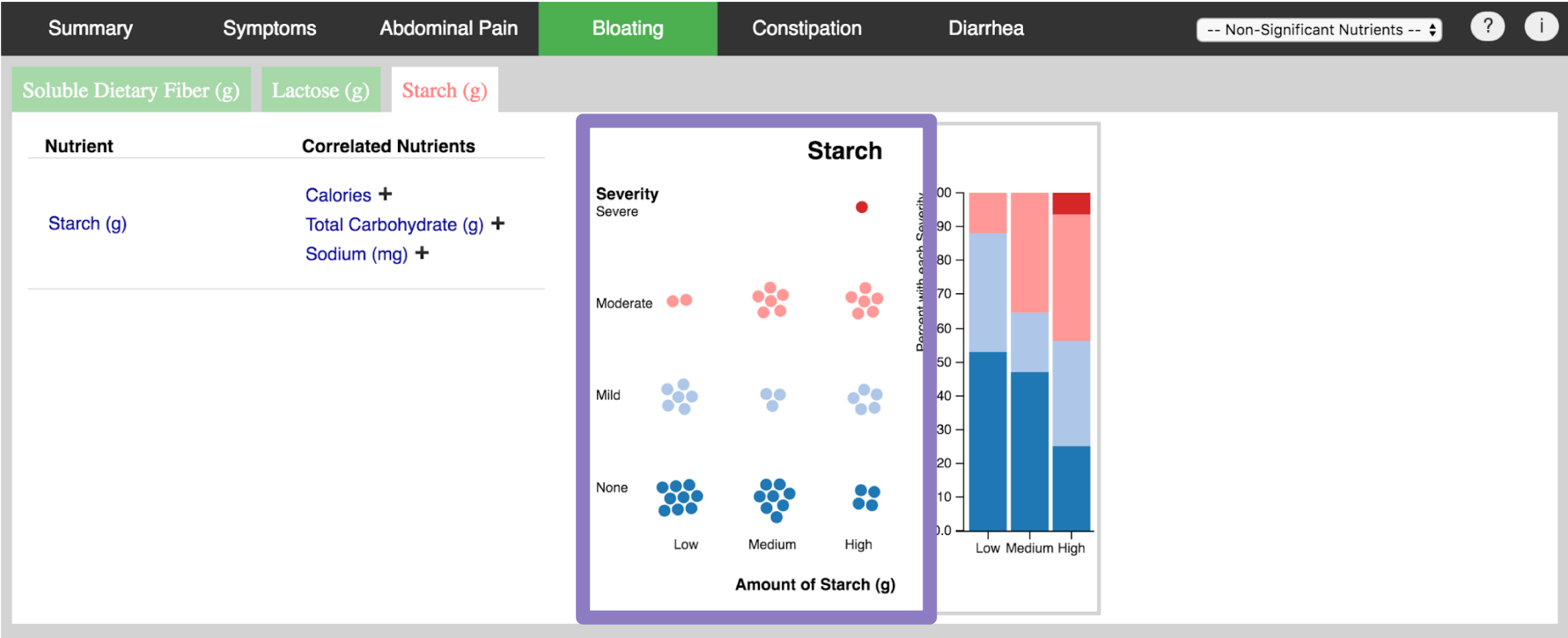
visualizing results: bubble and bar chart



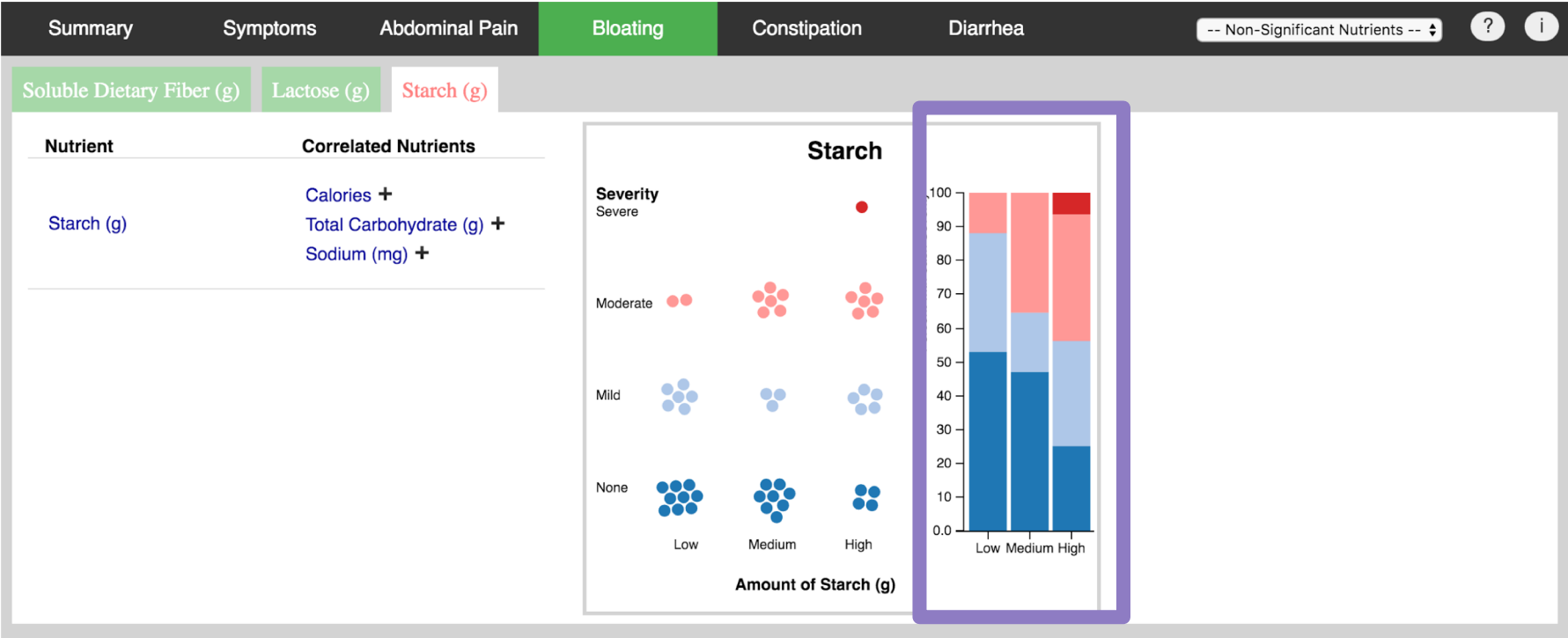
visualizing results: bubble and bar chart



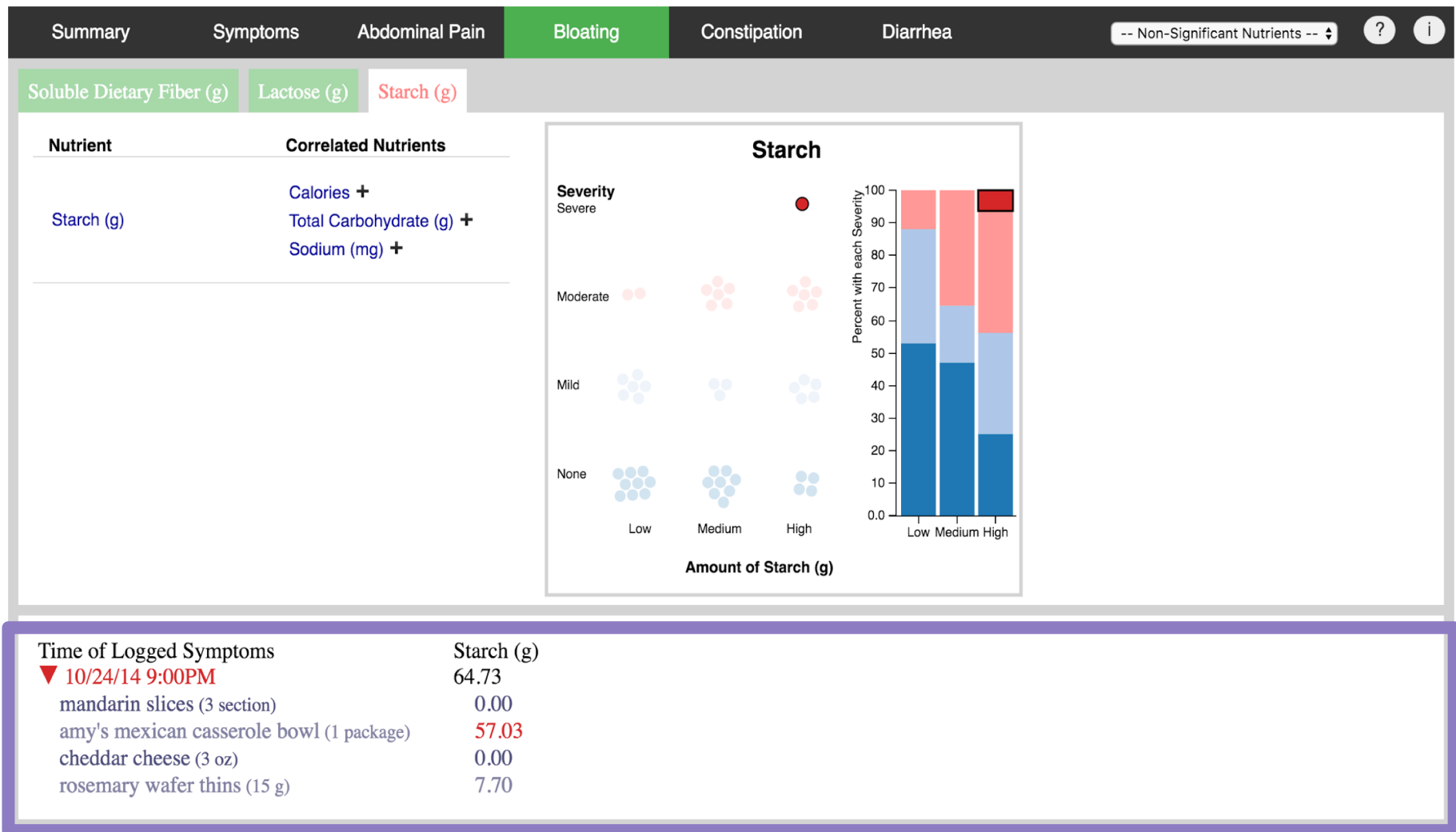
visualizing results: bubble and bar chart



