Charta | LESSON NOTES

Strengthen questions: close the gap

Verbal Reasoning

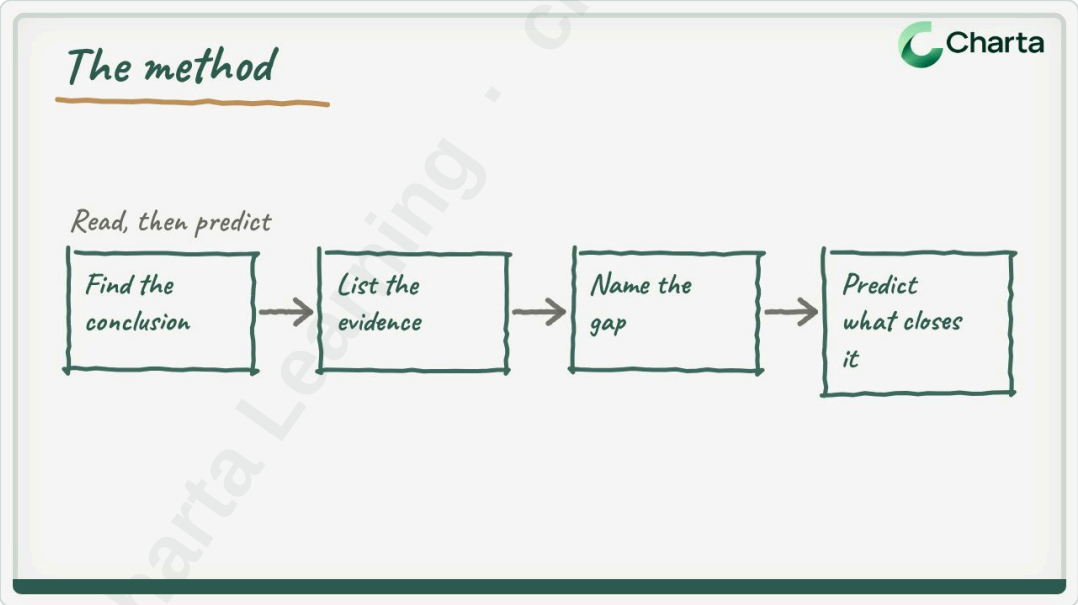
1 What the question asks

- Question line: if true, most strengthens
- Accept every choice as a fact
- Ask: does it make the conclusion more believable?
- The answer helps; it need not prove

IN THE LESSON

- How do you recognise a strengthen question?
- The question line says something like, which of the following, if true, most strengthens the argument, or, most supports the conclusion.
- Notice the words if true.
- You must accept every choice as a fact.
- You never ask whether a choice is likely or realistic.
- You only ask, if this were true, would the conclusion be more believable?
- Notice also the word most.
- The right answer does not have to prove the conclusion.
- It only has to give it more support than any other choice.
- And a choice can be completely true and still useless, if it does not touch the gap between the evidence and the conclusion.

2 The method



IN THE LESSON

- The method has four steps, the same as for assumption questions.
- Step one, find the conclusion, by asking why should I believe this.
- Step two, list the evidence.
- Step three, name the gap: what is the jump from the evidence to the conclusion?
- Often the evidence shows that two things happen together, and the conclusion says one causes the other.
- Step four, predict what would close the gap, before you read the choices.
- Then pick the choice that closes it most.
- Why predict?
- Because a strengthen question always has choices that are about the topic, and sound supportive, but leave the gap exactly where it was.
- A prediction keeps your eyes on the gap.

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3 Five ways to support a cause

- 1. Rule out another cause
- 2. A comparison group without the cause
- 3. Fair groups: alike from the start, chosen by chance
- 4. The right order: cause before effect
- 5. A mechanism: how it works

IN THE LESSON

- When the conclusion says A caused B, here are the five ways a choice can support it.
- One, rule out another cause: show that something else, such as the weather, did not do it.
- Two, a comparison group: show that where A did not happen, B did not happen either.
- Three, fair groups: show that the two groups being compared were alike to begin with, for example because they were chosen by chance.
- Four, the right order: show that A came before B, and that B did not cause A.
- Five, a mechanism: show how A could produce B.
- Keep this list beside you.
- In this lesson, the right answers use the first three.

