Lecture: Monday 5:30 - 8:20pm, SBSB 3127
Instructor: Theresa C. Vazquez (Cook), M.A., A.B.D.
Office hours: Wednesday 9:30am – 12:30pm, SBSB 3231 (or by appointment)
E-mail: pencilproductions@yahoo.com
Prerequisites: PSYC 100 or BIOL 211

Course Description: “Introduction to the biological bases of behavior, including material central to physiological psychology, comparative psychology, behavioral genetics, and sensory psychology. Issues to be addressed include but are not limited to neuroethology, behavioral endocrinology, evolutionary theory, sociobiology, and sensory systems” -Course Catalog

Lectures
Attendance at every class is extremely important. You cannot do well if you skip classes, because you will miss crucial material and explanations. Lecture slides will be posted before class, but please understand that having them ahead of time will not substitute in any way for taking good notes nor will the slides provide adequate information to substitute for attending class.

Supplemental Instruction (SI) and Supplemental Materials
CSUSM has a wonderful program to help students succeed in difficult science courses. SI meetings are run by student leaders who facilitate discussion that can help you understand course material. SI is optional, but statistics show that students who attend SI do better in the course than students who do not attend SI.

In addition, I have constructed a series of on-line materials designed to reinforce key course concepts. My hope is that these materials will provide even more support to students to strengthen understanding of complex concepts. More information will be provided on this topic in class and on CougarCourses.

Exams & “Quizzes”
You will be given a “quiz” at the end of each lecture. The quiz is designed to evaluate understanding of key course concepts. The quizzes are not graded for credit. However, each quiz will mirror a section of the exam. The material will not be the same as what is on the exams, but the formatting will be identical to what you can expect on exams. Hopefully, quizzes will not only allow me to evaluate class progress, but will also give you a “sneak peek” to prepare you for the format of exams.

Speaking of exams: You will be given four exams, the fourth of which serves as the final. All four exams will include multiple choice and/or T/F and/or matching, short answer, and short essay questions. These exams are OPEN NOTES. You may bring in the notes you have taken on lectures and reading assignments. Your own notes are the only materials you will be allowed to use: no textbooks (or any other book), no handouts except those you may use in SI (see below) or print-outs of my posted slides, no photocopies of anything (including other people's notes), and nothing that has been scanned from a book or other source.

Why this testing format? What it does is to reward you for careful reading, listening, and note taking. It encourages you to organize what you hear/read into notes that provide a framework for understanding the material, while freeing you from the need to memorize every detail. It also forces you to learn how to take good notes, if you don't already know how. Thorough, well-chosen, organized, and well-studied notes will be the best preparation for exams; dozens of pages of notes that you don't understand or haven't studied will simply overwhelm you at test time, and incomplete notes will leave you in the cold. The tests will be 75 minutes long; if you aren’t very familiar with your notes, you won't have time to find the answers within them in the allotted time.

The four exams count equally. I do give partial credit for some answers, but I expect clear, concise, complete and accurate answers for full credit. Each exam is worth 100 points total. The exam grades will be posted on-line, and I expect you to assume the responsibility of finding out how you did each time. I talk about the correct answers to the test during the class meeting following the test administration, though I do not return
your tests during class. I strongly encourage you to come to my office to go over your exam with me. I can help you see where you went wrong and I will give you advice for studying better the next time.

Students say my exams are hard, but most students also say they are fair. I grade on a curve, and any curve will be already added into the score you see posted on-line.

Make-up exams will only be offered in cases of DOCUMENTED medical emergencies (for yourself or immediate family).

