

Intelligence, Creativity, and Problem Solving (Psyc 434)

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Zoom conference hours general availability: Tues & Thursday morning; Email for appointment to meet digitally; other times are available

General Description

This upper-level undergraduate psychology course provides students an opportunity to (1) broadly examine what science knows about intelligence and creativity –and– (2) consider how these human abilities work together to help us successfully solve real-life, complex problems. The course will broadly review how our understanding of mental abilities has sharpened across history. Concerns about how mental abilities have been measured and what such measures can reliably predict will be emphasized and debated. The course will focus on the substantive areas of intelligence, creativity, and real-life problem-solving; but a central underlying theme will emphasize that what we know about any multiple-dimensional construct like intelligence or creativity is inseparable from how its respective dimensions are measured.

Course Objectives

Upon completing the course, students will understand and be able to broadly summarize:

- the history of human interest in mental abilities
- the different theoretical models that have been proposed to explain mental abilities
- the instruments that measure mental abilities and the types of analyses that confirm their validity
- the neuroanatomical correlates of intelligence, creativity, and problem-solving
- the relationship of mental abilities to other areas of human endeavor (business, art, government...)

Required Preparation (or equivalent coursework)

Psyc 100: Introduction to Psychology; Psyc 274: Introduction to Statistics.

Required Texts

All readings will be provided through links to USC Libraries’ ARES electronic reserves.

Evaluation Criteria

Grades for this course are based on five major components, assessed from three sources. The components, sources, and respective weights of importance are:

| | |
|-----------------------------------|--------|
| “Synthesis” Papers | |
| (Dr. B Assessment) | 17.0 % |
| (Self-Assessment) | 7.5 % |
| (Peer-Assessment) | 7.5 % |
| Supplemental Research / Analytics | |
| (Dr. B Assessment)..... | 16.0 % |
| E-Journal | |
| (Self-Assessment) | 10.0 % |
| Participation | |
| (Peer-Assessment) | 10.0 % |
| Final Report | |
| (Dr. B Assessment) | 17.0 % |
| (Self-Assessment) | 7.5 % |
| (Peer-Assessment) | 7.5 % |

Total Score Cut-Points for Letter Grades

In percentages your letter grade will be assigned according to your total final weighted-score as follows:

A = 93.5 (and above), A- = 89.5 to 93.4,
B+ = 86.5 to 89.4, B = 82.5 to 86.4, B- = 79.5 to 82.4,
C+ = 76.5 to 79.4, C = 72.5 to 76.4, C- = 69.5 to 72.4
D = 60 to 69.4, F = below 60.

Sources of Assessment (Grading)

Dr. Breland will provide grading rubrics for all assessment tasks. A proportion of the assessments will be solely executed by *Dr. Breland*. 50% of each student's total course grade will originate from *Dr. B Assessments*

Self-Assessments will be executed by each individual student wherein she or he evaluates her or his own completed work. These personal evaluations will be guided by grading rubrics constructed by *Dr. Breland*. 25% of each student's total course grade will originate from personal evaluations of her or his own work.

Peer-Assessments will be executed by 2 randomly-selected student-peers in the class. Across the semester each separate peer-assessed assignment will be evaluated by different, randomly formed, student-peer groupings. Peer assessments will be anonymous in general and neither the evaluated student nor the evaluators will know the identity of any of the others (exception: participation assessment will be *single blind*; student-peer evaluators will be anonymous). The peer evaluations will be guided by grading rubrics constructed by *Dr. Breland*. 25% of each student's total course grade will originate from student-peer evaluations.

Examinations

Brief exams will be administered to assess the degree to which the learning objectives of the course are being met. They will not affect students' course grades. The purpose of the exams is to identify which concepts are well understood and which require additional student-assignment support and explanation/discussion. Students are expected to take all the exams even though the degree of correctness will not negatively affect their grades. However, final grade bonus points will be available for doing well on these exams

"Synthesis" Papers

Students will write two *synthesis* papers (6 to 9 pages each, *not* counting title page, abstract, reference pages, tables, etc.) using APA format. The papers will describe each student's own personal perspectives on how the foci of this course are relevant to some other field of human endeavor. In the first paper, each student is expected to synthesize what is known about "intelligence" and the aspects of some field of work that is of personal interest to her or him (supported by supplemental research). The second synthesis paper will regard an equivalent conceptual task for "creativity."

