

Applying Neuroscience and Psychology to Packaging



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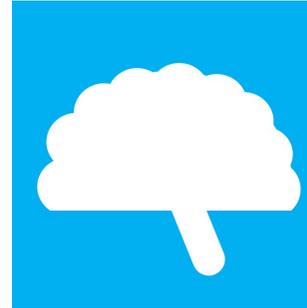
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OVERVIEW

- What do we know?
- Congruence and multi-sensory effects
- The science behind implicit measures
- Case studies
- Exploiting multisensory effects through packaging
- Other techniques
- Summary & further reading

CONSCIOUS



VS

SUBCONSCIOUS



THINGS WE KNOW ABOUT NEW PRODUCTS



~ 80%

of all new consumer products fail within the first year of launch. Billions are wasted every year.

(C. Christensen, Harvard Business School, May 2017)

What assumptions have we traditionally made about consumers that seem to be fundamentally wrong?

Slide 3

PF1

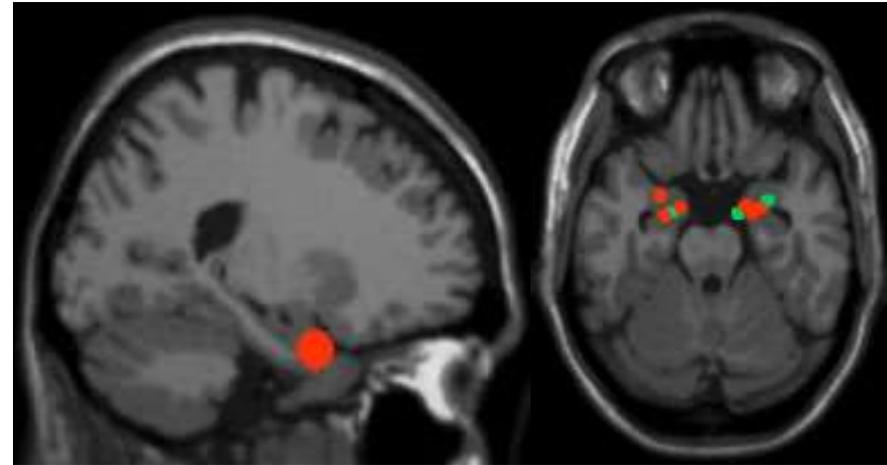
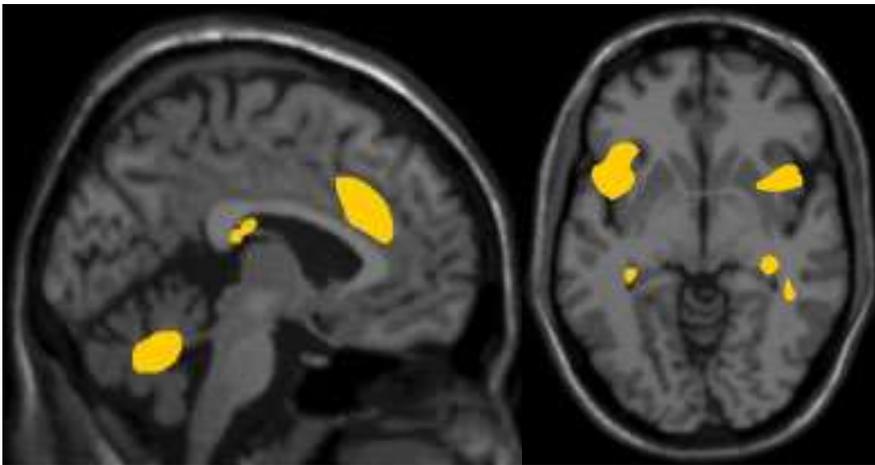
Pauline Foster, 20/11/2017



3 Things We Do Know About People

People don't always tell the truth.
People don't think how they feel.
People don't do what they say.

Magnetic Resonance Imaging



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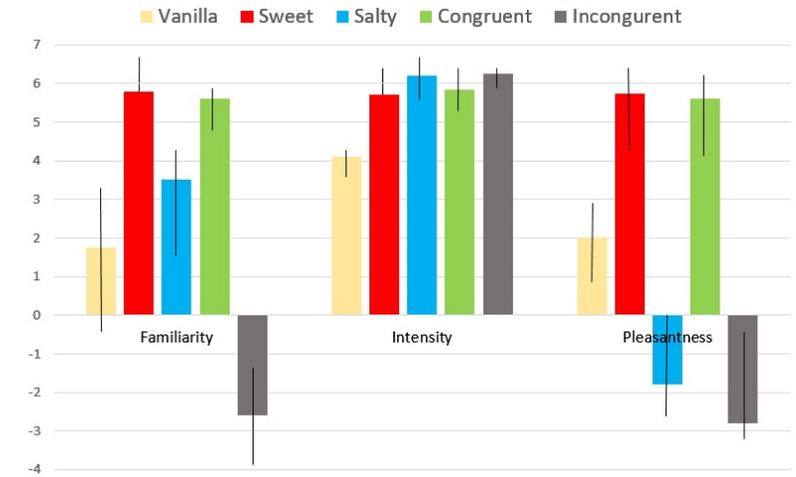
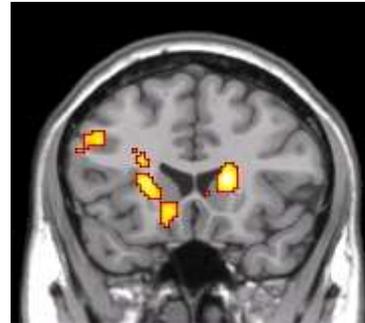
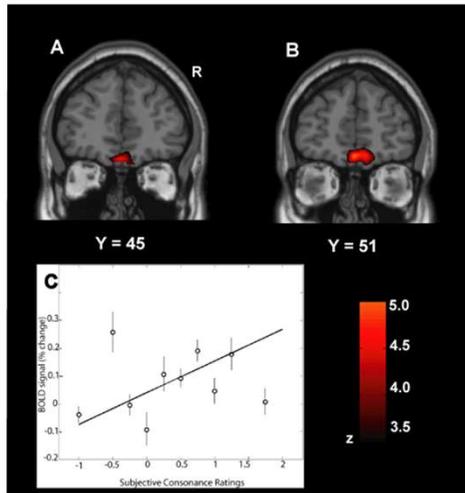
LOVE HATE



