

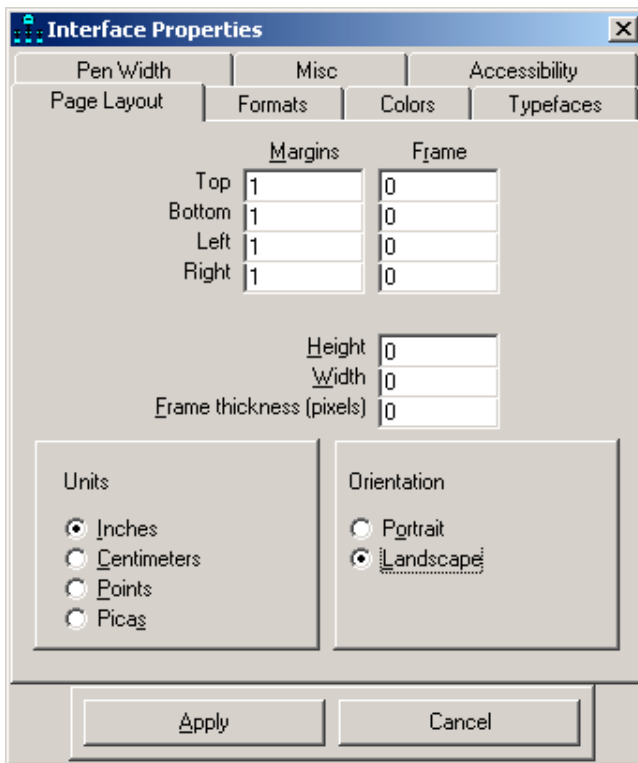
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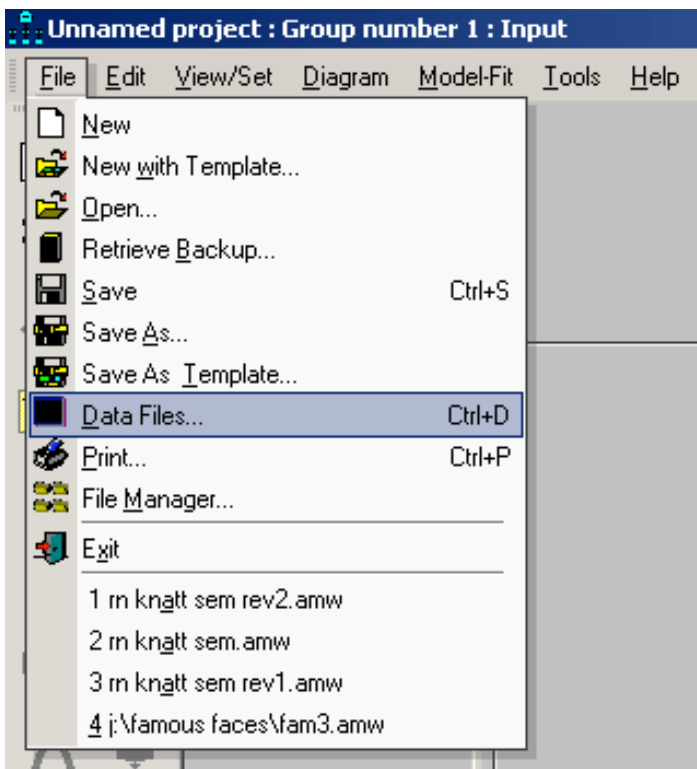
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Using AMOS to do confirmatory factor analysis: Some basic moves

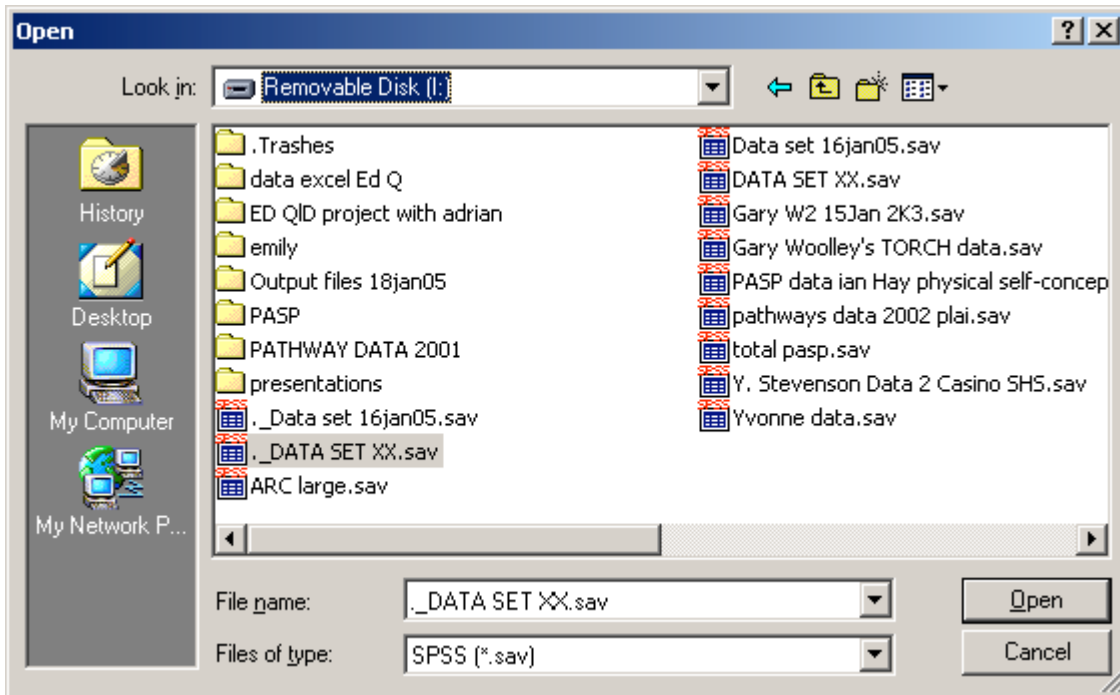
Select orientation (view/set menu)



