

GESIS Summer School in Survey Methodology 2022

Syllabus for course: “Designing, Implementing, and Analyzing Longitudinal Surveys”

Lecturers:	Dr. Tarek Al Baghal	Dr. Alexandru Cernat
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Date: 08-12 August 2022

Time: 10:00-13:00 | 14:00-17:00

Venue: KOMED, Im Mediapark 7, Cologne

About the Lecturers:

Dr. Tarek Al Baghal is a Professor of Survey Methodology at the Institute of Social and Economic Research, University of Essex, and is Deputy Director of Understanding Society, one of the largest longitudinal studies in the world. His research interest focus on new data sources and linkage to surveys. His PhD is in Survey Research and Methodology from the University of Nebraska, and he has a Master's in the same field from the University of Maryland.

Dr. Alexandru Cernat is an associate professor in Social Statistics at the University of Manchester. Previously he was a Research Associate at the Cathie Marsh Institute for Social Research and the National Centre for Research Methods, University of Manchester where he investigated non-response in longitudinal studies with a special focus on biomarker data. He has received a PhD in survey methodology from the University of Essex working on the topic of mixed mode designs in longitudinal studies.

Selected Publications:

- Cernat, A. & Keusch, F. (2020). Do surveys change behaviour? Insights from digital trace data. *International Journal of Social Research Methodology*. [Sci-Hub | Do surveys change behaviour? Insights from digital trace data. International Journal of Social Research Methodology, 1-12 | 10.1080/13645579.2020.1853878](https://doi.org/10.1080/13645579.2020.1853878)
- Cernat, A., Sakshaug, J. W., Chandola, T., Nazroo, J., & Shlomo, N. (2020). Nurse Effects on Non-response in Survey-Based Biomeasures. *International Journal of Social Research Methodology*, 0(0), 1-14. <https://doi.org/10.1080/13645579.2020.1832737>
- Cernat, A., & Revilla, M. (2020). Moving from Face-to-Face to a Web Panel: Impacts on Measurement Quality. *Journal of Survey Statistics and Methodology*. <https://doi.org/10.1093/jssam/smaa007>
- Al Baghal, T., Wenz, A., Sloan, L., and Jessop, C. (2021). Linking Twitter and Survey Data: Quantity and Possible Biases. *EPJ Data Science*, 10:32. <https://doi.org/10.1140/epjds/s13688-021-00286-7>
- Al Baghal, T., Sloan, L., Jessop, C., Williams, M., and Burnap, P. (2020). Linking Twitter and Survey Data: The Impact of Survey Mode and Demographics on Consent Rates Across Three UK Studies. Online first at *Social Science Computer Review* <https://doi.org/10.1177%2F0894439319828011>
- Al Baghal, T. (2019) The Effect of Online and Mixed-Mode Measurement on Cognitive Ability, *Social Science Computer Review*, 37: 89-103

Course Description:

The course will provide an overview of those aspects of survey design, implementation, and analysis that are unique to longitudinal surveys or that have distinct features in the longitudinal context. The course will specifically cover:

- A review of the advantages and limitations of longitudinal surveys and an outline of some of the uses to which longitudinal surveys are put.
- Key aspects of longitudinal survey design such as the sampling design, interval between waves, and data collection modes.
- Important aspects of designing a questionnaire and measurement for a longitudinal study, particularly for capturing micro-level change
- The impact of non-response and attrition in a panel, and adjustments such as weighting and imputation given that missing data patterns differ between waves.
- An introduction to important analysis considerations and methods when using a longitudinal survey design.
- In addition, each day there will be time used for practical applications of lectures and methods taught and provide an opportunity for more interaction with the instructors.

Keywords:

Longitudinal surveys, data collection, measurement, attrition, weighting

Course Prerequisites:

- participants should have basic knowledge of survey methodology from a cross-sectional perspective, in particular with respect to survey design, instrument development, and survey implementation
- basic knowledge of statistics and statistical modelling (i.e., regression) and of a statistical software (**Stata** or **R**).