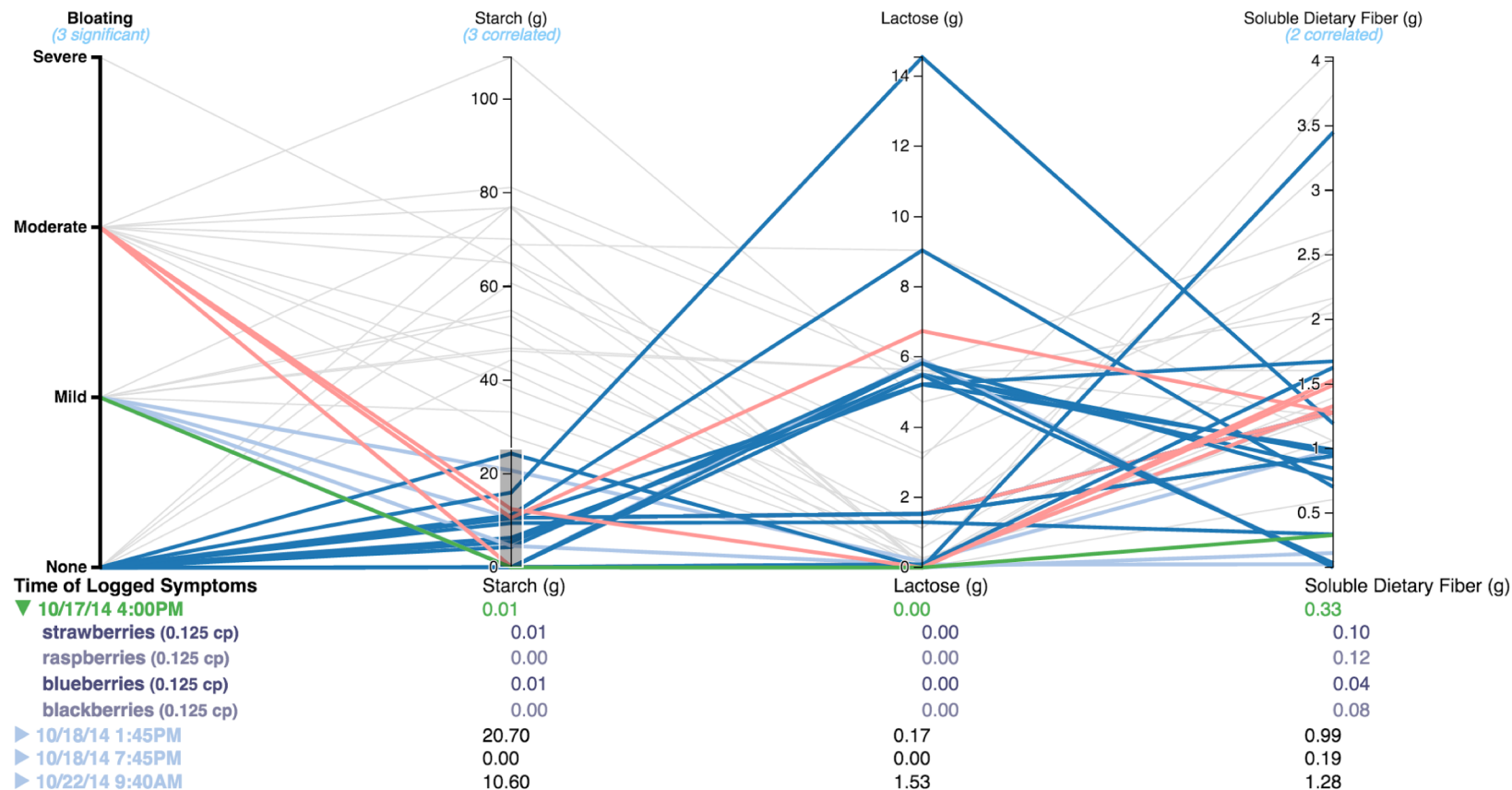
visualizing results: bubble and bar chart



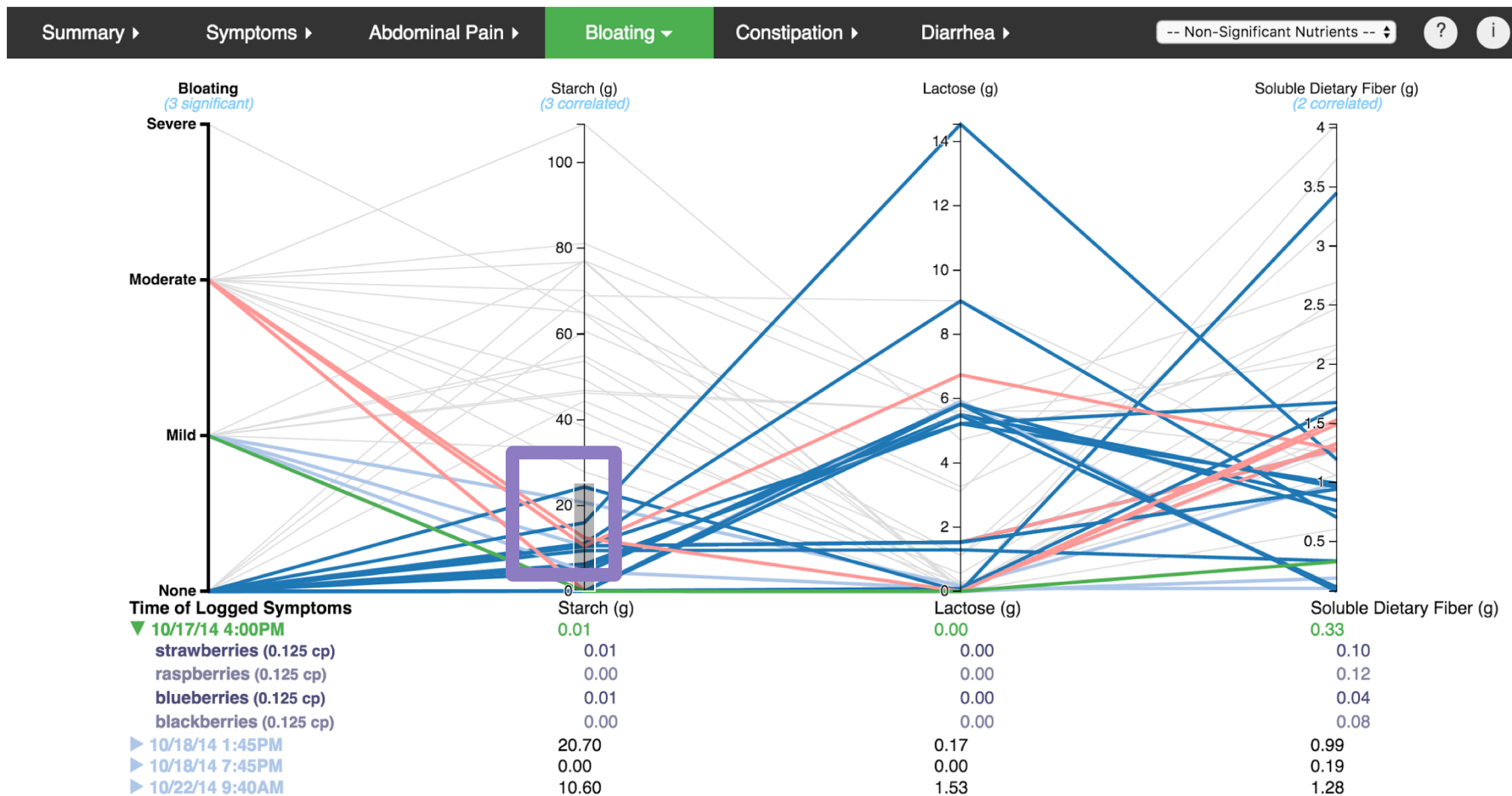
visualizing results: bubble and bar chart



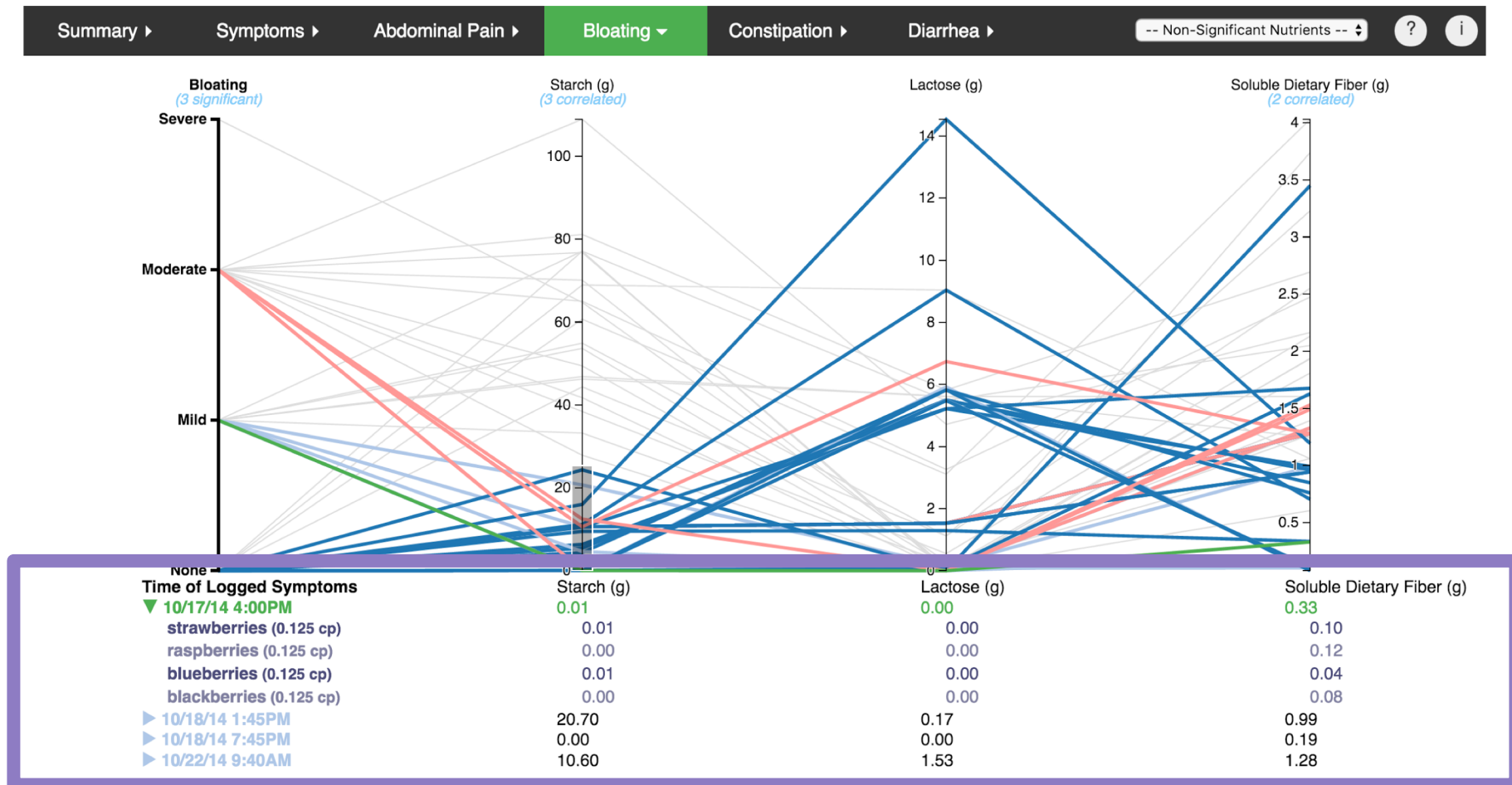
visualizing results: parallel coordinates plot



