PSYD33H3F L03 Current Topics in Clinical Psychology

Topic: Mobile Technology in Mental Health Research

Class Time and Location: Mondays 1:00-3:00pm, HL 008

Instructor:
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Office Hours:
Mondays 10:30 – 11:30am, Room SW132H
Other times by appointment

Course Overview: Believe it or not, your smartphone will be an important part of assessing and treating mental disorders in the near future. Researchers are using mobile sensing technology to continuously track and estimate people's mental health, helping clinicians and researchers understand more about different conditions and symptom dimensions. The insight garnered by these applications could be used to develop "just-in-time" interventions, delivered through an individual's smartphone. This course provides an introduction to research design and methods for non-invasive mental health monitoring using smartphones and wearable sensors. Students will learn about ecological momentary assessment approaches and their integration and advancement with smartphone mobile sensing technology. Students will gain a practical understanding of mobile monitoring approaches as they relate to mental health, including the delivery of mobile health (mHealth) interventions. Topics include estimating mental health correlates using technology, basic issues in smartphone application design and development, emerging issues in mental health, and learning to write research designs and proposals. The course assumes a background in abnormal psychology.

Course Objectives: Using readings, activities, lectures, and assignments, I hope that by the end of this course, you will:

- have a basic understanding of mobile technology and its applications to mental health
- be able to generate and test hypotheses related to issues in mental health
- write, explain, and disseminate research findings to a general audience
- understand issues related to mobile data collection, including ethics, inferences, and limitations

Course Web Site: A Quercus web site will be devoted to the course. The syllabus, related course material, and various assignments will be posted through the class website. Course readings are posted on the Resources page on Collab. There is no textbook for the course.

Prerequisites: [PSYB07H3 or STAB22H3 or STAB23H3] and PSYB32H3 and [0.5 credit at the C-level in PSY courses]. Exclusion: PSY440H.

Expectations: You are expected to: (a) come to class regularly, participate in class discussions and assignments; (b) complete all assignments on time; and (c) be ready to engage in the design and hypothesis testing of a real mHealth project with your classmates. You are expected to complete reading assignments *before* class meets**.** During class, I encourage you to ask questions about concepts that are unclear, or share examples that you think are relevant to the lecture. Outside of class, I encourage you to take advantage of office hours (or by appointment) to discuss any questions/concerns, or to discuss notes you have obtained from a classmate after missing class. E-mail is the best way to contact me outside of class**.**

EVALUATION AND ASSESSMENT:

Method of Evaluation	Weight
Reflection Papers (four submitted in total)	10%
Presentation of Readings/Facilitating Discussion	20%
Midterm Group Project, including presentation	20%
Final Individual Project: Literature Review, Presentation, and Research Proposal	35%
Participation/Attendance	15%

Pass/Fail: If you are taking the course on the Credit/No Credit option, you must receive at least a "C-" to receive credit for the course. This option must be elected during the Add period.

Reflection Papers: Students will write four response papers that *reflect* on class discussions and papers presented each week. Each reading response is worth 10 points and can be submitted until the final class (the earlier, the better). Reflection papers will consist of a few paragraphs (no more than 2 pages, double-spaced) that reflect original thoughts on one or more of the readings and discussions in class. Reflections *should not be summaries of the readings*, but should reflect your original thoughts regarding questions, implications, theory's strengths or weaknesses, weaknesses in research methodology, comparison of ideas between articles, or other thoughts about any of the readings for a particular week. Grading will be based on depth of thought, originality, and writing style (marked out of 10). Note: You are expected to complete assigned readings regardless of whether there is a reading response due on that date.

Presentation of Readings/Activities: On most weeks, the first hour will be set aside to discuss the readings that were assigned. Two-to-three students will prepare a 45-minute presentation based on readings from one of the weeks listed below (a sign-up sheet will be passed around). Student(s) will be responsible for summarizing the readings for the class and facilitating class discussion, including at least one activity that can get students involved in the discussion (either as small groups or the large group as a whole). Examples include demos of apps/websites/tools for research, writing activities, brainstorming, etc. Student(s) can locate additional articles or news reports to present alongside the assigned articles to engage the class as long as they relate to at least one of the article in that week. The instructor is more than happy to help provide feedback on planned activities and can photocopy materials. Grading will be based on content, preparedness, discussion of implications and limitations, and ability to facilitate class discussion (50 points total). The rest of the class will help facilitate discussion – to do this, try to read at least two of the papers per week (all of them if you can!).

