Latent Variable Modelling Workflow Reference

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Preface

What is this?

This is a book full of code to use when you want to do latent variable modelling. It gives suggested workflowswhich I've cobbled together from a few different textbooks, and has worked examples with data from those textbooks or from open datasets I found online. When you need to do latent variable modelling for your research, you can use these workflows as a place to start.

Specifically, it seems like these are the sub-areas of latent variable modelling to know how to do:

- Exploratory Factor Analysis;
- Confirmatory Factor Analysis;
- Item Response Theory;
- Full SEM;
- Longitudinal SEM

Maybe I'll discover some other types of things along the way. It's a lifelong journey haha.

What am I referencing?

The first book on latent variable modelling I read was Gorsuch (1983). This was a nice conceptual introduction, but the applied examples were pretty whack. I've since found a few sources with data and R code to work with:

- *Latent Variable Modelling with R*, by Finch (2015). They helpfully provide all of the datasets here
- *Principles and Practice of Structural Equation Modeling*, by Kline (2011). The publisher provides data and code here
- The *lavaan* documentation has some nice worked examples too.

I'll mostly be using **lavaan** and **tidyverse**, but maybe also some **brms** at some point.

```
1 + 1
```

```
[1] 2
```

1 Introduction

This is a book created from markdown and executable code.

```
1 + 1
```

```
[1] 2
```

2 CFA

Let's load the packages we'll need for what is to come in this chapter:

```
library(tidyverse)
library(lavaan)
```

2.1 Example 1:

The first example we'll look at is from Finch (2015). chapter 13.

```
dat_ff <- foreign::read.spss('data/finch-and-french/performance.data.sav')
```

```
re-encoding from CP1252
```

```
# Seems like I need to only use the first 12 columns I think?
dat_ff <- dat_ff %>%

  as_tibble() %>%

  select(1:12)
```

2.2 Example 2:

Now we'll look at an example from Kline (2011), chapter 13.

Load the data:

```
dat_kline <- read_csv('data/kline/kabc-amos.csv')
```

```
Warning: One or more parsing issues, call `problems()` on your data frame for details,
e.g.:
  dat <- vroom(...)
  problems(dat)


Rows: 11 Columns: 10
-- Column specification --------------------------------------------------------
Delimiter: ","
chr (2): rowtype_, varname_
dbl (8): HM, NR, WO, GC, Tr, SM, MA, PS

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

2.3 Example 3:

Lastly, let's walk through an example from the lavaan documentation

3 Summary

In summary, this book has no content whatsoever.

```
1 + 1
```

```
[1] 2
```

References

Finch, French, W. Holmes. 2015. *Latent Variable Modeling with r.*
Gorsuch, Richard L. 1983. *Factor Analysis, 2nd Edition.*
Kline, Rex B. 2011. *Principles and Practice of Structural Equation Modeling.*