

EXP 3082L – EXPERIMENTAL PSYCHOLOGY – 3sh

Laboratory Manual/Syllabus by Dr. Jay E. Gould

Spring 2005, January 5 – April 29

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Instructor:	Jay E. Gould	Laboratory Hours:	Tue & Thur 1:00–2:15 pm or
Phone:	474-2290	Laboratory Hours:	Tue & Thur 4:00–5:45 pm
Office:	Bldg. 41, Rm. 216	Office Hours:	Tue/Thur 10:30-11:30 pm Wed 2:30-5:30 pm
E-Mail:	jgould@uwf.edu	---	<i>Subject line should say: Advise Re. EXP 3082</i>
Website:	uwf.edu/jgould	---	<i>Go to Resources & Syllabi to find materials</i>

Required Book

Publication Manual of the American Psychological Association (Fifth Edition).

Recommended Books

Bruning, J. L. & Kintz, B. L. *Computational Handbook of Statistics*. or
Linton, M. & Gallo, P. *The Practical Statistician: Simplified Handbook of Statistics*.

Szuchman, L. T. *Writing With Style: APA Style Made Easy*.

Langston, W. *Research Methods Laboratory Manual for Psychology*

Prerequisite

Students should have completed STA 2023 or an equivalent course in applied statistics. Assignments in the laboratory section of Experimental Psychology will require that students perform appropriate statistical analyses on data collected.

Corequisite

Students enrolled in this course must also be enrolled in a Lecture Section of Experimental Psychology (EXP 3082) with the same instructor as for this laboratory section---unless it was previously completed and the student has permission.

Student-Learning Outcome Objectives

The objectives of the laboratory section of Experimental Psychology are to familiarize students with experimental (as well as descriptive) research methods by providing "hands-on" experiences--through a series of exercises--in designing, conducting, analyzing, interpreting, and writing up psychological research. As a result of careful study and fulfillment of the course assignments, students should be able (among other things) to:

1. Develop experimental research problems in psychology
2. Conduct reviews of the scientific literature relevant to chosen research problems
3. Formulate research hypotheses
4. Design experimental psychology studies
5. Run pilot studies
6. Execute experimental studies by collecting research data under carefully controlled conditions
7. Summarize and statistically analyze research data
8. Evaluate research results and draw conclusions pertaining to hypotheses
9. Communicate research studies in oral, written, and poster formats

Mechanism

The objectives of this course can be achieved through careful study of the required and recommended books listed earlier, attendance at all laboratory meetings, and careful execution of the assignments. Some of the assignments will be done in the field or involve use of the library without direct supervision. Students will be expected to be diligent and responsible at all times. **Note:** This *Laboratory Manual/Syllabus* contains very important information and guidance. Students will be held responsible for knowing and following all of its contents.

Experiments will be conducted using either just paper and pencil, microcomputers with software, or classical research equipment (e.g., tachistoscope, pursuit rotor, and mirror drawing apparatus; in addition to memory drum and reaction timer, for which, however, there are also good computer programs). Students will prepare research proposals, collect data, analyze and interpret results, and then write papers in *APA Publication Manual* style. In addition, there will be oral and poster presentations on the research.

Note: **This is not the kind of lab where you can be told in exact detail everything that has to be done. Instead you will need to show some initiative and creativity, since that is what science requires.** But you will not be left entirely on your own. You will conduct your research in groups, and the major elements of the first exercise are provided in a handout so that you only have to work out the details, execute the study, analyze the data, and write it up. Furthermore, the graduate teaching assistant and I are ready to help you whenever there are questions or problems. We want this lab to be not only instructional, but interesting, if not exciting. However, this will depend a great deal on your really getting involved in the research. **The lab will be challenging, but you will learn a great deal.** Any recommendations that you might have for

improving the *Laboratory Manual/Syllabus* and/or the exercises, will be most appreciated. After all, this laboratory course is designed for your benefit.

In order to be properly prepared, students will be expected to be up to date on the lecture class *Handbook* assignments before starting each of the laboratory assignments. See Course Calendar of Assignments and Exams. Students who do not prepare in advance for the laboratory assignments will not be able to take maximum advantage of the exercises, and their understanding and retention of the material will suffer. Such individuals will also most likely be a hindrance rather than an aid to classmates.

Before beginning to design and conduct your own research studies, you might need a review of the major principles of sampling and generalization, plus hypothesis testing and statistical analysis. If so, it would be a good idea, early in the course, to look at Chapters 11 and 12 of the course *Handbook* written by your instructor (also of value early on is Chapter 5 about the Initial and Final Phases of Research); and Chapters 2-4 in the *Simplified Handbook of Statistics* by Linton and Gallo (on reserve in Library), which has a useful exercise exam at the end of Chapter 3 to test your knowledge. Note: Control of extraneous variables is briefly touched on just before this exercise exam, and the notation system used in the book is described on p. 133.