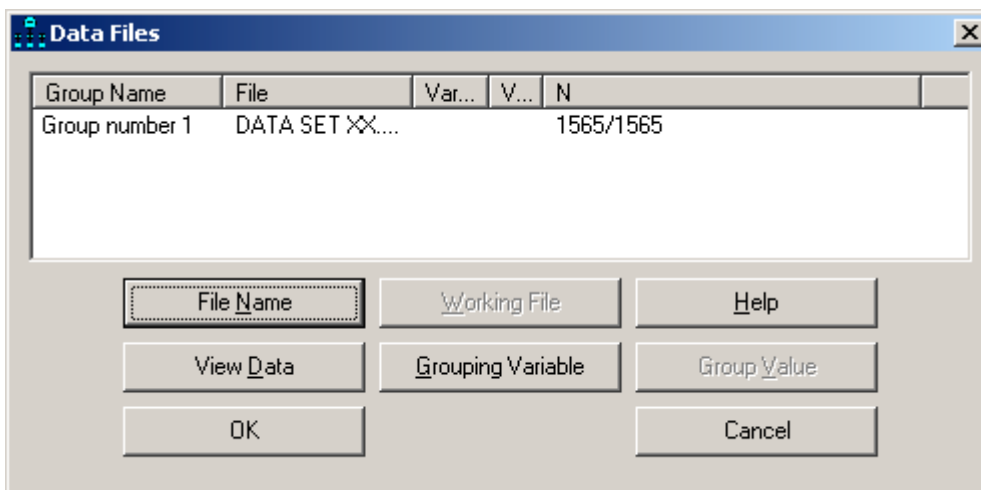
Select data file



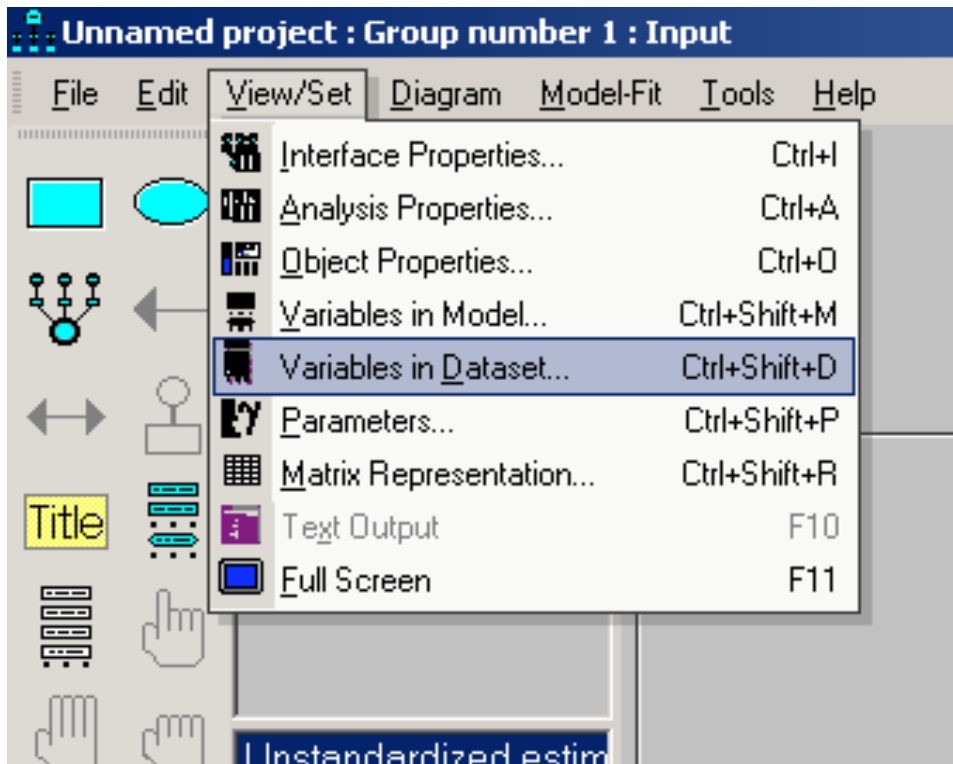
Avoid files with ._ prefixes



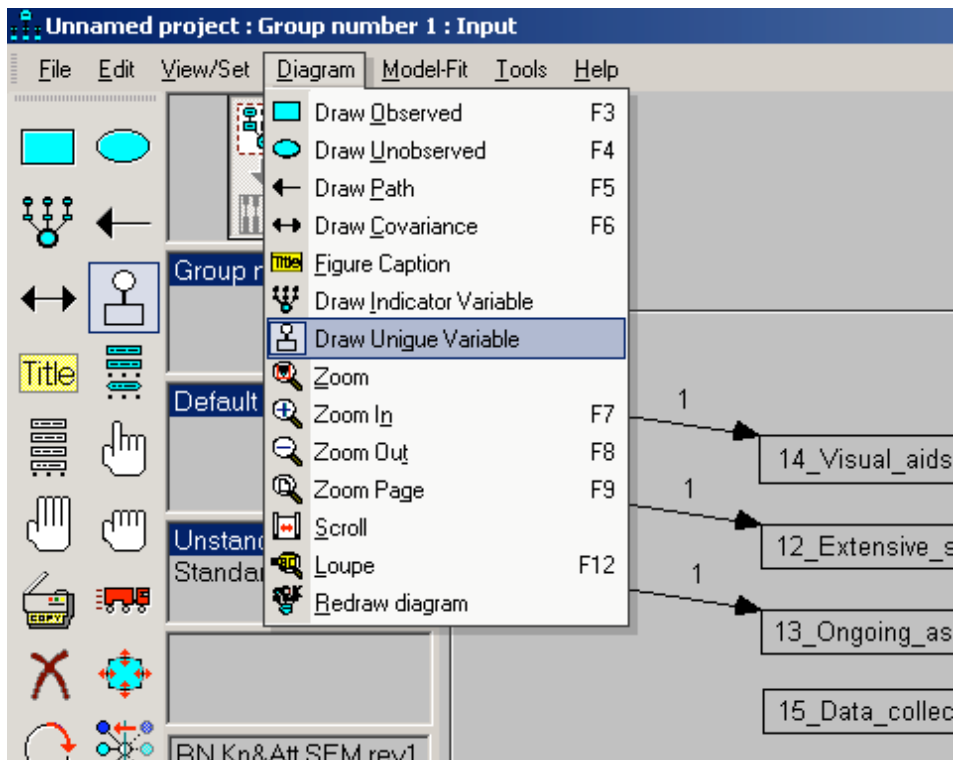