**Journal Article Reports - JARs (Writing Requirement)**

You will satisfy the university writing requirement by completing four short reports, 1.5 - 2 pages each, in which you review published primary empirical studies on topics we address in the course. This assignment puts you in contact with the actual research upon which textbooks are written and science advances. You will be responsible for searching relevant computer databases to find studies that are relevant to the subject matter of the current section of the course. For instance, the first report is due after we have covered neuroanatomy and physiology. Therefore, the first report will be on a research article that deals with some aspect of these topics. In your reports you will describe the goals, results (= data), and conclusions of the studies you have chosen to review. (See “Instructions for your Journal Article Reports,” starting on page 7). I expect you to thoroughly and thoughtfully consider each article you read. You must turn in a photocopy of the article (PDF version!!) on the day JARs are due, so that I can read the article and determine if you have, indeed, done your job, and if you have avoided plagiarism. You can bring in a copy of the articles ahead of time for me to look at to make sure they are appropriate. Note that the requirement is for four papers. This means you turn in one paper for each of the four course sections.

Each of your reports will be worth 25 points. So, your total grade for journal reports is like a fifth exam grade (each exam is 1/5 of your grade; your report total is also 1/5). **REPORTS MUST BE SUBMITTED TO TURNITIN ON COUGAR COURSES.** If you do not turn in the essays on time (at the beginning of class on the due day), you will receive a 5-point deduction for every day they are late. If you turn the journal article pdf in late, you MUST have it stamped with the date and time at the Psychology Department office and have it placed in my mailbox. Just leaving it in my office or anywhere else is not acceptable. It MUST be time and date stamped.

Make-up essays will only be offered in cases of DOCUMENTED medical emergencies (for yourself or immediate family).

**Reading**

As you will see (below), there is a good deal of reading to do in this course. You have probably discovered that we will use three books (Kolb & Wishaw, *An Introduction to Brain and Behavior* (5th edition); Plomin et al., *Behavioral Genetics* (7th edition), and Wright, *The Moral Animal*). I’m sorry to have put you to that expense, but I have not found a textbook that adequately covers all of the topics I teach in PSYC 360. Please be aware that some of what you read will not be repeated in lecture. Likewise, some of what you hear in lecture you will not find in the books. This is intentional: you are capable students who do not always need "double doses" of material. You are responsible for both book and lecture material whether you hear it, read it, or both. I can provide open source material for students who are unable to purchase the texts. However, these materials are even longer than text assignments, so be prepared to spend even more time with them than you would with the hard-copy texts. I will talk more about this topic in class.

There is one certain prediction I can very safely make: **If you don’t keep up with the reading, you will suffer the consequences on the exams.** Some of the material in this course is difficult to understand, and there is a great deal of terminology and many biological processes about which you must learn. Sometimes you will need to read and re-read a section several times before you grasp the major point(s) of that section, and you must really PRACTICE the language of biopsychology if you expect to use it properly. There is no getting around it: this material will not always sink in on the first try. **A quick read of the material will not be enough.** Expect to spend more time with the reading than you do in most of your other classes.
Course Objectives (Student Learning Outcomes)

The objectives of PSYC 360 are to 1) give you a basic but thorough understanding of neuroanatomy and neurophysiology, behavioral genetics, animal behavior, and evolution, and to 2) expose you to the primary scientific literature that serves as a foundation for advances in those fields. The course is designed to prepare you for further study, should you decide to pursue it, in any of the areas noted above. Students who successfully complete PSYC 360 will be able to:

• identify and distinguish among the major structures in the nervous system
• describe the location, function and development of those structures
• explain neural transmission, including the steps involved in the propagation of action potentials
• identify and describe the roles of major neurotransmitters
• distinguish between metabotropic and ionotropic receptors, and the actions of drugs on those receptors and related structures
• describe the anatomy, physiology, and adaptive significance of sensory systems
• identify the brain structures that are involved in different aspects of learning and memory
• explain the principles of human heredity, DNA structure and function, and the concept and applications of heritability
• explain Darwinian evolution as applied to nonhuman and human species
• identify major hormones and their organizational and activating roles in motivational systems
• read, understand, and summarize primary research articles that are relevant to topics discussed in class

PSYC 360 prepares you for any of the four biopsychology laboratory courses we offer. These are: animal learning; physiological psychology; sensation and perception; and comparative animal behavior. In these laboratory courses you explore and implement the research strategies associated with the relevant content areas. Once you have passed (grade of C or better) PSYC 360 and the other two prerequisites (PSYC 220 and 230), you may take any of these labs.