It might also be a good idea, when preparing for Exercises 2 & 3 later in this Laboratory Manual/Syllabus, to review the material on factorial designs in the above sources early on, rather than waiting for discussion on this topic occurring toward the end of the Lecture Course. To help you, there will be some earlier discussion of factorial designs in lecture and lab. Do not panic!

Students will be divided into groups of four to six for the purpose of discussing and assisting each other with the laboratory assignments. This will introduce students to the advantages and difficulties of team research. It is important that the graduate teaching assistant and/or course instructor be alerted if any member of a group does not appear to be participating fully. This will allow supportive corrective measures to be taken, which will be to the benefit of everyone involved. Members of each group should exchange phone numbers and e-mail addresses, along with their names, to facilitate communication.

Oral reports and discussions involving the entire class will occur at laboratory meetings when the exercises/studies (and perhaps research proposals) are completed. Students should be prepared to discuss their research and any questions that they or others might have. A student from each of the groups will be selected to present a 10-15 minute oral report on the study that the group conducted (or proposes to conduct). The report should discuss the research problem, hypotheses, methods, results, and conclusions. In other words: *What was done? Why was it done? How was it done? What was found? What does it mean?* (and similar questions for research proposals, except stated in the future tense) Attention should be given to the control of extraneous variables: i.e., what variables/factors were controlled, how were they controlled, what variables were not controlled, and why weren't they controlled?

These oral reports will provide an opportunity for the instructor, teaching assistant, and other students to offer feedback on the quality of the research. The reports will also give students experience in orally communicating research in a rigorous manner. They will not be graded. They are meant to provide experience and "pleasure."

Poster presentations during *final exam week* on Exercise #3 will be prepared by each research group in order to gain experience in this format used at most conventions as an alternative to oral presentations. Examples from previous classes will be provided. They will be viewed and commented on by the instructor, graduate teaching assistants, classmates, and other students and faculty in the Department.

Attendance and Late Papers

It is mandatory that students attend all laboratory meetings, unless you are specifically told otherwise--such as when the assignment is to analyze data or interpret and write up a study. Unexcused lab absences and late papers will each result in the **loss of 1/3 of a letter grade per day for that exercise. In no case will late papers be accepted after the last class meeting before Final Exam Week.** This is only fair to students who attend lab and get their work in on time. Moreover, since much of the lab work is done in groups, students not participating in lab meetings are most likely going to adversely affect the performance others in their research group.

Late papers must be turned in to the Department's Main Office, date/time stamped, and placed in the instructor's mail box. Papers slid under the instructor's door will not be accepted.

Note: Don't call the instructor or graduate teaching assistant about absences. A written or e-mailed explanation for missing class will be required, preferably before the absence. A doctor's note is not required--I use the honor system. **Students missing more than 4 laboratory meetings, regardless of the reasons, will receive an incomplete "I" in the course**, assuming that at least 70% of the course work was completed and that they were not failing.

Special Arrangements for Assistance: Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), at (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any *recommended accommodations*. Students should attend to this as early as possible. The instructor is not obligated to accommodate a student's needs unless presented with an official letter from the Office of Disabled Student Services.

Academic Dishonesty: I am very aware that there is a great deal of pressure to do well in college. But that is never an excuse for cheating on an exam, plagiarizing an assignment, or in any other way being academically dishonest. There are severe penalties for such wrongdoing. Do the right thing and be a good citizen--be honest! You should carefully review the Rights & Regulations section of the *UWF Student Handbook*, from which the following was excerpted.

Expectations for Academic Conduct/Plagiarism Policy: As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity—personal and institutional—is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.

Plagiarism: be very careful not to plagiarize. Plagiarism is defined as *an action to pass off the ideas, words, or creations of another as one's own*. For a discussion of this very important ethics issue, see pages 349-350 & 395 of the *Publication Manual of the American Psychological Association*, and review the information posted at <http://uwf.edu/cassupport/insupport/plagiarism.rtf> on the UWF Web site. Naturally, students should discuss the research with others in their group, but **all research papers and proposals turned in for a grade must be done independently, using the individual student's own words, ideas, figures, tables, and references** (there may be *some* overlap, but be sure you have personally read every reference you include in your paper). As an example, since a *proposal for group research* (Exercise #3) is written as a team effort, then no *individual's research report* should be worded the same as the proposal. If there are any questions at all about whether something would represent plagiarism, be sure to talk to the instructor or graduate assistant before making a serious mistake that could result in your ***failing the assignment, and even the entire course, and possibly being brought up for disciplinary action by the University.***

APA Publication Manual

The editorial style given in the *Publication Manual of the American Psychological Association* (Fifth Edition, 2001) is to be followed to the extent indicated in the instructions given below for each exercise. There are also Grading Criteria sheets included for the exercises. These should be reviewed before conducting and writing up each exercise. They will serve as a useful guide for you. Then, when turning in an exercise paper, attach the Grading Criteria sheet for that exercise to the back of your paper so that it can be used for grading purposes. Please note that all research papers and proposals must be typed and stapled.