Congruence - “agreement, harmony, compatibility”

f-MRI & congruence

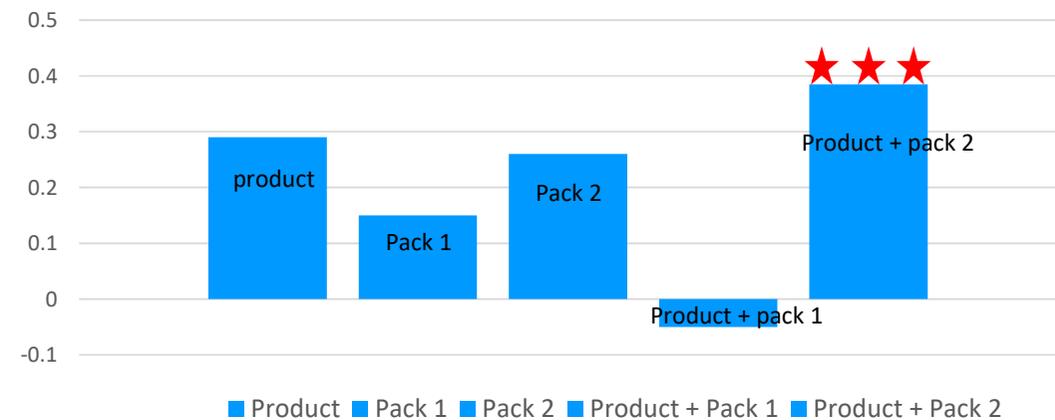
Correlation with ratings of pleasantness and consonance across all stimuli



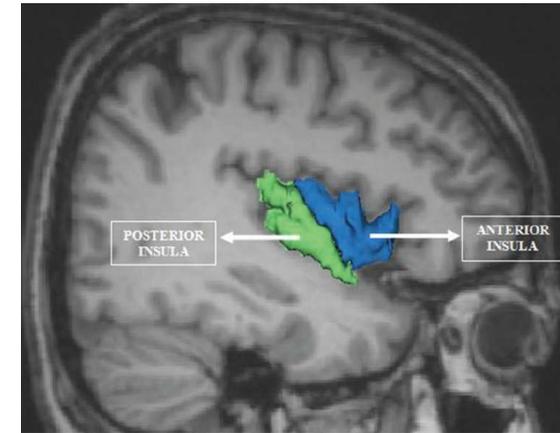
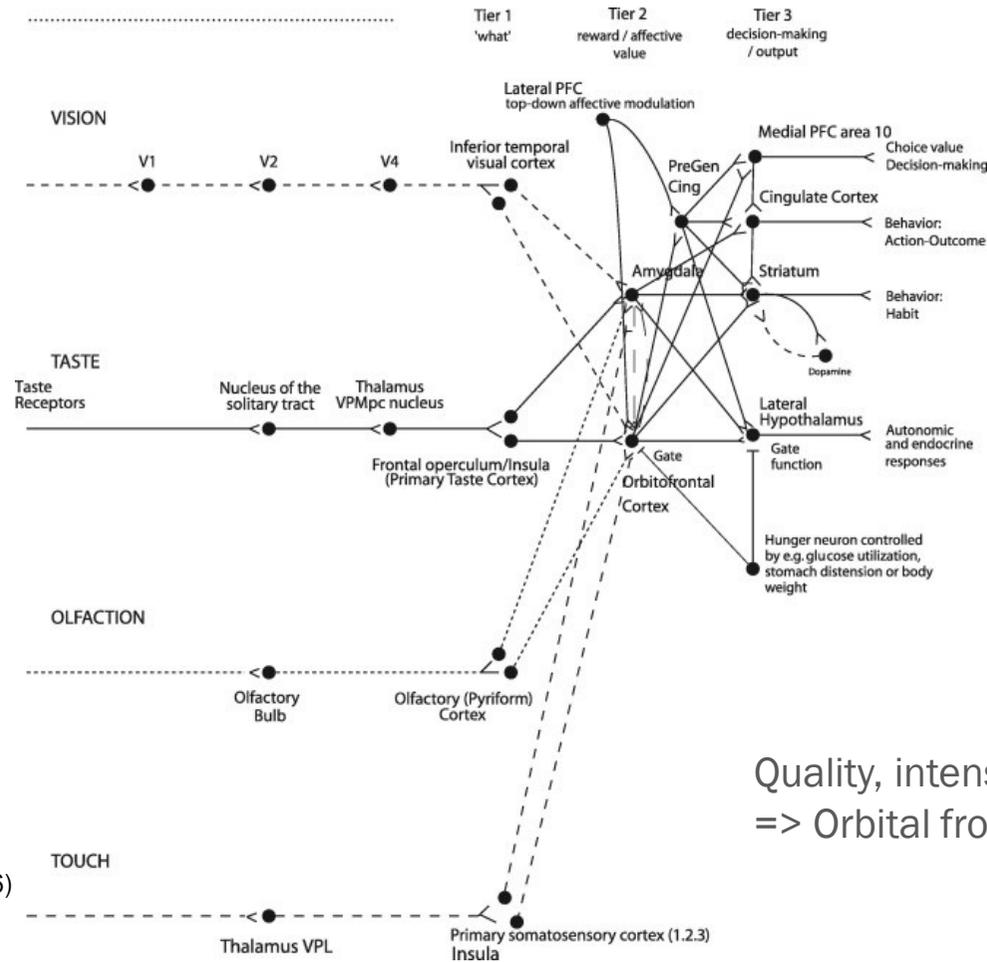
Congruence increases activity where as dissonance depresses

