

## **MACS 30200**

### **Problem Set #1**

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#### **Part 1. A Data Section for U.S. Natality Data (2016)**

The U.S. Natality Data, which is curated by the National Vital Statistics System of the National Center for Health Statistics (NCHS), is available in the website of National Bureau of Economic Research (NBER)<sup>1</sup>. The Natality Data, binned by year from 1968 to 2016, are based on information abstracted from birth certificates filed in vital statistics offices of each State and District of Columbia.

The Natality Data have been intensively used in the past research. Almond & Edlund (2007) used the Natality Data (1983-2001) to explore the potential role of offspring sex ratio to white mothers. Heck, et al. (1997) used the Natality Data (1969-1994) to examine delayed childbearing by material education level. Tucker, et al., (2007) used the data to explore the black-white disparity in pregnancy-related mortality. Mendoza, et al., (2013) used the Natality Data (2007-2010) to conduct pediatrics research related to early intervention programs enrollment. Schoendorf & Branum (2006) used the Natality Data to conduct perinatal and obstetric research.

This assignment only uses the Natality Data (2016) for the following analysis. The Natality Data (2016), which provide demographical and health information for the births occurring in the year of 2016, have 3956112 observations and 240 variables. Table 1 presents descriptive statistics for several demographical variables and health information, including the birth month, the birth day of week, mother's age, mother's race, mother's education, father's age, father's race, father's education, marital status, and the reported number of cigarette per day.

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<sup>1</sup> <http://nber.org/data/vital-statistics-natality-data.html>

Table 1. Descriptive Statistics

	Birth Month	Birth Day of Week	Mother's Age	Mother's Race	Mother's Education
mean	6.562	4.062	4.343	15.239	4.368
std	3.413	1.849	1.199	11.144	1.807
min	1.000	1.000	1.000	10.000	1.000
25%	4.000	3.000	3.000	10.000	3.000
50%	7.000	4.000	4.000	10.000	4.000
75%	9.000	6.000	5.000	20.000	6.000
max	12.000	7.000	9.000	61.000	9.000

	Marital Status	Father's Age	Father's Race	Father's Education	Cigarettes Before Pregnancy
mean	1.398	5.635	2.853	4.896	0.236
std	0.489	2.358	3.05	2.326	0.808
min	1.000	1.000	1.000	1.000	0.000
25%	1.000	4.000	1.000	3.000	0.000
50%	1.000	5.000	1.000	4.000	0.000
75%	2.000	6.000	4.000	6.000	0.000
max	2.000	11.000	9.000	9.000	6.000

Figure 1. Maternal Educational level vs. Prenatal Care Begin Month

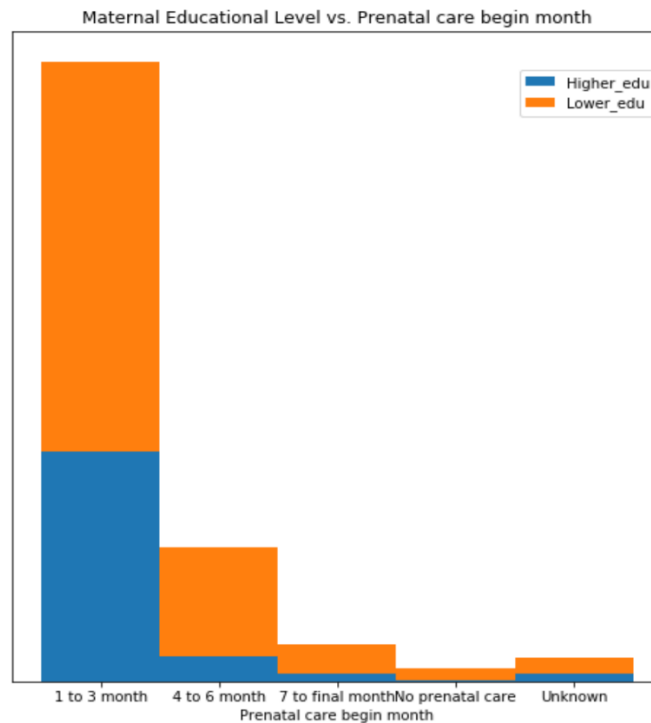


Figure 1 shows the relationship between mother's educational level and the prenatal care begin month. If the mother's education level is at least Bachelor's degree, the observation is categorized into the higher education group, otherwise it is categorized into the lower education group. Compared to the lower maternal education group, most of individuals in the higher maternal education group begin to have prenatal cares at an early date, such as 1<sup>st</sup> to 3<sup>rd</sup> month. Figure 2 shows the relationship between mother's race and the prenatal care begin month. Most of mothers in all racial groups tend to begin the prenatal care from the 1<sup>st</sup> to 3<sup>rd</sup> month.