Start reading the *APA Publication Manual* at the beginning of the term! Deviation from the APA style, as well as spelling, punctuation, and grammatical errors, will significantly affect the grade on the research paper. In addition to carefully reading the extensive description of "Parts of a Manuscript" in Chapter 1, be sure to thoroughly study Chapter 4, which contains sections giving "General Instructions for Preparing the Paper Manuscript," and "Instructions for Typing the Parts of the Manuscript," as well as a "Sample Paper." Additionally, there are helpful checklists in the *APA Publication Manual* for a quick check of major errors. Appendix A--Checklist for Manuscript Submission (pp. 379-383)--is probably the most useful, but also see the table and figure checklists on pages 175 and 201. Finally, Chapter 2 provides good general information in sections on "Writing Style, Grammar, and Guidelines to Reduce Bias in Language;" and Chapter 3 describes the many mechanical aspects of the "APA Editorial Style" that writers are expected to follow.

Other useful information on writing research papers will be found in Chapter 5 of the lecture course *Handbook* written by your instructor, and in the recommended book *Writing With Style: APA Style Made Easy*. In addition, I have placed in a file in the Reserve Book Room of the Library a textbook example of an APA-style research paper. Several other aids to writing, both in general and using the APA Editorial Style, can be found on the Internet. Remember, however, that the *APA Publication Manual* takes precedence over everything else for papers in this course!

A well written research report is essential since it is the major basis by which one's research may be evaluated by others. Moreover, writing in general is an expression of thought, and therefore our writing is a very important quality about ourselves that we exhibit to the world. Strive for accuracy, completeness, clarity, conciseness, and readability. When writing papers you should be able to form sentences free of grammatical, punctuation, and spelling errors; you should be able to organize sentences into effective paragraphs; and you should avoid writing that is vague, ineffective, and incoherent. If you think you need help with your writing, don't put it off! For those who would like to improve their skills, you can use the services of the University's Writing Laboratory, and/or you take a composition/writing course in the English Department.

NOTE: The grades for all exercises will be based on the quality of work turned in, as well as peer evaluations and observed performance during laboratory meetings, i.e.: attendance, demeanor, execution of exercises, and discussion of exercises. The grade on all research papers and proposals will be adversely affected by poor spelling, punctuation, grammar, and nonconformity to the editorial style of the *American Psychological Association Publication Manual*. **Moreover, students turning in an illiterate paper for the Major Experimental Study (discussed below) will receive an incomplete ("I") in the course, unless they are failing, in which case they will receive a grade of "F".** Don't let this happen to you! If you need help, talk to the instructor or graduate teaching assistant, and get help from the University's Writing Laboratory. As noted, there are also writing aids on the Internet.

ASSIGNMENTS AND GRADING CRITERIA

On this and the following pages you will find descriptions of the three main exercises you will be conducting during the semester. You should read over all of these now so that you are aware of everything that will be expected of you. This will also allow you to start preparing for the later exercises early if you wish. Note that there will also be one or more additional short exercises to be turned in for completion of the course requirements. See, e.g., "Bibliographic Exercise" in the Course Calendar (class 8).

EXERCISE #1: Driver Behavior Study

At the beginning of the course, students will work in pairs conducting field research on the behavior of drivers. This study will count 25% toward the lab grade. The major aspects of the research design are provided to help get you started. However, you and your partner(s) will get to flesh out the details, so that you begin learning some aspects of *research design* right from the very beginning. There is a separate handout describing this study, the research paper (which is to be written individually by each student), and the grading criteria. There are also separate handouts describing the Chi Square statistical analysis to be used, as well as an example of the computations.

If you wish, you may substitute a study from Chapter 1 of Langston's *Research Methods Laboratory Manual for Psychology*. You will need to turn the study into an experiment (see p. 39-41 of that book). You should use the Driver Behavior Study handout as a guide for doing an alternative experiment. Consult the instructor about your experimental design before carrying out the research. Also, I have an alternative public restroom hand-washing experiment article (in my Driver Behavior folder).

EXERCISE #2: Research Proposal

For this exercise each student will design an experimental study of his or her own. This will count 25% toward the lab grade. The research proposal is to be written individually by each student. This exercise is in preparation for Exercise #3, the Major Experimental Study, which will initially involve getting together with the others in your research team and preparing a group research proposal (which should build on your individual research proposals), and then running a pilot study. Logically, therefore, students must begin planning the group research proposal for the Major Experimental Study at the same time they are selecting specific topics for the individual research proposals of Exercise #2. The proposals can involve research done in a field setting or laboratory, using either a microcomputer with software, classical research equipment, an apparatus that you make yourself, or just good old paper and pencil.