visualizing results: parallel coordinates plot



visualizing results: parallel coordinates plot



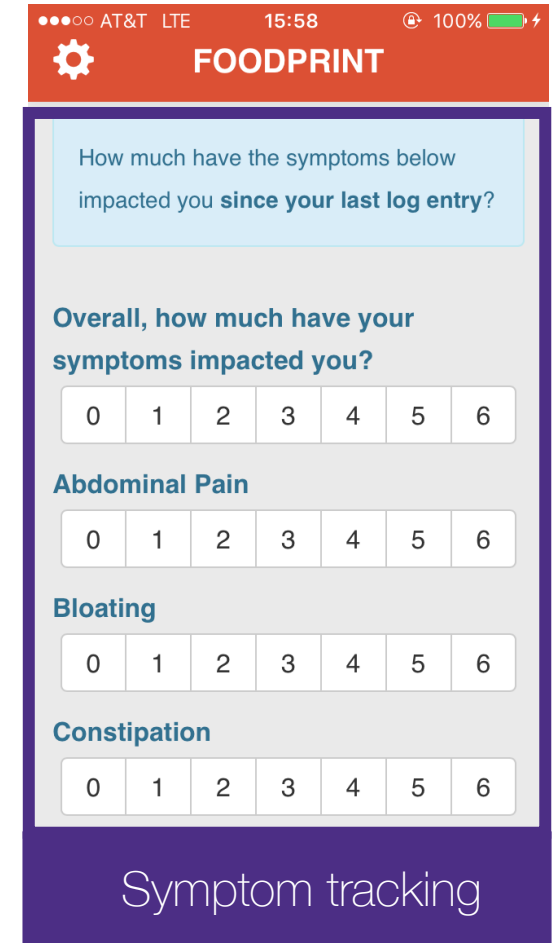
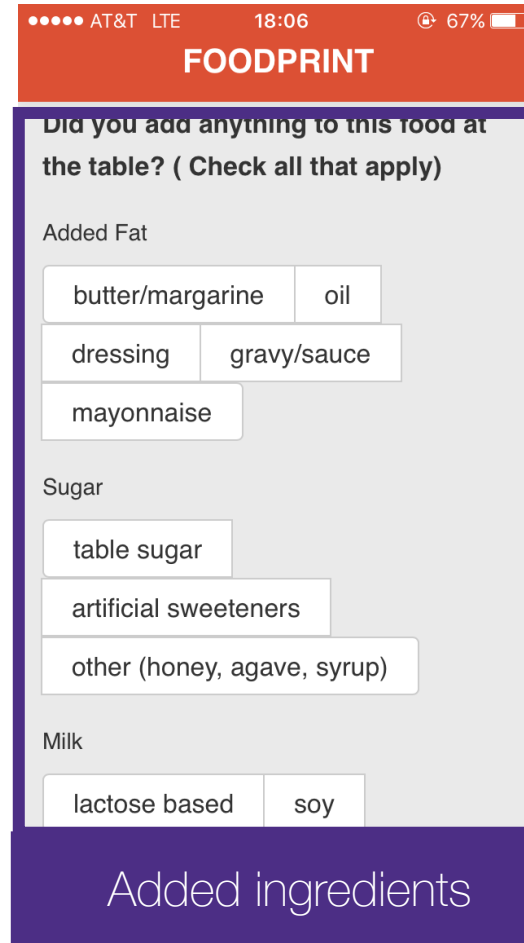
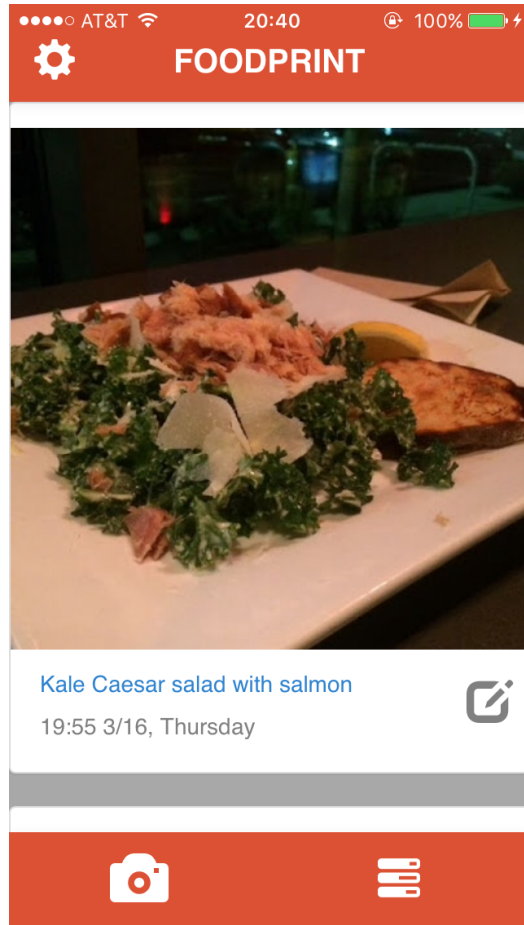
visualizations facilitated collaboration

- Greatly preferred over analyzing paper diaries; reduced burden of synthesis.
- At least initially, patients and providers had concerns about data and results, but these were generally resolved through collaboration.
- Very different preferences for *how* to use these tools.

Can photos help in IBS too?

IBS Mobile app

Supports low-burden food and symptom data tracking

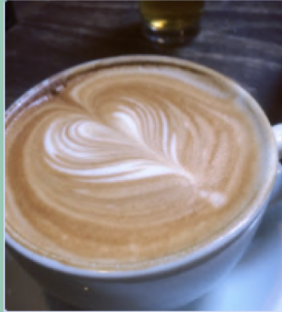





IBS Web app





Provides tailored summary for review

I want to see what I ate up to before I got





NO SYMPTOM

	
Coffee 10:26 2/17, Friday	Tom yum 19:22 2/20, Monday
	
Nuts 15:35 2/22, Wednesday	Choco milk 15:39 2/22, Wednesday

MILD

	
jerk chicken 12:46 10/6, Thursday	shrimp ceviche 13:45 10/5, Wednesday
	
yogurt + fruit + french toast + coffee 13:44 10/5, Wednesday	beef udon 13:50 10/5, Wednesday

SEVERE

	
rice burger 13:47 10/5, Wednesday	chocolate cookie 13:52 10/5, Wednesday
	
pancake 13:54 10/5, Wednesday	pasla 13:58 10/5, Wednesday

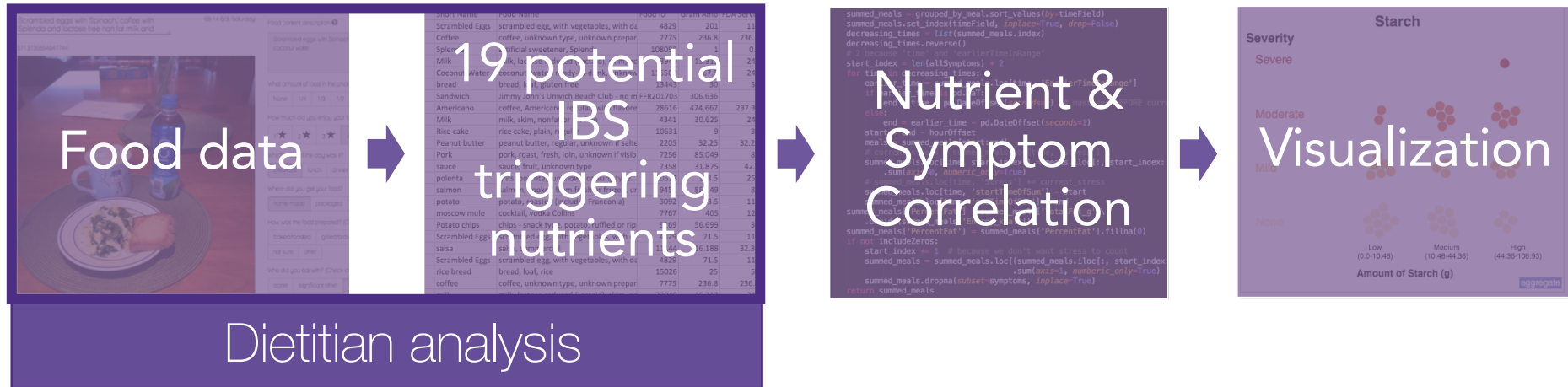
No Symptom

Mild Symptom

Severe Symptom

Quantified analysis

For half of participants





IBS study

16 Patients
13 females and 3 males

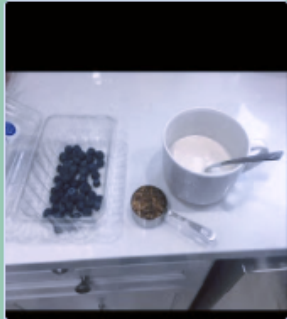
8 Providers
4 physicians, 2 nurses,
2 dietitians

Photo-based visualizations made it easy to see patterns

I want to see what I ate up to before I got , shown by

NO SYMPTOM

06:39 6/7, Wednesday



Cashew yogurt parfait
07:42 6/8, Thursday

night before avocado
07:47 6/8, Thursday



Coffee with non-dairy
creamer
07:44 6/8, Thursday



Leftover stir fry with rice



Cookie!!!

