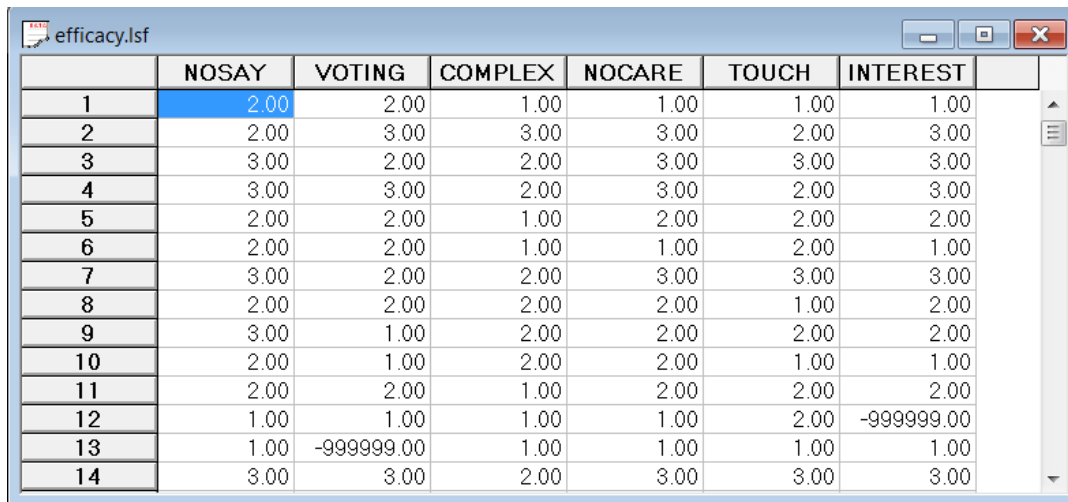


Confirmatory factor analysis model with latent variable relationship and latent variable means

This example is based on six political efficacy measurements as described in Aish & Jöreskog (1990). The dataset **EFFICACY.LSF** consists of 1719 cases obtained in a USA sample where the number -999999.0 denotes a missing value. The file can be found in the **Complex Survey Sample Examples** folder.



| | NOSAY | VOTING | COMPLEX | NOCARE | TOUCH | INTEREST |
|----|-------|------------|---------|--------|-------|------------|
| 1 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 2.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 |
| 3 | 3.00 | 2.00 | 2.00 | 3.00 | 3.00 | 3.00 |
| 4 | 3.00 | 3.00 | 2.00 | 3.00 | 2.00 | 3.00 |
| 5 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 | 2.00 |
| 6 | 2.00 | 2.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| 7 | 3.00 | 2.00 | 2.00 | 3.00 | 3.00 | 3.00 |
| 8 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | 2.00 |
| 9 | 3.00 | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| 10 | 2.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 |
| 11 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 | 2.00 |
| 12 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | -999999.00 |
| 13 | 1.00 | -999999.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 14 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 3.00 |

The data are the responses to the following statements:

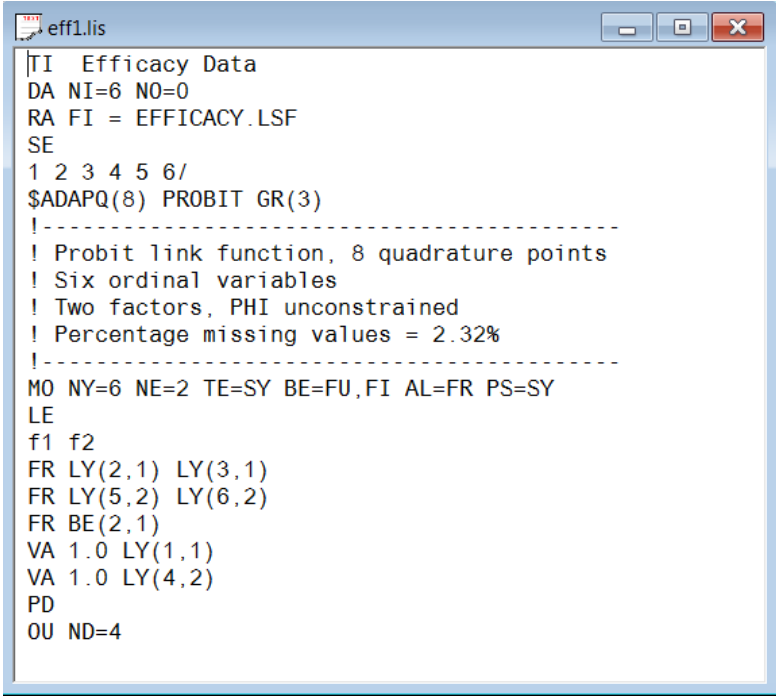
- NOSAY: "People like me have no say in what the government does."
- VOTING: "Voting is the only way that people like me can have any say about how the government runs things."
- COMPLEX: "Sometimes politics and government seem so complicated that a person like me cannot really understand what is going on."
- NOCARE: "I don't think that public officials care much about what people like me think."
- TOUCH: "Generally speaking, those who elect to Congress in Washington lose touch with the people pretty quickly."
- INTEREST: "Parties are only interested in people's votes but not in their opinions."

