CYBEHAVE · ADVANCED

Organisational Network Analysis for Security

Course workbook

Measure the network that carries behaviour, lawfully, and decide where Champions go.

Build Behaviour. Build Culture. Build Resilience.

This workbook belongs to

Organisation and role

The network I will analyse (division, site or function; how many people, how many teams)

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BEFORE YOU START

How to use this workbook

This is the advanced follow-on to Running a Security Champions Network. That course told you that shape matters more than size; this one is about seeing the shape: collecting network data lawfully, reading it, modelling what will move through it, deciding where Champions go, and measuring whether the network changed. Every method here can be done with a short survey, a spreadsheet and a free network library (Gephi, networkx or igraph). The workbook follows the ten videos in order, holds every instrument and worksheet the videos refer to, and ends with the quizzes and their answers.

Five ways to get the most from it

1. **Bring a real network.** A division, a site or a function you could actually survey. Every section has a "Your network" box; fill it with real numbers.
2. **Do module 3 before you collect anything.** The purpose, the three ruled-out uses, the lawful basis, the DPIA sketch and the cell size are decided before the first name is typed.
3. **Write your predictions first.** How many teams reached? What embedding? Write it down before the data comes back; it is the only kind of prediction that teaches you anything.
4. **Take the quizzes.** Scenarios, not definitions. Check the key and read the explanation for anything you missed.
5. **Tie every number to a decision.** If a metric would not change who you place, pair or connect, cross it out. The metric-to-decision table in module 4 is the test.

The course at a glance

Module	Title	Tools in this workbook
0	Welcome	What ONA is and is not; meet Ines and Owen.
1	The Informal Network	Three-networks sketch; ego network; covered-reached-tipped ledger.
2	Getting the Data	The survey instrument; boundary and scope sheet; response-rate tracker; behaviour-measure pairing.
3	Ethics and Lawful Basis	Purpose and ruled-out uses; three-part test; DPIA sketch; consultation log; reporting rules.
4	Reading a Network	Metric-to-decision table; the four pictures; hidden-connector count.
5	Contagion Models	Threshold worksheet; exposure-count sheet; placement comparison runs.
6	Placing Champions with the Map	Target-team tests; the placement plan; HEROES map and survey split.
7	Measuring Change in the Network	Wave plan; attrition check; noise log; change-against-noise tests.

Module	Title	Tools in this workbook
8	Limits, Failure Modes and Reporting	Failure-mode check; the one-page network report; what HEROES carries.
9	Close	Eight ideas; one analysis this quarter; glossary; further reading; quiz answers.

Three lines you will hear again

Measure reach, not coverage. · Every metric is a decision about a Champion. · Names are personal data: aggregate, or do not publish.

WORKED EXAMPLE

Meet Ines and Owen

Halden Engineering designs and builds infrastructure: 12,000 people in the UK, the Netherlands and Poland, a matrix of engineering disciplines and project teams, 310 teams. Owen Hale is the security culture lead; he finished the Champions Network course and knows he is at Stage 2 in the Infrastructure division: 71 names, 44 active, a busy channel, a flat behaviour line. Ines Marchetti works in People Analytics, has run engagement surveys for six years and has never run a network survey. The CISO's question: "If we move Champions around, how would we know it worked?"

Where the course takes it
Module 1: the roster says 60 of 96 teams covered; Owen guesses 40 reached; the survey will say 38.
Module 2: the pilot boundary (2,400 people, contractors in); three questions plus a behaviour item and a frequency; roster selection, five names; 1,944 responses, 81%; passive metadata declined.
Module 3: purpose and three ruled-out uses; legitimate interests; an eleven-page DPIA; the Dutch works council's three conditions; cell size five; "the names my people gave" refused.
Module 4: 38 of 96 teams reached, 19 by three or more; embedding 0.35; modularity 0.62; 14 wide bridges, 51 single ties, three single-person department bridges; 9 hidden connectors, 6 not on the roster.
Module 5: reporting at threshold three: 61% of non-adopters have no adopting contact, 7% have three or more; pairs in 18 target teams would make it 42%.
Module 6: the plan: 18 target teams, 36 Champions in pairs (22 new, 11 nominated by the survey), a backbone of 9, the three bridges widened, coverage 63% to 58% said in advance.
Module 7: wave two: 1,712 responses, panel 1,390; embedding 0.58; exposure 34%; 9 of 18 teams tipped; reporting 27% in seeded teams against 11%; the noise log and the attrition check.
Module 8: the one page, behaviour first; the works council reads it on Monday, the COO on Wednesday and answers the CISO's question himself.

