I Methods

A. Participants: Report information regarding subjects here.

1. number of subjects.
2. demographic characteristics:
   - gender (number or % of each)
   - ethnicity (African American, Asian Pacific Islander, Native American, Hispanic and/or Latino, Caucasian, and other),
   - age range
   - average age
   - Class rank if college students are used.
   - relationship status if applicable (single, dating, engaged, married, separated, divorced).
3. describe where from, how selected, how assigned to groups (if applicable), and incentives for participation (e.g., payment or course credit).
   - e.g. “Participants were 120 undergraduate college students attending a medium sized South-Eastern university who were given course credit for their participation. Participants ranged in age from 18 to 26, with a mean age of 18.94. A majority of the participants were female (70%) and 30% were male. Also, a majority of the participants were Caucasian (85.8%), 9.2% were African-American, 1% were Asian/Pacific Islander, less than 1% were Native-American, less than 1% were Hispanic, and 2.5% reported “other” ethnicity. A majority of the participants were freshmen (85.8%), 10.8% were sophomores, 1.7% were juniors, and 1.7% were seniors. The average GPA reported was 3.16 with a range of 2.30. A majority of the participants were single (92.5%), 3.3% were married, 2.5% were divorced, 1.7% were engaged.
4. If they have important characteristics, describe them, e.g., depressed or ADHD, and how determined.
5. if participants excluded, explain why and describe criteria for inclusion in the study.
   Also, report final sample size.
   - e.g. “Two participants were excluded from the study do to their lack of hepatic tissue (no liver) and their advanced state of death. The remaining sample consisted of 178 participants.”

B. Materials (Measures / Apparatus)

1. If you are using paper pencil tests (questionnaires) each one used should be described in detail and include examples of items, a description of how measures were computed from the questionnaires, the mean, the standard deviation, and the range.
   - e.g. “A measure of fearful animal attitudes was obtained using Aspelmeier’s (2002) Radford Avoidant Beast Interaction Test (RABIT) which assesses the degree of participant’s negative attitudes regarding small fury animals and their perceived likelihood of avoiding interactions with small fury animals. Participants rated 12 items on a seven point numerical rating scale as to how descriptive they were of them (1 = very undescriptive of me, 7 = very descriptive of me). For items one through six, ratings were scored and summed such that a higher score indicated more negative attitudes toward small fury animals (NATSFA) , with M = 4.55, SD = 2.12, and range = 6.99. Examples of the NATSFA scale items are: 1) “The Easter Bunny makes me sweat” and 2) “I often feel that vicious rabbits are lurking in the shadows.” For items seven through 12, ratings were scored and summed such that a higher score indicated a greater perceived likelihood that
one would avoid interactions with small furry animals (AISFA), with $M = 3.89$, $SD = 2.57$, and range = 6.85. Examples of the AISFA scale items are: 1) “I would probably never go to a park that did not implement squirrel control techniques” and 2) “I would never wear a baby seal fur coat for fear of being attacked by it.”

3. If you are using some kind of equipment or computer software to test participants then describe the equipment fully. (Note: sometimes this can be embedded in the procedures especially if your IV depends on how the equipment is set up, e.g. group 1 gets set up A and group 2 gets set up B).

   -e.g. “A second measure of small furry animal phobia was obtained by using an armpit emissions assessment. A standard 400 mhz PC was programmed to present various photographs of inanimate objects and a variety of photographs and cartoon caricatures of small woodland creatures. Participants arm pits were fitted with electronic moisture collection cups. These cups records the amount of sweat produced in each armpit in milliliters (ml). The sweat emissions from each pit were averaged. It should be noted that it was requested that participants avoid use of anti-perspirants for at least three days prior to testing. Scores were take before and after exposure to the stimulus and a difference score was calculated according to the formula (Post Test - Pre Test), such that a higher score indicated that participants sweat production increased after exposure to the test stimulus. The average amount of sweat production across all types of photographs was $M = 1.56$, $SD = 12.54$, range 64.85. A majority of the participants (62%) had no increase in sweat production for any of the pictures.”

C. Procedure

1. Include a complete description of what happened to a typical subject, in chronological order, from beginning to end. If appropriate, include any unexpected additions to the study.
2. Include the description of the design (experimental, quasi-experimental, longitudinal, etc).
3. Provide an operational definition of the IV (this definition should be the most descriptive one given in the paper).
4. Provide an operational definition of the DV (this definition should be the most descriptive one given in the paper). Describe how changes in the DV will be observed and recorded.

