Less Is More (Natural)
The Effect of Ingredient Quantity
on Preferences and Naturalness Perceptions

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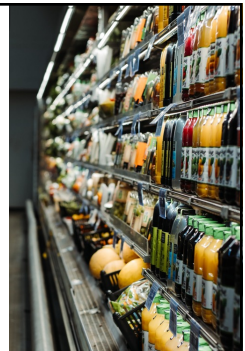
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Food products

Wellness products

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When and why does ingredient quantity influence people's preferences?

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People prefer natural products

e.g., Hagen 2022, Rozin 2005, Rozin et al. 2012, Scott et al. 2020

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Naturalness is a vague concept

"From a food science perspective, it is difficult to define a food product that is 'natural' because the food has probably been processed and is no longer the product of the earth……" –**FDA 2016**

Roman et al. 2017; FDA 2016

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"Natural products should be minimally processed"

No processing was the most frequent description for naturalness

Table 2
Categories and most frequent specific responses in defining natural.[a]

Category[a]	France	Germany	Italy	Switzerland	U.K.	U.S.A.	Total
1. No processing	**128**	**82**	**114**	**120**	**121**	**122**	**687**
Not altered	32	39	51	36	32	38	228
Not affected by industry	44	4	9	26	6	6	95
Not touched by humans	22	19	27	21	29	33	151
Not processed	11	11	18	13	30	34	117
2. No additives	**105**	**63**	**74**	**113**	**113**	**136**	**604**
Nothing added	32	13	18	27	41	41	172
No chemicals	40	33	35	49	39	51	247
No preservatives	9	5	6	12	7	24	63
3. Origin in nature	**15**	**57**	**65**	**62**	**32**	**62**	**293**
From nature	0	30	24	29	7	17	107
Found in nature	12	11	33	11	13	18	98

Rozin et al. 2012

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Processing history is not transparent

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Hypothesis – Less is More Natural

Ingredient Quantity → Processing → Naturalness → Preference
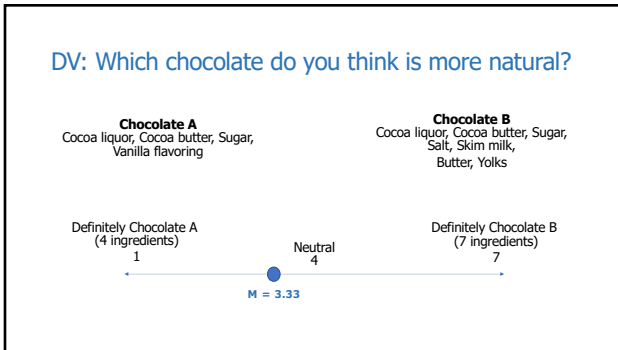
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A pre-registered pre-test

Chocolate A
Cocoa liquor, Cocoa butter, Sugar, Vanilla flavoring

Chocolate B
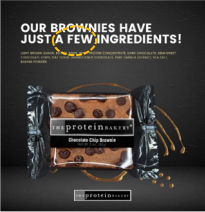Cocoa liquor, Cocoa butter, Sugar, Salt, Skim milk, Butter, Yolks

N = 400, M-Turk

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DV: Which chocolate do you think is more natural?

Chocolate A
Cocoa liquor, Cocoa butter, Sugar, Vanilla flavoring

Chocolate B
Cocoa liquor, Cocoa butter, Sugar, Salt, Skim milk, Butter, Yolks

Definitely Chocolate A
(4 ingredients)
1

Neutral
4

Definitely Chocolate B
(7 ingredients)
7

M = 3.33

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DV2: Rate the naturalness of each ingredient

Average naturalness: 4.10

Average naturalness: 4.81

Chocolate A
Cocoa liquor, Cocoa butter, Sugar, Vanilla flavoring

Chocolate B
Cocoa liquor, Cocoa butter, Sugar, Salt, Skim milk, Butter, Yolks

Salt - 5.67   Skim milk - 4.64

Vanilla flavoring - 3.05

Butter - 4.70   Yolks - 5.15

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Overview of the studies (all pre-registered)

