PNB 2XE3: Descriptive Statistics
Syllabus

Instructor
Nikol Piskuric, Ph.D.
Department of Psychology, Neuroscience & Behaviour, PC-108
piskurn@mcmaster.ca

Office hours
Wednesdays 2:30 – 3:30 PM, PC-108
Alternately, please post your questions on the “Lecture Questions” discussion board in Avenue. Other students will likely have the same question and will benefit from seeing the answer! The TAs and I will monitor discussion boards regularly and try to answer posts within 48 hrs. Note: there is no guarantee that I will answer questions posted after 5:00 PM the day before tests.

Emails must be sent from your McMaster address and must include the term “PNB 2XE3” in the subject heading. Emails sent from other accounts or lacking an appropriate subject may not be answered.

Teaching Assistants
Lecture TA: Juliana Kent (loureij@mcmaster.ca)
Lab TAs: Sarah Creighton (creigths@mcmaster.ca)
Nadia Wong (wongnp@mcmaster.ca)
Aaron Morrow (morroa3@mcmaster.ca)
Fiona Manning (manninfc@mcmaster.ca)
Onkar Marway (marwayos@mcmaster.ca)

Course Website
All lectures, supplementary readings, assignments, and course communication will be distributed on the Course Shell in Avenue to Learn (avenue.mcmaster.ca). Please check this site regularly for updates.

Course Description
Students will learn descriptive, graphical, and exploratory data analysis. We will also discuss hypothesis testing and hypothesis tests applied to means.

Intended Learning Outcomes
By the end of this course, students should be able to:
1. Distinguish between a statistic of a sample and a parameter of a population.
2. Describe distributions in terms on their shape and variability.
3. Interpret and create graphical displays of data, including stem-and-leaf displays, histograms, scatterplots and boxplots.
4. Compute the correlation coefficient (r) between two variables as well as the regression line that predicts one variable from another.
5. Devise null and alternate hypotheses related to specific research questions.
6. Make rational decisions about hypothesis tests (e.g. one- versus two-tailed, choosing alpha).
7. Distinguish between z-tests and t-tests, and apply the correct test where appropriate.
8. Manipulate data (e.g. sort, arrange into tables) in Excel and use formulae to calculate descriptive statistics on these data.
9. Create histograms and scatterplots in Excel, and boxplots in SPSS.
Prerequisites
Registration in an Honours Psychology, Neuroscience & Behaviour or Combined Honours Psychology program

Antirequisites
PSYCH 2RA3, 2RR3. Not open to students with credit or registration in ISCI 2A18 or STATS 2B03.

Course Format
This course consists of 2 50-minute lectures and 1 2-hr lab/tutorial per week.

Lectures  Mon, Wed  13:30 – 14:20  MDCL/1105
T01       Wed  09:30 – 11:20  KTH/B123  Aaron
T01       Tues  14:30 – 16:20  KTH/B123  Nadia
T03       Mon  09:30 – 11:20  KTH/B123  Sarah
T04       Fri  14:30 – 16:20  KTH/B123  Fiona
T05       Mon  15:30 – 17:20  KTH/B123  Onkar

Textbook
*Note: this text will also be used for PNB 3XE3.*

Software
We will use Excel and SPSS, both of which are available in all McMaster computer labs (open 7 days a week, check online for hours). Lab locations are as follows:
BSB 241/242/244/249  KTH B121/B123  JHE 233A/234

iClickers
Classroom response systems will be used in lectures. Students should purchase an iClicker at the Campus Bookstore (McMaster's main bookstore), *register their iClicker using their MacID*, and bring it to every class. iClicker questions will serve as real-time feedback for students and the Instructor. *Note that the use of another student's iClicker constitutes academic dishonesty and will result in a grade penalty.*

Throughout the course, we will use the iClicker system to generate data for use in computer labs. All such data will remain confidential and will be anonymized (i.e. not linked to your MacID). Data collected will solely be used for instructional purposes, and will not be distributed or reproduced. You are not required to answer any questions that make you feel uncomfortable.

Course Assessment  (%)  
Pre-labs + labs     20  (8 @ 2.5% each)  
Lab Quiz           5   (2 hr computer test)  
iClicker participation 5  
Midterms        30  2 @ 15% each (in class)  
Final Exam       40  (cumulative)

Pre-labs
Each week, the Instructor will post onto Avenue (1) a computer-based assignment and (2) a set of practice questions derived from the Howell text. These exercises will serve as the topic of the weekly lab. Prior to attending each lab, students are expected to complete the practice questions as well as to (at least) familiarize themselves with the computer assignment. Students will be required to submit a portion of the practice questions and/or the computer assignment at
the beginning of each lab; this will serve as the pre-lab assignment. Pre-labs will be graded by the TAs, and will be worth a portion of your weekly lab grade. The purpose of the pre-lab is to help students maintain a study schedule, and to make lab time more constructive.

