



Statistical Research Methods

TU-L0022/JSBJ1310

Fall 2024-Spring 2025

5-8 Credits

In English

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1 COURSE STAFF AND CONTACT INFORMATION

| | | |
|------------------|-------------------|--|
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- All course assignments are available and returned through Aalto MyCourses.
- All articles and other reading materials are available through Zotero.
- Except for personal matters, all course communications are done through the course discussion forum at Aalto MyCourses.

2 OVERVIEW OF THE COURSE

This is a blended learning course that contains both online and in-person elements. The course is organized by Aalto University and University of Jyväskylä and participants can obtain credits from either of these universities with a course code of their choice (TU-L0022/JSBJ1310).

The goal of the course is to develop an understanding of how statistical methods are used in management and other social research and how results are usually presented in journal articles. The course is designed for both those interested in just reading and understanding research done with statistical methods and for those who already use or plan to use statistical research methods in their own work.

During the course, we will go through empirical papers published in the *Academy of Management Journal*, *Strategic Management Journal*, and other high-quality journals and analyze how these papers were done. The methods and research designs used in these papers cover a majority of basic methods and designs used in these journals.

The analysis techniques covered during the course include regression analysis, its application moderation, mediation, and basic non-linear models, and factor analysis, focusing on exploratory factor analysis. Confirmatory factor analysis is explained on a surface level that is sufficient for its basic application and evaluation of published results. Extensions of these techniques, such as structural regression models (structural equation models), multilevel models, or other similar techniques for non-independent observations (e.g., longitudinal or multilevel data), are briefly introduced, but a more thorough study of these techniques is left for advanced courses.

The course consists of eight units, which typically take two weeks and consist of video lectures, online and in-person discussions, and assignments. Students earn between 5 and 8 credits depending on which assignments they complete. The content of each course component is explained later in the course brochure. The data analysis assignments are designed to be completed with Stata, R, or SPSS, but SPSS is not recommended. Other software (e.g. Python, Jamovi) can be used if agreed with the teacher in advance.

| Credits | Content |
|-----------|--|
| 5 | Pre-exam, mandatory video lectures, readings and written assignments 1, 6, and 7, data-analysis assignment 1, and learning diary. You must complete all assignments on time unless otherwise agreed. |
| +0.5 each | Written assignments 2, 3, 4, and 5 |
| +0.5 each | Data analysis assignments 2 and 3 |

The number of credits is rounded down.

3 PARTICIPATION AND SIGNING UP

This course is targeted to industrial engineering and management doctoral students who have already taken the course TU-L0000 - Research Methods in Industrial Engineering or an equivalent introductory level general research methods course. Faculty or students from other universities are admitted if space permits.

You can sign up for the course using Sisu. Students from outside Aalto who do not have access to Aalto Sisu must also sign up at Aalto MyCourses. Use the following URL and the enrolment key SRM2025 (in capital letters):

<https://mycourses.aalto.fi/course/enrol.php?id=43117>

4 LEARNING OUTCOMES

The main goal of the course is to provide a foundation that enables participation in advanced courses and independent self-study of quantitative research methods. Instead of just explaining how the methods are used, we focus on why certain methods are used and how, when, and why these methods work. Completing the 5-credit base module will introduce you to the logic of supporting causal claims with quantitative analyses, evaluating measurement reliability and validity, simple hypothesis testing with linear regression analysis and its extensions, and the basics of factor analysis.

The optional readings and written assignments are more challenging and recommended only for those who plan to use quantitative research methods in their own research. The two optional data analysis assignments will introduce you to using statistical software, data management and structuring a data-analysis project, and statistical analysis workflows using the methods discussed during the course.

5 WORKLOAD

The workload calculation below is for the full 8-credit version of course¹. If you want to complete all mandatory and optional assignments on the course, you should book about two full workdays per week for the duration of the contact teaching period of the course (January-March)

| Content | Units | Workload | Hours |
|---|-------|--------------------------|-------|
| Pre-exam textbooks (pages, easy readings) | 769 | 7 h / 100 pages | 54 |
| Video lectures (hours) | 14 | 2 h / each hour of video | 28 |
| In-person meetings | 7 | 3 + 4 hours each | 49 |
| Interactions on the course forum | 8 | 1 hours per unit | 8 |
| Self-study related to lectures, incl. learning diary | 7 | 3 hours each | 49 |
| Empirical articles (pages, easy reading) | 109 | 7 h / 100 pages | 8 |
| Methodological literature (pages, challenging reading) | 618 | 10 h / 100 pages | 62 |
| Written assignments | 7 | 2 hours each | 14 |
| Data-analysis assignments | 3 | 6 hours each | 18 |
| Total hours | | | 291 |