Use Halden as a mirror

Each time a Halden card appears, ask: what is my equivalent? What would my picture one show next to my roster? Who are my six hidden connectors? What would my works council ask?

MODULE 1

The Informal Network

Key ideas from the video

- Four words carry the subject: node, tie, direction, weight. An ego network is one person and their ties; a whole network is everyone in a boundary. Champions draw the first in HEROES; you need the second.
- Three networks sit under every chart (Krackhardt and Hanson, 1993): advice, trust, communication. Alerts travel on communication. Reporting, pausing on an urgent request and admitting a click travel on advice and trust.
- The chart is a map of authority; behaviour does not travel along authority. Matrix teams, sites and shifts, tenure, contractors and hybrid work are where they diverge most.
- Covered means a name on a roster. Reached means colleagues name the Champion when asked. Tipped means the team does the behaviour and keeps it going. The gap between the first two is the coverage illusion, and programme records cannot show it because they create it.
- Five questions a roster cannot answer: which teams turn to a Champion; who colleagues already ask who is not on the roster; where the bridges are and how wide; how many adopting contacts each non-adopter has; what share of a Champion's security conversations happen in their own team.

Template: my ego network for security

Who I ask	Who asks me	Who I would tell about a mistake	On my chart as manager or report?

Template: which network does each behaviour travel on?

Target behaviour	Advice, trust or communication?	Why	Threshold guess (1, 2, 3+)

Template: covered, reached, tipped

Team	Covered (roster)?	Reached (do you know, or assume)?	Tipped (Team Pulse)?

Owen and Ines compare the roster

Infrastructure division: 2,400 people, 96 teams, three countries. Roster: 71 Champions, 44 active, covering 60 teams; the dashboard says 63%. Owen's informal read: perhaps 20 teams where the Champion is actually asked. Ines: "Covered by whose account? Have you ever asked the team?"

Decided: treat 63% as a roster figure and say so to the CISO before the survey; survey the whole division, not the Champions; write the prediction first. Owen guessed 40 teams reached. The answer in module 4 is 38.

Your network

Write your coverage figure, where it comes from, and your honest guess at how many teams are reached.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. Draw your own ego network for security: who do you ask, who asks you, who would you tell? How many of them are on your chart as your reports or your manager?

2. For one target behaviour, which of the three networks does it travel on, and why?

3. How many teams does your roster say are covered? How many of them do you know, rather than assume, have a Champion colleagues actually turn to?

4. Where in your organisation would you expect the chart and the advice network to differ most? Shift work, sites, contractors, matrix teams?

5. If you could ask every colleague one network question tomorrow, which would it be?

MODULE 2

Getting the Data

Key ideas from the video

- Active (a survey) measures advice and trust and is transparent; passive (collaboration metadata) measures communication volume and reads as surveillance. The first wave is a survey; passive data, if ever, comes later, aggregated to teams, under its own DPIA.
- Three questions read a whole network: who do you go to for security advice; who would you tell about a suspicious message; who do you talk to about work. Two extensions: "which of these do you do routinely" for the target behaviours (marks adopters), and a frequency per name (weights ties). Up to five names each; under ten minutes.
- Roster selection up to a few thousand; type-ahead recall above. The fixed-choice trap: a cap truncates hubs, so in-degree is honest and out-degree is not.
- The boundary: who is in, who is out and why, names outside flagged. A team left out removes every bridge into it and manufactures isolates next to it (Kossinets, 2006).
- A network survey at 50% is a different network, not half of one: betweenness and clustering break first. Aim above 80%; 70 to 80 with care; below 70 do not place people on it. Read response rate by team before anything else.
- Collect a direct behaviour measure in the same month, so the network is never the only evidence.

The survey instrument (copy as is)

#	Question	Format
1	Who do you go to for security advice, or when you are not sure whether something is safe?	Up to five names from the roster; frequency per name: daily / weekly / monthly / rarely
2	If you received a message you thought might be a scam or a phishing attempt, who would you tell?	Up to five names; frequency per name
3	Who do you talk to about your work most, outside formal meetings?	Up to five names; frequency per name
4	Which of these do you do routinely? (list the three target behaviours)	Tick each that applies
5	Your team (pre-filled from HR; confirm or correct)	Single choice
	Opening paragraph: what this is for, what will never be shown (no names, nothing below five people, nothing to managers), who to ask, how to opt out.	Plain text, first screen

Template: boundary and scope

Inside the boundary (units, headcount)	Outside, and why	Edge cases (contractors, matrixed, remote)	Names outside the boundary: allowed and flagged?

