Integrating mixed methods analyses

MMIRA-IIQM webinar

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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?

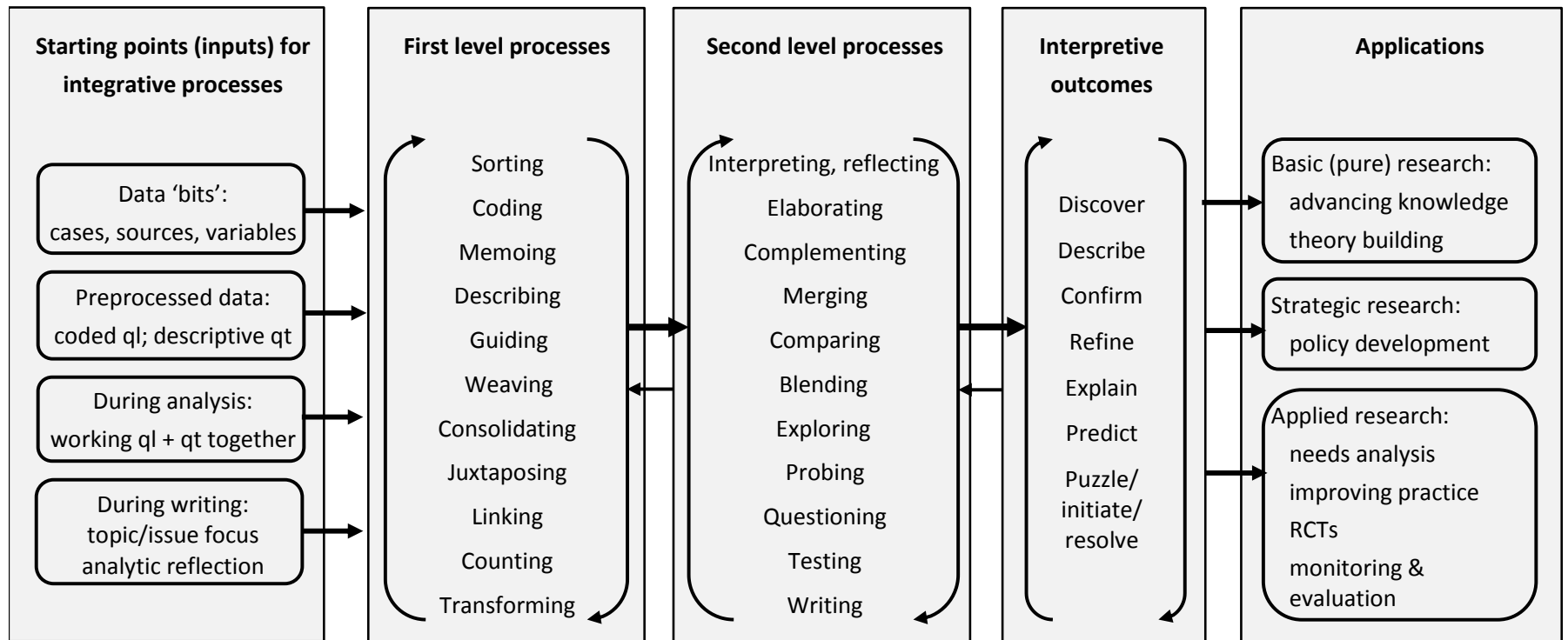*Think about data (not qual or quant)*

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)