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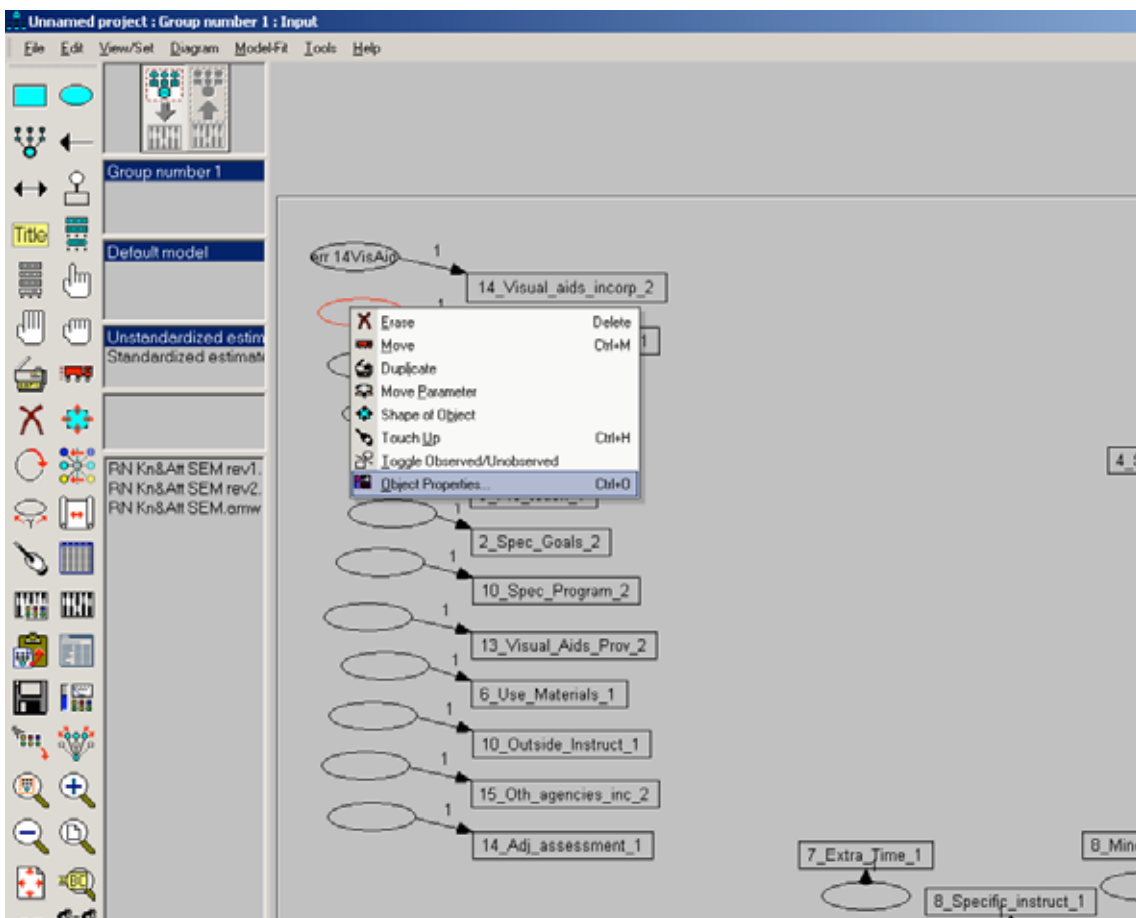
Select variables in dataset from view/set menu



