

THE PSYCHOLOGY OF CHOCOLATE

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THE USUAL SUSPECT (S)

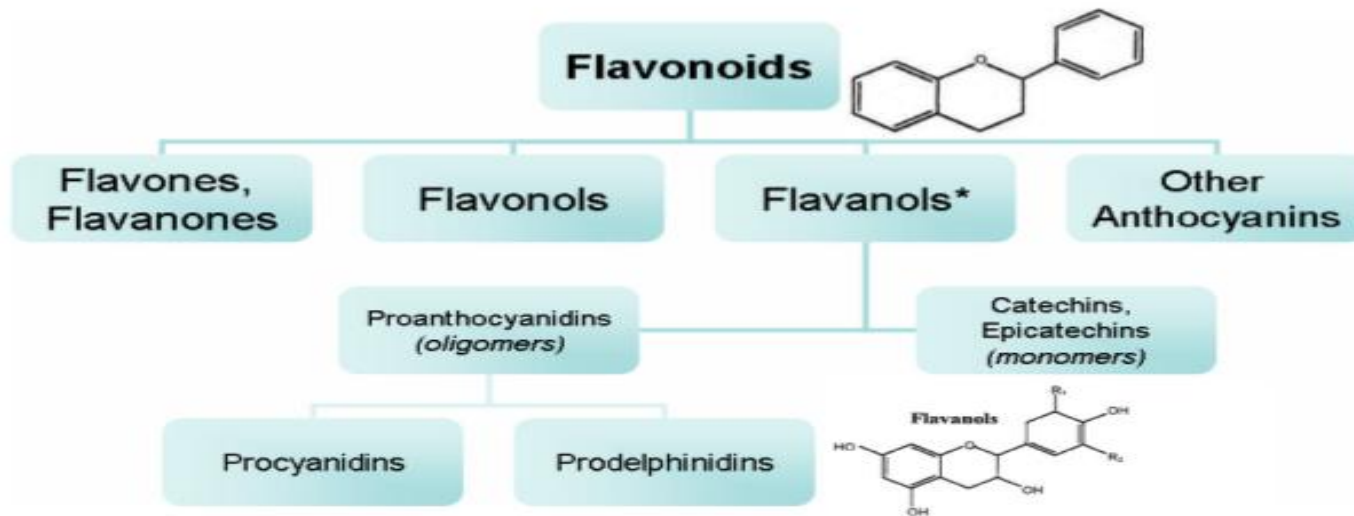


Figure 1
Structural skeleton of flavonoids and classification hierarchy of common flavonoids. *Flavanol is the predominate class of flavonoid found in cocoa and chocolate.



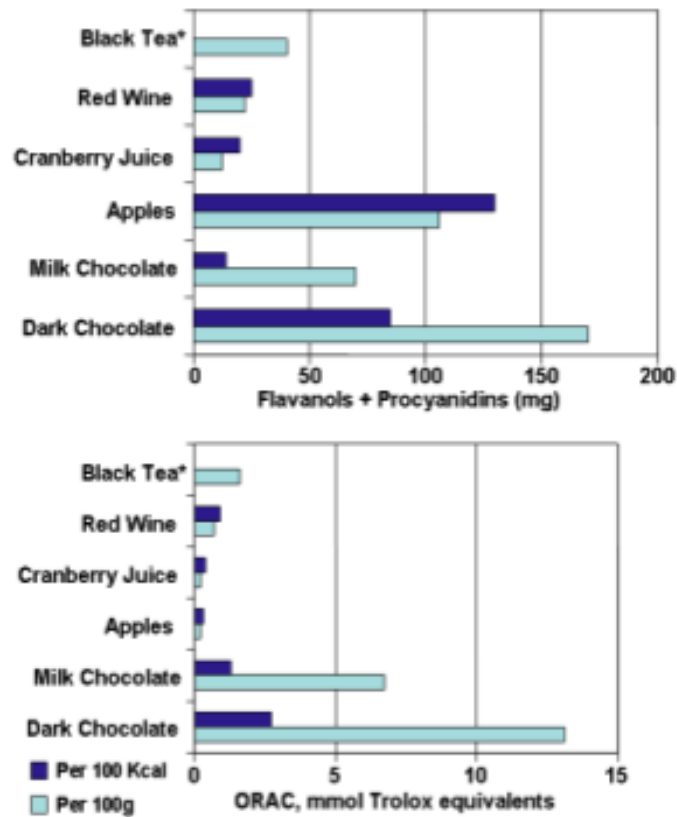
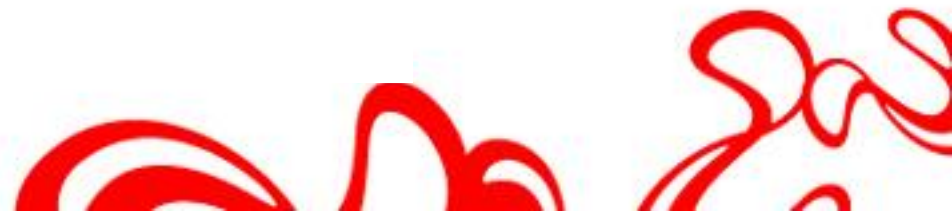


Figure 2
Flavonoid content and antioxidant capacity (ORAC)
of milk chocolate and dark chocolate versus other
high flavonoid foods. * Brewed, per 2 g bag/200 ml water.
 Antioxidant activity is reported as oxygen radical absorbance
 capacity (ORAC). Adapted from: Steinberg et al. J Am Diet
 Assoc 103: 215-23.



HOW DOES THIS AFFECT BEHAVIOUR?



