Advanced Topics in Structural Equation Modeling

Location: CIQSS, 3535 Queen-Mary, Suite 420, Montréal
Dates: May 13–15, 2019

Trainer

The seminar is under the responsibility of Dr. Rex B. Kline, Professor, Department of Psychology, Concordia University; rex.kline@concordia.ca; 514-848-2424, ext.7556; http://tinyurl.com/rexkline

Eligibility and Registration

The course is open to graduate students and postdoctoral fellows as well as to professors and applied researchers The seminar is limited to a maximum of 20 participants registered on a first-come, first-served basis. Online registration will take place on the CIQSS web site. Contact and registration information:

CIQSS website, https://www.ciqss.org/en/qicss-summer-school
Luc St-Pierre, luc.st-pierre@ciqss.org

Description

The sessions are in English. This three-day seminar deals with advanced topics in structural equation modeling (SEM). It is assumed that participants have a working knowledge of basic SEM applications, including path analysis and confirmatory factor analysis (CFA) in single samples. Topics for this advanced seminar include:

- Power analysis at the model level
- Analyzing categorical indicators (e.g., items) in CFA
- Mean structures (analyzing means and covariances)
- Latent growth models and nonlinear curve fitting
- Evaluating measurement invariance in CFA
- Estimating interaction effects of observed or latent variables

The presentation of topics will be conceptually rather than mathematically oriented despite the advanced level of the course, and many research examples will be considered.

Main Source (Optional)

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). New York: Guilford. Book resource site at http://www.guilford.com/kline

Other Readings with Links

Power analysis

Hancock, G. R., & Freeman, M. J. (2001). Power and sample size for the Root Mean square Error of Approximation of not close fit in structural equation modeling. *Educational and Psychological Measurement*, *61*, 741–758.
https://psychology.concordia.ca/fac/kline/sem/qicss2/hancock2001.pdf

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. Psychological Methods, 1, 130–149.
https://psychology.concordia.ca/fac/kline/sem/qicss2/maccallum1996.pdf

Muthén, L. K., & Muthén, B. O. (2002) How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling*, *9*, 599–620.
https://psychology.concordia.ca/fac/kline/sem/qicss2/muthen2002.pdf

Thoemmes, F., MacKinnon, D. P., & Reiser, M. R. (2010). Power analysis for complex mediational designs using Monte Carlo methods. *Structural Equation Modeling*, *17*, 510–534.
https://psychology.concordia.ca/fac/kline/sem/qicss2/thoemmes2010.pdf

Latent growth models and measurement invariance

Park, I., & Schutz, R. W. (2005) An introduction to latent growth model. *Research Quarterly for Exercise and Sport*, *76*, 176–192.
https://psychology.concordia.ca/fac/kline/sem/QICSS2/park2005.pdf

Wu, A. D., Li, Z., & Zumbo, B. D. (2007). Decoding the meaning of factorial Invariance and updating the practice of multi-group confirmatory factor analysis: A demonstration with TIMSS data. Practical Assessment Research & Evaluation, 12(3).
http://pareonline.net/pdf/v12n3.pdf

Moderated multiple regression

Aguinis, H., & Gottfredson, R. K. (2010). Best-practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of Organizational Behavior*, *31*, 776–786.
https://psychology.concordia.ca/fac/kline/sem/QICSS2/aguinis2010.pdf

Edwards, J. R. (2009). Seven deadly myths of testing moderation in organizational research. In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 143–164). New York: Taylor & Francis.
https://psychology.concordia.ca/fac/kline/sem/QICSS2/edwards2009.pdf

Latent variable interactions

Kenny, D. A., & Judd, C. M. (1984). Estimating the nonlinear and interactive effects of latent variables. Psychological Bulletin, 96, 201–210.
http://psychology.concordia.ca/fac/kline/sem/qicss2/kenny1984.pdf

Maslowsky, J., Jager, J., & Hemken, D. (2015). Estimating and interpreting latent variable interactions: A tutorial for applying the latent moderated structural equations method. *International Journal of Behavioral Development*, *39*, 87–96.
https://psychology.concordia.ca/fac/kline/sem/QICSS2/maslowsky2015.pdf

Schedule

Morning		Afternoon	
9:30–11:0am	Session 1	1:30–3:00pm	Session 3
11:15am–12:15pm	Session 2	3:15–4:45pm	Session 4

Topics

Mon	Power analysis, item-level CFA, mean structures
Tues	Latent growth models, measurement invariance
Wed	Interactive effects of observed or latent continuous variables

Syntax, Data, and Output Files for Examples with Links

Ordinal CFA

radloff-white-mplus.dat
https://psychology.concordia.ca/fac/kline/sem/qicss2/radloff-white-mplus.dat

radloff-white-mplus.inp
https://psychology.concordia.ca/fac/kline/sem/qicss2/radloff-white-mplus.inp

radloff-white-mplus.out
https://psychology.concordia.ca/fac/kline/sem/qicss2/radloff-white-mplus.out

Latent growth model

browne-mplus.dat
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-mplus.dat

browne-change-mplus.inp
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-change-mplus.inp

browne-change-mplus.out
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-change-mplus.out

browne-predict-mplus.inp
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-predict-mplus.inp

browne-predict-mplus.out
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-predict-mplus.out

browne-polynomial-mplus.inp
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browne-polynomial-mplus.out
https://psychology.concordia.ca/fac/kline/sem/qicss2/browne-polynomial-mplus.out

CFA measurement invariance

dillman.dat
https://psychology.concordia.ca/fac/kline/sem/qicss2/dillman.dat

model1.inp
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model1.out
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model2.inp
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model6.inp
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Kenny-Judd method

kenny-judd-mplus.dat
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kenny-judd-mplus.inp
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https://psychology.concordia.ca/fac/kline/sem/qicss2/kenny-judd-mplus.out