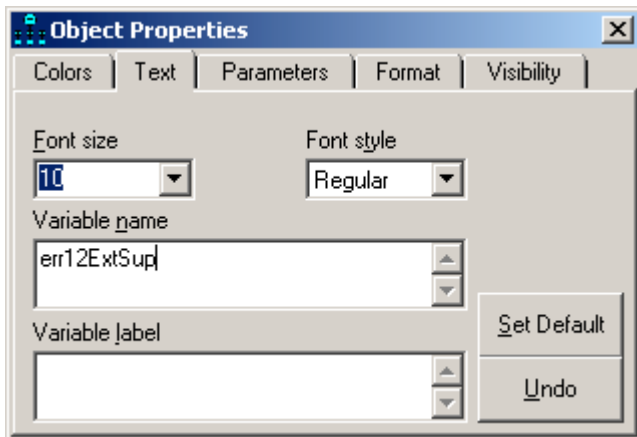
Add error terms via diagram menu



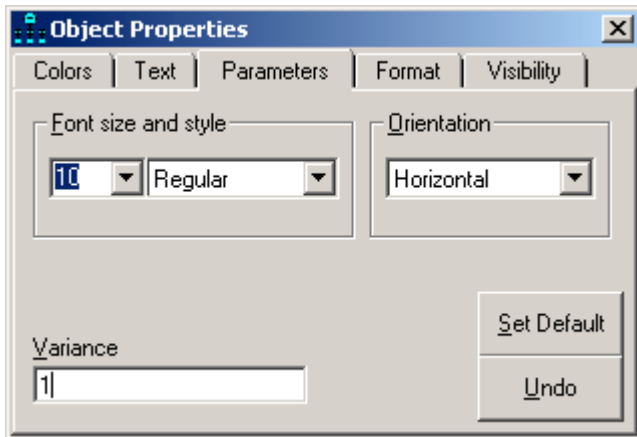
Can adjust object properties (font size, variance) for measured (rectangular) and latent (semi-circular) boxes (left-click for Windows or control click for Apple Macs)



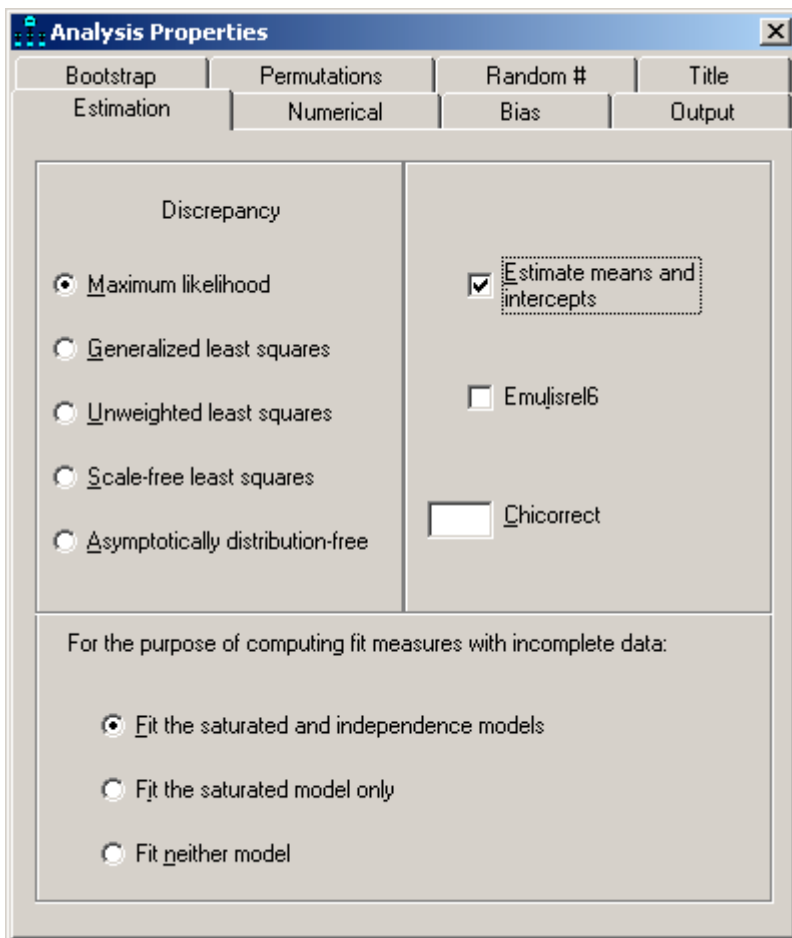
Here adjusting font size for labels and numbers to 10