   -e.g., “Participants initially agreed to spend two consecutive nights in the Radford Animal Avoidance Research-Center (RAAR). After receiving informed consent, a catheter was surgically inserted into the participant’s gall-bladder. Over the first night of testing, hepatic secretions were measured. The average rate of bile production was recorded in milliliters per hour, $M = 3.2$, $SD = 1.8$, range = 13.5. After the first night, the catheter was removed and participants were allowed to continue with their daily routine until 9:30 pm at which time they returned to the lab for further testing. During the second night of testing, pancreatic secretions were measured. Participants’ blood sugar levels were measured every hour, in order to establish each individual’s rate of insulin production measured in micrograms per hour, $M = 12.5$, $SD = 7.2$, range = 50. After the second night of testing, participants were given both the RABIT and the Pit Sweat measures of small furry animal phobia. After completing the measures participants were thanked for their participation and asked if they had any questions or concerns.

   It should be noted that during the second night of testing, it was discovered that several participants (33) were not secreting insulin due to diabetes. It was decided not to exclude these participants in that it would be useful to compare these participants with non-diabetic participants with respect to small furry animal phobia.”

II Results

A. This section contains all of the results, but no conclusions.
1. order: Descriptive statistics first, Tests with Demographic Variables second, and Inferential statistics second.

B. Descriptive Data: Here we present the means, standard deviations, and ranges for all variables (unless already provided in the Methods section as was done here).

C. Data Analysis Plan.
- Before you do your data analysis it is always good to develop an analysis plan that outlines all of the associations that must be tested and identifies the appropriate statistics for testing each association.
- Deciding which test to use can simplified by following these general procedures.
  a. decide what type of data you have. Are the variables Discrete (groups) or Continuous.

---Discrete Variables = Mutually Exclusive/Exhaustive Numerical Categories that can’t be broken down in to finer units (e.g., if sex is represented by 1: male and 2: female, there is no 1.5).

All Nominal and Ordinal Variables are Discrete. However, many Ordinal variables will be treated as continuous (e.g., the Numerical rating scales are often averaged to form a single score which is treated as continuous).

---Continuous Variables = Numerical systems where there are an infinite number of possible points between each unit. Also the measurements can be broken down into finer units (e.g., elapsed time: Years, Months, Days, Hours, Minutes, Seconds, Milliseconds, Nanoseconds, etc.).

b. Decide what types of variables you are comparing and select the appropriate statistic.

One Discrete Variable = \( P^2 \) (Pearson’s Chi Square). Allows us to test whether the group frequencies differ from chance patterns (base rate frequencies: the frequency for which instances naturally occur in the environment). \((df = k - 1)\), where \( k \) = the number of groups.

- Need to report the statistic & the group frequencies.

\[ P^2(df=?, n=?)= ?.??, \ p < ?. \]

Group 1 \( n = ? \), Group 2 \( n = ? \)

Two Discrete Variables = two way \( P^2 \) (Pearson’s Chi Square). Allows us to test whether the cross tabulation pattern of two nominal variables differs from the patterns expected by chance. If one variable is ordinal then \( t \) or \( F \) are normally used. \((df = (R-1)(C-1))\) where \( R \) = # groups in variable 1 & \( C \) = # of groups in variable 2.

- Need to report the statistic & present the cross-tabulation matrix in a table.

\[ P^2(df=?, n=?)= ?.??, \ p < ?. \] See page 17, Table 2, of sample paper for an example of a cross-tabulation matrix table.

One Discrete Variable & One Continuous Variable
--If Discrete variable has 2 groups or give one group the same measure twice, use \( t \)-tests.

a. 2 groups = Independent Sample \( t \)-test. Allows us to determine whether two group means are significantly different from one another. \((df = n - 2)\)

- Need to report statistic & means and standard deviations for each group.

\[ t(n-2) = ?.??, \ p < ?. \]

Group 1 \( M(SD) = ? (?) \), Group 2 \( M(SD) = ? (?) \)

b. 1 group measured twice = Repeated Measures \( t \)-test. Allows us to determine if the average score at time 1 is significantly different from the average score at time 2. \((df = n - 1)\)
- Need to report statistic & means and standard deviations for each time.
  \( t(n-1) = .???, \ p < .?? \)
  Time 1 \( M(SD) = ? \ (??) \), Time 2 \( M(SD) = ? \ (??) \)

--If Discrete variable has 3 or more groups = **One Way ANOVA**:
Anova tests whether 1 (or more) group mean is significantly different are significantly different from at least one other group mean.