E-Journal

Each student will maintain a weekly personal digital-journal on blackboard, journaling thoughts and questions about the readings, classroom discussions, and any extra-curricular supplemental-research-literature that the student decides to read. The task is expected to enrich a student's sense of self-referent understanding of the topics in the course. Moreover, the journals will help students meet three additional expectations of the course. Firstly, the journals will serve as a foundation for the two synthesis papers noted above since it will hold the student's notes and thoughts about all the readings, discussions, and personal supplemental research (see next page). Secondly, students are expected to guide an occasional "flipped" classroom; each student will be randomly assigned to guide a small discussion group through the main ideas of the day's assigned readings (see "Participation" section below). The journal will provide a central task/place for each student to organize and briefly summarize ideas that could be used to satisfy the "flipped" classroom requirement. A third principal expectation regards the *Final "Complex Problem" Report* (see third section below). This report represents a metacognitive task wherein students become more aware of how/when they personally use different types of thinking and mental abilities. The journal directs students to pay attention to this, it provides a central task/place for each student to introspectively notice thoughts, intuitions, processes, and decisions while working through the concepts and tasks of the course.

Participation

Students are expected to read the course-assigned, published literature prior to each respective lecture and be able to contribute to the class discussions that consider those readings. Additionally, students will be randomly asked to guide an occasional “flipped” classroom experience where they actively guide a discussion of the topics that have been scheduled for that particular lecture. Students will be allowed to *trade* their invitation to guide a “flipped” classroom with another student if they find that they have conflicting demands from other courses on their schedule (e.g. other major exams/assignments).

Supplemental Research / Analytics

Students are expected to identify a “personally interesting” field of human endeavor (outside the foci of this course) and research published sources regarding how mental abilities contribute or don’t contribute to success in that field. Ultra-concise summaries of the research are expected to be included in each student’s E-Journal. One-half the weight of this scoring-component will be determined by students’ full-effort attempts to successfully complete classroom exercises in data-analysis. The goal of these exercises will be to provide students an opportunity to learn basic concepts and skills with respect to psychometrics and general analytics.

Final “Complex Problem” Report

The final report will consider how intelligence and creativity impact real-life, complex problem solving. Students are expected to provide an overarching interpretation of their two “synthesis” papers. They will consider, from their end-of-course perspectives, how intelligence and creativity are important to solving complex problems versus how they are not important. Writing the report constitutes a real-life complex problem in itself. Students will include personal, metacognitive observations of the processes that led to creating the papers and the final report.

Special Notes

- 1 This course is interactive. *Students who do well in the course will* (a) attend class regularly, (b) stay current with the assigned readings so that they can discuss the main ideas during class, (c) contribute their best efforts when generating thoughts for their *personal journal* on blackboard, and (d) commit to completing writing assignments early rather than at the last minute. If doing well, students will find at the end of the semester that they have compiled a portfolio of work that provides evidence of their own high-caliber thinking.
- 2 Students producing high-caliber work with respect to all the components of this course will be considered worthy of an A (exceptional) or A- (better than good) work. The course’s distribution of letter grades will not be “curved;” so everyone could make an A if everyone completes their work at that level of excellence.
- 3 All assignments in this course are expected to be word-processed and any graphs/tables should be computer-generated.
- 4 All students are expected to have access to the student computer network. It is your responsibility to ensure that you have access to the internet, email, and blackboard during the semester.

Missed assignments

Missed participation and assignments cannot be made up and will result in a grade of zero for each respective task. Students who experience medical emergencies preventing them from attending class should provide original documentation from their physicians within one week explaining their absence. USC athletes should meet with Dr. Breland by the end of the second week of the semester regarding their scheduled athletic events that may conflict with course requirements. *Students honoring religious holy days are treated in a similar fashion.* Any missed work/assignments will be rescheduled for those whose absences are excused. Participation and class-exercises can be made up (when excused) by writing four-page papers on topics as assigned by Dr. Breland. You are responsible for submitting requests for these make-up assignments within one week of your absence.