Template: response-rate tracker

Team	Headcount	Responses	%	Under 70%? Action

Template: the behaviour measure beside the survey

Target behaviour	System source (tool, audit, access data)	Figure this month	Collected on

Ines designs wave one

Boundary: the whole division, 2,400 including 140 long-term contractors; outside names allowed and flagged. Instrument: three questions, five names from a roster with search, the behaviour item, a frequency per name; nine minutes in testing. Passive data declined for wave one. Response: 1,944 of 2,400, 81%, after the COO's invitation and three reminders; lowest team 52%; four teams under 70% flagged.

Written down first: the cap and the boundary; response rate by team as a column beside every later measure; the behaviour measure for the same month: 9% of simulated phish reported, 11% of real; 48% of payee changes verified; 61 live shared logins on site systems.

Your network

Draw your boundary, choose roster or recall, set your response-rate commitment, and name the behaviour measure you will collect in the same month.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. Survey or collaboration data for your first wave, and what would you say to a colleague who asked why?

2. Draw the boundary for your first network survey. Who is inside, who is out, and who sits on the edge?

3. Would you use a roster or free recall? What is the size of your scope, and what does that decide?

4. What response rate will you commit to before you launch, and what will you do if you land under it?

5. Which direct behaviour measure will you collect alongside the survey, so the network is never the only evidence?

MODULE 3

Ethics and Lawful Basis

Key ideas from the video

- A network survey is about other people: respondents name colleagues who did not consent; anonymity is impossible at collection; results can be used against individuals; and one misuse teaches the workforce never to answer honestly again (Borgatti and Molina, 2003, 2005).
- One purpose, written down, and three uses ruled out beside it: performance management of anyone; "influence" for any other programme; identifying who did or did not report, click or share a login.
- Lawful basis: usually legitimate interests, with the three-part test (purpose, necessity, balancing) written out. Consent is weak at work; offer an opt-out anyway and honour it silently. Named people have the same rights as respondents: tell them too.
- UK GDPR Article 35: a DPIA where processing is likely to result in a high risk. Ten pages: purpose, data, basis, who sees what, risks, mitigations, the DPO's view. Collaboration metadata is monitoring and brings the regulator's 2023 guidance on monitoring workers into play.
- Consult the people themselves, the works council (in the Netherlands a consent right under the Works Councils Act over arrangements that process employee data and anything that can observe behaviour), unions and staff forums.
- Reporting rules set in advance: minimum cell size (five), team level and above, each person may see only their own map, names in the plan are nominations with a real no, raw data on one system with two named people and a deletion date. Never publish a named picture, a ranking, "isolated" against a name, who named whom, or anything a manager could use.

Template: purpose and ruled-out uses

The purpose, in one sentence	Ruled out 1	Ruled out 2	Ruled out 3

Template: the three-part test

Purpose test: what is the legitimate interest?	Necessity test: could we do it with less data?	Balancing test: would people reasonably expect this; what overrides it?

Template: DPIA sketch (ten headings)

Heading	Your note
Purpose and ruled-out uses	
Data collected (questions, names, behaviour item, frequency, team)	
Lawful basis and the three-part test	
Who sees what (raw: two named people; reports: team level; individuals: own map only)	
Retention (two waves, then delete) and system	
Risks to individuals (named without consent, misuse by a manager, re-identification in small teams)	
Measures (cell size, aggregate-only, no manager reports, works council review of the page)	
Consultation (people, works council, unions, DPO)	
Residual risk and the DPO's view	
Review date	

Template: consultation log

Who	Date	What they asked for	Agreed?

The reporting rules (sign and keep)

- Minimum cell size: _____ (default five). No figure for any smaller group.

- Team level and above. Never person level. Each person may see their own map, opt-in, and nobody else.
- Names in the placement plan are nominations through the manager, with a real choice to say no.
- Raw tie list on one system, two named people, deleted on _____.
- Never: a named picture; a ranking by any centrality; "isolated" against a name; who named whom or nobody; who said they do or do not do the behaviour; anything a manager could use in a one-to-one.
- The works council (or equivalent) sees the one-page report before the sponsor.

Halden through the DPO and the works council

Purpose and three ruled-out uses first; legitimate interests with the test written out; an opt-out in the invitation. DPIA, eleven pages, through the DPO in three weeks: contractors named in the notice, retention cut to fifteen months. The Dutch works council, two meetings: cell size in writing, no manager-level reports, the one-page report before the sponsor. All agreed. Passive data declined and the reasons recorded.

