Question 1.

a)
explanatory variable(s): engagement in aromatherapy foot massage
response variable(s): anxiety level

b)
measurement for the response variable(s): self-reported total anxiety score based on a Likert scale (7 items per set of form; 0-3 points for each item: 0 = symptom absent; 3 = symptom present)

The subjects would fill out the Hospital Anxiety and Depression Scale-Anxiety forms one month before, right before, immediately after, one month after and three months after their aromatherapy foot massage. HADS-A is a brief measurement of symptoms of anxiety and it is generally used and tested. Hence, it would be a good reflection of the anxiety level of the subjects.

c)
additional explanatory variable: physical and mental conditions

description/impact: Anxiety is often a comorbidity of physical illness or mental health conditions. People with those conditions tend to have a higher and more fluctuating level of anxiety and thus would produce higher and inconsistent anxiety score reports (my measurement as described in part b). If subjects' engagement in aromatherapy foot massage is of a treatment purpose, which is associated with their physical and mental conditions, then it would be hard to determine whether a report with higher anxiety points (i.e. higher anxiety level) is because of their engagement in aromatherapy or their physical or mental conditions.

d)
description and justification: A WHO Composite International Diagnostic Interview would be conducted on each of the participates of the test to make sure they do not have any significant physical or mental conditions before their data was collected.
This should be the best approach in my case because it would decrease the complexity of the study by limiting the impact of additional explanatory variables on the response variable.

Question 2

a)
Population of interest: all human beings

b)
sampling frame: people from a neighbourhood in London, ON

explanation: The population of interest "all human beings" is too board to be captured in this study. People from a single neighbourhood in London would be easy to contact and collect data from, which would make it faster and cheaper for data collection. Besides, since those people are rather easier to keep track of, it would be easy for me to collect data from them in a long period of time (as they would be asked to provide some follow-up data in a time frame of 3 months as described in Question 1). Finally, as London is a city of high diversity, the sampling frame selected would cover most of the races and genders, which would make it highly representative of the population of interest.

critical evaluation: People from a neighbourhood in London can only represent a little proportion of all human beings as it would probably have more young population (i.e. university students) with an over-average economical level and tend to have certain living habits (e.g. would seek help from psychologists instead of foot massagers when under extreme anxiety). People of different age composition and different life-style likely have different preferences when dealing with anxiety and thus would show different effects of foot massages on their anxiety level. As a result, the results of this study should be generalizable to people of similar composition and background (i.e. other cities mainly composed of young population in North America).

c)
sampling design(s): simple random sample and systematic sampling

description: A neighbourhood in London would be selected with a simple random sampling method to collect data from. Households would be numbered by their geographic position following by a systematic random sampling to select 20 households to be visited. Individuals that are residents of the selected household, having the tendency to continue living in the neighbourhood for at least 3 months and with no physical or mental conditions (as described in Question 1) would be eligible to participate in the study. Introductory letters would be sent in the mail to each selected household followed by a phone call within one week. A member of the household with the closest birthday to the current date would be asked to speak with the recruiters and then the second member would be contacted if the first eligible participant is not available. Ten tempts would be made to recruit the sample subjects before the household is replaced with another randomly selected household.

explanation and justification: Taking a simple random sample of neighbourhoods can help prevent bias in selecting a particular neighbourhood (e.g. neighbourhood that is geographically close to the foot massage therapists, which may indicate a higher possibility of engagement of visiting them under stress). Similarly, the systematic random sampling

used to select the households visited would also prevent the influence of their location on the engagement of the participants. The objective of the recruitment strategy used to minimize the effort and expense while still making most of the sampling frame accessible and the sample large enough to the study.

Question 3

a)
type(s) of experiment: Completely randomized design

b)
description: Households would be numbered by their geographic position, consecutively from 1 to 20. They would then be randomly assigned to either the experimental (n=10) or the control (n=10) group, with or without the aromatherapy foot massage (explanatory variable):

- Experimental group: 30 min of aromatherapy foot massage
- Control group: 30 min of the researcher's attendance and casual conversation

Subjects in the experimental group will be encouraged to select their favourite type of massage, depending on what feels most comfortable to them at the time in order to minimize the effect of personal preference. Subjects in the control group would not be told anything about the treatment for the experimental group. They would be told that their participation was complete after 30 min.