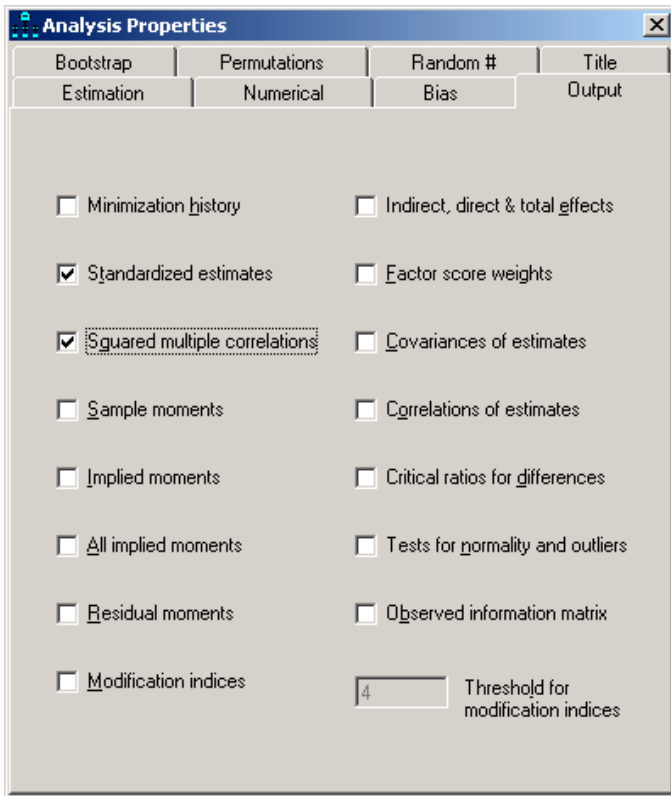
Here adjusting variance for latent variable or directional arrows, etc, to 1



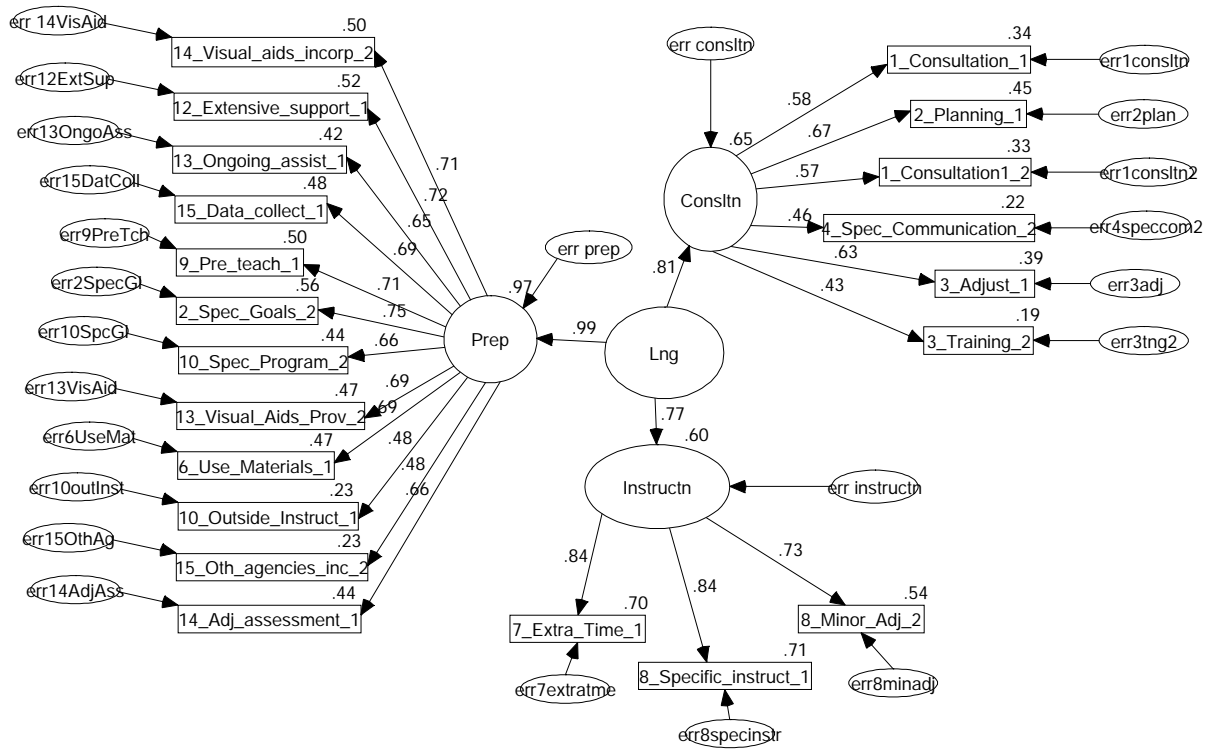
Here adjusting analysis properties to take account of missing values



