

Academic Reading Paper 29

Forecasts, Counting and Questions

Time allowed: 1 hour

INSTRUCTIONS TO CANDIDATES

- Do not open this booklet until you are told to do so.
- Write your name and the date at the top of the answer sheet.
- Answer **all** the questions.
- Write your answers **on the answer sheet**, not in this booklet.
- You must transfer your answers within the hour. **No extra time is given for transferring answers in the Reading test.**
- Do not remove this booklet from the examination room.

INFORMATION FOR CANDIDATES

- There are 40 questions in this paper.
- Each question carries one mark.
- There are three passages, with 13, 13 and 14 questions.

These passages were written for this library. They are **not** reproduced from any published past paper. The format, timing and task types follow the published specification for the Academic Reading test so that sitting this on paper feels like the real thing.

You should spend about 20 minutes on Questions 1–13, which are based on Reading Passage 1 below.

The man who invented the word forecast

Before the 1860s the weather was recorded but not predicted, and the distinction was a matter of professional respectability rather than of technique. Observations were collected diligently at stations across Britain and written up afterwards, and anybody who claimed to say what the weather would do next was placed in the company of almanac-makers and astrologers. The Royal Society regarded prediction as disreputable, and it had reason to: the people making predictions were mostly doing so from the phases of the moon, and a department that took up the practice would be taking up their company as well.

What changed the situation was not a discovery about the atmosphere but a machine for sending messages. Weather systems in the North Atlantic travel at something between twenty and forty miles an hour. A telegram travels at the speed of electricity. It follows that a station in the south-west of Ireland can report a falling barometer and a rising wind to a port in Yorkshire several hours before the weather itself arrives there, and this is the entire foundation of the practice. Prediction became possible because information could be made to outrun the thing it described.

The man who acted on this was Robert FitzRoy, who had commanded the Beagle on the voyage that carried Charles Darwin around the world, had governed New Zealand without much success, and from 1854 ran a small new department of the Board of Trade set up to collect wind and current data for shipping. He was not appointed to forecast anything. The department existed to compile statistics that would help a captain choose a route, and its staff numbered a handful of people working from a few rooms.

On the night of 25 October 1859 a storm crossed the Irish Sea and wrecked the steam clipper Royal Charter against the coast of Anglesey with the loss of about four hundred and fifty people. Something in the region of eight hundred lives and a hundred and thirty-three ships were lost around the coast that night. FitzRoy went through the observations afterwards and showed that the storm had been visible in the records from the south-west many hours before it reached Anglesey. The information had existed. Nothing had carried it, and the argument he built on that distinction is the one every warning system since has rested on.

In February 1861 he began telegraphing warnings to ports, where they were displayed as cones and drums hoisted on a mast so that a man on a deck could read them without going ashore. On the first of August that year The Times began printing his daily predictions, and he supplied a word for them. He called them forecasts, choosing the term deliberately over prophecy, on the ground that what he was issuing was a calculation from data and carried no claim to certainty.

The attacks came from both directions at once. Men of science objected that he had no theory: he was matching the present pattern of pressures and winds against patterns he had seen before, which is not an explanation of anything, and Francis Galton among others said so publicly. Shipowners objected when a warning kept a vessel in harbour and the storm went elsewhere, because a day in port is a cost and a

storm that does not arrive is not evidence. Newspapers printed the failures. FitzRoy paid for part of the work himself, designed a cheap barometer to be distributed to fishing ports, defended the forecasts continuously in print, and on 30 April 1865 he cut his own throat.

A committee reviewed the department after his death and concluded that the forecasts were insufficiently scientific to continue. They were stopped in 1866. The response from ports and fishing communities was strong enough that the storm warnings were restored the following year, and the daily forecasts came back in 1879, by which time nobody was proposing to do without them.

The fair assessment is not that his critics were fools. They were right that he had no theory and could not have had one, since the physics required to calculate the future state of the atmosphere did not exist and would not be usable for another hundred years. What they were wrong about was the standard. FitzRoy was not claiming to know what would happen; he had chosen a word that said so. He was claiming that a warning issued from incomplete information was worth more than no warning, which is a claim about the value of a bet rather than about the certainty of a result, and on that point the fishermen, who were being asked to risk a boat rather than a reputation, understood him better than the scientists did.