Target Group:

Participants will find the course useful if:

- they are interested in the uses and importance of longitudinal surveys
- they are involved in planning or conducting a longitudinal survey
- they are interested aspects of longitudinal data collection
- they are in the processes involved in measurement of phenomena over time
- they want to use appropriate methods to analyse longitudinal data.

Course and Learning Objectives:

By the end of the course participants will:

- be familiar with the central design issues of longitudinal surveys
- understand different strategies on how to collect longitudinal data
- be able to design questions that meet research objectives for longitudinal surveys and minimize error
- be able to identify and implement features that should help to prevent panel attrition
- be able to study the nature of non-response and attrition in a longitudinal survey
- understand generally the methods used in weighting and imputation in a panel survey.

Organizational Structure of the Course:

- In these meetings, practical applications will be given for the students to work through, with the opportunity to ask instructors questions one-on-one about the course or their own projects.
- The practical application will relate to topics in longitudinal survey design covered in the lectures, including the impact of question wording on measurement, the identification of attrition, the development of weights, and how these can impact analytic findings.
- After the individual work the lecturer will go through the solutions with the entire class
- Analysis done during practical applications will use Stata or R

Software and Hardware Requirements:

Participants will need to bring a laptop computer to successfully participate in this course. Participants may use R or Stata for exercises. Stata users may receive a Stata short term license provided by GESIS for the duration of the course if needed. R users should have installed a recent version of R (R packages needed: tidyverse, haven, sample, lme4, plm, broom).

Day-to-day Schedule and Literature:

Day	Topic(s)
1	<p>Introduction to Longitudinal Surveys; Research Questions; Sample Design; Survey Modes</p> <p>Compulsory reading (have to be read before the session):</p> <ul style="list-style-type: none"> ▪ Lynn, P. (2009). Methods for longitudinal surveys. Pp. 1-19 in: P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley. ▪ Groves, R. M., & Lyberg, L. (2010). Total Survey Error: Past, Present, and Future. Public Opinion Quarterly, 74(5), 849–879. http://doi.org/10.1093/poq/nfq065 ▪ Smith, P., Lynn, P. & Elliot, D. (2009). Sample design for longitudinal surveys. Pp. 21-33 in: P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley <p>Suggested reading (suggested, yet do not have to be read before the session):</p> <ul style="list-style-type: none"> ▪ Cernat, A., & Revilla, M. (2020). Moving from Face-to-Face to a Web Panel: Impacts on Measurement Quality. Journal of Survey Statistics and Methodology. https://doi.org/10.1093/jssam/smaa007 ▪ Sikkel, D. & A. Hoogendorn (2008): Panel surveys. Pp. 479-499 in: E.D. de Leeuw, J.J. Hox & D.A. Dillman (Eds.), International Handbook of Survey Methodology. New York, London: Lawrence Erlbaum Associates. ▪ Lynn, P. (2011). Maintaining cross-sectional representativeness in a longitudinal general population survey. Understanding Society Working Paper 2011-04. https://www.iser.essex.ac.uk/research/publications/working-papers/understanding-society/2011-04. ▪ Buck, N.H., Ermisch, J.F. and Jenkins, S.P. (1995) Choosing a Longitudinal Survey Design: The Issues. Occasional Paper 96-1, Colchester: University of Essex. (Pages 1-20, 33-41) https://www.iser.essex.ac.uk/files/occasional_papers/pdf/op96-1.pdf ▪ Rose, D. (1995) Household Panel Studies: An Overview. Innovation: The European Journal of Social Sciences, 8(1)7-24.
2	<p>Measurement in Longitudinal Surveys: What to measure, cognitive processes, problems, and questionnaire design</p> <p>Compulsory reading:</p> <ul style="list-style-type: none"> ▪ Jäckle, A. (2009). Dependent Interviewing: A Framework and Application to Current Research. Pp. 93-112 in: P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley ▪ Belli, R. F., Smith, L., Andreski, P., & Agrawal, S. (2007). Methodological comparisons between CATI event history calendar and conventional questionnaire instruments. Public Opinion Quarterly. 71, 603-622. <p>Suggested reading:</p> <ul style="list-style-type: none"> ▪ Hox, J. J. (1997). From theoretical concept to survey question. In Lyberg, Biemer, Collins, de Leeuw, Dippo, Schwarz, & Trewin (Eds.). Survey measurement and process quality. ▪ Callegaro, M. (2008). Seam Effects in Longitudinal Studies. Journal of Official Statistics, 24: 387-409. ▪ Chapter 4 in Tourangeau, R., Rips, L. & Rasinski, K. (2000): The Psychology of Survey Response Cambridge, MA: Cambridge University Press.