Midterm Group Project: The group project involves finding a mental health related mobile app on the App Store/Google Play Store and coming up with a proposal that seeks to validate what the app intends to do, or accomplish. For example, if the mobile app suggests that it can increase your mindfulness skills within 4 weeks, you will design a study that takes full advantage of mobile technology to do this, using your background in psychology and research methods, and what you are learning in class. You will be placed into teams of 4-6 people and challenged to submit a group-based report (no more than 15 pages main text) consisting of an Introduction, Hypotheses, Proposed Methodology/Design, Expected Results (tie back to hypotheses), Implications/Future Directions, and References sections. Groups are encouraged to play around with the app and potentially even collect their own data pertaining to the use of the mobile application in order to propose how they will specifically study how the application can improve mental illness symptoms (e.g., perhaps it helps you sleep better, improves mood or ability to reappraise). You can append these materials to the group project report as pilot data. Groups will choose what the best population might be to study the mobile application (e.g., students or clinical samples, specific disorders, etc.). Before the paper is due, each group will present their proposed projects in slideshow format, which will allow the class and instructor to give you feedback and suggestions (groups present on October 22, see schedule below).

Although members of each team will receive the same grade, I will use my judgment if it appears that individual students have not contributed as much. I will provide you with a Research Prep Worksheet and Project Outline document that can be used to outline your projects. Research topics and proposals should reflect something that is NOT an exact replication of another study that has been done (though it is recommended that you use previous research in the area to help you develop your idea). See the course schedule in this syllabus for due dates for each component of the group project. The In-Class Presentation is expected to last approximately 15-20 minutes, and should cover some relevant background (i.e., the

app and its focus), hypotheses, proposed methods/results, and potential implications/limitations (each group member is expected to present some aspect of the talk). Submitted with the assignment, should be a breakdown of how each member of the group participated in the group assignment (non-formal/bullet points is fine). All group project components will be penalized 5 points for every day they are late, and components more than one week late will not be accepted.

The point breakdown of the group project will be as follows: Research Prep Worksheet and Project Outline (20 points), Final Paper (60 points), Presentation (40 points), and Peer Review Ratings (averaged, 20 points).

Individual Project: The end of term individual project involves studying a particular mental health condition or symptom dimension in more depth, eventually cumulating in a literature review and study proposal that targets a specific mental disorder through assessment, treatment, or both. Each student will start by selecting a topic and conducting a literature review on the use of technology within their chosen condition. Before the end of the course, you will get a chance to give a brief presentation on your disorder of interest, 1-2 interesting studies you found on the topic, and proposed ideas for a study that involves mobile technology.

(a) Literature Review: Students will first be tasked with selecting a particular condition that they would like to study further using mobile health methods. Examples of mental health conditions include: Major Depressive Disorder, Persistent Depressive Disorder (Dysthymia), Bipolar Disorder (I or II), Social Anxiety Disorder, Posttraumatic Stress Disorder, Generalized Anxiety Disorder, Autism Spectrum Disorders, Eating Disorders (Anorexia, Bulimia, Binge Eating), Obsessive Compulsive Disorder, Borderline Personality Disorder, Alcohol Abuse/Dependence, and Schizophrenia. Students can also consider disorders that affect children, dimensions of mental illness (e.g., affective instability, mania, compulsive behaviors, psychopathy), and conditions that are highly comorbid with mental disorders may also be suitable (e.g., obesity, traumatic brain injury, diabetes), but please consult with the instructor to ensure adequate mental health applications. *The goal is to have as many different topics as possible to make the final presentations more diverse and interesting.*

