Principles of Cognition
Mental Construction

- Perception, memory, judgment, decision making are commonly based on constructed theories that try to make best sense of available evidence (both internal and external)
- Although often accurate, these constructions can be systematically biased and hence lead to inappropriate behaviour
- At the heart of many of these constructions is the (mis)attribution of fluent processing
- But there can be other causes, e.g., preserving self-esteem, social conformity, etc.

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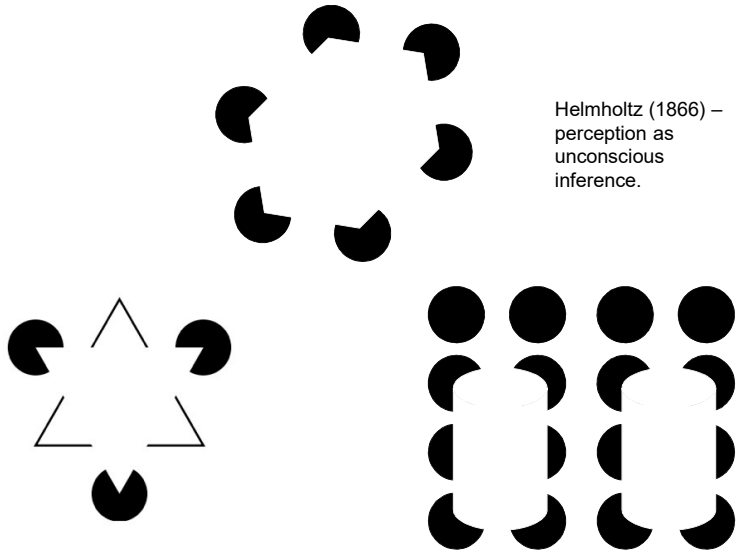


Helmholtz (1866) – perception as unconscious inference.

Mental Construction

Here the focus is on cognitive construction:

- Memory
- Judgment
- Decision making
- Social cognition

Origins of fluent processing

exposure to an object

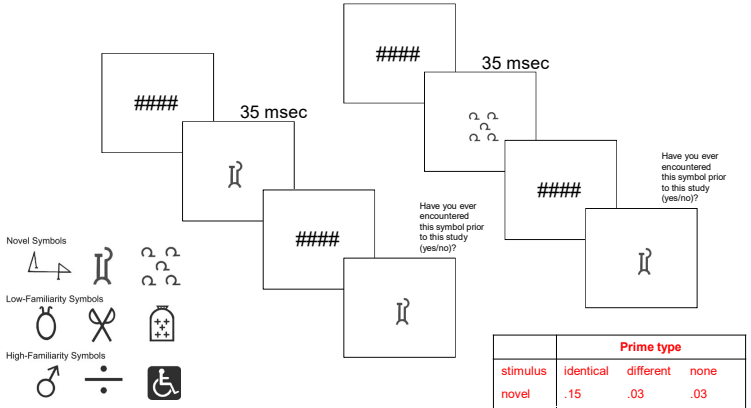
triggers a set of neural learning processes (synaptic changes)

such that when the same or a similar object is reencountered, it is processed more **fluently** (e.g., with less neural effort/activation)

consider a source in the past

which in turn is *experienced* as a feeling of FAMILIARITY

Fluent processing can induce familiarity



	Prime type		
stimulus	identical	different	none
novel	.15	.03	.03
low	.28	.16	.13

Brown & Marsh, *Psych Sci* (2009)

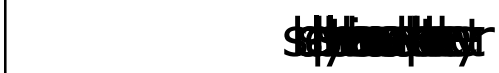
Fluent processing can induce familiarity

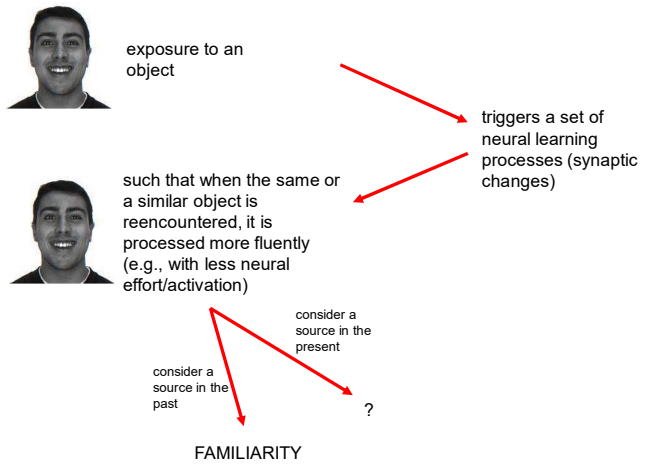
Lindsay and Kelley (*J Mem Lang*, 1996):

Participants were presented a long word list, ~2.5 sec per word.
Test fragments (e.g., H_TEL) had only 1 possible solution.

