

## **CRITICAL ANALYSIS OF SCIENTIFIC LITERATURE**

### **Directions**

You will write two (2) critical analyses of the scientific literature. Each will be a 3 to 4 page critique of a scientific paper. The first one you write will be a critique of a paper that will be given to you by your instructor. The second is a critique of a paper that you will choose yourself, from a suggested list of topics. This article will be the same article used for your class presentation. The article must be turned in with your written assignment. Your instructor will provide you with specific information as to how this article should be turned in.

After the first assignment, you will receive feedback on spelling, grammar and critical evaluation skills. Please use this feedback when preparing the second critical analysis.

Please see the green sheet for the due dates for the two different analyses. Late papers will receive lower grades, so please be sure to turn your paper in on time.

Each student must do his/her own work; plagiarism will not be tolerated and will result in a failing grade on the assignment and the student being reported to the Office of Student Conduct and Ethical Development. Prior to grading, all papers will be scanned by Turnitin.com. Your instructor will provide additional information regarding use of turnitin.com.

### **Form and Style Guidelines**

Your paper should:

- be written in narrative, paragraph format;
- be written in formal style-3<sup>rd</sup> person only (do not use 1<sup>st</sup> or 2<sup>nd</sup> person, such as “we”, “I” or “you”);
- use “past tense” when describing the research;
- be typed, double spaced, and 3-4 pages in length;
- be in a font size that is New York Times 12 point or similar size (easy to read);
- be left justified (do not right justify/align, which centers text) and have 1 inch margins;
- be submitted in a plain file folder with your name in the tab along with a copy of your references in APA format. Include Grading Sheet and Plagiarism Contract as the first page.

### ***Guidelines for Critical Evaluation:***

Be sure to consider the suggestions from lecture and the handout “How to Understand and Interpret Food and Health-Related Scientific Studies” for analyzing the articles. Using the following questions as a guide, please critically evaluate each section of the paper. Use the following questions as a guide:

## **KIN/NUFS 163 RUBRIC FOR CRITICAL ANALYSIS OF SCIENTIFIC LITERATURE**

“A” papers (receiving 90% or more of the total points) have the following characteristics:

- carefully follow the content guidelines given by the instructor; answer all questions posed on the critique outline;
- carefully follow the guidelines for format; which includes not exceeding by more than one-half page the maximum double-spaced pages allowed;
- are written in standard English, at an upper division college level, with complete sentences and appropriate paragraphs;
- are free of redundancies, and have, at most, only 2-3 spelling and/or grammatical errors;
- develop each section of the critique in a clear and logical fashion; have smooth transitions from one sentence or idea to another;
- include insightful interpretation that goes beyond the obvious or what the authors disclosed;
- covers all of the major aspects of the assignment without going off track or padding;
- are turned in on the due date and prior to the start of lecture.

“B” papers (receiving 80-89% of the total points) usually differ from an “A” report in *one or more* of the following ways:

- show less care in following the guidelines
- have a few lapses in good writing;
- have less than full clarity in expression of ideas and interpretations;
- show some tendency to go off track, pad the paper or have redundancies;
- are turned in one day or partial day (after the start of lecture) late.

“C” papers (receiving 70-79% of the total points) usually differ from an “A” paper in *more than one* of the following ways:

- show minimal care in following guidelines;
- have more than a few lapses in good writing;
- use some ambiguous descriptions in the analysis or interpretation;
- go off track, pad the paper or have redundancy in more than one instance;
- are turned in two days after the due date

Papers less than “C” (receiving less than 70% of the total points) usually differ from an “A” paper in *more than one* of the following ways:

- Do not follow guidelines;
- Are poorly written;
- Fail to interpret information correctly, or answer statements clearly;
- frequently wander off track, are “padded” with extraneous information, or are redundant;
- are turned in more than two days after the due date.

## CRITICAL ANALYSIS OF SCIENTIFIC LITERATURE

### Purpose:

This assignment will help you understand how to critically read and analyze research articles.

\*\*Your instructor will make an article available on either their web page or Canvas.

