Adaptive Memory in Contamination Context: Emotionality is a Proximate Mechanism.

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Background

Contamination-related cues are recalled better than neutral ones.

Infectious Disease Threat → Enhanced Episodic Memory

Contamination Effect (Fernandes et al., 2017)

likely because

Behavioral Immune System's defense mechanism, which is connected to disgust to avoid disease and promote survival. (e.g., Murray & Schaller, 2016)

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Memory is specialized to process fitness-relevant information and is particularly sensitive to disgust, more so than to fear. (Moeck et al., 2021; Nairne et al., 2007; Schienle et al., 2021)

But how?

But how is this memory tuning achieved in the immediate?

Emotions related to threats?

Some evidence suggest that **emotionality cannot explain** this tuning...

- but those studies only used self-reported scales
- or manipulated emotions that were unrelated to threats.

(e.g., Bel et al., 2013; Fernandes et al., 2021; Gretz & Huff, 2019; Kroneisen & Erdfelder, 2011; Nairne et al., 2017; Thiebaut et al., 2022; Yang et al., 2014)

vs.

In a similar paradigm involving the threat of predators and food deprivation, evidence has shown that....

! a deeper cardiac deceleration occurs in survival conditions, and the mnemonic advantage in survival conditions only occurs in the individual's native language and not in a secondary language, likely due to the weaker emotional associations in the latter.

(Fiacconi et al., 2015; Garrido & Prada, 2018; Kazanas et al., 2021; Saraiva et al., 2021)

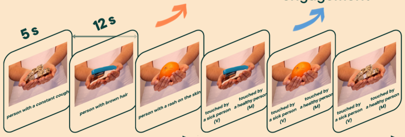
Evaluation of the Disgust's role

Replication of Contamination Effect with Psychophysiological Index Extension.

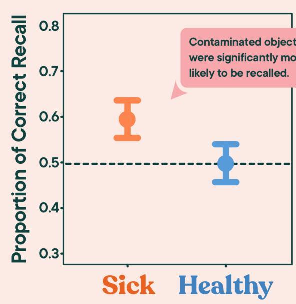
80 participants (55 females)

M_{age} = 22.60, SD_{age} = 8.06

Participants were asked to recall and identify (24) objects that have been **touched by people infected with a deadly disease or who were healthy**, based on clues provided in (12) short descriptions.

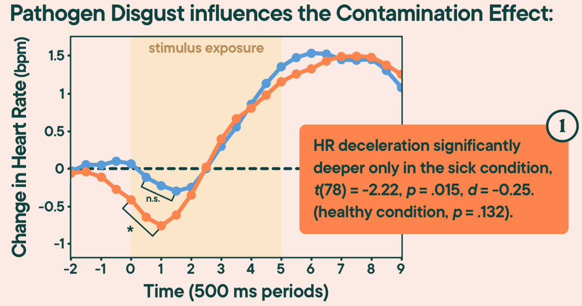


(3 Encoding Trials + 3 Immediate Memory Trials) x 8 + Distractor Task + Surprise Recall Task (5 min)



Contamination Effect was replicated, $b = 0.47$, $p < .001$, OR = 1.59. (Fernandes et al., 2017, 2021)

Pathogen Disgust influences the Contamination Effect:



① HR deceleration significantly deeper only in the sick condition, $t(78) = -2.22$, $p = .015$, $d = -0.25$. (healthy condition, $p = .132$).

② **Participants who exhibited the contamination effect** showed a significant bradycardia while recalling objects from the sick condition (vs. healthy condition), $t(42) = -1.86$, $p = .035$, $d = -0.28$.

Participants **who not exhibited** the contamination effect (n=36) showed no significant difference, $p = .170$. (in line with Fiacconi et al., 2015)

👉 **Memory advantage arises from the activation of autonomic disgust responses to pathogenic threats, which trigger the defensive motivational system.** (Bradley et al., 2001; Lang et al., 2000)

Limitations: The COVID-19 pandemic may have increased susceptibility to experiencing pathogen disgust.

Future research: Eye-tracking and fMRI can be used to further understand the interaction between cognitive and emotional systems in threatening contexts.

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