

FoodScrap: Promoting Rich Data Capture and Reflective Food Journaling Through Speech Input

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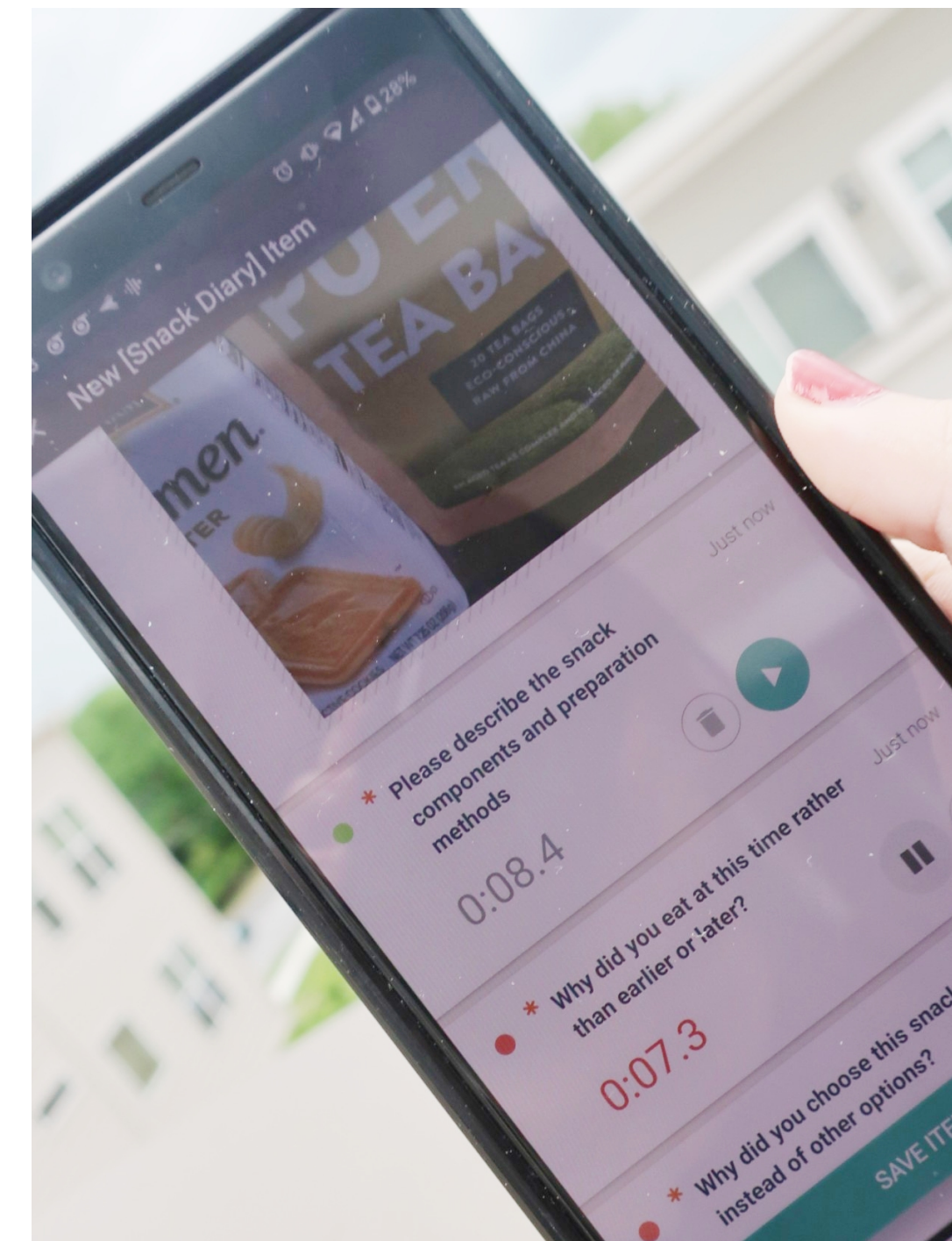
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