Microcomputers can be very useful tools for conducting psychological research. In the unlikely event that you are unfamiliar with microcomputers, which are more commonly called personal computers, the article by Tong and Gupta that has been placed on reserve in the Library should be helpful. The Department has some software programs for running studies on aspects of human behavior and cognition. There are also

programs available on the Internet, and on the CD-ROM that comes with the Langston lab manual. Examples of what can be investigated are: information processing and decision speed (reaction time tasks), verbal learning and memory, concept formation, reading and lateralization of language, problem solving, psychophysics, and visual illusions.

Classical research equipment is also available for this exercise. Examples are: the *tachistoscope*, which is used to investigate perceptual and attentional processes; the *pursuit rotor*, which is used to investigate sensory-motor coordination; the *mirror drawing apparatus*, which is used to study development of sensory-motor coordination and transfer of training; the *reaction timer*, which is used to measure decision making speed; and the *memory drum*, which is used to study verbal learning.

Note: Most students do interesting research studies for this course without using computers or other research equipment. This saves time that would be needed to learn how to use the software or equipment.

Several aids are available to you for finding research ideas/problems. One example is the recommended lab manual for the course by Langston. There are also books on reserve in the Library by Hergenhahn; Osgood; Stevens; Woodworth & Schlosberg; and King & Riggs (see the "Additional Recommended Readings" list in the lecture syllabus). These books should prove most useful in learning something about the research applications of each piece of classical apparatus as well as microcomputer software programs. These books, as well as that by Jung & Bailey, also contain ideas for studies using only paper and pencil. Note that the books by both Hergenhahn and by Jung & Bailey contain actual outlines of experiments that can be run by students in laboratory settings--the latter book's studies require only paper and pencil. The reserve book by Schwartz (*Classical Studies in Psychology*) might provide some additional ideas, but note that the studies in this book are not all experiments. In addition there are several articles on reserve in the Library of studies that could serve as the basis for your own research: e.g. those by Hearst; Josephs et al.; Pashler; and Rauscher et al. See the articles marked with asterisks on the Additional Recommended Readings list in the Lecture Syllabus. A particularly interesting approach for developing research studies is to look through some of the current issues of psychology journals in the Library to see what's been done most recently.

Although you are welcome to use the aids listed above to find research problems/topics, I strongly suggest that you try to come up with some ideas of your own. Think back over the courses that you have taken in psychology, the books and articles you have read, and your personal life experiences. Then ask yourself what it is that particularly interests you about psychology. Finally, try to imagine how you might go about conducting experimental research in that area. Taking an approach like this will make your laboratory research much more personal, and therefore exciting.

Literature Review and Written Proposal

After each student has individually come up with one or more ideas for research, the ideas should be discussed among the members of the research groups to refine them and determine whether they would be feasible as an experiment for Exercise #3. Each member of the group will then select a research problem/topic. Everyone's should be different in some way from the others in their group, but can overlap.

Each individual's research topic must involve **at least two independent variables**. One must be experimentally manipulated, but the rest can be correlational independent variables (see the lecture section *Handbook* for an explanation). Sex/gender may only be used as a variable in the study if there are at least two other independent variables. The same applies to a pretest-posttest testing independent variable. Note: Although statistically less powerful, and thus less desirable, one could simply compute pretest-posttest change scores (see *Handbook*) as the dependent variable, rather than adding a pretest-posttest independent variable. The **dependent variable must involve score data** (not frequency or ordinal data), which would be statistically analyzed using an ANOVA (Analysis of Variance).

Students will **individually** do a literature search/review to find a **minimum of three (3) pertinent studies** relating to their research problem/topic. At least two (2) of the references must have been published with the last 5 years. A laboratory meeting will be devoted to training and practice on conducting computerized literature searches (see "Bibliographic Instruction" under class 8 in the Course Calendar).

Each student will next **individually write** and hand in his/her **own research proposal** for an experimental study that builds on the knowledge gained from the literature review. Briefly, the typed proposal should include, among other things:

1. Study title and names of the investigators (your name, then others in your group)
2. Statement of the research problem(s) and hypothesis(es), along with the basis for them, i.e., *summarize* the relevant research literature (note: a *detailed* literature review is not required for this proposal)
3. Explicit identification and operational definitions of the independent variables (at least two, other than gender/sex or pretest-posttest) and the dependent variable(s)
4. Description of the research design and experimental methods (participants/ subjects, apparatus/materials, and procedure--including identification of extraneous variables and their controls, as well as the instructions and informed consent form)
5. Description of the statistical analysis(es) to be used, along with estimated mean dependent variable results, illustrated with a table and figure
6. Discussion of the expected results, generalizations, and conclusions
7. List of references in APA style.

