



Ph.D. Workshop

Advanced Methods in Structural Equation Modeling – Mediation and Moderation Analysis

15th – 17th December 2015

Course content and aims: Empirical research in various disciplines (e.g., management or marketing) is replete with studies trying to establish cause and effect relationships hypothesized by the respective theories. Although finding that two variables X and Y are associated represents valuable knowledge on its own, a deeper understanding of this relationship offers both theoretical and practical benefits. More detailed insights into causal processes can be gained by answering two fundamental questions: (1) “How” does X influence Y , i.e. which processes and intermediate variables enable X to exert an effect on Y ? (2) “When” does X influence Y , i.e. under what circumstances does X exert an effect on Y ? Whereas “how” questions are approached by investigating mediation processes, analyzing moderation processes aims at answering “when” questions. Exploring integrated models trying to answer “how” and “when” questions simultaneously (“conditional processes”) can provide an even more finegrained picture of cause-effect relations.

In this interactive course, participating Ph.D. students will learn various up-to-date statistical techniques to investigate causal hypotheses about mediation, moderation/interaction, and conditional processes in the context of regression and structural equation models with latent variables. The course will consist of a combination of lectures, exercise sessions, and a final exam (optional). During the exercise sessions following each lecture, participants will be actively involved in practical applications using Hayes’ SPSS macro *process* as well as SEM software like AMOS and R package *lavaan*. In addition, it will be shown how *Mplus* can be used to analyze interaction and quadratic effects in structural equation models.

Upon completion of the course, participating Ph.D. students will

- ...understand the *differences* between mediating/moderating/conditional (Me/Mo/Co) processes.
- ...be familiar with *state-of-the-art statistical techniques* to analyze Me/Mo/Co processes.
- ...be able to appropriately *interpret* the analysis results for Me/Mo/Co processes.
- ...know how to best *report* the analysis results for Me/Mo/Co processes.
- ...be able to use various *software* programs (e.g., SPSS macros *process*, AMOS, R package *lavaan*, *Mplus*) amenable of analyzing Me/Mo/Co processes.

Language: English

Place: Saarland University, Campus, building B4.1, 1st floor, room 1.03 (CIP-Pool)

Course schedule:

15/12/2015

13:30 – 15:00 Lecture 1: Introduction to mediation, moderation and conditional processes /
Mediation models with observed variables

15:00 – 15:15 *Short break*

15:15 – 16:45 Exercise session 1: Using *SPSS macro process* for mediation models with
observed variables

16/12/2015

09:00 – 10:30 Lecture 2: Recap structural equation modeling with latent variables

10:30 – 10:45 *Short break*

10:45 – 12:15 Exercise session 2: Using *AMOS* and *R* package *lavaan* for structural equation
models

12:15 – 13:30 *Lunch break*

13:30 – 15:00 Lecture 3: Mediation models with latent variables

15:00 – 15:15 *Short break*

15:15 – 16:45 Exercise session 3: Using *AMOS* and *R* package *lavaan* for mediation models
with latent variables

17/12/2015

09:00 – 10:30 Lecture 4: Moderation analysis with moderated multiple regression

10:30 – 10:45 *Short break*

10:45 – 12:15 Exercise session 4: Using *SPSS macro process* for moderated multiple

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	regression
12:15 – 13:30	Lunch break
13:30 – 15:00	<u>Lecture 5</u> : Moderation analysis with latent variables / Conditional process models
15:00 – 15:15	Short break
15:15 – 16:45	<u>Exercise session 5</u> : Using AMOS (or R package lavaan) and Mplus for moderation models with latent variables / conditional process models

Examination: At the end of the workshop, a 90 minutes exam will be offered. Participants who take the exam will receive a data set as well as a task sheet. Each task contains a graphical model presenting mediation, moderation or conditional processes for a set of variables included in the data set. In order to answer the specific questions related to the model (e.g., concerning the size and significance of a particular indirect effect in a mediation model or conditional effect in a moderation model), participants are required (1) to decide on the software appropriate for analyzing the model, (2) to make the necessary data preparations, (3) to specify the correct input file, (4) to interpret the analysis results and (5) to report and discuss the empirical findings in a written report. Participants will be graded based on the quality of the written report.

Please note: Guest students only get a confirmation of participation.

ECTS: The course (including the exam) is eligible for 6 credit points.