  - Need to report statistic & means and standard deviations for each group.
  \( F(df_{btw},df_{w/in}) = .???, \ p < .?? \). Note. \( df_{btw} = \) Number of grps - 1
  \( df_{w/in} = (N - df_{btw}) -1 \)
  Group 1 \( M(SD) = ? \ (??) \), Group 2 \( M(SD) = ? \ (??) \), Group j
  \( M(SD) = ? \ (??) \).

- When using 2 groups \( F = t^2 \).
  – If the groups are really one group assessed at multiple times, then a repeated measures ANOVA is called for, but that is beyond the scope of this handout.

**One Continuous Variable** = Single Sample \( t \)-test. Allows us to test whether our sample mean is significantly different from some known population mean. \( (df = n - 1) \).

  - Need to report statistic & means and standard deviations for sample and population and sample standard deviation.
  \( t(n-1) = .???, \ p < .?? \)
  Sample \( M(SD) = ? \ (??) \), Population \( M = ? \).

**Two Continuous Variables** = Pearson’s Correlation Coefficient \( r \) = Allows us to test the strength of the association between two continuous variables. It represents a ratio of the Covariance (variance shared by two variables) and the total variance (covariance + unique variance). \( df = n-2 \)

  - Need to report the statistic. \( r(n-2) = .???, \ p < .?? \)

D. Demographic Variables: Here we establish whether or not your demographic variables are contributing to the differences we find in the Independent and Dependent Var.'s.

1. Demographic Variables: Age (continuous), gender (discrete), ethnicity (discrete), relationship status (discrete), class rank (discrete), GPA (continuous), etc.
2. Main Variables: Bile production rate (continuous), Insulin production rate (continuous), diabetics vs. non-diabetics (discrete), Pit Sweat volume change (continuous), Pit sweat increase vs. no pit sweat increase (discrete), the NATSFA (continuous), or the AISFA (continuous) measures).

  e.g. “A series of preliminary analyses were conducted to test the associations between demographic variables (Age, gender, ethnicity, relationship status, class rank, GPA) and the main variables of interest (bile production rate, insulin production rate, diabetics vs. non-diabetics, Pit Sweat volume change, Pit sweat increase vs. no pit sweat increase, and the RABIT subscales NATSFA and AISFA).”

Example -
1. Demographic Variable Tests :
   Age (continuous)
   \( r(118) = .???, \ p < .?? \)
   diabetics vs. non-diabetics (discrete)
   \( t(118) = .???, \ p < .?? \)
   Diabetic \( M \ (SD) = ? \ (??) \)
   Non-Diabetic \( M \ (SD) = ? \ (??) \)
Pit Sweat volume change (continuous) \( r(118) = .??, p < .?? \)
Pit sweat change vs. no pit sweat change (discrete) \( t(118) = .???, p < .?? \)
  Pit Sweat Change \( M (SD) = ? (? \)
  No Pit Sweat Change \( M (SD) = ? (? \)

RABIT subscales
  NATSFA (continuous) \( r(118) = .??, p < .?? \)
  AISFA (continuous) \( r(118) = .??, p < .?? \)

Gender (Discrete)
  insulin production rate (continuous) \( t(118) = .??, p < .?? \)
  diabetics vs. non-diabetics (discrete) \( P^2(df=1, n=120)= ?, p < ? \)
    Diabetics = # of Males, # of Females
    Non-Diabetics = # of Males, # of Females
  Pit Sweat volume change (continuous) \( t(118) = .??, p < .?? \)
    Males \( M (SD) = ? (? \)
    Femals \( M (SD) = ? (? \)
  Pit sweat change vs. no pit sweat change (discrete) \( P^2(df=1, n=120)= ?, p < ? \)
    Pit sweat change group = # of Males, # of Females
    No pit sweat change group = # of Males, # of Females

RABIT subscales
  NATSFA (continuous) \( t(118) = .??, p < .?? \)
    Males \( M (SD) = ? (? \)
    Femals \( M (SD) = ? (? \)
  AISFA (continuous) \( t(118) = .??, p < .?? \)
    Males \( M (SD) = ? (? \)
    Femals \( M (SD) = ? (? \)