With thanks to Prof Edmund T Rolls (Warwick)

This is a multi-sensory effect



Model of taste reception in the anterior insula (cortical taste area)



Quality, intensity, texture & temperature
=> Orbital frontal – food “value”

Prof Edmund Rolls (2016)

Sensory perception **integrated** => multi-sensory perception

Multisensory effects



Charles Spence

Strawberry-flavoured mousse tastes 10% **sweeter** when served from a white container rather than a black one

Eat more healthily through packaging!



Consumers complained that Coke in the white can **didn't taste as sweet**. Even though the formula was identical, they were right it didn't taste as sweet because of multi sensory effects. Popcorn in red bowls also tasted sweeter.

Congruent 3-d surface patterns increase liking & product attributes

"See me, feel me": Effects of 3D-printed surface patterns on beverage evaluation"

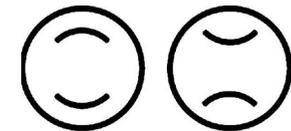
Fd Qual & Pref Vol 52 Dec 2017

Thomas J.L.van Rompay FriederikeFinger DanielSaakes AnnaFenko



Stronger flavours perceived in curved glasses compared to straight edged, plastic bottles "fizzer" than glass, but glass bottles perceived as sweeter.

Shoppers are **twice** as willing to choose a juice whose label features a concave, smile-like line rather than a convex, frown-like one.



Only half of how our food tastes is influenced by the ingredients. It all comes down to the packaging. C. Spence

Conscious (system 2)

