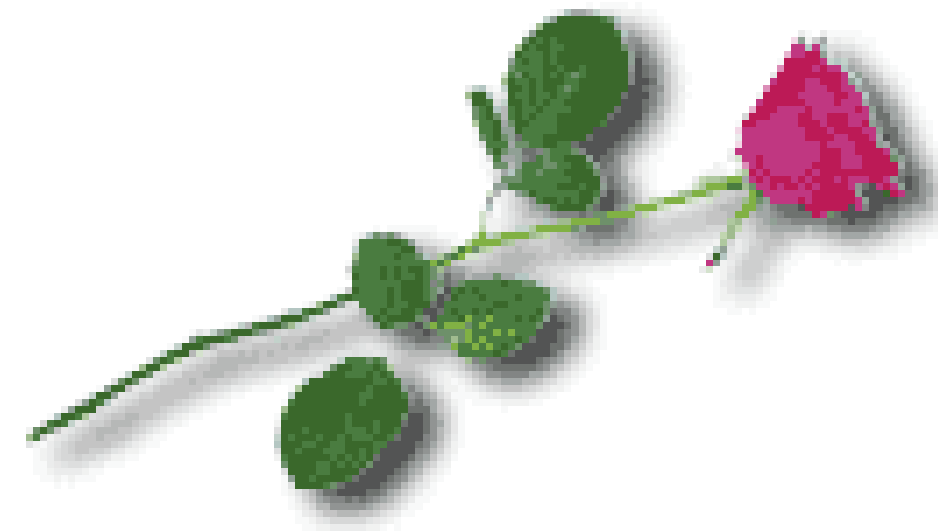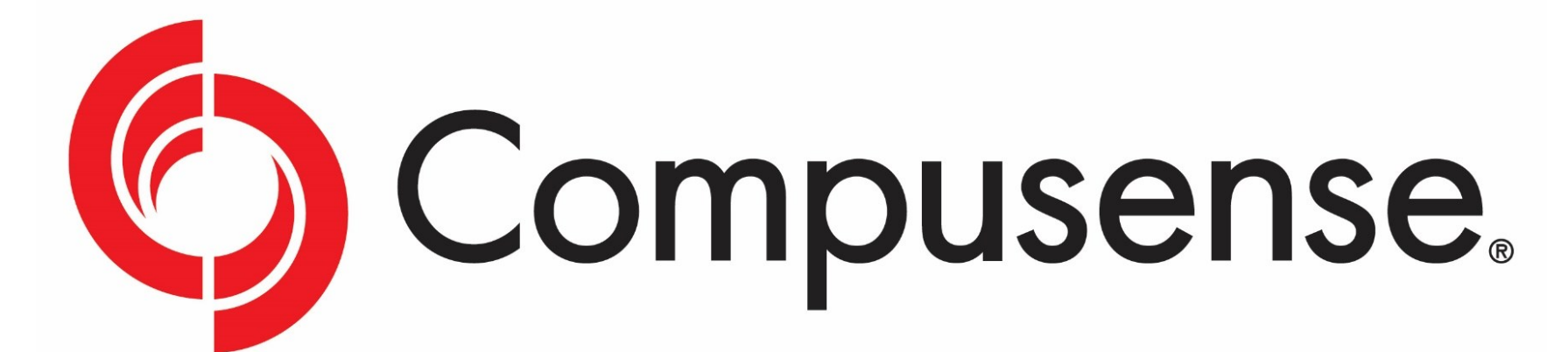# Do teenaged chocolate-flavored cereal consumers go cuckoo trying to do TCATA while eating Cocoa Puffs?

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Introduction

We wanted to understand consumer perception dynamics of chocolate-flavored ready-to-eat (RTE) breakfast cereals. Category consumers include a sizeable proportion of children/teens. Their perceptions matter, but we are unaware of previous temporal sensory evaluations performed by younger-than-adult consumers. We decided to focus on teens in this study, and asked:

Can teens use the TCATA Fading method to characterize perception dynamics of RTE breakfast cereals?

Materials & Methods

Assessors

76 high-school teenage category consumers:

	Grades 9-10	Grades 11-12
Male	20	22
Female	18	16

Parental/guardian consent was required. Both teens and parents/guardians were financially compensated for their participation.