4 The traps in the wrong choices

- It weakens: right topic, wrong direction
- True background that misses the gap
- The same pattern again, somewhere else
- Compares the wrong groups, or says why it matters

IN THE LESSON

- Now the traps.
- The first is the opposite direction: a choice that weakens.
- Under time pressure it is easy to pick a choice because it is relevant, without checking which way it pushes.
- The second is the true but off topic fact: background that sounds supportive, such as experts say walking is healthy, but does not touch the gap.
- The third repeats the evidence: the same pattern seen again somewhere else does not show the cause.
- The fourth is the irrelevant comparison: it compares the wrong groups.
- The fifth is about why the topic matters, not about whether the conclusion is right.
- For every choice, ask two questions: does it touch the gap, and which way does it push?

5 Question 1: the fertiliser ban

- Since Brook County banned lawn fertilisers that contain phosphorus, algae blooms in Lake Tamsin, which is fed by the county's streams, have become far less frequent. County officials conclude that the ban reduced the blooms.
- Which of the following, if true, most strengthens the argument?

IN THE LESSON

- Question one is an easy one.
- It is short, so read it with me slowly, and notice the order of events: first a ban, then fewer blooms.
- Since Brook County banned lawn fertilisers that contain phosphorus, algae blooms in Lake Tamsin, which is fed by the county's streams, have become far less frequent.
- County officials conclude that the ban reduced the blooms.
- The question: Which of the following, if true, most strengthens the argument?
- Before you look at the choices, find the conclusion, then the gap.

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6 Question 1: find the gap

Brook County: phosphorus ban, then fewer algae blooms

Conclusion	the ban reduced the blooms	**the claim**
Evidence	fewer blooms since the ban	**after**
Gap	after does not prove because	**the gap**
Prediction	no drop where no ban	**comparison**

IN THE LESSON

- The conclusion: the ban reduced the blooms.
- The evidence: since the ban, blooms in the lake have become far less frequent.
- The gap is the classic one.
- Two things happened one after the other, and the officials say the first caused the second.
- What else could have made the blooms less frequent?
- Weather, for example, or some change across the whole region.
- So what would close the gap?
- Our list of tools says: a comparison group.
- If lakes nearby that the ban could not affect still had just as many blooms, the regional explanations become much less likely, and the ban looks like the cause.
- Predict that, or something that rules out another cause.

7 Question 1: the five choices

- A. Blooms did not decline in nearby lakes that the county's streams do not feed.
- B. Phosphorus-free lawn fertilisers cost about the same as the fertilisers they replaced.
- C. Summers in the region have been cooler since the ban, and algae grows more slowly in cool water.
- D. Several farms near Lake Tamsin still spread fertilisers containing phosphorus on their fields.
- E. Algae blooms can make lake water unsafe for swimming and harmful to fish.

IN THE LESSON

- Here are the five choices.
- Choice A.
- Blooms did not decline in nearby lakes that the county's streams do not feed.
- Choice B.
- Phosphorus-free lawn fertilisers cost about the same as the fertilisers they replaced.
- Choice C.
- Summers in the region have been cooler since the ban, and algae grows more slowly in cool water.
- Choice D.
- Several farms near Lake Tamsin still spread fertilisers containing phosphorus on their fields.
- Choice E.
- Algae blooms can make lake water unsafe for swimming and harmful to fish.
- Which one uses a comparison group?

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8 Question 1: test each choice

Prediction: no drop in blooms where there was no ban

A: no decline in other lakes	a group without the ban	**strengthens**
B: same price as the old kind	price is not the cause	**off topic**
C: cooler summers since the ban	another cause of fewer blooms	**weakens**
D: farms still use phosphorus	makes the ban matter less	**weakens**
E: blooms harm swimmers and fish	why it matters, not the cause	**off topic**

IN THE LESSON

- Choice A matches the prediction.
- Lakes that the county's streams do not feed are a comparison group, untouched by the ban, and their blooms did not decline.
- That makes weather or a regional change less likely, so the ban looks more like the cause.
- Choice B, the price of the new fertiliser, says nothing about what caused the drop.
- Choice C is the opposite direction trap.
- Cooler summers are another possible cause, so C weakens.
- Choice D also pushes the wrong way: if farms still spread phosphorus, the lawn ban is less likely to matter.
- Choice E explains why blooms are a problem, not why they fell.
- The answer is A.

9 Question 2: the walking group

- Among the staff of Ferndale Council, employees who joined the voluntary lunchtime walking group took fewer sick days last year than employees who did not. The council's wellbeing officer concludes that taking part in the group improves employees' health enough to reduce their absence.
- Which of the following, if true, most strengthens the officer's conclusion?