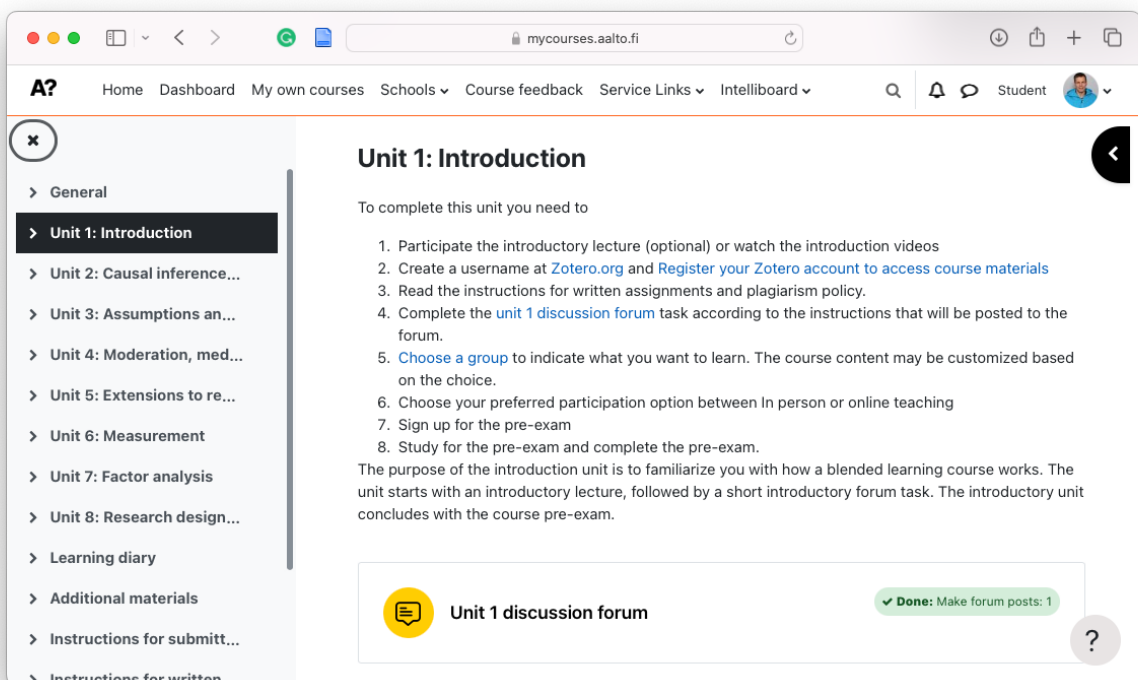
¹ Asko Karjalainen, Katariina Alha, and Suvi Jutila, *Anna Aikaa Ajatella: Suomalaisten Yliopisto-Opintojen Mitoitustarjostelmä* (Oulun yliopisto, opetuksen kehittämissyksikkö, 2007).

6 COURSE CONTENT

The course includes a pre-exam, a learning diary, readings and written assignments, data analysis assignments, video lectures, online interactions, seminar sessions, and computer classes. All assignments are distributed and returned through Aalto MyCourses where online interactions occur.

The course is structured as eight sequential units. At the beginning of each unit, the students receive a set of readings and video materials that they study independently. The content, possible questions, and thoughts raised by the materials are then discussed on the course forum. Each unit concludes with a seminar, where the materials are further discussed in person. After each unit, the students complete a short reflection task and can optionally give feedback on the unit.

The course introduction unit explains how the course works and concludes with the pre-exam. The beginning of each unit contains a list of tasks that you need to do to complete the unit. **It is important to start the introduction unit well before (at least a month) before the first contact teaching session.** Completion criteria are listed by the activity names and turn green when completed, as shown below.



The different parts of the course are listed below:

6.1 Pre-exam (mandatory)

The pre-exam is a written exam that you must pass to be able to participate and get credits. The exam covers the following two books:

Singleton, R., & Straits, B. C. (2018). *Approaches to social research* (Sixth edition). New York: Oxford University Press. ([Hard copy at library](#), [PDF at course Zotero library](#))

Allison, P. D. (1998). *Multiple Regression: A Primer* (1st edition). Thousand Oaks, Calif: Pine Forge Press. ([ebook at library](#), [PDF at course Zotero library](#))

The exam consists of four questions. The first question is a set of term definitions, in which you need to define eight terms from the course material. The three remaining questions are essays. The exam questions are chosen randomly from a question pool found on the course website. This

is a traditional exam, and you are not allowed to bring any books or notes to the exam room. The exam is completed on a computer in an Exam room. The practicalities and booking links for exam times can be found on the course website under Unit 1: Introduction.

6.2 Learning diary (mandatory)

The learning diary is for you to check that you have learned the key concepts and principles covered in the course. The list of questions is provided to you on the MyCourses page, and you will work on the answers independently. You should work on the learning diary document soon after each class to write down how you understood the content of the classes and unit materials. The final version of the learning diary is returned one week after the last unit.

