

PHYSICAL RISK ASSESSMENT

Analysis of Competing Hypotheses (ACH) compares multiple explanations against the same evidence to reduce bias and support sound decisions.

ACH Steps

- 1. List hypotheses:** specific, testable explanations of what might be occurring.
- 2. Gather evidence:** for each piece of evidence, consider each hypothesis in turn and decide how that evidence affects it.
- 3. Rate each evidence** against each hypothesis in the matrix (support, refute, or neutral).
- 4. Use any qualitative scale** you like, e.g., numbers, letters {S, N, R}, or symbols. 1/+ can indicate support, while 2/++ indicates strong support.

► **Supports (+ / ++):** Evidence increases the likelihood the hypothesis is true.

► **Refutes (- / --):** Evidence decreases the likelihood the hypothesis is true.

► **Neutral (0):** Evidence is ambiguous or unrelated to the hypothesis.

5. Multiply the weight by your rating in the matrix, then add the totals.

6. Draw conclusions: explain what the evidence points to as the most likely explanation and acknowledge uncertainty or gaps in the analysis.

Example Findings

Based on the available evidence, we assess with [confidence level] that [most likely hypothesis], as evidenced by [key evidence]. However, [acknowledge uncertainties or competing possibilities].

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Matrix Instructions

- 1 Add **Hypotheses** to the first row $\{H_1, H_2, H_n\}$
- 2 Add **Evidence** to the first column $\{E_1, E_2, E_n\}$
- 3 **Weight** the confidence of each piece of evidence $\{1, 2, 3\}$
- 4 **Evaluate** if each piece of evidence refutes (-1), supports (+1) or is neutral (0) for each hypothesis.
- 5 **Multiply** your evaluation (#4) by the weight (#3), then add the results for each hypothesis (#1). The highest number is the most likely hypothesis.

ACH Matrix

	H_1	H_2	H_3	Weight
E_1	-1	0	1	1
E_2	0	0	0	1
E_3	+1	-3	3	3
Totals	2	-3	4	

Tips for ACH

- ▶ Ask **Who, What, Where, When, and Why**.
- ▶ Listen to **all perspectives**.
- ▶ Be **creative**, but reasonable.
- ▶ Ask if **the evidence is reliable or questionable**.
 - Use weights to show evidence's relevance/reliability (e.g., 1 = low, 2 = medium, 3 = high)



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