Three months later a site director asked for "the names my people gave, so I can thank them". Owen read him the purpose and the ruled-out uses, offered a team picture with no names, and cited the works council. The director told his managers the survey was safe to answer. Wave two response at his site: 88%.

Your network

Write your purpose sentence and your answer to a manager who asks for names.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. **Who in your organisation would need to see a DPIA for a network survey, and have you met them yet?**

2. **Write the purpose of your survey in one sentence. Now list three uses it rules out.**

3. **What is your minimum cell size, and who agreed it?**

4. **Which works councils, unions or staff forums sit in your scope, and what rights do they have over this?**

5. **If a manager asked you for the names their team gave, what exactly would you say?**

MODULE 4

Reading a Network

Key ideas from the video

- Whole-division density is tiny and uninformative; within-team density is where a behaviour can start (0.25 or more lets a pair be seen at once). In-degree on the advice question is reach as colleagues see it; out-degree is capped: rank by in-degree, never by out.
- Betweenness (Freeman, 1979) finds the backbone, the people whose ties span departments and carry alerts; it does not choose embedded pairs, and it is the first measure to break under non-response.
- Modularity against team membership (Newman, 2006): high means teams are real clusters, place by team; low means advice ignores the chart, place by cluster. Brokers across structural holes (Burt) carry information and are narrow bridges for behaviour. Weak ties (Granovetter, 1973) reach far and carry behaviour badly. Homophily (McPherson, Smith-Lovin and Cook, 2001): similar Champions reach the same colleagues and miss the same ones.
- Every metric is a decision: if it does not change who you place, pair or connect, stop computing it.
- Four pictures, no names: teams reached (beside the roster view); embedding (one anonymous dot per Champion); bridges (teams as nodes, line thickness as tie count); hidden connectors (a count by team, never a chart).

Template: metric to decision

Metric	What it decides	Your figure	The decision it changes (or cross it out)
Within-team density	Which teams a pair can tip now		
In-degree, advice question	Who colleagues already go to; nominations		
Reach by team	Which "covered" teams are not; real coverage		
Champion embedding	Cluster or network		
Betweenness, top decile	Who carries the backbone		
Modularity against team	Place by team or by cluster		
Bridge width, team pairs	Where behaviour can cross		
Exposure counts	Whether the behaviour can start (module 5)		

Template: the four pictures

Picture	What it shows	Drawn? Date	The sentence it supports
1 Teams reached	Org tree coloured by colleagues naming a Champion (none / 1 to 2 / 3+), beside the roster view		
2 Embedding	One anonymous dot per Champion: share of security ties inside their own team		
3 Bridges	Teams as nodes; line thickness = ties between them; thin single lines between departments		
4 Hidden connectors	Count by team of top-decile betweenness or in-degree people not on the roster		

Template: hidden connectors (names stay in this book, never on a page)

Team	Named by (count)	On the roster?	Betweenness decile	Nominate for: team pair / backbone / neither

Ines draws the four pictures

Teams reached: 38 of 96, and 19 by three or more; the roster said 60. Embedding: median 0.35; two thirds of the active Champions' security conversations were with each other or with Owen's team. Bridges: modularity 0.62, so teams are real clusters; 14 team pairs share three or more ties, 51 exactly one; three departments joined by a single person each. Hidden connectors: 9 in the top decile of betweenness, 6 not on the roster. Within-team density: mean 0.31, range 0.08 to 0.55.

The CISO: "so coverage is forty percent, not sixty-three". Owen: "Reach is forty. Coverage is still sixty-three, and it was never the number."

Your network

Fill the metric-to-decision table for your scope, even with guesses, and mark which decisions you could already make.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. For each metric in this module, write the Champion decision it would change in your programme. Cross out any metric with no decision.

2. Which teams in your scope would you expect to have high within-team density, and which low? What does that mean for where a behaviour can start?