6.3 Readings and written assignments (3 mandatory, 4 optional)

The written assignments consist of reading methodological literature and empirical articles and then doing an assignment where you apply the methodological ideas that you just studied to analyze the empirical papers. You will be provided individual feedback on the written assignments and these are discussed in both the online and in-person interactions.

The written assignments 1, 5, and 7 are mandatory. The written assignments 2, 3, 4 and 6 are optional and can be completed for extra credits. All returned written assignments should follow the American Psychological Association (APA) Publication Manual style for article manuscripts. All work will be checked for plagiarism using the TurnItIn service and will be returned to the students for revising if plagiarism problems are found.

6.4 Data-analysis assignments (1 mandatory, 2 optional)

The course has three data-analysis assignments. In each assignment, you will conduct a small data analysis project using a dataset provided by the course instructors. You should submit a structured document containing the full analysis log and a written explanation of your analyses, the thought process that led to the analyses, and how you interpreted the results. All returned data analysis assignments will receive individual feedback.

The data analysis assignments are designed to be completed with Stata, R, or SPSS, but SPSS is not recommended. Other software (e.g. Python, Jamovi) can be used if agreed with the teacher in advance. If you plan to do the course assignments using R, it is highly recommended to do a tutorial (e.g. <https://www.datacamp.com>) on R before the course starts. The MyCourses page contains additional resources for familiarizing yourself with different statistical software before the start of the course.

The instruction for the data analysis assignments is done with screencasts that demonstrate an analysis or a technique that students then apply with their own computer to complete the assignment. The purpose of the screencasts is to allow students to proceed at their own pace and also allow supporting multiple different statistical software on the course.

The course website contains more information on how to compile and submit a data analysis assignment document. The first data analysis assignment is mandatory, and assignments 2 and 3 are optional and can be completed for extra credit.

6.5 Video lectures (mandatory and optional)

The course follows a flipped classroom design, and the lectures are delivered as videos that students watch on their own before online and in-person meetings with the instructor. The video library consists of about 80 videos, which form a total of about 14 hours of content.

Each of the videos is assigned to a unit, and the completion of watching the videos is tracked so that students can complete a unit only if they have watched all mandatory videos for that unit. The videos contain interactive content (e.g. quizzes) that must be completed successfully to

complete the video. The video lectures and their assignments should be completed before the in-person seminar.

6.6 Online interactions (mandatory)

Each unit contains mandatory online participation in the form of course forum discussion. At the beginning of each unit, the students are assigned the materials for that unit including readings, assignments, and video content. After a few days of familiarizing with the content, students are expected to post a question or a comment about the materials on the course forum. These questions and comments are then discussed online with the course instructor. To pass an online interaction session, a student must either start at least one discussion thread by posting a question or comment or reply to at least one thread started by someone else. Participation is graded.

Instructions for how to participate online are delivered by email when the course forums open.

6.7 Seminar sessions (mandatory)

Each unit concludes with a seminar, which can be held either in person or online on Zoom, depending on how the course is run. These seminars follow a flipped classroom design. Each seminar starts with an overview of the lecture materials that the students have viewed as videos in advance, but the focus is more on discussion and classroom assignments. You may miss one seminar without penalty to your grade.

6.8 Computer exercise sessions (optional and not graded)

The computer exercise sessions are optional and not graded. The course instructor is present to answer questions and give hand-to-hand guidance with the data analysis assignments. The first data-analysis assignment is designed so that it should be possible to complete it fully during the computer exercise sessions without working on the actual data analysis outside the class. In other words, the results files and analysis logs will be sufficient to complete the data-analysis assignment for the unit. After the class the students should not need to do additional analyses, but simply write a document explaining the analyses and interpret the results.

In addition to working with data, we will do “manual calculations” without statistical software. Most statistical estimations involve minimizing or maximizing an estimation function. For example, the least squares estimator minimizes the sum of squares of prediction errors (residuals), and the maximum likelihood estimator maximizes the likelihood of the data given a hypothesized model. During these exercises, we specify the estimation functions in Excel and estimate the models by minimizing or maximizing this function with the Solver tool in Excel. These assignments aim to make the students understand how the analysis tools work. While you are unlikely to encounter problems with linear regression, more advanced modeling techniques may not always work well, or you could get nonsense results. In these scenarios, understanding what the analysis software actually does is very important so that you can troubleshoot the analysis.

6.9 Reflection and feedback (mandatory and not graded)

Reflection is a key element of learning². At the end of the unit it is good time to look back at what you have learned, where you did well, and what you can still improve on. After a student has completed all parts of the unit and received grades and feedback for all the submitted work, he/she is required to do a short reflection and feedback task where he/she evaluates his/her own learning and optionally gives feedback on the unit. This is a light task that should not take more

² Karl Aubrey and Alison Riley, *Understanding and Using Educational Theories* (SAGE, 2018), chap. 14.

than 30 minutes to complete, but of course a student can spend more time on this if he/she wishes.