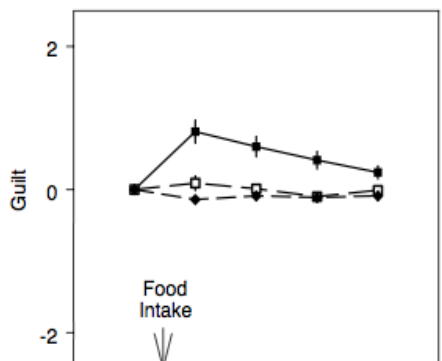
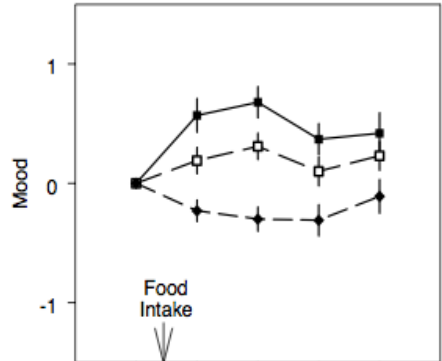
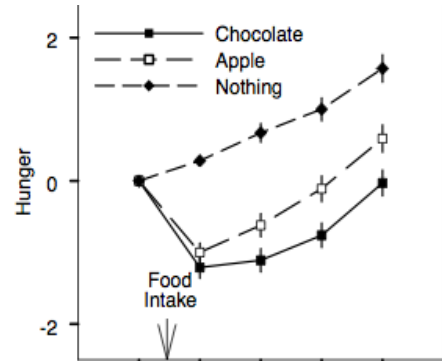
- People spend longer looking at slides in the presence of chocolate aroma
- More words recalled when learning and recall take place in presence of odour
- When paired with a nice painting, picture is rated artistically better
- Consumption greater in Parkinson's Disease (Wolz et al, 2009)



DOES CHOCOLATE EATING AFFECT MOOD?

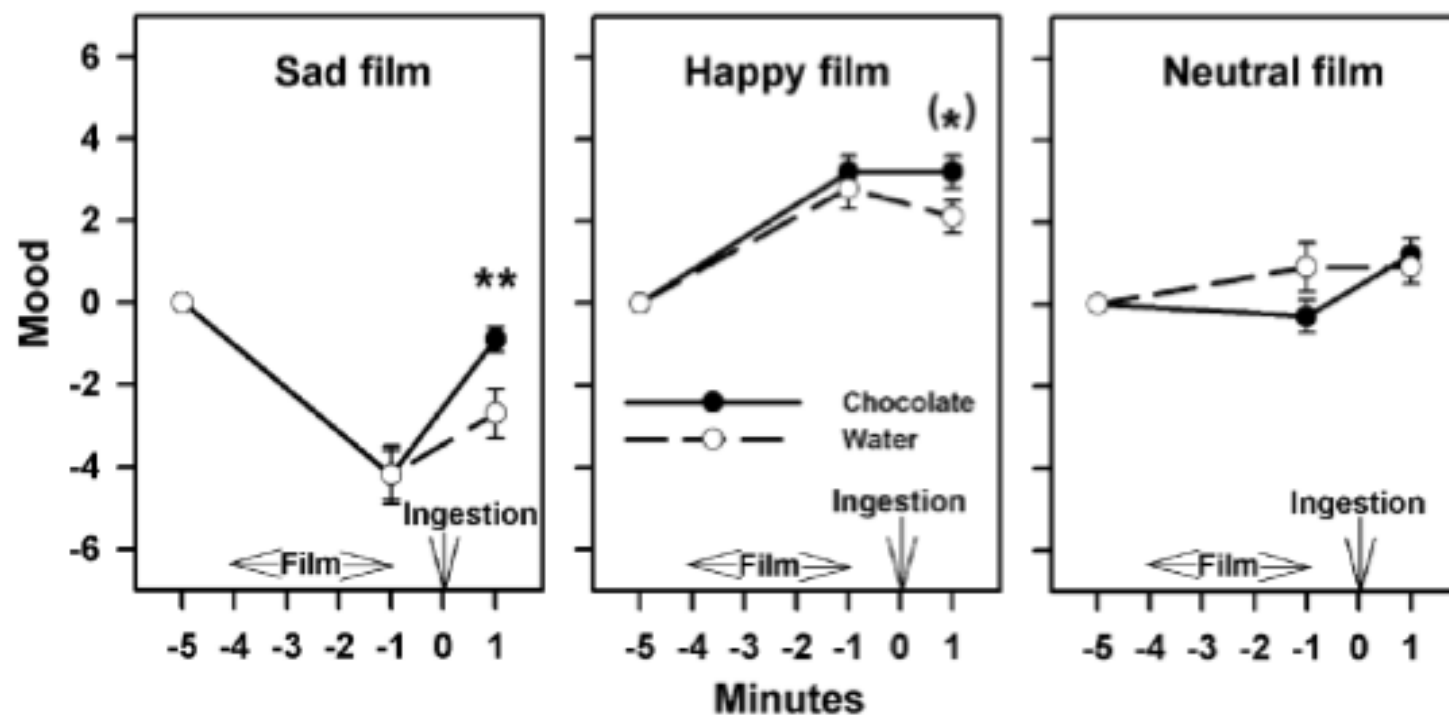
- Apple and chocolate eating improved mood but chocolate's effect was stronger (Macht & Dettmer, 2006)
- Chocolate eating reduced negative mood after watching sad film; no effect on positive mood (Macht & Mueller, 2007)
- Bad mood alleviated after eating palatable chocolate (up to 70% cocoa)- but effect very short-lived