### Directions

In a 3-4 page essay, answer all of the following questions based on the article provided:

1. What is the research problem? Another way to think about this is: Why was this research conducted?
2. Describe the hypothesis/hypotheses stated by the author(s)?
3. A. Who were study participants (how many were there? How were they recruited? B. Describe the inclusion/exclusion criteria.
4. Describe the study design.
5. Briefly give the study results.
6. Did the study results support the authors' hypothesis/hypotheses? Why or why not?
7. What was/were the limitation(s) and strength(s) discussed by the author(s)? List other strengths and weaknesses you were able to identify that may not have been discussed by the author(s).
8. A. What conclusion(s) did the author(s) make? B. Describe the suggestions about how the research findings can be applied. If no suggestions were given, in 3<sup>rd</sup> person describe how you think the findings could be applied. Also, describe direction for future research given what is now known, and given what this paper has reported.

Use your own words to discuss the answers using information from the article. Cite in APA format when appropriate. Do not include the questions. Your paper will be turned into turitin.com to check for plagiarism.

Please check with your instructor for further instructions as to how to turn in assignments.

San Jose State University  
NUFS/KIN 163- Physical Fitness and Nutrition  
Departments of Kinesiology and Nutrition, Food Science & Packaging

**Please attach to first page of assignment, along with grading rubric which follows.**

Name \_\_\_\_\_

### PLAGIARISM CONTRACT

I acknowledge that I have not committed plagiarism in the process of writing this paper. I have cited the appropriate sources and given credit to the authors' works. I also acknowledge that this paper is my own work and that I have not plagiarized or received answers from fellow classmates or other students.

I understand that plagiarism will result in a ZERO for the paper, and other possible academic sanctions, including a report to the appropriate academic authorities.

Signature \_\_\_\_\_ Date \_\_\_\_\_

**GRADING SHEET FOR RESEARCH ARTICLE INTERPRETATION**  
 ATTACH THIS SHEET TO THE FRONT OF YOUR PAPER

<b>CATEGORY</b>			
<b>Followed directions, writing, format</b>	Major flaws in directions, writing, format.	Followed some, but not all directions; some errors in writing, and/or some formatting errors.	Flawlessly followed directions, writing, format.
<b>Possible Points</b>	<b>0-1</b>	<b>2-4</b>	<b>5</b>
<b>Your points</b>			

	<b>Poor; showed lack of understanding</b>	<b>Average</b>	<b>Very good-excellent Shows high level understanding</b>
<b>Question 1</b> Stated problem clearly	<b>0-2</b>	<b>3-4</b>	<b>5</b>
<b>Your points</b>			
<b>Question 2</b> Described hypothesis/research question/goal clearly	<b>0-2</b>	<b>3-4</b>	<b>5</b>
<b>Your points</b>			
<b>Question 3</b> Participants, inclusion, exclusion criteria	<b>0-2</b>	<b>3-4</b>	<b>5</b>
<b>Your points</b>			
<b>Question 4</b> Described study design	<b>0-2</b>	<b>3-4</b>	<b>5-6</b>
<b>Your points</b>			
<b>Question 5</b> Described results clearly	<b>0-2</b>	<b>3-4</b>	<b>5-6</b>
<b>Your points</b>			
<b>Question 6</b> Results relative to hypothesis/research question/goal	<b>0-2</b>	<b>3-4</b>	<b>5-6</b>
<b>Your points</b>			
<b>Question 7</b> Limitations & strengths described	<b>0-2</b>	<b>3-4</b>	<b>5-6</b>
<b>Your points</b>			
<b>Question 8</b> future research; conclusions, applications,	<b>0-2</b>	<b>3-4</b>	<b>5-6</b>
<b>Subtotal</b>			

• -5% if late (for each calendar day or partial day late) Deductions \_\_\_\_\_  
**Your Total** \_\_\_\_\_

## **GUIDELINES FOR ORAL PRESENTATION**

Using assigned specific topics, each group will be required to engage in a cooperative effort whereby *each* individual in the group will be allowed approximately **5-6 minutes** to lead a discussion on their own article (original research) related to the assigned topic. Each individual should try to take a different side of the topic, using a different journal article. Your instructor will assist you in determining topics for your presentation, and the presentation should go beyond the scope of the textbook. Students are encouraged to use current topics in nutrition and exercise or controversial issues. Instructor approval is needed (1 week in advance) regarding the appropriateness of your article.