The Psychology BA program includes five Student Learning Outcomes for the entire degree program. Each course is associated with one or more of these Student Learning Outcomes. In this course, the Program Student Learning Outcomes that are relevant are:

PSLO 1: Describe the major concepts theories, empirical findings, and historical trends in psychology and their application to behavioral and mental processes.

PSLO 2: Describe (as a way of understanding) the scientific approach to psychology and apply basic research methods in psychology, including research design, quantitative analysis, interpretation, and reporting in APA format.

PSLO 4: Demonstrate the ability to independently locate, identify, and critically evaluate scholarly literature in the discipline of psychology.

The Child and Adolescent Development BA program includes eight Student Learning Outcomes for the entire degree program. Each course is associated with one or more of these Student Learning Outcomes. In this course, the Program Student Learning Outcomes that are relevant are:

PSLO 2: Locate, interpret and critically evaluate scholarly articles in psychology.

PSLO 6: Demonstrate effective written communication skills in a variety of formats and for a variety of audiences, using APA format when appropriate.

Disabled Student Services (DSS)

Reasonable accommodations will be made for students with disabilities. I encourage students with specific needs to meet with me as soon as possible to discuss their learning needs. Information about DSS can be found at http://www.csusm.edu/dss/handbooks/support_services.html. The Office of Disabled Student Services is in Craven Hall in Suite 4300. DSS offers walk-in and scheduled appointments Monday - Friday from 8:00 a.m. - 5:00 p.m. You can call DSS at (760) 750-4905 or (760) 750-4909 (TTY), their fax number is (760) 750-3445, and their e-mail address is dss@csusm.edu.
**Academic Dishonesty**

As my previous classes can attest, I am known to strictly enforce Academic Integrity in my classroom. I have reported students for cheating in the past, and I will report any academic dishonesty I discover to the Office of the Dean of Students, as is REQUIRED at CSUSM. Academic dishonesty includes (but is not limited to) cheating, plagiarism, and unendorsed collaboration with other students. When you take an exam in class, you cannot ask another student for help or refer to their answers. When you complete your papers at home, you must work ALONE. You are not to consult with other students about the papers in advance, and you are not to consult with other students when writing your papers. You can and should consult any written materials you have received in class, as well as your text, notes, and my slides when writing the papers, though papers MUST BE IN YOUR OWN WORDS. Do not quote any source, and certainly do not plagiarize (copy) from any source without citation (including your classmates, class materials, texts, on-line sources, and/or journal articles) when writing your papers.

Here is the bottom line with Academic Integrity: If your behavior gives you any advantage over other students, besides the obvious advantage you might gain from studying hard, you are doing something dishonest. If I find out, like I said, I will report you to the Office of the Dean of Students and recommend/administer a suitable consequence for the incident. If you have any doubt whatsoever about what does or does not constitute academic dishonesty, ask me, and I will be happy to clarify. More on Academic Dishonesty can be found here: [http://www.csusm.edu/policies/active/documents/Academic_Honesty_Policy.html](http://www.csusm.edu/policies/active/documents/Academic_Honesty_Policy.html)

**Classroom Policies**

I am known as a “tough” grader. When I assign you a grade, I am going on record with an important assertion – one that may well be used by grad schools, employers, etc. – about the extent to which I am convinced that you have learned the material. Therefore, you must really MASTER the material in PSYC 360 to get an A or B, because an A or B means that you have demonstrated a very thorough understanding of all the course matter. Simply "learning a lot", taking a lot of notes, and understanding what you read and heard is not enough to justify a high grade. In a class of 40, it is typical that there end up to be about 5 As, 10 Bs, 15 Cs, and 10 Ds/Fs. Don't get me wrong: if you all perform at an "A" level on the exams, you'll all get "As", and I’ll be thrilled! But if history has any predictive validity, that's not going to happen. So set realistic expectations for yourself (i.e., don't fall apart if you don't get an A) and prepare to work hard.