7 UNITS AND SCHEDULE

The course consists of eight units. Each unit starts with a self-study of the materials, followed by online interactions where the materials are discussed on the course forum, and concludes with an in-person seminar and computer class. During the in-person teaching days, we will discuss theory and principles of quantitative research in the mornings and do hands-on assignments during the computer class in the afternoon. There will be no computer class on the seventh week, but we will instead discuss theory and principles for the full day.

The course schedule and locations are summarized in the table below. The contact teaching events are organized in TUAS-building, Maarintie 8, Espoo or in Agora building, Mattilanniemi 2, Jyväskylä. The JYU seminars can be replaced with online versions on Zoom. The seminar content is the same between the two locations and students can choose which of the two parallel seminars to participate in.

| Date | Time | Location | Topic |
|--|----------|-----------------|--|
| Unit 1: Course introduction and pre-exam Weeks 47-52 | | | |
| 18.11. | 00:00 | Online | Course forum for unit 1 opens. The task is to write a forum post where you introduce yourself to others on the course. |
| 1.12.- 31.12. | | Exam system | Course pre-exam |
| Unit 2: Causal inference, and basics of linear regression model Weeks 2-3 | | | |
| 7.1. | 00:00 | Online | Course forum for unit 2 opens. |
| 13.1. | 23:59 | Online | Deadline for written assignment 1 (mandatory) |
| 15.1. | 9:15-12 | 4126 (Aalto) | Unit 2 seminar |
| 15.1. | 13.15-17 | AS5 (Aalto) | Unit 2 computer class |
| 16.1. | 9:15-12 | Ag C133.1 (JYU) | Unit 2 seminar |
| 16.1. | 13.15-17 | Ag C133.1 (JYU) | Unit 2 computer class |
| Unit 3: Assumptions and diagnostics in linear regression models Weeks 4-5 | | | |
| 20.1. | 00:00 | Online | Course forum for unit 3 opens. |
| 27.1. | 23:59 | Online | Deadline for written assignment 2 (optional) |
| 29.1. | 9:15-12 | 4126 (Aalto) | Unit 3 seminar |
| 29.1. | 13.15-17 | AS5 (Aalto) | Unit 3 computer class |
| 30.1. | 9:15-12 | Ag B201 (JYU) | Unit 3 seminar |
| 30.1. | 13.15-17 | Ag B201 (JYU) | Unit 3 computer class |
| 2.2. | 23:59 | Online | Deadline for data-analysis assignment 1 (mandatory) |

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|---|----------|-----------------|--|
| Unit 4: Moderation, mediation, and instrumental variables | | | |
| Week 6-8 | | | |
| 3.2. | 00:00 | Online | Course forum for unit 4 opens. |
| 17.2. | 23:59 | Online | Deadline for written assignment 3 (optional) |
| 19.2. | 9:15-12 | 4126 (Aalto) | Unit 4 seminar |
| 19.2. | 13.15-17 | AS5(Aalto) | Unit 4 computer class |
| 20.2. | 9:15-12 | Ag C134.1 (JYU) | Unit 4 seminar |
| 20.2. | 13.15-17 | Ag C134.1 (JYU) | Unit 4 computer class |
| Unit 5: Extensions to regression: nonlinear, longitudinal, and multilevel models | | | |
| Weeks 9-10 | | | |
| 24.2. | 00:00 | Online | Course forum for unit 5 opens. |
| 3.3. | 23:59 | Online | Deadline for written assignment 4 (optional) |
| 5.3. | 9:15-12 | 4126 (Aalto) | Unit 5 seminar |
| 5.3. | 13.15-17 | AS5(Aalto) | Unit 5 computer class |
| 6.3. | 9:15-12 | Ag C134.1 (JYU) | Unit 5 seminar |
| 6.3. | 13.15-17 | Ag C134.1 (JYU) | Unit 5 computer class |
| 9.3. | 23:59 | Online | Deadline for data-analysis assignment 2 (optional) |
| Unit 6: Measurement | | | |
| Weeks 11-12 | | | |
| 10.3. | 00:00 | Online | Course forum for unit 6 opens. |
| 17.3. | 23:59 | Online | Deadline for written assignment 5 (optional) |
| 19.3. | 9:15-12 | 4126 (Aalto) | Unit 6 seminar |
| 19.3. | 13.15-17 | AS5 (Aalto) | Unit 6 computer class |
| 20.3. | 9:15-12 | Ag C134.1 (JYU) | Unit 6 seminar |
| 20.3. | 13.15-17 | Ag C134.1 (JYU) | Unit 6 computer class |
| Unit 7: Factor analysis | | | |
| Weeks 13-14 | | | |
| 24.3. | 00:00 | Online | Course forum for unit 7 opens. |
| 31.3. | 23:59 | Online | Deadline for written assignment 6 (mandatory) |
| 2.4. | 9:15-12 | 4126 (Aalto) | Unit 7 seminar |
| 2.4. | 13.15-17 | AS5 (Aalto) | Unit 7 computer class |
| 3.4. | 9:15-12 | Ag B201 (JYU) | Unit 7 seminar |
| 3.4. | 13.15-17 | Ag B201 (JYU) | Unit 7 computer class |
| 6.4 | 23:59 | Online | Deadline for data-analysis assignment 3 (optional) |
| Unit 8: Research design, research ethics, and current issues | | | |
| Week 15-16 | | | |