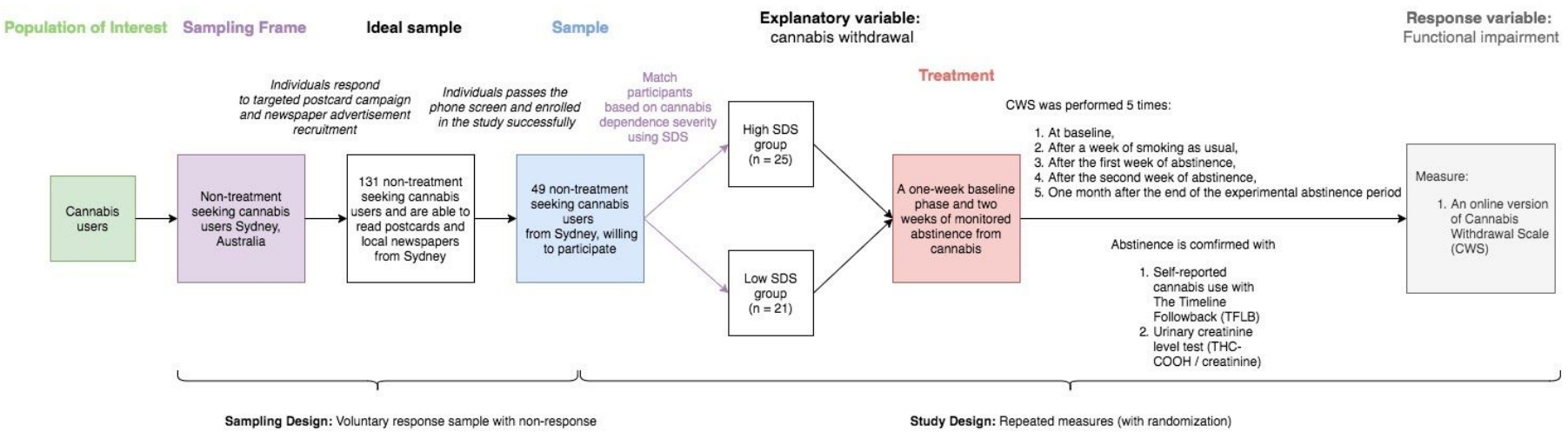
As mentioned in Question 1, all of the participants will be contacted to fill out their Hospital Anxiety and Depression Scale-Anxiety forms (response variable; 7 items per set of form, 0-3 points for each item) one month before, right before, immediately after, one month after and three months after the treatments. The researchers will be examining the content validities of all instruments. Descriptive statistics including the mean (SD), minimum and maximum will be calculated and two-sample t-tests will be performed to test the differences between the two groups.

c)
Control: This experiment demonstrates the concept of control by limiting the effects of extraneous sources of variation on the anxiety level of the subjects. By taking only people with no physical or mental conditions into the study, some additional explanatory variables can be limited to decrease the experimental bias. Blocking is also shown in the study by choosing all of the subjects from one neighbourhood in order to eliminate the influence of the geographical position.

Randomization: Both experimental and control treatments are assigned at random to the subjects, which means that every possible allotment of treatments has the same probability on the participants and that demonstrates the randomization in this study.

Replication: Twenty subjects are recruited in this study, which shows a rather large number of replication. The data would be collected multiple times from the subjects over a long time frame (repeated measurements), which would help obtain a more precise estimate of the effect on the treatment group.

Question 4


Population of Interest
Sampling Frame
Ideal sample
Sample
Explanatory variable:
cannabis withdrawal
Response variable:
Functional impairment
Individuals respond to targeted postcard campaign and newspaper advertisement recruitment
Individuals passes the phone screen and enrolled in the study successfully
Match participants based on cannabis dependence severity using SDS
Treatment
Cannabis users
Non-treatment seeking cannabis users Sydney, Australia
131 non-treatment seeking cannabis users and are able to read postcards and local newspapers from Sydney
49 non-treatment seeking cannabis users from Sydney, willing to participate
High SDS group (n = 25)
Low SDS group (n = 21)
A one-week baseline phase and two weeks of monitored abstinence from cannabis
CWS was performed 5 times:
1. At baseline,
2. After a week of smoking as usual,
3. After the first week of abstinence,
4. After the second week of abstinence,
5. One month after the end of the experimental abstinence period
Abstinence is comfirmed with
1. Self-reported cannabis use with The Timeline Followback (TFLB)
2. Urinary creatinine level test (THC-COOH / creatinine)
Measure:
1. An online version of Cannabis Withdrawal Scale (CWS)
Sampling Design: Voluntary response sample with non-response
Study Design: Repeated measures (with randomization)