Sensitivity analysis of the mediation inference from the parallel latent growth curve mediation model to the omission of a potential time-invariant confounder of the mediator-outcome relations

(ML estimation is used for the frequentist and hybrid sensitivity analyses)

csv file (include header) for the data frame containing variables in the LGCM model only

Browse...	LGCMdata.csv

Upload complete

See an example dataset with 5 time points (and a baseline covariate Z included in both the latent mediator models and latent outcome models)
exampledata

The illustrative values specified below are for this example datset.

Column numbers for repeated measures of outcome from the first to the last time points in the input datcsv file (the column numbers should be separated by comma.)

1,2,3,4,5

Outcome slope loadings on repeated measures of the outcome from the first to the last time points (the loading values should be separated by comma.)

-4,-3,-2,-1,0

Column numbers for repeated measures of mediator from the first to the last time points in the input datcsv file (the column numbers should be separated by comma.)

6,7,8,9,10

Mediator slope loadings on repeated measures of the mediator from the first to the last time points (the loading values should be separated by comma).

0,1,2,3,4

Column number corresponding to the independent variable (time-invariant) in the input datcsv file

11

Column numbers corresponding to the covariates (time-invariant) included in both the latent mediator models and latent outcome models in the input datcsv file (separated by comma).

12

the columns in the input datcsv file corresponding to the covariates (time-invariant) included in only the latent mediator models; the column numbers should be separated by comma.

the columns in the input datcsv file corresponding to the covariates (time-invariant) included in only the latent outcome models; the column numbers should be separated by comma.

significance level for testing a specific indirect effect

0.05

☑ Frequentist sensitivity analysis (where confounder sensitivity parameters are viewed as fixed values)

☑ Bayesian-frequentist hybrid sensitivity analysis (where multiple [K] sets of confounder sensitivity parameters are randomly drawn from user-specified prior distributions, and then used to make mediational inferences using frequentist maximum likelihood methods)

how many sets of confounder sensitivity parameters to draw? (the results will be summarized across all the draws)

1000

Specify priors for which type of confounder sensitivity paramters?
- ⦿ Confounder correlations (uniform priors)
- ◯ Confounder path coefficients (normal priors)

minimums of the uniform priors for the confounder correlations with the latent mediator intercept, mediator slope, outcome intercept and outcome slope (separated by comma):

0.2,0.2,0.2,0.2

maximums of the uniform priors for the confounder correlations with the latent mediator intercept, mediator slope, outcome intercept and outcome slope (separated by comma):
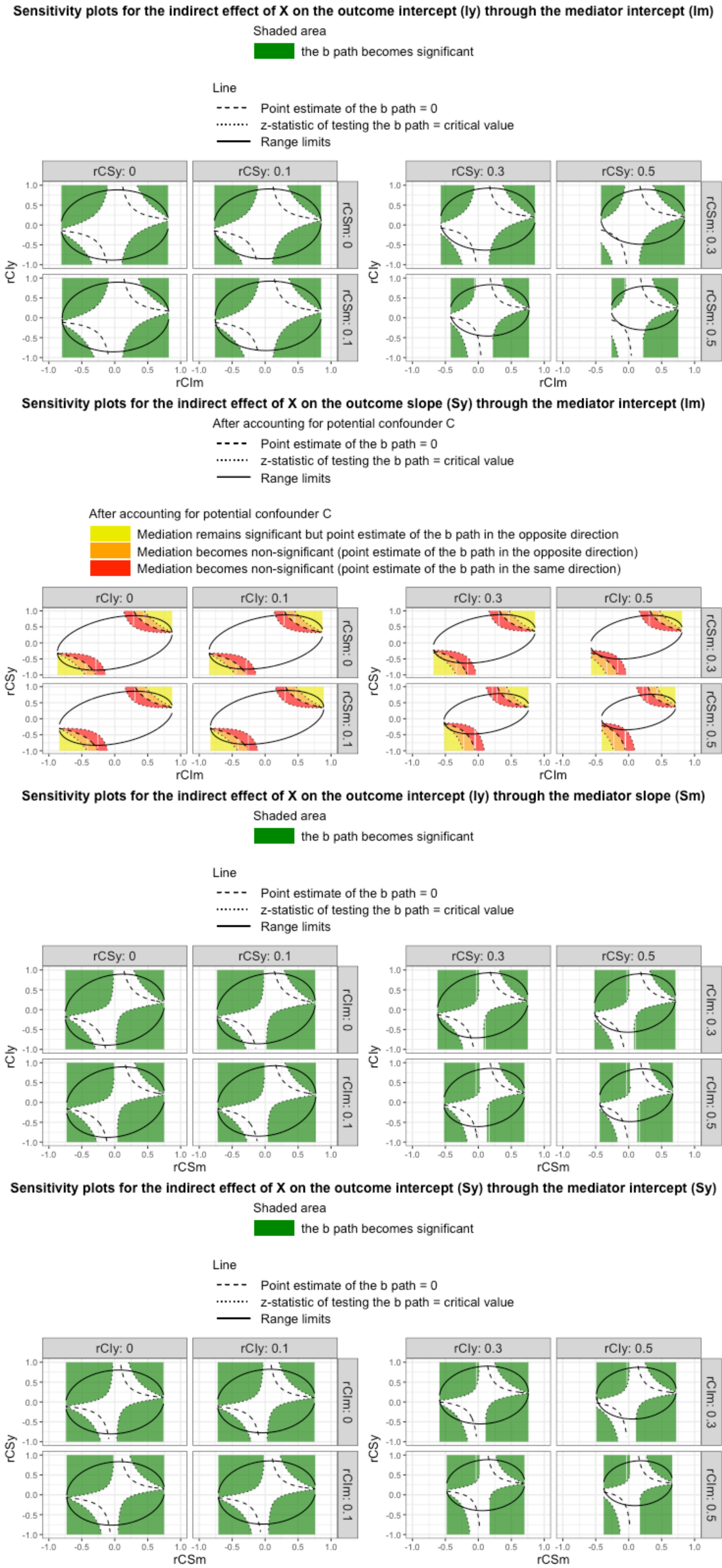
0.4,0.4,0.4,0.4