| | | | |
|---|---------|---------------|---|
| 7.4. | 00:00 | Online | Course forum for unit 8 opens. |
| 14.4. | 23:59 | Online | Deadline for written assignment 7 (mandatory) |
| 16.4. | 9:15-17 | 4126 (Aalto) | Unit 8 seminar |
| 17.4 | 9:15-17 | Ag B201 (JYU) | Unit 8 seminar |
| Learning diary Week 17 | | | |
| 27.4. | 23:59 | Online | Deadline for learning diary |

The detailed description of the eight units follows.

7.1 Unit 1: Course introduction

The purpose of this unit is to introduce the students to the work practices on the course. The students may not be familiar with working on a blended learning / online course, and this first unit will introduce the course tools (MyCourses/Moodle, Zotero, TurnItIn) and work practices. We will also discuss what the requirements for the written assignments are and go over the course plagiarism policy.

The unit concludes with the course pre-exam.

7.2 Unit 2: Causal inference, and basics of linear regression model

The unit introduces the course content, the principles of causal inference, and basics of linear regression models.

Required readings:

Singleton, R., & Straits, B. C. (2018). *Approaches to social research* (Sixth edition). New York: Oxford University Press. (Chapter 4: Elements of Research Design)

Aguinis, H., & Vandenberg, R. J. (2014). An Ounce of Prevention Is Worth a Pound of Cure: Improving Research Quality Before Data Collection. *Annual Review of Organizational Psychology and Organizational Behavior*, 1(1), 569–595. doi:10.1146/annurev-orgpsych-031413-091231

Hekman, D. R., Aquino, K., Owens, B. P., Mitchell, T. R., Schilpzand, P., & Leavitt, K. (2010). An Examination of Whether and How Racial and Gender Biases Influence Customer Satisfaction. *Academy of Management Journal*, 53(2), 238–264. doi:10.5465/AMJ.2010.49388763

Deephouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20(2), 147–166. doi:10.1002/(SICI)1097-0266(199902)20:2<147::AID-SMJ11>3.0.CO;2-Q

Sankey, H. (2010). Scientific method. In S. Psillos & M. Curd (Eds.), *The Routledge companion to philosophy of science* (1. publ. in paperback, pp. 248–258). London: Routledge.

7.3 Unit 3: Assumptions and diagnostics in linear regression models

The unit discusses assumptions and principles behind regression analysis. We address the different assumptions and how some of them can be diagnosed empirically. Log transformation and dummy coding are introduced. Marginal prediction plots are introduced. The important concepts of endogeneity and model implied correlation matrix are introduced.

Optional readings:

Wooldridge, J. M. (2013). *Introductory econometrics: a modern approach* (5th ed.). Mason, OH: South Western, Cengage Learning. (Chapters 2-4)

Hekman, D. R., Aquino, K., Owens, B. P., Mitchell, T. R., Schilpzand, P., & Leavitt, K. (2010). An Examination of Whether and How Racial and Gender Biases Influence Customer Satisfaction. *Academy of Management Journal*, 53(2), 238-264. doi:10.5465/AMJ.2010.49388763 (AMJ best paper winner for 2010)

Deepphouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20(2), 147-166. doi:10.1002/(SICI)1097-0266(199902)20:2<147::AID-SMJ11>3.0.CO;2-Q

7.4 Unit 4: Moderation, mediation, and instrumental variables

The unit continues from the previous unit with additional issues in linear regression models. We discuss the use of linear regression to estimate mediation and moderation models. Instrumental variables are introduced as a tool for addressing endogeneity.