	<ul style="list-style-type: none"> ▪ Sturgis, P., Allum, and Brunton-Smith, I. (2009). Attitudes Over Time: The Psychology of Panel Conditioning. Pp. 113-126 in: P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley. ▪ Uhrig, SC. N. (2012) Understanding panel conditioning: An examination of social desirability bias in self-reported height and weight in panel surveys using experimental data”. Journal of Longitudinal and Life Course Studies, 3: 120-136.
3	<p>Attrition in Longitudinal Surveys: Specific issues and methods to counter nonresponse</p> <p>Compulsory reading:</p> <ul style="list-style-type: none"> ▪ Watson, M. & Wooden, M. (2009). Identifying factors affecting longitudinal survey response. Pp. 157-181 in P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley. ▪ Lepkowski, J.M. & Couper, M.P. (2002). Nonresponse in the second wave of longitudinal household surveys. Pp. 259-272 in R.M. Groves, D. Dillman, J.L. Eltinge & R.J. Little (Ed.), Survey Nonresponse. New York: Wiley. <p>Suggested reading:</p> <ul style="list-style-type: none"> ▪ Couper, M.P. & Ofstedal, M.B. (2009). Keeping in contact with mobile sample members. Pp. 183-203 in P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley. ▪ Laurie, H., Smith, R. & Scott, L. (1999). Strategies for reducing nonresponse in a longitudinal panel survey. Journal of Official Statistics, 15: 269-282. ▪ Lynn, P. (2014). Targeted response inducement strategies on longitudinal surveys. Pp. 322-338 in U. Engel et al (Ed.s), Improving Survey Methods: Lessons from Recent Research. New York: Routledge. ▪ Laurie, H. & Lynn, P. (2009). The use of respondent incentives on longitudinal surveys. Pp. 205-233 in P. Lynn (Ed.), Methodology of Longitudinal Surveys. Chichester: Wiley. ▪ Banks, J., Muriel, A., & Smith, J. P. (2011). Attrition and health in ageing studies: evidence from ELSA and HRS. Longitudinal and Life Course Studies, 2(2), 101–126. ▪ Groves, R.M. (2006). Nonresponse Rates and Nonresponse Bias in Household Surveys. Public Opinion Quarterly, 70: 646-675. ▪ Groves, R.M, Singer, E. & Corning, A. (2000). Leverage-Saliency Theory of Survey Participation: Description and an Illustration. Public Opinion Quarterly, 64: 299-308.
4	<p>Weighting and Imputation in a Longitudinal Survey</p> <p>Compulsory reading:</p> <ul style="list-style-type: none"> ▪ Lynn, P. (1996). Weighting for nonresponse. Pp 205-214 in R. Banks et al (Ed.s), Survey and Statistical Computing. Amersham: ASC. Chapter can be downloaded from http://iserwww.essex.ac.uk/home/plynn/downloads/. ▪ Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. Psychological Methods, 7(2), 147. <p>Suggested reading:</p> <ul style="list-style-type: none"> ▪ Seaman, S. R., & White, I. R. (2013). Review of inverse probability weighting for dealing with missing data. Statistical Methods in Medical Research, 22(3), 278–295. http://doi.org/10.1177/0962280210395740 ▪ Peytchev, A. (2012). Multiple Imputation for Unit Nonresponse and Measurement Error. Public Opinion Quarterly. http://doi.org/10.1093/poq/nfr065 ▪ Enders, C. K. (2010). Applied Missing Data Analysis (1st ed.). New York: The Guilford Press.
5	<p>Introduction of analysis issues in longitudinal surveys</p> <p>Compulsory reading:</p> <ul style="list-style-type: none"> ▪ Chapters 3, 4, 5 in Singer, J., & Willett, J. (2003). Applied longitudinal data analysis: modeling change and event occurrence. Oxford University Press. <p>Suggested reading:</p>