Labs
Students are required to attend their assigned weekly labs. The purpose of the labs is to (1) introduce students to statistical software (Excel and SPSS), and (2) reinforce class content through problem sets and student discussions.

1. Computer portion
The computer assignments are designed to introduce students to statistical software (Excel and SPSS), and to teach data handling techniques that will be helpful in future courses/research. Your TAs will guide you through parts of the computer assignment during the first 30-60 min of each lab; you are required to complete the rest of the lab on your own time, as practice, and in preparation for the lab test. (On your own time, you may find the “Help” feature in Excel very “help”ful.)

2. Tutorial portion
During the second portion of the tutorial, TAs will discuss the practice questions, and review important concepts from that week’s lectures. This is a great time to ask questions and get help!

Lab quiz
The final lab will be a 2-hr lab test, during which students will complete a modified version of one of the 8 computer assignments assigned throughout the term. Students may bring a sheet of formulae or personal notes. The completed lab will be due at the end of the lab session, and will be graded by the TAs for 5% of your final grade.

Midterms and Exams
Midterms will be multiple-choice. Exams will be multiple-choice and may include short answer and calculation questions. You must bring with you (1) a McMaster-approved calculator (Casio fx991), (2) pencils and erasers suitable for multiple-choice scan sheets, and (3) your McMaster student ID card to the exams. Sheets with formulae (if required) will be supplied for you.

Missed Work Policy
For absences from classes lasting up to 5 days due to a minor medical situation:
Using the McMaster Student Absence Form (MSAF) on-line self-reporting tool, undergraduate students may report absences due to minor medical situations lasting up to 5 days and may also request relief for missed academic work worth less than 30% of the final grade. The submission of medical documentation is normally not required. Students may use this tool to submit a maximum of one request for relief of missed academic work per term. Students must immediately follow up with their course instructors regarding the nature of the relief. Failure to do so may negate the opportunity for relief. The MSAF on-line, self-reporting tool cannot be used to apply for relief for any final examination or its equivalent.

Students who (1) are absent for more than five days, (2) wish to submit more than one request for relief of missed academic work per term, (3) are absent for reasons other than a medical situation, or (4) missed work worth 30% or more of their grade, cannot use the MSAF tool to request relief. They MUST report to their Faculty Office to discuss their situation and may be required to provide appropriate supporting documentation. If warranted, students will be approved to use a discretionary version of the MSAF on-line, self-reporting tool.

For absences from classes lasting more than five days, for work worth 30% or more, or for the reporting of more than one request for relief per term:
If the reason was medical, the approved McMaster University Medical Form covering the relevant dates must be submitted. The student must be seen by a doctor at the earliest possible date, normally on or before the date of the missed work and the doctor must verify the duration of the illness. Relief will not be considered for minor illnesses. If the reason is non-medical, appropriate documentation with verifiable origin covering the relevant dates must be submitted, normally within five working days. In some circumstances, students may be advised to submit a Petition for Special Consideration (Form A) seeking relief for missed academic work. In deciding whether or not to grant a petition, adequacy of the supporting documentation, including the timing in relation to the due date of the missed work and the degree of the student's incapacitation, may be taken into account. If the petition is approved the Faculty Office will notify the instructor(s) recommending relief. The student must contact the instructor promptly to discuss the appropriate relief. Failure to do so may negate the opportunity for relief. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.

**Missed Labs**
If a student misses a lab, the weight of that lab will be redistributed among the other labs. Students who miss more than 2 labs will have to complete a make-up assignment.

**Missed Lab Quiz**
Students who miss the lab quiz will be required to complete a make-up lab quiz. No student will be exempt from completing the lab quiz, regardless of whether the MSAF was submitted.

**Missed Midterms**
If a student misses a midterm, the weight of the midterm will be reallocated to the final exam. If a student misses both midterms, the student will be required to complete a 1 hr oral examination with the instructor and Lecture TA.

**Seeking Help**
Please ask the course Instructor or TAs for help at any time if you need it. As a learner, it is your responsibility to recognize when you need help and then ask for it.

**Student Services**
A number of services are available on campus to assist students. Students are encouraged to visit the Student Wellness Centre (http://wellness.mcmaster.ca) for mental and/or physical health related issues, or the Student Accessibility Centre (http://sas.mcmaster.ca/) for academic or disability-related needs.

**Academic Dishonesty**
Academic dishonesty consists of misrepresentation by deception or by other fraudulent means, and can result in serious consequences for a student such as the grade of zero on an exam or assignment, loss of course credit with a notation on the student’s transcript that reads “Grade of F assigned for academic dishonesty”, and/or suspension or expulsion from McMaster University. It is your responsibility to understand what constitutes academic dishonesty. For example, plagiarism, improper collaboration, copying and/or use of unauthorized aids in tests and examinations (i.e. cheating) are just a few forms of academic dishonesty. For more information on academic integrity and the various kinds of academic dishonesty, please refer to McMaster’s Academic Integrity Policy located at http://www.mcmaster.ca/academicintegrity.

