Survival, Death, and the Supernatural

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The dilemma formed by at once foreseeing approaching death, while also having faith in one’s survival.

The human instinct to live, and to fight for one’s survival

“fear of death”
Survival Memory

- Nairne, Thompson, & Pandeirada (2007, *JEP:LMC*)
- Nairne, Pandeirada, & Thompson (2008, *Psychological Science*)
Adaptive Memory: Remembering with a Stone-Age Brain

- We propose that memory evolved to enhance reproductive fitness and, accordingly, its systems are tuned to retain information that is fitness-relevant.

- Psychologists know a lot about human memory but very little about its function.
Why did memory evolve?

- It is unlikely that memory and its associated mechanisms evolved simply to remember the past.
- Evolved memory should be sensitive to content—tuned to remember certain kinds of information.
- Memory mechanisms evolved as design "solutions" to problems associated with fitness—reproductive fitness.
What are the mnemonic consequences of processing information in terms of its ultimate survival value?

To the extent that an item is processed in terms of its survival relevance, we expected it to be remembered well, much like the accessing of meaning aids retention relative to shallow forms of processing.
Nairne et al. (2007, Exp. 1)

- Subjects imagine themselves in one of several situations and then rate the relevance of arbitrarily selected words.

- After the rating task, everyone is given a surprise memory test for the rated words.
Survival Scenario

In this task, we would like you to imagine that you are stranded in the grasslands of a foreign land, without any basic survival materials. Over the next few months, you’ll need to find steady supplies of food and water and protect yourself from predators. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this survival situation. Some of the words may be relevant and others may not—it’s up to you to decide.
Nairne et al. (2007)

Moving Scenario

In this task, we would like you to imagine that you are planning to move to a new home in a foreign land. Over the next few months, you’ll need to locate and purchase a new home and transport your belongings. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in accomplishing this task. Some of the words may be relevant and others may not—it’s up to you to decide.
Pleasantness Scenario

In this task, we are going to show you a list of words, and we would like you to rate the pleasantness of each word. Some of the words may be pleasant and others may not—it’s up to you to decide.
Nairne et al. (2007)

Words:
truck, juice, silver, door, car, silk, diesel, shoes, orange, broccoli, sword, teacher, mountain, finger, whiskey, bear, apartment, pan, pepper, aunt, flute, cathedral, soccer, sock, book, chair, snow, screwdriver, emerald, eagle, carbon, catfish
Figure 1. Average proportion correct recall, average rating, and average response time sorted by condition for Experiment 1 (error bars indicate 95% confidence interval).
Imagery

In this experiment, we would like you to rate a list of words as to the ease or difficulty with which they arouse mental images. Nouns differ in their capacity to arouse mental images of things or events. Some words arouse a sensory experience, such as a mental picture or sound, very quickly and easily, whereas others may do so only with difficulty (i.e., after a long delay) or not at all.
Nairne et al. (2008)

- Imagery (continued)

- Any word which, in your estimation, arouses a mental image (i.e., a mental picture, or sound, or other sensory experience) very quickly and easily should be given a high imagery rating; a word that arouses a mental image with difficulty or not at all should be given a low imagery rating. (Rating values ranged from 1 (low) to 5 (high).)
In this task, we are going to show you a list of words, and we would like you to rate the pleasantness of each word. Some of the words may be pleasant and others may not—it’s up to you to decide. You will notice that the first two letters of each word are switched; before you make each rating, you will need to mentally switch the letters back to their original positions in order to know which word you are rating.
Nairne et al. (2008)

- **Generation (continued)**
  - For example, if you are presented with “iktten,” you will need to switch the first two letters in your head to get the word “kitten” and then you can make your pleasantness rating for that word.
  - Again, the rating scale ranged from 1 (totally unpleasant) to 5 (extremely pleasant).
Nairne et al. (2008)

- Intentional Learning
  - In this task, we are going to show you a list of words, and we would like you to try to remember those words for a future memory test.
Nairne et al. (2008)
“... it is fair to conclude that survival processing is one of the best—if not the best—encoding procedures yet identified in human memory research, at least when free recall is used as the retention measure.”
Nairne proliferated the field!

- Journal of Memory and Language
- Current Directions in Psychological Science
- The American Journal of Psychology
- JEP:LMC
- Psychological Science
- Cognitive Psychology
- Memory & Cognition
- Wikipedia!
Klein (2013, M&C)

- Does a subject necessarily need to consider an environment related to evolutionary adaptation in order to show a survival advantage?
Klein (2013, M&C)

- Does a subject necessarily need to consider an environment related to evolutionary adaptation in order to show a survival advantage? **No!**

- Compared the standard survival scenario to the following: *In this task, I want you to imagine that you are trying to stay alive...*
Klein (2013, *M&C*)

- Found no significant differences in word recall between the standard passage and the one devoid of the “environment of evolutionary adaptation (EEA)”. 