3. Who would you guess sits in the top decile of betweenness in your division, and are they on your roster?

4. Where do you suspect a bridge of exactly one person joins two departments?

5. Which of the four pictures would change your sponsor's mind fastest, and why?

MODULE 5

Contagion Models

Key ideas from the video

- People adopt when enough of their contacts have; "enough" is the threshold (Granovetter, 1978). Simple contagion has a threshold of one and any network carries it; complex contagion needs two, three or more seen at once and needs clustered ties (Centola and Macy, 2007; Centola, 2010).
- Exposure count: for each non-adopter, how many of their contacts already do it. Computed from the behaviour item and the advice and trust ties; reported as the share with zero, one, two, three or more, per team and per behaviour. It is the direct test of whether a behaviour can start, and it moves before the behaviour does.
- The sixty-Champion simulation at threshold three: scattered 5%, concentrated 5%, triads 80%, paired 100%. At threshold two: scattered 100%, paired or triads 100%, concentrated 89%. How much reinforcement a behaviour needs decides how much placement matters. Illustration of a mechanism, not a forecast.
- Run it yourself: graph from the survey, weights from frequency, drop the "rarely" ties, one written threshold per behaviour, same seed count per placement, twenty runs, read exposure not dates. It ranks placements; it does not promise outcomes.
- Centola and colleagues (2018): a committed minority of roughly a quarter flipped a group convention in experiments. Aim for a local share in a target team, not an organisation-wide percentage. Crestline's Stage 2 cluster is the concentrated placement in real life.

Template: thresholds per behaviour

Target behaviour	Costs something? Value depends on others? Risks looking foolish? Breaks a habit?	Threshold you will use (1, 2, 3)	Why

Template: exposure counts

Team (or scope)	Non-adopters	0 contacts	1	2	3 or more	Reading: seeds or messages?

Template: placement comparison runs

Placement (same number of seeds)	Threshold	Share of non-adopters at 3+ exposures (mean of 20 runs)	Note
Current roster			
Pairs in target teams			
Triads in fewer teams			
Backbone only			

The sentence for the slide: "This placement raises the share of colleagues who can start the behaviour from __% to __%. The model ranks placements; it does not give dates. Adopters are self-reported; the system figure is __%."

Ines runs the model

Reporting, threshold three. Adopters: 412 of 1,944 self-report (21%); the tool says 11% of real phish are reported, so both figures carried. Exposure today: of 1,532 non-adopters, 61% have no adopting contact, 7% have three or more. Four placements, 36 seeds, twenty runs: current roster 9% at three or more; pairs in 18 target teams 42%; triads in 12 teams 38%; backbone-only 11%. Threshold two: roster 31%, pairs 71%.

The CISO asked when reporting would hit 30%. Owen: "Measured in the Team Pulse, team by team, and the first teams in two to three quarters if the model is right. We will show you exposure every quarter until then."

Your network

Choose a threshold for each behaviour, write it down with the reason, and estimate your exposure distribution for one team.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. For each of your target behaviours, how many adopting contacts do you think a colleague needs before they try it? One, two, three? Why?

2. What share of non-adopters in your scope have zero adopting contacts today? If you cannot say, what would it take to find out?

3. Run the sixty-Champion thought experiment on your own numbers: your Champions, your teams. Which of the four placements is closest to what you have?

4. Which behaviour on your list is simple enough that coverage is nearly enough, and which needs real reinforcement?

5. What would you tell a sponsor who asked the simulation to predict the date the behaviour will reach the whole division?

MODULE 6

Placing Champions with the Map

Key ideas from the video

- Valente (2012): four kinds of network intervention, individuals, segmentation, induction, alteration. A Champions placement is the first three at once; most programmes do only the first, by enthusiasm.
- A target team passes three tests: the behaviour matters there; within-team density 0.25 or more; a size where two is a real share (eight to twenty-five). Start with twelve to twenty teams.
- Who goes in: first, anyone colleagues already name three or more times, roster or not; second, a pair who already work together. A Champion with in-degree zero in the team moves to the backbone, kindly. Every name is an invitation through the manager with a real no.
- Backbone from the top decile of betweenness, eight to twelve people, alerts and identity only. Widen single-person bridges with a pair on each side or a Champion on an existing cross-department tie. Pair seeded with unseeded teams. Leave a team that has tipped alone.
- HEROES' Network Map reads placement (none / awareness at one or two / behaviour change at three or more; logical units grey with a rim; the flows-up rule). Your survey reads reach, Champion-to-Champion ties, exposure and hidden connectors. Export CSV or GEXF and join them in Gephi.
- Say the coverage drop out loud before it happens, and write "what will count as the plan working" now.

