SURVIVAL-RELATED DIMENSIONS FOR 732 FRENCH WORDS AND MEMORY PERFORMANCE

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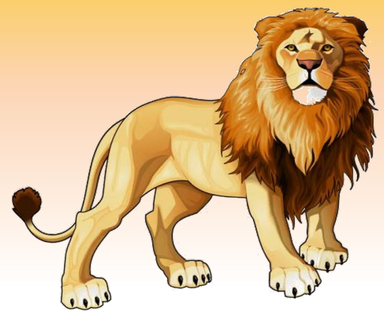


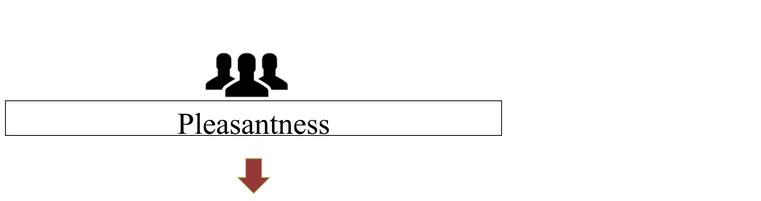
INTRODUCTION

• **Survival Processing Advandage (SPA)** → A well-investigated type of evidence in favor of adaptive memory view (e.g., Nairne, 2015)
→ processing information according to its survival value improves memory retention compared to the processing of the same information in different non-survival (control) situations (e.g., pleasantness) (e.g., Nairne et al., 2007; for a meta-analysis, see: Scofield et al., 2018).

• In the **SPA**, 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 words according to their relevance for the survival situation using Likert scales from 1 (totally irrelevant) to 5 (extremely relevant) (e.g., how relevant the words "rake", "truck" or "bird" are to the situation of surviving). Deep-processing tasks such as rating words for their pleasantness (e.g., Nairne et al., 2007, 2008) are generally 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 level of **congruency** between the ratings given to words and the encoding scenarios used.

• In order to address the congruency issue further, we collected survival-related dimensions for a set of 732 French words **(Study 1)**. By using the norms on survival-related dimensions, we designed 3 memory experiments that were aimed at investigating three survival problems as a function of the level of congruency of the items (which was either high or low) and the survival problem **(Study 2)**.



STUDIES

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

Participants

- 383 adults (M = 23.16 years; SD = 7.50; 317 females) recruited online through Facebook.
- The participants (P) were all native speakers of French. 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).

Procedure

The questionnaires were created with Limesurvey and were completed online.

- **First page** of the questionnaire → The 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, or **(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.

Results

Reliability analyses

The correlations between the by-items means obtained from the even and odd participants and the intraclass correlation coefficients were computed within each list of words. With the exception of the even/odd correlation for contamination ratings in the second list, which was equal to .79, all coefficients were above .80, which suggests a high level of consistency between the participants' ratings for all sets of words.

Descriptive statistics

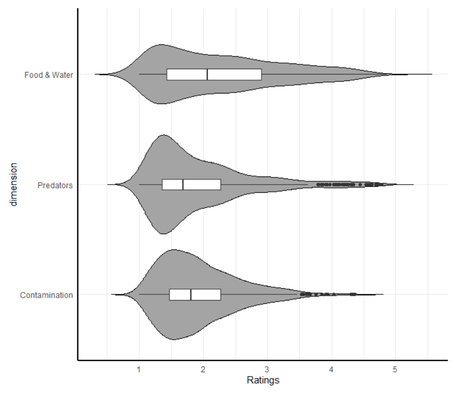


Figure 1. Violin and boxplots of the three types of survival rating scores. Points at the right of the distributions are situated more than 1.5 interquartile range beyond the third quartile.

Correlations

Table 1. Correlations between the three survival-related dimensions and four objective word characteristics

	Predation	Contamination	Number of letters	Number of syllables	Film frequency	Book frequency
		N = 732			N = 702	
Food &Water	.231***	.576***	-.146***	-.146***	.072	.021
Predation		.320***	-.091*	-.090*	.164***	.142***
Contamination			-.042	-.079*	.230***	.218***

Notes. *** : $p < .001$; * : $p < .05$. Log of the subtitle and book frequencies +1 taken from LEXIQUE (New et al., 2004) (number of words included in the analyses: 702).

Study 2: Survival-related dimensions and memory performance

Based on the norms 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 congruency/relevance of the words to the survival scenario**.

Type of Encoding was the independent variable (e.g., survival-predation versus pleasantness) in all three experiments. 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.

Experiments

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

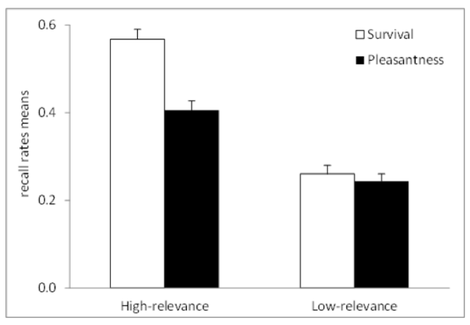
• The words lists were created based on the survival-related norms collected in Study 1.
Experiment 1: 32 words that were divided into two sets of 16 items. The words in the first set were highly relevant to the **predation survival** scenario whereas those in the second set were very irrelevant.
• **Experiment 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.
• **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.

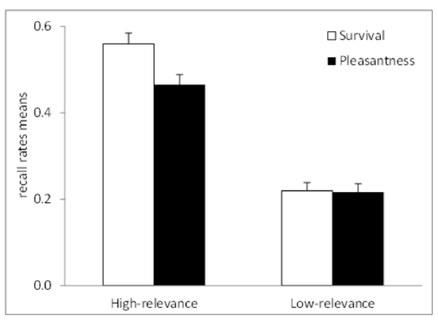
Results

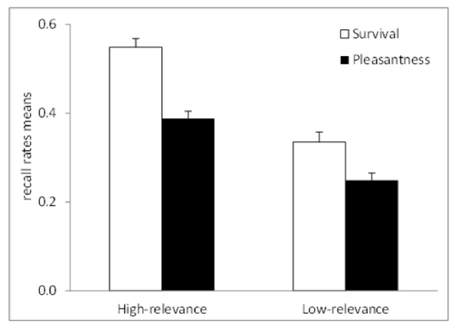
Exp. 1

Exp. 2

Exp. 3







DISCUSSION

• As reported by Alonso et al. (2021) in Spanish, the ratings of the words in the three survival-related dimensions of "food and water", "predation", and "contamination" were **highly reliable**.

• The bivariate correlations revealed that the three survival-related dimensions were positively correlated. This finding indicates that researchers can **easily select**—depending on their research aims—**words that either are or are not related to survival in general** when designing their experiments.

• In the three **memory experiments**, the **survival effect** was **larger** when the words were **highly related to/congruent with the survival scenario** than when they were not related to/congruent with it.

- The present findings lend further credence to the claim that **congruity** is a **moderator** (Erdfelder & Kroneisen, 2014) or **important boundary condition** of the **survival processing advantage** (Palmore et al., 2012).
- Congruency effects in memory are often explained by the process of **elaboration**. Because the survival processing advantage is thought to involve elaboration (e.g., Röer et al., 2013), the congruency effects found here with the survival processing paradigm suggest that elaboration is a **proximate mechanism**.

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