MILD

SEVERE



Coffee with non dairy
creamer
08:08 6/16, Friday



Spinach almond cheese
ravioli and turkey
mushroom pepper onion
sauce
12:34 6/20, Tuesday



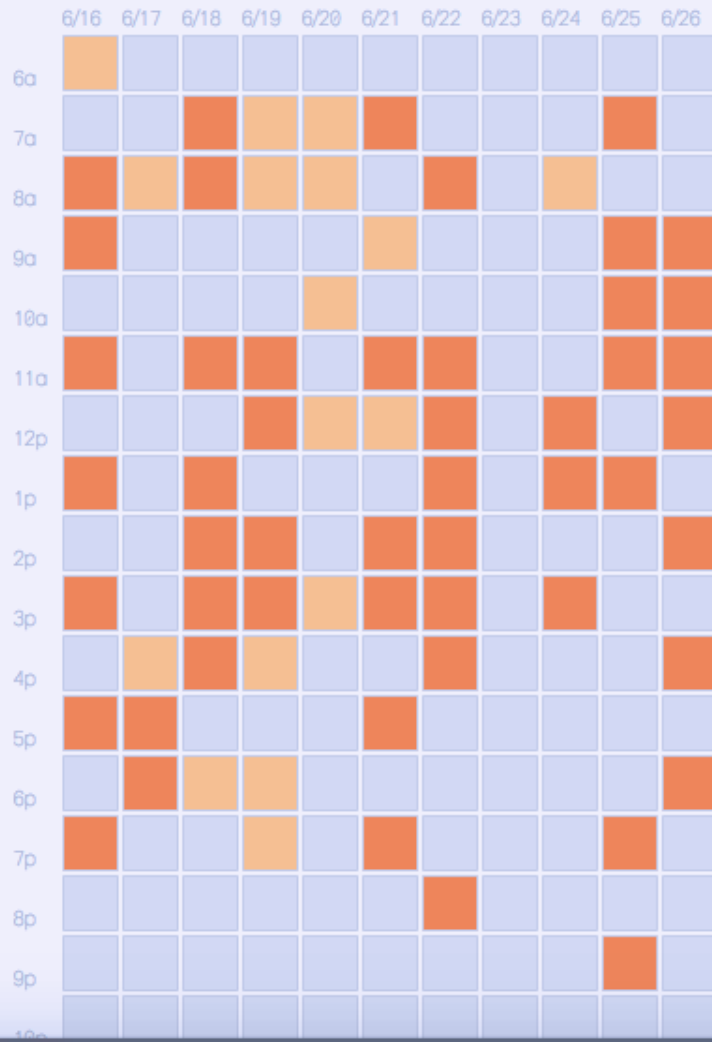
Naan and Curry

11 IBS patients found new potential triggers,
5 supported existing hypotheses

Photo-based visualizations made it easy to see patterns ... even to identify non-food triggers

I want to see what I ate up to 4 hours before I got Symptoms Overall x

■ No Symptom
 ■ Mild Symptom
 ■ Severe Symptom

[Show earlier time](#)

Pre-visit notes helped focus on patient goals during collaborative review

SEVERE



Naan and Curry
15:44 6/24, Saturday



Spinach almond cheese
ravioli and turkey
mushroom pepper onion
sauce
12:34 6/20, Tuesday

What we found to **keep the flavor** is to use the green tops of the scallions to cook in for the onion, and then you can use olive oil that infuse garlic. Or use one Indian spice, asafetida. It's very smelly but it tastes like garlic when you cook with it.

Dietitian 1 & IBS Patient 2

Shared visualization of real foods helped collaborative interpretation and knowledge exchange

Foodprint

Update ²⁶

Analysis

History

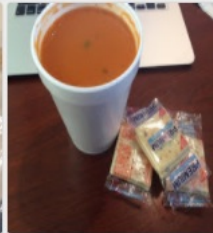
10/24, Tuesday



06:38 10/24, Tuesday



Peanut butter and
honey sandwich
08:45 10/24, Tuesday



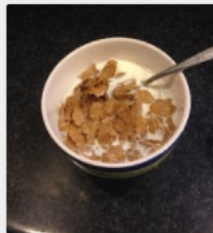
Tomato bisque soup
with crackers
12:20 10/24, Tuesday



Bowl of cereal
16:38 10/24, Tuesday



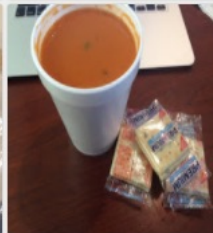
10/25, Wednesday



Bowl cereal with milk
04:43 10/25,
Wednesday



Peanut butter and
honey sandwich
08:45 10/25,
Wednesday



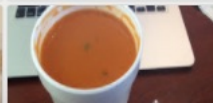
Corn chowder and
crackers
15:20 10/25,
Wednesday



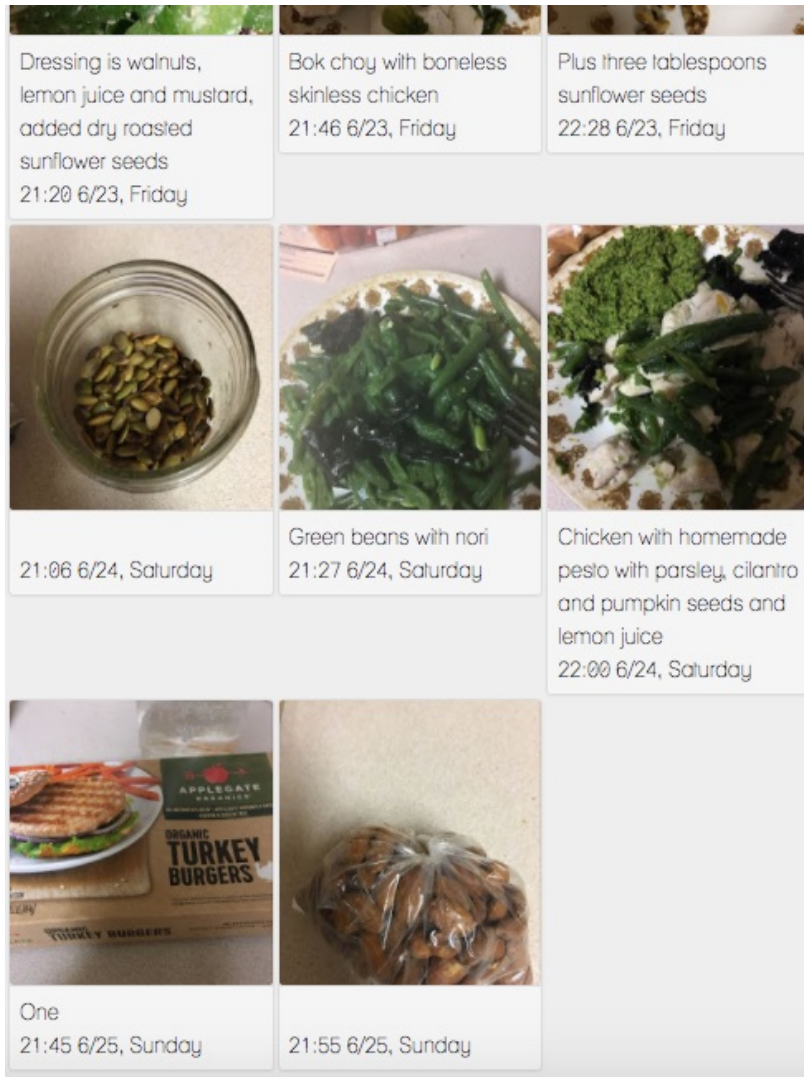
Bowl of cereal and
milk
16:05 10/25,
Wednesday



10/26, Thursday



Shared visualization of real foods helped collaborative interpretation and knowledge exchange



When you soak them [nuts], it helps leach out some of those FODMAPs.

We see that with tofu, too. Firm tofu is low FODMAP because they've kind of drained all that liquid out of there. And the FODMAPs and fermentable carbs tend to leach out with that. Whereas silken tofu, they blend that liquid in there so there's more FODMAP content in there.

Dietitian 2 and IBS Patient 3



Photo-based Visualizations

Overview

Straightforward pattern

Food-symptom relationship

Supports conversation



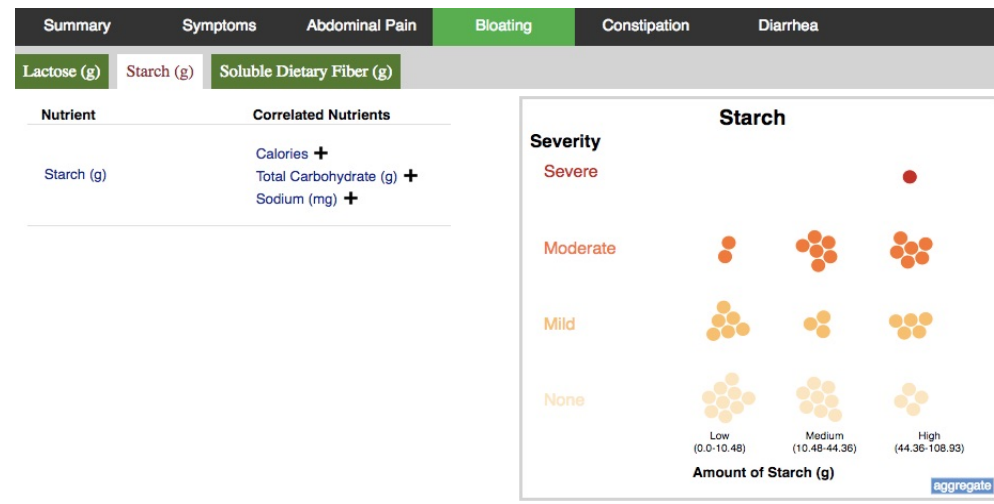
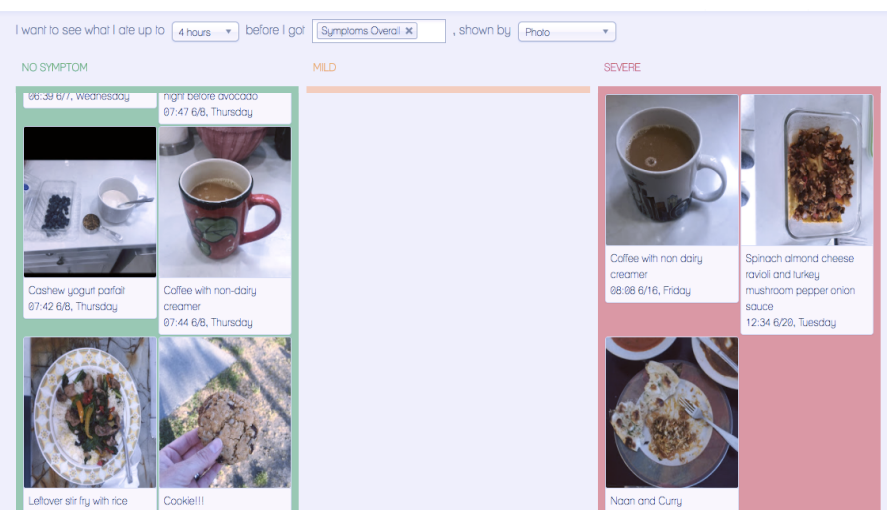
Stats-based Visualizations