Will Power

Logical thinking

Critical Evaluation

As much as 90% of brain activity is conducted in the subconscious

Beliefs

Imagination

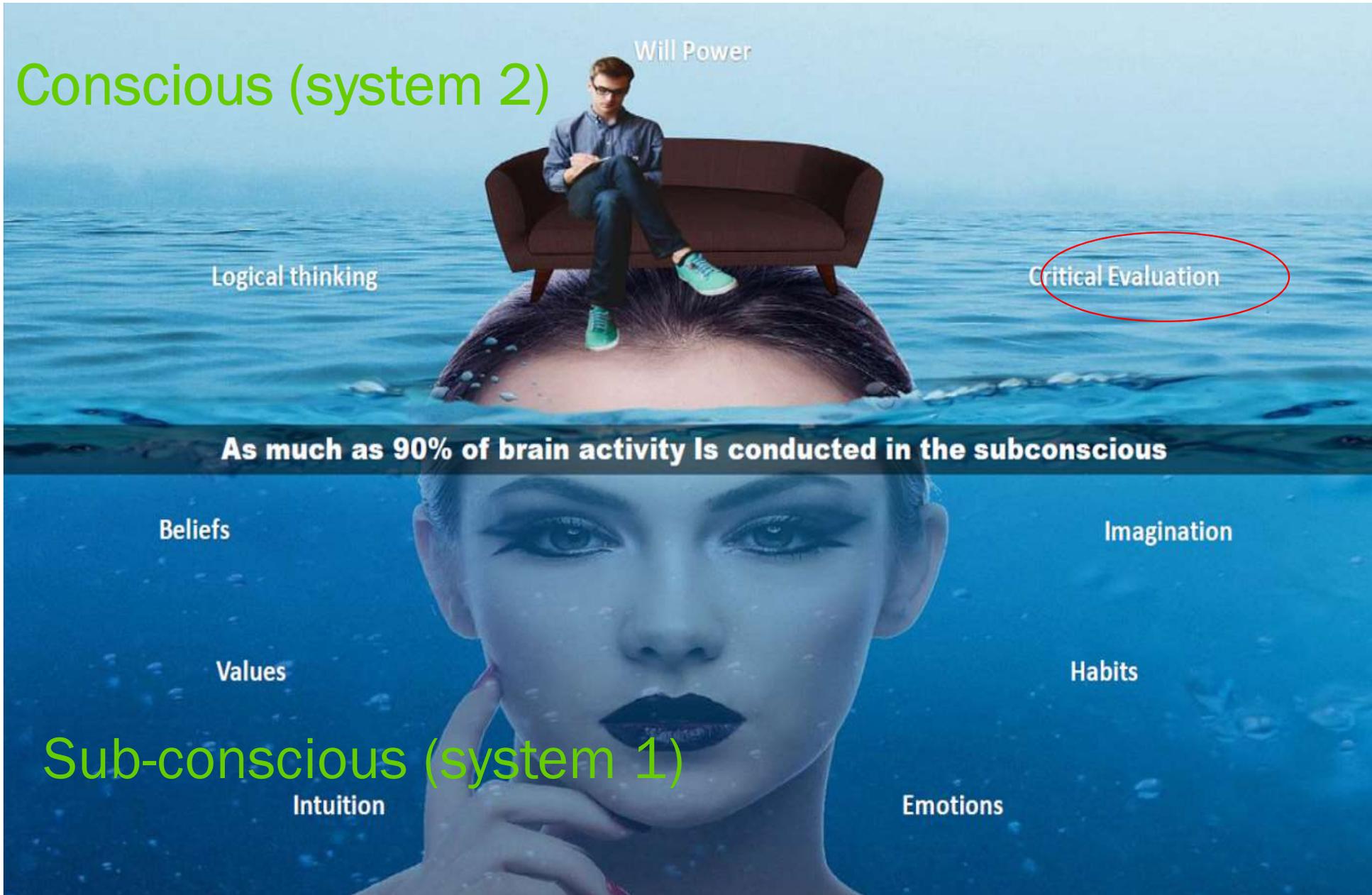
Values

Habits

Sub-conscious (system 1)

Intuition

Emotions



Implicit (system 1) and explicit (system 2)