-5 5 30 60 90





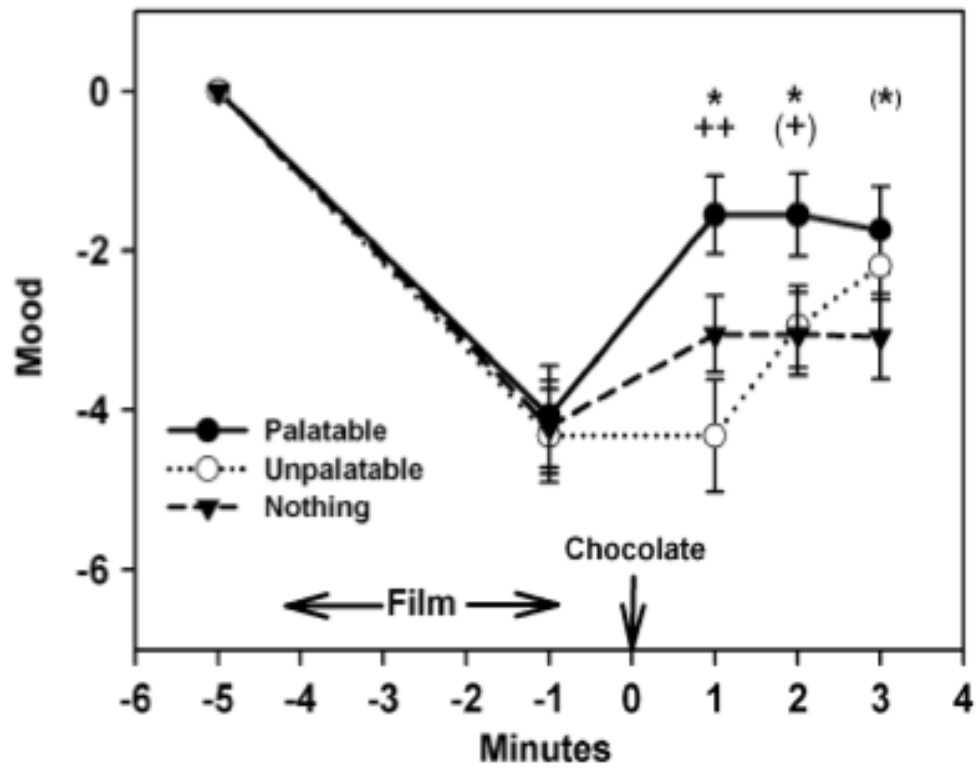


Fig. 2. Self-rated mood (mean \pm SEM) before and after viewing a sad film and after ingestion of palatable chocolate ($n = 38$), unpalatable chocolate ($n = 37$) or nothing ($n = 38$). *: $p < 0.05$ and *: $p < 0.10$ for comparisons between palatable chocolate and eating nothing; ++: $p < 0.01$ and +: $p < 0.10$ for comparisons between palatable and unpalatable chocolate.



HERNAN CORTES

- “just one glass was sufficient to refresh a soldier for a whole day”