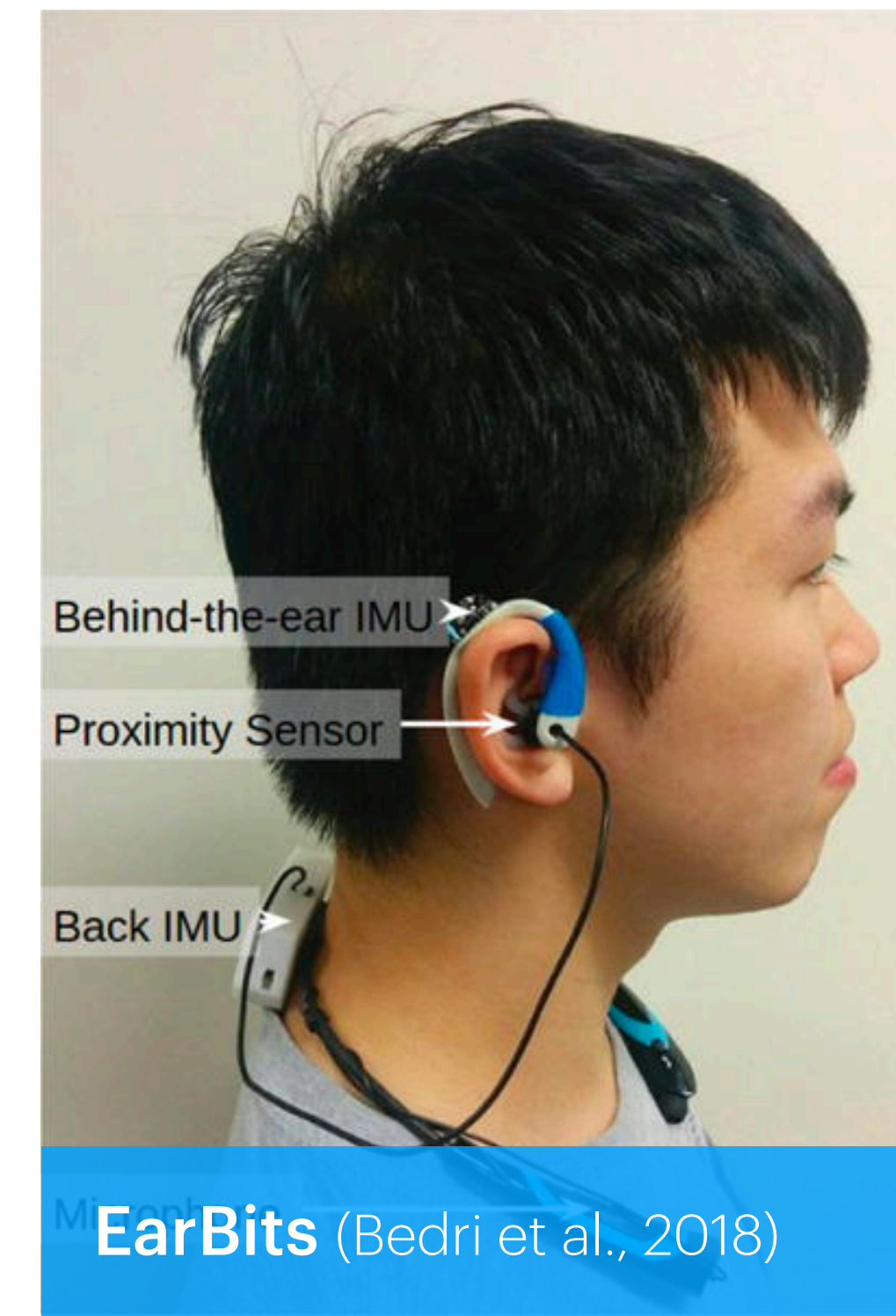
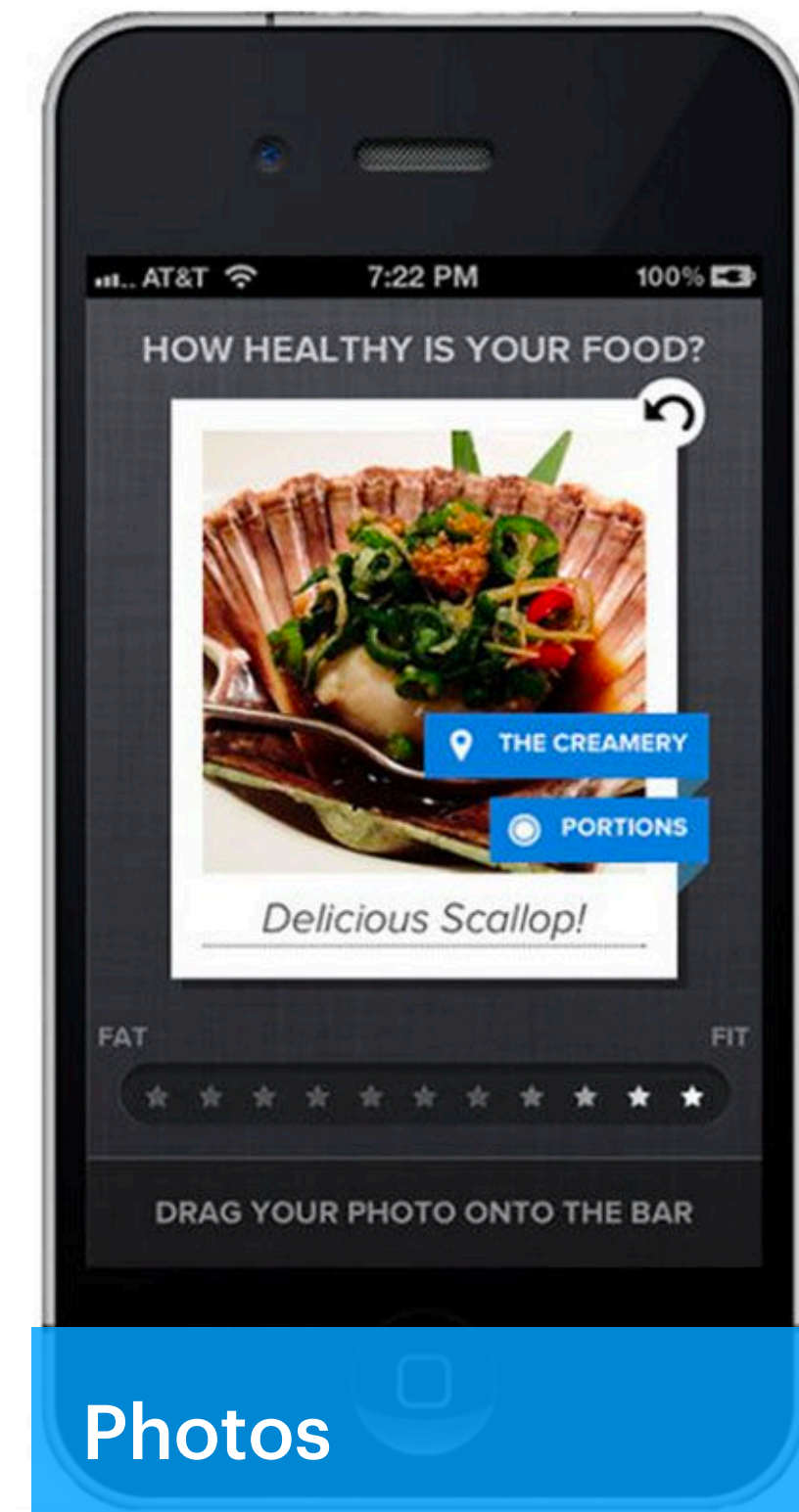
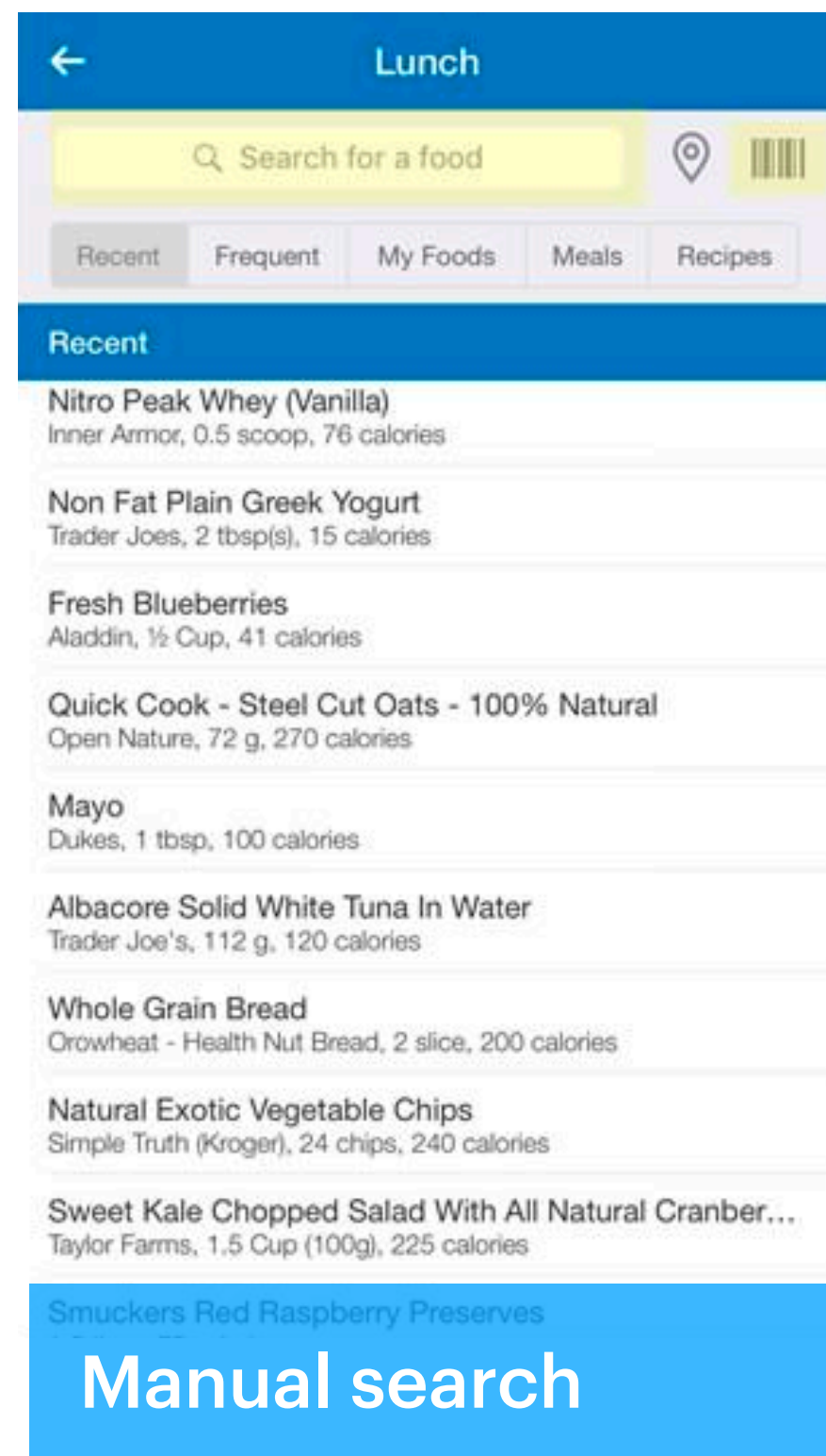


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Research





How do people practice food journaling?