System 1
Unconscious Emotion

Very Fast
Involuntary
Associative

Implicit responses



System 2
Conscious Thinking

Slow
Controlled
Rule following

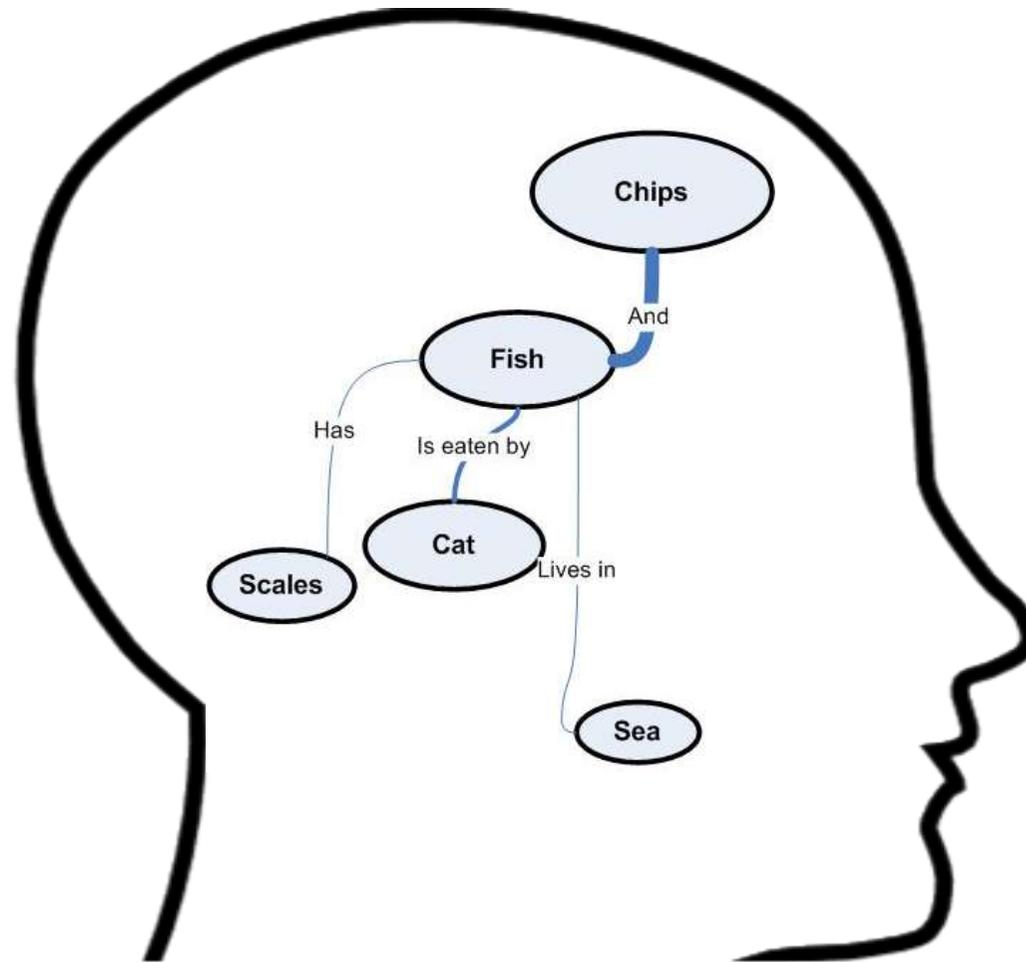
Explicit responses

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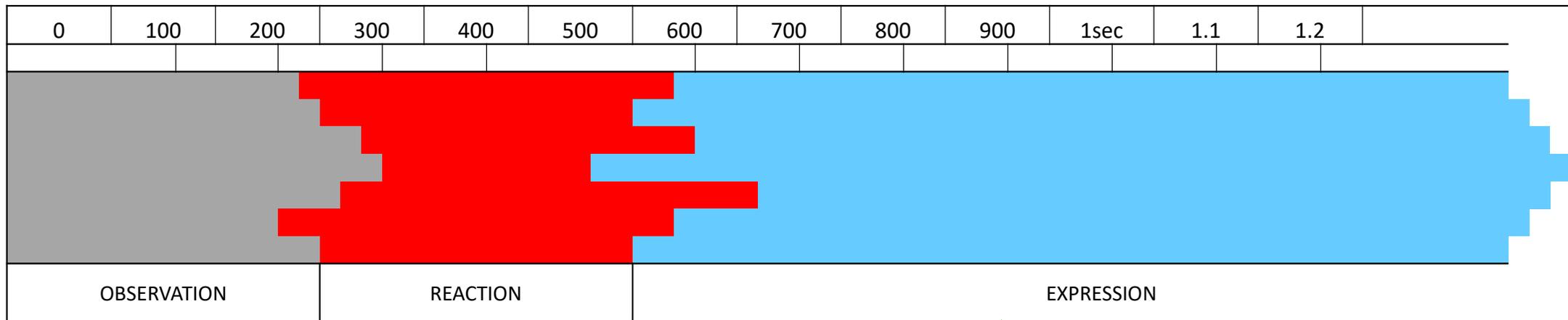


People store concepts associatively

IMPLICIT tests exploit the fact that neural networks in the brain are connected through associations



IMPLICIT tests basically measure the strength of these mental associations



Neurological testing measures here

IMPLICIT
Often referenced as:
Non-Conscious
Non-articulated
Pre-Cognitive

Traditional research measures here and beyond

EXPLICIT
Often referenced as:
Conscious
Articulated
Post-Cognitive
Expressed



Example of an implicit online test: an implicit reaction time test

Practice Trials

1. A brand or pack is shown on the screen
2. Respondents have to decide which pack it is as quickly as they can and press the correct key (in this case they press **C** because it's **Coca-Cola**)
3. There is only one correct response

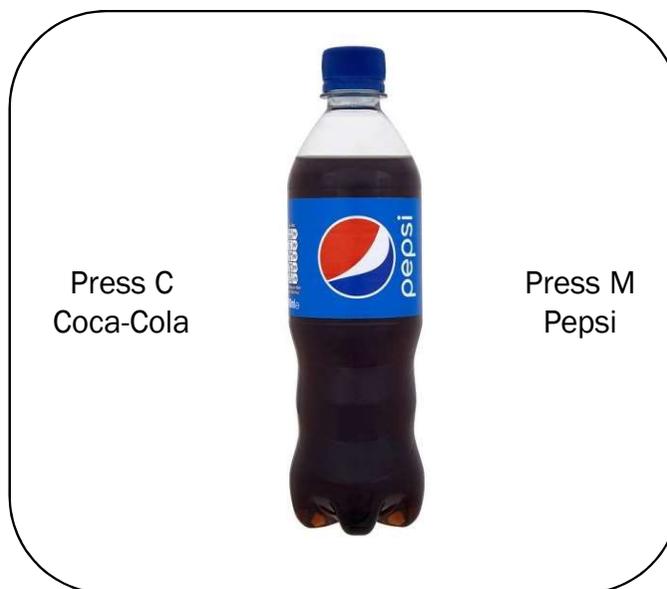


Press the spacebar to walk through the animation

Example of an implicit test – an implicit reaction time test

Practice Trials

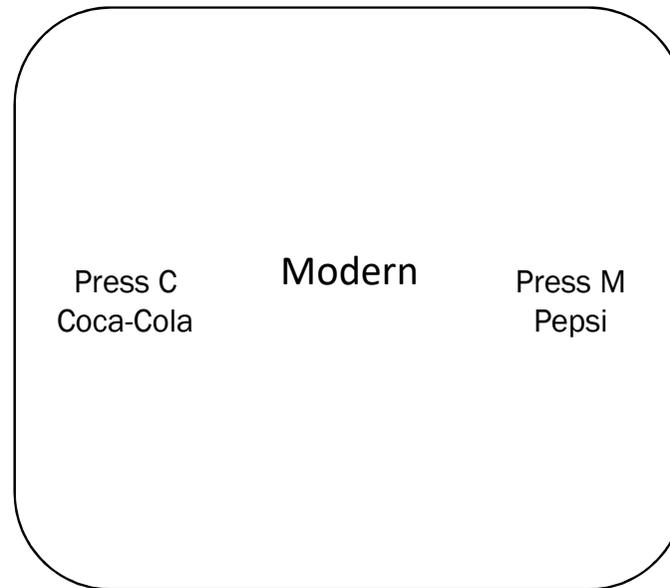
1. On other trials, the second logo is shown on the screen
2. Respondents in this case press **M** because it's **Pepsi**)
3. There is only one correct response