(b) *Brief* presentation on Proposed Study: Each student presentation is expected to last approximately 10-12 minutes, and should cover your disorder of interest (e.g., DSM criteria or how your symptom dimension is tied to multiple mental disorders), 1-2 interesting studies you found in your literature search related to mobile technology, the proposed question for your individual project, and how mobile technology may uniquely contribute to your proposed study. Because of class size, this presentation will need to be brief and to the point (e.g., avoid specific details about the methods/stats but do get specific about what you are focusing on for your project). Try to limit your presentation to 10 minutes and 10 slides. This will simplify the presentation and allow the class to provide feedback on your proposal, which will ultimately aid in your final write-up. Note, you should have more references in your final proposal (see below).

(c) Research Proposal: The last portion of the individual project involves incorporating a research question into a proposal involving the mental health disorder of interest. Your paper (15 pages double spaced, main text) will consist of the following components: (a) critical literature review of your mental health topic, as well as any research involving applications of mobile technology; and (b) unanswered questions and how future work in mobile technology can improve our understanding of your mental health topic (e.g., ways that GPS/location information can further our understanding of alcohol use disorder). As a general guideline, roughly half of your paper (e.g., 8 pages) should be devoted to the literature review, whereas the other half should be devoted to mobile technology applications of your topic (e.g., 7 pages), including what issues mobile technology can help address and how it uniquely contributes to our understanding and/or treatment of that disorder. It is expected that you will have at least 10 primary research references in your final report.

The point breakdown of the individual project will be as follows: Paper (70 points), Presentation (40 points), Peer-review ratings (averaged, 20 points). The paper will be penalized 5 points for every day it is late and components more than one week late will not be accepted.

Participation/Attendance: The instructor will keep track of attendance and participation. Students will also be asked to provide peer review ratings during presentations, which will help provide additional feedback to presenters. Students should plan to attend all classes and discuss absences with the instructor. Additional mini-group activities might be assigned for the purpose of facilitating discussion and demonstrating certain themes within the course (e.g., try out an app and report back to the larger group on it).

COURSE SCHEDULE

Note: The schedule is subject to change; however, the instructor will consult with students should important changes to schedule be required. To find each reading, *use Google Scholar* and search the title of each reading. This will make it much easier to find the engineering papers.

Date/ Class	Topic and Readings	Assignments & Activities
Sep. 10 #1	**Introduction to mobile sensing, part 1: Overview** *Background Readings: A summary will be presented in class with additional content.* Mohr, Zhang, & Schueller (2017). Personal sensing: Understanding mental health using ubiquitous sensors and machine learning. *Annu. Rev. Clin. Psychol. 13*, 11.1–11.25. Onnela & Rauch (2016). Harnessing smartphone-based digital phenotyping to enhance behavioural and mental health. *Neuropsychopharmacology, 41*, 1691-1696. Singh et al. (2016). Many mobile health apps target high-need, high-cost populations, but gaps remain. *Health Affairs, 35,* 12, 2310-2318. Lui, Marcus, & Barry (2017). Evidence-based apps? A review of mental health mobile applications in a psychotherapy context. *Professional Psychology: Research and Practice, 48*(3), 199-210.	*Introductions* *Review syllabus* *Students rank their week to present readings (1st & 2nd choice)*
Sep. 17 #2	**Introduction to mobile sensing, part 2: Methods, research design, ethics** *Background Readings: A summary will be presented in class with additional content.* Wenze & Miller (2010). Use of ecological momentary assessment in mood disorders research. *Clinical Psychology Review, 30,* 794-804. Cuthbert & Insel (2013). Towards the future of psychiatric diagnosis: The seven pillars of RDoc. *BMC Medicine,* 11, e126. Luxton, Kayl, & Mishkind (2012). MHealth data security: The need for HIPAA-compliant standardization. *Telemedicine and eHealth, 18*, 284-288. Krontiris, Langheinrich, & Shilton (August 2014). Trust and privacy in mobile experience sharing: Future challenges and avenues for research. *IEEE Communications Magazine.*	Reflection Paper (if desired) *Re-Introductions/Finalize class list/Finalize week to present readings* *Students form groups for group assignment; start thinking about an app they would like to use for project.*
Sep. 24 #3	**Using mobile technology to make inferences about mental health, part 1: Mood/Depression/Anxiety** Rohani et al. (2018). Correlations between objective behavioral features collected from mobile and wearable devices and depressed mood symptoms in patients with affective disorders: Systematic review. *JMIR mHealth and uHealth, 6,* e165. Wang et al. (2017). StudentLife: Using smartphones to assess mental health and academic performance of college students. In J.M. Rehg et al. (Eds). *Mobile Health.* (Book Chapter) Boukhechba, M., Chow, P., Fua, K., Teachman, B. A., & Barnes, L. E. (2018). Predicting Social Anxiety From Global Positioning System Traces of College Students: Feasibility Study. *JMIR mental health, 5(3).*	Reflection Paper (if desired) Reading Presentation *Brainstorming on ways to test the mental health apps. Groups to start Project Prep Worksheet. Try to finalize app choice.*