Food journaling is not only about calorie and nutrients

- **Condiment** and **preparation methods** are important information for dietary assessment (Signorello et al., 2009)
- Capturing **eating contexts** can promote self-reflection (Luo et al., 2019; Zhang et al., 2020)
- Understanding **food decision-making** can help develop personalized diet and promote mindful eating (Sobal et al., 2009; Albers, 2012)



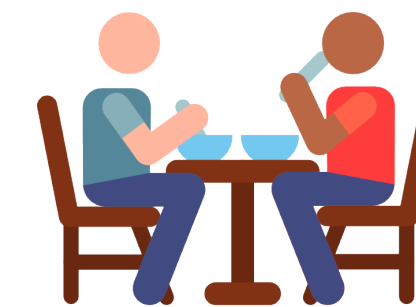
Spice & Sauce



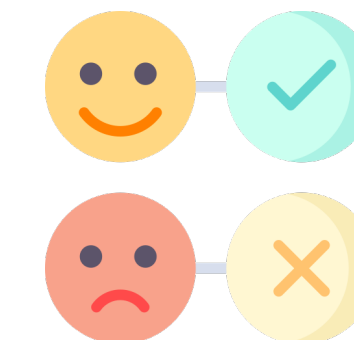
Cooking method



Time



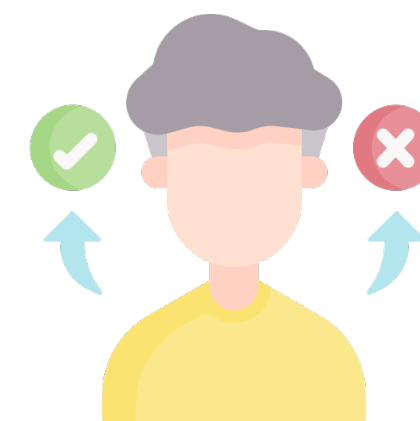
People



Feelings



Eating environment



How can we
efficiently capture
this information?

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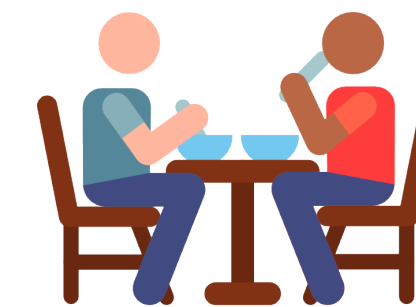
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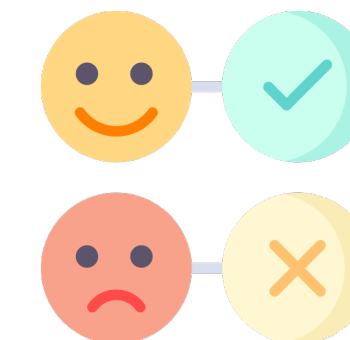
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Time



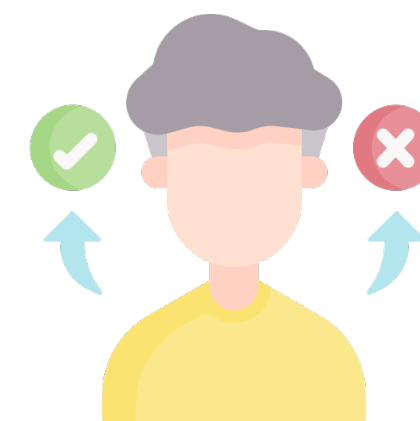
People



Feelings



Eating environment



Automated
approaches?

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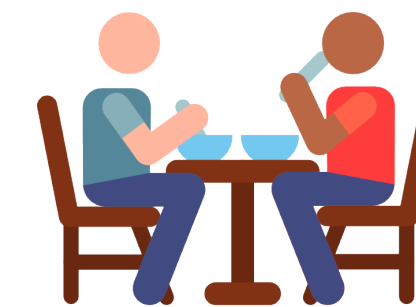
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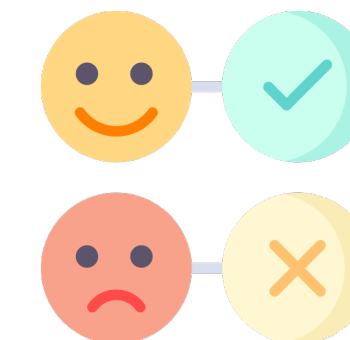
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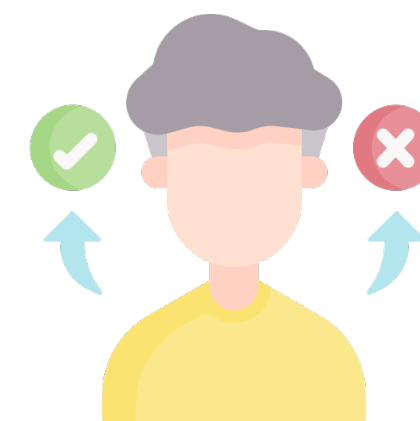
People



Feelings



Eating environment



Manual
approaches?

Food journaling is not only about calorie and nutrients

- **Condiment** and **preparation methods** are important information for dietary assessment (Signorello et al., 2009)
- Capturing **eating contexts** can enable situated reflection (Zhang et al., 2020)
- Understanding **food decision-making** can help develop personalized diet and promote mindful eating (Sobal et al., 2009; Albers, 2012)