**Preparation:** Each student is required to review **one original research article** (primary reference), but can also use textbooks for additional background and support. Information from this article must be incorporated into the presentation, and all reference(s) must be cited by authors' last names and year of publication during the presentation. Each student in the group will present a different study dealing with a unique aspect of the overall topic. When possible, a variety of opinions should be presented.

### **Presentation**

- The presentation should include an evaluation (critique) of the research article, including the purpose of the research, methodology, results, conclusions, limitations, and applications to the "real" world. Compare and contrast studies. Students are encouraged to evaluate studies that provide differing results. Students should be creative and use any or all of the following in their presentations: demonstrations, visual aides (overheads, charts, handouts), and other techniques to inform and interest the class. Place your requests for University audiovisual equipment at least 7 days before your presentation. If using PowerPoint, bring presentation on a memory stick.
- The instructor, as well as other students will pose questions to the group after the presentation. Discussion of the presentation can help to assess the class knowledge of the presented material. Material in these oral presentations will then be tested in class exams.
- The group should collaborate on an introduction to the topic, as well as a conclusion that provides a summary and "take home message."

**Paper:** Each student will provide a paper (typed) to the instructor prior to the presentation, along with the appropriate grading sheet. This paper serves as "Analysis of Scientific Literature #2" and should follow the same format and instructions used for the first Analysis of Scientific Literature. This paper will be corrected separately from the presentation and returned to students.

### **EVALUATION OF THE ORAL PRESENTATION WILL BE BASED ON:**

1. Adherence to time guidelines;
2. Organization of presentation/preparedness;
3. Clarity and evidence of understanding the material;
4. Effectiveness of oral presentation (delivered without excessive reliance on notes);
5. Originality of material presented (not copied verbatim from references);
6. Adequate review of research articles;
7. Ability to critically evaluate scientific research;
8. Ability to define/demonstrate practical application of the material;
9. Effective use of visual aids/ability to interest audience;
10. Appropriateness of nutrition/fitness topic;
11. Ability to compare & contrast article with other articles in group/contribution to group summary & conclusions.

This assignment is worth a total of 50 points and grades will be assigned as follows:

1. Up to 25 points for each individual contribution
2. Up to 25 points as a group grade (the group grade will be the average percentage of the sum of the individual grades)

**SUGGESTED TOPICS FOR NUTRITION PRESENTATIONS**

**Please choose from this list or choose your own topic (approved by instructor)**

**LIPIDS / FAT**

Possible sub-topics

- Dietary fat recommendations/needs for children (< 2 yr olds), elderly
- Dietary fat and risk for various cancers
- Omega-3 fatty acid (linolenic acid) and treatment or prevention of diseases
- Fat replacements used in the food industry

**PROTEIN SUPPLEMENTS**

Possible sub-topics

- Whey protein supplements for weight (muscle) gains
- Glutamine and the immune system and/or muscle recovery in athletes
- Creatine supplementation: effects on strength performance OR effects on endurance performance
- Nitrogen balance studies in determining protein needs for athletes
- Branched-chain amino acids and exercise performance

**DRUGS, SUPPLEMENTS & HERBS FOR WEIGHT CONTROL**

- Possible sub-topics:
- Evaluating hydroxycitrate supplement for weight loss
- Evaluating chromium supplements for weight loss
- Evaluate pyruvate supplements for weight loss
- Evaluate/review the “Phen-Fen” drugs
- Evaluate/review the over-the-counter drug phenylpropanolamine, Alli, etc.
- Evaluate ephedrine (ephedra), EGCG, ginseng or Hoodia and weight loss

**DISORDERED EATING ISSUES**

- Possible sub-topics
- Eating disorders: case studies, adverse complications, therapies, etc.
- Childhood obesity: prevalence, causes, and treatment
- Research in the area of obesity and genetics
- Adult obesity

**VITAMINS & MINERALS IN HEALTH**

- Possible sub-topics
- Vitamin E's role in reducing risk of heart disease or cancer
- Zinc and the common cold
- Folic acid deficiency and birth defects
- Folic acid, B6, and/or B12's role in preventing heart disease
- Iron deficiency effects in the young (children)
- Vitamin D status and supplementation in the older population