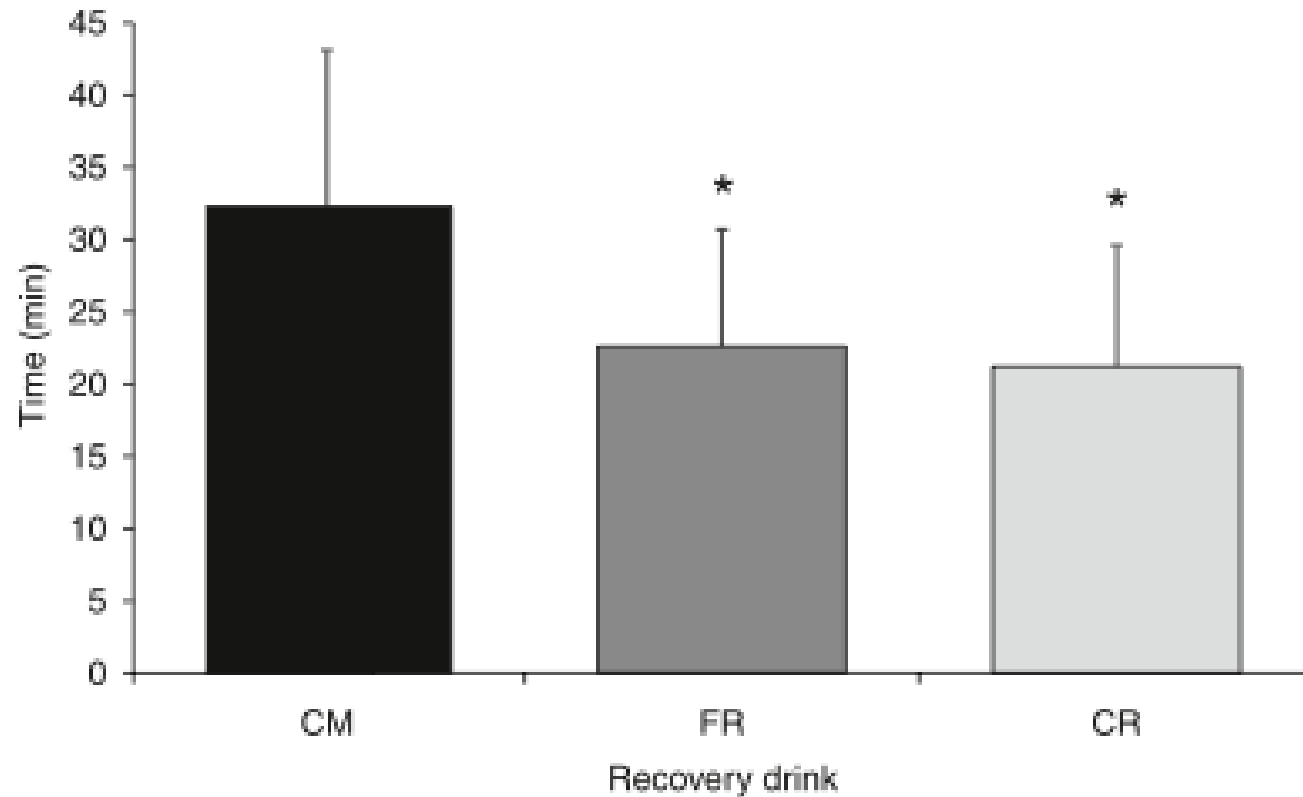


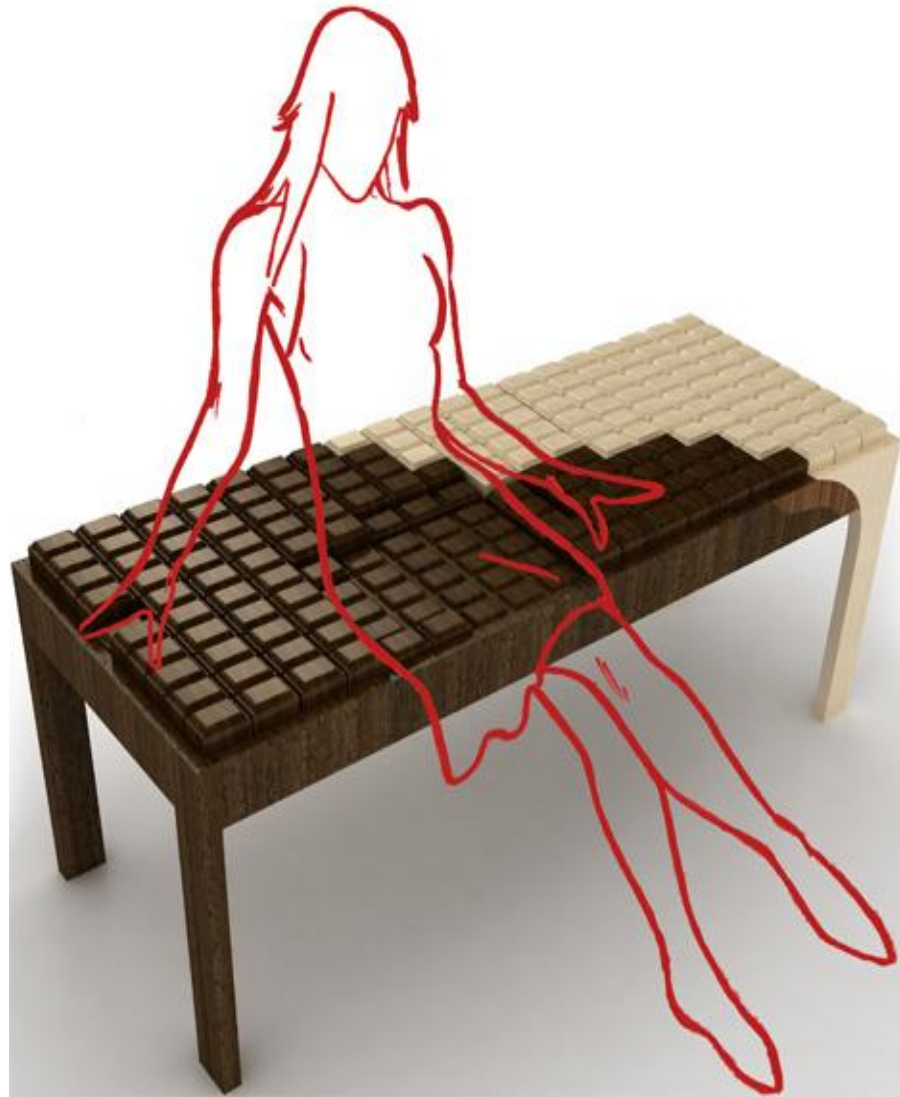
AN AID TO RECOVERY?

- Cyclists cycle 49%-51% longer after milk choc ingestion (Karp et al, 2006; Thomas et al, 2009)...
- ...and become exhausted less quickly (Karp et al, 2006)
- Chocolate urges reduced by exercise (Taylor & Oliver, 2009)



Fig. 2. Time to exhaustion during endurance capacity trial, following ingestion of 3 different recovery drinks. CM, chocolate milk; FR, fluid replacement drink; CR, carbohydrate replacement drink. *, Significantly different from chocolate milk.