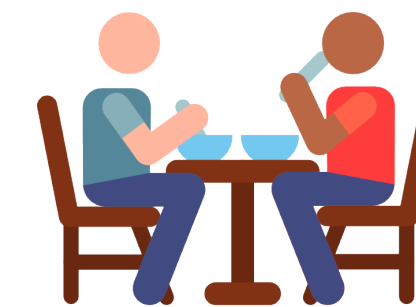
Spice & Sauce



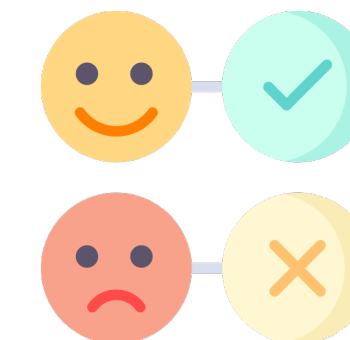
Preparation



Time



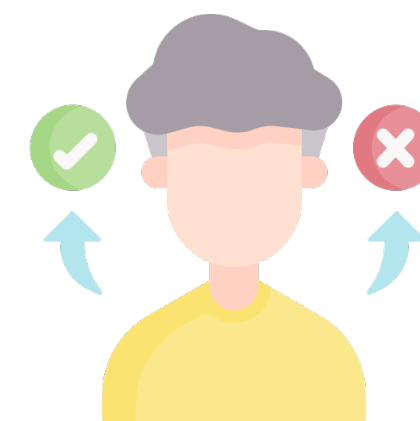
People



Feelings

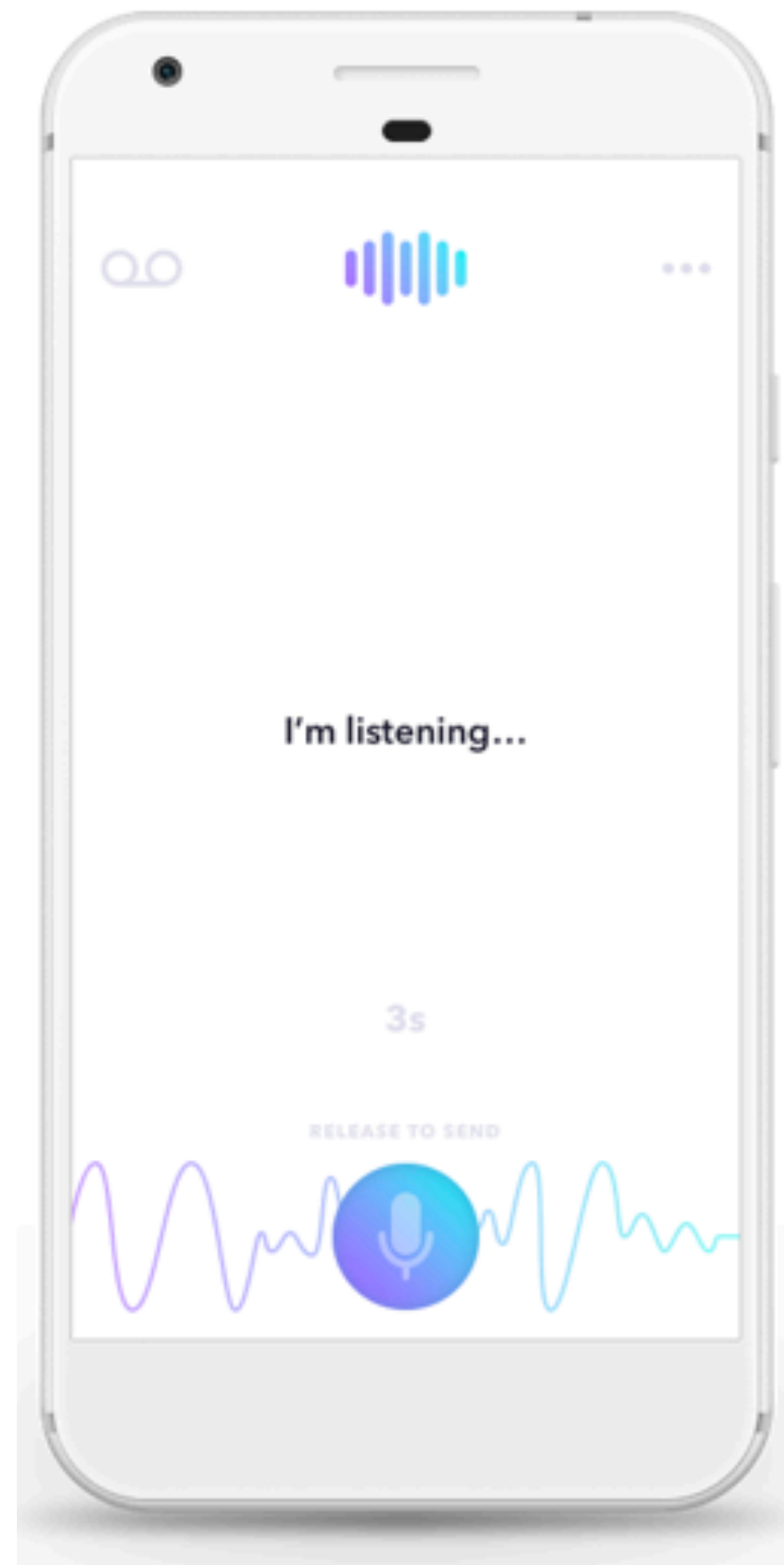


Eating environment



How about
Speech Input?

Why speech input?



The growing popularity

1 in 5 US adults use speech-based search on mobile devices
(Global Web Index, 2016).

Nearly **50%** Americans used digital voice assistant, mostly on their mobile phones (Pew Research, 2017).

50% consumers will adopt voice shopping on mobile devices by 2022 (MoffettNathanson, 2018)

How can speech input facilitate data capture?

+ Fast

Lower data capture burden
(Ruan et al., 2018)

+ Expressive

Collect rich details
(Chalfonte et al., 1991)



- Difficult to edit

Cannot edit the data on the fly
(Murad et al., 2018)

- Privacy concerns

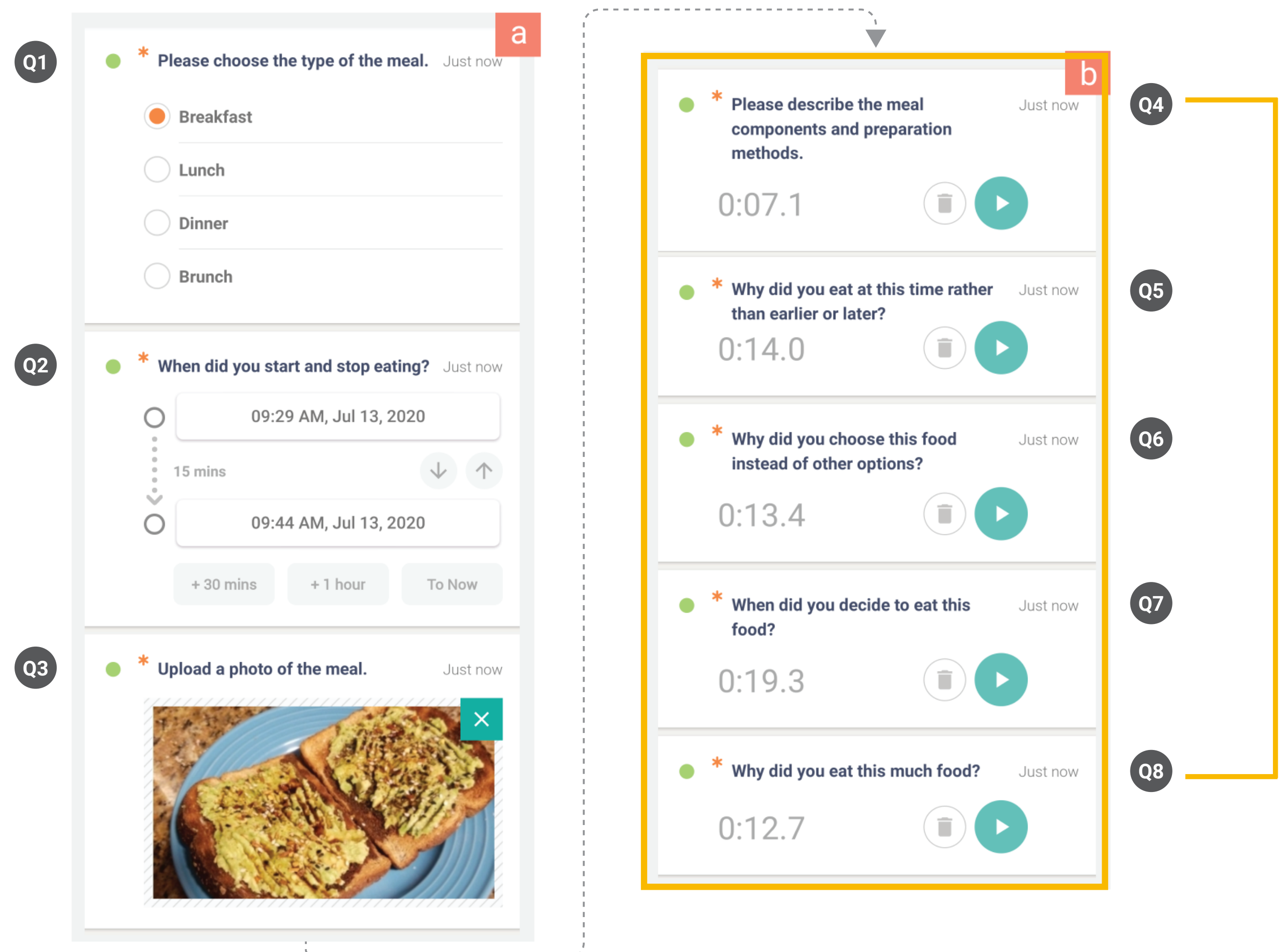
Not appropriate in public settings
(Liao et al., 2019)

But little is known about how speech input can support capturing unstructured personal data such as food practice

Research Question

How can speech input support collecting food practice regarding **data richness** and **data capture burden**?