Products

Products were sourced from supermarkets in Guelph, Ontario:
(1) Chocolate Cheerios*, (2) Chocolate Lucky Charms*,
(3) Cocoa Puffs*, (4) Nestle Nesquick*, (5) Reese's Puffs*,
(6) Sally's Cocoa Crunch 'Rageous*.

(*******See below for legal information.)

Experimental design

Training was negligible. Consumers received a verbal task description and instructions (2 min.), then evaluated RTE cereal samples according to a modified Williams design. Samples presentation was sequential monadic, where each presentation consisted of 2 cups of dry RTE cereal (each 1.5 g).

	1st intake 1-min TCATA evaluation	Delay 5-s delay	2nd intake 1-min TCATA evaluation	Comment on other sensations	Liking 9-point scale	Delay 25 s with rinse
Practice sample	⬭	◦	⬭	◆	◆	◯
1st sample	⬭	◦	⬭	◆	◆	◯
2nd sample	⬭	◦	⬭	◆	◆	◯
3rd sample	⬭	◦	⬭	◆	◆	◯
4th sample	⬭	◦	⬭	◆	◆	◯
5th sample	⬭	◦	⬭	◆	◆	◯
6th sample	⬭	◦	⬭	◆	◆	

Results & Conclusions

Teens discriminated cereals well using TCATA Fading.

TCATA curves are given below (without time warping). Attributes (*Bitter taste*, *Chocolate flavor*, *Corn/Corn meal flavor*, *Crunchy texture*, *Oat flavor*, *Off flavor*, *Other flavor*, *Peanut Butter flavor*, *Sweet taste*) are emphasized where a significant difference exists between the product and the average product. Highlight above (below) the reference line indicates higher (lower) citation rates than the average rate. Consumer discrimination of the cereal was good, indicating that teens were able to characterize these RTE using the TCATA Fading method.
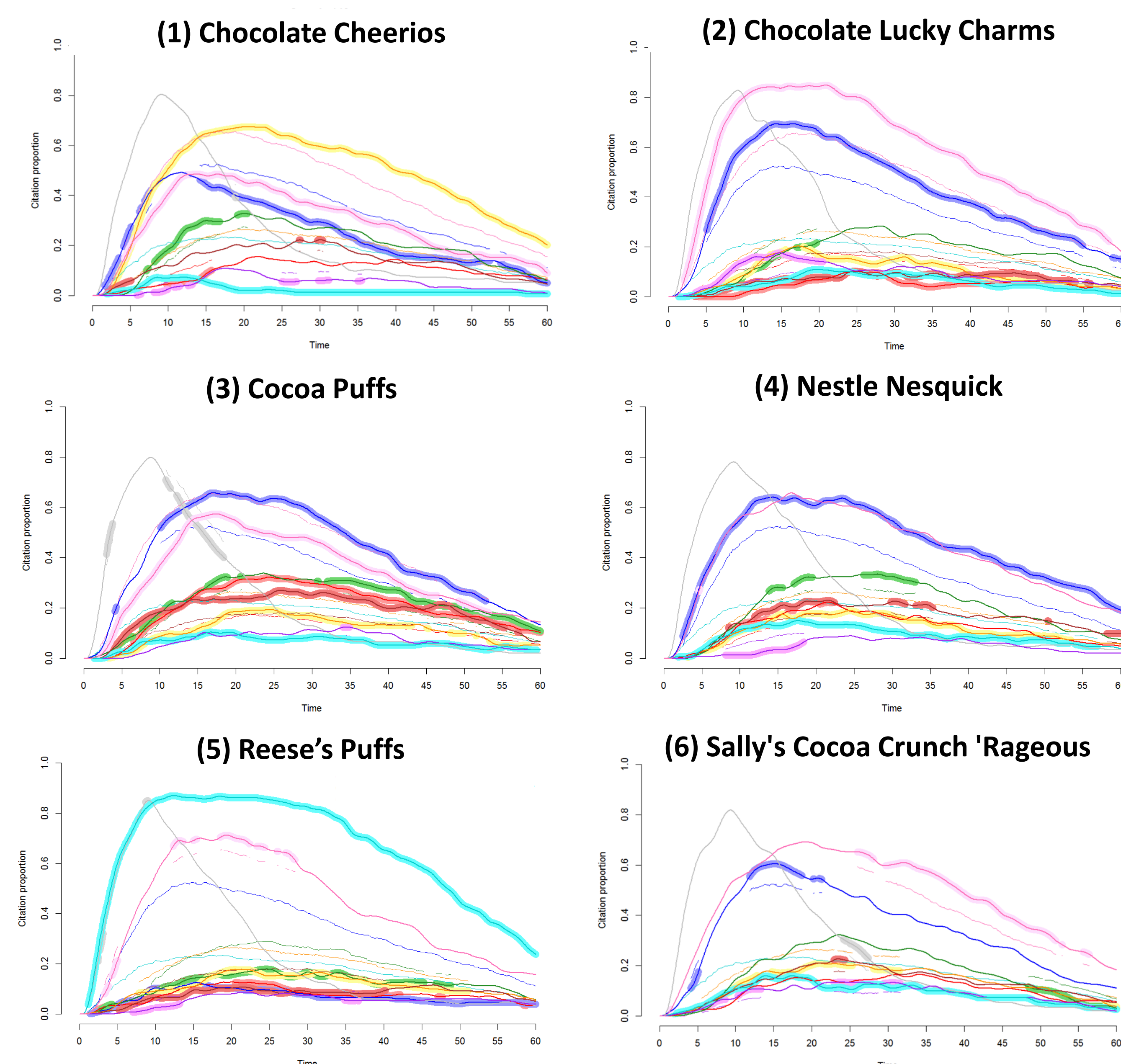
(1) Chocolate Cheerios
(2) Chocolate Lucky Charms
(3) Cocoa Puffs
(4) Nestle Nesquick
(5) Reese's Puffs
(6) Sally's Cocoa Crunch 'Rageous

