Integrating mixed methods analyses

MMIRA-IIQM webinar
Pat Bazeley
What is analysis?

Historically:

• Analysis comes from the Ancient Greek ἀνάλυσις (analysis, "a breaking up", from ana- "up, throughout" and lysis "a loosening")

• The process of breaking a complex topic or substance into smaller parts in order to gain a better understanding of it
An interpretive orientation to analysis

• All phenomena have both qualities and quantities – numbers and words are both representations of phenomena

• All data are based on a qualitative foundation, interpreted, and then ‘selectively rendered’.
  “If we are to be truly scientific, we must re-establish the qualitative grounding of the quantitative.” Donald Campbell (1974: 30)
  “Statistics is not really about numbers; it is about understanding our world.” David Howell (2014: xi)

• Analysis, then, is a process of deconstructing and reconstructing evidence that involves interrogation of and critical thinking about data and the questions they are designed to answer in order to produce a useful and/or meaningful result.

  Think about data (not qual or quant)
Phases of analysis (in general)

- Preparatory work is needed to ready the data for analysis.
- Explore the data, to see what is there.
- Manage, reduce, sort and code the data to identify relevant variables, concepts and themes.
- Describe what is being revealed by the data.
- Undertake comparative analyses that answer research questions about differences and/or help to discern deeper meaning.
- Investigate patterns of association.
  - Build toward interrelated thematic or explanatory/predictive statements
  - Explore and test alternative explanations.
- Report results, inferences, interpretations
  - supported by data displays (models, tables) and source evidence.
For MM analysis, integration is critical

Integration implies

• Using more than one approach, method, source of data and/or strategy for data analysis

• Having a common purpose or goal

• *Interdependence* of these different elements in reaching the goal

• Having a sum greater than the parts

Integration occurs primarily through data management and analysis.
Approaching mixed methods analysis

• See analysis as a continuation of a “conversation” between methods that began when the foundations of the study were laid.

To make a start:

• What are the questions you want to answer (they might be different from those you started with)?

• What data you have for answering these?

  Think about data (not qual or quant)
A theory of change for integrative mixed methods analysis

The theory of change (Do -> Get) model behind integrative mixed methods analysis is very simple. It is that:

(1) effectively combining more than one source or type of data and/or more than one approach to analysis will deliver a gain over using a single source, type of data, or approach to analysis, and

(2) effective integration of sources and analyses will also deliver a gain over separate analyses of different sources.
A logic model for mixed methods analysis

Logic models operationalise a theory of change (Knowlton & Phillips, 2013)
Data preparation/preprocessing

• Some preprocessing is usually required involving, e.g., coding and descriptive analyses

• Keep your focus on the whole dataset, and your research purposes, while doing this: it is part of the continuing conversation!

• Develop a habit of memoing
  – To build an audit trail
  – To record interpretive reflections, insights and ideas for further analysis along the way.
Major integrative strategies

• Sorting and coding
  – basic to most further steps
• Combining (weaving, merging)
  – complement, converge, complete
• Linking and comparing
  – juxtapose, corroborate, contrast
• Iterative guiding
  – next steps (data, analyses)
• Counting and transforming
  – count, convert, consolidate, blend
Sorting and coding – underpins most other processes

Data sources
- various

Labelling, grouping, categorising

Data management:
thematically sorted/
variable data

Source material for:
juxtaposing; linking;
develop q’aire/interview;
transforming, blending

Composite picture
Preliminary theory

Weaving, merging complementing

Tools
- SPSS
- QDAS
- Summaries
- Excel
- Word
- Cards
- Colour pens
- Marginal codes

Issues
Choices
(methods, codes)

Inhibit/enhance analysis;
next steps
Combining data/sources

Preprocessed (coded) data ‘bits’ from multiple sources

Sort by categories, themes, issues

Weave, intertwine

Merge into a unified whole

Explore

Joint display – using categories, themes, issues

Sort by data type or subgroups

Compare and contrast

Converge/contradict

Description Confirmation Initiation Elaboration

Further investigation

Complement Complete

Compare Converge Corroborate
Complementary analysis - example

Weekly household income, 2011

 asked, specifically, what they most enjoyed about their children

the women replied:

- their affection/love: 6.7%
- their company: 33.6%
- their dependency: 12.6%
- their personality/individuality: 22.7%
- as a source of pride: 5.9%
- watching their development (mainly physical): 5.0%
- other: 6.7%

A further 6.7% gave essentially negative responses: “when he’s asleep”, “when he’s good”, “none has trouble”, “they’re good to me when I’m sick”.

