# SURVIVAL-RELATED DIMENSIONS FOR 732 FRENCH WORDS AND MEMORY PERFORMANCE

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- **Survival processing effects** are taken as evidence that our memory systems have been shaped by natural selection to process and retain information that is relevant to fitness (Nairne, 2015).

- The general procedure to obtain a survival processing advantage is as follows:

→ Participants are instructed to imagine that they are stranded in the grasslands of a foreign land and that they will have to find food and water and avoid predators.

→ Participants are required to rate (”unrelated”) words according to their relevance for the survival situation using Likert scales.

*how relevant the words “rake”, “truck” or “bird” are to the situation of surviving*
*totally irrelevant 1—2—3—4—5 extremely relevant*

→ Deep-processing tasks such as rating words for their pleasantness (e.g., Nairne et al., 2007, 2008) are often used as control condition.

→ After the rating task, a surprise retention test (recall or recognition) takes place.

- In the present studies, we focused on one dimension involved in the survival processing paradigm: The **role of the fitness-relevance ratings** assigned to the words (an issue not settled).

- In order to address the issue of survival relevance further, we collected survival-related dimensions for a set of 732 French words **(Study 1)**.

- By using ratings on survival-related dimensions, we aimed to investigate whether memory performance (correct recall) for each survival problem (avoiding predators, avoiding contamination and illness, finding food and water) would be modulated by the fitness-relevance level of the items with the survival dimension in question and the survival scenario **(Study 2)**.

# Study 1: Ratings of survival-related dimensions for French words

## Participants

- 383 French adults (*M* = 23.16 years; *SD* = 7.50; 317 females) recruited online through Facebook.
- They received course credits for their participation.
- Written informed consent was obtained from all the P All the study procedures were approved by the Statutory Ethics Committee of Clermont Université.

## Stimuli

- The words were taken from the Bonin et al. (2003) database which contains norms for 866 words.
- The final list of words consisted of **732 words** subdivided into four sets.
- The different sets were **matched on several psycholinguistic variables** (e.g., lexical frequency, imageability, valence).

# Study 1: Ratings of survival-related dimensions for French words

## Procedure

The questionnaires were created with LimeSurvey and were completed online.

→ **First page:** P provided informed consent.

→ **Second page:** Demographic information was collected (age, gender, native language and educational level).

→ **Third page:** P had to imagine that they were stranded in the grasslands of a foreign land, without any basic survival materials. Over the next few months, they would, depending on the condition to which they were assigned, have to:

(1) find steady supplies of **food and water**,
(2) protect themselves from **predators**,
(3) avoid being contaminated by **pathogens** and becoming ill.

P were told that a long list of words would be shown to them and that they would have to rate how relevant each of these words would be for them in the described survival situation. Likert scales (1 = “totally irrelevant” to 5 = “extremely relevant”) were used.

The words were presented randomly.

# Study 1: Norms of survival-related dimensions for French words

## Results

*Reliability analyses*

All coefficients above .80 → a high level of consistency between the participants' ratings for all sets of words (except the even/odd correlation for contamination ratings in the second list, which was equal to .79).

*Correlations*

The three survival-related dimensions were positively correlated: Words relevant on one survival-related dimension were also relevant on the other two survival-related dimensions.

One interesting methodological implication is that it is easy for researchers to select fitness-related words.

Other correlations between "survival-related dimensions" & "psycholinguistic variables"

→ → →

# Study 2: Survival-related dimensions and memory performance

- Based on the ratings collected in Study 1 on the three survival-related dimensions of “finding food and water”, “avoiding predators”, and “avoiding being contaminated by pathogens”, **3 experiments** were designed in order to investigate whether, in each survival processing situation, **recall performance** would be altered by the **level of relevance of the words to the survival scenario**.

- **Type of Encoding** (e.g., survival-predation versus pleasantness) in all three experiments.
- **Relevance:** For each type of encoding, half of the words were *highly related* to the survival scenario and the remaining half were *very unrelated*.

- The dependent variable was the **number of correct words** written down during **free recall**.