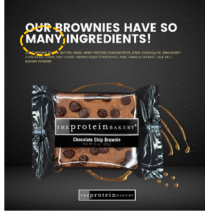|	Category	Finding
1A	Granola	Few (vs. control) framing increases click-through rate on FB
1B	Protein brownie	Few (vs. many) framing increases click-through rate on FB
2	Snack bar	Few (vs. many) framing increases the **actual choice** among undergrads
3	Juice	Inferences about processing and naturalness **mediate** the effect of IQ
4	Nut butter	Individual differences in preference for naturalness moderate the effect
5A	Appetizer	A uniqueness goal reverses the effect
5B	Snack bar	A hedonic goal reverses the effect
5C	Fruit smoothie	A benefit goal reverses the effect
5D	Ointment	A goal of cure (vs. prevent) attenuates the effect
6A	Jam	Grouping ingredients can increase preferences
6B	Fruit juice	When a better processing information is available, the effect attenuates

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Study 1B - Advertising brownies on Facebook

OUR BROWNIES HAVE JUST A FEW INGREDIENTS!

OUR BROWNIES HAVE SO MANY INGREDIENTS!

$100 daily budget for 3 days (**n = 81,099**)

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Few (vs. many) framing increases clicks

OUR BROWNIES HAVE JUST A FEW INGREDIENTS!

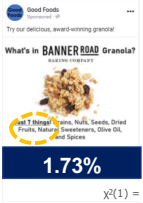OUR BROWNIES HAVE SO MANY INGREDIENTS!

3.48%

3.07%

$\chi^2(1) = 10.83$, $p < .001$

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Few framing (vs. control) increases clicks

Few framing

Control

Try our delicious, award-winning granola!

What's in BANNER ROAD Granola?

Just 7 things! Grains, Nuts, Seeds, Dried Fruits, Natural Sweeteners, Olive Oil, and Spices

Grains, Nuts, Seeds, Dried Fruits, Natural Sweeteners, Olive Oil, and Spices

1.73%

1.20%

$\chi^2(1) = 7.87$, $p = .005$

$50 daily budget for 3 days (**n = 17,040**)

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Why is fewer ingredients preferred?

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Experiment 3: Processing Perception

Our juice has just a few ingredients!

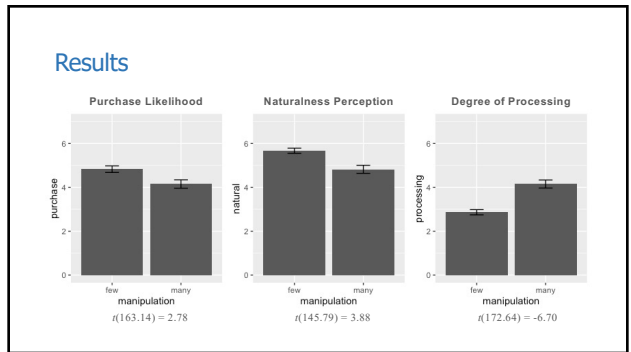pressed

Our juice has so many ingredients!
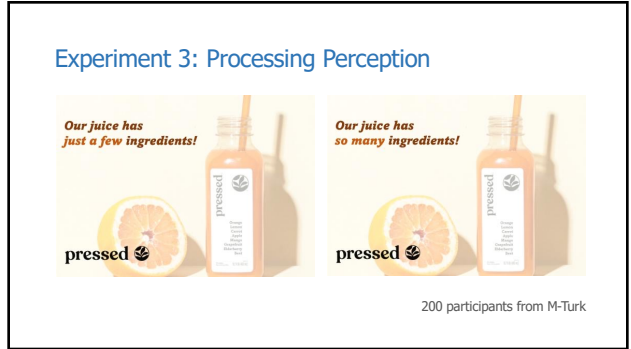
pressed