	Chow et al. (2017). Using mobile sensing to test clinical models of depression, social anxiety, state affect, and social isolation among college students. *Journal of Medical Internet Research, 19*, e62.	
Oct. 1 #4	**Using mobile technology to make inferences about mental health, part 2: Anxiety/Schizophrenia/Bipolar Disorder** Place et al. (2017). Behavioral indicators on a mobile sensing platform predict clinically validated psychiatric symptoms of mood and anxiety disorders. *Journal of Medical Internet Research, 19*, e75. Faurholt-Jepsen et al. (2016a). Voice analysis as an objective state marker in bipolar disorder. *Translational Psychiatry, 6,* e856. *(compares manic to depressed states).* Faurholt-Jepsen et al. (2016b). Behavioral activities collected through smartphones and the association with illness activity in bipolar disorder. *International Journal of Methods in Psychiatric Research,* 25*,* 309-323. Wang et al. (September 2017). Predicting symptom trajectories of schizophrenia using mobile sensing. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, Vol. 1, No. 3, Article 110.*	Reflection Paper (if desired) Reading Presentation *Continued activities supporting the group project. Groups will have time to discuss projects.*
Oct. 8	FALL READING BREAK (no class)	*Have at least 1 reflection finished by this week.*
Oct. 15 #5	**Using mobile technology to make inferences about mental health, part 3: Sleep/Eating/Substance Use Disorders** Abdulla et al. (2017). Circadian computing: sensing, modeling, and maintaining biological rhythms. In J.M. Rehg et al. (Eds). *Mobile Health* (Book Chapter). Thomas, Essa, & Abowd (2015). A practical approach for recognizing eating moments with wrist-mounted inertial sensing. UbiComp '15 September 7-11, 2015 Osaka Japan. Rahman, Czerwinksi, Gilad-Bachrach, & Johns (2016). Predicting "About-to-Eat" Moments for Just-in-Time Eating Intervention. *Digital Health Conference Paper.* Cole et al. (2017). Detecting smoking events using accelerometer data from smartwatch technology: Validation study. *JMIR mHealth and uHealth,* 5(12), e189.	Reflection Paper (if desired) Reading Presentation *Activities: TBD*
Oct. 22 #6	Group project presentations (max. 6 groups; roughly 15-20 minutes each). ***Group project due on October 30th, end of day (11:59pm).***	Peer feedback form for group presentations completed online. *Have at least 2 reflections finished by this week.*
Oct. 29 #7	**Using social media to make inferences about mental health, part 1:** Marino, Gini, Vieno, & Spada (2018). The associations between problematic Facebook use, psychological distress and well-being among adolescents and young adults: A systematic review and meta-analysis. *Journal of Affective Disorders, 226,* 274-281.	Reflection Paper (if desired) Reading Presentation