Example of an implicit test – an implicit reaction time test

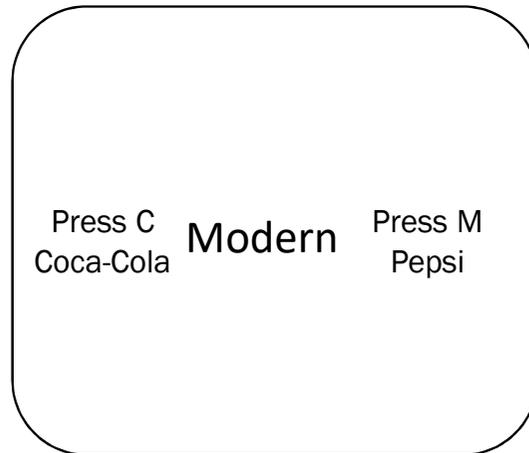
Main Trials

1. A word attribute (e.g. **modern**) is flashed on the screen
2. Followed by the pack (in this case **Coca-Cola**)
3. There is only one correct response (press **C**)
4. Note that the respondent is **not** making any evaluative judgement



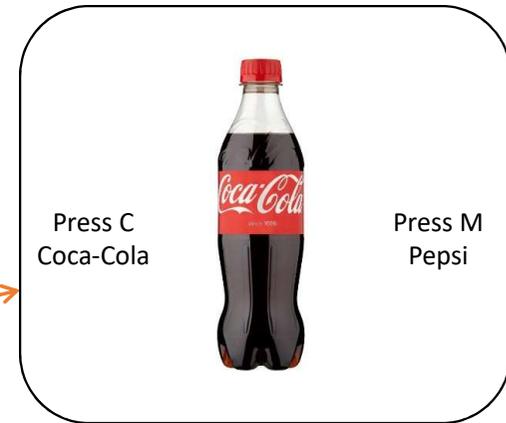
Example of an implicit test – an Implicit reaction time test

Important:
We can measure how they feel about the packs based on their reaction times



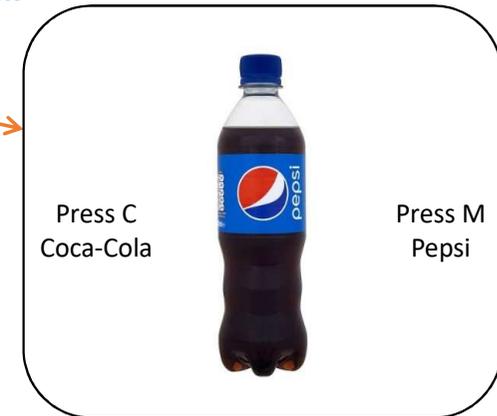
The prime is flashed on the screen

If Coca-Cola is **strongly associated** with being **modern**, the time taken to respond to the Coca-Cola brand will be **FAST**



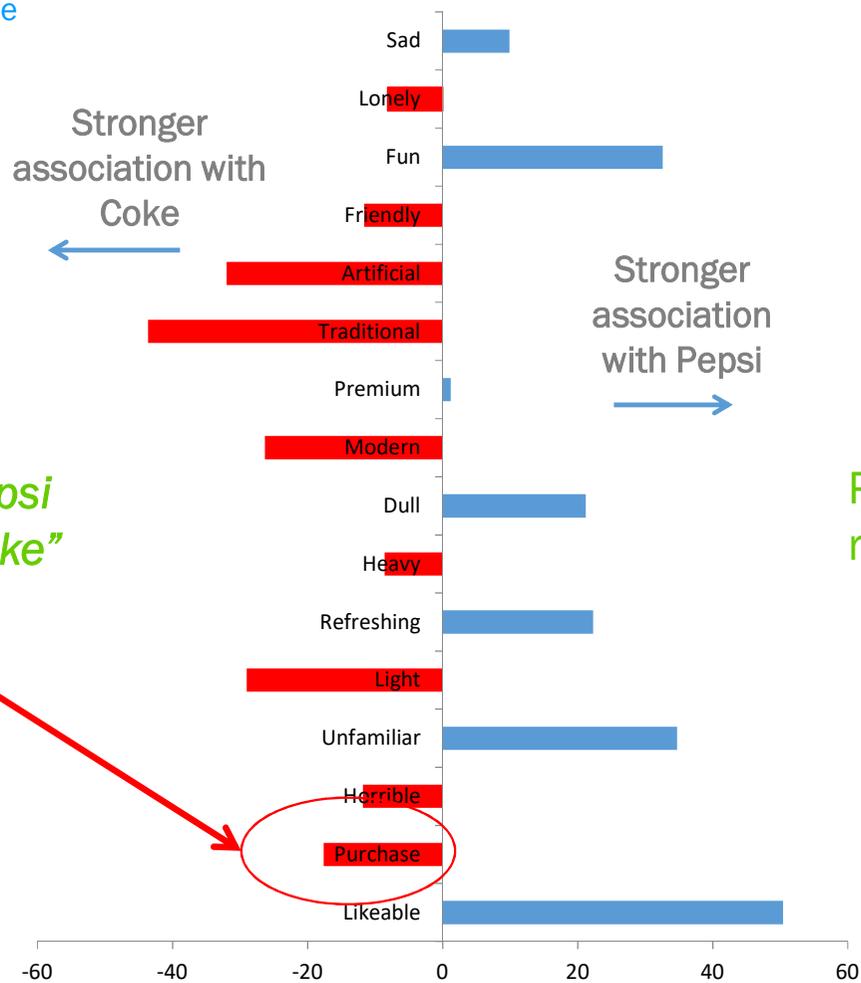
Swiftly followed by the target...