**Notice of changes to course structure**
The university reserves the right to modify elements of the course during the term. The
university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

The professor reserves the right to change any and all course requirements if the need should arise. Any change in the course requirements will be posted on the webpage, and the details will be announced in class. Any concerns about announced changes should be addressed with the professor as soon as the changes are announced.

**Important Dates**

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes begin</td>
<td>Monday, January 5</td>
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<tr>
<td>Last day for registration and drop/add</td>
<td>Tuesday, January 13</td>
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<tr>
<td>Mid-term recess</td>
<td>Monday, February 16 – Saturday, February 21</td>
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<tr>
<td>Last day for cancelling classes</td>
<td>Friday, March 13</td>
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<tr>
<td>Text and exam ban</td>
<td>Wednesday, April 1 – Wednesday, April 8</td>
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<tr>
<td>Last day of classes</td>
<td>Wednesday, April 8</td>
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<tr>
<td>Exams</td>
<td>Friday, April 10 – Thursday, April 30</td>
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**Grades**

Grades obtained in LIFE SCI 2B03 will be converted according to the following scheme, which is in general use at McMaster University.

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 100%</td>
<td>A+</td>
<td>12</td>
</tr>
<tr>
<td>85 – 89%</td>
<td>A</td>
<td>11</td>
</tr>
<tr>
<td>80 – 84%</td>
<td>A-</td>
<td>10</td>
</tr>
<tr>
<td>77 – 79%</td>
<td>B+</td>
<td>9</td>
</tr>
<tr>
<td>73 – 76%</td>
<td>B</td>
<td>8</td>
</tr>
<tr>
<td>70 – 72%</td>
<td>B-</td>
<td>7</td>
</tr>
<tr>
<td>67 – 69%</td>
<td>C+</td>
<td>6</td>
</tr>
<tr>
<td>63 – 66%</td>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>60 – 62%</td>
<td>C-</td>
<td>4</td>
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<tr>
<td>57 – 59%</td>
<td>D+</td>
<td>3</td>
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<tr>
<td>53 – 56%</td>
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<tr>
<td>50 – 52%</td>
<td>D-</td>
<td>1</td>
</tr>
<tr>
<td>0 – 49%</td>
<td>F</td>
<td>0</td>
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# List of Topics

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Assessment</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 5</td>
<td>Introduction &amp; basic concepts</td>
<td></td>
<td>Ch. 1-2</td>
</tr>
<tr>
<td>2</td>
<td>Jan 12</td>
<td>Displaying data; measures of central tendency</td>
<td>Lab 1: Where’s Waldo – Histograms</td>
<td>Ch. 3-4</td>
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<tr>
<td>3</td>
<td>Jan 19</td>
<td>Measures of variability</td>
<td>Lab 2: Aliens – Means, medians and modes</td>
<td>Ch. 5</td>
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<tr>
<td>4</td>
<td>Jan 26</td>
<td>Correlation</td>
<td>Lab 3: Hamilton Weather – Boxplots</td>
<td>Ch. 9-10</td>
</tr>
<tr>
<td>5</td>
<td>Feb 2</td>
<td>Regression</td>
<td>Midterm 1 (Feb. 4)</td>
<td>Ch. 10 cont’d</td>
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<tr>
<td>6</td>
<td>Feb 9</td>
<td>The normal distribution</td>
<td>Lab 4: Word Recall – Scatterplots, $r^2$ and regression</td>
<td>Ch. 6</td>
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<tr>
<td></td>
<td>Feb 16</td>
<td>Reading week – no classes</td>
<td></td>
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<tr>
<td>7</td>
<td>Feb 23</td>
<td>Basic concepts of probability</td>
<td>Lab 5: The normal distribution</td>
<td>Ch. 7</td>
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<tr>
<td>8</td>
<td>Mar 2</td>
<td>Sampling distributions and hypothesis testing</td>
<td>Lab 6: Food preference survey – probability</td>
<td>Ch. 8</td>
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<tr>
<td>9</td>
<td>Mar 9</td>
<td></td>
<td>Lab 7: Nerd Survey – Central Limit Theorem Midterm 2 (Mar. 11)</td>
<td>Ch. 8 cont’d</td>
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<tr>
<td>10</td>
<td>Mar 16</td>
<td>Hypothesis tests applied to means: One sample</td>
<td>Lab 8: Politics – z- and t- tests</td>
<td>Ch. 12</td>
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<tr>
<td>11</td>
<td>Mar 23</td>
<td>Hypothesis tests applied to means: Two related samples</td>
<td>Lab Test</td>
<td>Ch. 13</td>
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<td>12</td>
<td>Mar 30</td>
<td>Hypothesis tests applied to means: Two independent samples</td>
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<td>Ch. 14</td>
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<td>13</td>
<td>April 6</td>
<td>Spillover topics</td>
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