FoodScrap: a speech-enabled food journaling app

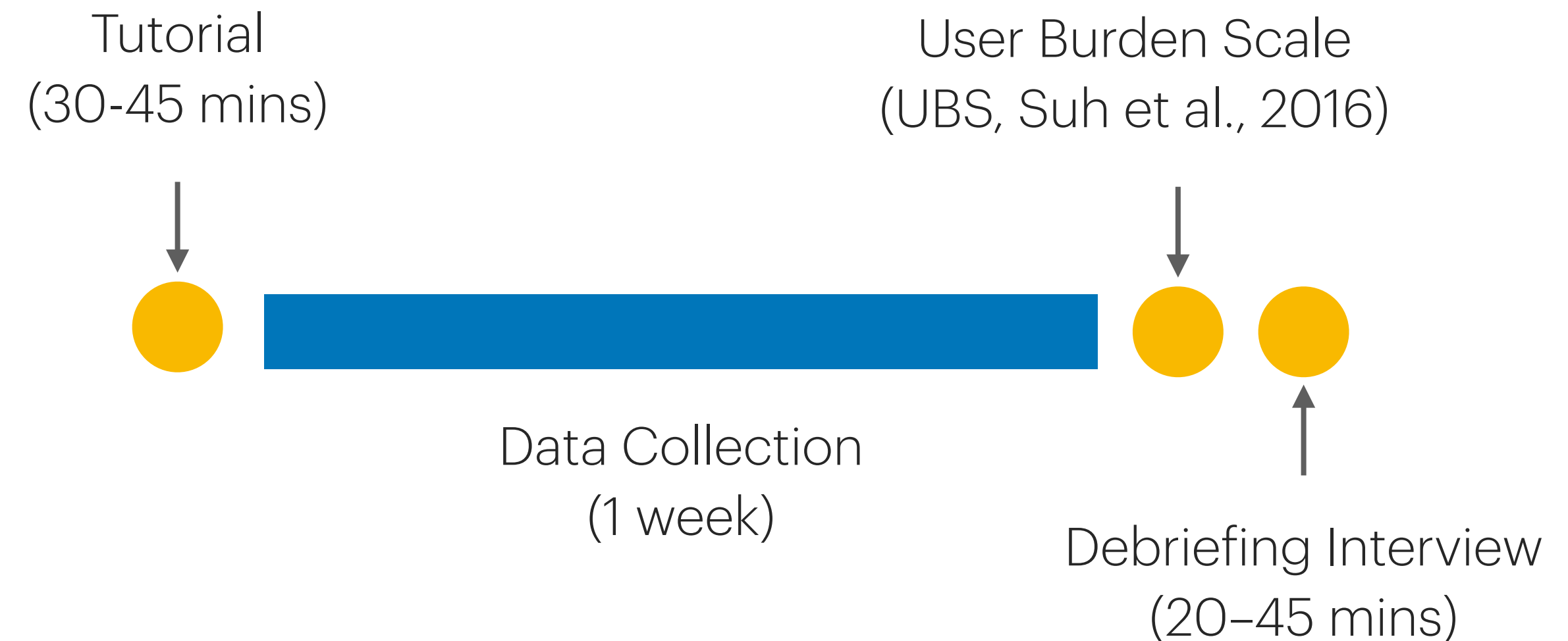


Guided prompts on food details & food decisions
(Sobal et al., 2009; Bilman et al., 2017)

A one-week **remote** data collection study

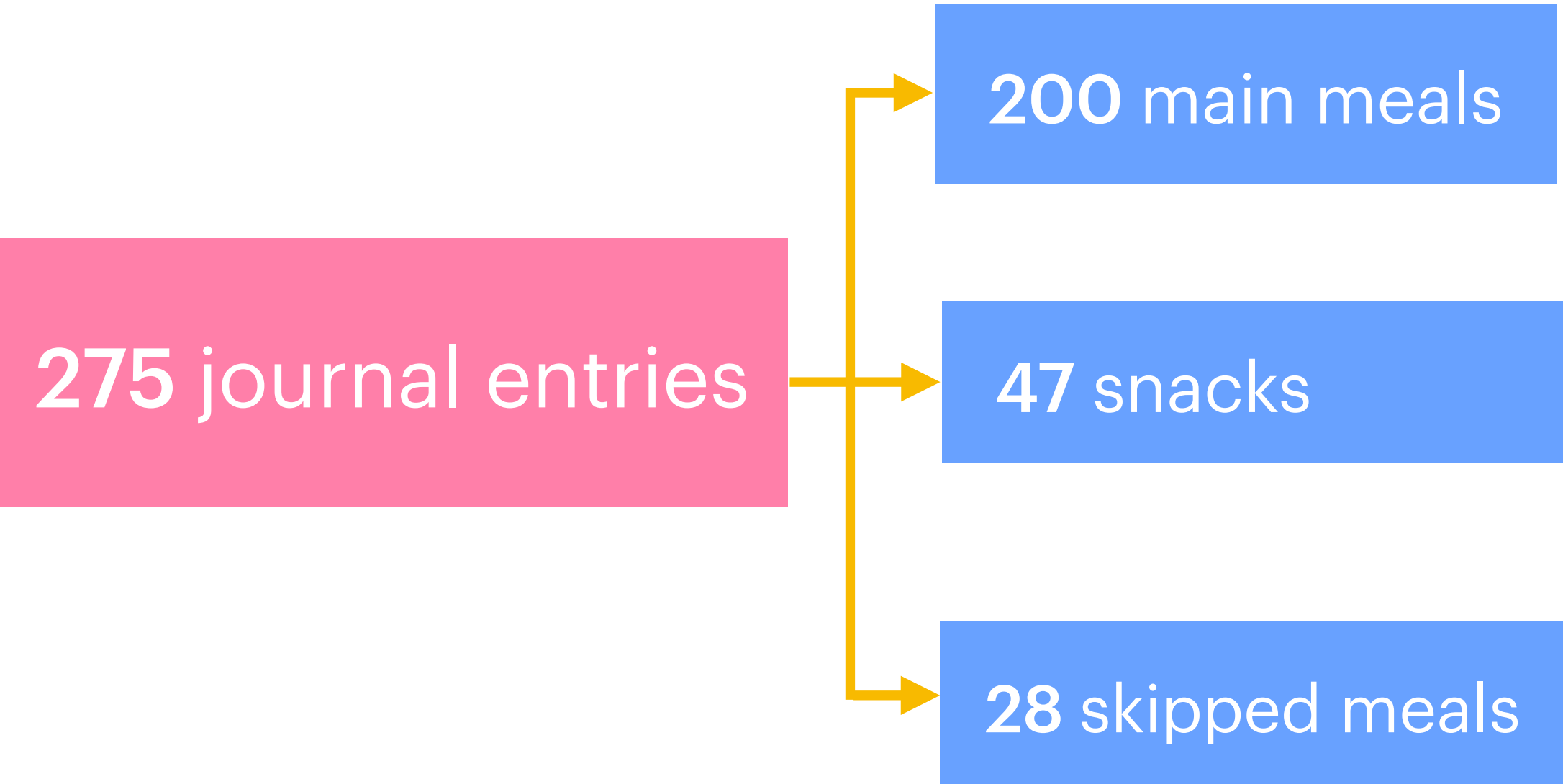
Participants ($N = 11$)

