

Use of Web App for SEM with Networks

The network data analysis can also be conducted using our online app available at: <https://bigsem.psychstat.org/app> . To use the app, one need to register as a user to protect the data of the users. Once logging in, a user with work with an interface like below:

BigSEM

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Project: SEM-network

Path Diagram

Diagram It

Upload Files

New File

<input type="checkbox"/> File name	Operations	File Actions	File size	Time
<input type="checkbox"/> network.ex1.diag		Edit View Delete Download Rename History	3.26 KB	2024.10.22 15:36:50.
<input type="checkbox"/> network.ex1.sem		Edit View Delete Download Rename History	383 B	2024.10.22 15:36:50.
<input type="checkbox"/> network.ex1.sem.out		Edit View Delete Download Rename History	9.4 KB	2024.10.22 15:36:50.
<input type="checkbox"/> network.ex2.net.edge.sem.out		Edit View Delete Download Rename History	6.7 KB	2024.10.22 15:22:52.
<input type="checkbox"/> network.ex2.net.edge.diag		Edit View Delete Download Rename History	3.27 KB	2024.10.22 15:01:48.
<input type="checkbox"/> network.ex2.net.edge.sem		Edit View Delete Download Rename History	393 B	2024.10.22 15:01:48.
<input type="checkbox"/> network.RData		Edit View Delete Download Rename History	17.81 KB	2024.10.21 21:41:08.
<input type="checkbox"/> cf_wechat.csv	Analysis	Edit View Delete Download Rename History	54.19 KB	2024.10.19 20:38:23.
<input type="checkbox"/> cf_friends.csv	Analysis	Edit View Delete Download Rename History	54.04 KB	2024.10.19 17:43:05.
<input type="checkbox"/> cf_nonnetwork.csv	Analysis	Edit View Delete Download Rename History	28.86 KB	2024.10.19 17:43:05.

Delete

Compare

Organizing data

Organizing the data for analysis is the first step for using the app or R package. In R, the data are provided as a list with a non-network component and a network component. To conveniently organize the data online, we developed a simple app.

To use the app, one first upload the non-network data and network data sets as separate files. Then, in the app, one selects the corresponding data files. An example is given below with two networks - friendship and WeChat networks. Note that the new data set will be saved as R data with the provided name, i.e., `mynetworkdata.RData` in this example.