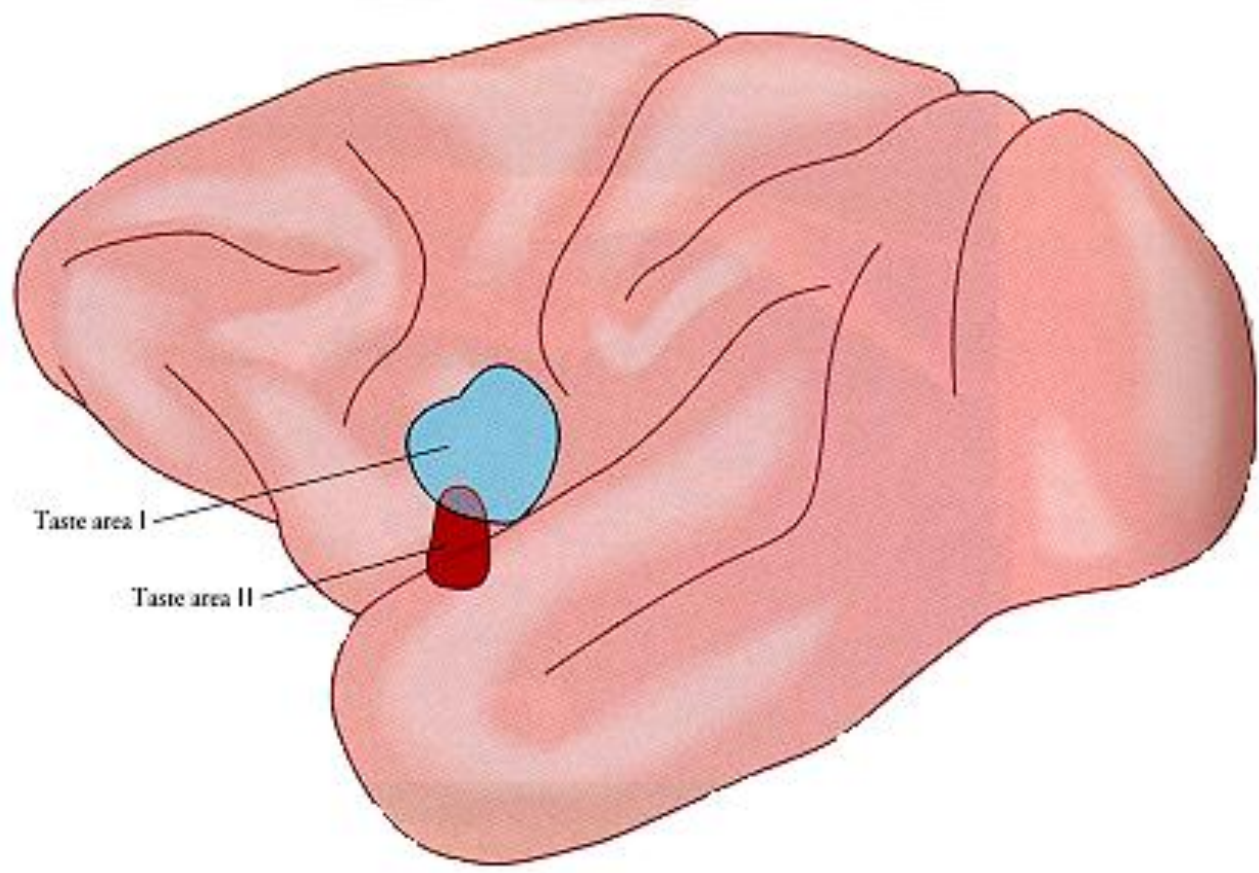




THE NEUROPSYCHOLOGY OF CHOCOLATE

- Eating chocolate to satiety (Small et al, 2001)
- Pleasantness- orbitofrontal cortex/insula
- Satiety- different regions and decrease in OFC
- There are sex diffs (Smeets et al, 2006)





Dopamine Pathways

Serotonin Pathways

Frontal cortex

Striatum

Substantia nigra

Functions

- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine tuning)
- Compulsion
- Perseveration