Tardy policy

There is a fair amount of material to cover in this course. Tardy students (more than 5 minutes late) are disruptive to the class, and significantly retard the flow of information. After a first tardy, each time a student is late for class, his/her class grade will be dropped by 1% on the final grade.

Cell Phone and Electronic Device Policy

Cell phones should be turned off during class. Computers may be used for note taking purposes only. Any other usage (such as accessing Facebook, email, gaming, or working on outside class assignments) is not permitted and will result in disciplinary action. *Multiple infractions will result in being dropped from the course.*

Academic Dishonesty and DSP Arrangements

Students are held to the highest standards of ethical conduct. All the materials presented for this course in lecture, discussion, sent via email, or posted on Blackboard are “all rights reserved” by the course instructor. Some of it may be copyrighted and distributed by a publishing corporation for in-class use only. You should be aware that it is a violation of student ethics to store, post, distribute, sell, or purchase any course materials with the intent of offering that material to or receive it from any student who is not presently enrolled in this course (applicable to commercial Internet sources).

You may not submit work for this class that you or anyone else has presented, even in part, for this or another class. You should be especially vigilant with regard to plagiarism (presenting someone else's ideas as your own, whether deliberately or accidentally – in whole or in part).

Students with disabilities and/or special needs should be registered through the University DSP and should meet with Dr. Breland regarding the arrangements approved through the DSP within the first week of entering the course. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. DSP is open Monday-Friday, 8:30-5:00, their phone number is (213) 740-0776.

Course Schedule

| Wk # | Date | Lectures | Assigned Readings (on ARES) |
|-------------|-------------|--|---|
| 1 | 8/22 | Introduction to class * Brief Overview of the Course Linking Intelligence, Creativity, and Problem Solving * What are human abilities? * The “Intelligence” Debate | 2a. Cooper, C. (2015). <i>Intelligence and Human Abilities, from Chptr 2: What are abilities? (pp. 18-44);</i> 2b. Stanovich, K. (2009). <i>What Intelligence Tests Miss, from Chptr 1: Inside George W. Bush’s Mind (pp.1-7);</i> |
| 2 | 8/29 | * Historical Perspectives on Intelligence * Considering General Definitions for Intelligence * Scientific Efforts to Measure Intelligence > downloading “R” freeware - computer tools < | 1a. Breland, W. (2017). <i>Early Interest in Intelligence: A Small Patchwork of Thoughts to Launch an Intra-Course Discussion of Intelligence;</i> 1b. Plucker & Esping. (2014). <i>Intelligence 101, from Chptr 5: Intelligence or Intelligences (pp. 55-85);</i> 2. Cianciolo & Sternberg (2004). <i>Intelligence: A Brief History, from Chptr 2: The Measurement of Intelligence (pp. 30-55);</i> |
| 3 | 9/5 | * Monday – University Holiday – Labor Day * <u>No Monday Lecture / Discussion</u> * Exploring a Complex Psychometric Space * Covariance as Basis for Strong Measurement ? Number of Dimensions in Your Psyc-Space ? > <i>examining basic psychometric ideas - computer tools</i> < | 1. No Assigned Readings – University Holiday 2a. Breland, W. (2019). <i>Test Measurement, True Score, and Precision.</i> 2b. McDonald, R. (1999). <i>Test Theory, A Unified Treatment, from Chptr 5: Reliability for Total Test Scores (pp. 62-75);</i> |