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| | <ul style="list-style-type: none"> ▪ Chapters 6, 7 and 8 in Singer, J., & Willett, J. (2003). Applied longitudinal data analysis: modeling change and event occurrence. Oxford University Press. |
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Preparatory Reading:

General introduction to survey methodology and survey data collection (alternatively you could take a course such as “Introduction to Survey Design” in the first week):

- Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E. and Tourangeau, R. (2009). Survey Methodology. Hoboken: Wiley.

Additional Recommended Literature:

General introduction to survey methodology and survey data collection:

- de Leeuw, E. D., Hox, J. J. and Dillman, D. A. (Eds.) (2008). International Handbook of Survey Methodology. New York: Lawrence Erlbaum Associates.
- Dillman, D. A., Smyth, J. D. and Christian, L. M. (2008). Internet, Mail, and Mixed-Mode Surveys. The Tailored Design Method. Hoboken: Wiley.

General longitudinal data collection:

- Lynn, P. (Ed.). (2009). Methodology of Longitudinal Surveys (1 edition). Chichester, UK: Wiley.
- Cernat, A., & Sakshaug, J. W. (2021). Measurement error in longitudinal data. Oxford University Press.

Mixed modes and longitudinal studies:

- Cernat, A., & Revilla, M. (2020). Moving from Face-to-Face to a Web Panel: Impacts on Measurement Quality. Journal of Survey Statistics and Methodology. <https://doi.org/10.1093/jssam/smaa007>
- Sakshaug, J. W., Cernat, A., & Raghunathan, T. E. (2019). Do Sequential Mixed-Mode Surveys Decrease Nonresponse Bias, Measurement Error Bias, and Total Bias? An Experimental Study. Journal of Survey Statistics and Methodology, 1–27. <https://doi.org/10.1093/jssam/smy024>
- Cernat, A. (2015). Impact of mixed modes on measurement errors and estimates of change in panel data. Survey Research Methods, 9(2), 83–99. <http://doi.org/10.18148/srm/2015.v9i2.5851>
- Cernat, A. (2015). The Impact of Mixing Modes on Reliability in Longitudinal Studies. Sociological Methods & Research, 44(3), 427–457. <http://doi.org/10.1177/0049124114553802>
- Lynn, P., Uhrig, S.C.N. and Burton, J. (2010) Lessons from a Randomised Experiment with Mixed-Mode Designs for a Household Panel Survey. Understanding Society Working Paper 2010-03, Colchester: University of Essex. (Pages 1-6) <http://research.understandingsociety.org.uk/publications/working-paper/2010-03.pdf>

Online panels:

- Blom, A. G., Bosnjak, M., Cornilleau, A., Cousteaux, A.-S., Das, M., Douhou, S., & Krieger, U. (2016). A Comparison of Four Probability-Based Online and Mixed-Mode Panels in Europe. Social Science Computer Review, 34(1), 8–25. <http://doi.org/10.1177/0894439315574825>
- AAPOR Standards Committee. (2010). AAPOR Report on Online Panels (pp. 1–82). AAPOR Executive Council. https://www.aapor.org/AAPORKentico/AAPOR_Main/media/MainSiteFiles/AAPOROnlinePanelsTFReportFinalRevised1.pdf