Nucleus accumbens

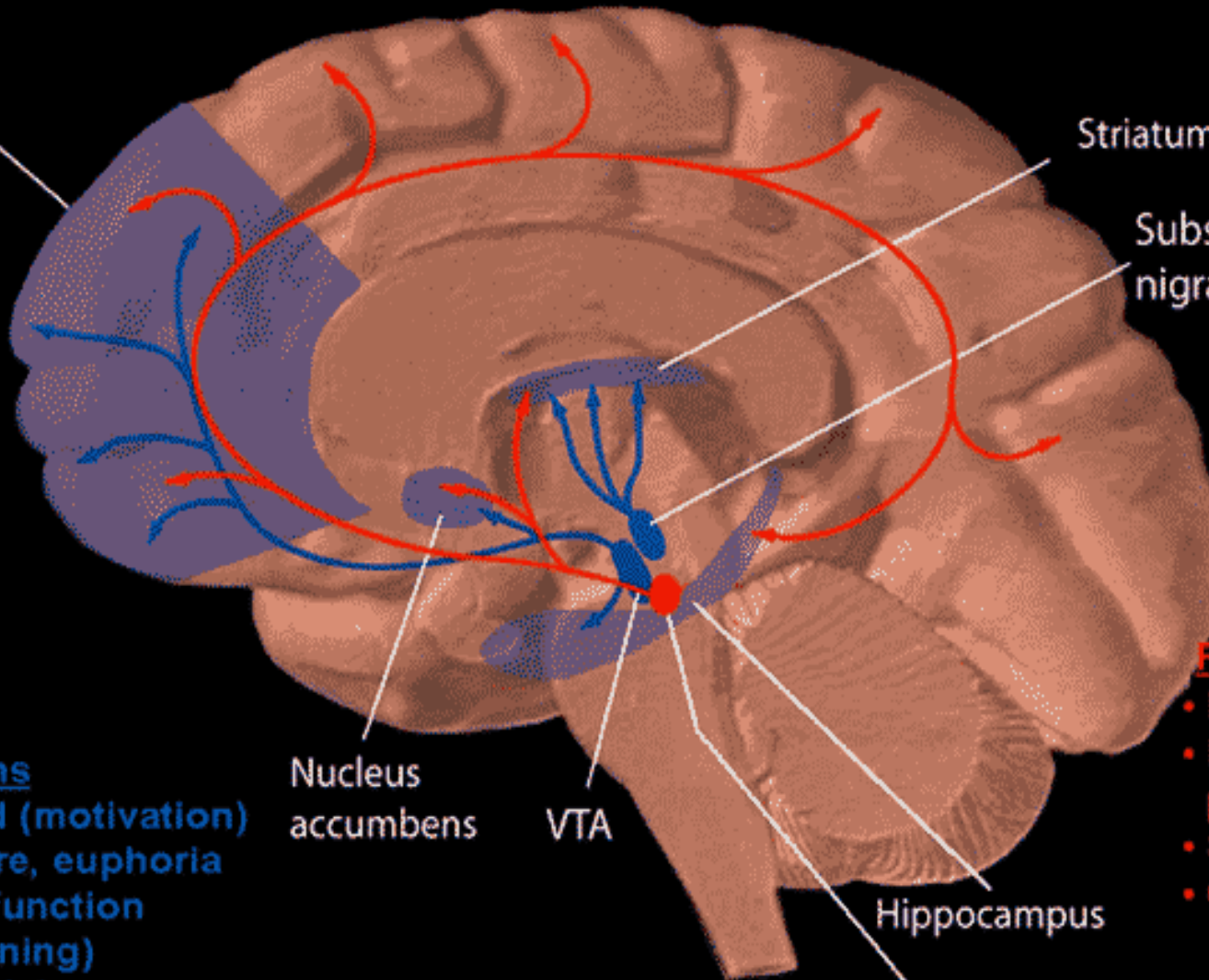
VTA

Hippocampus

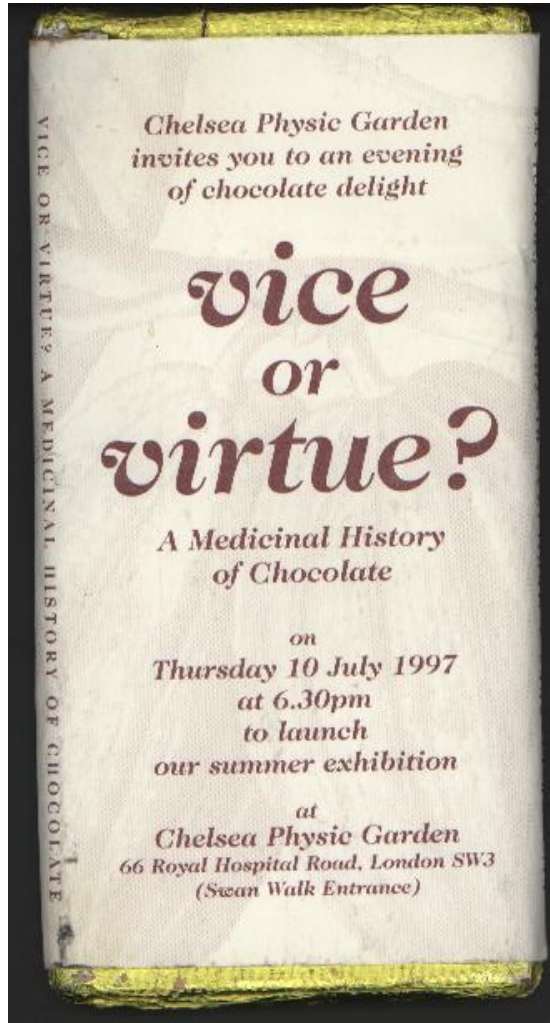
Raphe nucleus

Functions

- Mood
- Memory processing
- Sleep
- Cognition



CHOCOLATE AND BRAIN ACTIVATION



Martin (1998)

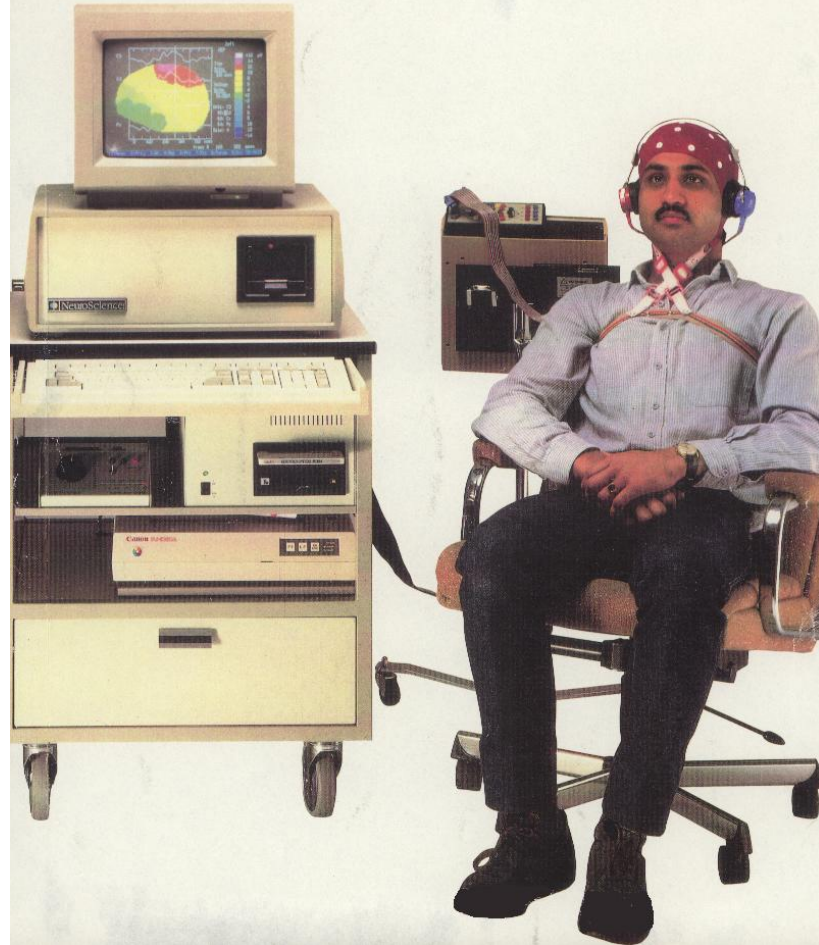
EEG response to
synthetic/real food odour





