

The Neuroscience of Candy Preferences

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Consumer neuroscience has been applied to understand preferences for a wide variety of goods, including foods. Food is particularly intriguing for neuroscientists because it involves touch, taste, smell, sound, and sight. Most food preferences are set by our twenties and evolve only slowly after that.¹ Could neurophysiology predict food preferences? And if so, what foods would one test?



Candy

Candy is an interesting food to test because of its manufacturing consistency, familiarity, and positive regard by most people. Eating candy is a joyful experience, but articulating why we like one candy over another is difficult. As a result, confectioners struggle to forecast the demand for existing and new candies. Market research typically uses self-report on taste alone, ignoring the larger consumption experience: opening the package, pulling out the candy, putting it in the mouth, chewing it, and (of course) tasting. Because these senses have common pathways in the brain, the entire experience impacts on candy preferences and ultimately purchases.

Study Description

ZESTxLabs partnered with a US-based candy company² to conduct a pilot study designed to capture the brain responses of the entire candy experience, and to use these measures to predict consumption preferences. Data were collected on ten study volunteers aged 20-55, both males and females. Eight types of hard candies and licorices, along with one chocolate candy, were used in this study.

After being connected to wireless sensors to measure peripheral neurologic activity, the volunteers were asked to watch while the candy package was opened. They were then invited to place the candy in their mouths and chew it slowly for 60 seconds. Neurologic data were collected during the entire experience, including during the post-consumption period as the taste faded away. Participants then answered questions regarding the candy's taste, familiarity, and their intent to purchase. To cleanse their palates, participants were given a cracker and some water before tasting the next candy.

As in all ZESTxLabs studies, we included behavioral measures to assess candy preferences. The first measure was whether the participant swallowed the candy she or he tasted (rather than spit it into a cup). The second measure tracked the candies chosen for future consumption (participants were allowed to take home a handful of two of the candies tested).

Neural Predictors

Six measures of peripheral neural activity were collected during the consumption experience, including cardiac and electrodermal activity as in our previous studies.³¹ We used this data to calculate our proprietary ZEST (Zak Engagement Statistic) measure of experience immersion for each candy. The ZEST algorithm evaluates multiple measures of attention and emotional resonance to produce a linear measure of neurologic engagement in a consumer experience or ad. After a decade of academic and government research, ZEST has been shown to predict consumer responses with 82-95 percent accuracy, including charitable donations after watching public service announcements and changes in mood during shopping experiences.⁴¹ For this study, ZEST took into account the entire experience of candy consumption: opening the package, taking out a piece of candy, chewing the candy, and enjoying its taste. We related each candy's ZEST to the intent to purchase it.

Findings

We estimated a statistical model of intent to purchase each type of candy using ZEST and taste ratings as explanatory factors. The statistical model predicted the intent to purchase. We found a 0.73 (partial) correlation between ZEST and intent to purchase, a very strong result for such a small sample. Moreover, the model

predicted intent to purchase with 78 percent accuracy. The accuracy would likely improve as the sample size reached 30, the minimum sample we use in our complete studies. Including familiarity, eating the candy, and candies taken home did not improve the model. This pilot study suggests that immersion in the candy consumption experience is more than just eating sweets.

Conclusion

This pilot study demonstrates the power of neuroscience to capture a wide range of consumer experiences. All aspects of product interactions can be studied, from ads, to packaging, to product design, to product use. In doing so, consumer experiences will be improved, as will companies' bottom lines.

So why do we like some foods more than others? Of course, this depends on our life experiences, exposure to various foods during travel, and taste sensitivities. Counting on self-report to identify "why" is asking too much of the brain's valuation and language centers, physically distinct regions with almost no direct connections to each other. But it is not asking too much when we measure neurologic activity during these experiences. People may not know why they like what they like, but the brain can tell us.

Additional Reading

Alexander, V., Tripp, S., Zak, P.J. 2015. Preliminary Evidence for the Neurophysiologic Effects of Online Coupons: Changes in Oxytocin, Stress, and Mood. *Psychology & Marketing*, 32(9): 977-986.

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References

³¹ Nu, C. T., MacLeod, P., & Barthelemy, J. (1996). Effects of age and gender on adolescents' food habits and preferences. *Food quality and preference*, 7(3), 251-262.

²¹ We thank our collaborators at SalesBrain for introducing us to the candy company.

³¹ Alexander, V., Tripp, S., & Zak, P.J. (2015). Preliminary Evidence for the Neurophysiologic Effects of Online Coupons: Changes in Oxytocin, Stress, and Mood. *Psychology & Marketing*, 32(9): 977-986; Barraza, J.A., Alexander, V., Beavin, L.E. Terris, E.T., & Zak, P.J. (2015). The heart of the story: Peripheral physiology during narrative exposure predicts charitable giving. *Biological Psychology*, 105: 138-143.

⁴¹ Lin, P-Y., Grewal, N.S., Morin, C., Johnson, W.D., & Zak, P.J. (2013). Oxytocin increases the influence of public service advertisements. *PLoS ONE*, 8(2); Zak, P.J., & Barraza, J.A. (2013). Neurobiology of Collective Action. *Frontiers in Neuroscience: Decision Neuroscience*, 7(211); Grave, S. American Express has 'Plenti' rewards to make you happy Fashion Invest, May 18, 2015.