Structural Equation Modelling Training: Latent Constructs, Causal Paths, Fit Evidence and Reporting

23 – 27 August 2027
Tokyo

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Programme Summary

Structural equation modelling is the subject of this one-week training course for heads of analytics, research directors and insight leaders at managerial level, ending in a model review pack for one study. Findings from latent variable and path models often reach decision makers with fit statistics and causal claims that no one has challenged. The programme moves from research questions and constructs to measurement models, path models and mediation, then fit testing and reporting. Mars Training Centre UK delivers this programme on structural equation modelling to mixed-organisation cohorts.

The Business Case

Organisations commission surveys and behavioural studies and expect clear answers on what drives satisfaction, adoption or performance. When models are built on weak measures, thin samples or unchecked fit, decisions rest on relationships that do not hold. Leaders who can question the model and read its evidence commission better studies and report results with fair limits.

- Decision Quality: Improves as causal claims are tied to tested paths and stated limits.
- Study Cost: Falls as weak measures and sample problems are found before data collection.
- Reporting Credibility: Strengthens as fit evidence and alternatives are shown with every result.

Principles and Evidence Base

- Confirmatory Factor Analysis: Tests whether indicators measure the latent variables they are meant to reflect, used in Session 2.
- Path Analysis: Estimates direct and indirect relationships between variables in a hypothesised model, used in Sessions 3 and 5.
- Mediation Analysis: Separates the effect that runs through an intermediate variable from the direct effect, used in Session 3.
- Model Fit Indices CFI and RMSEA: Judge how closely the model reproduces the observed data, used in Sessions 4 and 5.

Intended Participants

- Analytics leaders who commission models and approve how results are reported.
- Research directors who review study designs, measures and sample plans.
- Insight leaders who turn survey and behavioural findings into recommendations.
- Evaluation managers who test whether programmes work through the routes claimed.
- Senior advisers who challenge statistical claims before they reach a board.

Typical settings include health services, education, financial services and public programme evaluation.

Learning Outcomes

1. Participants will be able to construct a hypothesised path diagram from a research question and defined constructs.
2. Participants will be able to evaluate whether indicators and scales measure their latent variables.
3. Participants will be able to diagnose weak identification, sample size and missing data problems in a model plan.
4. Participants will be able to interpret direct, indirect and mediated effects in a path model.
5. Participants will be able to appraise model fit evidence and compare alternative models fairly.
6. Participants will be able to justify how results should be reported to decision makers using a model review pack.

Programme Structure

Day 1: Structural Equation Modelling: Questions and Constructs

What is the model meant to explain, and which ideas can it measure?

- Research Question Brief
- Construct Definition Sheet
- Indicator Selection Review
- Hypothesised Path Diagram
- Sample Size and Identification Check

Day 2: Measurement Models and Latent Variables

Do the indicators measure the latent variables they claim to?

- Confirmatory Factor Analysis Review
- Factor Loading Table
- Reliability and Validity Checklist
- Measurement Invariance Question List
- Scale Revision Log

Day 3: Path Models and Mediation

Which paths hold, and what runs through a mediator?

- Path Analysis Reading Guide
- Direct and Indirect Effect Table
- Mediation Analysis Review
- Alternative Model Comparison
- Missing Data and Assumption Screen

Day 4: Model Fit and Evidence Quality

Is the model good enough to rely on?

- Model Fit Indices Scorecard
- CFI and RMSEA Interpretation Sheet
- Modification Index Caution Note
- Overfitting and Capitalisation Check
- Software Output Review Template

Day 5: Model Review Pack for One Study

Do the earlier tools form one review pack that supports a decision?

- Applying the Session 1 Hypothesised Path Diagram
- Testing the Session 2 Reliability and Validity Checklist
- Reviewing the Session 3 Direct and Indirect Effect Table
- Checking the Session 4 Model Fit Indices Scorecard
- Completing the Model Review Pack

Methodology

The programme uses a data workshop built on prepared outputs from one survey study and one behavioural study, each with a path diagram, a loading table, effect estimates and fit statistics. Participants read the outputs in small groups, challenge the claims drawn from them and record what a decision maker may and may not conclude.

- Suggested activity: Reading a loading table and flagging indicators that weaken a scale.
- Suggested activity: Tracing a mediated effect and stating what it does and does not show.
- Suggested activity: Comparing two rival models and defending the choice.

Capstone Output

Each participant completes a model review pack for one study. It holds a path diagram review, a measurement assessment, an effect summary, a fit scorecard and a reporting note for decision makers. The pack is used at work to brief a commissioning board, question an analyst's report and set the limits on what a study may claim.

Frequently Asked Questions

Is structural equation modelling suitable for leaders who do not run statistical software themselves?

Yes. Structural equation modelling is taught through prepared outputs and review templates. It assumes familiarity with surveys, research or analytics reports, but no experience of fitting models in statistical software.

Which methods does structural equation modelling in this programme rest on?

Structural equation modelling here rests on confirmatory factor analysis, path analysis, mediation analysis and model fit indices such as CFI and RMSEA.

How is the pack from structural equation modelling review used at work?

You use the model review pack to brief a commissioning board, question an analyst's report and set clear limits on what a study may claim.

How does structural equation modelling differ from a general data analytics programme?

Structural equation modelling concentrates on latent variables, causal paths and fit evidence, while a general data analytics programme covers reporting, dashboards and a wider range of statistical methods.