Template: target-team tests

Team	Behaviour it is for	Within-team density	Size	Passes all three?	Neighbour (seeded / unseeded)

Template: the placement plan (one page)

Line	Your plan
Target teams: which, why each, the behaviour each is for	
Pairs: who in each, nominated or already named, manager agreed first	
Backbone: who, chosen by betweenness, what they will and will not do	

Line	Your plan
Bridges: the narrow ones widened; seeded-unseeded neighbours	
Moves: Champions leaving paper-covered teams, and how each was told	
Numbers before and after: reach, exposure, embedding, the coverage drop	
Measurement date, and what will count as working	

Template: what the map holds and what the survey holds

Question	HEROES Network Map / influence map	Your survey
Who is placed where; target teams below a pair	Yes	
Capability colour per unit	Yes (placed Champions only)	
Does anyone in the unit name the Champion?		Yes
Champion-to-Champion ties; embedding		Yes
Exposure counts		Yes
Hidden connectors not on the roster		Yes
Joined view	Export CSV / GEXF	Overlay in Gephi

Halden's placement plan

18 target teams: 6 site teams (shared logins), 4 finance and procurement (payee verification), 8 project teams (reporting); density 0.25 or above, sizes 9 to 24. 36 Champions in pairs: 14 existing, 22 new, 11 named three or more times; every invitation by the manager first; two said no. Backbone of 9, six not previously Champions. The three single-person bridges: a pair on each side; two project teams chosen because they sat next to a site team.

Said in advance: coverage 63% to 58%; reach modelled 38 to 52; exposure 7% to 42% if the model holds; embedding expected to rise. Wave two in twelve months; "working" = half the target teams tipped on reporting and exposure above 30%.

Your network

List your first target teams and the coverage figure you will announce before it changes.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. Name your target teams: the teams where the behaviour matters most and the within-team density says a pair could tip it. How many are there?

2. For each target team, who did the survey nominate, and is anyone on your roster already named by three or more colleagues there?

3. Which Champions on your roster are better suited to the backbone than to a team, by their betweenness and their embedding?

4. Where would you place one Champion on an existing cross-department tie, rather than inside a team?

5. What will the coverage figure read after your placement, and who will you tell before it changes?

MODULE 7

Measuring Change in the Network

Key ideas from the video

- What moves, in order: embedding (within a quarter), exposure (the leading indicator), bridge width (a year), tipped teams (Team Pulse at 70% or more), the behaviour line (last, seeded teams first). Show the sequence with the dates the model said each would move.
- Baseline before the first placement; if missed, the nearest recoverable, labelled. Same instrument, boundary, cap and month at every wave. Report cross-section and matched panel together, with the panel size; never one alone.
- Attrition: check adoption among leavers against stayers at wave one. The panel is the survivors and over-states; say so. Count the months each target team actually had its pair.
- The noise log, written as events happen: vendor changes, reorganisations, incidents, new managers, redundancy rounds.
- Change against noise: seeded against unseeded in the same quarter; sequence (exposure before behaviour); dose (teams that held their pair against those that did not); and, with help, a difference-in-differences. None proves cause; all make the alternatives work harder.
- The three HEROES measures beside the survey: Behaviour Index from colleagues (where "tipped" comes from), Network Strength from Champions (capped by stage), Programme Capability from the programme. Three groups, never folded.

Template: wave plan

Wave	Date (same month each year)	Instrument version / boundary / cap	Behaviour measures collected the same month	Response (overall and lowest team)
Baseline				
Wave 2				
Wave 3				

Template: attrition and panel check

Check	Figure
Respondents at wave 1 / wave 2	
Matched panel size	
Adoption rate among leavers at wave 1 / among stayers	
Exposure at 3+: cross-section / panel (and the gap)	
Target teams that held their pair all year / that did not	

Template: noise log (keep it open all year)

Date	Event	Which measures it could move	Handled how

Template: change against noise

Test	Your result
Seeded against unseeded, same quarter, behaviour measure	
Sequence: did exposure rise before behaviour, in the teams where it rose?	
Dose: teams that held their pair all year against those that lapsed	
Difference-in-differences (if People Analytics can run it)	

Ines runs wave two

Response 1,712 of 2,290 (75%, after a redundancy round); panel 1,390. Leavers 20% adopters against stayers 21%: attrition did not flatter the line. Panel: embedding 0.35 to 0.58; exposure at 3+ 7% to 34% (cross-section 31%); wide bridges 14 to 29; the three single-person bridges now 4, 3 and 2 ties. Behaviour: 9 of 18 target teams tipped; real phish reported 27% in seeded teams against 11%; shared logins 61 to 23. Noise log: vendor change month 7, two teams merged month 9, one pair lapsed five months.