I do not have strict policies regarding classroom etiquette and personal behavior, including the use of electronic devices. However, I will treat you with basic human respect, and I ask that you do the same for your classmates and me. If your behavior (including your use of electronic devices) becomes disruptive, I will ask you to stop what you are doing or leave the class. My intention is to foster a comfortable atmosphere for everyone, free of extraneous distractions. Over the past few semesters, gum chewing has become an increasing problem in my classes. I do not mind if you chew gum in class. However, **loud, open-mouth gum chewing, popping, or bubble blowing will not be allowed**, especially during the quiet of exams. If you are loudly chewing, popping, or blowing bubbles, you will be asked to stop or leave class.

I will accommodate students involved in school sanctioned sports or religious activities in a reasonable way and on an individual basis, as requested by the university.

**Words of wisdom**

Here is some advice about succeeding as a student. If you adhere to it you will increase your chances (no guarantees, of course!) of doing well in this class:

1. Come to class EVERY day. That’s EVERY day. If you miss classes your exam grades will suffer, I guarantee you.
2. Come to class ON TIME. That’s ON TIME, not a little bit later than on time.
3. Keep up with the reading. Plan to read a certain number of pages every night, so that you are completely DONE with the reading (and note-taking) at least 2 days before the test. Use those last two
days to STUDY your notes. If you cannot keep up with the reading, you cannot expect to do well on the test.

4. Take good notes on the reading:
   • notes are not helpful if they are disorganized. Use some sort of outline form.
   • all headings and subheadings in the book should appear as headings and subheadings in your notes. Then, under each heading/subheading, you’ll list the important points, of which there may well be MANY. Having too many notes is rarely the problem, unless you haven’t studied those notes.
   • with some exceptions, each paragraph you read should generate something in your notes… sometimes a lot, sometimes just a line or two.
   • make sure you understand the examples given. How/why do they illustrate the point or concept being made? If you understand the example, there’s no need to take notes on it.
   • never just copy out of the book onto your paper. Read from the book, then turn to your paper and summarize what you have just read. Copying is a waste of time!!
   • don’t ignore the tables, figures, and boxed material in the text. Take notes on them, too, if necessary.
   • once you have taken notes on a chapter, you must go over and over those notes, making sure you understand them. A common problem is that students spend hours taking lots of notes but do poorly on tests because they never asked themselves if they really understood their notes.

5. Take good notes on the lectures.
   • come to class ALERT, and try not to let your attention stray.
   • go over your notes within 12 hours after class and modify them as necessary, adding things you missed, clarifying, etc.
   • use the daily outlines to help you organize your notes into major topics and subtopics.

6. Come to see me when you haven’t understood something in the book or in lecture. It is suicide to just cross your fingers and hope that I won’t ask about it on the test.

7. If you do poorly on the first test, don’t wait until the second test to come talk to me. Come see me right away, so we can figure out a way to make the next test a success.

8. Form study groups, but only if you are TOUGH on each other during group meetings and only if your group-mates are studying hard on their own, too. Ask each other difficult questions and if the answers aren’t adequate, SAY SO! Students sometimes get a false sense of security from a study group because everyone is being too nice or because the overall level of knowledge/understanding in the group is low.

9. Use good test taking strategies:
   • answer test questions only after making sure you really understand the question.
   • ask me for clarification if necessary (I may or may not be able to help, but it’s worth a try!)
   • avoid wasting time by including irrelevant information in the answer.
   • answer the easy questions first, then go back and answer the harder ones.
   • don’t use your notes to answer a question to which you are pretty sure you already know the answer. It wastes valuable time! Once you are done with the test you can always go back and check answers against your notes if you have time.