- 9 females, age: 18 ~ 60
- 7 different food cultures
- Specific eating goals



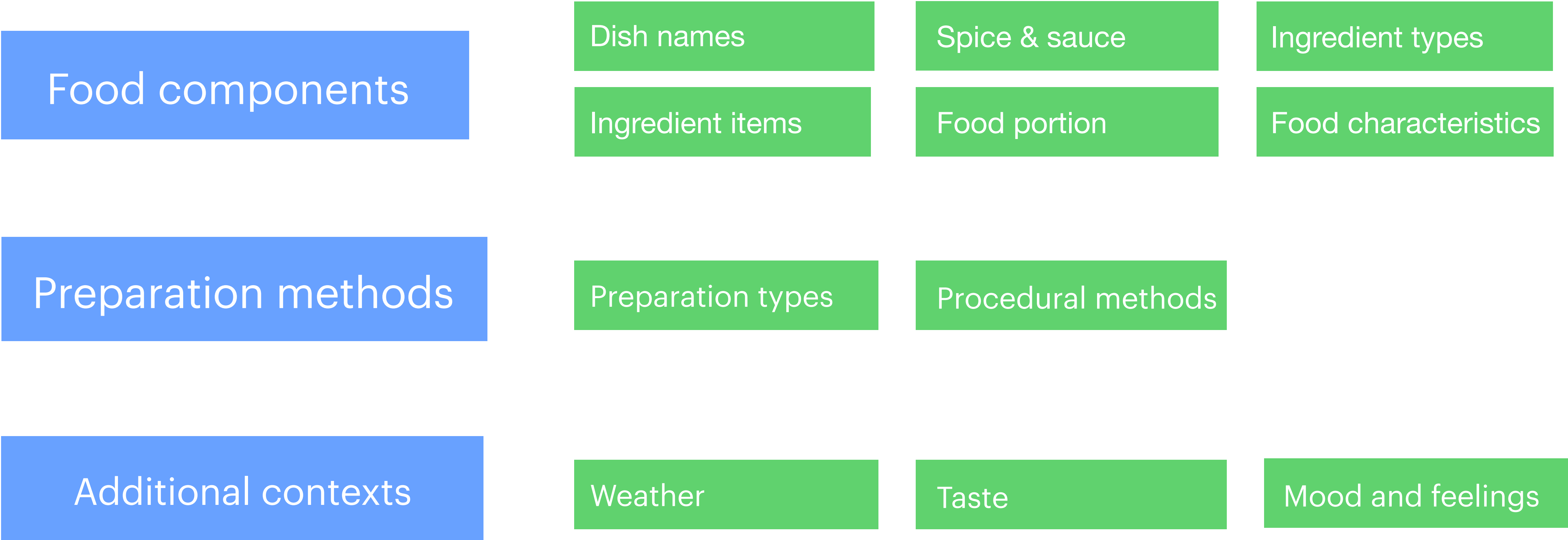
Finding Highlights

Journal entries & time spent



Time spent (avg.)	# of words (avg.)
148.81 seconds	147.61
126.41 seconds	141.61
43.71 seconds	48.11

Detailed components & preparation methods



Detailed components & preparation methods



Elaboration on food decisions

74% responses on food decisions were **elaborated with explanations and examples**

Describing the eating moments	Personal status	Food access	Social environment
Explaining eating strategies	Planning ahead	Health belief	Habits
Self-assessment	Judgment	Comparison	

Elaboration on food decisions

Describing the eating moment: food access

*"They are my favorite candy and **they were laying in front of me on my kitchen counter**. So they were calling my name."*

(P4, Day 3, Snack)

Self-assessment: judgement

*"I've been eating a lot of **junk [food]** so I thought I had to **keep it a little [more] fresh for sustainability and healthy, so I thought about those veggies.**"*

Explaining the eating strategy: health belief

(P7, Day 5, Lunch)

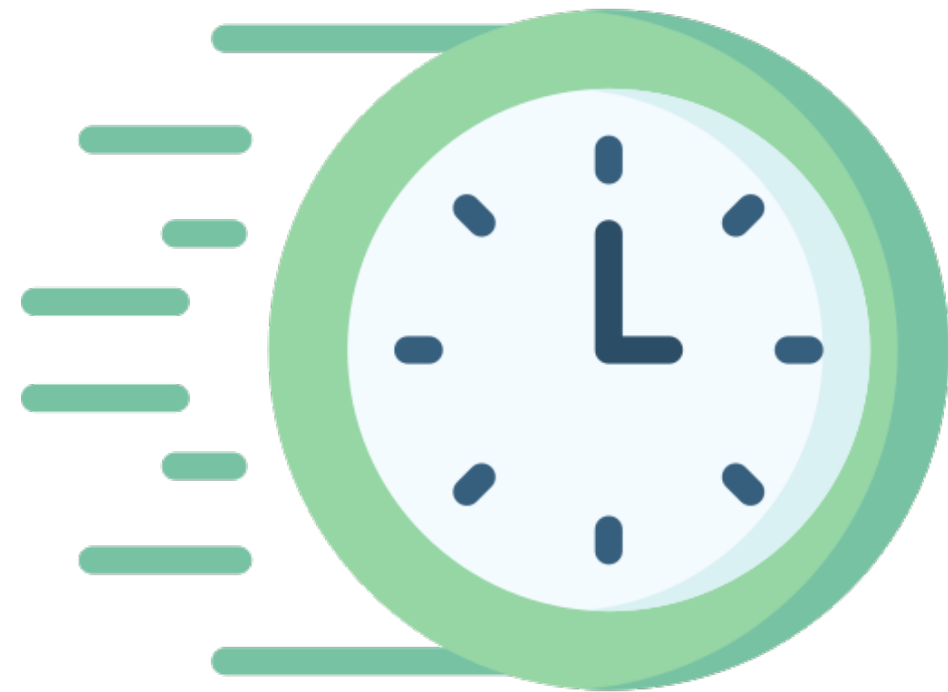
Easy and fast data capture

Results from the User Burden

Scale (UBS):

Less than 1 on a scale of 0 ~ 4:

Low perceived data capture burden



“

*I think filling it out via audio was much more easier than what I thought it would be. If I had to fill it out via text it would have been really difficult, because you had to mention cooking, whatever ingredients are there and everything. ... **I think I would barely managed a sentence or two.***

”

(P7)

Additional Challenges



Re-recording effort

Redo the entire recording if losing the train of thoughts



Mental load

Require extra attention and concentration



Social environmental constraints

Feel embarrassing to talk in public settings



Privacy concerns

"voice is more identifiable than text"

“In-the-moment” reflection

“ I feel like interacting **with people**, so it made me want to talk more. I feel more accountable, you know, to explain my food [decisions], to really think about it, like why am I eat this now. ”