IN THE LESSON

- Question two is a medium one.
- Read it with me.
- Among the staff of Ferndale Council, employees who joined the voluntary lunchtime walking group took fewer sick days last year than employees who did not.
- The council's wellbeing officer concludes that taking part in the group improves employees' health enough to reduce their absence.
- The question: Which of the following, if true, most strengthens the officer's conclusion?
- Ask yourself who chooses to join a walking group.

10 Question 2: who joins?

Ferndale: walkers took fewer sick days than others

Conclusion	walking cuts absence	**the claim**
Evidence	members took fewer sick days	**together**
Rival	healthy people chose to join	**selection**
Prediction	the often absent joined too	**fair groups**

IN THE LESSON

- The conclusion: taking part in the group improves health enough to reduce absence.
- The evidence: members took fewer sick days than staff who did not join.
- The key word in the question is voluntary.
- Staff chose for themselves whether to join.
- So there is a rival explanation called selection.
- Perhaps the people who join a lunchtime walking group were healthier to begin with, and would have taken fewer sick days anyway.
- If so, the group did nothing.
- To strengthen the argument, we need a choice that makes the two groups look alike before anyone joined.
- That is tool three, fair groups.
- Predict: people who were often absent joined just as much as anyone else.

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11 Question 2: the five choices

- A. Staff with a record of frequent absence were as likely to join as staff with little absence.
- B. Doctors widely recommend regular walking as a way of improving general health.
- C. Group members took fewer sick days than other staff in every month of the year, not only in the summer months.
- D. Walking groups at other employers have also reported lower absence among their members than among other staff.
- E. Sick days taken by the council's staff as a whole were fewer last year than the national average for public employers.

IN THE LESSON

- Here are the five choices.
- Choice A.
- Staff with a record of frequent absence were as likely to join as staff with little absence.
- Choice B.
- Doctors widely recommend regular walking as a way of improving general health.
- Choice C.
- Group members took fewer sick days than other staff in every month of the year, not only in the summer months.
- Choice D.
- Walking groups at other employers have also reported lower absence among their members than among other staff.
- Choice E.
- Sick days taken by the council's staff as a whole were fewer last year than the national average for public employers.
- Which one rules out selection?

12 Question 2: test each choice

Prediction: the often absent joined as readily as others

A: frequent absentees joined too	the groups started alike	**strengthens**
B: doctors recommend walking	true, but misses the gap	**off topic**
C: fewer sick days every month	healthy joiners fit this too	**no help**
D: other walking groups did too	the same pattern elsewhere	**repeats**
E: below the national average	compares the wrong groups	**comparison**

IN THE LESSON

- Choice A matches the prediction.
- If staff with a record of frequent absence were just as likely to join, then the members were not simply the healthy ones, and selection is ruled out.
- That leaves the walking as the likelier cause.
- Choice B, doctors recommend walking, is true background, but it does not touch the rival explanation that healthier staff joined.
- Choice C, a gap in every month, would also happen if healthy people joined, so it cannot tell the two stories apart.
- Choice D repeats the same pattern at other employers, and selection could explain it there too.
- Choice E compares the council with other employers, but the claim compares members with non-members.
- The answer is A.

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13 Question 3: the coated hives

- In an orchard, researchers compared two sets of honeybee hives: hives whose entrances were fitted with a new anti-mite coating and hives without it. Bees in the coated hives lived longer on average than bees in the uncoated hives. The researchers conclude that the coating extends the lives of honeybees.
- Which of the following, if true, most strengthens the researchers' conclusion?

IN THE LESSON

- Question three is another medium one.
- Read it with me.
- In an orchard, researchers compared two sets of honeybee hives: hives whose entrances were fitted with a new anti-mite coating and hives without it.
- Bees in the coated hives lived longer on average than bees in the uncoated hives.
- The researchers conclude that the coating extends the lives of honeybees.
- The question: Which of the following, if true, most strengthens the researchers' conclusion?
- Think about how the hives ended up in each group.

14 Question 3: how were the groups chosen?

Orchard: coated hives' bees lived longer on average

Conclusion	the coating lengthens bee lives	**the claim**
Evidence	coated hives lived longer	**together**
Rival	the best hives got the coating	**selection**
Prediction	hives chosen by chance	**fair groups**

IN THE LESSON

- The conclusion: the coating extends the lives of honeybees.
- The evidence: bees in coated hives lived longer, on average, than bees in uncoated hives.
- Again, two groups differ in one visible way, and the researchers say that difference is the cause.
- But the groups might differ in other ways too.
- If beekeepers picked which hives to coat, they might have picked their strongest hives, which would have lived longer anyway.
- What closes this gap best?
- Tool three again: fair groups.
- The strongest form of fair groups is to choose them by chance, because chance cannot favour the strong hives.
- Predict: the coated hives were picked at random.