In summary, here are the TOP TEN reasons students get poor grades on exams:
1. you didn’t do all the reading
2. you put off some of the reading until the night before the test
3. you didn’t take notes on all of the reading
4. you took notes on the readings but they were not clear, organized, or thorough
5. you took good notes on the reading but didn’t study those notes
6. your lecture notes were incomplete and/or disorganized
7. you missed classes and/or came late to class
8. you didn’t understand parts of the material but you didn’t come to see me about it
9. you did poorly on the first test but didn’t come to see me until after the second test
10. you didn’t use self-testing techniques when you studied (such techniques include asking yourself the following questions: can I really explain this? can I think of an example of this? can I contrast this with or relate it to other topics relevant to this issue? etc.)

**Grade breakdown:** Your grade will be calculated by simply adding up all the points you earn during the semester and dividing that by the total number of points possible. This method of calculating your grade should make it very easy for you to keep track of your grade in class. Therefore, **if you ask me to calculate your grade for you - or how you must do on future assignments to receive a certain grade in the class - I will reduce your grade by 5 points for each time you ask.**

4 exams, 100 points each = 400 points
4 Journal Article Reports, 25 points each = 100 points
Total possible = 500 points

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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<tbody>
<tr>
<td>Jan. 23</td>
<td>Introduction</td>
<td>Syllabus</td>
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<td></td>
<td>Nervous system anatomy</td>
<td>Ch. 1 (pp. 1-13) (Kolb); Ch. 2 (Kolb)</td>
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<tr>
<td>Jan. 30</td>
<td>Neurons &amp; support cells</td>
<td>Ch. 3 (pp. 74-97) (Kolb); Ch. 8 (pp. 246-261) (Kolb)</td>
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<td>Action potentials &amp; receptors</td>
<td>Ch. 4 (Kolb)</td>
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<td>Feb. 6</td>
<td>Receptors &amp; neurotransmitters</td>
<td>Ch. 5 (pp. 139-163) (Kolb)</td>
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<td>Drugs &amp; neurotransmitters</td>
<td>Ch. 6 (pp. 172-201) (Kolb)</td>
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<tr>
<td>Feb. 13</td>
<td><strong>EXAM #1</strong></td>
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<td>Feb. 20</td>
<td>Vision</td>
<td>Ch. 9 (Kolb)</td>
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<td></td>
<td>Audition</td>
<td>Ch. 10 (skip pp. 338-347) (Kolb)</td>
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<td><strong>First Journal Article Report (JAR) due</strong></td>
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<td>Feb. 27</td>
<td>Olfaction/gustation (lecture)</td>
<td>Ch 12 (pp. 402-406) (Kolb)</td>
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<td>Somatosenses (reading)</td>
<td>Ch 11 (pp. 378-395) (Kolb)</td>
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<td>Mar. 6</td>
<td>Memory &amp; learning</td>
<td>Ch. 14 (Kolb)</td>
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<td>Learning</td>
<td>Ch. 5 (pp. 164-169) (Kolb)</td>
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<td>Mar. 13</td>
<td><strong>EXAM #2</strong></td>
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<td>Mar. 20</td>
<td><strong>NO CLASS – SPRING BREAK =)</strong></td>
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<td>Mar. 27</td>
<td>Heredity</td>
<td>Chs. 1, 2, 3 (Plomin); Ch. 3 (pp. 97-107) (Kolb)</td>
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<td>DNA</td>
<td>Chs. 4 &amp; 9 (Plomin)</td>
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<td><strong>Second JAR due</strong></td>
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<td>Apr. 3</td>
<td>Heritability</td>
<td>Chs. 5,6,7 (Plomin)</td>
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<td>Applied behavior genetics</td>
<td>Chs. 12 &amp;14 (Plomin)</td>
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<td>Apr. 10</td>
<td>Phylogeny</td>
<td>Ch. 1 (pp. 14-18) (Kolb)</td>
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<td>Apr. 17</td>
<td><strong>EXAM #3</strong></td>
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<td>Apr. 24</td>
<td>Evolution</td>
<td>Intro and Ch. 1 (Wright); Ch. 20 (Plomin)</td>
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<td>Mating strategies</td>
<td>Chs. 2,3,4 (Wright)</td>
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<td><strong>Third JAR due</strong></td>
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<td>May 1</td>
<td>Cooperation &amp; competition</td>
<td>Chs 7 &amp; 9 (Wright)</td>
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<td>Great ape societies</td>
<td>Chs 12 &amp; 13 (Wright)</td>
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<td>May 8</td>
<td>Human evolution</td>
<td>Ch. 18 (Wright); Ch. 1 (pp. 19-31) (Kolb)</td>
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<td>Hormones</td>
<td>Ch. 6 (202-208) (Kolb); Ch. 12 (pp. 411-417 &amp; 427-440)</td>
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<td><strong>Fourth JAR due</strong></td>
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<tr>
<td>May 15</td>
<td><strong>Final Exam – 6:15-8:15pm</strong></td>
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Instructions for your Journal Article Reports