BRAIN IMAGER

neuroscience



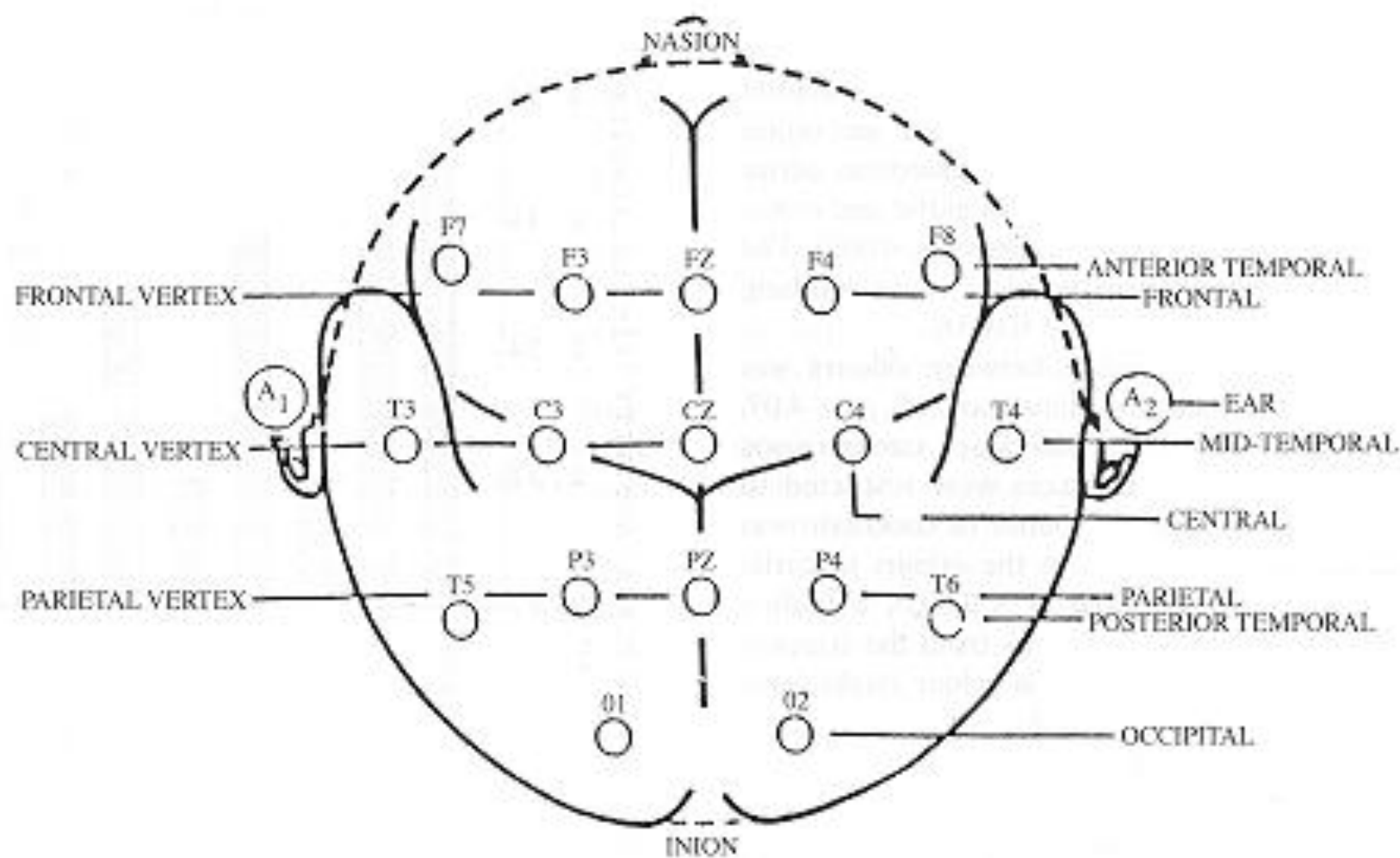
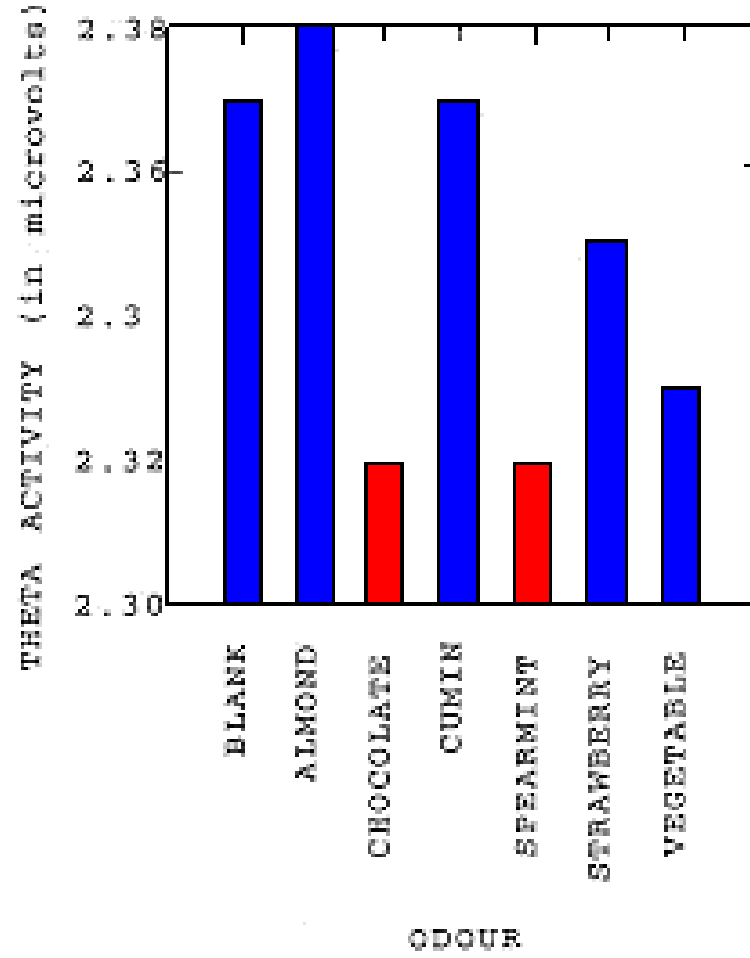