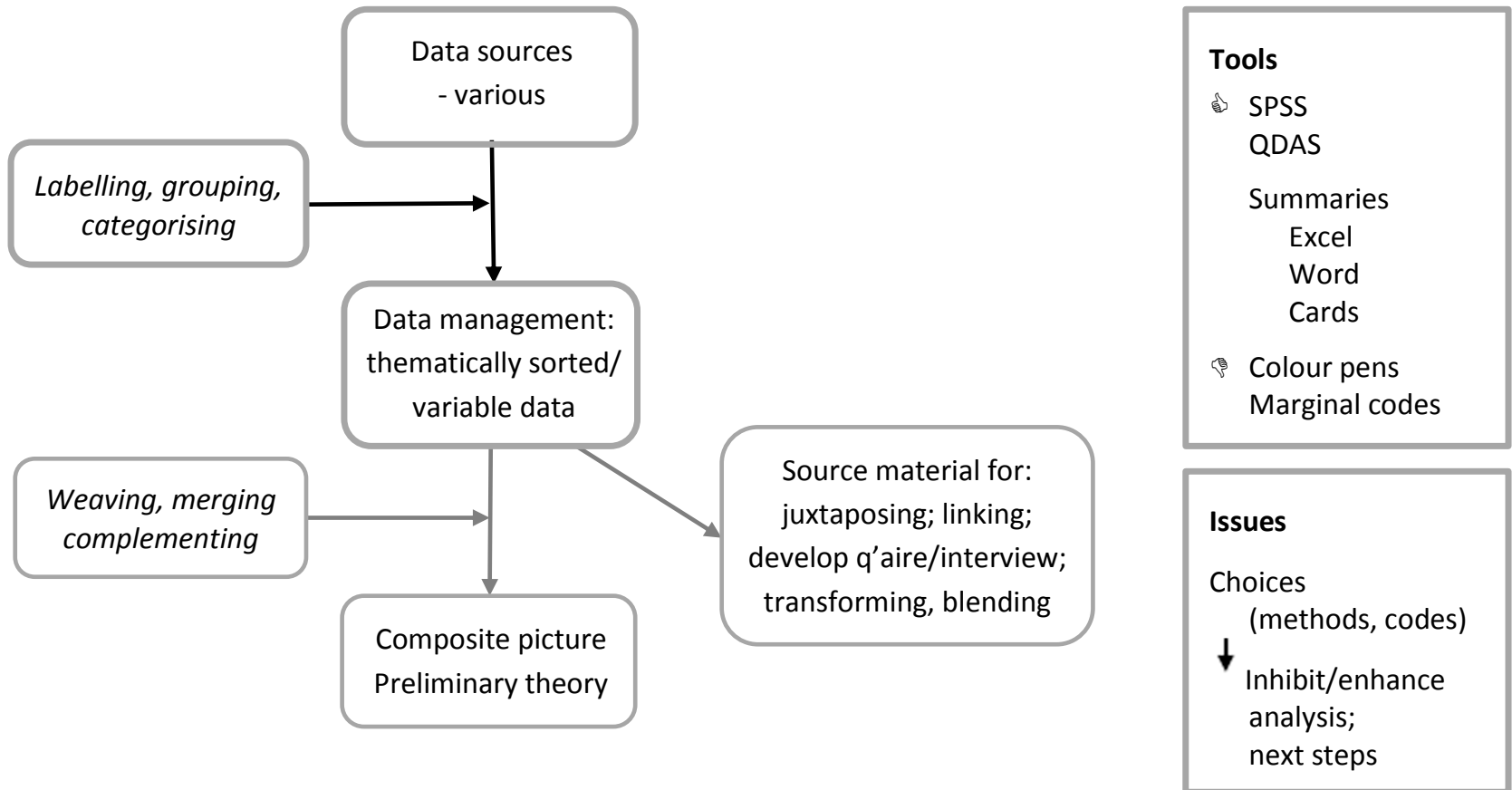| Starting points (inputs) for integrative processes	First level processes	Second level processes	Interpretive outcomes	Applications
Data 'bits': cases, sources, variables	Sorting Coding Memoing Describing Guiding Weaving Consolidating Juxtaposing Linking Counting Transforming	Interpreting, reflecting Elaborating Complementing Merging Comparing Blending Exploring Probing Questioning Testing Writing	Discover Describe Confirm Refine Explain Predict Puzzle/ initiate/ resolve	Basic (pure) research: advancing knowledge theory building
Preprocessed data: coded ql; descriptive qt				Strategic research: policy development
During analysis: working ql + qt together				Applied research: needs analysis improving practice RCTs monitoring & evaluation
During writing: topic/issue focus analytic reflection				

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.
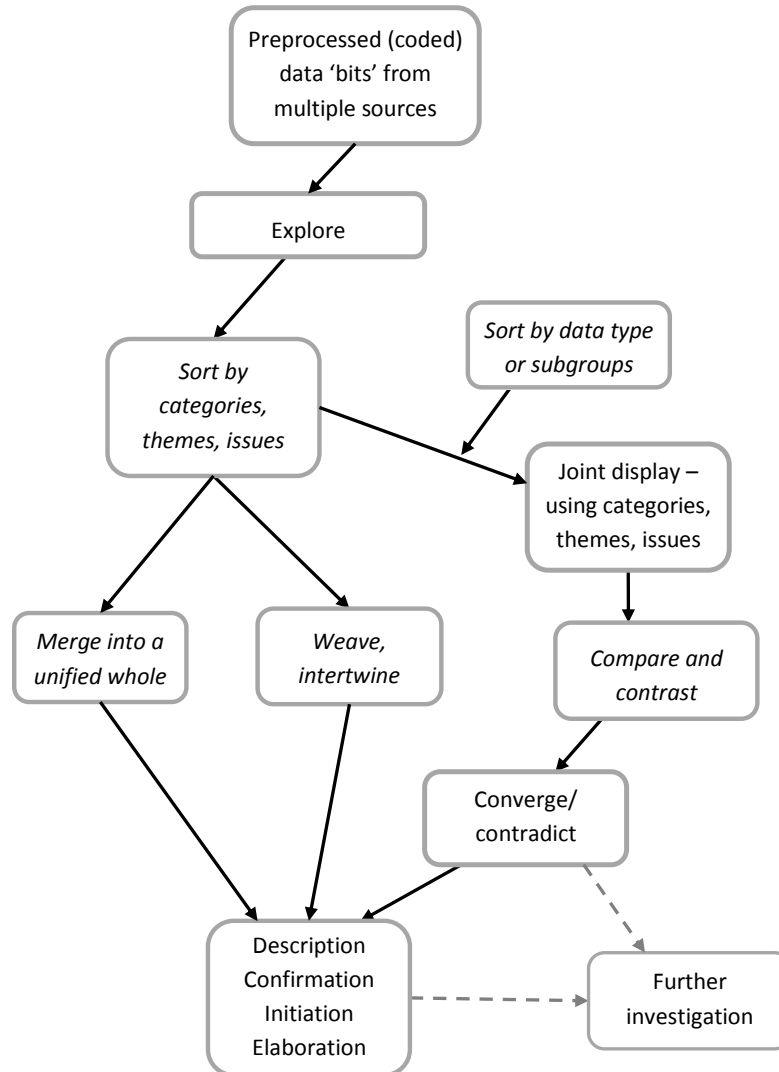
Major integrative strategies