In comparison, the time taken to respond to the Pepsi logo will be much **SLOWER**



Consumer Implicit Reactions

Response as in classical explicit test but using implicit we can unpick why they choose to buy **Coke** although they like **Pepsi** more



“They PREFER Pepsi but would BUY Coke”

Pepsi more “likeable, refreshing & fun”





So what's so good about implicit?

- Are difficult to fake
- Able to detect unobservable attitudes & feelings
- High levels of predictive validity
- Are easy to administer both online or offline.
- Eliminates errors caused by 'social desirability' or the need to be consistent
- But not a replacement...

Some case studies using Implicit & related tests



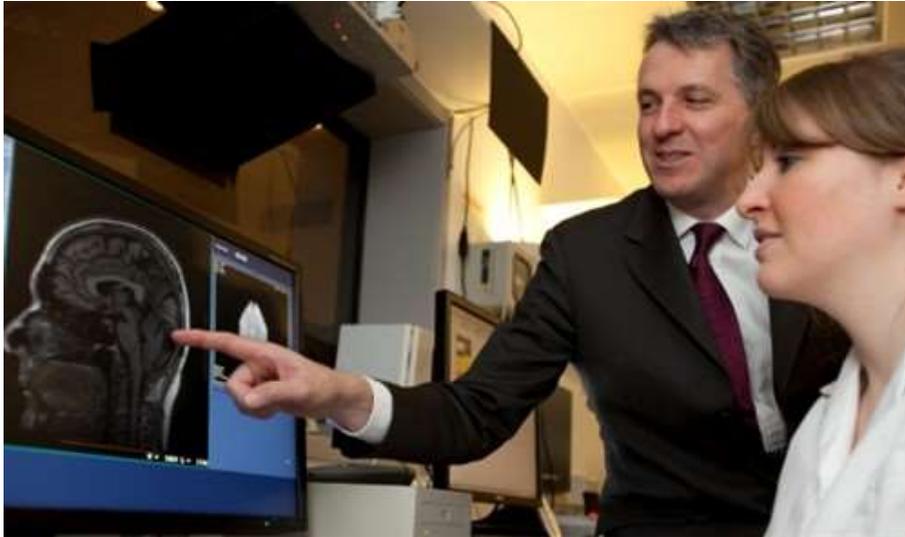
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“Extending a leading brand into a new category sector is always a difficult decision. So how can we know, with more certainty, whether to proceed or not?”





Volunteers were scanned using fMRI as they viewed images of the current brand, and 2 planned brand extensions.

They then answered a market research questionnaire about their preferences and completed an implicit online test