	Al-Mosaiwi & Johnstone (2018). In an absolute state: Elevated use of absolutist words is a marker specific to anxiety, depression, and suicidal ideation. *Clinical Psychological Science, 6,* 529-542. Reece & Danforth (2017). Instagram photos reveal predictive markers of depression. *EPJ Data Science, 6*, e15. McClellan et al. (2017). Using social media to monitor mental health discussions - evidence from Twitter. *Journal of the American Medical Informatics Association, 24*(3), 2017, 496–502.	*Midterm course feedback* *Introduction to individual project. Search strategies for literature review.*
Nov. 5 #8	**Using social media to make inferences about mental health, part 2:** Holland & Tiggemann (2017). "Strong beats skinny every time": Disordered eating and compulsive exercise in women who post fitspiration on Instagram. *International Journal of Eating Disorders, 50*, 76-79. Twenge, Joiner, Rogers & Martin (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among US adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science, 6,* 3-17. De Choudhury, Gamon, Counts, & Horvitz (2013). Predicting depression via social media. *Proceedings from the 7th International AAAI Conference on Weblogs and Social Media.* De Choudhury et al. (2016). Discovering shifts to suicidal ideation from mental health content in social media. *CHI 2016 Conference Paper, May 07-12, 2016, San Jose, CA.*	Reflection Paper (if desired) Reading Presentation *Activities: TBD*
Nov. 12 #9	**Designing interventions for mobile delivery, part 1:** McCall, Richardson, Helgadottir, & Chen (2018). Evaluating a web-based social anxiety intervention among university students: Randomized controlled trial. *JMIR, 3,* e91. Furukawa et al. (2018). Cognitive and behavioral skills exercises completed by patients with major depression during smartphone cognitive behavioral therapy: Secondary analysis of a randomized controlled trial. *JMIR Mental Health, 5*, e4. Werner-Seidler et al. (2017). Smartphone app for adolescents with sleep disturbance: Development of the sleep ninja. *JMIR Mental Health, 4,* e28. Franklin et al. (2016). A brief mobile app reduces nonsuicidal and suicidal self-injury: Evidence from three randomized controlled trials. *Journal of Consulting and Clinical Psychology, 84*, 6, 544-557.	Reflection Paper (if desired) Reading Presentation *Activities: TBD*
Nov. 19 #10	**Designing interventions for mobile delivery, part 2:** Wahle et al. (2016). Mobile sensing and support for people with depression: A pilot trial in the wild. *Journal of Medical Internet Research mHealth and uHealth,* 4(3), e111. Meyer et al. (2015). Effects of an internet intervention (Deprexis) on severe depression symptoms: Randomized controlled trial. *Internet Interventions, 2,* 48-59.	Reflection Paper (if desired) Reading Presentation Peer feedback forms for presentations online.

	Pulantara, Parmanto, & Germain (2018). Development of a just-in-time adaptive mHealth investigation for insomnia: Usability study. *JMIR Human Factors, 5*(2), e21. Schroeder et al. (2018). Pocket skills: A conversational mobile web app to support dialectical behavior therapy. *In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (p. 398). 2018 ACM Conference.	*Some individual project presentations will occur in the second hour (4-5).*
Nov. 26 #11	**Other methods and measures: Smartwatches, physiological signals, and games** Costa, Adams, Jung, Guimbetiere, & Choudhury (2016). EmotionCheck: Leveraging bodily signals and false feedback to regulate our emotions. *In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing.* Hao et al. (2017). StressHacker: Towards Practical Stress Monitoring in the Wild with Smartwatches. *In AMIA Annual Symposium Proceedings (Vol. 2017, p. 830). American Medical Informatics Association.* Ballinger et al. (2018). DeepHeart: Semi-supervised sequence learning for cardiovascular risk prediction. *Proceedings from the Association for the Advancement of Artificial Intelligence.* Watanabe et al. (2017). Pokémon GO and psychological distress, physical complaints, and work performance among adult workers: A retrospective cohort study. *Scientific Reports*, *7*, e10758.	***Have all reflections finished by this week.*** Reading Presentation Peer feedback forms for presentations online. *Some individual project presentations will occur in the second hour (4-5).*
Dec. 3 #12	Individual project presentations (majority of students): Aim for 10-12 minutes, and 10 slides. ***Individual projects due December 10th, end of day (11:59pm).***	Peer feedback forms for presentations online.