(P10)



“ I mostly just use it as a **tool for self-reflection**. I guess I overthink things all the time. I always reflect on what I said. Sometimes I thought maybe I should stop [eating]. ”

(P9)

Implications

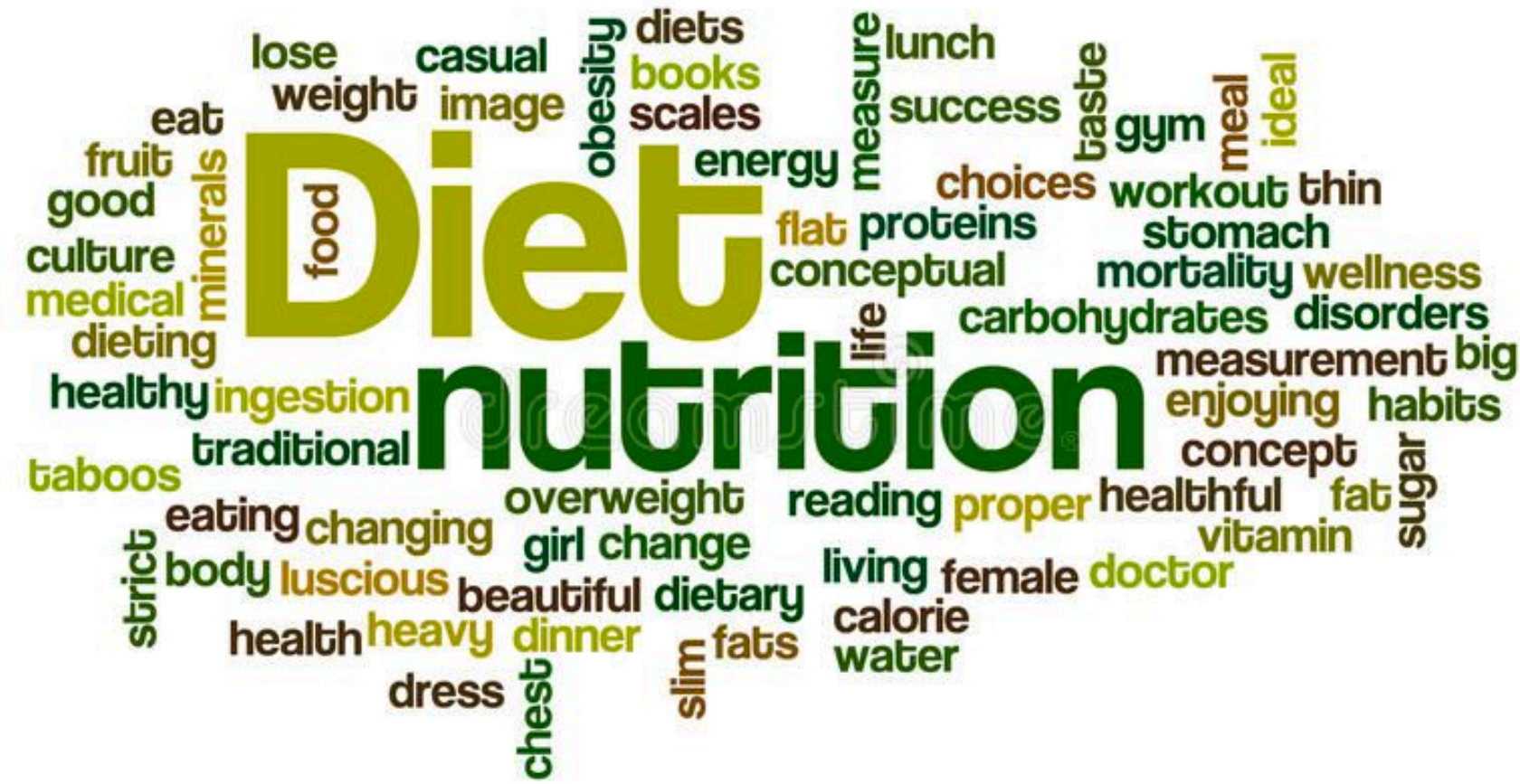
Effectively processing the data for healthcare use



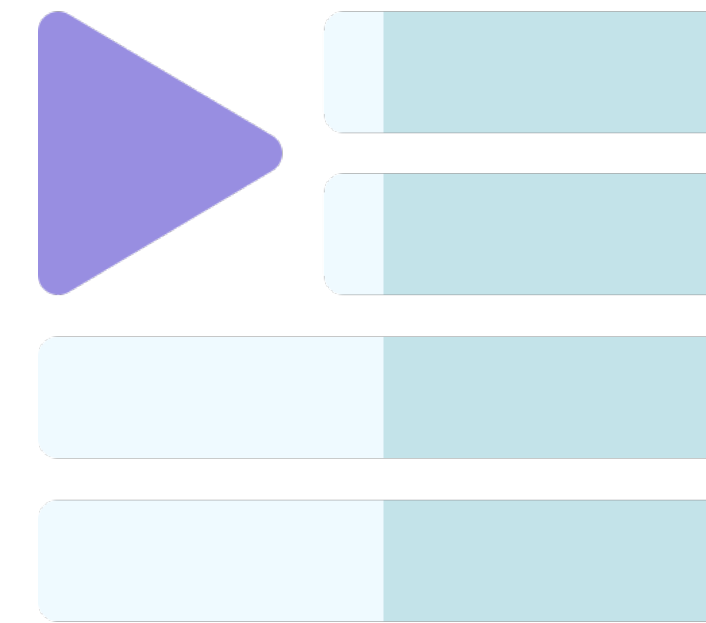
Dietary assessment

- Extracting food details by healthcare providers' information needs (e.g., food portion, condiment, preparation)
- Supporting efficient sorting and filtering based on providers' information needs