15 Question 3: the five choices

- A. Mites are found in many of the hives in the orchard.
- B. Which hives received the coating was decided by chance rather than by the beekeepers.
- C. Beekeepers chose to coat the hives that they judged to be the strongest.
- D. Beekeepers who took part in the study kept more hives than the average beekeeper in the region.
- E. The researchers who measured the bees' lifespans knew which hives had been coated.

IN THE LESSON

- Here are the five choices.
- Choice A.
- Mites are found in many of the hives in the orchard.
- Choice B.
- Which hives received the coating was decided by chance rather than by the beekeepers.
- Choice C.
- Beekeepers chose to coat the hives that they judged to be the strongest.
- Choice D.
- Beekeepers who took part in the study kept more hives than the average beekeeper in the region.
- Choice E.
- The researchers who measured the bees' lifespans knew which hives had been coated.
- Look for chance.

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16 Question 3: test each choice

Prediction: chance decided which hives were coated

A: mites are common	says nothing about the coating	**off topic**
B: hives chosen by chance	rules out picking the best	**strengthens**
C: keepers coated the strongest	the rival comes true	**weakens**
D: keepers had many hives	about the people, not the groups	**off topic**
E: measurers knew which was which	could bias the result	**weakens**

IN THE LESSON

- Choice A says mites are common in the orchard.
- That may be why a coating is useful, but it does not show that the coating, rather than some other difference, made the bees live longer.
- Choice B matches our prediction.
- If chance decided which hives were coated, the beekeepers could not have favoured their strongest hives, so the coating is the likeliest cause.
- Choice C is the opposite direction trap: it makes the rival explanation true, so it weakens.
- Choice D describes the beekeepers, not how the two groups were chosen.
- Choice E also weakens, because researchers who knew which hives were coated might have measured with a bias.
- The answer is B.

17 Question 4: the pain trial

- In a trial of a new drug for chronic pain, patients taking the drug reported, on average, the same level of pain as patients taking a placebo. The researchers conclude that the drug relieves pain in none of the patients who take it.
- Which of the following, if true, most strengthens the researchers' conclusion?

IN THE LESSON

- Question four is a hard one.
- Read the conclusion very carefully.
- In a trial of a new drug for chronic pain, patients taking the drug reported, on average, the same level of pain as patients taking a placebo.
- The researchers conclude that the drug relieves pain in none of the patients who take it.
- The question: Which of the following, if true, most strengthens the researchers' conclusion?
- Watch the word none.

18 Question 4: an average hides people

Pain trial: drug group's average pain = placebo group's

Conclusion	the drug helps no patient	**none**
Evidence	same average pain	**average**
Gap	an average can hide some	**the gap**
Prediction	no wider spread of pain	**no subgroup**

IN THE LESSON

- This one is not about cause in the usual way.
- The conclusion: the drug relieves pain in none of the patients.
- The evidence: on average, the drug group reported the same pain as the placebo group.
- The gap is between an average and every single person.
- An average can hide a lot.
- Imagine the drug helped some patients a great deal and made others worse.
- The two effects could cancel out, and the average would look exactly like the placebo.
- So what would strengthen the claim that nobody was helped?
- Something showing there is no hidden group that was helped.
- If some patients improved and others got worse, the drug group's pain levels would be more spread out.
- Predict: the spread was no wider than the placebo group's.

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19 Question 4: the five choices

- A. The trial was large enough to detect an average difference of the size that patients would regard as worthwhile.
- B. Within the drug group, patients' pain levels were no more widely spread than within the placebo group.
- C. Patients in both groups were assigned by chance, and neither patients nor researchers knew who received the drug.
- D. A few of the patients taking the drug reported far less pain than the average patient taking the placebo.
- E. The patients in the drug group and the placebo group reported the same average pain level at the start of the trial.