- 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

Weaving, merging complementing

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

Composite picture
Preliminary theory

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

Explore

Sort by categories, themes, issues

Sort by data type or subgroups

Joint display – using categories, themes, issues

Merge into a unified whole

Weave, intertwine

Compare and contrast

Converge/ contradict

Description
Confirmation
Initiation
Elaboration

Further investigation
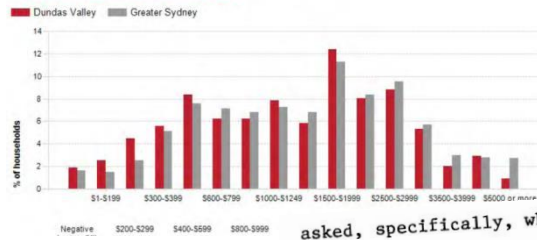
Complement
Complete

Compare
Converge
Corroborate

Complementary analysis - example

Weekly household income, 2011

■ Dundas Valley ■ Greater Sydney

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 respons

"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,
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
him 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 adul
in each of the families in 104 of the 206 flats built befor
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
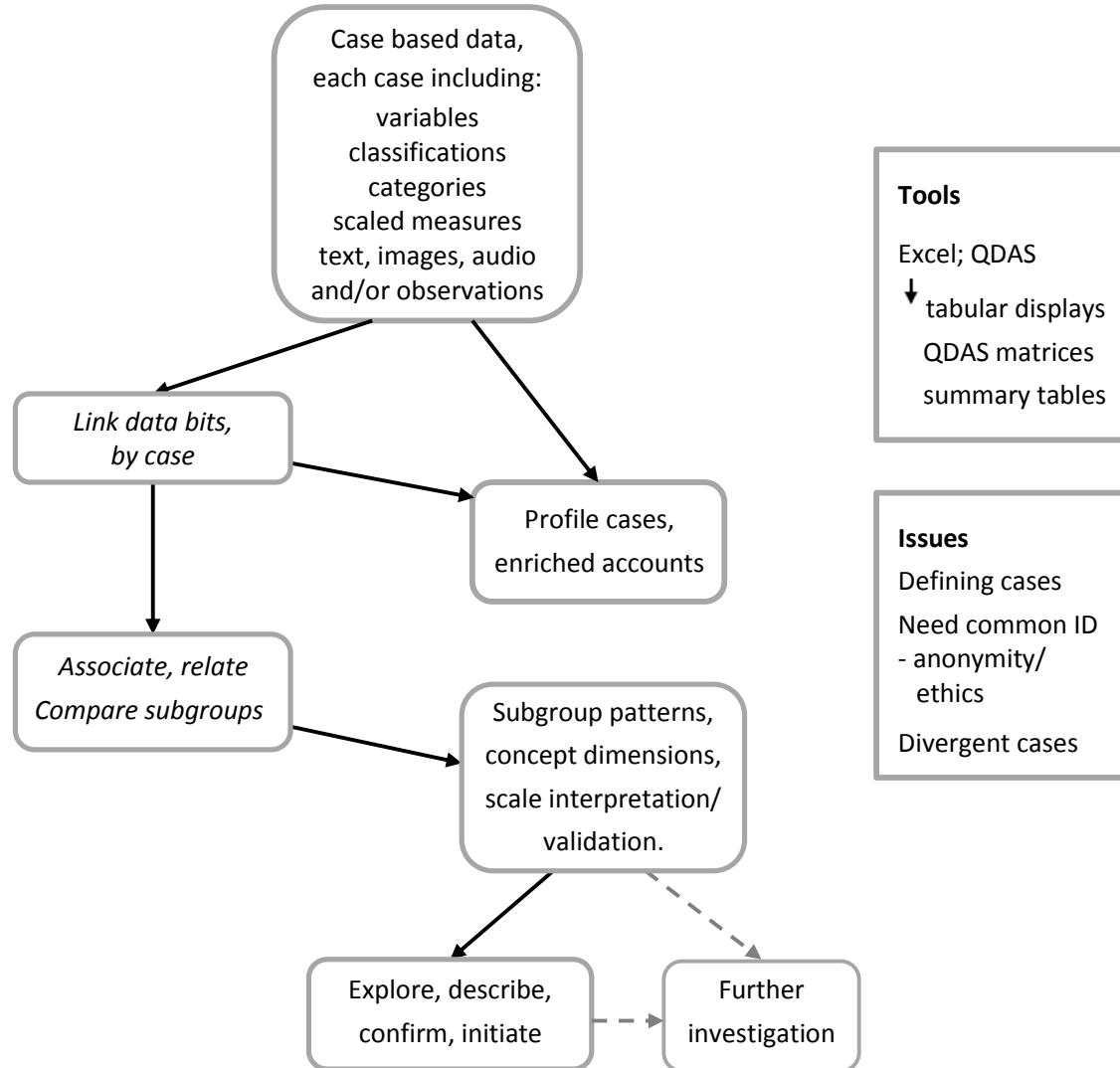
e.g., Fitzpatrick (2016: 284, Table 2)