**VITAMINS, MINERALS & HERBS IN EXERCISE PERFORMANCE**

- Possible sub-topics
- Iron deficiency & anemia in female athletes
- Coenzyme Q10 and exercise performance OR Ginseng supplementation and exercise performance
- Vanadium and body composition
- Antioxidant supplementation (such as vitamin E and vitamin C) and exercise
- Medium-chained triglycerides (MCTs) supplementation and exercise performance/body comp

### **SUGGESTED TOPICS FOR FITNESS PRESENTATIONS** **EXERCISE AND AGING**

Possible sub-topics:

- Effects of training on muscle strength and/or muscle mass of older adults, including underlying mechanisms
- Effects of training on cardiovascular function in older adults, including underlying mechanisms
- Effects of exercise on aging and changes in flexibility
- Effects of training on body composition in older adults.
- Exercise and the prevention of falls in older adults, as well as other changes in balance and equilibrium

### **EXERCISE AND COGNITION**

Possible sub-topics:

- Effects of exercise on cognitive functions
- Exercise and brain-derived neurotrophic factors
- Exercise and prevention/treatment of Alzheimer's and/or dementia

### **EXERCISE IN DIVERSE ENVIRONMENTS**

Possible sub-topics:

- Environmental impact on individuals exercising in the heat
- Environmental impact on individuals exercising at high altitudes
- Environmental impact on individuals exercising in polluted environments
- Environmental impact on individuals exercising in cold environments
- Environmental impact on individuals exercising in water environments

### **TRAINING CONSIDERATIONS**

Possible sub-topics

- Effects of de-training on cardiovascular fitness
- Effects of de-training on muscle fitness
- Does strength training affect cardiovascular function
- Effects of overtraining

### **PERFORMANCE ENHANCING DRUGS AND EXERCISE**

Possible sub-topics

- Effects of creatine on training and performance
- Effects of anabolic steroids on training and performance
- Effects of smoking on training and performance
- Effect of caffeine on sport performance
- Effect of caffeine on endurance or strength performance
- Effect of growth hormones on exercise and sport performance

### **EXERCISE PRESCRIPTION FOR DIVERSE POPULATIONS**

Possible sub-topics

- Effects of training on women during pregnancy OR Effects of training post pregnancy
- Role of physical activity in the prevention or treatment of childhood obesity
- Role of physical activity in children with Type II diabetes
- Exercise considerations for obese populations
- Exercise and prevention or treatment of hypertension
- Exercise and prevention or treatment for diabetic individuals



**Please turn in this grade sheet along with your analysis of scientific literature #2 (and the grade sheet for that analysis assignment) plus a copy of the scientific article used (if directed by your instructor). Give all required information to your instructor at the start of your oral presentation.**

1. Adherence to time guidelines				
poor				Excellent
0	.5	1.5	1.75	2
2. Organization of presentation/preparedness				
poor				Excellent
0	.5	1.5	1.75	2
3. Clarity and evidence of understanding the material				
poor				Excellent
0	.5	1.5	1.75	2
4. Effectiveness of oral presentation (delivered without excessive note reading)				
poor				Excellent
0	.5	1.5	1.75	2
5. Originality of material (not plagiarized from text or reference)				
poor				Excellent
0	.5	1.5	1.75	2
6. Adequate review of research articles				
poor				Excellent
0	.5	1.5	1.75	2
7. Ability to <u>critically evaluate</u> scientific research				
poor				Excellent
0	.5	1.5	1.75	2
8. Ability to define/demonstrate practical application of material				
poor				Excellent
0	.5	1.5	1.75	2
9. Effective use of visual aids/ability to interest audience				
poor				Excellent
0	.5	1.5	1.75	2
10. Appropriateness of nutrition/fitness article				
poor				Excellent
0	.5	1.5	1.75	2
11. Ability to compare & contrast article with other articles in group; include contributing to group summary and conclusions, as well as group introduction				
poor	below average			Excellent
0-1	2	3	4	5
Total Points – Individual _____ / 25				
Total Points – Group Average _____ / 25				
<b>GRAND TOTAL POINTS _____ / 50</b>				

## CRITICAL EVALUATION OF CONSUMER PRODUCT

### Purpose of the Assignment

To evaluate a printed or electronic advertisement in an effort to encourage the student to become a more critical consumer. The advertisement will be evaluated by comparing the claims made in the ad to scientific evidence and research findings.