1. Go on-line, using one of the library’s databases to look for articles that interest you (don’t limit yourself to PsycINFO, which isn’t necessarily the best place for neuroscience and biopsychology). Remember that you are going to be looking up primary empirical research articles (articles in which the authors have collected, analyzed and presented their own data) in journals (not books). Do not use articles in which the author only describes the data of other researchers, and do not use articles in which the author is explaining his or her work that has already been published elsewhere; these are not primary empirical sources. Do not use articles written for a general audience (like articles in Natural History, Smithsonian, and Scientific American, for instance). Case studies are not usually considered empirical research so do not select case study articles. Also, do not choose an article that was published prior to 2006.

2. If you are having trouble with the above process, talk to a reference librarian!! Show him or her this page from your syllabus and s/he can help you find an article.

3. Once you’ve located a potential article, read through it quickly and decide whether or not it is a good one for you to use by asking yourself the following:
   • “is it a primary empirical research article?” (if no, DON’T USE IT!)
   • “was it published more than 10 years ago?” (if yes, DON’T USE IT!)
   • “is it on a topic that we have covered in this section of class?” (if no, DON'T USE IT!)
   • “can I understand MOST of what it's saying?” (if no, DON'T USE IT!)
   • “can I answer the required questions (see next page)?” (if no, DON'T USE IT!)

4. To be safe, print out the article and bring it to me before you start writing the report so I can be sure it’s a good choice.

5. Answer the four questions (see below).

6. Staple (no paper clips please!) a complete copy of the article together and turn it in to me. The copy of the article must be in PDF format.

7. Here are the four questions you must answer in your reports:
   a. What question(s)/hypothesis(es) did the authors address with their research? Why are these question/hypothesis(es) interesting and important? That is, what is the rationale behind the authors’ decision to do this particular research?
   b. How did they do the research? That is, what techniques or methodologies did they employ to answer the question(s)? (I don't want great detail here; I just want to know how they did what they did).
   c. What did the authors find? (again: I don't want great detail here, just a summary of their data)
   d. What are the conclusions of the study?

8. Things to remember
   a. Each of the reports will be
      • 1.5 (minimum) - 2 (maximum) pages
      • 1.5 spacing between lines in the body of the report
      • 1.0 spacing between the lines in the first part (your name, the citation, etc.)
      • 12 pt. Times New Roman font
      • 1.25” margins
      • grammatically correct and neat. Poorly written reports and reports that are not proof-read will be given low scores.
   b. Use the format given in the example given below!
   c. You will hand the reports in on (or before) the day they are due or get no credit for that assignment. Late papers are accepted only with an ironclad medical or family emergency excuse. (Check your syllabus for due dates).
   d. The report you write must be turned in through TurnItIn on CougarCourses.
   e. Plagiarism is absolutely unacceptable. Unless you are directly quoting (in which case quotation marks are used) you may not use an author’s words unless it is a very simple phrase. You might be
tempted to think that you’ll just use lots of direct quotes! Sorry, but that isn’t acceptable either. If you quote, I don’t know if YOU understand what is being said. So: NO quoting allowed.