IN THE LESSON

- Here are the five choices.
- Choice A.
- The trial was large enough to detect an average difference of the size that patients would regard as worthwhile.
- Choice B.
- Within the drug group, patients' pain levels were no more widely spread than within the placebo group.
- Choice C.
- Patients in both groups were assigned by chance, and neither patients nor researchers knew who received the drug.
- Choice D.
- A few of the patients taking the drug reported far less pain than the average patient taking the placebo.
- Choice E.
- The patients in the drug group and the placebo group reported the same average pain level at the start of the trial.
- Which one speaks about individual patients, not the average?

20 Question 4: test each choice

Prediction: pain in the drug group was no more spread out

A: the trial was big enough	supports the average only	**average only**
B: spread no wider than placebo	no hidden group was helped	**strengthens**
C: chance and blinding	good design, still an average	**average only**
D: a few did far better	some were helped	**weakens**
E: same average at the start	says nothing about each patient	**average only**

IN THE LESSON

- Choice A says the trial was big enough to find a worthwhile average difference.
- That supports the finding of no average effect, but our gap is about individuals, so A misses it.
- Choice B matches the prediction.
- If pain levels in the drug group were no more widely spread than in the placebo group, there is no sign of a hidden group that improved, which supports the claim that nobody was helped.
- Choice C, chance and blinding, is good trial design, but it again supports only the average.
- Choice D is the opposite direction trap: a few patients who did far better suggests the drug helped some of them.
- Choice E, equal starting levels, says nothing about whether any individual improved.
- The answer is B.

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21 Accurate and quick

- Question line first
- Name the gap in one word: cause, selection, average
- Recall the five tools before the choices
- Mark each choice plus, minus or zero
- Two pluses? Pick the one that hits the gap

IN THE LESSON

- Some habits that make you faster without making you careless.
- First, read the question line first, so you know you want support.
- Second, write the conclusion in a few words, and name the gap with one word if you can: cause, selection, average.
- Third, run through the five tools in your head before you read the choices, so you know what shape the answer will take.
- Fourth, for each choice ask two quick questions: does it touch the gap, and which way does it push?
- Mark it plus, minus or zero.
- Usually only one choice is a clear plus.
- Fifth, if two look positive, choose the one that hits the gap directly, not the one that only adds background.

22 What the four questions taught

- After is not because: use a comparison group
- Volunteers: rule out selection
- Chance makes the groups fair
- An average is not every person

IN THE LESSON

- Look back at the four questions.
- In question one, the officials saw one thing follow another, and a comparison group without the ban closed the gap.
- In question two, people chose for themselves whether to join, and showing that the often absent joined too ruled out selection.
- In question three, the right answer was the strongest form of fair groups: allocation by chance.
- And in question four, the conclusion was about every patient while the evidence was an average, so the answer had to be about individuals.
- In all four, at least one wrong choice pushed in the opposite direction.
- That trap is the most common one in strengthen questions, so always check the direction.

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23 Quick check

1. A choice is relevant. Is that enough to pick it?
   Answer: No: check its direction, as it may weaken.
2. People chose to join a club. What rival should you look for?
   Answer: Selection: the joiners differed from the start.
3. Why does choosing groups by chance help?
   Answer: The groups start alike, so the treatment explains the difference.

IN THE LESSON

- A quick check.
- Pause after each question.
- Question one.
- A choice is clearly relevant to the argument.
- Is that enough to pick it in a strengthen question?
- The answer is no.
- You must also check its direction, because a relevant choice may weaken.
- Question two.
- An argument compares people who chose to join a club with people who did not.
- What rival explanation should you look for?
- The answer is selection: the people who joined may have been different from the start.
- Question three.
- Why does choosing groups by chance strengthen a claim that a treatment works?
- The answer: chance makes the groups alike to begin with, so a difference afterwards is more likely to come from the treatment.

24 Recap: the strengthen method

- Conclusion, evidence, gap, prediction
- Five tools for a cause
- Touch the gap? Which way does it push?
- Pick the choice that closes the gap most

IN THE LESSON

- Let us recap the technique.
- Find the conclusion, list the evidence and name the gap.
- Accept every choice as true.
- When the conclusion is about a cause, remember the five tools: rule out another cause, a comparison group, fair groups, the right order, and a mechanism.
- Predict which one the answer will use.
- Then test each choice with two questions: does it touch the gap, and which way does it push?
- Name the trap in every wrong choice: weakens, true but off topic, repeats the evidence, or compares the wrong groups.
- The right answer is the choice that closes the gap the most.
- Practise this on every strengthen question until it is automatic.

Summary notes for the Charta whiteboard lesson. Figures are from the lesson's made-up examples.

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