

## Women versus men, what do you want to eat? We might have an answer

*A recent study showed that when it comes to choosing food when unconsciously eating for hungry or pleasure, females prefer high calorie meals while males prefer low calorie meals.*

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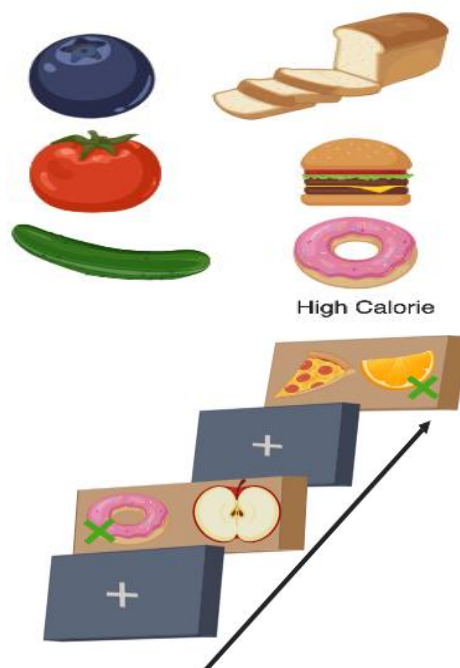
Everyone knows the never-ending argument between couples, friends, or family members of the opposite sex: what do you want to eat? It has become such a trend that it has been turned into memes and a running joke in the 21<sup>st</sup> century. The common scenario occurs as such: male asks the female what they want to eat and after going back and forth about food options, the male finally picks a place to only be told by the female they don't want to eat there. Oddly enough, an article by Manippa and colleagues found that there is science behind this common scenario. They came to conclusion that forced food choices vary between sexes. However, in order for Manippa and colleagues to come to this conclusion, previous studies need to be evaluated in order to gain a better understanding of food choices between males and females<sup>1</sup>.

In the last decade more studies about food behaviors and food choices have become a higher priority due to the large availability of food in western countries<sup>1,2,3</sup>. This results in individuals to shift from eating for survival to eating for pleasure<sup>1,2,3</sup>. This style of eating has led people to choose higher calorie foods which could lead to negative effects such as weight gain and obesity<sup>3,4,5</sup>. These studies in the last decade found that not only is psycho-physiology a factor, but the sex of the consumer affects eating behavior as well<sup>1,2,3</sup>. In a study conducted by Shingleton and colleagues, they looked at the difference between males and females and binge eating<sup>4,5</sup>. The study looked at the difference in men's and women's outlook on their body image and how this affected their eating disorder treatment<sup>4,5,6,7</sup>. They found that women were more concerned with body weight/shape compared to men. During the initial eating disorder examination, they found women tested higher with severe concerns of body weight/shape as a majority of men tested much lower<sup>4,5,7</sup>. However, some men tested higher with severe concerns, but it was not a significant population<sup>7</sup>. The treatment took significantly longer for women and men that tested higher with severe concerns with body weight/shape<sup>4</sup>. As males who tested low for concerns with body weight/shape treatment was significantly lower<sup>4</sup>. This trend of women being more concerned with weight and body shape than men is common<sup>4</sup>.

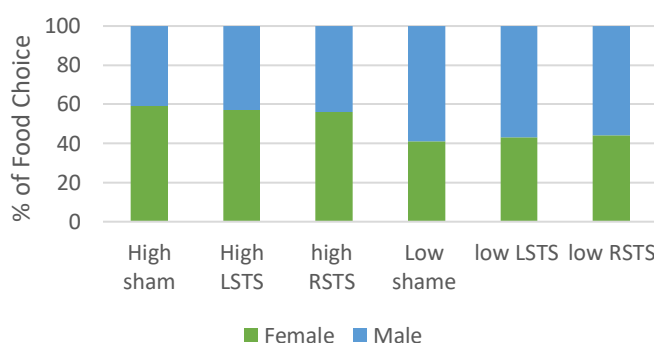
A study conducted by Uccula and Nuvoli found that women tend to be more invested in food choices resulting in women to overestimate their weight and decrease amount of meals (also limiting themselves to healthier food options such as higher intakes of dietary fibers and low intake of fats and salts)<sup>1,8</sup>. When these decisions and choices were evaluated by looking at the brain regions between men and women, women showed significantly more activation in these areas compared to men: the prefrontal cortex, insula and middle/posterior cingulate<sup>1,8</sup>. All of these areas are involved in behavioral control and self-referential cognition<sup>8</sup>. In other studies, evaluating brain region correlation to food choices found that the superior temporal sulcus (STS) was activated

during forced food choices (between high and low calorie foods)<sup>1,8</sup>. This is the common situation we all know of when individuals are forced to pick a place to eat<sup>1,8</sup>. However, there were no studies done seeing if there was a difference in forced food choice between males and females<sup>1,8</sup>.

Due to no studies being done about the differences in male and female STS activation during forced food choices, Manippa and colleagues took the initiative to investigate this question. In their study, they decided to use high frequency transcranial magnetic stimulation on the STS (right and left) as individuals (men or women) had to choose between high and low calorie foods<sup>1</sup>. Transcranial magnetic stimulation is a magnet that creates a magnetic field in a focused area that produces small electrical currents to activate desired brain regions<sup>9,10</sup>. The method Manippa and colleagues used was transcranial random-noise stimulation (tRNA) which is random amplitudes of electrical current applied to the participant's scalp<sup>1,9,10,11</sup>.