Optional readings:

Wooldridge, J. M. (2013). *Introductory econometrics: a modern approach* (5th ed.). Mason, OH: South Western, Cengage Learning. (Chapter 15)

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21(6), 1086-1120. doi:10.1016/j.leaqua.2010.10.010

Hekman, D. R., Aquino, K., Owens, B. P., Mitchell, T. R., Schilpzand, P., & Leavitt, K. (2010). An Examination of Whether and How Racial and Gender Biases Influence Customer Satisfaction. *Academy of Management Journal*, 53(2), 238-264. doi:10.5465/AMJ.2010.49388763 (AMJ best paper winner for 2010)

Deepphouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20(2), 147-166. doi:10.1002/(SICI)1097-0266(199902)20:2<147::AID-SMJ11>3.0.CO;2-Q

Mochon, D., Johnson, K., Schwartz, J., & Ariely, D. (2017). What Are Likes Worth? A Facebook Page Field Experiment. *Journal of Marketing Research (JMR)*, 54(2), 306–317.

Ketokivi, M., & McIntosh, C. N. (2017). Addressing the endogeneity dilemma in operations management research: Theoretical, empirical, and pragmatic considerations. *Journal of Operations Management*, 52, 1–14. <https://doi.org/10.1016/j.jom.2017.05.001>

7.5 Unit 5: Extensions to regression: nonlinear, longitudinal, and multilevel models

The unit provides an introduction to various extensions of regression analysis. The techniques are covered on an introductory level. Generalized linear model, which is an extension to linear regression covering most commonly used single dependent variable models as special cases (e.g. logistic regression, Poisson regression, Tobit regression, etc.). Maximum likelihood estimation is introduced. Cluster-robust standard errors are introduced as a technique for non-independent data (e.g., clustered, longitudinal data). We discuss regression techniques for estimating between, within, contextual, and population average effects using cluster means.

Optional readings:

Wooldridge, J. M. (2013). *Introductory econometrics: a modern approach* (5th ed.). Mason, OH: South Western, Cengage Learning. (Chapters 6-8, 9.5)

Hekman, D. R., Aquino, K., Owens, B. P., Mitchell, T. R., Schilpzand, P., & Leavitt, K. (2010). An Examination of Whether and How Racial and Gender Biases Influence Customer

Satisfaction. *Academy of Management Journal*, 53(2), 238-264.
doi:10.5465/AMJ.2010.49388763 (AMJ best paper winner for 2010)

Deephouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20(2), 147-166. doi:10.1002/(SICI)1097-0266(199902)20:2<147::AID-SMJ11>3.0.CO;2-Q

Mochon, D., Johnson, K., Schwartz, J., & Ariely, D. (2017). What Are Likes Worth? A Facebook Page Field Experiment. *Journal of Marketing Research (JMR)*, 54(2), 306–317.

Antonakis, J., Bastardo, N., & Rönkkö, M. (2019). On ignoring the random-effects assumption in multilevel models: Review, critique, and recommendations. *Organizational Research Methods*, forthcoming.

7.6 Unit 6: Measurement

The unit discusses the concept of measurement, which refers to efforts to quantify abstract concepts such as innovativeness. We discuss reliability and validity and measurement theory. We address the conceptualization stage of measurement development. The unit introduces reliability statistics that can be used once unidimensionality has been established with factor analysis. The computer class covers basics of data management.

Required readings:

Singleton, R., & Straits, B. C. (2018). *Approaches to social research* (Sixth edition). New York: Oxford University Press. (Chapter 5: Measurement)

Chang, H., & Cartwright, N. (2010). Measurement. In S. Psillos & M. Curd (Eds.), *The Routledge companion to philosophy of science* (1. publ. in paperback, pp. 367–375). London: Routledge.

DeVellis, R. F. (2003). *Scale development theory and applications*. Thousand Oaks: Sage. (Chapters 2-4, more recent editions of the book will also do)

Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587–613. doi:10.1002/smj.183

Mesquita, L. F., & Lazzarini, S. G. (2008). Horizontal and Vertical Relationships in Developing Economies: Implications for SMEs' Access to Global Markets. *Academy of Management Journal*, 51(2), 359–380

7.7 Unit 7: Factor analysis

The unit focuses on factor analysis. We will cover exploratory factor analysis in detail. Confirmatory factor analysis is introduced. Measurement theory is discussed on more detailed level and more advanced measurement models are introduced. Scale development procedures are discussed. Structural regression models are introduced.

Optional readings:

DeVellis, R. F. (2003). *Scale development theory and applications*. Thousand Oaks: Sage. (Chapters 5-6, more recent editions of the book will also do)

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21(6), 1086–1120.
doi:10.1016/j.leaqua.2010.10.010

Mesquita, L. F., & Lazzarini, S. G. (2008). Horizontal and Vertical Relationships in Developing Economies: Implications for SMEs' Access to Global Markets. *Academy of Management Journal*, 51(2), 359–380.

Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587–613. doi:10.1002/smj.183

7.8 Unit 8: Research design, research ethics, and current issues

The unit we will address research design, research ethics, and current issues and debates in quantitative management research. We end with a summary of the course units. This unit concludes with a full day seminar.