200 participants from M-Turk
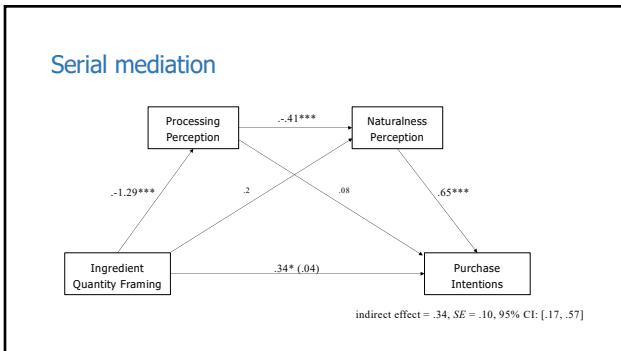
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Experiment 3 DVs (7-point scale)

1. Preference
How likely are you to buy juice from "pressed"?

2. Naturalness Perception
To what extent do you think the juice from "pressed" is natural?

3. Degree of processing
Making this juice requires a lot of human processing
This juice is heavily processed
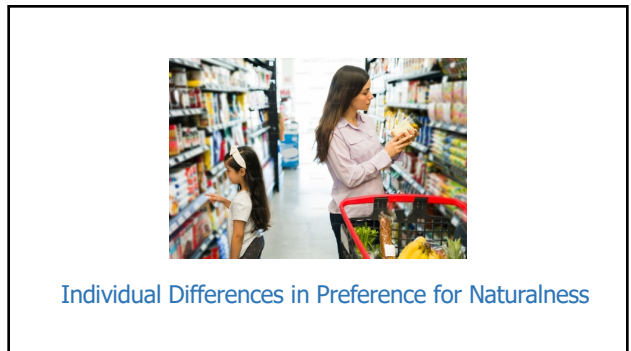There is only minimal processing in making this juice (reverse-coded)

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Results

Purchase Likelihood
purchase
few / many
manipulation
$t(163.14) = 2.78$

Naturalness Perception
natural
few / many
manipulation
$t(145.79) = 3.88$

Degree of Processing
processing
few / many
manipulation
$t(172.64) = -6.70$

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Serial mediation

Processing Perception → Naturalness Perception: -.41***

Ingredient Quantity Framing → Processing Perception: -1.29***

.2

.08

Naturalness Perception → Purchase Intentions: .65***

Ingredient Quantity Framing → Purchase Intentions: .34* (.04)

indirect effect = .34, SE = .10, 95% CI: [.17, .57]

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Individual Differences in Preference for Naturalness

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Experiment 4: Individual Difference

- 591 participants from Mturk
- 2 (few vs. many) between-subjects

Preference for Naturalness Scale (7-point scale)
- I cherish naturalness in all things
- I don't believe that natural foods are better than conventional foods
- I feel better when I eat natural foods
- I purchase or consume natural foods whenever possible

(Brunner et al. 2010; Siegrist et al. 2008)

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"Few"

9 ingredient nut butter   **4** ingredient nut butter

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"Many"

9 ingredient nut butter   **4** ingredient nut butter   **1** ingredient nut butter

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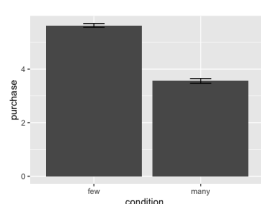
Slide 28

DVs

1. Purchase Likelihood
How likely are you to buy the nut butter with 4 ingredients?

2. Naturalness Perception
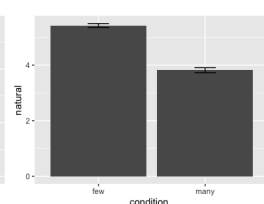To what extent do you think that the nut butter with 4 ingredients is natural?"