Study	Test		P(old)
HOTEL	H_TEL	(OLD EASY)	.84
BIRCH	B_RC_	(OLD DIFFICULT)	.75
	D_UGS	(NEW EASY)	.63
	A_OV_	(NEW DIFFICULT)	.51

- Ease of word completion increased the likelihood of judging a word old
- For new words this cannot be recollection from episodic memory as they are false memories





Fluent processing can induce feelings other than familiarity

The *mere exposure effect* – fluency induces feelings of liking

Newell & Shanks (*Eur J Cog Psy*, 2007):

Study (400 msec):

Test:

Which is more likable? *Which is more likable?*

Presented x3, repeated stimulus liked 50-53%

Presented x9, repeated stimulus liked 56-58%*

Fluent processing can induce feelings other than familiarity

The *mere exposure effect* is abolished by disrupting fluent processing

Topolinski et al. (*J Consumer Psych*, 2014):

Participants shown unfamiliar real adverts (beverages, perfume, etc.) in a cinema (e.g., *Fizz Diamond*, *Magjia & Shkenca*).

Then 1 week later rated their liking of old and new products.

	Old	New
Control (sugar cube)	3.03	2.78
Oral (popcorn)	2.70	2.71

(0 = not at all, 6 = very much)

- Repetition increased liking ratings (the mere exposure effect)
- The effect was abolished by interfering with the fluency of subvocal pronunciation during exposure

Fluent processing can induce judgment biases

The *truth effect* is the unintentional judgment that repeated statements are more likely to be true. Is this because they are processed more fluently?

Unkelbach (*JEP:LMC*, 2007)

Participants presented with 60 true and false statements. Independent of their truth, half were presented in high contrast colours and half in low contrast. Participants made a binary true/false judgment for each statement.

	Response latency	P("true"|true)	P("true"|false)
Europe's biggest glacier is the Vatnajökull on Iceland	4347 msec	.68	.48
The speed of sound is independent from temperature	4686 msec	.55	.45

The high-contrast statements feel fluent as a result of perceptual ease, but the person does not correctly appreciate the source of the fluency. Hence the fluency is attributed to the truth of the statement rather than to its true source.

Fluent processing can induce judgment biases

Fluency affects judgments of humour.

Topolinski (*Cog & Emotion*, 2014):

	Rating (0 = not funny at all, 10 = very funny)
What were the last words of a vampire? "Dawn!"	4.78
What were the last words of a restaurant guest? "I'll have the mushroom soup."	3.79

Jokes in an easy-to-read font feel fluent as a result of perceptual ease, but the source of the fluency is not correctly appreciated. Hence the fluency is attributed to the joke's humour rather than to its true source.

Fluent processing can induce judgment biases

The *false fame effect*:

Squire and McKee (*JEP:LMC*, 1992)

Study: list of famous (e.g., *Christopher Wren*) and nonfamous names (e.g., *Sebastian Weisdorf*).

Test: participants made fame judgments for different types of names:

Old famous	*Christopher Wren*
Old nonfamous	*Sebastian Weisdorf*
New famous	*Howard Hughes*
New nonfamous	*Valerie Marsh*

Results: famous > nonfamous
old > new

Fluent processing can induce judgment biases

The *false fame effect:*

Topolinski and Strack (*J Pers & Soc Psych*, 2010):

Study: nonfamous names (e.g., *Aishwarya Rai,* unrecognized by the German participants).
Test: fame judgments for old and new nonfamous names

	Old	New
Manual (kneading a ball)	5.36	4.82
Oral (eating popcorn)	5.16	5.12

(0 = not famous at all, 10 = very famous)

- Repetition increased the likelihood of calling a nonfamous name famous
- The effect was abolished by interfering with the fluency of subvocal pronunciation

Fluent processing can induce judgment biases

Fluency can also affect *risk judgments:*

Topolinski and Strack (*J Pers & Soc Psych*, 2010):

Participants judged the harmfulness of fictitious food additives: easy (e.g., Magnalroxate), difficult (e.g., Hnegripitrom)

	Easy	Difficult
Manual (kneading a ball)	3.74	5.00
Oral (chew gum)	4.06	4.16

(1 = very safe, 7 = very harmful)

- Ease of pronunciation increased the likelihood of calling a fictitious food additive dangerous
- The effect was abolished by interfering with the fluency of subvocal pronunciation

Fluency attributions

Processing of a stimulus can be enhanced (i.e., made more fluent) by recent encounter with that stimulus.

In the context of making a memory judgment ("have I seen this stimulus before?"), fluency can be a useful cue. People **attribute** their fluent processing to a previous encounter with the event and experience it as familiar.

However, this fluent processing can be attributed to other sources.

False fame/truth effects = cognitive (judgment) misattributions
Mere exposure effect = emotional misattribution

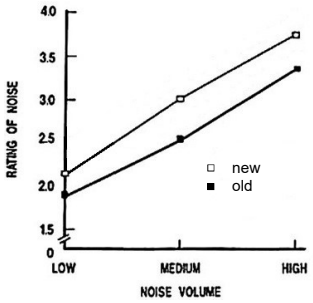
Can misattributions even occur for very low-level perceptual judgments?