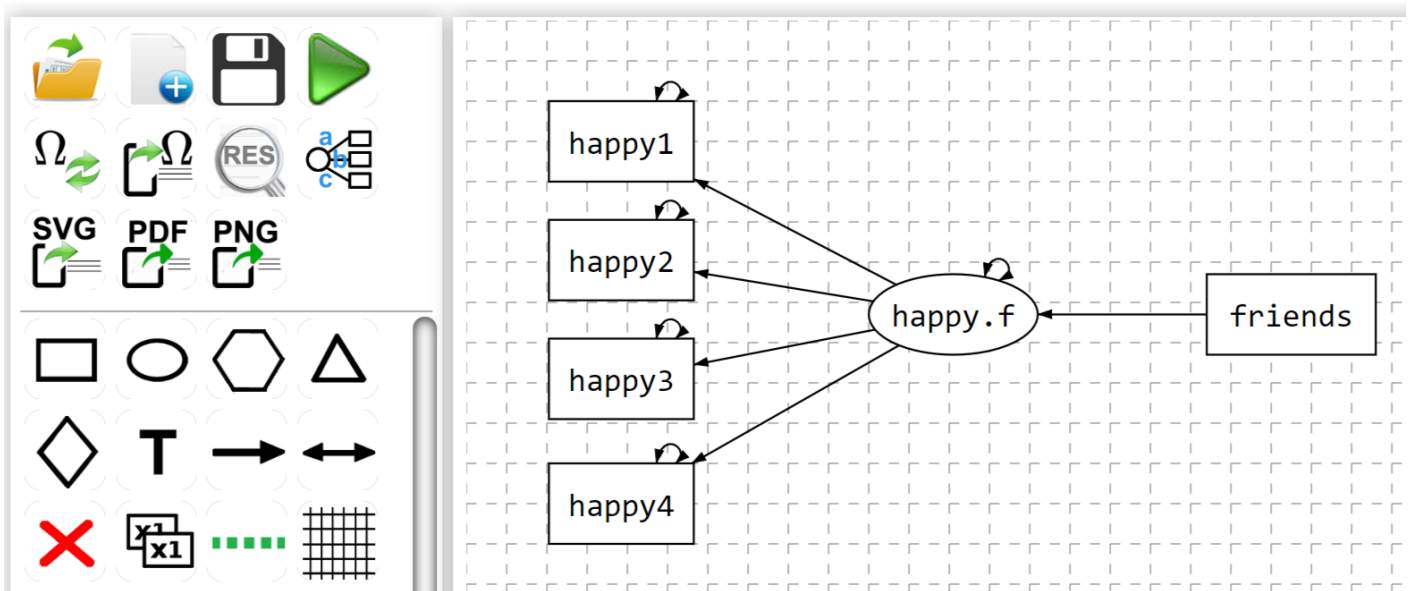
Organize network data

Analysis Menu

New network data set name:	<input type="text" value="mynetworkdata"/>	
Non-network data:	<input type="text" value="nonnetwork"/>	<input type="text" value="cf_nonnetwork.csv"/> ▾
Network data 1:	<input type="text" value="friends"/>	<input type="text" value="cf_friends.csv"/> ▾
Network data 2:	<input type="text" value="wechat"/>	<input type="text" value="cf_wechat.csv"/> ▾
Network data 3:	<input type="text" value="input name"/>	<input type="text" value="NA"/> ▾
Network data 4:	<input type="text" value="input name"/>	<input type="text" value="NA"/> ▾
<input type="button" value="RUN"/>		

Conducting the analysis

We use a simple example to illustrate the use of the online app. To conduct the analysis, we need to first draw the path diagram of the model. Here, we create a latent happiness factor (happy.f) from the 4-item measure of global subjective happiness. We then use the friendship network to predict the happiness factor.



For the network analysis, one needs to choose the software to use, here "NetworkSEM". Then, one selects the Data File "network.RData".

Software:

NetworkSEM ▾

Data File:

network.RD ▾



For the network statistics based method, one need to choose what statistics to use. Here, one can specify them in the "Control" field. In this example, we use `netstats = degree, betweenness, closeness` to allow the use of the three network statistics.

Control:

```
netstats=degree,  
betweenness, closeness
```

To run the analysis, one clicks on the green triangle in the left panel. The output of the analysis is given below. The output has several parts:

- The basic information, particularly, the user and the analysis id
7cf61d4792351966add082d56368301d.
- The descriptive statistics for numerical variables in the non-network data set.
- The information on the networks.
- The basic model information
- The results from fitting the model.

BigSEM started at 15:36:50 on Oct 22, 2024.

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Please refresh your browser for complete output of complex data analysis.

The current analysis was conducted by the BigSEM user **johnny**.

To contact us, make sure to include the ticket # for this analysis

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Descriptive statistics (N=165, p=59)