Questions 1–5

Complete the table below.

Choose **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

Why warning became possible		
	Speed	Consequence
A North Atlantic weather system	between twenty and 1 miles an hour	a station in the south-west can report hours before the weather itself 2
A telegram	the speed of 3	information can be made to 4 the thing it describes
Warnings at ports, from February 1861	—	displayed as cones and 5 hoisted on a mast

Questions 6–9

Complete the sentences below.

Choose **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

- 6** About four hundred and fifty people died when the steam clipper Royal Charter was wrecked against the coast of
- 7** FitzRoy chose the word forecast in preference to , because it carried no claim to certainty.
- 8** The daily forecasts were stopped in 1866 and did not return until
- 9** FitzRoy designed a cheap to be distributed to fishing ports.

Questions 10–13

Do the following statements agree with the information given in Reading Passage 1?

Write **TRUE** if the statement agrees with the information, **FALSE** if the statement contradicts the information, or **NOT GIVEN** if there is no information on this.

- 10** FitzRoy's department had not been set up to predict the weather.
- 11** The passage says the scientific objection to FitzRoy was unreasonable.
- 12** Warnings were sent to more ports after the forecasts were restored.
- 13** Shipowners objected to the warnings because too many ships were lost.

You should spend about 20 minutes on Questions 14–26, which are based on Reading Passage 2 below.

What a child knows about number before counting

- A** Long before a child can count, it can tell that four things are more than two. This is not counting and it should not be confused with it: the ability is approximate, it gets worse as the quantities grow, and it does not depend on words. It is present in infants a few months old, it is present in adults asked to judge quickly without counting, and it is present in a wide range of animals, from fish to crows to rhesus monkeys. The question that has occupied this field for thirty years is how that rough sense relates to the exact arithmetic a child later learns at school, and whether one is built out of the other or the two simply coexist.
- B** The experiment that opened it up was done by Karen Wynn in 1992 and used the only measure available with a five-month-old, which is how long the baby looks. A doll is placed on a stage; a screen comes up; a hand visibly adds a second doll behind the screen; the screen drops to reveal either two dolls or, by a concealed manipulation, one. Infants looked reliably longer at the impossible outcome. Infants shown the possible outcome looked away sooner and went back to whatever else was in the room. Something in the ones watching the impossible outcome had kept track of one, then of one more, and registered that the result was wrong.
- C** Elizabeth Spelke placed this within a wider argument. Human beings, she proposed, are equipped from the start with a small number of systems for representing the world — objects, agents, places and quantity among them — which are present before instruction and shared with other species. These systems are supposed to be narrow and automatic rather than general, and to work without anybody being taught them. On this account the approximate sense of number is not a rudimentary version of arithmetic. It is a separate device, with its own signature limits, that arithmetic will later be attached to. The prediction that follows is that the limits should still be detectable in an adult who has been doing sums for decades.
- D** Stanislas Dehaene described what those limits look like in adults. Asked which of two numbers is larger, people are slower when the two are close together than when they are far apart, and slower for large numbers than for small ones at the same distance. The pattern is what you would expect if quantities were represented as overlapping smudges along a line rather than as exact values, and it persists in people who have been doing exact arithmetic for forty years. The approximate system does not go away when the exact one is installed on top of it, and a mathematician comparing sixty-eight with sixty-nine is measurably slower than the same mathematician comparing twelve with ninety.
- E** The test that separates the two most cleanly was carried out among the Mundurukú, a people of the Brazilian Amazon whose language has number words only up to about five. Speakers compared large sets, and estimated the result of adding one large set to another, as accurately as French controls did. They could not do exact arithmetic beyond the range of their vocabulary, and when the

answer required distinguishing six from seven they were at chance. The approximate ability was intact without the words. The exact ability was not available without them, which is as close as this subject comes to a controlled experiment on the effect of vocabulary.

