

ÉPREUVE MUTUALISÉE AVEC E3A-POLYTECH
ÉPREUVE COMMUNE - FILIÈRES MP - MPI - PC - PSI - TPC - TSI

LANGUE VIVANTE B
ANGLAIS - ESPAGNOL

L'épreuve de langue vivante B est obligatoire pour Lorraine INP - EEIGM (filières MP, PC et PSI)

Durée : 1 heure

RAPPEL DES CONSIGNES

- Utiliser uniquement un stylo ou un feutre noir
 - N.B. : si un candidat croit repérer ce qui paraît être une erreur d'énoncé, il le signalera par écrit en expliquant au verso de la grille réponse les raisons des initiatives qu'il a été amené à prendre et poursuivra normalement son épreuve.
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L'usage d'un dictionnaire et de machines (traductrice, calculatrice, etc.) est strictement interdit.

INFORMATIONS GÉNÉRALES

Définition et barème

QCM en trois parties avec quatre propositions de réponse par item.

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|------|---------------------------|-----------------------------|
| I. | Compréhension : | 12 items (10 points sur 20) |
| II. | Lexique : | 12 items (5 points sur 20) |
| III. | Compétence grammaticale : | 15 items (5 points sur 20) |

Réponse juste : + 3

Pas de réponse : 0

Réponse fausse ou réponses multiples : – 1

Instructions

Lisez le texte et répondez ensuite aux questions.

Choisissez parmi les quatre propositions de réponse (A, B, C ou D) celle qui vous paraît la mieux adaptée. Il n'y a qu'une seule réponse possible pour chaque item.

Reportez votre choix sur la feuille de réponse.

Index " alphabétique "

Anglais : pages 2 à 5

Espagnol : pages 6 à 10

ANGLAIS

Scientists say they've discovered a 'phonetic alphabet' in whale calls

Scientists have accomplished a whale of a feat. They've identified previously unknown complexity in whale communication by analyzing thousands of recorded sequences of sperm whale clicks with artificial intelligence. Variations in tempo, rhythm and length of the whales' click sequences, called codas, weave a rich acoustic tapestry. These variables hint that whales can combine click patterns in multiple ways, mixing and matching phrases to convey a broad range of information to one another. What sperm whales are saying with their clicks remains a mystery to human ears.

Still, uncovering the scope of whales' vocal exchanges is an important step toward linking whale calls to specific messages or social behaviors, the scientists reported May 7 in the journal *Nature Communications*. The researchers dubbed their catalog of sound combinations a "phonetic alphabet" for sperm whales, comparing variations in the whales' click sequences to the production of different phonetic sounds in human speech.

But while the team's findings are interesting, that term offers a misleading perspective on whales' vocal interactions, said Dr. Luke Rendell, a researcher at the University of St. Andrews in the United Kingdom whose work focuses on communication in marine mammals, in an email. "The presentation of the 'phonetic alphabet' – it's nothing of the sort," said Rendell, who was not involved in the research. "The way the tempo variation is used is completely different to how, say, we use elements of an alphabet to construct linguistic expression," he said. "There's no evidence of that, and it's not a super helpful interpretation because it forces everything into a restricted and somewhat over-sold perspective of 'is it like human language or not,' when there are a much broader range of interpretations available."

Sperm whales produce their clicks by forcing air through an organ in their heads called the spermaceti, and these sounds can be as loud as 230 decibels – louder than a rocket launch and capable of rupturing human eardrums – another team of scientists previously reported in the journal *Scientific Reports*. For the new study, the researchers used machine learning to detect patterns in audio data collected by The Dominica Sperm Whale Project, a repository for observations of sperm whales that inhabit the Caribbean Sea. The recordings represented the voices of approximately 60 sperm whales – a subset of a group of about 400 whales known as the Eastern Caribbean clan – and the vocalizations were recorded between 2005 and 2018.