Go

Bayesian-frequentist hybrid sensitivity analysis

param	M0.est	M0.se	M0.pval	M1.admissble_percent	M1.sig_percent	M1.average	M1.quartile1	M1.median	M1.quartile3
IY.ON_IM	0.14	0.14	0.29	1.00	0.00	0.07	0.05	0.07	0.09
IY.ON_SM	0.22	0.12	0.08	1.00	0.00	0.12	0.09	0.13	0.15
SY.ON_IM	0.40	0.12	0.00	1.00	1.00	0.34	0.32	0.34	0.36
SY.ON_SM	0.15	0.10	0.14	1.00	0.00	0.07	0.04	0.07	0.10
IM.ON_X	0.43	0.09	0.00	1.00	1.00	0.43	0.43	0.43	0.43
SM.ON_X	0.59	0.06	0.00	1.00	1.00	0.59	0.59	0.59	0.59
X_IM_IY	0.06	0.06	0.30	1.00	0.00	0.03	0.02	0.03	0.04
X_SM_IY	0.13	0.07	0.09	1.00	0.00	0.07	0.06	0.07	0.09
X_IM_SY	0.17	0.06	0.00	1.00	1.00	0.15	0.14	0.15	0.16
X_SM_SY	0.09	0.06	0.15	1.00	0.00	0.04	0.02	0.04	0.06
X_TO_IY	0.19	0.07	0.01	1.00	0.08	0.10	0.08	0.10	0.12
X_TO_SY	0.26	0.07	0.00	1.00	0.93	0.19	0.16	0.19	0.21

In the "param" column, the first six parameters are the path coefficients for the mediator-outcome relations and input-mediator relations (e.g., "SY.ON_IM" denotes the path from the mediator intercept to outcome slope); the last six parameters are the specific and total indirect effects (e.g., "X_IM_IY" denotes the indirect effect of the input variable on the outcome intercept through the mediator intercept; "X_TO_IY" denotes the total indirect effect of the input variable on the outcome intercept through both the mediator intercept IM and mediator slope SM)

Frequentist sensitivity analysis

Sensitivity plots for the indirect effect of X on the outcome intercept (Iy) through the mediator intercept (Im)

Shaded area
- 🟩 the b path becomes significant

Line
- – – – Point estimate of the b path = 0
- ······ z-statistic of testing the b path = critical value
- —— Range limits

Sensitivity plots for the indirect effect of X on the outcome slope (Sy) through the mediator intercept (Im)

After accounting for potential confounder C
- – – – Point estimate of the b path = 0
- ······ z-statistic of testing the b path = critical value
- —— Range limits

After accounting for potential confounder C
- 🟨 Mediation remains significant but point estimate of the b path in the opposite direction
- 🟧 Mediation becomes non-significant (point estimate of the b path in the opposite direction)
- 🟥 Mediation becomes non-significant (point estimate of the b path in the same direction)

Sensitivity plots for the indirect effect of X on the outcome intercept (Iy) through the mediator slope (Sm)

Shaded area
- 🟩 the b path becomes significant

Line
- – – – Point estimate of the b path = 0
- ······ z-statistic of testing the b path = critical value
- —— Range limits

Sensitivity plots for the indirect effect of X on the outcome intercept (Sy) through the mediator intercept (Sy)

Shaded area
- 🟩 the b path becomes significant

Line
- – – – Point estimate of the b path = 0
- ······ z-statistic of testing the b path = critical value
- —— Range limits

criterion of robustness should be based on substantive knowledge.