Here selecting analytic output of interest



Resulting Confirmatory factor analysis



Analysis Summary

Groups

Group number 1 (Group number 1)

Notes for Group (Group number 1)

The model is recursive.

Sample size = 1565

Variable Summary (Group number 1)

Your model contains the following variables (Group number 1)

Observed, endogenous variables

V33
V13
V14
V16
V10
V21
V29
V32
V7
V11
V34
V15
V8
V9
V27
V22
V4
V3
V2
V23
V20

Unobserved, endogenous variables

Prep
Instructn
Consltn

Unobserved, exogenous variables

err 14VisAid
err12ExtSup
err13OngoAss
err15DatColl
err9PreTch
err2SpecGl
err10SpcGl
err13VisAid
err6UseMat

err10outInst
 err15OthAg
 err14AdjAss
 err7extratme
 err8specinstr
 err8minadj
 err3tng2
 err3adj
 err2plan
 err1consltn
 err4speccom2
 err1consltn2
 Lng
 err prep
 err consltn
 err instructn

Variable counts (Group number 1)

Number of variables in your model: 49
 Number of observed variables: 21
 Number of unobserved variables: 28
 Number of exogenous variables: 25
 Number of endogenous variables: 24

Parameter summary (Group number 1)

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	24	0	4	0	0	28
Labeled	0	0	0	0	0	0
Unlabeled	24	0	21	0	21	66
Total	48	0	25	0	21	94

Models

Default model (Default model)

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 252
 Number of distinct parameters to be estimated: 66
 Degrees of freedom (252 - 66): 186

Result (Default model)

Minimum was achieved

Chi-square = 1478.445

Degrees of freedom = 186

Probability level = .000

Group number 1 (Group number 1 - Default model)

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Prep <--- Lng	5.987	3.470	1.725	.084	
Consltn <--- Lng	1.368	.093	14.725	***	
Instructn <--- Lng	1.219	.068	17.794	***	
V33 <--- Prep	.088	.050	1.771	.077	
V13 <--- Prep	.090	.051	1.771	.077	
V14 <--- Prep	.054	.030	1.769	.077	
V16 <--- Prep	.097	.055	1.771	.077	
V10 <--- Prep	.103	.058	1.770	.077	
V21 <--- Prep	.099	.056	1.771	.077	
V29 <--- Prep	.092	.052	1.769	.077	
V32 <--- Prep	.095	.054	1.770	.077	
V7 <--- Prep	.120	.068	1.769	.077	
V11 <--- Prep	.077	.043	1.764	.078	
V34 <--- Prep	.068	.039	1.762	.078	
V15 <--- Prep	.091	.052	1.770	.077	
V8 <--- Instructn	.313	.012	25.828	***	

		Estimate	S.E.	C.R.	P	Label
V9	<--- Instructn	.318	.012	25.901	***	
V27	<--- Instructn	.319	.014	23.542	***	
V2	<--- Consltn	.382	.024	16.228	***	
V3	<--- Consltn	.360	.021	17.439	***	
V20	<--- Consltn	.337	.022	15.620	***	
V23	<--- Consltn	.093	.007	13.479	***	
V4	<--- Consltn	.332	.022	15.374	***	
V22	<--- Consltn	.089	.007	12.881	***	

Standardized Regression Weights: (Group number 1 - Default model)

		Estimate
Prep	<--- Lng	.986
Consltn	<--- Lng	.807
Instructn	<--- Lng	.773
V33	<--- Prep	.706
V13	<--- Prep	.720
V14	<--- Prep	.650
V16	<--- Prep	.694
V10	<--- Prep	.708
V21	<--- Prep	.749
V29	<--- Prep	.660
V32	<--- Prep	.689
V7	<--- Prep	.686
V11	<--- Prep	.478
V34	<--- Prep	.476
V15	<--- Prep	.664