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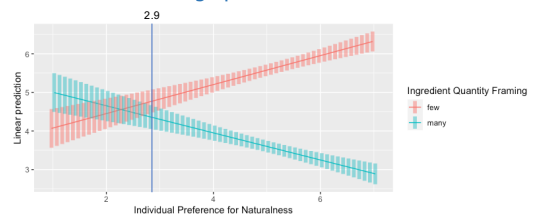**Slide 29**

Purchase Likelihood — $t(556.38) = 18.24$

Naturalness Perception — $t(548.99) = 15.71$

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The preference for few ingredients is stronger among individuals with a high preference for naturalness

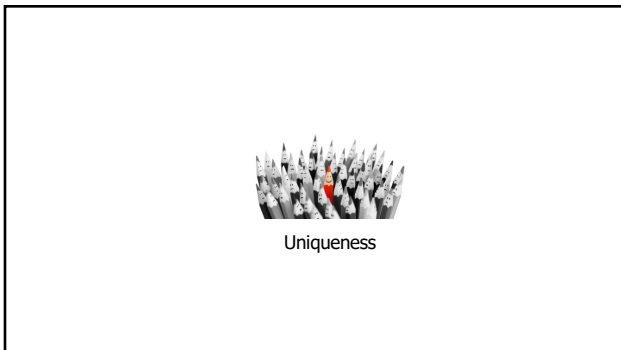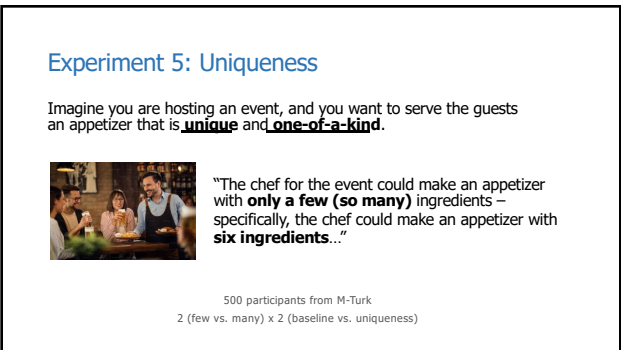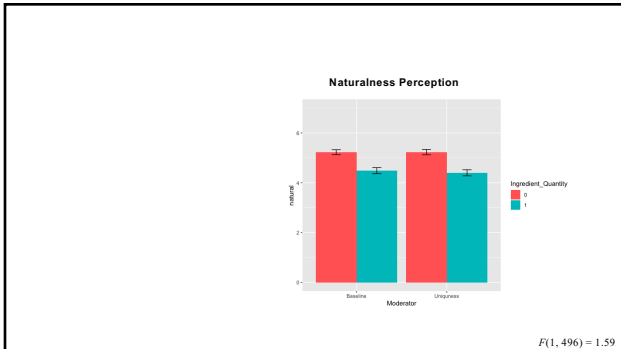$b = .73$, $SE = .08$, $t(586) = 8.69$, $p < .001$

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When do people prefer more ingredients?

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When naturalness is overshadowed by goals

Indulgence   Uniqueness   Variety

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Uniqueness

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Experiment 5: Uniqueness

Imagine you are hosting an event, and you want to serve the guests an appetizer that is **unique** and **one-of-a-kind**.

"The chef for the event could make an appetizer with **only a few (so many)** ingredients – specifically, the chef could make an appetizer with **six ingredients**…"

500 participants from M-Turk
2 (few vs. many) x 2 (baseline vs. uniqueness)

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Naturalness Perception

$F(1, 496) = 1.59$

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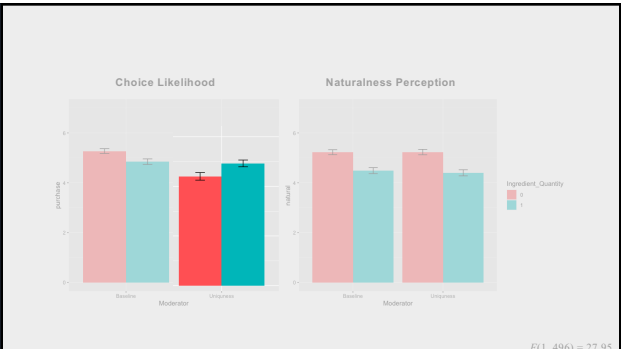**Choice Likelihood**   **Naturalness Perception**

$F(1, 496) = 27.95$

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Summary: Less is More Natural

1. In baseline, people use **the number of ingredients** as a cue for inferring naturalness. Less is more natural and preferred.
2. When naturalness is less important or when processing history is already known (I didn't show this today), this effect goes away!

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