- Has prompted follow-up research on “thoughts of death” (Klein, 2012, *Memory*) and “mortality salience” (Bell, Röer, & Buchner, 2013, *M&C*).
Soderstrom and McCabe (2011, *PB&R*)

- Are survival processing memory advantages based on *ancestral priorities*?
- Compared ancestor-consistent threats with more "modern" survival scenarios
Soderstrom and McCabe (2011, *PB&R*)

- Are survival processing memory advantages based on *ancestral priorities*?
- Compared ancestor-consistent threats with more “modern” survival scenarios
- *Predators vs. Zombies!*
In this task we would like you to imagine that you are stranded in the grasslands/city of a foreign land, without any basic survival materials. Over the next few months, you’ll need to find steady supplies of food and water and protect yourself from predators/zombies/attackers. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this survival situation. Some of the words may be relevant and others may not—it’s up to you to decide.
Soderstrom and McCabe (2011, *PB&R*)
Kazanas and Altarriba (2017, *EBS*)

**Aims:**

- Expand the findings of Soderstrom and McCabe (2011) to examine other supernatural entities, looking to replicate the fact that other “fictitious” threats can also influence memory recall.
- Consider these threats in light of the standard survival advantage and compare recall in both instances.
- Introduce the variable of “bizzareness” as a possible encoding variable that when considered in an appropriate context, can also challenge the current survival advantages reported in the literature.
Kazanas and Altarriba (2017)

- Consider possible supernatural entities—for example, vampires!
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- Supernatural Ratings Task
- Subjects rated the following categories of words, randomly-intermixed:
  - Supernatural positive (e.g., angel, mermaid, fairy)
  - Supernatural negative (e.g., vampire, zombie, demon)
  - Positive person-related (e.g., mother, father, brother)
  - Negative person-related (e.g., criminal, murderer, traitor)
  - Neutral person-related (e.g., gymnast, cook, nurse)

Rated on a scale from “1” to “9” on how you feel in reaction to each word; 1 = happy, pleased, satisfied, content, hopeful; 9 = unhappy, annoyed, unsatisfied, despaired, afraid
Kazanas and Altarriba (2017)

- $N = 21$
- 40 words total (5 in each category)
- Incidental memory test followed
- Results:
  - The words “demon” and “zombie” were recalled with equal frequency
  - “Demon” was rated as significantly more negative than “zombie” and “vampire” (8.67 vs. 6.67 vs. 5.62)
Kazanas and Altarriba (2017)

- The power of imagination – Bizarreness!

- Does bizarreness have a mnemonic effect in a survival context? Could the effect be similar, additive, or an interference effect?

- Free-recall advantages for bizarre relative to common items has been reported for narratives (Davidson, Malmstrom, Burden, & Luo, 2000, *Experimental Aging Research*) and sentences (Worthen & Roark, 2002, *American Journal of Psychology*).
Kazanas and Altarriba (2017)

In this task, we would like you to imagine that you are stranded in the grasslands of a foreign land, without any basic survival materials. Over the next few months, you’ll need to find steady supplies of **food** and **water** and protect yourself from **predators**. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this survival situation. Some of the words may be relevant and others may not—it’s up to you to decide.
In this task, we would like you to imagine that you are stranded in the grasslands of a foreign land, without any basic survival materials. Over the next few months, you’ll need to find steady supplies of rust and dice and protect yourself from clowns. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this survival situation. Some of the words may be relevant and others may not—it’s up to you to decide.
Four Conditions (between subjects):

- Standard Survival Scenario/Predators
- Standard Survival Scenario/Demons
- Bizzareness/rust, dice, and Clowns
- Pleasantness

(N = 80; 20 Ss per condition)

read scenario → rate words → forward digit span task (2 min) → incidental recall → rate scenarios on 4 dimensions → provide demographic details
Kazanas and Altarriba (2017)

Proportion Correct

Condition

Pleasantness
Predators
Demons
Clowns

Proportion Correct
Kazanas and Altarriba (2017)

Average Rating

- Pleasantness: 3.5
- Predators: 2.5
- Demons: 2.5
- Clowns: 2.5

Condition
Conclusions

- Being in a survival mode—the avoidance of death—can significantly affect the ability to remember information in a very effective manner (see Kazanas & Altarriba, 2015, *EP*, for a review).

- Presumed predators in the form of demons or zombies can likewise influence memory behavior.
Thank you!