INTERMEDIATE STATISTICS USING SPSS
PHD COURSE, SPRING, 2021

DEPARTMENT OF PSYCHOLOGY AND BEHAVIOURAL SCIENCES
AARHUS UNIVERSITY

Dates: **3-4 February, 2021**
4-5 March, 2021
7-8 April, 2021
5-6 May, 2021
3-4 June, 2021

Time: **10.00-15.30: 3/2, 4/3, 7/4, 5/5, 3/6**
09.00-15.30: 4/2, 5/3, 8/4, 6/5, 4/6

Location: **Aarhus University – Exact location TBA**

Lectures: **Ali Amidi (AA; ali@psy.au.dk)**

Anne Scharling Rasmussen (ASR; annesr@psy.au.dk)

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Course description

Objective: The aim of this course is to provide participants with a broad, intermediate-level competence in carrying out common quantitative psychological analyses using IBM SPSS Statistics software as well as to introduce a few subjects on more advanced statistics using IBM SPSS Statistics software as well as AMOS.

Content: The course begins with a brief review of basic statistical concepts and tests followed by more detailed instruction on: (i) Multiple regression including mediation/moderation; (ii) Factorial ANOVAs, (iii) Logistic regression, (iv) Factor Analysis and Structural Equation Modelling; and (v) Multi-Level Modelling. Please note that this course assumes previous undergraduate knowledge of introductory statistics. It is recommended that if you need a brush-up, you review the suggested readings for the first two days of class before the course begins.

Format and Evaluation: The course includes a combination of lectures and practical instruction using SPSS and AMOS software. Focus will be on giving participants hands-on experience with each type of analysis. Practical exercises will be assigned for each session; some of these exercises will be done collectively during the teaching day and others must be completed independently.

In order to receive a certificate of completion and ECTS points for the course, participants must submit at least 1 homework assignments and attend at least 2 days of the course (corresponding to participation in one module). The specific number of ECTS points awarded is determined as follows: 1 assignment + 2 days of attendance = 3 ECTS; 2 assignments + 4 days of attendance = 6 ECTS points; 3 assignments + 6 days of attendance = 9 ECTS points, 4 assignments and 8 days of attendance = 12 ECTS points, all 5 assignments + full attendance (10 days) = 15 ECTS points.

Priority will be given to students who can attend all of the course. It is possible to attend specific modules if space is available, but be aware that certificates are not sent out, until the whole course is finished. Notice that certification for a module only is awarded if the corresponding assignment is submitted and approved. Please note that this means that you will not be awarded with any ECTS-points for a module that you have attended, unless the corresponding assignment is approved!

Expected work load: 100-150 pages per course day as well as homework assignments.

The due dates for the homework assignments are as follows:

Assignment 1: February 25, 9am
Assignment 2: March 26, 9am
Assignment 3: April 28, 9am
Assignment 4: May 27, 9am
Assignment 5: June 25, 9am

Please email your assignment in word document or PDF format to the relevant instructor (see email addresses on cover page).

Getting in Contact with Us
Open dialogue and co-operation is important to us, and we encourage you to use us to your best advantage. If you have questions about the class, special needs, or require clarification regarding the course requirements, please ask! Similarly, if you are having difficulty understanding something, don't stay quiet. We can't help you if you don't let us know that you're having trouble!

Readings and Resources: The core reading material is Field, A. (2018). *Discovering Statistics Using SPSS, 5th Edition.* Sage Publications + three extra chapters (Byrne, 2016; Ullman, 2013) for the days on factor analysis and structural equation modelling, which will focus on data analysis in AMOS.

An 'Additional Reading' list is also outlined in this booklet. These readings are not part of the core pensum for this course but are listed here for your information, as some of you may find it helpful to consult a secondary or more advanced resource if and when you have to run these analyses on your own.

A Blackboard webpage will be made for the course where we will upload powerpoint slides, answers for the assignments, links to additional materials, etc. Announcements will also be posted on the course website throughout the semester, so please ensure you can receive emails from the system.

A detailed schedule and core/additional reading lists for the course are provided on the following pages. Please note that minor modifications to the schedule may be required as the course progresses.

