

# OneNote Meal: A Photo-Based Diary Study For Reflective Meal Tracking

eHealth --S19

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Yuhan, our co-authors, and I have no relevant relationships with commercial interests to disclose.



- Understanding "framing manipulation & valence" in the context of selftracking.
- Learning how tracking meals by valence can affect people's *meal tracking experience*.

## **Food Tracking**





https://www.runtastic.com/blog/es/perder-peso-registrando-comidas-con-balance/

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## **Challenge: Lack of Support for Reflection**





#### [Cordeiro, 2015; Tomaz, 2013; Amft, 2005]

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**Reflection On-Action:** 

Reflection

- Reflecting *after* something happens
- Retroactively learning from past actions

**Reflection In-Action:** 

- Reflecting *while* something happens
- Making responsive decisions

Schön, D. A. (1984). The architectural studio as an exemplar of education for reflection-in-action.



## Reflection



**Reflection On-Action:** 

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## **Framing Effect & Valence**



#### Valence

A type of frame manipulation used to shape different perceptions of the same information

Highlights positive or negative aspects of the target behaviors



Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice.

## Framing Effect & Valence



Achieved vs. Remaining Framing



Choe, E.K., Lee, B., Munson, S.A., Pratt, W., Kientz, J.A. (2013). Persuasive Performance Feedback: The Effect of Framing on Self-Efficacy.

## **Framing Effect & Valence**



#### **Productive vs. Distracted Framing**



Kim, Y., Jeon, J.H., Choe, E.K., Lee, B., Kim, K., Seo, J. (2016). TimeAware: Leveraging Framing Effects to Enhance Personal Productivity.

## Valence of Meals





https://www.macheesmo.com/wp-content/uploads/2010/09/Classic-Chicken-Fried-Steak.jpg



# Research Question



How does the *valence* of meals that people capture affect their food tracking experience, including:

- assessment of meal *healthiness*,
- self-reflection,
- and *food choice intention*?





#### Four-week diary study with 22 college students

Track only healthy meals (HG, N= 13)



Track only unhealthy meals (UG, N= 9)



icons are made by Freepik from Flaticon

## **Methods**



#### Breakfast

Sunday, January 22, 2017 8:24 PM



#### meal date if later than log time

#### Breakfast Eaten on 1/20/17

Food: banana, dark chocolate peanut butter almond bar, dried mango

meal type

Bananas are a good source of potassium and other vitamins. Dried mangos are a healthier snack compared to other junk food. The bar is good for protein since it contains peanut butter and almonds meal description/ preparation method

reasoning for "healthy" or "unhealthy"

Daily OneNote Meal Entry (HG-3)

HG: healthy meal tracking group.

## **Methods**



- Receive weekly summary
   USDA info input by researchers
- Follow-up interviews
- Pre/Post survey of dietary quality & attitudes on their eating habits



Total Calorie	213		
Protein	3 g		
Total Carbohydrate	30 g		
- Sugar	9 g		
- Dietary Fiber	11 g		
Total Fat	9 g		
- Saturated	2 g		
Sodium	192 mg		

Total Calorie	40
Protein	0 g
Total Carbohydrate	10 g
- Sugar	9 g
- Dietary Fiber	0 g
Total Fat	0 g
- Saturated	0 g
Sodium	10 mg

#### Meal Item in Weekly Summary (UG-3)

UG: unhealthy meal tracking group.

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## **Data Analysis**

#### Bottom-up thematic coding process •

- Written comments in OneNote 0
- Interview transcripts Ο





#### **Iteration 2**







# **Results**



## **General Usage**



#### 28 days, 642 meal entries in total

Average Entries / Days Per Participant	HG (N = 13)	UG (N = 9)
Total Entries	31.15	26.33
Entries With Photos	25.92	18.89
Entries With Reasons	26.54	21

## **General Usage**



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Entries With Reasons	26.54	21
Nothing to Capture	4.23	6.11
Missing Days	3.69	4

## **Perceived Meal Healthiness**



#### Valence shapes participants' assessment on meal healthiness in opposite ways

Dinner, chicken quesadilla

Tuesday, January 17, 2017 11:41 PM



For dinner I had a chicken quesadilla with cheese and rice from a dining hall on campus. This dinner was healthy because it included a variety of food groups

HG-7

#### Quesadilla

Wednesday, February 1, 2017 6:37 PM



Homemade dinner: Quesadilla (flour tortilla) with chicken, sharp cheddar cheese and onions Unhealthy but not terribly bad either Many Cheese and not much veggies



## **Perceived Meal Healthiness**



#### Valence shapes participants' assessment on meal healthiness in opposite ways

#### Omelette, banana, milk

Wednesday, January 25, 2017 09:25 AM



This breakfast was home prepped and not shared. The omelette consisted of two eggs, diced ham, diced onions, and cheese. I think this meal is healthy because it provides a nice source of protein to start the day, along with some other vitamins like calcium, potassium, and fiber.