# Study 2: Survival-related dimensions and memory performance

## Participants

• **Experiment 1**: 76 students (Mean age 19.5 years; 62 females) at the University of Bourgogne.

• **Experiment 2**: 86 students (Mean age = 19.2 years; 74 females) from the same pool.

• **Experiment 3**: 90 students (Mean age = 19.8 years; 71 females) from the same pool.

• All were native speakers of French.

• The number of P per condition was chosen on the basis of Scofield et al.'s (2018) meta-analysis of the SPA in memory.

## Stimuli

• The words lists were created based on the survival-related norms collected in Study 1.

•**Experiment 1**: 32 words that were divided into two sets of 16 items. The words in the first set were highly relevant to the **predation** survival scenario whereas those in the second set were very irrelevant.

*knife* versus *hat*

• **Experiment 2**: 30 words were selected: Half of the items were rated as highly relevant for **avoiding contamination** and the remaining half were rated as being of little relevance on this survival-related dimension.

*ambulance* versus *accordion*

• **Experiment 3**: 30 words were selected: Half of the items were rated as highly relevant for **ensuring food and water supplies** and the remaining half were rated as low on this survival-related dimension.

*apricot* versus *window*

Survival scenario

Pleasantness

Relevance - survival or pleasantness - of words on a 1-5 scale

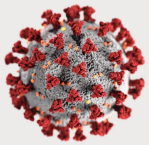
Interference tasks

Surprise free recall

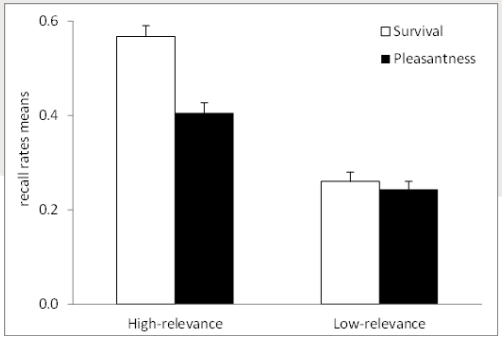
Exp. 1

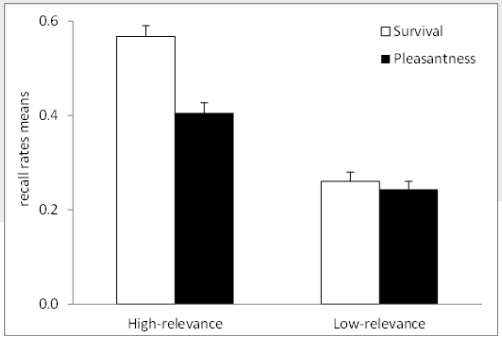
Survival effects

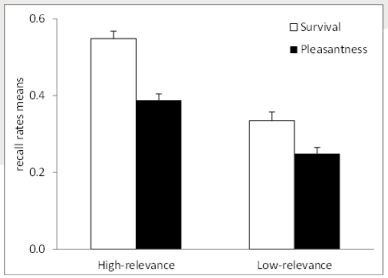
Exp. 2



Exp. 3




Means and standard errors of recall rates as a function of Type of Encoding (Survival vs Pleasantness) and Relevance (High vs Low-relevance words)

- A **large advantage for survival** over pleasantness was found with the **high-relevance words** but not ("or less so") with the low-relevance words.

- **Recall rates** in the **pleasantness** condition were **higher for words that were a priori rated high on survival** than for words that were rated low.

# General Discussion

**(1)** Nairne and Pandeirada (2010): "(…) *any stimulus bathed in the spotlight of survival processing will receive some kind of mnemonic boost.*" (p.18)

→ this claim is not fully supported by the current findings.

**(2)** The fitness-relevance of words plays a role in memory, irrespective of whether the words are encoded for survival or for pleasantness.

→ these words are able to generate richer memory traces than words rated low on survival (which facilitates their later retrieval).

**(3)** A survival processing advantage is found when only one survival problem is included in the survival scenario, be it "protection from predators", "avoiding contamination" or "finding food and water".

**(4)** The "survival ratings" should be very useful to researchers investigating episodic memory by making it possible to control for verbal stimuli.

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