### Assignment Format

**Page 1: Critical Evaluation of Consumer Product Grading Sheet**

**Page 2: Advertisement**

For **Nutrition**: your instructor will give a copy of the nutrition ad to you in class.

However, the original ad will be shown to the class so that actual colors and reference information can be noted.

For **Kinesiology**: you will select your own kinesiology ad. Tape, glue, or staple the original advertisement to an 8.5 by 11 inch sheet of paper. Provide the source of the advertisement, giving title, page, and date of publication. Pick an advertisement that has some substance to it; the less the ad says, the harder it is to critique. Please note: Original advertisements should not come from library sources/magazines!

### **Pages 3-6/7: Evaluation**

This section contains your evaluation of *both* the ad itself and the product advertised; it should be no longer than 3-4 pages. You should comment on the positive aspects (praise) and the negative aspects (criticism) of the ad. Your analysis should be in paragraph form and critical comments should be well developed. You should make limited use of quotations; references should be paraphrased. If you use quotes, statements must be in proper form (e.g., use quotation marks and cite page for quoted material). You must cite your references, using APA format, to support your statements. In the text of your paper, **author & year** should be indicated. When 2 or more authors are cited, "et al.," may be used as per APA format (however, remember to include all names on Reference Page.) For direct quotes, also include page numbers. See examples below:

According to Maughan et al. (1995), creatine supplementation has been shown to significantly increase total body mass in subjects over a 4-week period.

"Caffeine is a diuretic and also stimulates metabolism" (Williams, 2005, p.184).

When critically **evaluating the product**, consider the following questions, if appropriate, but **do not** limit your critique to only these questions:

- Is the use of this product supported by scientific evidence? If so, are there any conflicting results among various studies? Do the subjects' age, health condition, fitness level, etc. match those for whom the ad is directed? Were there limitations and/or flaws in these studies? Describe the studies, as appropriate, to defend your statements and give evidence for or against the claims made in the ad.
- What, if any, contribution would the consumption of the product make to the nutrient intake, physique, or fitness level of the intended consumer?
- Could some less expensive product be used to obtain the same results?
- What hazards/adverse effects might be associated with the use of this product? Are there any conditions (e.g., medical, age-related) that would contraindicate the use of the product?

When critically **evaluating the advertisement**, comment on the text, and use of color and graphics. You need to also consider the following questions:

- Who appears to be the intended consumer?
- What techniques are used to draw the attention of the reader? Are they successful or not? Again, consider wording, terminology, graphics and more.
- Is the ad straightforward and factual? Explain
- Is any important information omitted that should be disclosed to the consumer? What gimmicks are used to sell the product? Were the gimmicks successful?

#### **Page 7 or 8:                   References**

Title- this is a separate page and should be headed “References” at the top of the page.

List the source of the advertisement, and alphabetically list the references used to support your evaluation. Do not alphabetize “within” each reference by changing the original order of authors. However, alphabetize your order among the various references, using the last name of the 1<sup>st</sup> author of each reference.

You may use the course textbooks. However, in addition, **you must use at least 3 other reliable (HIGH QUALITY) references to support your analysis. References need to be current (published within the last 10 years) and must be cited in the evaluation.** Give the full publication information of each reference used, including all author(s), title of article and journal or title of book, year of publication, volume or edition, and page number(s).

Indentation - Although the current *Publication Manual* advises standard (five spaces, first line) indentation for the references list, this is primarily designed to make typesetting easier; the typeset version will have hanging indents (first line flush left, following lines five spaces indent). We recommend for this paper that you use hanging indents for enhanced readability. We have formatted our sample references list with hanging indents.

Capitalization - Capitalize only the first word of book titles and articles and the first word after a colon. However, for name of journals, capitalize first letter of all words.

Punctuation - Use a comma to separate:

- surnames from initials
- a journal title from volume number
- a volume number from page numbers
- when given, an issue number from page numbers
- (Ed.) from book title
- city of publication from state

Spacing - All entries (the entire page) should be **double-spaced**.

References should be completed in American Psychological Association (APA) format. See examples below.