Required readings:

Colquitt, J. A., & George, G. (2011). Publishing in AMJ—Part 1: Topic Choice. *Academy of Management Journal*, 54(3), 432–435. doi:10.5465/AMJ.2011.61965960

Bono, J. E., & McNamara, G. (2011). Publishing in AMJ—Part 2: Research Design. *Academy of Management Journal*, 54(4), 657–660. doi:10.5465/AMJ.2011.64869103

Grant, A. M., & Pollock, T. G. (2011). Publishing in AMJ—Part 3: Setting the Hook. *Academy of Management Journal*, 54(5), 873–879. doi:10.5465/amj.2011.4000

Sparrowe, R. T., & Mayer, K. J. (2011). Publishing in AMJ—Part 4: Grounding Hypotheses. *Academy of Management Journal*, 54(6), 1098–1102. doi:10.5465/amj.2011.4001

Zhang, Y. (Anthea), & Shaw, J. D. (2012). Publishing in AMJ—Part 5: Crafting the Methods and Results. *Academy of Management Journal*, 55(1), 8–12. doi:10.5465/amj.2012.4001

Geletkanycz, M., & Tepper, B. J. (2012). Publishing in AMJ—Part 6: Discussing the Implications. *Academy of Management Journal*, 55(2), 256–260. doi:10.5465/amj.2012.4002

Guide, D., & Ketokivi, M. (2015). Notes from the editors: Redefining some methodological criteria for the journal. *Journal of Operations Management*, 37, v–viii. [https://doi.org/10.1016/S0272-6963\(15\)00056-X](https://doi.org/10.1016/S0272-6963(15)00056-X)

Bettis, R. A., Ethiraj, S., Gambardella, A., Helfat, C., & Mitchell, W. (2016). Creating repeatable cumulative knowledge in strategic management. *Strategic Management Journal*, 37(2), 257–261. <https://doi.org/10.1002/smj.2477>

Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. *The Leadership Quarterly*. <https://doi.org/10.1016/j.leaqua.2017.01.006>

8 GRADING

All submitted work will be graded between 1-5 and your grade will be a weighted average of the parts of the course that you completed.

| Course part | Weight | Notes |
|--|--------|---|
| Pre-exam | 10% | |
| Participation Seminars, course forum, video tasks | 30% | By default, you will receive 2 for posting something on the course forum or being present at a seminar and your grade will increase based on your unit participation. In the video tasks, two lowest video scores are excluded for each unit. |
| Learning diary | 20% | |
| Assignments Written assignments, data-analysis assignments | 40% | Assignments contribute 40% to your grade regardless how many assignments you do. Each assignment is weighted equally. |

9 COURSE MATERIAL

The reading materials for the course are distributed through the Zotero reference management system. To get access to the materials:

1. Create an user account at [Zotero.org](https://www.zotero.org)
2. Enter your Zotero username on the course website on MyCourses.
3. The course instructor will send you an invitation to a group library, which you need to accept.

After you have accepted the invitation, you can access the material either [online](#) with a web browser or by installing the Zotero software on your computer. See the MyCourses page for information.

9.1 Books

DeVellis, R. F. (2003). *Scale development theory and applications*. Thousand Oaks: Sage. (Third edition of the book will also do: 160 pages)

Singleton, R., & Straits, B. C. (2018). *Approaches to social research* (Sixth edition). New York: Oxford University Press. (575 pages)

Allison, P. D. (1998). *Multiple Regression: A Primer* (1st edition). Thousand Oaks, Calif: Pine Forge Press (187 pages)

Wooldridge, J. M. (2013). *Introductory econometrics: a modern approach* (5th ed.). Mason, OH: South Western, Cengage Learning. (Chapters 2-4, 6-8, 9.5, 15: 308 pages)

Sankey, H. (2010). Scientific method. In S. Psillos & M. Curd (Eds.), *The Routledge companion to philosophy of science* (1. publ. in paperback, pp. 248–258: 11 pages). London: Routledge.

Chang, H., & Cartwright, N. (2010). Measurement. In S. Psillos & M. Curd (Eds.), *The Routledge companion to philosophy of science* (1. publ. in paperback, pp. 367–375: 9 pages). London: Routledge.

1 250 pages total.

9.2 Articles

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21(6), 1086–1120. doi:10.1016/j.leaqua.2010.10.010

Video: <https://www.youtube.com/watch?v=dLuTjoYmfXs> (32:19)

Antonakis, J., Bastardo, N., & Rönkkö, M. (2019). On ignoring the random-effects assumption in multilevel models: Review, critique, and recommendations. *Organizational Research Methods, forthcoming*.