Detailed Course Schedule and Reading List

	Date		Content	Literature
1.	3/2 21	ASR	**Fundamentals** Review of the SPSS, statistical assumptions, effect sizes and confidence intervals, correlation, t-tests	Field, A. (2018) chapters 1 - 7, 10
2.	4/2 21	ASR	**ANOVAs I** One way and repeated measures ANOVA, advanced post hoc analysis, missing data, sample size, power analysis, introduction to Bayesian statistics and bootstrapping	Field, A. (2018) chapters 12,15
3.	4/3 21	AA	**Linear regression I** Simple and multivariate regression	Field, A. (2018) chapters 8 - 9
4.	5/3 21	AA	**Linear regression II** Mediation and moderation in regression	Field, A. (2018) chapter 11
5.	7/4 21	ASR	**ANOVAs II** Advanced ANOVA designs: Factorial ANOVA, Mixed ANOVA	Field, A. (2018) chapters 14 - 16
6.	8/4 21	ASR	**Categorical data analysis** X^2, logistic regression	Field, A. (2018) chapters 19 - 20
7.	5/5 20	KBW	**Factor Analysis** Reliability tests, exploratory factor analysis, introduction to AMOS	Field, A. (2018) chapter 18 Byrne, B. M. (2016)
8.	6/5 20	KBW	**Structural Equation Modelling** Confirmatory factor analysis and structural equation modelling	Byrne, B. M. (2016) Ullman, J. B. (2013)
9.	3/6 20	MSO	**Multi-Level Modelling I**	Field, A. (2018) chapter 21
10.	4/6 20	MSO	**Multi-Level Modelling II**	Field, A. (2018) chapter 21

Core Readings:

Byrne, B. M. (2016). *Structural Equation Modeling with Amos: Basic Concepts, Applications, and Programming (3rd ed.)* (pp. 3-64). New York: Routledge.

Field, A. (2018). *Discovering Statistics Using SPSS, 5th Edition.* Sage Publications.

Ullman, J. B. (2013). Structural Equation Modeling. In B.G. Tabachnick & L.S. Fidell. *Using Multivariate Statistics (6th ed.)* (pp. 681-785). Boston: Pearson.

Additional Readings

American Psychological Association (2009). *Publication manual of the American Psychological Association (6th ed.)*. Washington, DC: American Psychological Association.

Baguley, T. (2012). *Serious stats: A guide to advanced statistics for the behavioural sciences*. New York, NY: Palgrave MacMillan.

Bandalos, D. L. & Finney, S. J. (2010). Factor analysis: Exploratory and confirmatory. In G. R. Hancock & R.O. Mueller (Eds.). *The reviewer's guide to quantitative methods in the social sciences* (pp. 93-114). New York, NY: Routledge.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research.* New York, NY: Guilford.

Byrne, B. (2016). *Structural equation modeling with Amos: Basic concepts, applications, and programming (3rd ed.)*. New York, NY: Routledge.

Camerer, C. F., Dreber, A., Holzmeister, F., Ho, T.-H., Huber, J., Johannesson, M. et al., (2018). Evaluating the replicability of social science experiments in Nature and Science between 2010 and 2015. *Nature: Human Behaviour, 2*, 637-644.

Cummings, G. (2014). The new statistics: Why and how? *Psychological Science, 25*, 7-29.

Cummings, G., & Calin-Jageman, R. (2017). *Introduction to the New Statistics: Estimation, Open Science, and Beyond.* New York: Routledge.

Field, A., & Hole, G. (2003). *How to report and design experiments*. London: Sage.

Gamst, G., Meyers, L.S., & Guarino, A.J. (2008). *Analysis of variance designs.* Cambridge: Cambridge University Press.

Hayes, A. F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*: Guilford Publications.

Heck, R.H., Thomas, S.L., Tabata, L.N. (2014). *Multilevel and longitudinal modelling with IBM SPSS* (2nd ed). New York, NY: Routledge.

Hoekstra, R., Kiers, H.A.L., Johnson, A. (2012). Are assumptions of well-known statistical techniques checked, and why (not)? *Frontiers in Psychology, 3*, 1-9.

Kline, R. B. (2011) *Principles and practices of structural equation modeling* (3rd ed.). New York, NY: The Guilford press.

Lance, C. E., & Vandenberg, R. L. (2010). *Statistical and methodological myths and urban legends*. Routledge: New York, US.

Mueller, R. O. & Hancock, G. R. (2010). Structural equation modeling. In G. R. Hancock & R.O. Mueller (Eds.). *The reviewer's guide to quantitative methods in the social sciences* (pp. 371-384). New York, NY: Routledge.

Pallant, J. (2010). *SPSS survival manual (4th ed).* Maidenhead, England: McGraw Hill.

Palij, M. (2012). Review of Cummings – Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis. *PsycCRITIQUES, 57* (24).

Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). P-curve: A key to the file-drawer. *Journal of Experimental Psychology: General, 143*, 534-547.

Tabachnick, B.G., & Fidell, L.S. (2012). *Using Multivariate Statistics (6th ed.)*. Pearson.

Wagenmakers, E.-J. (2007). A practical solution to the pervasive problem of *p* values. *Psychological Bulletin & Review, 14*, 779-804.