Research Question 3: What attitudes and beliefs do teachers hold towards teaching instrumental music in urban schools?

Associated Survey Theme	Quantitative Data	Qualitative Data Examples	Associated Qualitative Code	Data Convergence Label
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

Complementary and comparative analyses Applications (1)

- 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
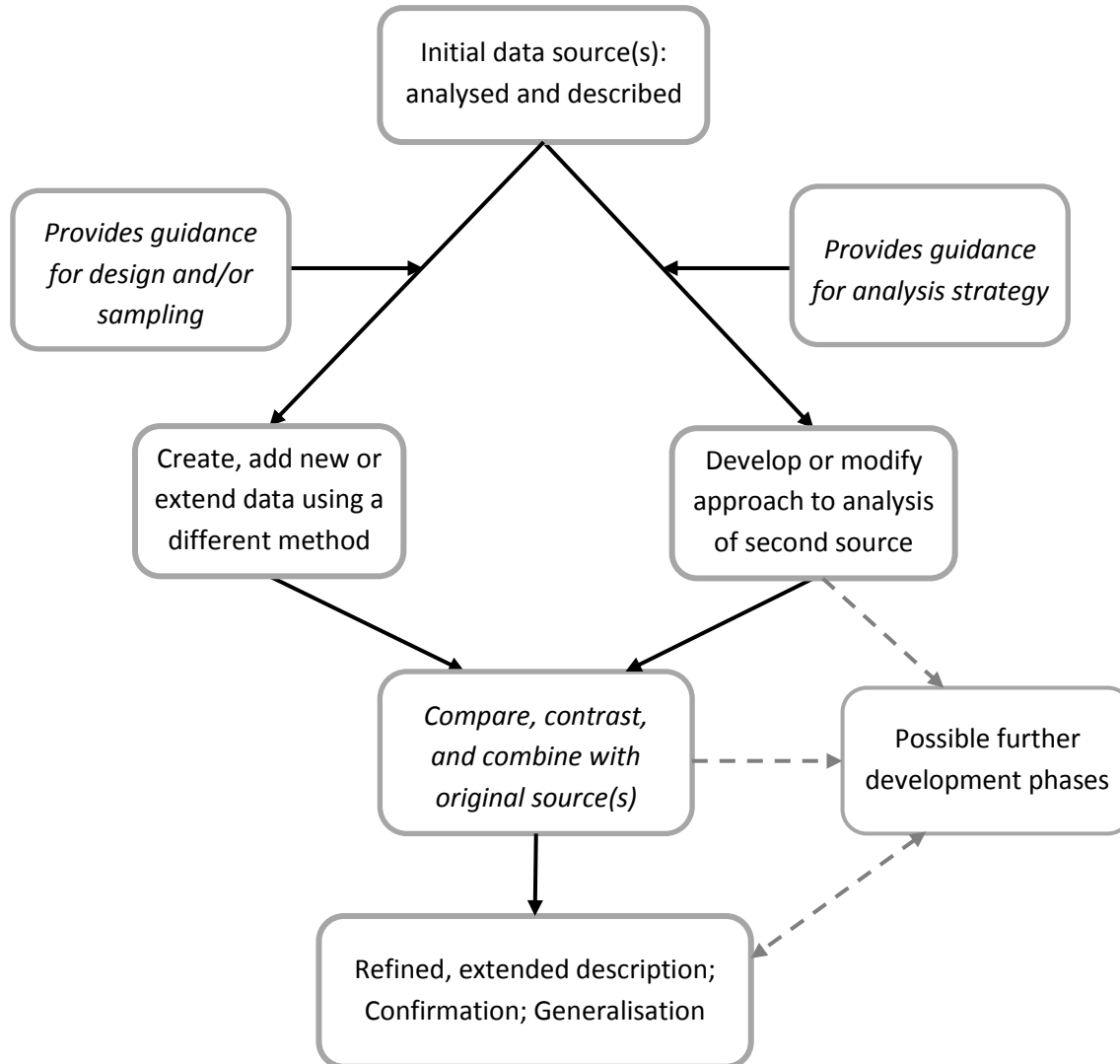## - Explore patterns and contrasts (e.g., in Excel)