Against the line written in advance (half tipped, exposure above 30%): 9 of 18, and 34%. Sequence held: exposure by Q2, first teams tipped Q3, behaviour Q4. Dose: 15 teams held their pair, 9 tipped; the lapsed and merged teams, none. Seeded-unseeded gap 16 points, same quarter, same tool.

Your network

Write your baseline date, your wave-two date and the first three lines of your noise log.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. When is your baseline, relative to the first placement? If the placement has already happened, what is the nearest thing to a baseline you can still recover?

2. Will you compare the whole division at each wave, the matched panel, or both? What does each one hide?

3. List every event in the last year that could move your network measures and has nothing to do with Champions.

4. Which direct behaviour measure sits beside each network measure on your report, so neither stands alone?

5. If embedding rises and the behaviour line does not, what are the three explanations you would check first?

MODULE 8

Limits, Failure Modes and Reporting

Key ideas from the video

- Four limits: small teams (below the cell size, nothing; place by judgement and say so); self-report (pair every self-reported figure with a system one); the cap (rank, do not measure, at the top of the distribution); the snapshot (never place on a map more than a year old).
- Six failure modes: the popularity trap; over-read centrality; the network as the only evidence; surveillance creep; the pretty picture; the metric with no decision.
- The one-page report, in order: behaviour line; teams tipped; reach and exposure (cross-section and panel); shape; what else moved (noise, attrition); next quarter and the ask. No names, no individual metrics, response rate and cell size in the footer; the works council sees it before the sponsor.
- HEROES carries placement, the Network Map, each Champion's influence map, the Graph and Density views, Network Strength, and CSV/GEXF exports. It does not survey colleagues, record Champion-to-Champion ties, or derive the Behaviour Index from the network. Three sources, kept apart.
- Honest position: simple against complex contagion is established; its application to security behaviour in organisations is an extension with field evidence still building. Every two-wave programme that publishes its seeded-unseeded gap adds to it.

Template: failure-mode check

Failure mode	Closest to it? (yes / a little / no)	The one change that moves you away
The popularity trap		
Over-read centrality		
The network as the only evidence		
Surveillance creep		
The pretty picture		
The metric with no decision		

Template: the one-page network report

Section	Your line
1 The behaviour line: each target behaviour, systems and Team Pulse, seeded against the rest, against baseline	
2 Teams tipped: how many, which (by team), how many held their pair all year	
3 Reach and exposure: teams naming a Champion; share at 3+ exposures, cross-section and panel	

Section	Your line
4 Shape: embedding, bridge width, narrow bridges widened	
5 What else moved: noise log in two lines; the attrition check	
6 Next quarter and the ask	
Footer: response rate, cell size, wave dates. No names anywhere.	

Template: who sees what

Audience	Sees	Does not see
Works council / staff forum	The one page, before the sponsor	Any name or individual metric
Sponsor and CISO	The one page; the four pictures	Names; raw ties
Programme team	Team-level tables; the placement plan with nominations	Rankings of individuals
Managers	Their team's colour on picture one, if cell size allows	Who named whom; anyone's in-degree
Each respondent	Their own map, opt-in	Anyone else's
Two named analysts	The raw tie list, until the deletion date	

Halden's one page

Line one: real phishing reports 27% in the 18 seeded teams, 11% elsewhere, 9% at baseline; shared logins 61 to 23; payee verification 48% to 66%. Teams tipped: 9 of 18; 15 held their pair; none of the other three tipped. Reach 38 to 51; exposure 7% to 34% (panel) and 31% (cross-section); embedding 0.35 to 0.58; wide bridges 14 to 29. Noise: vendor change month 7, two teams merged month 9, one pair lapsed. Attrition: leavers 20% adopters against 21%. Footer: response 75%, cell size 5.

The ask: 16 more target teams next to tipped ones; wave three in twelve months; backbone stays at nine. The works council read it on Monday and asked whether any manager had seen a name. None had. The COO read it on Wednesday and answered the CISO's question himself.

Your network

Write the first line of your one-page report as it would read today, and the line you want it to read in a year.

Reflect & apply

Pause the video and take ten minutes with these. Write, do not just think.

1. Which of the six failure modes is your programme closest to today, and what is the one change that would move it away?

2. How many teams in your scope have fewer than five respondents? What will you report for them, and how will you place Champions there?

3. Write the first line of your one-page network report. Does it name a behaviour and a count of teams, or does it name a metric?