Conventional MR hall tests also run by Unilever in UK & US



Unilever

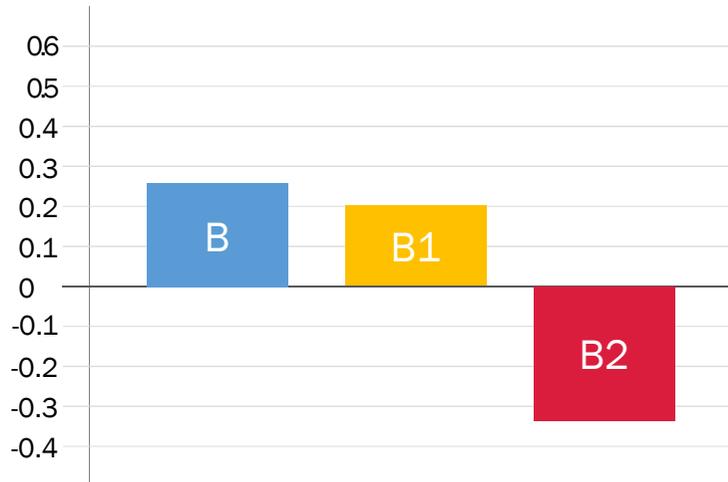




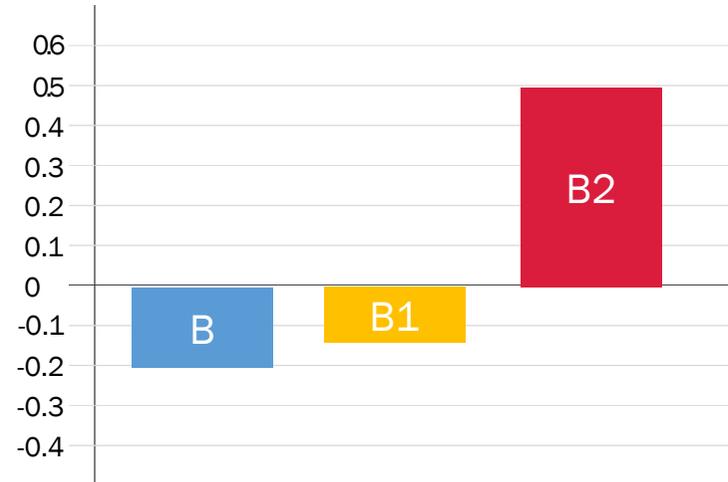
- B Original Brand Pack
- B1 Brand Extension 1 Pack
- B2 Brand Extension 2 Pack



fMRI Scan - Positive Emotions



fMRI Scan - Negative Emotions





	EXISTING BRAND (PERSONAL CARE)	BRAND EXTENSION 1 (SECTOR A)	BRAND EXTENSION 2(SECTOR B)
CONSCIOUS EXPLICIT RESPONSE (& MR QUESTIONNAIRES)	✓	✓	✓
SUBCONSCIOUS IMPLICIT RESPONSE (BRAIN SCAN)	✓	✓	✗
SUBCONSCIOUS IMPLICIT RESPONSE (ONLINE IMPLICIT TEST)	✓	✓	✗





“ If we had run this study before the launch of this brand extension in the US, we would have saved several million US dollars... ”

Head of CREFT

Exploratory Research Group, Unilever (UK)





How do we make our beer
fizzier on a **low** budget without
changing the flavour profile?



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Prof. Charles Spence



Pringles taste 15% fresher and crisper when the high frequency sounds were boosted in real time.

The crispiness (feel & look) of the packaging enhances perception of crispness and freshness of crisps significantly

Implicit tools to find the best match (aroma integration into pack design)



Coffee quality, flavour and aroma attributes significantly improved when bean aroma in the jar boosted in real time.



Similarly quality, flavour and appearance attributes in peanuts significantly improved when roasted aroma in the tub was boosted in real time.

In both cases consumers were willing to pay significantly more for the enhanced product

Pack redesign, based on “change blindness”

Change blindness is a perceptual phenomenon that occurs when a change in a visual stimulus is introduced and the observer does not notice it. For example, observers often fail to notice major differences introduced into an image while it flickers off and on again.





L

R



L

R



L

R



L

R



L

R



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Pack Redesign



Online eye-tracking tests

- This test uses the respondent's own web-cam
- Eye-tracking can also be done in central locations using eye-tracking glasses
- Eye-tracking can be used to assess a single pack or by comparing attention to two packs presented side-by-side.
- Despite its high contrast “Super Mix” does not attract as much visual attention in this example for this group.



Examples of Packaging Research Tools from Split Second Research

Research Questions

Does our new packaging have more visual appeal?

Will it attract prospective customers?

Which features of the pack grab most attention and appeal?

What increase in sales might we expect with our new pack?

• IMPRESS™ Pack Test

- Identify the strengths and weaknesses of each pack design and how they deliver the brand proposition

• Findability Test

- Discover how easy your pack is to find on the shelf
- Find out if your product range or your brand name is easy to find

• IMPACT™ (Implicit Attention Capture Test)

- Does your pack or brand name “grab” attention?

• Online Eye-Tracker

- What do eyes look at, on your pack, website, advert?



Summary

- Implicit & explicit methods are complementary.
- Implicit testing yields more accurate predictive data, **i.e. You validate ideas before committing to an expensive launch.**
- Implicit methods measure hidden or subtle differences in attitudes and emotions towards products.
- Congruent mixtures enhance perceptions, incongruent depress. This is a **multisensory** effect.



Some further contacts:

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Some further reading:

Neurosense and packaging: Understanding consumer evaluations using implicit technology, *Integrating the Packaging and Product Experience in Food and Beverages*, E Fulcher, A Dean, G Trufil 2016

Handbook of Multisensory Processing, Calvert, G.A., Spence, C., & Stein, B.E (Eds). 2004.

The Role of Auditory Cues in Modulating the Perceived Crispness and Staleness of Potato Chips.”
Massimiliano Zampini & Charles Spence *Journal of Sensory Studies*, October 2004

Constructing flavour perception: from destruction to creation and back again
Charles Spence & Jozef Youssef *Flavour* October 2016

Predicting Consumer Behaviour. Calvert GA & Brammer, M.J. (2012). *IEEE Pulse*, Vol 3 (3)

Brand Sense: Sensory Secrets Behind the Stuff We Buy Martin Linstrom 2010 (not academic)

Multisensory Packaging, *Baking Europe*, Spence C.J. Nov 2017