Case	Education	Age at last immunisation (mths)	Mention of needles, pain in account of last immunisation	Main thoughts re immunisation
Wendy	SC	12	child cried	it will hurt and she'll cry
Felicity	SC	12	fear of pain	important, but fear of pain
Vivien	SC	18	mother hates needles	needles, but has to be done
Helen	SC	18	tense, fear of pain	fear of pain
Margie	SC	50+	screams and kicking	upset children, fear of needles
Kirstie	SC	50+	child getting upset	child getting upset
Susan	SC	50+	fear of needle, upset	child getting upset
Janice	HSC	not immunised	no mention	risk of reactions higher than risk of diseases
Sandra	HSC	1	no mention	prevention of disease
Sue	HSC	18	no mention	possible reaction
Angela	Uni	1	fearful beforehand	protection from disease
Barbara	Uni	6	no mention	keep child healthy
Peta	Uni	6	no mention	possible side effects

Comparing patterns of response across groups (e.g., in NVivo)
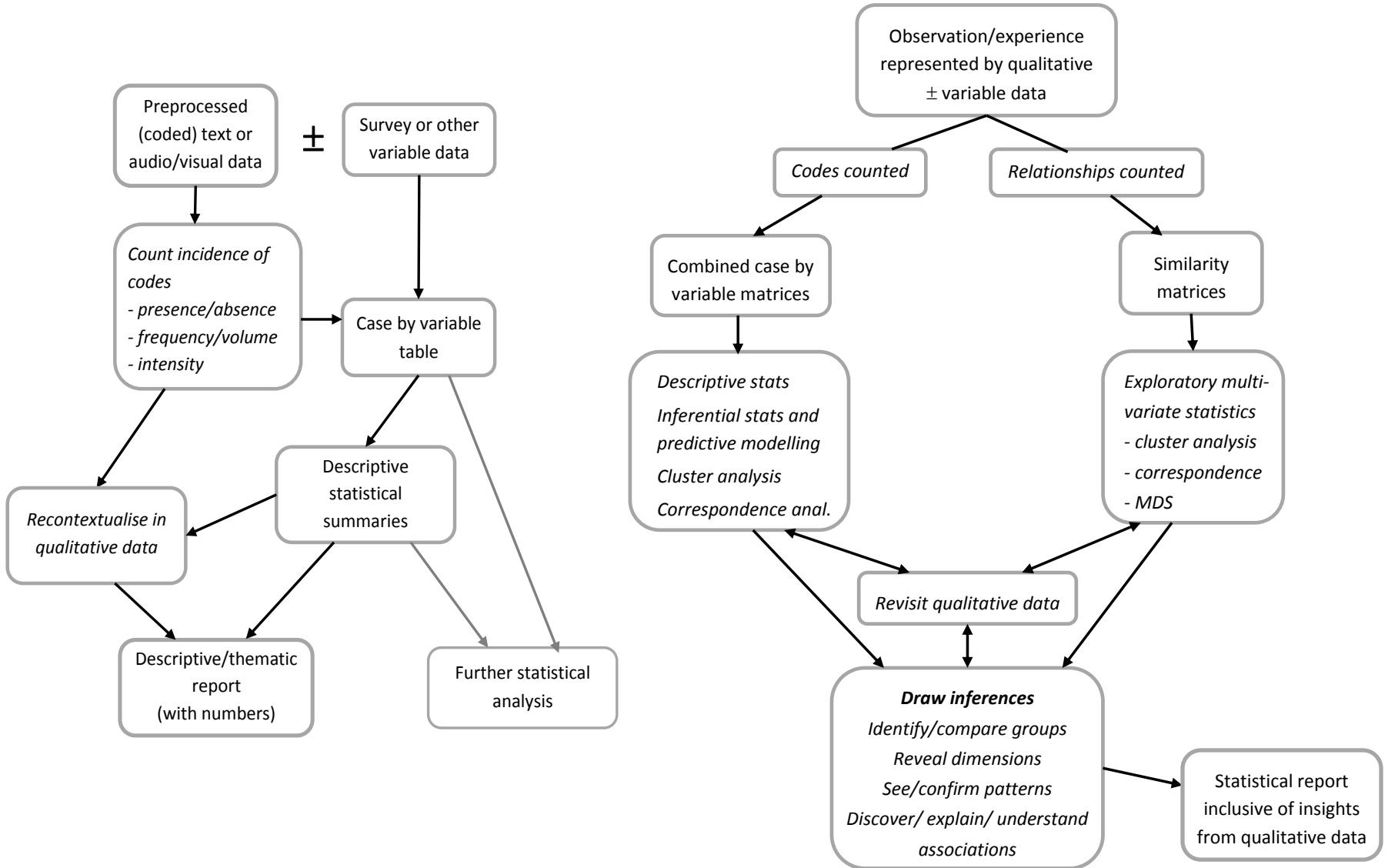
Complementary analyses – Applications (2)