COURSE POLICIES AND RESOURCES:

Note on Course Communication: Course announcements will be made through Quercus. Students are responsible for monitoring the course website regularly for important announcements and updates. Class emails will also be sent through Quercus; please make sure your listed email address is correct. Students may also ask questions on the discussion board on the course website. I encourage other students to provide potential answers or comments.

Diversity, Respect, and Confidentiality: During the course of the semester, students and instructors may present differing opinions that involve disclosure of information. All students will treat each other with respect regardless of opinions or personal feelings (note: disagreements are allowed, as long as they are voiced in a way that shows appreciation for others' viewpoints and experiences). Diversity is not limited to race, ethnicity and culture, but also includes regionalism, religious, economic, political, educational, and sexual orientation, among other differences.

Missed Term Work due to Medical Illness or Other Emergency: If you must miss classes due to a medical or personal emergency, discuss your situation with me as soon as possible. Do not wait until the end of the semester/past deadlines or until the problem has been resolved before contacting me. If you will need to miss more than two classes due to illness or some other set of events, please speak to me immediately to discuss the situation.

All students citing a documented reason for missed term work must bring their documentation to the Psychology Course Coordinator in SW427C **within three (3) business days** of the assignment due date. You must bring the following:

(1.) A completed Request for Missed Term Work form (http://uoft.me/PSY-MTW), and
(2.) Appropriate documentation to verify your illness or emergency, as described below.

Appropriate Documentation (as per departmental procedures):

- For missed **ASSIGNMENTS** due to ILLNESS: Submit **both** (1.) a **hardcopy** of the Self-Declaration of Student Illness Form (http://uoft.me/PSY-self-declare-form), **and** (2.) the **web-based** departmental declaration form (http://uoft.me/PSY-self-declare-web).

For missed term tests or assignments in OTHER CIRCUMSTANCES:

- In the case of a **death of a family member**, a copy of a death certificate should be provided.
- In the case of a **disability-related concern**, an email from your Disability Consultant at AccessAbility Services should be sent directly to both the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca) and your instructor, detailing the accommodations required.
- For U of T Varsity **athletic commitments**, an email from your coach or varsity administrator should be sent directly to the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca), detailing the dates and nature of the commitment. The email should be sent **well in advance** of the missed work.

Documents covering the following situations are **NOT acceptable**: medical prescriptions, personal travel, weddings, or personal/work commitments.

Accessibility Needs: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at (416) 287-7560; http://www.utsc.utoronto.ca/~ability/. We will work together to ensure you can achieve your learning goals in this course. Enquiries will remain confidential.

Writing: As a student here at the University of Toronto, you are expected to write well. The university provides its students with a number of resources to help them achieve this. For more information on campus writing centres and writing courses, please visit: https://www.utsc.utoronto.ca/twc/writing-support

Academic Integrity and Plagiarism: Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (http://www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. These include, but are not limited to: using or possessing unauthorized aids; looking at someone else's answers during an exam or test; misrepresenting your identity; falsifying documents or grades; falsifying or altering any documentation required by the University (e.g., doctor's notes); obtaining or providing unauthorized assistance on any assignment.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (www.utoronto.ca/academicintegrity).

Copyright in Instructional Settings: If a student wishes to tape-record, photograph, video-record lectures, this is allowed for the private use by students and not for the sake of distribution or sale of these mediums, which is not permitted through the instructional copyright policy. Reproducing lectures, course notes/slides, or other similar materials provided by instructors, is also not permitted for the intention of distribution or sale of materials for this course. This includes posting lecture slides to Facebook or other social media websites.

Other Resources:
Campus Life and Student Resources (https://www.utsc.utoronto.ca/currentstudents)
Academic Support at UTSC (https://www.utsc.utoronto.ca/currentstudents/academic-support)
Health and Wellness Centre, Personal Counselling (ttps://www.utsc.utoronto.ca/hwc/health-wellness-centre)