Percent Differences Between Males and Females Food Choice Based on High and Low Calorie Food



**temporal sulcus. (A)** The definition of what was considered low and high calorie food. **(B)** the procedure of participants selecting a food choice in 3 seconds. The green X represent the choice selected **(C)** The results, showing that males had a higher percentage of food choices that were low calorie as females had a higher percent choice for higher calorie foods. Sham = control, LSTS = left superior temporal sulcus, RSTS = right superior temporal sulcus

After each image the participants were asked the following questions and had to rate each item from 0-9: "How much do you like the product?" (0 = not at all/ 9 = very much), "How many calories do you think this product consists of?" (0 = very few calories/ 9 = many calories), and "How healthy do you think this product is?" (0 = not healthy/ 9 = very healthy)<sup>1</sup>.

These choices were used to independently create food pairing for each participant to be used during the tRNA task<sup>1</sup>. During the tRNA task, the selected photos for each participant were presented in a random order<sup>1</sup>. Each participant was told to choose the product they most wanted to eat<sup>1</sup>. The first choice that comes to mind is the best option. Each participant was shown the image for 3 seconds (s) and had 3 s to make a choice. If participants did not make a choice in 3 s it was counted as a miss choice.

They found that women significantly chose higher calorie foods in control, right STS stimulation, and left STS stimulation compared to males. Even though males significantly choose lower calorie food than females, there was a significant difference between males left STS compared to the males' sham and right STS stimulation. When analyzing the miss choices in males and females they found that there were significantly more miss choices during the right STS stimulation compared to the control and left STS<sup>1</sup>.

In conclusion they found that females tend to choose higher calorie food when forced to make food decisions as males tend to want lower calorie food. These results also show that there is neurological factor in deciding food choices when forced to pick food without thinking heavily about food consumption results. This is due to a larger activation in the STS in females than males. Based on these articles you can see that males and females have different ideas on food intake and food choices. Food arguments arise due to these differences, so next time when making a choice on what to eat, try to think of a middle ground that will meet everyone's conscious and subconscious needs.

## REFERENCES

1. Manippa, V., Padulo, C., van der Laan, L. N., & Brancucci, A. (2017). Gender Differences in Food Choice: Effects of Superior Temporal Sulcus Stimulation. *Frontiers in human neuroscience*, 11, 597. doi:10.3389/fnhum.2017.00597
2. Leblanc, V., Hudon, A. M., Royer, M. M., Corneau, L., Dodin, S., Bégin, C., & Lemieux, S. (2015). Differences between men and women in dietary intakes and metabolic profile in response to a 12-week nutritional intervention promoting the Mediterranean diet. *Journal of nutritional science*, 4, e13. doi:10.1017/jns.2015.2
3. Leblanc, V., Bégin, C., Corneau, L., Dodin, S., & Lemieux, S. (2015) Gender differences in dietary intakes: what is the contribution of motivational variables? doi:10.1111/jhn.12213
4. Shingleton, R. M., Thompson-Brenner, H., Thompson, D. R., Pratt, E. M., & Franko, D. L. (2015). Gender differences in clinical trials of binge eating disorder: An analysis of aggregated data. *Journal of consulting and clinical psychology*, 83(2), 382–386. doi:10.1037/a0038849
5. Smith, K. E., Mason, T. B., Murray, S. B., Griffiths, S., Leonard, R. C., Wetterneck, C. T., ... Lavender, J. M. (2017). Male clinical norms and sex differences on the Eating Disorder Inventory (EDI) and Eating Disorder Examination Questionnaire (EDE-Q). *The International journal of eating disorders*, 50(7), 769–775. doi:10.1002/eat.22716
6. Wardle J., Haase A., Steptoe A., Nillapun M., Jonwutiwes K., Bellisle F., (2017) Gender differences in food choice: The contribution of health beliefs and dieting, *Annals of Behavioral Medicine*, Volume 27, Issue 2, Pages 107–116, doi: 10.207/s15324796
7. Zayas, LV, Wang, SB, Coniglio, K, et al. Gender differences in eating disorder psychopathology across DSM-5 severity categories of anorexia nervosa and bulimia nervosa. *Int J Eat Disord*. 2018; 51: 1098– 1102. doi:10.1002/eat.22941
8. Uccula A., Nuvoli G. (2016) Body Perception and Meal Type Across Age and Gender in a Mediterranean Island (Sardinia), *Psychology, Health, & Medicine*, doi: 10.1080/13548506.2017.1307997
9. Basil, B., Mahmud, J., Mathews, M., Rodriguez, C., & Adetunji, B. (2005). Is there evidence for effectiveness of transcranial magnetic stimulation in the treatment of psychiatric disorders?. *Psychiatry (Edgmont (Pa. : Township))*, 2(11), 64–69.
10. Rossi, S., Hallett, M., Rossini, P. M., Pascual-Leone, A., & Safety of TMS Consensus Group (2009). Safety, ethical considerations, and application guidelines for the use of transcranial magnetic stimulation in clinical practice and research. *Clinical neurophysiology: official journal of the International Federation of Clinical Neurophysiology*, 120(12), 2008–2039. doi: 10.1016/j.clinph.2009.08.016
11. Korzhova, J. , Bakulin, I. , Sinitsyn, D. , Poydasheva, A. , Suponeva, N. , Zakharova, M. and Piradov, M. (2019), High-frequency repetitive transcranial magnetic stimulation and intermittent theta-burst stimulation for spasticity management in secondary progressive multiple sclerosis. *Eur J Neurol*, 26: 680-e44. doi:10.1111/ene.13877