Friday, January 20, 2017 10:44AM



1-19-17 This was my breakfast, a 2 egg omelet with cheese and green peppers. It was unhealthy since I cooked it in oil and I added extra cheese, so it had a lot of fat and saturated fat in it.

UG-6

#### 4/8/2017 Lunch

Saturday, April 8, 2017 12:00 PM



Quick noodle and seaweed salad Healthy meal with the added vegs

HG-13

#### 12/28 Pork Ramen with Egg

Thursday, December 29, 2016 2:16 AM



Snack, using pack of ramen and hard boiled egg This meal is unhealthy since there is artificial flavorings. Also this contains a lack of vegetables and meats.

UG-2

## The Effect of Valence on Self-Reflection

#### HG Participants : creating a positive picture of diet

*"helpful to keep tracking and realize what I'm eating healthy"* (HG-3)

*"feel better than tracking everything"* (HG-4)

*"feel guilty when there's nothing to capture"* (HG-3, 5)

HG: healthy meal tracking group. icons are made by Freepik from Flaticon





### The Effect of Valence on Self-Reflection

#### **UG Participants: going through a self-discovery journey**

"(the foods) were a lot more unhealthy than I thought they were" (UG-7)

"judge my food more critically" (UG-6)

"feel good when there's nothing to capture" (UG-3, 5, 7)

UG: unhealthy meal tracking group. icons are made by Geotatah from Flaticon





#### The Effect of Valence on Food Choice Intention

#### HG Participants: helping to maintain a healthy diet

*"it helped me target for at least one (healthy) meal a day"* (HG-4)

*"a good opportunity to keep up with healthy foods"* (HG-12)

*"to avoid the days when there's nothing to upload"* (HG-1, HG-13)



HG: healthy meal tracking group. icons are made by Freepik from Flaticon

## The Effect of Valence on Food Choice Intention

#### **UG Participants: enabling conscious eating**

*"more cautionary before eating"* (UG-1, 4, 5, 6, 7)

"try to balance out the unhealthy food I log" (UG-4)

*"to avoid eating the food that is recognized unhealthy"* (UG-5)



UG: unhealthy meal tracking group. icons are made by Freepik from Flaticon



# **Discussion**



## **Valence: A Filter for Reflection**





#### **Selectively Tracking**



#### Reduce tracking burden

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## **Valence: A Filter for Reflection**





Incorporating valence into food tracking practice.

http://www.oprah.com/spirit/understanding-the-food-guidelines-ask-geneen-roth

## **Valence: A Filter for Reflection**



Taking alternative sessions to track meals by valence.



icons are made by Freepik from Flaticon

## Supporting Reflection Throughout Self-Tracking







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Description (Required)	
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asdfo	ghjkl
1 Z X C V	vbnm 🕶
Sym 🌣 Englis	sh(UK) . Next

1/23/2017 Lunch: ½ blueberry muffin	Total C Proteir
	Total F
	Sodiun
1/23/2017 Lunch: Coffee (with sugar)	Total Ca Protein
	Total Ca

- Dietary Fiber Total Fat - Saturated Sodium	11 g 9 g 2 g 192 mg
Total Calorie	40
Protein	0 g
Total Carbohydrate	10 g
- Sugar	9 g
<ul> <li>Dietary Fiber</li> </ul>	0 g
Total Fat	0 g
- Saturated	0 g
Sodium	10 mg

rbohvdrate

3 g

30 g 9 g

#### icons are made by Freepik from Flaticon

## Supporting Reflection Throughout Self-Tracking



icons are made by Freepik from Flaticon

http://elportaldelhostelero es/blog/redes-sociales-ynuestro-restauranteinstagram-b26.html



# Thank you!

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## Questions



As a type of frame manipulation, valence shapes people's perception of the same information differently, thereby affecting their attitudes and behaviors in different ways. In the context of self-tracking, which of the following most appropriately applies "valence manipulation"?