Jimmy, aged 3, was pushing several rolls of toilet paper, but his mother had to be persuaded in the cupboard, along the floor. They were his train. He was enjoying his ‘creation’, but his mother had to be persuaded to allow him to continue his play, rather than return the rolls to their place. There was no alternative activity in the room at all.

were five families being regularly supervised because of previous neglect of children, two instances of children being before the Children’s Court, one of a child receiving supervision following institutional care, and one case of school default (truancy). In addition, there were two applications for an unmarried mother’s allowance and one for maintenance by a deserted wife (during the period prior to becoming eligible for a Federally paid benefit).

three families with children were evicted from the flats and therefore came to the attention of the Child Welfare Department, one child was exempted from school attendance at 14 years (requiring special concession on grounds of economic or other hardship), and there were five allocations of short-term cash benefits. In all, 14 families (7.8%) of the 180 (of which some were without children) came to the attention of Child Welfare Officers on 21 separate counts. (This analysis has not included

Library membership records indicated that at least one adult in each of the families in 104 of the 206 flats built before was a registered borrower. This figure is not very meaning because the records could be up to three years out of date. Those flats for which members of two different families were registered were counted only once (15 of them); there are likely to have been several more which
Use joint displays to compare and contrast

e.g., Fitzpatrick (2016: 284, Table 2)

<table>
<thead>
<tr>
<th>Associated Survey Theme</th>
<th>Quantitative Data</th>
<th>Qualitative Data Examples</th>
<th>Associated Qualitative Code</th>
<th>Data Convergence Label</th>
</tr>
</thead>
</table>
| Beliefs: About programs       | Moderate agreement with the statement “My program provides a haven from the problems in the rest of the school” ($M = 3.52$, $SD = 1.06$). Moderate agreement with the statement “My program provides a haven from the problems of the neighborhood” ($M = 3.71$, $SD = 1.04$). | Students “hang out” in Ms. Sanders’ room: “I think they just have fun in here, where they can’t anywhere else in the building” (interview, May 22, 2007).
Mr. Michaels: “Oh, yeah, they hang out. We have to kick them out oftentimes” (interview, May 30, 2007).
Mr. Sims: “A lot of them would rather be here than at home” (interview, May 25, 2007). | The program as a haven                                | Confirm                              |
Linking and comparing

Case based data, each case including:
- variables
- classifications
- categories
- scaled measures
- text, images, audio and/or observations

Link data bits, by case

Profile cases, enriched accounts

Associate, relate
Compare subgroups

Subgroup patterns, concept dimensions, scale interpretation/validation.

Explore, describe, confirm, initiate

Further investigation

Tools
Excel; QDAS
- tabular displays
- QDAS matrices
- summary tables

Issues
Defining cases
Need common ID
- anonymity/ethics
Divergent cases
Questions that can be answered:
- Do different sources agree?
- Build a comprehensive profile of a person, site, or process.
- How do the examples or comments provided by people support and/or illuminate their quantified responses?
- Are there figures that can support statements made by interviewees?
- Were all respondents interpreting the question (or scale item) in the same way?
- Is the way in which participants talk about Y differentially associated with their gender (or age or education or role or self-efficacy, etc.)?
- If a score on scale X is associated with a difference to text responses, do these differences validate the scaled measure?
- What does it mean experientially to be at a certain point as measured by a quantitative scale?
- Does examining differences across subgroups of the sample reveal variations in (or sub-dimensions of) a concept?
Combine data types in a single display  
- Explore patterns and contrasts (e.g., in Excel)