#### **Journal article:**

Volek, J. S., Duncan, N. D., Mazetti, S. A., Putukian, M., Gomez, A. L., & Kraemer, W. J. (2000). No effect of heavy resistance training and creatine supplementation on blood lipids. *International Journal of Sports Nutrition*, 10, 144-156. doi:134-5678-321

#### **Book (Other than first edition):**

San Jose State University  
NUFS/KIN 163- Physical Fitness and Nutrition  
Departments of Kinesiology and Nutrition, Food Science & Packaging  
Whitney, E., & Rolfes, S. (2005). *Understanding nutrition* (10<sup>th</sup> ed.). Belmont, CA: Thomson  
Wadsworth.

**Article or chapter in edited book:**

Eiser, S., Redpath, A., & Rogers, N. (1987). Outcomes of early parenting: Knowns and unknowns. In  
A. P. Kern & L. S. Maze (Eds.), *Logical thinking in children* (pp. 58-87). New York: Springer.

**Electronic Reference** (see note of caution below):

Mack, G. W., & Bergeron, M. F. (May 30, 1997). *Hydration and physical activity: Scientific concepts  
and practical applications*. Retrieved from: <http://www.gssiweb.com/hydr.html>

**Quality of References:** Acceptable references include any reliable, professional, nutrition, physical education, sports medicine, or scientific journal or book. Unacceptable references include popular magazines (e.g., *Runner's World*, *American Health*, *Prevention*, *Muscle and Fitness*) or popular books (*The Zone Diet*, *Fit for Life*, *50 Ways to Stay Fit on a Busy Schedule*, *Total-Life Exercise Book*). **IF YOU ARE UNSURE OF THE RELIABILITY OF A REFERENCE, CHECK WITH YOUR INSTRUCTOR!** Refer to the syllabus for a partial list of acceptable periodicals and on-line resources.

You may contact our Reference & Instruction Librarian, *see green sheet for contact information* to make an appointment at the library for help in using the databases and searching for appropriate references.

**Use of WWW pages:** The World Wide Web (WWW) is an unmonitored, unrefereed source of information. Consequently, information may be accurate or inaccurate, and each page must be judged for accuracy and reliability. Authoritative web pages are written by individuals with appropriate credentials (e.g., Ph.D., R.D., M.D., etc.) and should cite references used to write the page. Pages that are sponsored or maintained by the seller of a product are most often biased toward the product and should be read with this in mind. We highly recommend only journal articles (or articles coming from professional sources) from the internet be used. Again, if you are unsure of the reliability of the source, check with your instructor.

**General Paper Form and Style Guidelines**

Your paper must:

- be written in narrative, paragraph format, typed and double spaced
- be written in the 3<sup>rd</sup> person (do not use first or second person, such as “we”, “I” or “you”)
- be written in the past tense when describing the research study
- be in a font size that is New York Times 12 point or similar size (easy to read)
- be left justified (but do not right justify/align, which centers the text); have 1 inch margins all around
- have numbered pages
- submitted in the manner requested by your instructor, including the grading rubric and plagiarism contract.

Name \_\_\_\_\_

**CRITICAL EVALUATION OF CONSUMER PRODUCT GRADING SHEET**  
*(please attach this sheet to the front of your paper)*

Format/appearance/organization

Poor				Very Good
0-1	2	3.5	4	5

References (number, quality, complete reference information in APA format)

Poor				Very Good
0-1	2	3.5	4	5

Use of references in paper (appropriate citations for all references)

Poor				Very Good
0-1	2	3.5	4	5

Quality of writing (syntax, grammar, spelling)

Poor				Very Good
0-5	6	7-8	9	10

Critical evaluation of advertisement (text, color, graphics)

Poor				Very Good
0-5	6	7-8	9	10

Critical evaluation of product (how claims of ad relate to scientific evidence)

Poor				Very Good
0-7	8-9	10-11	12-13	14-15
				Subtotal

Subtotal \_\_\_\_\_

Deductions:

- 5 points are deducted for each day late, Monday through Friday

Deductions \_\_\_\_\_

**Total possible points = 50**

**Your Total** \_\_\_\_\_

**PLAGIARISM CONTRACT**

I acknowledge that I have not committed plagiarism in the process of writing this paper. I have cited the appropriate sources and given credit to the authors' works. I also acknowledge that this paper is my own work and that I have not plagiarized or received answers from fellow classmates or other students. I understand that plagiarism will result in a ZERO for the paper, and other possible academic sanctions, including a report to the appropriate academic authorities.

Signature \_\_\_\_\_ Date \_\_\_\_\_