| Wk # | Date | Lectures | Assigned Readings (on ARES) |
|------|-------|---|--|
| 4 | 9/12 | <ul style="list-style-type: none"> * Neural Correlates of Intelligence * Taking a Closer Look at Intelligence Tests | <ol style="list-style-type: none"> 1. <u>Hunt, E. (2011). Intelligence: Human Intelligence, from Chptr 7: Intelligence and the Brain (pp. 172-202);</u> 2. <u>Kaufman, A. (2009). IQ Testing 101, from Chptr 3: History, Part 2: At Long Last – Theory Meets Practice (pp. 55-101);</u> |
| 5 | 9/19 | <ul style="list-style-type: none"> * Multiple Dimensions (?) or Types (?) of Intelligence > factor analysis – computer tools < * Change in Intelligence across Age * Summarizing Intelligence – what we know > recalling psychometric discussions – computer tools < | <ol style="list-style-type: none"> 1. <u>Kincheloe, J. (2004). Multiple Intelligences Reconsidered: from Chptr 1: Twenty-first Century Questions about Multiple Intelligences (pp. 3-28);</u> 2. <u>Sternberg & Kaufman (2011). The Cambridge Handbook of Intelligence, from Chptr 9 [Hertzog, author]: Intelligence in Adulthood (pp. 174-190);</u> <p style="text-align: center;">First “Synthesis” Paper Due Due Sunday 9/25 at 6:00 PM</p> <p style="text-align: center;">>>Where Intelligence Fits with Your Interest<<</p> |
| 6 | 9/26 | <ul style="list-style-type: none"> * Introduction to Creativity: Early Foundations * The Intelligence/Creativity Relationship * Establishing a Definition for “Creativity” | <ol style="list-style-type: none"> 1. NO ASSIGNED READINGS Transition Lecture Bridging Intelligence & Creativity Modules 2a. <u>Plato (380 B.C.). Dialogue with Ion;</u> 2b. <u>Breland, W. (2009). The Nature of Creativity, Chptr 1 from: Pushmi-pullyu and little C: A search for the structure of creativity in a general population, (pp. 2-28);</u> |
| 7 | 10/3 | <ul style="list-style-type: none"> * Considering Individual Drive in Creative Activity * Invariance of the Creativity Construct * Introduction to the Measurement of Creativity > introducing Structural Equation Models – computer tools < | <ol style="list-style-type: none"> 1a. <u>Rank, O. (1932). Life and Creation: Chptr 2 from: Art and Artist: Creativity Urge and Personality Development (pp. 37-51?);</u> 1b. <u>May, R. (1975). The Nature of Creativity, Chptr 2 from: The Courage to Create (pp. 33-56?);</u> 2a. <u>Gluck, Ernst, & Unger. (2002). How Creatives Define Creativity, Creativity Research Journal 14 (1), pp. 55-67;</u> 2b. <u>Renzulli, J. (2002). Emerging conceptions of giftedness. Exceptionality, 10(2), pp. 67-75;</u> |
| 8 | 10/10 | <ul style="list-style-type: none"> * Continuation of Measurement of Creativity * Wednesday Lecture / Discussion will be held * Thursday & Friday – University Holiday – Fall Recess * | <ol style="list-style-type: none"> 1a. <u>Abdulla & Cramond. (2017). After six decades of systematic study of creativity; Roeper Review, 39, pp. 9-23;</u> 1b. <u>Simonton, D.K. (1977). Eminence, creativity, and geographic marginality, Journal of Personality and Social Psychology, 35(11), pp. 805-816</u> 2. NO ASSIGNED READINGS for Lecture; Lecture & Discussion will Revisit Basic Issues of Measurement |