Fluent processing can induce perceptual biases

Jacoby et al. (*JEP:LMC*, 1988):

Study: Participants heard spoken sentences

Test: Old and new sentences spoken against background noise (1 of 3 levels) – participants judged the intensity of the background noise



- The noise was judged less intense when old compared to new sentences were heard.
- Participants misattributed their fluent processing (caused by repetition) to a perceptual property, noise level.

exposure to an object

triggers a set of neural learning processes (synaptic changes)

such that when the same or a similar object is reencountered, it is processed more fluently (e.g., with less neural effort/activation)

consider a source in the past

consider a source in the present

fame/truth (conceptual)

loudness (perceptual)

FAMILIARITY

liking/goodness (affective/emotional)

Attributional processes

Mental Construction

- Perception, memory, judgment, decision making are commonly based on constructed theories that try to make best sense of available evidence (both internal and external)
- Although often accurate, these constructions can be systematically biased and hence lead to inappropriate behaviour
- At the heart of many of these constructions is the (mis)attribution of fluent processing
- But there can be other causes, e.g., preserving self-esteem, schematization, duration neglect, social conformity, etc.

Constructing the past to preserve self-esteem

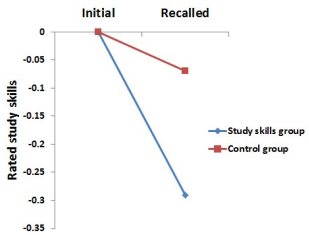
Conway & Ross (*J Pers & Soc Psych*, 1984)

Students initially rated their study skills (time-management, planning and revision skills, etc).

Then assigned to a 3-week study-skills group or a control group.

At the end of the course, they recalled their previous skill levels.

rated skills:



Participants 'derogated' their past abilities.

In fact, the course was useless! Exam grades:

exp 72.0% con 71.3%

Nevertheless, 6 mo later, the groups differed in their recall of their exam performance:

exp 73.3% con 70.6%

This misrepresentation is benign in the sense that it helps us to tell convincing, consistent, and positive stories about ourselves.

Memory bias helps us to maintain coherence and cope with stress.

Constructing the past to cope with trauma

Can memory construction help us cope with stressful life events?

McFarland & Alvaro (*J Pers & Soc Psych*, 2000)
Participants asked to think of either a very traumatic or a mildly negative event from age 6-16.

Then they rated themselves on a 27-item scale of current standing and of standing before the event.

e.g.,: kind/tolerant/good-natured/wise/insightful/honest/healthy

These ratings then combined into a composite measure of standing.

Table 3
Mean Current (Post-Event) and Recalled (Pre-Event) Attribute Standings as a Function of Event Focus (Study 2)

		Rating type	
Event focus	*n*	Current post-event standing	Recalled pre-event standing
Traumatic negative event	47	6.88_a	5.62_b
Mild negative event	36	6.89_a	6.09_c

Note. Higher values indicate more positive attribute ratings on a 9-point scale. Within rows or columns, means with different subscripts differ significantly at $p < .05$, two-tailed.

- The two groups rated themselves equal in current standing.
- But those focusing on a traumatic earlier event rated themselves significantly lower in standing before the trauma.
- Hence people seem to use biased recall as a coping mechanism for negative life events, perceiving erroneously that the experience has enriched them ('personal growth').
- The effect must be erroneous because participants were assigned at random to the two groups and hence would not have differed in actual standing at any stage in their lives.
- When people state that they are wiser as a result of some significant event, their assertions must be treated with caution as they could be unconscious victims of biased recall.

water
stream
lake
Mississippi
boat
tide
swim
flow
run
barge
creek
brook
fish
bridge
winding

RIVER 40 -- % FALSE recall

This is called the Deese-Roediger-McDermott (DRM) test.

Schema-based construction

Roediger and McDermott (*JEP:LMC*, 1995)

Study phase: Participants read a list of 12 words (e.g., *bed, rest, awake, tired, dream,…*) which were all associates of a critical nonpresented "lure" word (*sleep*).

Test phase: Immediate recall.

Social construction

Gabbert, Memon, & Allan (*App Cog Psych*, 2003)

Used videos of a girl entering an unoccupied office to return a book. Two slightly different versions: eg in version A (but not B), the book title was legible; she throws a note in the waste bin. In version B (but not A), she checks the time on her watch; steals £10.

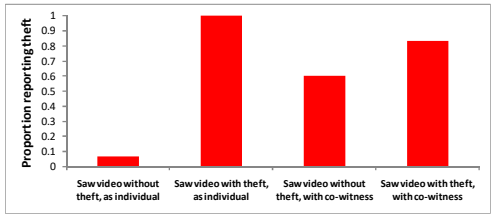
Pairs: participants simultaneously watched video, but each member of the pair saw a different version. Then jointly discussed and recalled the event and completed a questionnaire on it.

Individuals: watched either version A or B. Then recalled the events and completed a questionnaire on it.

Test: 45 min later, all participants completed the recall questionnaire individually.

Results:

- 43/60 participants in the Pair condition recalled an unseen co-witness detail.
- Participants tended to assimilate their co-witness's memories.



How good was this presentation?

Think of 2 [10] ways it could've been improved
Then rate the presentation…

Higher ratings after generating 10 than 2 ways!

Fox (*Judgment & Decision Making*, 2006)

Principles of Cognition - CoDeS
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