Detailed Instructions for Research Proposal

Writing research proposals and reports is covered in the *Handbook* written by your instructor in Part One, Chapter 5, and Appendix 3 of the *Handbook* provides a detailed list of components. APA style must be strictly followed throughout the paper, and the format of the proposal must be the narrative form of a typical research report with its various sections--rather than a list format. These variations are discussed at the end of Appendix 3.

All the components listed in Appendix 3 of the *Handbook* must be included. In addition, the proposal should include an abstract placed right after the title page. Abstracts are challenging to write, so you need this practice before Exercise #3. Be sure that the paper's title indicates that this is a research proposal.

At the end of the proposal there should also be both a table and figure (see the *APA Publication Manual*: Table Example 3 on page 151 [ignore bottom 1/3rd, but add marginal means at right and bottom of your table], and Figure Example 4 on page 183), properly labeled, and with some made-up values approximating the descriptive statistics that you would expect to find if the study were actually run (give only the estimated mean dependent variable scores for conditions, not individual raw scores). Note that these are different than the design matrix diagram for the preliminary draft of the research proposal that is discussed in the next paragraph. The table and figure are being required first of all to help students learn to correctly prepare illustrative material, with table title, figure caption, and independent and dependent variable labels that make tables and figures self explanatory. Secondly, it is instructive whenever proposing a study to think ahead about the quantitative values of the dependent variable means that are expected for the different independent variable conditions. Specifically, how different are the means expected to be, and are the differences (i.e., the primary/experimental variance) likely to be statistically significant when compared against the random/error variance (i.e., chance effects)? If statistical significance is not likely, then improvements should be made in the study to maximize the primary/experimental variance and/or minimize the random/error variance. These issues are discussed in the course *Handbook* written by you instructor.

Note: A preliminary draft of the research proposal's title page and abstract, along with a design matrix diagram (see example on the next page) is to be turned in for feedback by the instructor and graduate teaching assistant before submitting the final full proposal. So as to clearly communicate the students' understanding of the design that they will be using, the design matrix diagram should be similar to those in the lecture section *Handbook*, Chapter 10, under Factorial Designs (see, e.g., p. 302), but with the independent variables and levels named (rather than using symbols), and with the independent variables described (in parentheses) as being either experimental between or within, or correlational. Below the matrix, name the dependent variable(s), give a shorthand designation of the factorial design, and name the statistical analysis or analyses to be used (see *Handbook* pages 306 to 307 top). Note that unlike the Chi Square analysis matrix done for the Driver Behavior Study, when preparing a factorial design matrix, only show the independent variables and their levels on the matrix. But as already noted, the dependent variable name(s), and the name of the statistical analyses to be used, should be listed below the matrix.

Design Matrix Example

(From Milinki, Article 10, Exp. 1)

		Cohesiveness (Experimental Between)	
		Cohesive	Noncohesive
Work Condition (Experimental Within)	Individual		
	Collective		

Dependant Variable: Number of words typed per minute (Work Output)

Design: 2(Cohesiveness: Cohesive, Noncohesive) X 2(Work Condition: Individual, Collective) Mixed Factorial Design with repeated measures on Work Condition

Statistical Analysis: Two-way mixed-groups ANOVA, with repeated measures on one factor

Grading Criteria for Exercise #2 Paper: Research Proposal

See Appendix 3 "Proposals and Research Reports" in Gould's *Handbook*
(Criteria include coverage of each of the 16 components in Appendix 3)

— **Title Page**

All components in APA style
Number 1 of *Handbook* Appendix--Study Title
Number 2 of *Handbook* Appendix--Names of Investigators

— **Abstract**

— **Introduction**

Number 3 of Appendix--Research Problem(s)
Number 4 of Appendix--Literature Review
Number 5 of Appendix--Research Hypothesis(es)
Relevancy of the cited references to the research problems and hypotheses--Sources

— **Method**

DO NOT FORGET SUBHEADINGS: Participants, Materials, Procedure
Number 6 of Appendix--Describe participants:
Proposed number, source, gender, age range, and how assigned to conditions.
Number 7 of Appendix--Materials and/or Apparatus
Number 8 of Appendix--Procedure
Number 9 of Appendix--Operational Definitions of
Independent Variables and Dependent Variable(s)
Number 10 of Appendix--Extraneous Variables & Controls
Number 11 of Appendix--Research Design

— **Results**

Number 12 of Appendix--Statistical Analyses:
Expected descriptive statistics and the inferential statistical analyses to be used
Number 13 of Appendix--Results Expected

— **Discussion**

Number 14 of Appendix--Conclusions Possible (note that this is plural)
Number 15 of Appendix--Generalizations possible
Relevancy of the cited references to the conclusions and generalizations--Sources

— **References**

Number 16 of Appendix--References: APA style properly cited in text

— **Table and Figure**

APA style, with made-up expected values

— **Other Requirements**

At least one-inch empty margins (top/bottom/sides)
No right-margin justification
Double spacing throughout
All section headings and subheadings in APA style
Accuracy, completeness, clarity, conciseness, readability
Proper grammar, punctuation, spelling, etc.