| Wk # | Date | Lectures | Assigned Readings (on ARES) |
|------|-------|---|--|
| 9 | 10/17 | <ul style="list-style-type: none"> * Qualitative Attempts to Understand Big-C * Quantitative Attempts to Understand Creativity * Insight and Intuition in Creative Processing <ul style="list-style-type: none"> --The Bowers Game— > Structural Equation Models – computer tools < > revisiting psychometric discussions – computer tools < | <p>1a. Gruber & Wallace, A. (2001). <i>Creative Work: The Case of Charles Darwin</i>, <u>American Psychologist</u>, 56(4), pp. 346-349;</p> <p>1b. Mednick, M. (1963). <i>Research Creativity in Psychology Graduate Students</i>. <u>Journal of Consulting Psychology</u>, 27 (3), pp 265-266.</p> <p>1c. Kaufman, J. C. et.al (2012). <i>Assessing Creativity with Self-Report Scales: A Review and Empirical Evaluation</i>. <u>Psychology of Aesthetics, Creativity, and the Arts</u>, 6 (1), pp 19-34.</p> <p>2a. Jausovec, N. & Bakracevic, K. (1995). <i>What can heart rate tell us about the creative process</i>. <u>Creativity Research Journal</u>, 8 (1), pp 11-24.</p> <p>2b. Baker-Sennett & Cecci. (1996). <i>Clue efficiency and insight: Unveiling the mystery of inductive leaps</i>. <u>The Journal of Creative Behavior</u>, 30 (3), pp 153-172.</p> |
| 10 | 10/24 | <ul style="list-style-type: none"> * Creative Motivations Revisited * Creative Cognitions * Summarizing Creativity – what we know -End of Creativity Module- | <p>1a. McClelland, D. C. (1985). <i>How motives, skills, and values determine what people do</i>. <u>American Psychologist</u>, 40 (7), pp 812-825;</p> <p>1b. Csikszentmihalyi, M. (1997). <i>The Content of Experience; from Chptr 2: Finding Flow: The Psychology of Engagement with Everyday Life</i>, pp. 17-34.</p> <p>2. Finke, R. A. (1996). <i>Imagery, creativity, and emergent structure</i>. <u>Consciousness and Cognition</u>, 5, pp. 381-393;</p> <p style="text-align: center;">Second “Synthesis” Paper Due Due Sunday 10/29 at 6:00 PM >>Where Creativity Fits with Your Interest<<</p> |
| 11 | 10/31 | <ul style="list-style-type: none"> * Defining Complex Problem Solving * Questioning the Validity of CPS Measurement | <p>1. NO ASSIGNED READINGS Transition Lecture Bridging Creativity & Complex Problem Solving Modules</p> <p>2a. Martin, A. H. (1932). <i>Problem Solving by Men and Mammals</i>. <u>Journal of Psychology and Philosophy</u> 10, pp 243-258;</p> <p>2b. Dorner, D. & Funke, J. (2017). <i>Complex Problem Solving: What it is and What it is not</i>. <u>Frontiers in Psychology</u>, 8 (1153), pp. 1-11;</p> |
| 12 | 11/7 | <ul style="list-style-type: none"> * Problem Solving Examples: Experts vs. Novices * Differentiating Difficult vs. Complex Problems * Consideration of Various Complex Problem Solving Measurement Instruments | <p>1. Bryson, Bereiter, Scardamalia, & Joram (1991). <i>Going beyond the problem as given: Problem solving in expert and novice writers</i>. <u>from Chptr 2: Complex Problem Solving: Principles and Mechanisms</u>, pp 61-84</p> <p>2. Beckmann, Birney, & Goode (2017). <i>Beyond Psychometrics: The difference between difficult problem solving and complex problem solving</i>. <u>Frontiers in Psychology</u>, 10(1739), pp. 1-13;</p> |

| Wk # | Date | Lectures | Assigned Readings (on ARES) |
|-----------|-------|---|---|
| 13 | 11/14 | * Considering the structural relationships among inductive thinking and types of problem solving | <p>1. Funke, J. (1991). <i>Solving Complex Problem: Exploration and Control of Complex Systems. from Chptr 6: Complex Problem Solving: Principles and Mechanisms, pp 185-222;</i></p> <p>2. Molnar, Greiff, & Csapo (2013). <i>Inductive reasoning, domain specific and complex problem solving: Relations and Development. Thinking Skills and Creativity, 9, pp. 35-45;</i></p> |
| 14 | 11/21 | * Wednesday thru Friday – University Holiday – Thanksgiving * | <p>1. Sulik, Bahrami, & Derooy (2022). <i>The Diversity Gap: When diversity matters for knowledge. Perspectives on Psychological Science. 17(3), pp. 752-767.</i></p> <p>2. NO ASSIGNED READINGS (holiday)</p> |
| 15 | 11/28 | * Course Summary and Wrap-Up | <p>1. Leone & Reiter-Palmon (2022). <i>Leading Creative Teams: A process perspective with implications for Organizational Leaders, Translational Issues in Psychological Science. 8(1), pp. 90-103 ;</i></p> <p>2. NO ASSIGNED READINGS (end of course summary)</p> |
| Exam Days | | <i>There is no final exam per se, the Final Paper/Project replaces any final examination</i> | <p><u>Final Paper/Project Due</u> Due on Monday 12/12 at 1:00 PM >>Metacognitive Introspection: Complex Problem <<</p> |