<table>
<thead>
<tr>
<th>Case</th>
<th>Education</th>
<th>Age at last immunisation (mths)</th>
<th>Mention of needles, pain in account of last immunisation</th>
<th>Main thoughts re immunisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wendy</td>
<td>SC</td>
<td>12</td>
<td>child cried</td>
<td>it will hurt and she'll cry</td>
</tr>
<tr>
<td>Felicity</td>
<td>SC</td>
<td>12</td>
<td>fear of pain</td>
<td>important, but fear of pain</td>
</tr>
<tr>
<td>Vivien</td>
<td>SC</td>
<td>18</td>
<td>mother hates needles</td>
<td>needles, but has to be done</td>
</tr>
<tr>
<td>Helen</td>
<td>SC</td>
<td>18</td>
<td>tense, fear of pain</td>
<td>fear of pain</td>
</tr>
<tr>
<td>Margie</td>
<td>SC</td>
<td>50+</td>
<td>screams and kicking</td>
<td>upset children, fear of needles</td>
</tr>
<tr>
<td>Kirstie</td>
<td>SC</td>
<td>50+</td>
<td>child getting upset</td>
<td>child getting upset</td>
</tr>
<tr>
<td>Susan</td>
<td>SC</td>
<td>50+</td>
<td>fear of needle, upset</td>
<td>child getting upset</td>
</tr>
<tr>
<td>Janice</td>
<td>HSC</td>
<td>not immunised</td>
<td>no mention</td>
<td>risk of reactions higher than risk of diseases</td>
</tr>
<tr>
<td>Sandra</td>
<td>HSC</td>
<td>1</td>
<td>no mention</td>
<td>prevention of disease</td>
</tr>
<tr>
<td>Sue</td>
<td>HSC</td>
<td>18</td>
<td>no mention</td>
<td>possible reaction</td>
</tr>
<tr>
<td>Angela</td>
<td>Uni</td>
<td>1</td>
<td>fearful beforehand</td>
<td>protection from disease</td>
</tr>
<tr>
<td>Barbara</td>
<td>Uni</td>
<td>6</td>
<td>no mention</td>
<td>keep child healthy</td>
</tr>
<tr>
<td>Peta</td>
<td>Uni</td>
<td>6</td>
<td>no mention</td>
<td>possible side effects</td>
</tr>
</tbody>
</table>
Comparing patterns of response across groups (e.g., in NVivo)
Complementary analyses – Applications (2)

• Explore process and outcome in evaluation studies and RCTs: use qualitative component to
  – Clarify conceptual issues and inform the design of the intervention;
  – Improving recruitment and involvement in the study;
  – Understand the role of intermediary and contextual factors (‘validity threats’) in producing the outcome;
  – Improve understanding and utility of an intervention;
  – Understanding participants who drop out or are non-compliant;
  – Assess the fidelity of wider implementation.
Iterative guiding

Initial data source(s): analysed and described

- Provides guidance for design and/or sampling
- Provides guidance for analysis strategy

- Create, add new or extend data using a different method
- Develop or modify approach to analysis of second source

- Compare, contrast, and combine with original source(s)

- Refined, extended description; Confirmation; Generalisation

Possible further development phases

Explore
Extend
Confirm
Generalise
Counting, transforming

Preprocessed (coded) text or audio/visual data

Survey or other variable data

Count incidence of codes
- presence/absence
- frequency/volume
- intensity

Case by variable table

Descriptive statistical summaries

Recontextualise in qualitative data

Descriptive/thematic report (with numbers)

Further statistical analysis

Observation/experience represented by qualitative ± variable data

Codes counted

Relationships counted

Combined case by variable matrices

Descriptive stats
- Inferential stats and predictive modelling
- Cluster analysis
- Correspondence anal.