- 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)

Possible further development phases

Refined, extended description; Confirmation; Generalisation

Explore
Extend
Confirm
Generalise

Counting, transforming

Observation/experience represented by qualitative ± variable data

Codes counted

Relationships counted

Combined case by variable matrices

Similarity matrices

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

Recontextualise in qualitative data

Descriptive statistical summaries

Descriptive/thematic report (with numbers)

Further statistical analysis

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

Exploratory multi-variate statistics
- *cluster analysis*
- *correspondence*
- *MDS*

Revisit qualitative data

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

Statistical report inclusive of insights from qualitative data

Transforming – 1

Case*variable output

	C : engagement	D : task orient...	E : research pr...	F : analytic pr...	G : disseminat...	H : collegial
1 : CASE1	1	2	1	0	0	0
2 : CASE10	1	0	1	0	2	0
3 : CASE100	2	6	0	2	3	1
4 : CASE101	0	0	0	0	1	0
5 : CASE102	2	1	0	1	2	3
6 : CASE103	2	1	0	1	3	1
7 : CASE104	2	1	3	0	3	1
8 : CASE105	3	1	2	0	4	0

Statistical analyses, e.g., t-test, regression
→Description
Prediction
Explanation

Transforming – 2

Similarity matrix → exploratory multivariate statistics

	commitment...	organised, ...	strategic	methodologi...	technical skill	substantive ...	analytic, thi...	creative, inn...
commitment, persist...	133	20	8	7	4	15	27	22
organised, disciplined	20	74	8	7	4	7	16	11
strategic	8	8	63	5	4	7	12	10
methodologically so...	7	7	5	96	12	19	37	27
technical skill	4	4	4	12	44	6	9	8
substantive knowled...	15	7	7	19	6	86	33	15
analytic, thinker	27	16	12	37	9	33	151	43
creative, innovative	22	11	10	27	8	15	43	138