— **Total Points** (includes 100 points for doing literature review & writing the paper)

— **Total Percentage Score** (100 X Total Points / 200 Possible Points = Total Points / 2)

EXERCISE #3: Major Experimental Study

For 50% of the lab grade, each research group will conduct a full-fledged experimental study. The major experimental study may be conducted in either the field or laboratory. Students may use research equipment available in the Department, equipment that someone in the group possesses, equipment that can be borrowed elsewhere, equipment that the group might build, or simply using paper and pencil.

The research project may be original or a replication of a published study *with some modification*. Note, however, that the research must utilize a true experimental design, and it must involve two or more independent variables, i.e., it must employ a factorial design. At least one independent variable must be experimentally manipulated, but the rest can be correlational independent variables (see the course *Handbook* written by your instructor for an explanation). Note: Sex/gender and/or pretest-posttest testing may only be used as independent variables in the study if there are at least two other independent variables. The dependent variable must involve score data (not frequency or ordinal data), which would be statistically analyzed using an ANOVA (Analysis of Variance).

Group Research Proposal

First it will be necessary to design the study. It is intended, but not required, that this will grow out of some combination of the individual research proposals done for Exercise #2. Before conducting the major experimental study, each **group as a whole** (rather than each individual) must have approved by the instructor a single, typed, group research proposal for the study, done using the list format of Appendix 3 in the course *Handbook*, rather than the narrative research report format used for Exercise #2. As per Appendix 3, for each listed item you should type the list number and heading. The information provided under each list item should be in bullet format, not narrative format. This will result in students having practice in preparing proposals in this alternate format, and will facilitate quick review of the proposals by the instructor and graduate teaching assistant. For additional information on research proposals, see also Part One, Chapter 5 of the course *Handbook*.

The proposal must additionally include a design matrix diagram. See the description and example given earlier for the Research Proposal Exercise #2.

Each group must also fill out and submit: 1) the first two pages of the UWF Application to Institutional Review Board for Human Subjects, 2) an Informed Consent Form, and 3) a Debriefing Form. These all deal with ethical issues, which are covered in Chapter 6 of the course *Handbook*. The UWF IRB Application Form (Word) can be found at <http://www.research.uwf.edu/boards-committees/irb/irb.htm>. There you will also find Guidelines for Writing Informed Consent Documents, and a Sample Informed Consent Form, which is an abbreviated version of the one prepared by your instructor and found

in Appendix 4 of the course *Handbook*. You might also want to look at the *Instructor Guidelines for Screening Course-Related Student Research Proposals*. Each group will need to develop their own Informed Consent Form and Debriefing Form.

Note: Although only one proposal is to be submitted by each group, it would be advantageous, after discussing together the research possibilities, for each individual in a team to prepare his/her own draft of a group proposal for subsequent discussion and integration. This will also help to ensure that everyone in a team completely understands the research. Note that there will be no grade for the group proposal, it is being done simply so that students can be given guidance by the instructor and graduate teaching assistant in the development of a good experiment. However, the Major Experimental Study cannot be started until the Group Research Proposal, Application to Institutional Review Board for Human Subjects, Informed Consent Form, and Debriefing Information Form are approved by the instructor or graduate teaching assistant.

The instructor and/or teaching assistant will discuss with each group the proposal and ethical considerations. Probing questions will be asked of all individuals, and suggestions, if necessary, will be made for improvements in the design. Be prepared to respond to any and all questions about the proposed study. Each member of a research group must be thoroughly familiar with all aspects the research proposal and any ethical issues.

Pilot Study and Main Study

After approval is obtained, a pilot study should be run before the main study in order to troubleshoot all the apparatus, materials, and procedures (including the instructions and informed consent form). For participants/subjects in the pilot study it might be acceptable to use individuals from within your own research group. For the actual main study, however, the participants should consist of individuals from all the other groups--as well as friends, relatives, and possibly students from other classes if necessary (check with the instructor first regarding the latter).