Instructor: Univ.-Prof. Dr. Dirk Temme (Bergische Universität Wuppertal, Schumpeter School of Business and Economics)

Contact: temme@wiwi.uni-wuppertal.de

Course readings:

Introduction to mediation, moderation, and conditional processes

Hayes, A.H. (2013), Introduction to Mediation, Moderation, and Conditional Process Analysis, Chapter 1, pp. 3-22.

Wu, A.D./Zumbo, B.D. (2008), Understanding and Using Mediators and Moderators, Social Indicators Research, 87(3), pp. 367-392.

Mediation models with observed variables

Hayes, A.H. (2013), Introduction to Mediation, Moderation, and Conditional Process Analysis, Chapters 4, 5, & 6, pp. 85-202.

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Zhao, X., Lynch, J. G., Chen, Q. (2010), Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis, *Journal of Consumer Research*, 37(August), pp. 197-206.

Recap structural equation modeling with latent variables

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010), *Multivariate Data Analysis – A Global Perspective*, 7th ed., Upper Saddle River, NJ: Pearson, Chapter 11, pp. 629-686.

Mediation models with latent variables

Cheong, J.W., MacKinnon, D.P. (2013), Mediation/Indirect Effects in Structural Equation Modeling, in: Rick, R.H. (ed.), *Handbook of Structural Equation Modeling*, New York: Guilford, pp. 417-435.

Cheung, G. W., Lau, R. S. (2008), Testing Mediation and Suppression Effects of Latent Variables: Bootstrapping With Structural Equation Models, *Organizational Research Methods*, 11(2), pp. 296-325.

Iacobucci, D., Saldanha, N., Deng, X. (2007), A Meditation on Mediation: Evidence That Structural Equations Models Perform Better Than Regressions, *Journal of Consumer Psychology*, 17(2), pp. 140-154.

Moderation analysis with moderated multiple regression

Hargens, L.L. (2009), Product-Variable Models of Interaction Effects and Causal Mechanisms, *Social Science Research*, 38(1), pp. 19-28.

Hayes, A.H. (2013), Introduction to Mediation, Moderation, and Conditional Process Analysis, Chapter 7, pp. 207-244.

Spiller, S.A., Fitzsimons, G.J., Lynch, J.G., McClelland, G.H. (2013), Spotlights, Floodlights, and the Magic Number Zero: Simple Effects Tests in Moderated Regression, *Journal of Marketing Research*, 50(2), pp. 277-88.

Moderation analysis with latent variables

Kelava, A., Werner, C.S., Schermelleh-Engel, K., Moosbrugger, H., Zapf, D., Ma, Y., Cham, H., Aiken, L.S., West, S.G. (2011), Advanced Nonlinear Latent Variable Modeling: Distribution Analytic LMS and QML Estimators of Interaction and Quadratic Effects, *Structural Equation Modeling*, 18(3), pp. 465-491.

Marsh, H.W., Wen, Z., Nagengast, B., Hau, K.-T. (2013), Structural Equation Models of Latent Interactions, in: Rick, R.H. (ed.), *Handbook of Structural Equation Modeling*, New York: Guilford, pp. 436-458.

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Conditional process models

Hayes, A.H. (2013), Introduction to Mediation, Moderation, and Conditional Process Analysis, Chapter 10, pp. 325-355.

Attendees and application: The course is open to a maximum of 15 participants. Ph.D. students will be admitted until the maximum number of participants has been reached. Please send an email to Dr. Eva Pohl (e.pohl@eiabm.de), including your name, your thesis topic (your university, if not Saarland University) and a valid email address.

Deadline for registrations: Wednesday, 1st December 2015

Fees: The workshop is free for Ph.D. students of Faculty 1 of Saarland University. All other participants have to pay a fee of 200,- € for the workshop.

Furthermore, the registration as guest student (= Gasthörer) is required and a fee of 76.30 € will be charged.

More details at <http://www.uni-saarland.de/einrichtung/zell/allgemeine-informationen-zur-einschreibung/unt-erlagen.html>

Please send us the copy of your bank receipt.

For further information:

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The European Institute for Advanced European Behavioural Management (EIABM) has a tradition of more than 25 years now. The research and teaching focus is on behaviour of people, in their role as consumer, customer, employee, decision maker and markets from an economic, societal and psychological perspective.

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