Positive and negative hedonic drivers were identified based on liking and duration that TCATA attributes were applicable.

Positive hedonic drivers were *Sweet taste*, *Chocolate flavor*, and *Crunchy texture*, especially when co-elicited. *Peanut Butter flavor*, was well-liked, especially if elicited concurrently with *Sweet taste*. (*Note: Peanut Butter flavor* was strongly associated with Reese's Puffs.) Negative hedonic drivers were *Bitter taste*, *Off flavor*, and *Corn/Corn meal flavor*, which are sensory characteristics that are associated with whole grains.

Cluster analysis on consumer preferences suggested 2 consumer groups.

Liking responses were standardized and submitted to hierarchical cluster analysis using Ward's method. The two-group solution was similar to clusters obtained from a two-group mixture of factor analyzers. Mean liking by group is presented below. Raw TCATA citation rates for the panel were row centered and submitted to PCA. PC1 explained most (68%) of variance, and separated Reese's Puffs from other cereals based on its high citation rates for *Peanut butter flavor*. Each group's product trajectories were projected into the space. The plane of PC2 and PC3 is shown below. Group characterizations were similar with some exceptions. **Group 2** characterized Nestle Nesquick by *Chocolate flavor* and *Corn/Corn meal flavor* (a negative hedonic driver) early more so than **Group 1**. **Group 2** characterized Cocoa Puffs has having a *Bitter taste* (a negative hedonic driver) and liked this product less than **Group 1**. Chocolate Cheerios was characterized by *Oat flavor* by both groups, which had divergent hedonic responses on (what is nominally) the same sensation, indicating why *Oat flavor* was not identified as a positive or negative hedonic driver above. Results suggest that it is worthwhile to investigate consumer heterogeneity in both perception and liking, a recommendation that seems appropriate for other types of consumer data not investigated in this study.

Like very much (8)
Like moderately (7)
Like slightly (6)
Neither like nor dislike (5)
Dislike slightly (4)

Group 1 (n=52)
Group 2 (n=23)
Removed/ non-discriminating (n=1)

(1) Chocolate Cheerios
(2) Chocolate Lucky Charms
(3) Cocoa Puffs
(4) Nestle Nesquick
(5) Reese Puffs
(6) Sally's Cocoa Crunch 'rageous