Ethnicity (Discrete)
  insulin production rate (continuous) \( F(5, 114) = .?, p < .? \)
    African American \( M (SD) = ? (? \)
    Asian/Pacific Islander \( M (SD) = ? (? \)
    American Indian \( M (SD) = ? (? \)
    Hispanic/Latino \( M (SD) = ? (? \)
    Caucasian \( M (SD) = ? (? \)
    Other \( M (SD) = ? (? \)
  diabetics vs. non-diabetics (discrete) \( P^2(df=5, n=120)= ?, p < ? \)
    Diabetics = # in each ethnic group
    Non-Diabetics = # in each ethnic group
  Pit Sweat Volume Change (continuous) \( F(5, 114) = ?, p < .? \)
    African American \( M (SD) = ? (? \)
    Asian/Pacific Islander \( M (SD) = ? (? \)
    American Indian \( M (SD) = ? (? \)
    Hispanic/Latino \( M (SD) = ? (? \)
    Caucasian \( M (SD) = ? (? \)
    Other \( M (SD) = ? (? \)
  Pit sweat change vs. no pit sweat change (discrete) \( P^2(df=5, n=120)= ?, p < ? \)
    Pit sweat change = # in each ethnic group
    No pit sweat change = # in each ethnic group

RABIT subscale
  NATSFA (continuous) \( F(5, 114) = ?, p < .? \)
    African American \( M (SD) = ? (? \)
    Asian/Pacific Islander \( M (SD) = ? (? \)
    American Indian \( M (SD) = ? (? \)
    Hispanic/Latino \( M (SD) = ? (? \)
    Caucasian \( M (SD) = ? (? \)
$\text{Other } M (SD) = ? (\?)$

\text{AISFA (continuous)} $F(5, 114) = ?, p < ?$

$\text{African American } M (SD) = ? (\?)$

$\text{Asian/Pacific Islander } M (SD) = ? (\?)$

$\text{American Indian } M (SD) = ? (\?)$

$\text{Hispanic/Latino } M (SD) = ? (\?)$

$\text{Caucasian } M (SD) = ? (\?)$

$\text{Other } M (SD) = ? (\?)$

\text{Relationship Status (Discrete)}

\text{insulin production rate (continuous)} $F(3, 116) = ?, p < ?$

$\text{Single } M (SD) = ? (\?)$

$\text{Engaged } M (SD) = ? (\?)$

$\text{Married } M (SD) = ? (\?)$

$\text{Divorced } M (SD) = ? (\?)$

$\text{diabetics vs. non-diabetics (discrete)} \chi^2(df=3, n=120)= ?, p < ?$

\text{Diabetics = # in each relstat group}$

$\text{Non-diabetics = # in each relstat group}$

\text{Pit Sweat Volume Change (continuous)} $F(3, 116) = ?, p < ?$

$\text{Single } M (SD) = ? (\?)$

$\text{Engaged } M (SD) = ? (\?)$

$\text{Married } M (SD) = ? (\?)$

$\text{Divorced } M (SD) = ? (\?)$

$\text{Pit sweat change vs. No pit sweat change (discrete)} \chi^2(df=3, n=120)= ?, p < ?$