In-depth analysis

Underlying cause

Nutrient-symptom relationship

Requires provider knowledge



Context matters here, too

I want to see what I ate up to before I got , shown by

NO SYMPTOM



Coffee with lactose free milk.
30 oz container.
07:57 7/18, Tuesday



Banana
08:17 7/18, Tuesday



Carrots and tomatoes
10:11 7/18, Tuesday



With a table spoon of granola
11:12 7/18, Tuesday

MILD



Grilled pork chops with
spinach salad with blue
cheese, almonds, dried
cherries and white vinegaretle
dressing
19:16 7/18, Tuesday



Coffee with lactose free milk.
Drank 3/4 of a 30 oz
container.
08:55 7/19, Wednesday



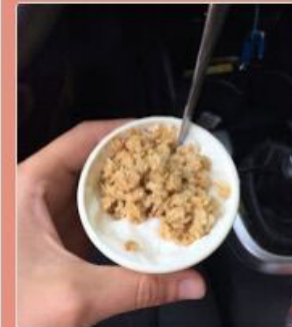
SEVERE



PB Sandwich
11:53 8/3, Thursday

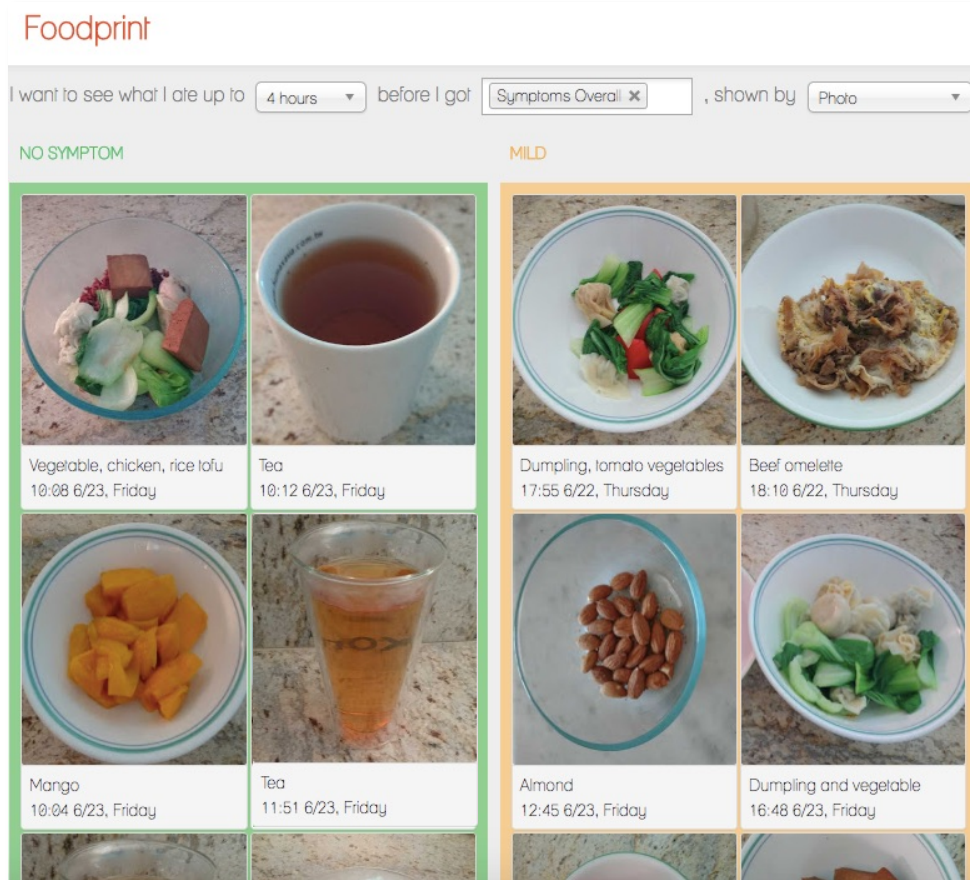


Coffee with lactose free milk
08:38 8/4, Friday



Vanilla yogurt with granola
08:47 8/4, Friday

Prior photos help people develop actionable plans

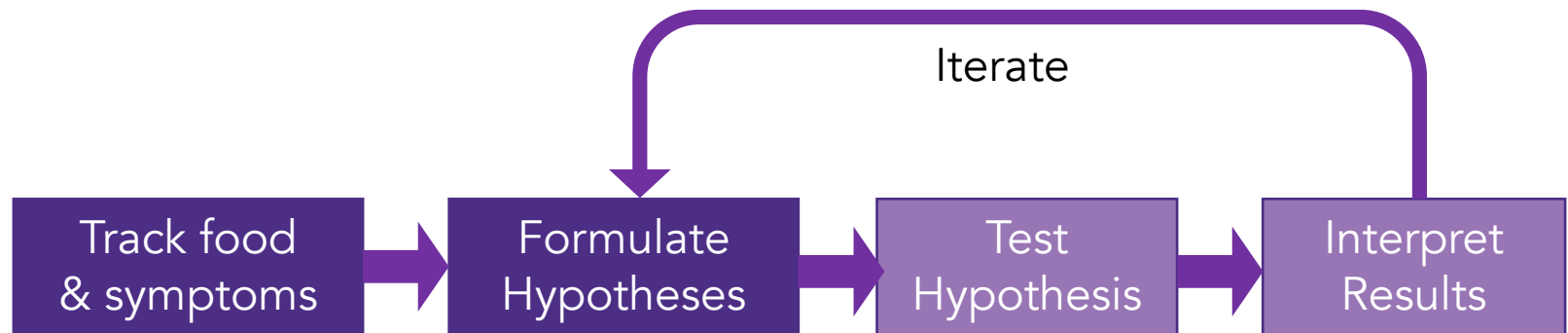


Is the kind of work that you do, do you have control over your day, so that you could actually every two hours step out and do something or are you at a kind of job where you can take breaks at specified times?

Nurse 5 and IBS Patient 7

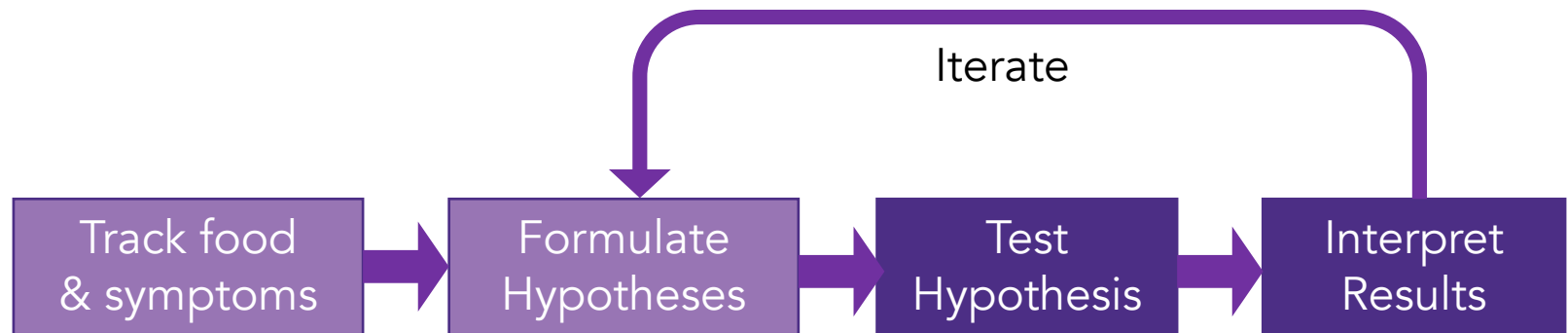
recasting self-tracking

- Hypothesis formation based on journals
- Rethinking trigger detection to rigorously test hypotheses while reducing patient and provider burden.



recasting self-tracking

- Hypothesis formation based on journals
- Rethinking trigger detection to rigorously test hypotheses while reducing patient and provider burden.



a new process for Jane



Severe Symptoms

Missing Work

Needs Help

Preparation

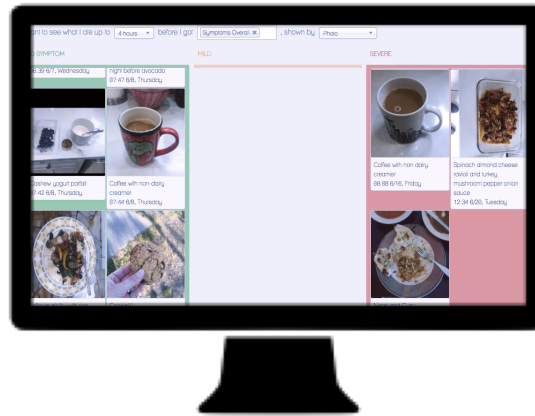
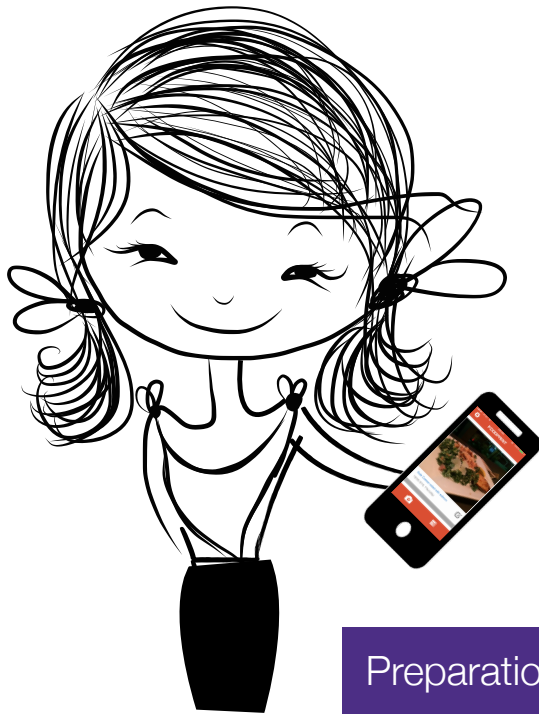
Collection

Integration

Reflection

Action

Hypothesis formation



Preparation

Collection

Integration

Reflection

Action

Jane's personal hypotheses



Lactose



?