Prior research had identified 150 types of codas in sperm whales worldwide, but the Caribbean whales used just 21 of those codas. The scientists examined the timing and frequency of 8,719 coda sequences – in solitary whale utterances, in choruses and in call-and-response exchanges between whales. When visualized with artificial intelligence, previously unseen coda patterns emerged. The study authors defined four features in codas: rhythm, tempo, rubato and ornamentation. Rhythm describes the sequence of intervals between clicks. Tempo is the duration of the entire coda. Rubato refers to variations in duration across adjacent codas of the same rhythm and tempo. And ornamentation is an "extra click" added at the end of a coda in a group of shorter codas, Rus explained.

These so-called ornament clicks "occur more towards the beginning and end of turns" during vocal exchanges between whales, "behaving like discourse markers," Rus said. In all, the program detected 18 types of rhythm, five types of tempo, three types of rubato and two types of ornamentation. These coda features could all be mixed and matched to form an "enormous repertoire" of phrases, the study authors reported. What's more, meaning could be tweaked even further depending on the placement of a coda – following or overlapping other codas – within an exchange or chorus involving two or more whales. "Actually, many of us have been waiting for advanced technology to allow us to do something like this for decades!" said

Dr. Brenda McCowan, a professor at the University of California Davis School of Veterinary Medicine, in an email.

50 McCowan, who was not involved in the research, was part of another team that, in 2021, conducted an interactive “conversation” with a humpback whale in waters near Alaska. For about 20 minutes, a curious whale repeatedly responded to a recording of a humpback song transmitted from the scientists’ boat. “This particular playback (with the humpback in 2021) was an opportunistic experiment with an inquisitive whale engaging us both behaviorally and vocally, and completely at her own volition,” McCowan said. Such interactive experimentation with
55 whales, along with observations of whale behavior, could be an important part of unraveling the syntax of sperm whale click sequences, the authors wrote in the study.

Adapted from *CNN.com*
13 May 2024

I. COMPRÉHENSION

Choisissez la réponse qui vous paraît la plus adéquate en fonction du sens du texte.

- | | |
|--|---|
| <p>1. From line 1 to line 7, it should be understood that whale communication:</p> <ul style="list-style-type: none">(A) was fully understood in the past.(B) could not be studied with AI.(C) has been better understood thanks to AI.(D) will soon be explained with AI. <p>2. From line 1 to line 7, it should be understood that whale speech:</p> <ul style="list-style-type: none">(A) has never been a mystery for man.(B) has never been studied before.(C) resembles human speech.(D) is difficult for man to understand. <p>3. From line 8 to line 12, it should be understood that whales:</p> <ul style="list-style-type: none">(A) have no social interactions.(B) have their proper coded speech.(C) communicate randomly.(D) use their clicks to find food only. <p>4. From line 13 to line 21, it should be understood that whales’ alphabet:</p> <ul style="list-style-type: none">(A) is quite similar to the humans’ one.(B) is quite different from man’s one.(C) is hard to compare with the humans’ one.(D) varies according to the season. <p>5. From line 22 to line 29, it should be understood that whales use their spermaceti:</p> <ul style="list-style-type: none">(A) only to track their prey.(B) to cool down when the water is too hot.(C) to feed their offspring.(D) to produce their sounds. | <p>6. From line 22 to line 29, it should be understood that in the Caribbean sea:</p> <ul style="list-style-type: none">(A) there are only 60 sperm whales.(B) 60 sperm whales were studied before 2005.(C) scientists recorded the voices of about 60 whales.(D) scientists stopped research between 2005 and 2018. <p>7. From line 30 to line 38, it should be understood that researchers:</p> <ul style="list-style-type: none">(A) used 150 types of codas in the Caribbean.(B) studied 261 types of codas altogether.(C) needed more than 150 codas.(D) based their research on 21 codas. <p>8. From line 30 to line 38, it should be understood that AI helped:</p> <ul style="list-style-type: none">(A) visualize 8,719 coda sequences.(B) discover new code patterns.(C) increase whale communication.(D) locate solitary whales. <p>9. From line 30 to line 38, it should be understood that:</p> <ul style="list-style-type: none">(A) rhythm shows whales’ moving speed.(B) ornamentation completes a short coda.(C) rubato calculates the duration of a coda.(D) tempo is linked to variations in duration. <p>10. From line 39 to line 48, it should be understood that ornament clicks:</p> <ul style="list-style-type: none">(A) split whale discourse into several parts.(B) often happen at the beginning of a speech.(C) never close whales’ conversation.(D) are used only by young whales. |
|--|---|