Aguinis, H., & Vandenberg, R. J. (2014). An Ounce of Prevention Is Worth a Pound of Cure: Improving Research Quality Before Data Collection. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 569–595. doi:10.1146/annurev-orgpsych-031413-091231

Video: <https://www.youtube.com/watch?v=y1tNSEXh9Gk> (18:49)

Colquitt, J. A., & George, G. (2011). Publishing in AMJ—Part 1: Topic Choice. *Academy of Management Journal, 54*(3), 432–435. doi:10.5465/AMJ.2011.61965960

Bono, J. E., & McNamara, G. (2011). Publishing in AMJ—Part 2: Research Design. *Academy of Management Journal, 54*(4), 657–660. doi:10.5465/AMJ.2011.64869103

Grant, A. M., & Pollock, T. G. (2011). Publishing in AMJ—Part 3: Setting the Hook. *Academy of Management Journal, 54*(5), 873–879. doi:10.5465/amj.2011.4000

Sparrowe, R. T., & Mayer, K. J. (2011). Publishing in AMJ—Part 4: Grounding Hypotheses. *Academy of Management Journal, 54*(6), 1098–1102. doi:10.5465/amj.2011.4001

Zhang, Y. (Anthea), & Shaw, J. D. (2012). Publishing in AMJ—Part 5: Crafting the Methods and Results. *Academy of Management Journal, 55*(1), 8–12. doi:10.5465/amj.2012.4001

Geletkanycz, M., & Tepper, B. J. (2012). Publishing in AMJ—Part 6: Discussing the Implications. *Academy of Management Journal, 55*(2), 256–260. doi:10.5465/amj.2012.4002

Guide, D., & Ketokivi, M. (2015). Notes from the editors: Redefining some methodological criteria for the journal. *Journal of Operations Management, 37*, v–viii. [https://doi.org/10.1016/S0272-6963\(15\)00056-X](https://doi.org/10.1016/S0272-6963(15)00056-X)

Bettis, R. A., Ethiraj, S., Gambardella, A., Helfat, C., & Mitchell, W. (2016). Creating repeatable cumulative knowledge in strategic management. *Strategic Management Journal, 37*(2), 257–261. <https://doi.org/10.1002/smj.2477>

Antonakis, J. (2017). On doing better science: From thrill of discovery to policy implications. *The Leadership Quarterly, 28*(1), 1–14. <https://doi.org/10.1016/j.leaqua.2017.01.006>

Ketokivi, M., & McIntosh, C. N. (2017). Addressing the endogeneity dilemma in operations management research: Theoretical, empirical, and pragmatic considerations. *Journal of Operations Management, 52*, 1–14. <https://doi.org/10.1016/j.jom.2017.05.001>

131 pages total

9.3 Empirical articles used as examples

Deephouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal, 20*(2), 147–166. doi:10.1002/(SICI)1097-0266(199902)20:2<147::AID-SMJ11>3.0.CO;2-Q

Hekman, D. R., Aquino, K., Owens, B. P., Mitchell, T. R., Schilpzand, P., & Leavitt, K. (2010). An Examination of Whether and How Racial and Gender Biases Influence Customer Satisfaction. *Academy of Management Journal, 53*(2), 238–264. doi:10.5465/AMJ.2010.49388763 (AMJ best paper winner for 2010)

Video: <https://www.youtube.com/watch?v=NanIRlhHR8> (1:40)

Mochon, D., Johnson, K., Schwartz, J., & Ariely, D. (2017). What Are Likes Worth? A Facebook Page Field Experiment. *Journal of Marketing Research (JMR)*, 54(2), 306–317.

Mesquita, L. F., & Lazzarini, S. G. (2008). Horizontal and Vertical Relationships in Developing Economies: Implications for SMEs' Access to Global Markets. *Academy of Management Journal*, 51(2), 359–380.

Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587–613. doi:10.1002/smj.183

109 pages total

9.4 Other material

Rausser, J. (2014, October 15). *Statistics Without the Agonizing Pain*. Presented at the Big Data Conference - Strata + Hadoop World, New York, NY. Retrieved from <http://strataconf.com/stratany2014/public/schedule/detail/37554>

Video: <https://www.youtube.com/watch?v=5Dnw46eC-0o> (11:47)

10 ABOUT THE INSTRUCTOR

Mikko Rönkkö is an associate professor of entrepreneurship at Jyväskylä University School of Business and Economics and a docent of management at Aalto University. He completed his doctorate at Aalto University in 2014. His current research interests are quantitative research methods and software entrepreneurship. He has taught courses on statistical research methods in multiple universities in and outside Finland. He has published in *Organizational Research Methods*, *Psychological Methods*, *Journal of Operations Management*, *Journal of Applied Psychology*, *Entrepreneurship Theory and Practice*, and *MIS Quarterly*, among others. He currently serves as an associate editor for *Organizational Research Methods* and on the editorial board of *Entrepreneurship Theory and Practice*. In the past, he served as a department editor in *Journal of Operations Management*, handling methodological articles for the journal.