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)
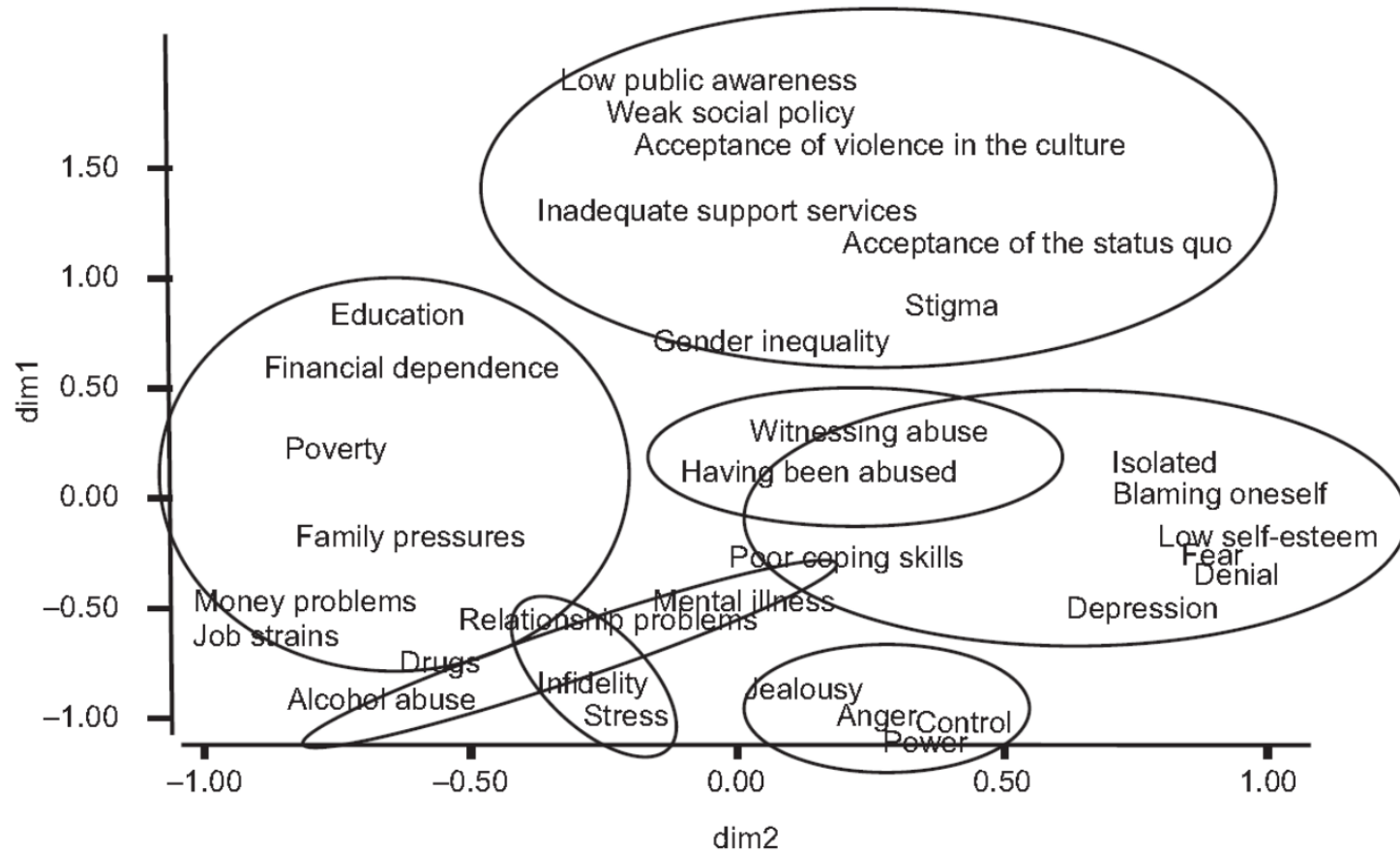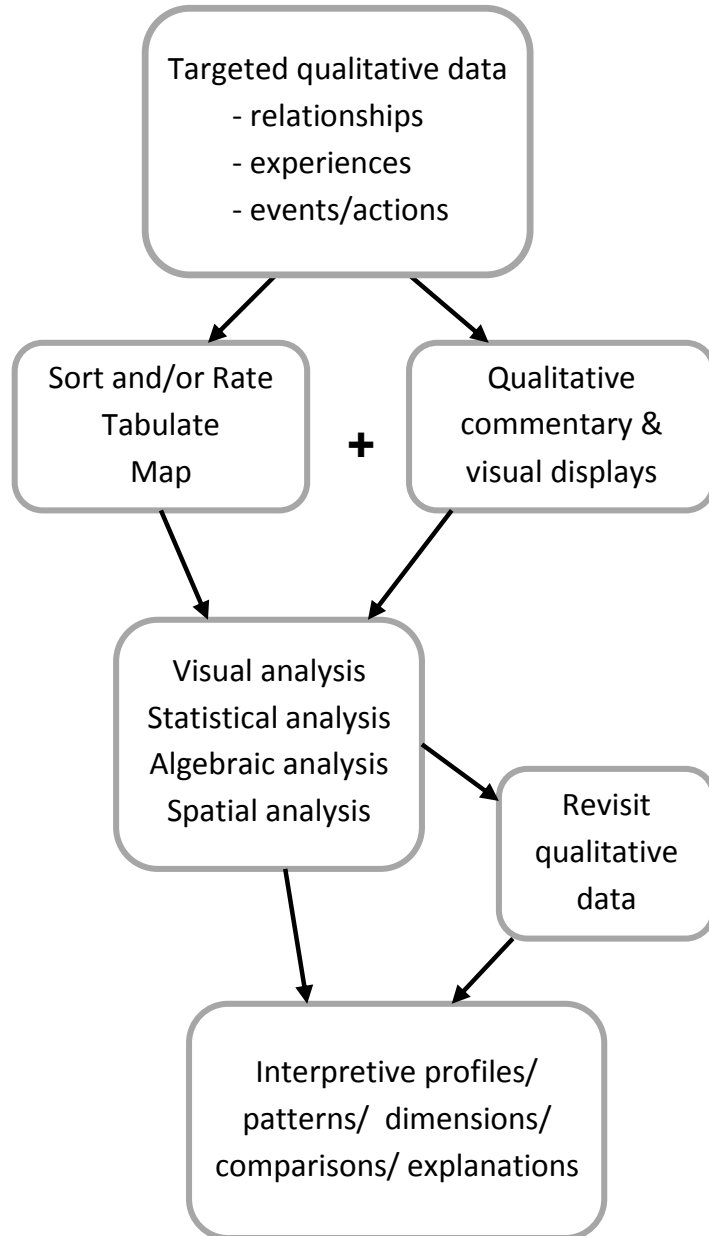

Do human service providers (welfare workers, domestic violence workers, nurses, and the general public) share issues related to domestic violence?