11. From line 39 to 48, it should be understood that in the coda patterns, the study identified:
- (A) more types of tempo than rhythm.
 - (B) fewer types of rubato than ornamentation.
 - (C) as many types of tempo as rhythm.
 - (D) more types of rhythm than tempo.

12. From line 49 to line 56, it should be understood that the 2021 research:
- (A) proved unsatisfactory.
 - (B) confirmed the whales' capacity to interact.
 - (C) used the same tools as the Caribbean study.
 - (D) refuted the former research.

II. LEXIQUE

Choisissez la réponse qui vous paraît la plus appropriée en fonction du contexte.

13. weave (line 4) means:

- (A) imitate
- (B) make
- (C) include
- (D) come from

14. patterns (line 5) means:

- (A) papers
- (B) answers
- (C) solutions
- (D) designs

15. scope (line 8) means:

- (A) basis
- (B) extent
- (C) height
- (D) sound

16. dubbed (line 10) means:

- (A) initiated
- (B) started
- (C) called
- (D) sent

17. broader (line 21) means:

- (A) thinner
- (B) shorter
- (C) larger
- (D) nicer

18. repository (line 26) means:

- (A) complaint
- (B) building
- (C) project
- (D) storage space

19. utterances (line 32) means:

- (A) trips
- (B) vocalizations
- (C) meetings
- (D) conditions

20. features (line 42) means:

- (A) conclusions
- (B) characteristics
- (C) reports
- (D) numbers

21. tweaked (line 43) means:

- (A) shortened
- (B) broken
- (C) split
- (D) modified

22. overlapping (line 44) means:

- (A) extending over
- (B) absorbing
- (C) eliminating
- (D) discarding

23. volition (line 54) means:

- (A) rhythm
- (B) will
- (C) capacity
- (D) strength

24. unraveling (line 55) means:

- (A) covering
- (B) constructing
- (C) mixing
- (D) resolving

III. COMPÉTENCE GRAMMATICALE

Choisissez la réponse adéquate.

25. If I you, I trust him.
(A) were / will
(B) was / have
(C) was / will
(D) were / would
26. I think about it, I believe in it.
(A) The more / the less
(B) More / less
(C) The more / less
(D) More / the less
27. Whale hunting should severely
(A) be / punish.
(B) have been / punish.
(C) be / punished.
(D) been / punished.
28. Scientists any reliable results.
(A) have not find
(B) have not finded
(C) have not to find
(D) have not found
29. They the same tools for decades.
(A) will used
(B) have used
(C) have use
(D) are used
30. find interesting results, publish them at once.
(A) Should they / they would
(B) They should / they would
(C) If they should / they would
(D) If they would / they should
31. They use digital information for their study.
(A) fewer and fewer
(B) less and less
(C) little and little
(D) many and many
32. The new project costs money the former one.
(A) as many / than
(B) the same / as
(C) as much / as
(D) the same / than
33. I would listen to you.
(A) rather not
(B) rather to not
(C) to rather not
(D) not rather
34. They the form this morning.
(A) complete
(B) have completed
(C) completed
(D) have complete
35. They used samples for this research.
(A) hundred and hundred of
(B) hundreds and hundreds
(C) hundreds and hundreds of
(D) hundred and hundred
36. they used a lot of money, the project failed.
(A) Despite
(B) Although
(C) In spite
(D) If although
37. As soon as you the results, please inform the service.
(A) receive
(B) will receive
(C) have receive
(D) received
38. They left the room after the manager.
(A) meeting
(B) they meet
(C) meet
(D) to meet
39. They were keep silent.
(A) told to
(B) tell to
(C) told
(D) have told to

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