Caffeine



?

Stress



?

Possible Triggers

Lactose

Caffeine

Stress

Confounding Effect

Preparation

Collection

Integration

Reflection

Action

designing a self-experiment



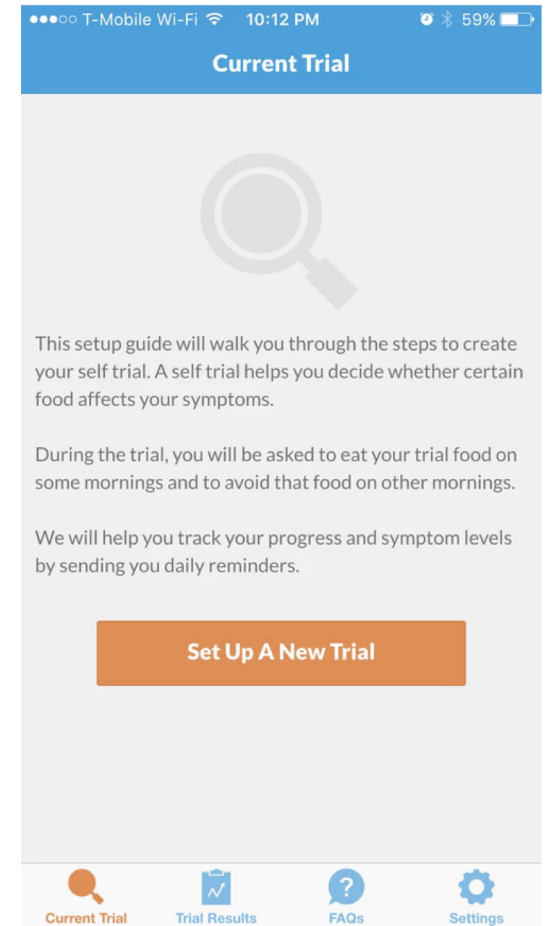
Preparation

Collection

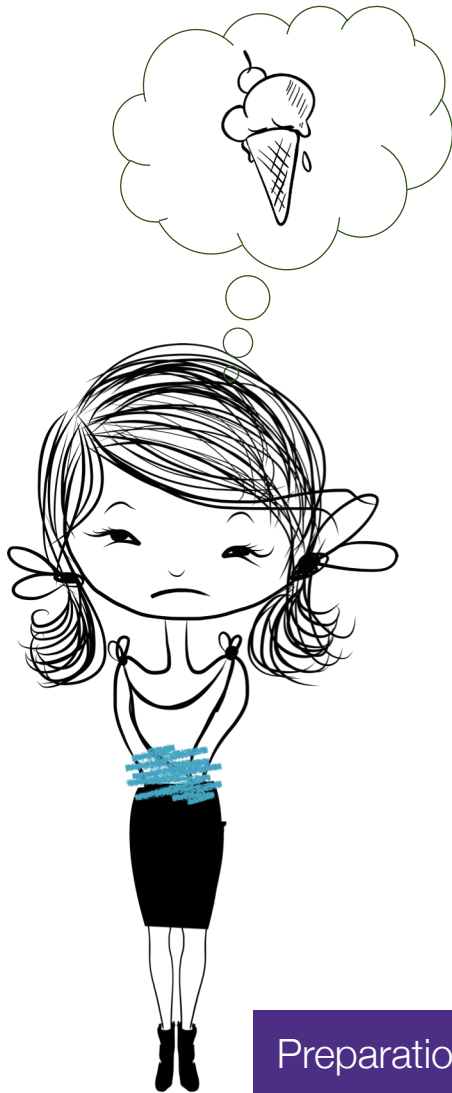
Integration

Reflection

Action



designing a self-experiment



< Trial Setup (1 of 4)

1. Choose Symptoms

What symptoms do you want to test? ?

- ☒ Abdominal Pain i
- ☒ Bloating or Gas i
- ☐ Constipation i
- ☐ Diarrhea i
- ☐ Bowel Urgency i
- + Add symptom >

CONTINUE >

Current Trial My Trials FAQs Settings

Preparation

Collection

Integration

< Trial Setup (2 of 4)

2. Choose a Possible Cause

Which possible trigger do you want to test? ?

- ☐ Eating Large Meals >
- ☒ Eating Lactose / Dairy >
- ☐ Drinking Caffeine >
- ☐ Eating Gluten >
- ☐ Eating Fructose >
- ☐ Eating Artificial Sweeteners (Sorbitol) >
- ☐ Eating High Fat >

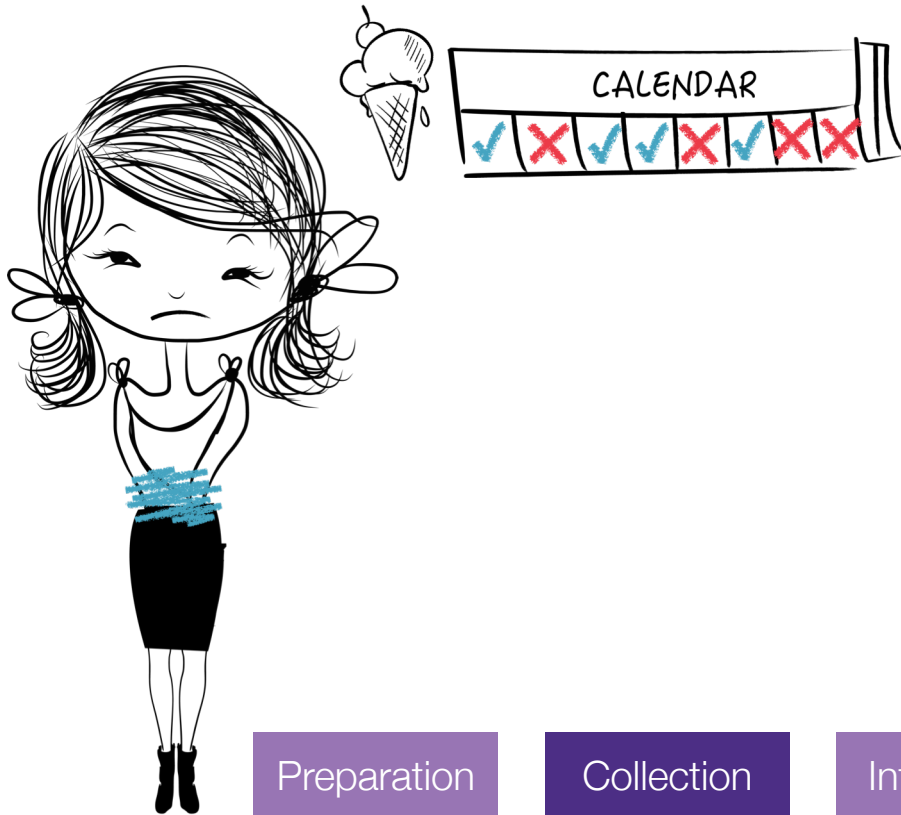
CONTINUE >

Current TrialF My Trials AQS ettings

Reflection

Action

conducting the self-experiment



Preparation

Collection

Integration

Reflection

Action

< Input Symptom Severity

DAY 2/8

TU	W	TH	F	S	SU	M	TU
	28	29	30	31	12		3

LACTOSE

Step 2 of 4

At its worse, how much has your symptom impacted your day since you last ate?