Similarity matrices

Exploratory multivariate statistics
- cluster analysis
- correspondence
- MDS

Revisit qualitative data

Draw inferences
- Identify/compare groups
- Reveal dimensions
- See/confirm patterns
- Discover/ explain/ understand associations

Revisit qualitative data

Statistical report inclusive of insights from qualitative data
Transforming – 1

Case*variable output

<table>
<thead>
<tr>
<th></th>
<th>C: engagement</th>
<th>D: task orient...</th>
<th>E: research pr...</th>
<th>F: analytic pr...</th>
<th>G: disseminat...</th>
<th>H: collegial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : CASE1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 : CASE10</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3 : CASE100</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4 : CASE101</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5 : CASE102</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6 : CASE103</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>7 : CASE104</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>8 : CASE105</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Statistical analyses, e.g., t-test, regression

→ Description
   Prediction
   Explanation
Transforming – 2

Similarity matrix → exploratory multivariate statistics

Cluster analysis
Multidimensional scaling
Correspondence analysis
e.g., Identifying and comparing different understandings of causes of domestic violence (Collins & Dressler, 2008, *JMMR*, 2(4), 362-387)

Do human service providers (welfare workers, domestic violence workers, nurses, and the general public) share issues related to domestic violence?

- Service providers identified and sorted the 32 terms used to describe the causes of domestic violence (+ record comments) -> similarity matrices
- Multidimensional scaling (MDS) applied for each group -> similar overall model, so amalgamated.
- **Controllability** (Dimension 1) and **location within victim-perpetrator** (Dimension 2) = two perceived causal dimensions for domestic violence.
- Cluster analysis identified groups of items. Labels from participant commentaries.
- **Child welfare workers** had highest levels of agreement within their own group and with the model, and **domestic violence workers** were most distinctive and most dissonant.
Hybrid approaches

Targeted qualitative data
- relationships
- experiences
- events/actions

Qualitative commentary & visual displays

Sort and/or Rate
Tabulate
Map

Visual analysis
Statistical analysis
Algebraic analysis
Spatial analysis

Revisit qualitative data

Interpretive profiles/
patterns/ dimensions/
comparisons/ explanations

‘Inherently mixed’
• Case study
• Ethnography

Hybrid
• Qualitative comparative analysis
• Social network analysis
• Geographic information systems
• Q-factor analysis
• Repertory grid analysis
Bringing it all together into a ‘negotiated account’

• Review purpose and questions
  – These may have changed

• Review concepts, contexts and processes
  – Draw on key points and clarifications developed in earlier analyses
  – Identify/document the range of evidence available

• Search for patterns
  – Compare observations to expectations
  – Check hunches and interim findings against evidence
  – Use cross-case synthesis to build meta-knowledge
  – Explore negative and extreme cases
Building explanatory models

• Return to initial theory or a preliminary program or logic model
  – Are these supported by the data?
  – Test rival explanations
  – Iteratively refine; build (and test) explanations
    (process parallels with analytic induction, grounded theory)

• Need presumed causes, effects, and mechanisms

• Check conclusions against established knowledge. Is it applicable to other settings

→ Inference to best explanation – ‘warranted assertions’ – that account for all your data.
Develop coherence through displays

• Use models and tables throughout the project to prompt and assist the conversations between methods.

• Use models and tables to set out what you are finding – they clarify for the researcher as well
  “You know what you display” (M&H)
Develop coherence through writing

Writing both together
Clarification
Organisation
Compare and contrast
Weave, Merge

Writing during analysis
Initiation Reflection
Deepen analysis

Writing both together
Clarification Organisation

Integrated (topic focused) report

Tools
QDAS memos
Word – use
- heading styles
- navigation pane
- outline view
Coming up in 2017!

Integrating mixed methods analyses
by Pat Bazeley
for
Sage Publications
MMIRA

Mixed Methods International Research Association

• MMIRA aims to create an international community to promote and support interdisciplinary mixed methods research
• Our vision includes bringing together diverse communities of scholars, students, practitioners, policymakers, citizens, and other stakeholders, with the goals of expanding knowledge and producing social betterment and social and global justice
• Support provided through regional and international conferences, newsletters, website resources, etc. Membership includes electronic access to Journal of Mixed Methods Research

Further info: www.mmira.org