	Mean	sd	Min	Max	Skewness	Kurtosis	
gender	0.55152	0.49885	0.000	1.0000	-0.2071631	1.0429	
gpa	3.27293	0.48805	1.173	4.2200	-0.6399076	4.2619	
age	21.64242	0.85505	18.000	24.0000	-0.1255522	4.5903	
weight	62.29091	14.16756	37.000	110.0000	0.9021334	3.2265	
height	169.54545	8.15808	155.000	188.0000	0.3186553	1.9660	
smoke	0.26061	0.44030	0.000	1.0000	1.0907192	2.1897	
drink	0.41212	0.49372	0.000	1.0000	0.3570735	1.1275	
wechat	157.32927	180.36548	0.000	1000.0000	2.9199355	11.9943	
id	83.00000	47.77552	1.000	165.0000	0.0000000	1.7999	
personality1	2.81818	1.06652	1.000	5.0000	-0.0869982	2.4384	
personality2	2.61818	1.22710	1.000	5.0000	0.3212422	2.0339	
personality3	2.45455	0.98436	1.000	5.0000	0.4540597	2.8503	
personality4	2.64242	0.98743	1.000	5.0000	0.1910639	2.5725	
personality5	3.03636	1.15764	1.000	5.0000	-0.0235915	2.2242	
personality6	3.07879	1.12612	1.000	5.0000	0.1017642	2.3871	
personality7	3.27273	1.16537	1.000	5.0000	-0.1954555	2.1881	
personality8	2.36970	1.13816	1.000	5.0000	0.5103888	2.4850	
personality9	2.75758	0.94451	1.000	5.0000	0.3684034	3.1224	
personality10	3.01212	1.08194	1.000	5.0000	0.0049198	2.5241	
personality11	2.89697	1.20276	1.000	5.0000	0.0931915	2.2009	
personality12	3.78788	1.08081	1.000	5.0000	-0.4433181	2.2537	
personality13	2.61818	1.03283	1.000	5.0000	0.3473757	2.9438	
personality14	3.80000	1.04298	1.000	5.0000	-0.5964333	2.8276	
personality15	3.42424	1.11613	1.000	5.0000	-0.3898210	2.5711	
personality16	2.65455	1.20292	1.000	5.0000	0.2450516	2.2534	
personality17	2.31515	0.98033	1.000	5.0000	0.3493841	2.6210	
personality18	3.59394	0.99937	1.000	5.0000	-0.1128832	2.1067	
personality19	3.82424	0.94966	1.000	5.0000	-0.5435870	3.1673	
personality20	3.12121	1.06946	1.000	5.0000	0.0874853	2.4055	
depress1	0.98788	0.55202	0.000	3.0000	0.6478164	5.7357	
depress2	0.61818	0.58926	0.000	3.0000	0.5205043	3.3723	
depress3	0.76364	0.78002	0.000	3.0000	0.8239322	3.2396	

depress4	0.91515	0.59884	0.000	3.0000	0.3722678	4.0971
depress5	0.70303	0.67376	0.000	3.0000	0.6728525	3.3429
depress6	0.80606	0.69753	0.000	3.0000	0.7141707	3.7965
depress7	0.66667	0.70998	0.000	3.0000	0.8848909	3.5949
lone1	1.04848	0.77935	0.000	3.0000	0.2260045	2.3813
lone2	1.26667	0.88437	0.000	3.0000	0.1437581	2.2374
lone3	1.03030	0.87251	0.000	3.0000	0.2729773	2.0401
lone4	1.29091	0.90404	0.000	3.0000	0.1403947	2.1952
lone5	1.27879	0.88750	0.000	3.0000	0.0558801	2.1521
lone6	0.85455	0.79828	0.000	3.0000	0.5543989	2.5604
lone7	0.98788	0.85531	0.000	3.0000	0.3749858	2.2210
lone8	1.64242	0.89682	0.000	3.0000	-0.2540419	2.3354
lone9	1.00000	0.86954	0.000	3.0000	0.3907138	2.2320
lone10	0.88485	0.76832	0.000	3.0000	0.5218129	2.7655
happy1	5.34545	1.31897	1.000	7.0000	-0.8142547	3.6334
happy2	5.25455	1.30969	1.000	7.0000	-0.7392627	3.2077
happy3	5.24848	1.30387	2.000	7.0000	-0.4342157	2.6097
happy4	3.89091	1.65654	1.000	7.0000	0.1177261	2.2404
lone	1.12848	0.56674	0.000	2.6000	-0.0868936	2.8135
depress	0.78009	0.41754	0.000	1.8571	0.1401042	2.5266
happy	4.93485	0.86774	2.500	7.0000	0.2112938	3.2653
p.e	2.91364	0.78605	1.000	5.0000	0.1731648	3.4108
p.c	3.53182	0.69743	2.000	5.0000	0.2454618	2.4799
p.i	3.53788	0.68721	1.500	5.0000	-0.2099051	2.6462
p.a	3.55606	0.61259	1.750	5.0000	0.0235716	2.8378
p.n	2.87576	0.63835	1.000	4.7500	0.1728206	3.3815
bmi	21.50942	3.84812	15.401	39.5197	1.5035276	6.1558