\text{Pit sweat change = # in each relstat group}$

$\text{No pit sweat change = # in each relstat group}$

\text{RABIT subscales}$

\text{NATSFA (continuous)} $F(3, 116) = ?, p < ?$

$\text{Single } M (SD) = ? (\?)$

$\text{Engaged } M (SD) = ? (\?)$

$\text{Married } M (SD) = ? (\?)$

$\text{Divorced } M (SD) = ? (\?)$

\text{AISFA (continuous)} $F(3, 116) = ?, p < ?$

$\text{Single } M (SD) = ? (\?)$

$\text{Engaged } M (SD) = ? (\?)$

$\text{Married } M (SD) = ? (\?)$

$\text{Divorced } M (SD) = ? (\?)$

\text{Class Rank (Discrete)}

\text{insulin production rate (continuous)} $F(3, 116) = ?, p < ?$

$\text{Freshmen } M (SD) = ? (\?)$

$\text{Sophomores } M (SD) = ? (\?)$

$\text{Juniors } M (SD) = ? (\?)$

$\text{Seniors } M (SD) = ? (\?)$

$\text{diabetics vs. non-diabetics (discrete)} \chi^2(df=3, n=120)= ?, p < ?$

$\text{Diabetics = # in each class}$

$\text{Non-Diabetics = # in each class}$

$\text{Pit Sweat Volume Change (continuous)} $F(3, 116) = ?, p < ?$

$\text{Freshmen } M (SD) = ? (\?)$

$\text{Sophomores } M (SD) = ? (\?)$

$\text{Juniors } M (SD) = ? (\?)$

$\text{Seniors } M (SD) = ? (\?)$

$\text{Pit sweat change vs. no pit sweat change (discrete)} \chi^2(df=3, n=120)= ?, p < ?$

$\text{Pit sweat change = # in each class}$

$\text{No pit sweat change = # in each class}$
RABIT subscales

NATSFA (continuous) \[ F(3, 116) = ?, p < ? \]
- Freshmen \( M (SD) = ? (?) \)
- Sophomores \( M (SD) = ? (?) \)
- Juniors \( M (SD) = ? (?) \)
- Seniors \( M (SD) = ? (?) \)

AISFA (continuous) \[ F(3, 116) = ?, p < ? \]
- Freshmen \( M (SD) = ? (?) \)
- Sophomores \( M (SD) = ? (?) \)
- Juniors \( M (SD) = ? (?) \)
- Seniors \( M (SD) = ? (?) \)

- **Note:** \( F \)'s are used instead of \( t \)'s for the variables Ethnicity, Relationship Status, and Class Rank because these variables have more than 2 levels (groups).

E. Main Analyses: Here we restate the hypotheses between the main variables (describe your hypotheses with respect to the relationships between variables and scores), tell what statistics were used to test this hypothesis, and then give the results of the test, and describe the behavior.

- **e.g.**
  1. Hypothesis: it was hypothesized that high levels of insulin production would be associated with reporting greater animal avoidance.
     - Test:
       \[
       \text{Insulin Production (continuous) x NATSFA (continuous)} \quad r(118) = .??, p < .??
       \]
  2. Hypothesis: it was hypothesized that high levels of insulin production would be associated with greater pit sweat volume change.
     - Tests:
       \[
       \text{Insulin Production (continuous) x Pit Sweat Volume Change (continuous)} \quad r(118) = .??, p < .??
       \]
       \[
       \text{Insulin Production (continuous) x Pit sweat change vs. No pit sweat change (discrete)} \quad t(118) = .??, p < .??
       \]
       \[
       \text{Pit sweat change} \quad M (SD) = ? (?)
       \]
       \[
       \text{No pit sweat change} \quad M (SD) = ? (?)
       \]
  3. Hypothesis: Since diabetics participants had no pancreatic secretions, it was hypothesized that diabetic participants would report lower levels of animal avoidance and lower levels of tongue licking behavior, compared to non-diabetic participants.
     - Tests:
       \[
       \text{Diabetic vs. non-diabetics (discrete) x NATSFA (continuous)} \quad t(118) = .??, p < .??
       \]
       \[
       \text{Diabetic Mean RABIT score} \quad M = ?, SD = ?
       \]
       \[
       \text{Non-diabetic Mean RABIT score} \quad M = ?, SD = ?
       \]
       \[
       \text{Diabetic vs. non-diabetics (discrete) x Pit sweat volume change (Continuous)} \quad t(118) = .??, p < .??
       \]
       \[
       \text{Diabetic Mean Tongue Lick Frequency} \quad M = ?, SD = ?
       \]
       \[
       \text{Non-diabetic Mean Tongue Lick Frequency} \quad M = ?, SD = ?
       \]
       \[
       \text{Diabetic vs. non-diabetics (discrete) x Pit sweat change vs No pit sweat change (discrete)} \quad \chi^2(df=1, n=120) = ?, p < ?
       \]
       \[
       \text{Diabetics = # of pit sweat change participants, # of No pit sweat change participants}
       \]
       \[
       \text{Non-diabetics = # of pit sweat change participants, # of No pit sweat change participants}
       \]
F. When you have a series of similar tests it may be best to represent them in a table. You will still
need to describe the relationships between the variables of interest, but you do not need to include
the numbers because they will be contained within the table.

For example, many of the means and group frequencies presented above could be
combined into a series of tables.