Enabling reflection-on-action through feedback

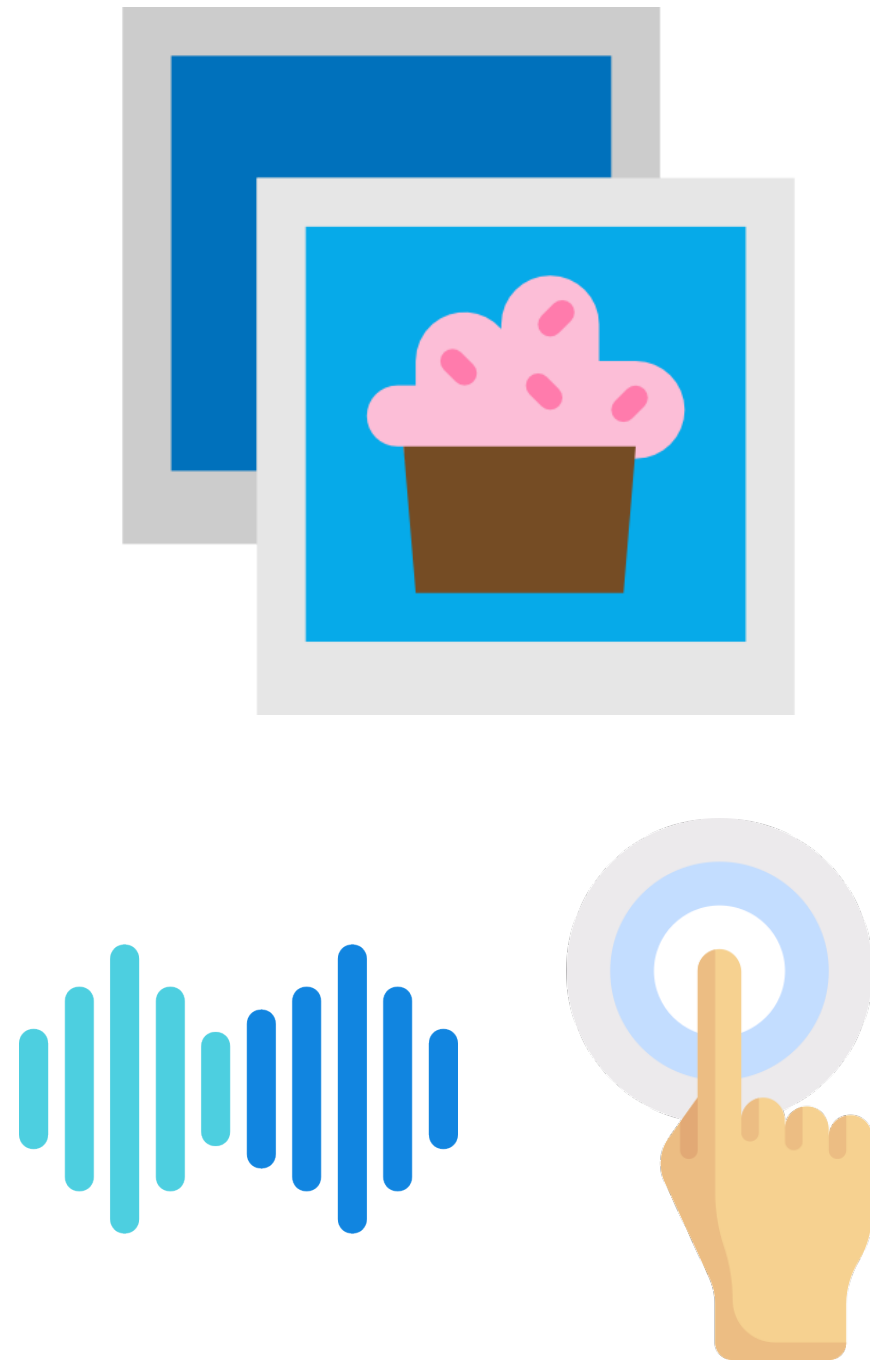


Key factors influencing one's food decisions



Efficient audio searching

Supporting multimodal data capture in varying contexts

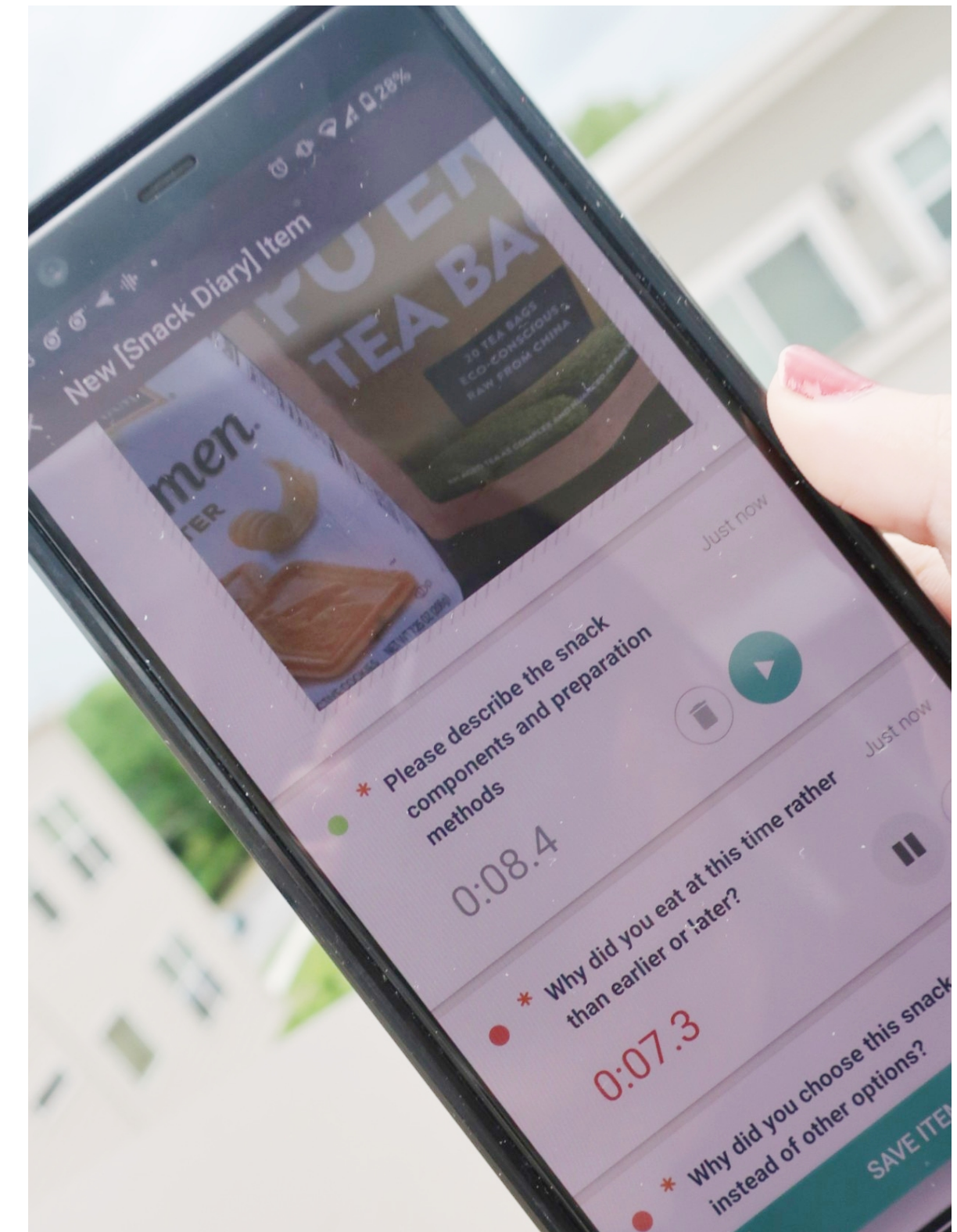


- Photo: quickly capture food items
- Touch input: public spaces
- Speech input: quiet and private settings

Thank you!

Research Contributions

- Empirical understandings of speech input's pros and cons in capturing everyday food practice
- Design implications for process and presenting large amounts of speech input
- Recommendations of designing multiple food journaling technologies



Fundings: NSF, iSchool Research Improvement Grants (RIGs)

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Appendix

Participants' Demographics

ID	Age	Gender	Occupation	Household members	Food culture	Eating goals
P1	27	F	Accountant	2 Housemates	African	Eat healthier
P2	30	F	Grad. student	A partner	Asian (mixed)	Increase food variety
P3	33	M	Project manager	A cousin	Asian (Indian)	Boost immune system
P4	47	F	Assistant writer	N/A	Asian (Chinese), American	Lose weight
P5	18	F	Undergrad. student	Parents	Asian (Chinese)	Eat healthier
P6	30	F	Case manager	A partner	American	Get healthier and fitter
P7	25	M	Grad. student	N/A	Asian (Indian)	Eat healthier
P8	41	F	Unemployed	A child	Western European	Eat healthier and lose weight
P9	26	F	Grad. student	Parents	Asian (Indian)	Eat with mindfulness and lose weight
P10	60	F	Personal assistant	A partner + 2 children	American	Reduce sweets intake
P11	26	F	Civil engineer	A partner	Mixed	Eat healthier