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| **Client:** | Dr. Erin Dunn | **File:** 24-042 |
| **Dept:** | Sociology | **Faculty:**  **Student:** |
| **Date:** | 6/19/2024 | **Initial Meeting:**  **Follow-up:** |
| **Consultant and Attendees:**  Sumeeth Guda, Dr. Erin Dunn, Dr. Chong Gu, Dr. Antik Chakraborty, Xiyu Wang (Observer) | | |
| **Statement of Problem:**  To what extent to do genetic factors and children’s exposure to adversity affect tooth decay and tooth formation timing. | | |
| **Goal of this Project:** Publication and Grant Application | | |
| **Background:**  The client is a dream hire professor in the sociology department who studies the genetic, epigenetic, and socioenvironmental determinants of depression, with a focus on the role of childhood adversity in early life. Her current project is about short-term training to learn concepts and methods to measure tooth development and dental hard tissue phenotypes, to study the connections between tooth and brain development.  The client gathered data through a study from the Center for Oral Health Research in Appalachia (COHRA). The population used in the study was a birth cohort consisting of 1000 European-ancestry and 250 African American pregnant women from northern Appalachia.  The client needs to analyze existing data from COHRA to investigate the extent to which genetic factors and children’s exposure to maternal distress (A common type of childhood adversity) and see how this associates with dental caries (tooth decay) and age at first tooth eruption. The client has 2 aims with regards to their plain of analysis.   1. The client will use bioinformatics data on brain structures and disorders to calculate genetic risk scores capturing the aggregate effect of multiple genes (i.e., polygenic risk scores; PRS) and then examine their role on both dental caries risk and age at first tooth emergence. 2. The client will use an analytic technique called the structured life course modeling approach (SLCMA) to assess with repeated-measures data how the developmental timing of children’s exposure to maternal distress (e.g., global and parenting stress; depressive symptoms) associates with number of dental caries and primary tooth eruption timing.   The client indicated that they need help completing the second analysis technique and understanding the findings from this data. Overall, the client hopes to discover, and the identification of new genes associated with dental caries and tooth formation timing and increase knowledge on the role of maternal distress on these dental outcomes, which could then guide targeted preventive interventions. | | |
| **Progress of project at this time:** Analysis (All data have been collected). | | |
| **Relevant information presented at meeting:**  In the meeting, Dr. Dunn gave a brief overview of their research and the variables they would analyze for the project. They collected their data through phone interviews, home visit, and in-person assessments over the course of 47 data periods. They recruited their 1172 European-ancestry mother-child pairs from West Virginia and Pennsylvania. Because of the frequency of the visits and assessments, ultimately there was an attrition rate of 10% between each visit, thereby leading to a final study size of 544 mother child pairs remaining. The data from the West Virginia and Pennsylvania sites were pooled together.  Variables measured:   * The response variable is the outcome Measures of Dental Caries and Tooth Eruption.   + Dental caries was assessed from age 2 months to 10 years during yearly intra-oral exams performed by a trained/licensed dentist or hygienist. Providers used the Decayed, Missing, or Filled Tooth Surfaces (DMFS) Index to evaluate the status of each primary tooth (e.g., decayed, healthy, restored) and surface, as part of the PhenX Toolkit Dental Caries Experience Prevalence Protocol.   + For the clients project DMFS at age 5 is the age of interest, the age before primary tooth exfoliation. Tooth eruption was assessed through the DMFS, and phone interviews conducted every 6 months from 2 months of age to 10 years. Interviewers asked mothers if their child had any new teeth, how old the child was when their first tooth came in, and how many teeth the child has now. Client will analyze the age (in months) at first tooth emergence. * The predictor variables are the exposure measures of maternal distress.   + There exist 23 different measurement occasions as indicated in the client’s grant proposal where mothers reported their experiences of stressors and mental health symptoms commonly examined in studies of maternal distress. .Some examples of distress include (anxiety, stress, depression, etc).   + The client decided to choose 5 of these exposure measures for their study.   After Dr. Dunn briefed everyone about the project, she mentioned the situation she was facing. The client is a newly hired professor in Purdue, who worked with a data analyst to collect, organize, and create the plans to analyze the data. During her transition to Purdue, she lost her data analyst and as a result did not have a dedicated member of her team to complete her analysis for her. She came to the Purdue SCS on the recommendation of Dr. Bruce Craig to see if we could help her and understand her project better. She said that her study design and analysis techniques were finalized, and because she has 4 months left on this project grant, she needs to complete the analysis as soon as possible. All of her data was collected, and her previous analyst wrote up all the code for the SCLMA models. The only step remaining is to run the data across the analyst’s model, complete exploratory data analysis, and present the relevant findings to her.  Throughout the meeting, the consultant and SCS professors had some concerns about the project. Which they told Dr. Dunn. The two major concerns were that Dr. Dunn did not have any specific statistics questions she needed help with, and the second was that Dr. Dunn did not share the dataset or show how the data worked. Dr. Gu expressed that the first concern is problematic because although the statistical consulting service is willing to help researchers with their project, ultimately, we would not be data analysts on behalf of the client and do the analysis for the client, but we could always help them if they had specific questions or problems. Dr. Chakraborty and Dr. Gu had concerns about not being able to see the data, especially since there wasn’t a deep understanding of the SCLMA model within the SCS. So, unless the data could be viewed, ultimately no advice could be given about her analysis procedures or model.  The ultimate conclusion of the meeting was that Dr. Dunn wanted to finish the project; however, she needed help from a new data analyst to run her model and do the exploratory data analysis. The recommendation that Dr.Gu gave Dr.Dunn was that the SCS might not be the best place for her to ask for help because the demands of her project are greater than what the SCS can offer clients. Dr. Gu, however, told that she should instead make this job temporary research posting job, and share it with the statistics department and with the Purdue Data Mine Learning Community. By collaborating with both of the departments, she can hire a statistic focused student or faculty member who is willing and able to put in the hours to complete her project. | | |
| **Recommendations for Design and/or Analysis:**  Within the meeting itself, the client indicated that they had worked with a statistician on their project. Ultimately their plan for the design and the plan for analysis were finalized. All of the models and data schema were drafted by a data analyst. The only issue the client needed help with was to run their data through their model, do exploratory data analysis, and present the findings. Since the client did not have any plans to deviate from their original design and analysis plan, and did not have any statistics related questions to ask the SCS, ultimately no recommendations could be given because the project was straightforward. | | |
| **Who will carry out these actions?**  **Client:**   * Reach out to the research coordinators in the statistics department and the Purdue data mine to make the project a research job posting. * If they want to still work with the SCS, come up with specific statistics-based research questions, and send the data + relevant materials for the project. | | |
| **Status:** Follow up meeting not needed. | | |

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