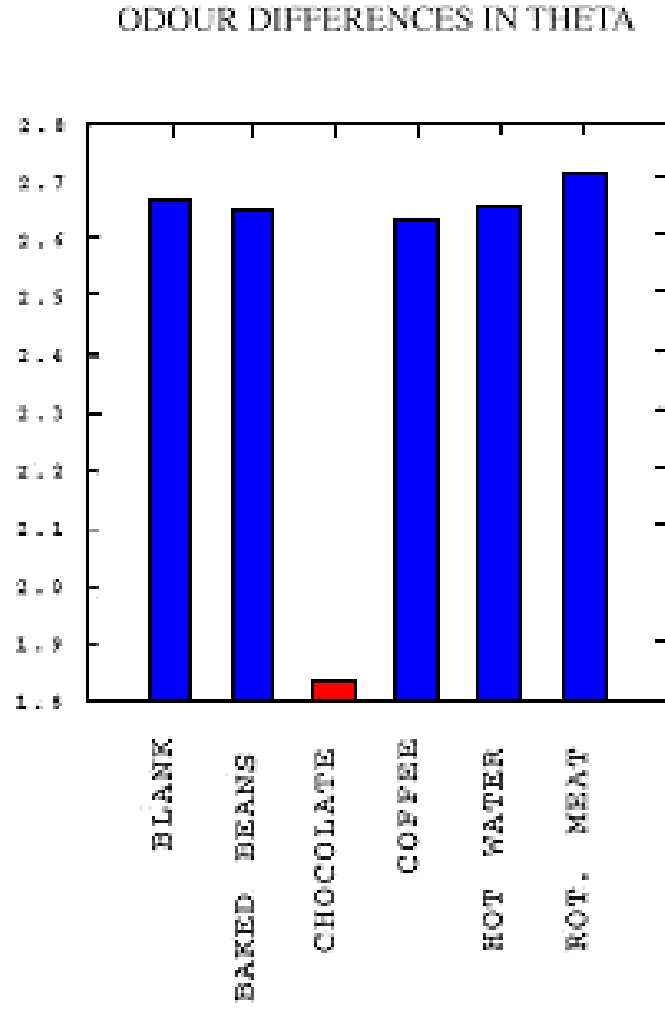
Fig. 1. An illustration of the 19 electrode sites employed.



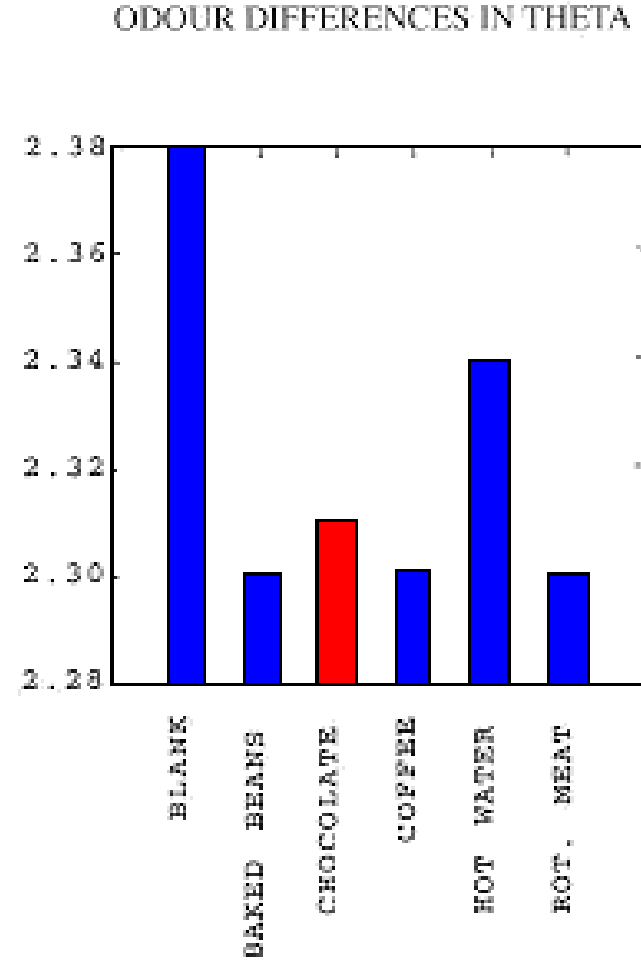
ODOUR DIFFERENCES IN THETA



(a) THETA ACTIVITY (in microvolts)



(b) THETA ACTIVITY (in microvolts)



EFFECT OF CHOCOLATE AROMA ON MOTOR BEHAVIOUR

- No effect on hand skill/co-ordination
- Participants less tense, depressed and confused



HOW DOES CHOCOLATE AFFECT ME?

- 73%- puts me in a good mood
- 60%- makes me happy
- 50%- makes my temper disappear
- 53%- makes me feel better
- 37%- makes me feel relaxed
- 63%- the smell makes me crave/want it more
- 67%- seeing somebody else eat makes me want it
- 70%- preferred the smell to cakes/sweets



PLEASURE CHART

1. GOING ON HOLIDAY
 2. HAVING SEX
 3. WATCHING A GOOD FILM
 4. GOING FOR A WALK IN THE PARK
 5. GOING TO THE BEACH
 6. GOING SHOPPING
 7. EATING CHOCOLATE
 8. EATING ICE CREAM
 9. READING A GOOD BOOK
 10. DRINKING ALCOHOL
-TO BE CONTINUED





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