- A. Sleep tracking: one condition focusing on tracking bedtime and the other condition focusing on tracking wake-up time.
- B. Food tracking: one condition focusing on tracking protein intake and the other condition focusing on calorie intake.
- C. Time spent tracking: one condition focusing on assessing the level of productivity and the other condition focusing on assessing the level of distraction.
- D. Exercising tracking: one condition focusing on tracking step counts and the other condition focusing on tracking sedentary time.





- A. Sleep tracking: one condition focusing on tracking bedtime and the other condition focusing on tracking wake-up time.
- B. Food tracking: one condition focusing on tracking protein intake and the other condition focusing on calorie intake.
- C. Time spent tracking: one condition focusing on assessing the level of productivity and the other condition focusing on assessing the level of distraction.
- D. Exercising tracking: one condition focusing on tracking step counts and the other condition focusing on tracking sedentary time.

Explanation: Based on prior research, "valence manipulation" usually casts the same information either in a positive or a negative light. Therefore, tracking the same information (time spent) using opposite scales (productivity versus distraction) is most appropriate. Among the incorrect answers, bedtime and wake-up time frame different information. Protein intake and calorie intake are parts of the food intake, but they do not frame the food intake oppositely. Step counts and sedentary time seem to frame the same information oppositely, whereas they do not examine the information from the same dimension.

## Questions



Self-reflection is essential for gaining insights from self-tracking data. Opportunities for reflection occur at various points throughout the self-tracking process, in the form of reflection-on-action and reflection-in-action. Which of the following tracking activities helps support reflection-in-action?

- A. Providing the user with information once a week showing that they most frequently engage in binge eating behaviors on weekends.
- B. Prompting the user to answer nutrition-related questions at their usual lunchtime.
- C. Inquiring at the end of the day whether the user feels that their meals of the day are on track with their weekly goals.
- D. Asking how the user rationalized their meal choices once they have entered their food diary with their breakfast foods.





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- C. Inquiring at the end of the day whether the user feels that their meals of the day are on track with their weekly goals.
- D. Asking how the user rationalized their meal choices once they have entered their food diary with their breakfast foods.

Explanation: Based on previous work, reflection-in-action is prompted in-situ, or when the behavior takes place. However, reflection-on-action occurs when considering one's habits over time, often through the use of aggregated feedback data. In the correct answer, B, this feedback is set to coincide with the time leading up to or during the meal choice, prompting the user to think through their behavior and potentially make a more informed decision. The other answers promote reflection-on-action, providing them with past information which can help them be aware of their overall eating habits and set goals for future food decisions.

## **Participants**



ID	Gender	Age	Major
HG-1	F	23	Information science
HG-2	F	23	Information science
HG-3	F	21	Environmental science
HG-4	М	22	Accounting
HG-5	М	29	Information Science
HG-6	F	19	Biology
HG-7	F	19	Biobehavioral health
HG-8	F	22	Biobehavioral health
HG-9	F	22	Biochem
HG-10	F	19	Advertising
HG-11	М	20	Chemical engineering
HG-12	М	22	Telecommunication
HG-13	М	27	Computerscience

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UG-1	F	21	Material science
UG-2	М	20	Information science
UG-3	F	21	Economics
UG-4	F	21	Health policy
UG-5	F	22	Biology
UG-6	F	22	Landscape Architecture
UG-7	F	20	Chemical engineering
UG-8	F	24	Immunology and Infectious Disease
UG-9	F	21	Nursing

## **General Usage**



Group	Usage	Mean	SD	Min	Мах
HG (N = 13)	Total Entries	31.15	9.44	15	48
	Entries With Photos	25.92	10.35	0	44
	Entries With Reasons	26.54	10.00	0	48
	Nothing to Capture	4.23	4.49	0	12
	Missing Days	3.69	4.60	0	14
UG (N = 9)	Total Entries	26.33	5.71	19	37
	Entries With Photos	18.89	7.95	0	33
	Entries With Reasons	21	8.08	0	33
	Nothing to Capture	6.11	5.73	1	19
	Missing Days	4	3.8	0	11

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