The ordered categories are:

- 1: agree strongly
- 2: agree
- 3: disagree
- 4: disagree strongly

It is hypothesized that the six variables are indicators of two factors, where Factor 1 represents Internal Efficacy measured by NOSAY, VOTING and COMPLEX. Factor 2 represents External Efficacy measured by NOCARE, TOUCH and INTEREST.

It is further hypothesized that Factor 2 depends on Factor 1. The LISREL syntax for fitting the model is shown next. Six quadrature points are selected for each of the two dimensions using the probit link function.



```
eff1.lis
|TI Efficacy Data
DA NI=6 NO=0
RA FI = EFFICACY.LSF
SE
1 2 3 4 5 6/
$ADAPQ(8) PROBIT GR(3)
!-----
! Probit link function, 8 quadrature points
! Six ordinal variables
! Two factors, PHI unconstrained
! Percentage missing values = 2.32%
!-----
MO NY=6 NE=2 TE=SY BE=FU,FI AL=FR PS=SY
LE
f1 f2
FR LY(2,1) LY(3,1)
FR LY(5,2) LY(6,2)
FR BE(2,1)
VA 1.0 LY(1,1)
VA 1.0 LY(4,2)
PD
OU ND=4
```

A portion of the output is shown next, being the parameter specifications where values greater than zero correspond to parameters that are estimated while zero values correspond to parameters that are fixed at zero or the values entered in the "VA" paragraphs.

eff1.OUT

Parameter Specifications

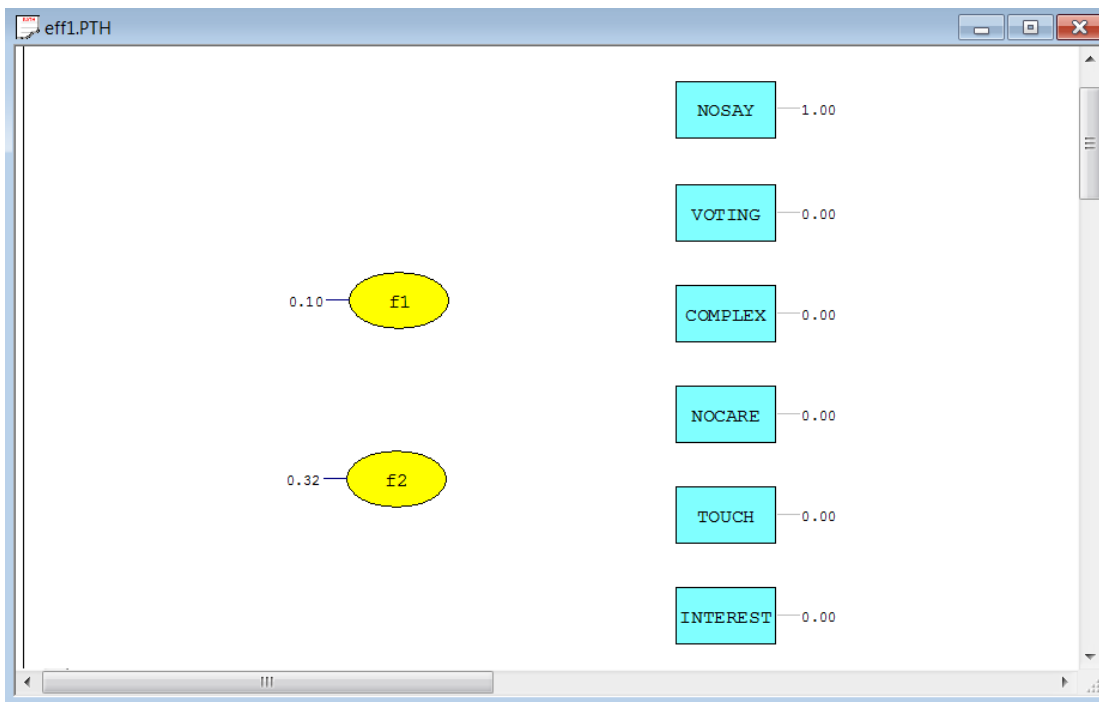
| LAMBDA-Y | | |
|----------|----|----|
| | f1 | f2 |
| NOSAY | 0 | 0 |
| VOTING | 1 | 0 |
| COMPLEX | 2 | 0 |
| NOCARE | 0 | 0 |
| TOUCH | 0 | 3 |
| INTEREST | 0 | 4 |

| BETA | | |
|------|----|----|
| | f1 | f2 |
| f1 | 0 | 0 |
| f2 | 5 | 0 |

| PSI | | |
|-----|----|----|
| | f1 | f2 |
| | 6 | 7 |

| ALPHA | | |
|-------|----|----|
| | f1 | f2 |
| | 8 | 9 |

The path diagram representation shown below provides the values of the estimated parameters for factor means.



The path diagram for the basic model showing the parameter estimates are given next.