Figure 2. Mother's Race vs. Prenatal Care Begin Month

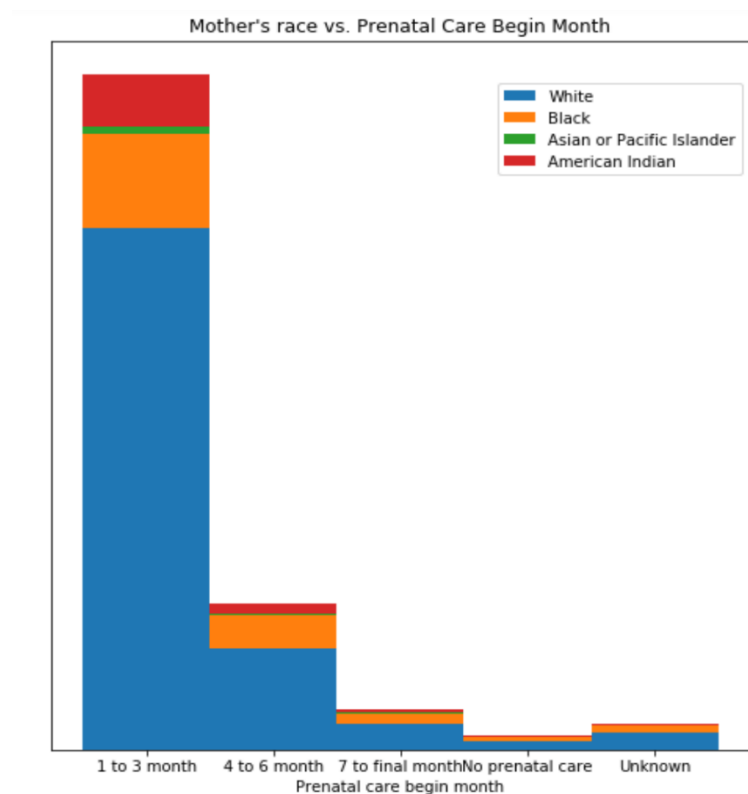


Table 2 shows the descriptive statistics by maternal education level. Similiary to Figure 1, observations are categorized into either higher maternal education group or lower maternal educational group. By comparing the two sub-tables, the average mother's age in the higher education group is greater than that in the lower education group; the higher education group also has much higher father's education level on average; the higher education group has more prenatal visits as well; but the lower educational group has higher BMI than the higher educational group.

Table 2. Descriptive Statistics by Maternal Educational Level

i. Higher Maternal Education Group

	Mother's Age	Father's Education	Number of Prenatal Visits	Body Mass Index (BMI)
mean	4.974	5.859	7.246	2.849
std	0.931	1.617	1.864	1.468
min	1.000	1.000	1.000	1.000
25%	4.000	5.000	6.000	2.000
50%	5.000	6.000	7.000	2.000
75%	6.000	7.000	8.000	3.000
max	9.000	9.000	12.000	9.000

ii. Lower Maternal Education Group

	Mother's Age	Father's Education	Number of Prenatal Visits	Body Mass Index (BMI)
mean	4.033	4.423	6.786	3.197
std	1.194	2.471	2.153	1.571
min	1.000	1.000	1.000	1.000
25%	3.000	3.000	6.000	2.000
50%	4.000	4.000	7.000	3.000
75%	5.000	6.000	8.000	4.000
max	9.000	9.000	12.000	9.000

## Part 2. Critique a Computational Research Paper

The assigned paper:

Roach Anleu, S., & Mack, K. (2015). Performing authority: Communicating judicial decisions in lower criminal courts. *Journal of Sociology*, 51(4), 1052-1069.

1. State the research question of your assigned paper.

This paper examines the ways magistrates at judicial officers deliver their decisions in criminal matters in open court, and the specific questions is whether sentencing decisions are communicated in different ways depending on the types of decisions. The hypothesis is that when communicating sentencing decisions, magistrates' judicial behaviors will exhibit more personal engagement in sentencing decisions than other non-trial decisions.

## 2. What data did the paper use?

The paper drawn its data from observational research of magistrates and their courts across Australia. The data included courts from a variety of locations and several magistrates with various characteristics. To be specific, the data covered a total of 1287 matters, and 27 magistrates were observed conducting a general criminal list in 30 different court sessions across 20 different locations. In addition, three aspects of judicial behaviors were observed. These court observations were conducted by two researchers whom were instructed to record magistrates' behaviors and other courtroom events with consistent coding standards.

## 3. What theory did the paper reference in order to interpret the data?

The paper mainly referenced Max Weber's theories of authority and legitimacy, which recognized that "accomplishing authority normally requires 'the belief in legitimacy'". The paper also presented Goffman's theory of "social settings constituted by professional and lay actors and driven by institutional and everyday imperatives", and Mack, et al., theory of "impartial adjudication embodied as impersonal, unemotional detachment".

## 4. Was your assigned paper a descriptive study, an identification exercise, a numerical solution to system of equations study, or some combination of the three?

It is more likely to be a descriptive study because the data were collected from observational research of magistrates and their courts across Australia. The researchers mainly investigated the different ways of communication performed by magistrates when delivering different decisions including sentencing decisions and other non-trial decisions.

It could also be considered as an identification exercise because it examines the relationship between magistrates' performance or characteristics of communicating decisions and the nature of decisions in criminal matters.

## 5. What computational methods did this paper use to answer the research question? What was their result or answer to the question?

The paper presented descriptive statistics and used  $\chi^2$  tests to identify the differences between magistrates' performance when communicating decisions. The results supported their hypotheses that magistrates' manners were different in communicating various decisions. To be specific, magistrates were more likely to have personal engagement in delivering sentencing decisions, such as directly looked at and spoke to the defendants more. Magistrates also had more reasoning in sentencing decisions, which suggested the structure of communicating were also distinct.

6. Think of yourself as an academic referee. Give two suggestions to the author(s) of your assigned paper of things the authors might do to improve their results or strengthen their evidence for the answer to the question.

(1) Since the paper focused on examining the communication characteristics of magistrates when communicating different decisions, magistrates' personal communication habits could be potential confounding variables in the research. Therefore, the results could be more robust if there are some balance check on daily communication habits before comparing the communication characteristics in court context.

(2) The paper did not examine whether defendant's demographical variables, such as race, gender, and age, had effects on magistrates' communication characteristics. However, defendant's demographical information, especially race, could have significant effects in varying magistrates' communication behaviors. Therefore, taking defendant's demographical information into considering might strengthen the paper's evidence.

## Reference

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