- F** That result is the reason the two systems are now generally treated as separate. It also explains a familiar difficulty in classrooms, which is that a child may have a perfectly good sense of roughly how much something is and no purchase at all on the procedure being taught, since the procedure is a cultural technology laid over a biological capacity and does not follow from it. Neither does the difficulty indicate that the child is bad at mathematics; it indicates that a particular tool has not yet been fitted. Learning to count is not the refinement of an instinct. It is the acquisition of a tool that the instinct makes usable.
- G** Two cautions belong here. The looking-time method carries a good deal of interpretation on a thin measure, and several results in this literature, including replications of the arithmetic study, have come out weaker than the originals or not at all. And the claim that the approximate system predicts later mathematical achievement, which has been made often, rests on correlations that are modest and inconsistent between studies. What is solid is the existence of the two systems and the demonstration that one can operate without the other.

Questions 14–20

Reading Passage 2 has seven sections, A–G.

Choose the correct heading for each section from the list of headings below.

Write the correct number, I–X.

List of Headings

- i** An ability that arrives before the words for it
- ii** An ability that arrives with the words for it
- iii** Measuring a belief by how long a baby stares
- iv** Measuring a belief by asking the child afterwards
- v** A separate device that arithmetic is fixed on to
- vi** A rough version of arithmetic that is later refined
- vii** The marks the rough system leaves in an adult
- viii** A language that supplies one ability and not the other
- ix** What this means in a classroom
- x** Where the evidence is thinner than it looks

14 Section A

15 Section B

16 Section C

- 17** Section D
18 Section E
19 Section F
20 Section G

Questions 21–23

Look at the following contributions and the list of researchers below.
Match each contribution with the correct researcher, A–C.

List of Researchers	
A	Karen Wynn
B	Elizabeth Spelke
C	Stanislas Dehaene

- 21** She set the finding inside a general account of what infants are equipped with.
22 He described the pattern of errors adults still make when comparing quantities.
23 She used a concealed manipulation to produce an impossible outcome.

Questions 24–26

Choose the correct letter, A, B, C or D.

- 24** What did the Mundurukú speakers fail to do?
- A Compare two large sets.
 - B Estimate the result of adding two large sets.
 - C Distinguish six from seven exactly.
 - D Match the performance of French controls on approximate tasks.
- 25** According to the passage, a child who struggles with an arithmetic procedure
- A lacks the approximate sense of quantity.
 - B has not yet been fitted with a particular tool.
 - C is unlikely to succeed at mathematics.
 - D has been taught the procedure too early.

- 26** Which claim does the passage describe as resting on modest and inconsistent evidence?
- A** That the two systems exist separately.
 - B** That the approximate system predicts later mathematical achievement.
 - C** That the approximate system works without words.
 - D** That infants look longer at impossible outcomes.

You should spend about 20 minutes on Questions 27–40, which are based on Reading Passage 3 below.

The case against the survey

A great many of the things we believe about what people think come from asking them, and the asking is a far weaker instrument than either its defenders or its critics generally allow. The defenders treat a percentage as a measurement of an underlying quantity. The critics treat the whole exercise as manipulation. Both assume the survey is measuring an opinion that exists independently of the question, and the difficulty is that this is frequently not the case. What follows is not an argument for ignoring surveys but for reading them as the output of a procedure.

The clearest demonstration is nearly a century old and has never been improved on. Asked whether the government should forbid public speeches against democracy, a minority of Americans agreed. Asked whether the government should allow such speeches, a substantially larger minority said it should not. The two questions are logically identical and the gap between the answers is more than twenty points. Nothing about the respondents changed. The word forbid carries a weight that not allow does not, and a proportion of people are moved by the weight rather than by the proposition. Whichever figure a newspaper prints, it will be reported as the proportion who hold a view.

That is not a defect that better wording removes, because there is no neutral wording. Every question has to be phrased somehow, every phrasing carries something, and the effect of order is as large: a question about national economic conditions asked before a question about personal finances produces different answers to the second than the same pair asked the other way round. A survey does not read a value off a respondent. It runs a small procedure on them, and the result depends on the procedure.