- 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

Sort and/or Rate
Tabulate
Map

+

Qualitative commentary & visual displays

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
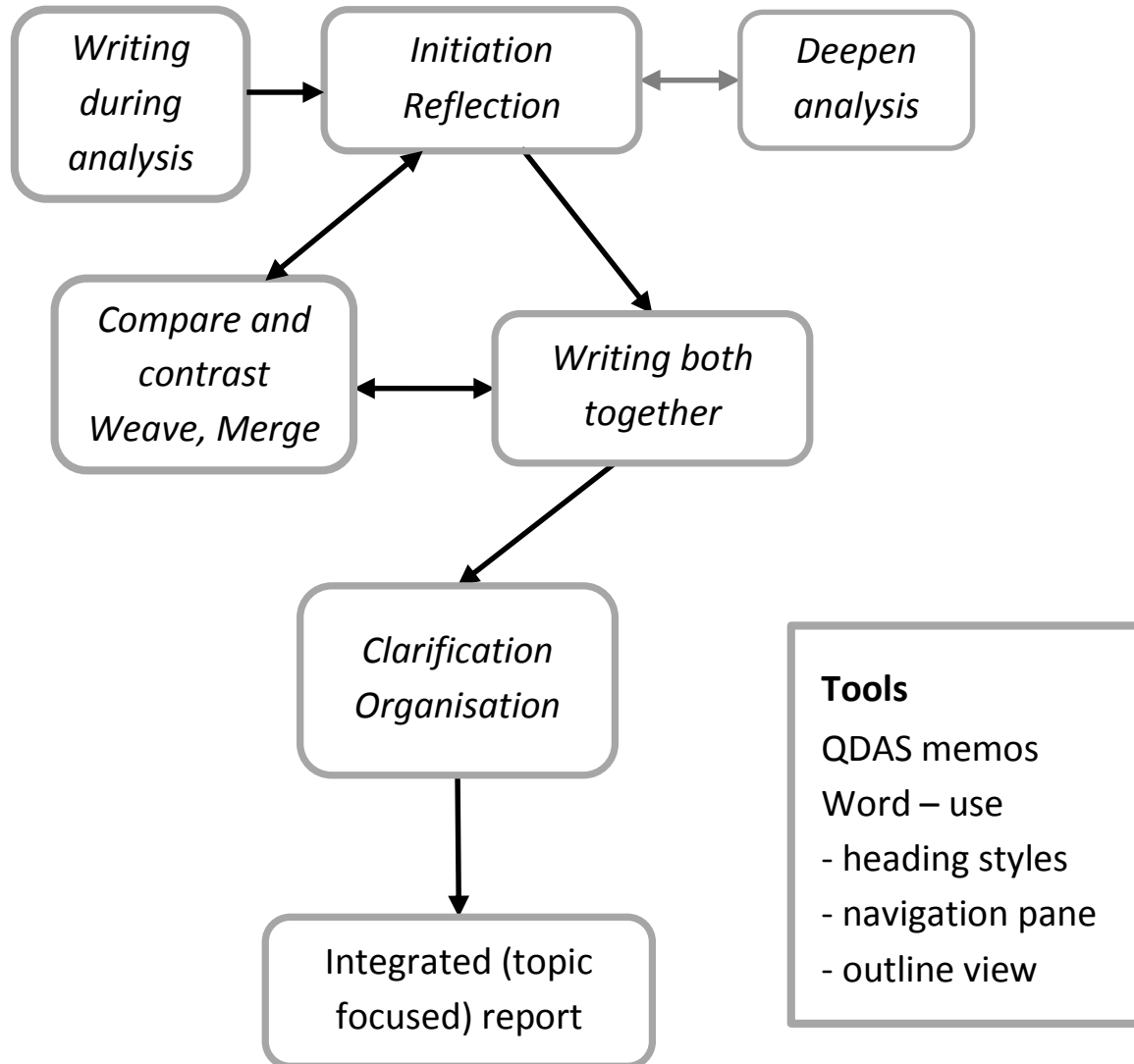 - Explore negative and extreme cases

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 during analysis → *Initiation Reflection* ↔ *Deepen analysis*

Compare and contrast Weave, Merge ↔ *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