**STAT121 Tutorial 4 Task** Hakau Ballard 1181917

**Task 1**

1. **a)** This is an experiment. We know this because the researcher has assigned a change to the units in the experiment.

**b)** The explanatory variable is the pill taken. The response variables are the blood pressure and cholesterol levels measured at the end of the experiment.

**c)**

**d)** A double blind study reduces the chance of encountering bias in an experiment, from either the participants or the researcher.

**e)** Randomization occurs so that the obtained sample can be as representative of the population as possible. It also makes it possible to determine cause-and-effect.

**f)** One group was given a placebo. This makes the study placebo-controlled. This means that the placebo group is used for comparison to the group taking a ‘real’ pill but still allows for the double blinding.

**Task 2**

1. **a) Study 1:** The factor being assessed is how someone’s sleep and waking time affects a 65-year or older person’s ‘success’ in life. The way ‘success’ is compared is by measurements such as median income, cognitive abilities and state of health. Explanatory Variable = Sleep/Wake time. Response variables = Mean income, Cognitive abilities and state of health.

**Study 2:** The factor being tested is a person’s IQ group and how it affects annual income. The groups are compared by measurement of annual income. Explanatory Variable = IQ group. Response Variable = Annual income.

**Study 3:** The factor being tested is how different racial groups respond to different lasagne recipes. The groups are compared by the taste score for the meals, determined by the researcher’s survey.

**b)** Study 1 = Observational Study

Study 2 = Observational Study

Study 3 Experiment

**c)** No, it only examines those with an age of 65 years or older.

**d)** All three studies used blocking to some extent.

Blocking is used in the first experiment to block units depending on their sleep/wake time, i.e. a block for those who sleep from before 11 to before 8 and a block for after those times.

Blocking is also used in the second experiment to block the units depending on IQ. I.e. Low IQ, Medium IQ, High IQ.

Blocking in the third experiment was used to block the units depending on racial group. They were then further blocked into groups depending on the treatment (recipe) they received.

**Task 3**

1. Submitted through moodle.

**Task 4**

1. **a)**

**Descriptive Statistics: Domtime, NonDomtime**

Variable N N\* Mean StDev

Domtime 10 0 20.495 2.570

NonDomtime 10 0 20.942 1.262

The sample size for each hand was 10, as the ruler was dropped 10 times for each hand. My dominant (right) hand had a mean time of 20.495 compared to my non-dominant (left) hand, which had a mean time of 20.942, so my dominant is slightly faster, based on the sample. There was a notable difference in the standard deviations, suggesting that there was more variance in the catch times of my dominant hand.

**b)**

**Task 5**

1. **a)** The first mean length of 2.50 cm is a parameter. The second measured mean length is from a sample so it is a statistic.

**b)** The mean atomic weight of 134.355 is a parameter.

**c)** A census is data from the population so the mean income of $24,400 is a parameter.