		Estimate
V8	<--- Instructn	.838
V9	<--- Instructn	.844
V27	<--- Instructn	.734
V2	<--- Consltn	.583
V3	<--- Consltn	.671
V20	<--- Consltn	.572
V23	<--- Consltn	.465
V4	<--- Consltn	.628
V22	<--- Consltn	.432

Intercepts: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
V33	4.311	.021	209.150	***	
V13	4.308	.021	207.388	***	
V14	4.566	.014	324.265	***	
V16	3.911	.022	176.694	***	
V10	4.059	.024	165.751	***	
V21	4.195	.021	196.723	***	
V29	3.805	.025	150.133	***	
V32	4.285	.022	190.866	***	
V7	3.766	.033	114.484	***	
V11	3.529	.028	127.159	***	
V34	3.677	.027	134.843	***	
V15	3.217	.022	143.503	***	
V8	4.682	.015	309.521	***	

	Estimate	S.E.	C.R.	P	Label
V9	4.663	.015	305.324	***	
V27	4.632	.018	261.912	***	
V2	2.533	.028	89.157	***	
V3	3.347	.023	143.154	***	
V20	2.281	.027	85.556	***	
V23	1.854	.009	203.892	***	
V4	3.107	.027	114.878	***	
V22	1.850	.009	201.367	***	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Lng	1.000				
err prep	1.000				
err consltn	1.000				
err instructn	1.000				
err 14VisAid	.286	.013	22.269	***	
err12ExtSup	.280	.013	22.059	***	
err13OngoAss	.145	.007	22.246	***	
err15DatColl	.371	.016	23.950	***	
err9PreTch	.386	.018	21.491	***	
err2SpecGl	.284	.013	22.346	***	
err10SpcGl	.404	.020	20.115	***	
err13VisAid	.370	.016	23.193	***	
err6UseMat	.596	.032	18.760	***	
err10outInst	.732	.031	23.450	***	

	Estimate	S.E.	C.R.	P	Label
err15OthAg	.590	.028	21.106	***	
err14AdjAss	.389	.017	23.340	***	
err7extratme	.103	.006	17.177	***	
err8specinstr	.101	.006	16.721	***	
err8minadj	.217	.010	22.194	***	
err3tng2	.098	.004	24.959	***	
err3adj	.487	.026	18.592	***	
err2plan	.455	.021	21.371	***	
err1consltn	.813	.034	23.761	***	
err4speccom2	.090	.004	24.242	***	
err1consltn2	.668	.029	22.721	***	

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
Consltn	.652
Instructn	.598
Prep	.973
V20	.328
V23	.216
V2	.340
V3	.450
V4	.394
V22	.187
V27	.539
V9	.712

	Estimate
V8	.702
V15	.441
V34	.227
V11	.229
V7	.470
V32	.474
V29	.436
V21	.562
V10	.501
V16	.482
V14	.423
V13	.518
V33	.499

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	66	1478.445	186	.000	7.949
Saturated model	252	.000	0		
Independence model	21	9875.940	231	.000	42.753

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.850	.814	.867	.834	.866
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.805	.685	.697
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	1292.445	1173.676	1418.654
Saturated model	.000	.000	.000
Independence model	9644.940	9323.106	9973.101

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.945	.826	.750	.907
Saturated model	.000	.000	.000	.000
Independence model	6.315	6.167	5.961	6.377

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.067	.064	.070	.000
Independence model	.163	.161	.166	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	1610.445	1612.328		
Saturated model	504.000	511.191		
Independence model	9917.940	9918.539		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	1.030	.954	1.110	1.031

Model	ECVI	LO 90	HI 90	MECVI
Saturated model	.322	.322	.322	.327
Independence model	6.341	6.136	6.551	6.342

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	232	248
Independence model	43	45

Analysis Summary

Groups

Group number 1 (Group number 1)

Notes for Group (Group number 1)

The model is recursive.

Sample size = 1565

Variable Summary (Group number 1)

Your model contains the following variables (Group number 1)

Observed, endogenous variables

V33
V13
V14
V16
V10
V21
V29
V32
V7
V15
V8
V9
V27
V4
V3
V2

Unobserved, exogenous variables

err14VisAid
err12ExtSup
err13OngoAss

err15DatColl
 err9PreTch
 err2SpecGl
 err10SpcGl
 err13VisAid
 err6UseMat
 err14AdjAss
 err7extratme
 err8specinstr
 err8minadj
 err3adj
 err2plan
 err1consltn
 Prep
 Instructn
 Consltn

Variable counts (Group number 1)

Number of variables in your model: 35
 Number of observed variables: 16
 Number of unobserved variables: 19
 Number of exogenous variables: 19
 Number of endogenous variables: 16

Parameter summary (Group number 1)

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	16	0	3	0	0	19
Labeled	0	0	0	0	0	0
Unlabeled	16	3	16	0	16	51
Total	32	3	19	0	16	70

Models

Default model (Default model)