Important: Members of this class are expected to cooperate with their fellow student researchers and participate in one another's experiments or pilot studies as subjects, regardless of whether or not a student's own research is completed. Each research group should rotate who is the experimenter, so that each student serves as the experimenter for at least one participant in the pilot study and/or main study, and in order that every student will be available to serve at some time as a participant for the other groups' studies. Each lab section may also use students in the other lab section as research participants, but that will usually require going to the other lab and running the participants at the time that lab meets.

Research Paper

Be careful not to plagiarize! (See earlier discussion of this on page 6.)

After conducting the major experimental study, students will have about two weeks to do **your own individual statistical analyses and to complete the writing of individual research papers** as if they were to be submitted to a journal for publication. Please note that you should not wait until the study is completed before you begin to write it up. By the time your research proposal has been accepted you will have done your literature review and designed the study. Thus, using your research proposal, you are ready to prepare a draft of the introduction and method sections of the research paper before and/or during the time of data collection. If you do not start writing the research paper early, you will almost definitely not have enough time to do it right. **Note that papers turned in late will lose 1/3 of a letter grade per day! Also, students turning in an illiterate paper for this Major Experimental Study will receive an incomplete ("I") in the course, unless they were already failing.**

As noted near the beginning of the Laboratory Manual, all papers are to be typed using the editorial style given in the *Publication Manual of the American Psychological Association* (Fifth Edition, 2001). Deviation from this form, as well as spelling, punctuation, and grammatical errors, will significantly affect the grade on the research paper. Additional guidance can be found in Chapter 5 in the course *Handbook* written by the instructor, the recommended book by Szuchman titled *Writing With Style: APA Style Made Easy*, and summary guidelines on the Internet--but remember that the *APA Publication Manual* takes precedence! Some good examples of past research reports by students (with grading notations) are in the Reserve Book Room of the Library. Note, however, that they are not perfect papers.

Your research paper should include all parts/sections with both tables (e.g., for statistical analyses) and figures (e.g., graphs) illustrating the results (note: a published research paper might not have both tables and figures, but this exercise assignment was developed to give you maximum experience). Remember that in the text portion of the results section you should not repeat all the details contained in tables and figures. This would be redundant. Rather you should just summarize and report the major findings (descriptive and inferential statistics). Discuss all results in the Discussion Section.

Your statistical analyses should include strength-of-association measures (e.g., eta squared) for each independent variable main effect and interaction. These measures are covered in the lecture section *Handbook*, Chapter 12; Linton & Gallo, pp. 329-337; and the APA Publication Manual, p. 25-26. Put the strength-of-association values in your statistical analysis table in a column to the left of the probability value column.

The report must also include at least five (5) original-source references relevant to the experiment, and at least three (3) should have been published within the last 5 years. These articles, etc. can serve as models for organizing and writing a good research paper (but note that they might not all be written in APA format). Finally, the raw data

and statistical calculations should be included as an appendix at the end of the report. Note: *You must* do the calculations with paper, pencil, and calculator to understand what is being done; the SPSS computer program is only used for checking your work.

The appendix need not be typed, but must be neat; the rest of the paper, as already noted, must be typed. The text length of the paper will probably be about 10 pages. Do not waste your money on expensive (or cheap) binders--simply staple pages together at the upper left corner. On the cover page of your research report give as the author your name first followed by the names of the other members of your group.

Having a paper reviewed before submitting it for publication is common practice among professionals. You may want someone to proof your paper for major errors before turning it in. The teaching assistant for this course will assist you if you wish (allow a few days for review and rewriting), but remember that you assume total responsibility for the paper you finally turn in to your instructor. You should take advantage of the spelling and grammar checkers built into all major word processor programs. But keep in mind that they might not catch all errors.

Please note that although this paper will be similar in organization to the proposal paper, this is a research paper and will thus include the findings. Therefore, you will be reporting your research methods, etc. in the past tense (not the future tense used in the proposal).

Finally, let me point out that the instructor and graduate teaching assistant(s) are aware that this lab course is a learning experience. Since you will be conducting your research in the lab or field at the same time that relevant material is being covered in the lecture course with regard to research designs, it is not expected that your research will be absolutely perfect. It is expected, however, that by the time your paper is turned in, any weaknesses in your research that you should have learned about in the course up to that point will be noted by you in the discussion section of your report.

Oral Reports and Poster Presentations

Each group, as discussed earlier, will give oral reports and poster presentations of the studies. The posters will be presented in the laboratory classroom during the second half of the double time-block scheduled for the lecture final exam, which should not require more than a regular time-block. The group members with the best-evaluated poster presentation will receive 6 points extra credit toward the grade for Exercise #3. Second-place group members will receive 5 points, third-place group members 4 points, and everyone else participating will receive 3 points. This extra credit, however, will be adjusted downward proportionately for group members doing less than 100% of the maximum (see form). Further information about posters, along with examples, will be provided during the semester. In addition to the instructor, graduate teaching assistants, and classmates, other students and faculty in the Department will probably be invited to view and comment on the poster presentations.