Bloating/Gas Severity

Not at all

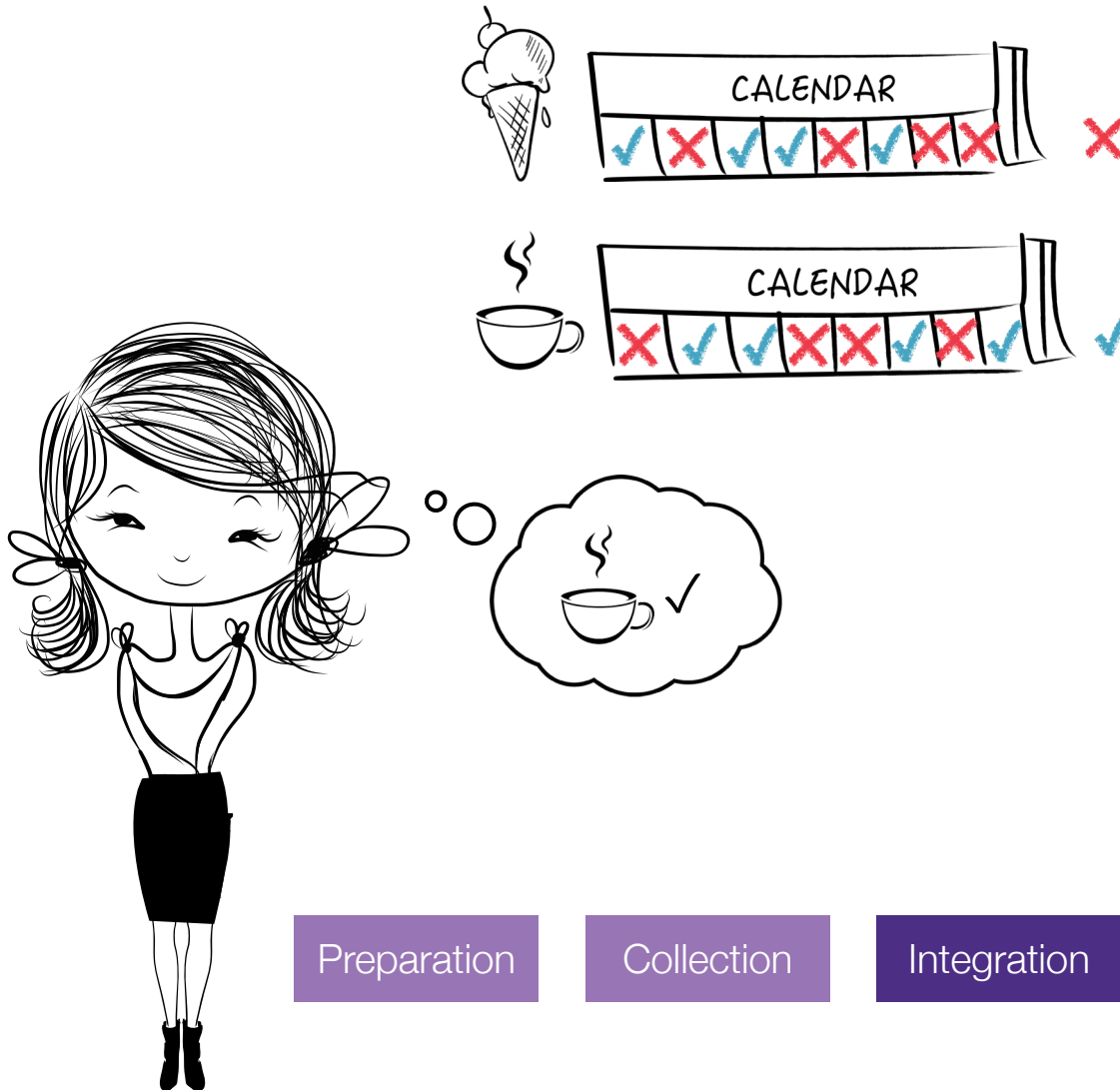
Mildly

Moderately

Severely

Extremely

interpreting results



Preparation

Collection

Integration




Past Studies

Eating Caffeine Study Findings

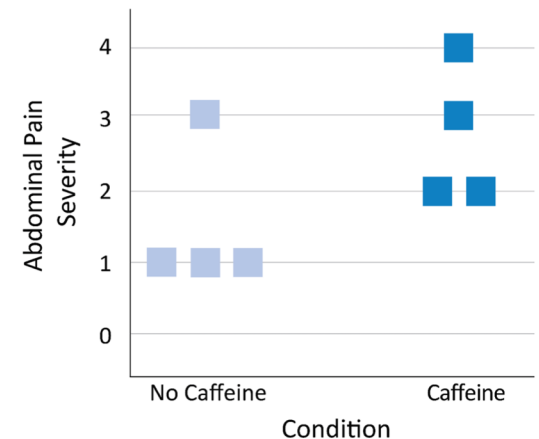
May 27th – June 3rd



Abdominal Pain

Based on the study, there is a **no evidence** that your abdominal pain decreases when you don't eat caffeine ($p=0.762$). 

Abdominal Pain Severity

May 27th – June 3rd



  Each square represents one day

FREQUENCY VIEW

DAILY VIEW

Reflection

Action

Days without Caffeine was 1.5



Schedule



Symptoms

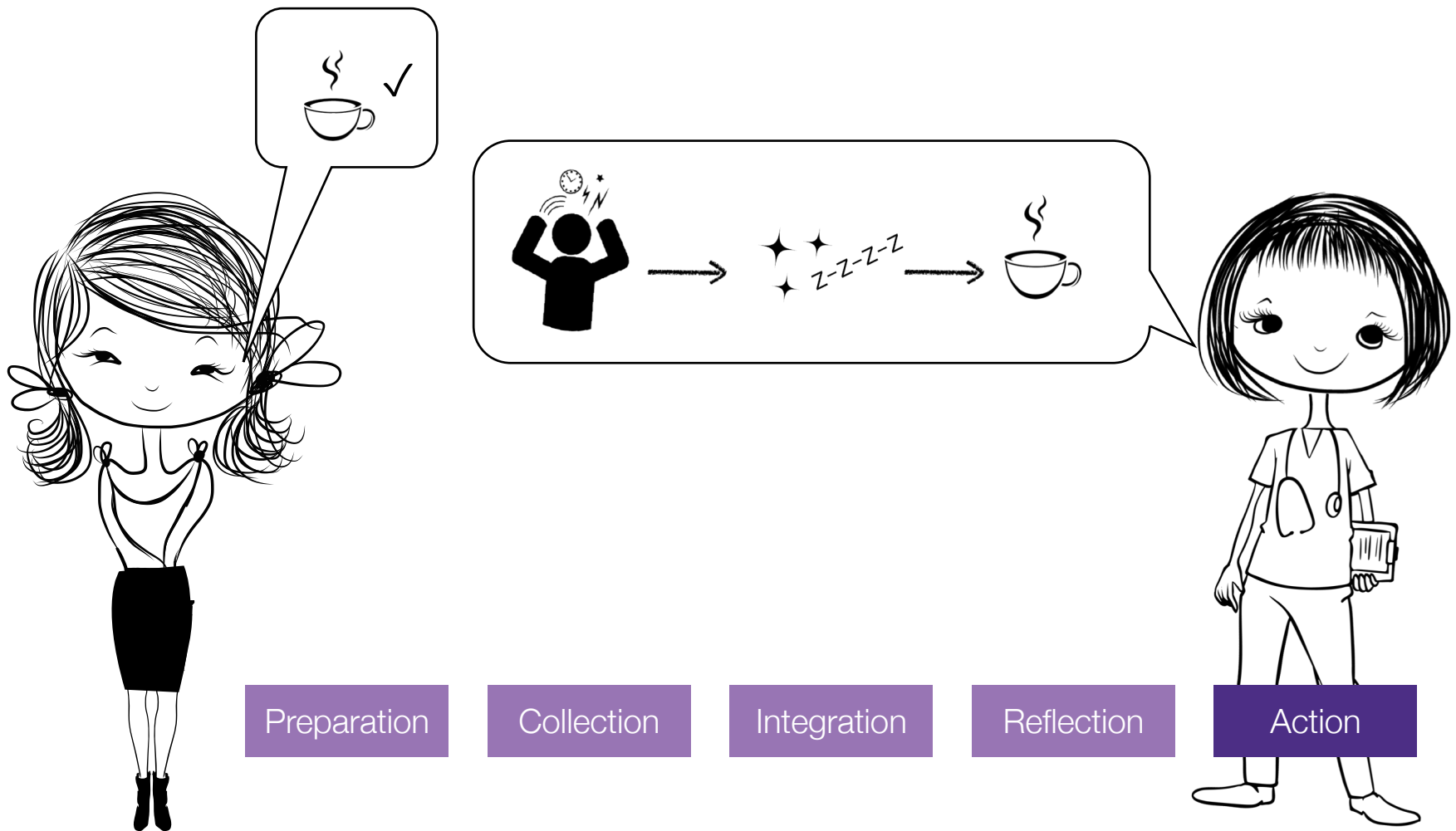


Past Studies



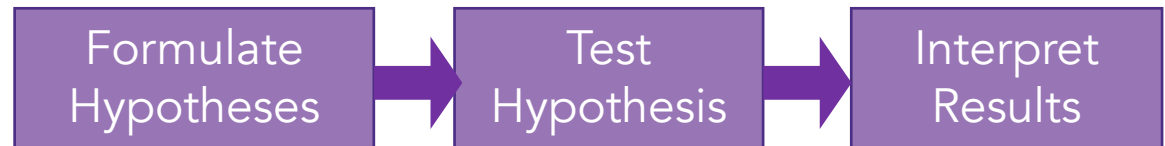
Study Setup

actionable answers



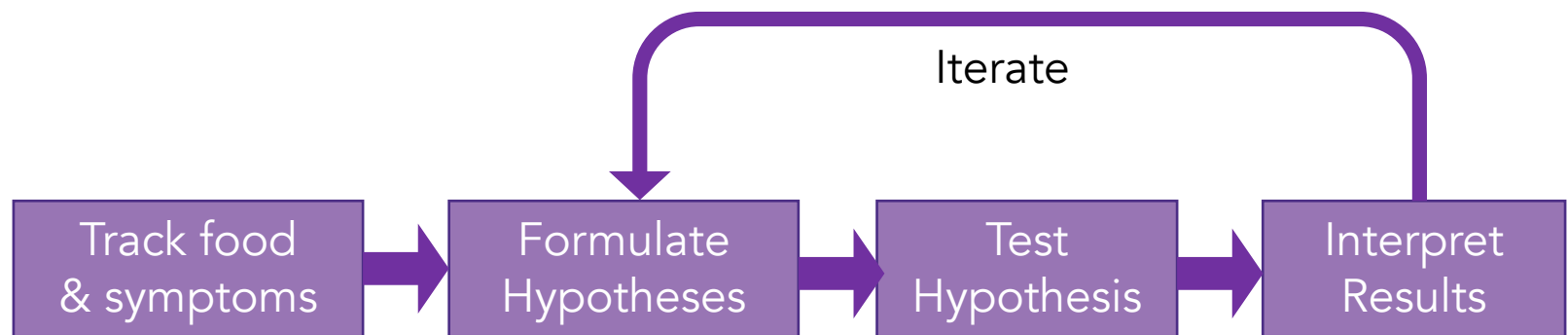
evaluation (15 person field study)

- High completion rate, low reported burden
- People:
 - Valued design of controlled experiment
 - Relied on visual analysis much more than statistical analysis
- Rigor: participants were willing to accept and act on less than scientific standards, to better fit study into their lives.



recasting self-tracking

- Hypothesis formation based on journals
- Rethinking trigger detection to rigorously test hypotheses while reducing patient and provider burden.