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 152

Number of distinct parameters to be estimated: 51

Degrees of freedom (152 - 51): 101

Result (Default model)

Minimum was achieved

Chi-square = 843.005

Degrees of freedom = 101

Probability level = .000

Group number 1 (Group number 1 - Default model)

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
V33 <--- Prep	.537	.019	28.262	***	
V13 <--- Prep	.548	.019	28.729	***	
V14 <--- Prep	.329	.013	24.637	***	
V16 <--- Prep	.582	.020	28.556	***	
V10 <--- Prep	.626	.023	27.559	***	
V21 <--- Prep	.589	.019	30.660	***	
V29 <--- Prep	.543	.025	22.144	***	
V32 <--- Prep	.577	.021	27.776	***	
V7 <--- Prep	.727	.032	22.970	***	
V15 <--- Prep	.550	.021	26.068	***	
V8 <--- Instructn	.493	.013	37.524	***	
V9 <--- Instructn	.501	.013	37.938	***	
V27 <--- Instructn	.502	.016	30.995	***	
V2 <--- Consltn	.638	.030	21.065	***	
V3 <--- Consltn	.687	.024	28.122	***	
V4 <--- Consltn	.584	.029	20.250	***	

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
V33 <--- Prep	.711
V13 <--- Prep	.720
V14 <--- Prep	.656
V16 <--- Prep	.689
V10 <--- Prep	.713
V21 <--- Prep	.737
V29 <--- Prep	.645
V32 <--- Prep	.690
V7 <--- Prep	.685
V15 <--- Prep	.660
V8 <--- Instructn	.838
V9 <--- Instructn	.845
V27 <--- Instructn	.732
V2 <--- Consltn	.575
V3 <--- Consltn	.757
V4 <--- Consltn	.652

Intercepts: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
V33	4.314	.021	209.657	***	
V13	4.312	.021	207.866	***	
V14	4.568	.014	324.647	***	
V16	3.914	.022	177.215	***	
V10	4.063	.024	166.121	***	
V21	4.202	.021	197.882	***	

	Estimate	S.E.	C.R.	P	Label
V29	3.817	.025	150.662	***	
V32	4.289	.022	191.339	***	
V7	3.771	.033	114.565	***	
V15	3.220	.022	143.836	***	
V8	4.682	.015	309.629	***	
V9	4.664	.015	305.463	***	
V27	4.632	.018	262.051	***	
V2	2.534	.028	89.165	***	
V3	3.349	.023	143.341	***	
V4	3.116	.027	115.245	***	

Covariances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Consltn <--> Prep	.724	.021	33.894	***	
Consltn <--> Instructn	.613	.025	24.528	***	
Prep <--> Instructn	.764	.015	50.004	***	

Correlations: (Group number 1 - Default model)

	Estimate
Consltn <--> Prep	.724
Consltn <--> Instructn	.613
Prep <--> Instructn	.764

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Prep	1.000				
Instructn	1.000				
Consltn	1.000				

	Estimate	S.E.	C.R.	P	Label
err 14VisAid	.281	.013	21.960	***	
err12ExtSup	.279	.013	21.807	***	
err13OngoAss	.143	.007	22.021	***	
err15DatColl	.375	.016	23.782	***	
err9PreTch	.380	.018	21.199	***	
err2SpecGI	.292	.013	22.273	***	
err10SpcGI	.414	.021	20.089	***	
err13VisAid	.367	.016	22.948	***	
err6UseMat	.596	.032	18.596	***	
err14AdjAss	.391	.017	23.184	***	
err7extratme	.103	.006	17.231	***	
err8specinstr	.101	.006	16.685	***	
err8minadj	.218	.010	22.260	***	
err3adj	.463	.027	17.206	***	
err2plan	.353	.023	15.021	***	
err1constln	.825	.036	22.987	***	

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
V2	.330
V3	.572
V4	.425
V27	.536
V9	.714
V8	.702

	Estimate
V15	.436
V7	.470
V32	.476
V29	.416
V21	.544
V10	.508
V16	.475
V14	.430
V13	.518
V33	.506

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	51	843.005	101	.000	8.347
Saturated model	152	.000	0		
Independence model	16	8161.565	136	.000	60.012

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.897	.861	.908	.876	.908
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.743	.666	.674
Saturated model	.000	.000	.000

Model	PRATIO	PNFI	PCFI
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	742.005	653.087	838.383
Saturated model	.000	.000	.000
Independence model	8025.565	7732.774	8324.667

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.539	.474	.418	.536
Saturated model	.000	.000	.000	.000
Independence model	5.218	5.131	4.944	5.323

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.069	.064	.073	.000
Independence model	.194	.191	.198	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	945.005	946.126		
Saturated model	304.000	307.341		
Independence model	8193.565	8193.916		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.604	.547	.666	.605
Saturated model	.194	.194	.194	.197
Independence model	5.239	5.052	5.430	5.239

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	233	255
Independence model	32	34