Missing Rate

gender	0.0000000
gpa	0.0000000
age	0.0000000
weight	0.0000000
height	0.0000000
smoke	0.0000000
drink	0.0000000
wechat	0.0060606
id	0.0000000
personality1	0.0000000
personality2	0.0000000
personality3	0.0000000
personality4	0.0000000
personality5	0.0000000
personality6	0.0000000
personality7	0.0000000
personality8	0.0000000
personality9	0.0000000
personality10	0.0000000
personality11	0.0000000
personality12	0.0000000
personality13	0.0000000
personality14	0.0000000
personality15	0.0000000
personality16	0.0000000

personality17	0.0000000
personality18	0.0000000
personality19	0.0000000
personality20	0.0000000
depress1	0.0000000
depress2	0.0000000
depress3	0.0000000
depress4	0.0000000
depress5	0.0000000
depress6	0.0000000
depress7	0.0000000
lone1	0.0000000
lone2	0.0000000
lone3	0.0000000
lone4	0.0000000
lone5	0.0000000
lone6	0.0000000
lone7	0.0000000
lone8	0.0000000
lone9	0.0000000
lone10	0.0000000
happy1	0.0000000
happy2	0.0000000
happy3	0.0000000
happy4	0.0000000
lone	0.0000000
depress	0.0000000
happy	0.0000000
p.e	0.0000000
p.c	0.0000000
p.i	0.0000000
p.a	0.0000000
p.n	0.0000000
bmi	0.0000000

Network data information

	#row	#col
friends	165	165
wechat	165	165

Model information

Observed non-network variables: happy1 happy2 happy3 happy4 .

Observed network variables: friends .

Latent variables: happy.f .

The weight is: 0 .

Results

lavaan 0.6-18 ended normally after 66 iterations

Estimator	ML
Optimization method	NLMINB
Number of model parameters	11
Number of observations	165

Model Test User Model:

Test statistic	14.749
Degrees of freedom	11
P-value (Chi-square)	0.194

Model Test Baseline Model:

Test statistic	162.858
Degrees of freedom	18
P-value	0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI)	0.974
Tucker-Lewis Index (TLI)	0.958

Loglikelihood and Information Criteria:

Loglikelihood user model (H0)	-1077.697
Loglikelihood unrestricted model (H1)	-1070.322
Akaike (AIC)	2177.394
Bayesian (BIC)	2211.559
Sample-size adjusted Bayesian (SABIC)	2176.733

Root Mean Square Error of Approximation:

RMSEA	0.045
90 Percent confidence interval - lower	0.000
90 Percent confidence interval - upper	0.099
P-value H_0: RMSEA <= 0.050	0.498
P-value H_0: RMSEA >= 0.080	0.170

Standardized Root Mean Square Residual:

SRMR	0.039
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Parameter Estimates:

Standard errors	Standard
Information	Expected
Information saturated (h1) model	Structured

Latent Variables:

	Estimate	Std.Err	z-value	P(> z)
happy.f =~				
happy4	1.000			
happy3	-4.933	5.032	-0.980	0.327
happy2	-7.445	7.547	-0.986	0.324
happy1	-8.133	8.251	-0.986	0.324

Regressions:

	Estimate	Std.Err	z-value	P(> z)
happy.f ~				
friends.degree	-0.024	0.037	-0.655	0.513
frinds.btwnnss	0.019	0.029	0.654	0.513
friends.clsnss	0.011	0.027	0.401	0.689

Variances:

	Estimate	Std.Err	z-value	P(> z)
.happy4	2.708	0.299	9.070	0.000
.happy3	1.219	0.147	8.306	0.000
.happy2	0.633	0.150	4.207	0.000
.happy1	0.450	0.167	2.701	0.007
.happy.f	0.019	0.039	0.494	0.621

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BigSEM ended at 15:36:50 on Oct 22, 2024

Revision #2

Created 24 October 2024 17:54:16 by Admin

Updated 24 October 2024 20:03:04 by Admin