There is a second problem, and it has grown severe within a professional lifetime. Response rates to telephone surveys have fallen from something over a third of those contacted to well under a tenth. The people who answer are therefore not a random sample of the population; they are a sample of the population who answer surveys, and there is no reason to think that group is representative on any dimension that correlates with willingness to talk to strangers. Weighting corrects for the characteristics the pollster can measure, which are age, sex, region, education and a few others. It cannot correct for the ones nobody has thought of, and the ones nobody has thought of are exactly where the risk lives.

The third problem is the oldest and the least often admitted, which is that what people say they will do is a poor guide to what they do. Stated willingness to pay for a product exceeds actual purchasing by a wide margin. Stated intention to exercise, to save, to vote and to donate all exceed the behaviour. This is not lying, and treating it as lying is how the finding gets misused. The person answering is reporting on an intention, sincerely held, formed in a quiet moment under conditions that will not be present when the moment itself arrives.

So the objection is serious, and the conclusion people usually draw from it is wrong. Surveys are not worthless; they are worth different amounts for different questions, and the distinction is not subtle. Asking how many people in a country have a bank account, or piped water, or a qualification, is asking about a fact the respondent knows and has no strong reason to misreport. Those numbers are good, they are the basis of most public statistics, and no alternative method comes close to them.

What survives the objection badly is the other kind of question: what would you do if, how would you feel about, would you support a policy you have not previously considered. Here the respondent has no stored answer to report, so they construct one during the interview, and what they construct is shaped by the wording, the order and the interviewer's presence. The number that results is real in the sense that the procedure would produce it again. It is not a measurement of anything that existed before the question.

The practical rule follows from the distinction rather than from a general suspicion. Ask about facts wherever the fact will do. Where the question is genuinely about an attitude, report it as the output of a specific instrument, with the wording attached, and treat two surveys with different wordings as two instruments rather than as one result and one error. And where a decision turns on what people will actually do, find a way to observe them doing something, because the answer to a hypothetical is evidence about the hypothetical and about very little else.

Questions 27–31

Do the following statements agree with the claims of the writer in Reading Passage 3?

Write **YES** if the statement agrees with the claims of the writer, **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

- 27** The writer thinks surveys should be treated as worthless.
- 28** The writer accepts that people who overstate their intentions are being sincere.
- 29** Online surveys have higher response rates than telephone surveys.
- 30** The writer believes careful wording can remove the effect that wording has.
- 31** The writer holds that two surveys worded differently should be reported as two instruments.

Questions 32–36

Complete the summary below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Three separate problems

The first problem is that a question does not read a value off a respondent but runs a small

32 on them. The second is that those who reply are a sample of the people who

33, and weighting cannot correct for characteristics nobody has thought of. The

third is that a stated intention is formed under conditions that will not be present when the
34 itself arrives. The writer's rule is to ask about **35** wherever
one will do, and where a decision turns on behaviour, to find a way to **36** people
instead.

Questions 37–40

Choose the correct letter, A, B, C or D.

- 37** What does the forbid-and-allow example demonstrate?
- A That respondents did not understand the questions.
 - B That two logically identical questions produce answers more than twenty points apart.
 - C That most people oppose free speech.
 - D That the survey was badly conducted.
- 38** Which position does the writer reject?
- A That questions about facts produce good numbers.
 - B That a percentage measures a quantity existing independently of the question.
 - C That order of questions affects the answers.
 - D That people construct an answer during an interview.
- 39** What does the passage say weighting can and cannot do?
- A It corrects for measured characteristics but not for unconsidered ones.
 - B It corrects for willingness to talk to strangers.
 - C It removes the effect of question order.
 - D It has no useful function at all.
- 40** Which of the following best expresses the writer's conclusion?
- A The value of a survey depends on the kind of question it asks.
 - B Surveys should be replaced by observation in every case.
 - C Attitude questions should never be reported.
 - D Public statistics should not rely on surveys.