Grading Criteria for Exercise #3 Research Paper: Major Experimental Study

- **Title Page**
APA style for all components, e.g., centering and margins
Study title with names of investigators and institutional affiliation
Running head and page header

- **Abstract**
Appropriate length
Clear, concise, accurate, self-contained, grammatical, etc.
Research problem(s), participants, method, findings, conclusions

- **Introduction**
Research problem(s), including quality of question(s) asked
Literature review, including quality and relatedness to current study
Content clear, concise, accurate, grammatical, etc.
Research hypothesis(es), including rationale

- **Method**
Subheadings: APA style
Participants: description, number, source, assignment
Materials and/or apparatus: description completeness
Procedure: description complete, accurate, clear, concise
Operational definitions of independent and dependent variables
Extraneous variables: description and quality of control
Research design: description and quality

- **Results**
Descriptive statistics: clear, concise, accurate, complete
Inferential statistics: clear, concise, accurate, complete APA format
Major findings summarized and reported
Reference to and description of all tables and figures

- **Discussion**
Interpretation/evaluation of results regarding hypotheses
Generalizability of findings
Theoretical and/or practical implications--conclusions
Relatedness of findings to those of other referenced studies
Description of the study's shortcomings (controls)
Suggestions for further research
Content clear, concise, accurate, grammatical, etc.

- **References**
APA format, with five or more original sources, properly cited here and in the text

- **Appendix**
Raw data and correct statistical computations

- **Tables and Figures**
APA style, including a separate figure caption page
Clearly presented and labeled, e.g., self-explanatory
Helpful information--not just redundant to results in text

- **Total Points** (including 100 points for doing the research and writing the paper)

- **Total Percentage Score** (100 X Total Points / 200 Possible Points = Total Points / 2)

Evaluation Criteria for Exercise #3 Poster Session: Major Experimental Study

General Requirements

Length less than a full paper but longer than an abstract: don't overwhelm with excess detail
Posters visually appealing and text legible from 1.5 meters (use large font sizes: ≥ 5 mm)
Blank spaces to separate parts of the poster and communicate relationships among parts
Subdued or dark colors for matting are better than brilliant, intense colors
Background paper for text and illustrations very light color, e.g., beige, off white, or white
Color used in visuals, if possible
Materials arranged in columns to be read top to bottom from the leftmost column to rightmost
Concise, bulleted lists used in place of running text wherever possible for ease of reading
Researchers have thorough knowledge of the study and able to answer viewers' questions

Title, Authors, and Affiliation

Typed in **bold** and clearly visible from 3 meters away (use large font: ~ 25 mm & 15 mm high)
Placed at top center of poster, usually

Abstract

Clear, concise, accurate, self-contained, summary of the research problem(s), participants, method, findings, conclusions

Introduction

Clear statement of the research problem and hypotheses
Inclusion of a brief overview of the relevant research literature

Method

Brief description of the participants and materials/apparatus
Good organization of the main procedural points
Easily understood description of the experimental design

Results

Visually appealing tables and figures of descriptive statistics, etc. are particularly useful
Clear statement of the inferential statistical analyses used and the significances found

Discussion/Conclusions

Clear interpretation/evaluation of the results
Concise statement of the findings Generalizability and theoretical and/or practical implications

References

Listing, in APA format, of all citations included in the poster presentation

Estimated Contribution to Poster Session

EXP 3082L

Please indicate below what relative percentage of effort you believe that you contributed toward your groups' poster presentation. This assessment should be made relative to the person in your group that you believe contributed the most (e.g. relative to Ms. Brain, I contributed 75% as much to the poster presentation--i.e., I contributed about 3/4 of what Ms. Brain contributed). This information will be used to determine the percentage (proportion) of possible extra credit points that you will be awarded.

Relative to the maximum effort in my group, I contributed _____ % as much to my groups' poster presentation.

Your name printed clearly

Your signature, initialed by all other members of the group

Poster Evaluation by Classmates

EXP 3082L

Name of the Rater _____

Title of the Rater's Poster Presentation _____

Directions: Please list below the titles of poster presentations, if not already done for you, and cross through your own.

In the left margin assign a numerical value, on a 100-point scale, to each poster presentation, *with the exception of your own*.

Note that for fairness to all in the class, it is important that you view and rate objectively each of the poster presentations prepared by the other groups in both lab sections.

Circle the highest poster score. You may indicate a tie between two poster presentations by circling the score for both of them.

-
- _____ 1.
 - _____ 2.
 - _____ 3.
 - _____ 4.
 - _____ 5.
 - _____ 6.
 - _____ 7.
 - _____ 8.
 - _____ 9.
 - _____ 10.