**Patient generated health data will
transform care.**

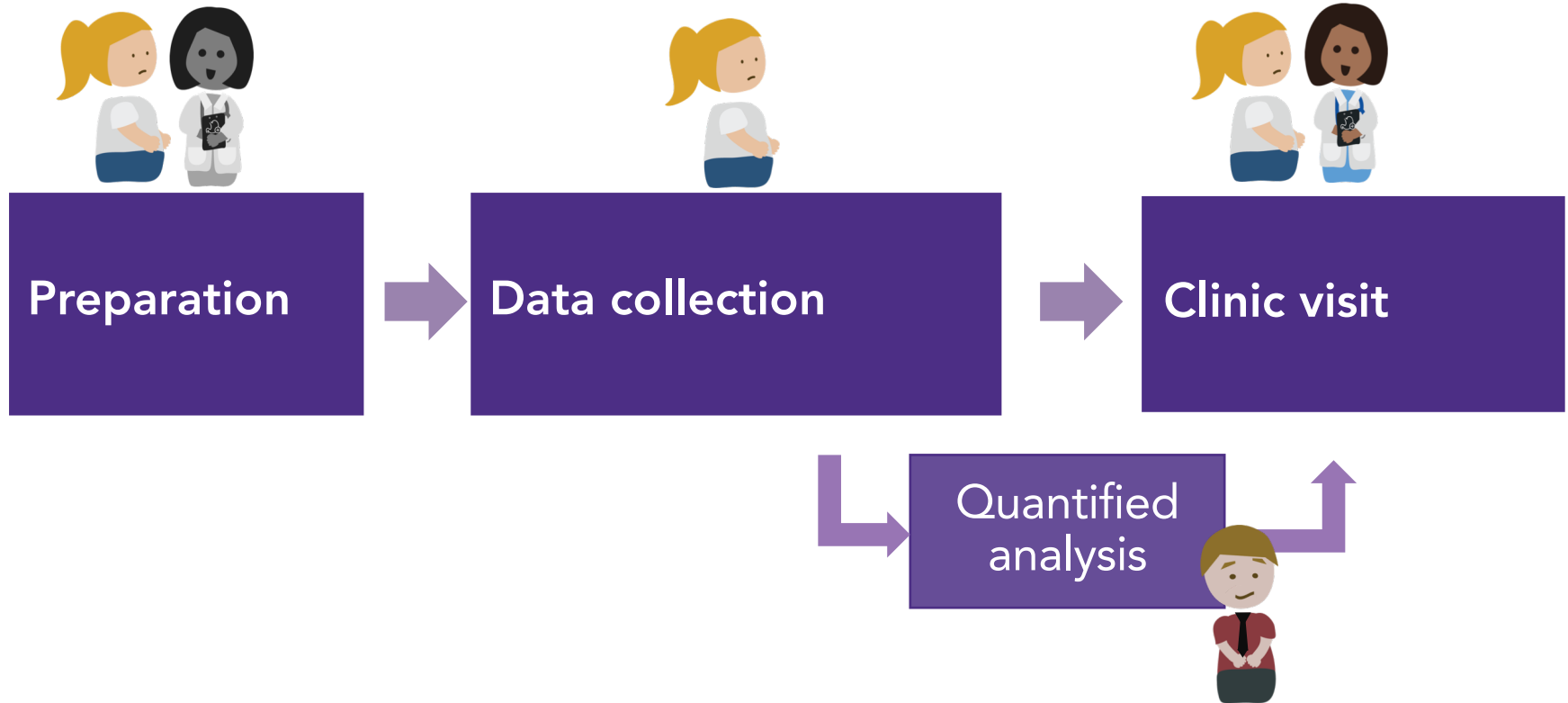
Patient generated health data will transform care.

To succeed, designers need to:

- Think beyond presenting numbers.
- Find new ways to understand and support people's goals.
- Design for collaboration from the start.
- Think autonomy and informed decision making, not adherence.
- Scaffold the entire process of tracking, from preparing to action, not just focus on improving collection.

There are some big challenges ahead.

Who should do what work?



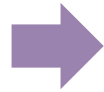
Do setup entirely
in software?

Enlist peer
support?

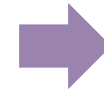
Should collection be
more automated?

Is reviewing data the best
use of a primary provider
or specialist's expertise?
Do they even have the
right expertise?

Preparation



Data collection



Clinic visit



Quantified
analysis

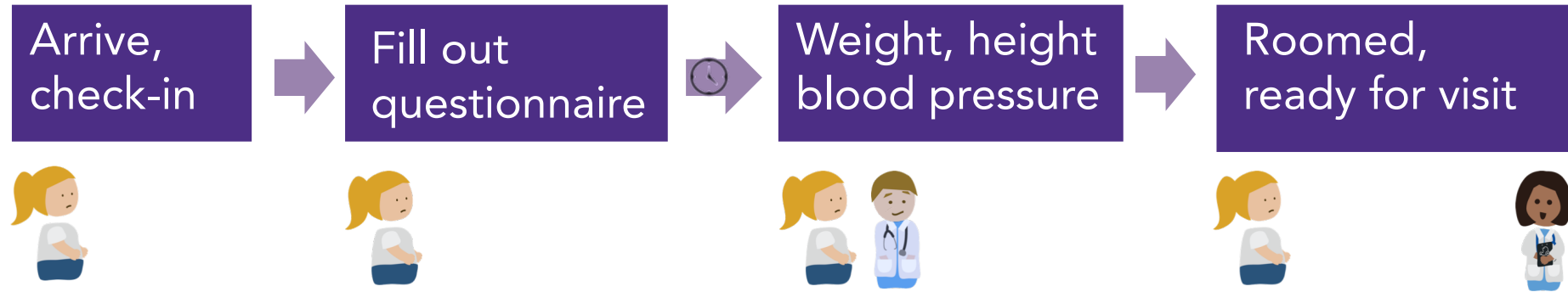


Surely computer vision
can help? (be wary!)

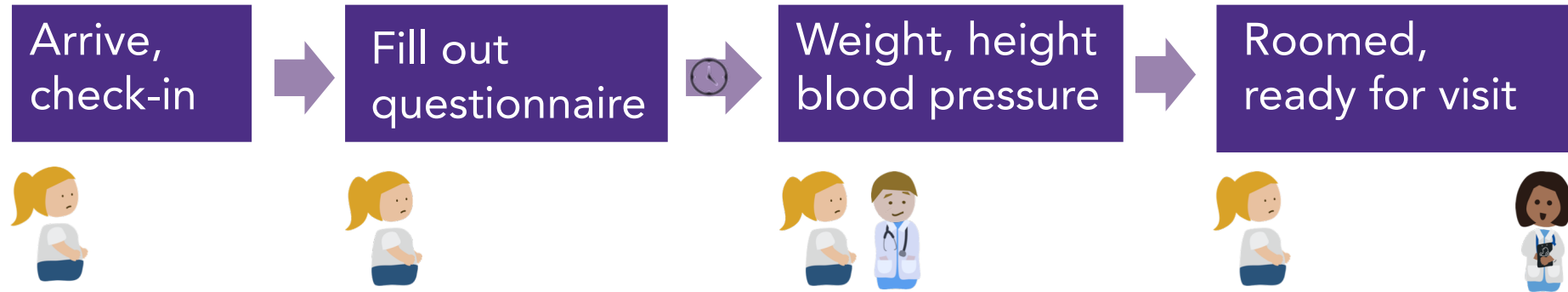
Or maybe this is a good place to
use peers or crowd workers?

How do we rearrange work?

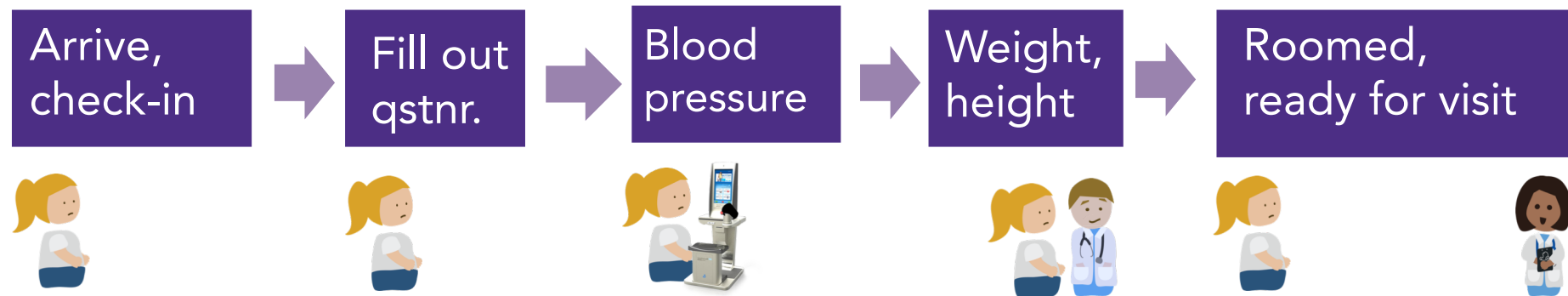
standard flow for primary care visit



standard flow for primary care visit



revised flow



- Freed up medical assistant time to follow up with patients by phone.
- Some indications patients were more engaged with BP.
- Generally high perceptions of accuracy, some skepticism.
- Some patient privacy concerns.

From Personal Data to Personal Health: Tools to Reduce Burden & Improve Collaboration

Sean Munson · smunson.com · [@smunson](https://twitter.com/smunson)

AHRQ#1R21HS023654

NSF# OAI-1028195, IIS-1344613, IIS-1553167

University of Washington Innovation Award

Intel Science and Technology Center for Pervasive Computing

Robert Wood Johnson Foundation



HUMAN CENTERED DESIGN & ENGINEERING
UNIVERSITY of WASHINGTON



From Personal Data to Personal Health: Tools to Reduce Burden & Improve Collaboration

Sean Munson · smunson.com · [@smunson](https://twitter.com/smunson)

Many collaborators, especially PhD students who lead the projects:



Christina
Chung



Daniel
Epstein



Jessica
Schroeder



Ravi
Karkar



Jane
Hoffswell



HUMAN CENTERED DESIGN & ENGINEERING
UNIVERSITY of WASHINGTON



Patient generated health data will transform care.

To succeed, designers need to:

- Think beyond presenting numbers.
- Find new ways to understand and support people's goals.
- Design for collaboration from the start.
- Think autonomy and informed decision making, not adherence.
- Scaffold the entire process of tracking, from preparing to action, not just focus on improving collection.