4. Which of your network numbers would you be embarrassed to defend to a sceptical statistician, and why?

5. What does HEROES carry for you today, what does your survey carry, and where is the gap between them written down?

COURSE SUMMARY

Close

Eight ideas to carry forward

1. **The chart is not the network.** Advice and trust carry security behaviour; the roster measures neither. Covered is not reached.
2. **Three questions, a boundary, and 80%.** Survey first; roster selection; a defined boundary; a response rate you can defend, by team.
3. **Names are personal data.** Purpose written, three uses ruled out, a DPIA, the works council, a cell size, and nothing a manager could use.
4. **Every metric is a decision.** Density, in-degree, betweenness, modularity, bridge width, embedding: each changes who you place, pair or connect, or you drop it.
5. **Exposure count is the test.** How many adopting contacts each non-adopter has. It moves before the behaviour and tells you whether it can start.
6. **Pairs in target teams, a thin backbone, wide bridges.** Nominated by the survey, agreed with the manager, with the coverage drop said in advance.
7. **Baseline, two waves, panel and cross-section.** Attrition checked, the noise log kept, seeded against unseeded, and the sequence shown.
8. **One page, behaviour first, no names.** The works council reads it before the sponsor. HEROES holds the Champion side; your survey holds the colleagues.

The lines underneath

Measure reach, not coverage. · Every metric is a decision about a Champion. · Names are personal data: aggregate, or do not publish.

One analysis this quarter

Pick one division. Write the purpose and the three ruled-out uses. Take it to your DPO. Ask the three questions. Draw picture one and put it next to the roster. Write it here, with a date.

Glossary

Term	Meaning
Node / tie / direction / weight	A person; a working relationship; who asks whom; how often or how strongly.
Ego network / whole network	One person and their ties / everyone inside a boundary and every tie among them.
Advice, trust, communication networks	Who you ask when unsure; who you would tell about a mistake; who you talk to about work. Security behaviour travels on the first two.
Coverage / reach / tipped	A name on the roster / colleagues name the Champion / most of the team does the behaviour and keeps it going.
Active / passive ONA	A survey / collaboration metadata. The first wave is a survey.
Roster selection / free recall / fixed choice	Picking names from a list / typing names / a cap on names per question, which truncates hubs.
Boundary specification	Deciding who is inside the network. A team left out removes every bridge into it.
Density	Ties that exist as a share of ties that could. Within-team density is where behaviour can start.
In-degree / out-degree	How many people name you / how many you name. Rank by in-degree.
Betweenness / closeness	How often you lie on shortest paths between others / how few hops to everyone. Betweenness finds the backbone.
Modularity	How strongly the network splits into groups. Against team membership: high means teams are real clusters.
Broker / structural hole	A person tied to two groups with no other tie between them (Burt). Carries information; a narrow bridge for behaviour.
Weak tie	An occasional tie. Reaches far, carries news, carries behaviour badly (Granovetter).
Homophily	People tie to people like themselves. Similar Champions reach the same colleagues.
Threshold	How many adopting contacts a person needs before adopting. One for information; two, three or more for behaviour.
Simple / complex contagion	Spread on one exposure / spread that needs reinforcement from several contacts seen at once.
Exposure count	For each non-adopter, the number of adopting contacts. The direct test of whether behaviour can start; a leading indicator of a tip.
Embedding	The share of a Champion's security ties inside their own team. Low embedding is the single-cluster signature.
Bridge width	The number of ties between two teams. One carries news; several carry behaviour.
Hidden connector	A person in the top decile of betweenness or in-degree who is not on the roster.
Backbone	A thin set of ties among Champions and back to security, for alerts and identity only.
Target team	A team where the behaviour matters, density allows a pair to be seen, and the size makes two a real share.
Cross-section / panel	Everyone who answered at each wave / only those who answered both. Report both.

Term	Meaning
Attrition / survivorship	People leaving between waves / the panel being the engaged people who stayed. Check and say so.
Noise log	Every event that could move a measure and has nothing to do with Champions, written as it happens.
Cell size	The minimum number of respondents below which no figure is reported (default five).
DPIA / legitimate interests / three-part test	Data Protection Impact Assessment (UK GDPR Art. 35) / the usual lawful basis at work / purpose, necessity, balancing.
Behaviour Index / Network Strength / Programme Capability	HEROES' three measures: colleagues (Team Pulse), Champions (survey and map, capped by stage), programme leads. Never folded together.

Further reading

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- Information Commissioner's Office (2023). Employment practices and data protection: monitoring workers. ico.org.uk. ICO guidance on legitimate interests and on data protection impact assessments.
- Wet op de ondernemingsraden (Netherlands Works Councils Act), Article 27(1)(k) and (l).

Notes