f. Each of your reports will be assigned a score of 0 – 25 points. That grade will count as a fifth exam grade (each exam is 1/5 of your grade; the report total is also 1/5).

g. This assignment will only be hard if you make it hard. Pick articles that are relatively short, understandable, and enjoyable! Don’t wait until the last minute. If you take the time to find the right kind of article, you’ll have no trouble answering the questions correctly.

h. Note that I ask you to include the APA-style citation for your study. Here is a simple explanation of APA (American Psychological Association) citation style:

Authors are listed by last name followed by initials; publication year goes between parentheses, followed by a period. The title of the article is in sentence-case, meaning only the first word and proper nouns in the title are capitalized. The periodical title is in title case (first words capitalized), and is followed by the volume number. Journal and volume are italicized or underlined. Here’s the basic format:

Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. *Title of Periodical, volume number* (issue number), pages. Here is a real example:


Some journals have an issue number along with the volume number. The volume number but not the issue number is italicized. If in the example above it was volume 12 issue 4, you would write *12*(4).

I am not requiring you to put the DOI (digital object identifier) in your citation, nor do you have to write “retrieved from xxx database on…”

Here is an example of a journal article review as it should be done. You must follow this format when you write your papers.

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**PSYC 360**
**Your name**
**Journal report #1**
**Date**

**Title:** The role of the medial temporal lobe in autistic spectrum disorders.

**Journal:** *European Journal of Neuroscience*


a) Autism spectrum disorders (ASD) are characterized by deficits in social behavior and communication. People with ASD show characteristic memory impairments as well; they tend to remember facts (semantic memory), but not events (episodic memory). Because we know that the hippocampus and related medial temporal lobe structures are essential to the formation of memories, the authors of this study chose to examine the medial temporal lobe function of people with ASD, relating the imaging results to data they collected on the behavior and cognitive function of their participants.
b) The participants were 14 children aged 8-18 who were diagnosed with relatively mild ASD, and two control groups of normally developing children matched for age and IQ. The first control group (N=18) was used for comparison with the ASD children on the neuropsychological tests and the second control group (N=13) was used for comparison with the ASD group on the MRI data. The ASD children were recruited by contacting support groups and schools. Parents of all participants gave consent. The participants were given a battery of neuropsychological tests, including memory and attention tests. Parents were given a check-list to rate the presence and severity of various ASD symptoms in their children. Finally, the children were given MRI scans so that the brain structures of interest could be correlated with the symptoms and test scores of the children.

c) As expected, the ASD children performed more poorly than the controls on episodic, but not semantic, memory tests. At first it appeared the poorer performance by the ASD group might be due to problems they had with sustaining attention to the episodic memory tasks. However, an analysis of covariance showed that the difference between the ASD and control groups could not simply be due to attentional factors. The MRIs of the ASD group showed increased grey matter (cell bodies) in several regions of the brain, including the peri-hippocampal cortex, cerebellum, and frontal lobes. When the authors looked within the ASD group they found positive correlations between grey matter density in medial temporal lobe structure borders and autism symptoms.

d) The authors speculate that the increased grey matter densities of the ASD children may indicate a failure of the brain to selectively reduce the number of neurons (programmed cell death) in the brains of developing children, accounting in part for ASD memory deficits and other cognitive/social problems. Or, it is possible that the neurons failed to migrate during a critical period of brain development. The increased density of grey matter in the vicinity of the border between the hippocampus and amygdala is consistent with other studies that have found amygdala defects in autism. It is not clear from this study why the observed brain abnormalities are associated with episodic but not semantic memory. The authors warn that this study used high-functioning ASD children only; the results might not generalize to ASD children who are more severely affected by autism. Nonetheless, this study contributes to our growing understanding of the underlying causes of ASD.