

Guide to Writing Your Primary Research Paper

Your Research Report should be divided into sections with these headings: Abstract, Introduction, Methods, Results, Discussion, and References.

Introduction: the "WHY" section (min: 1 page)

- state the purpose and rationale for your project
- state your research question succinctly, clearly, and thoroughly
- state why it is important to address this question
- describe the population to be studied
- identify the impact of your research results (think “big picture”)

Written Example for Research Question: How is caffeine consumption associated with memory?

INTRODUCTION

Some teenagers describe themselves not being “morning” people—they report feeling their best, both physically and mentally, after the morning hours have passed. In fact, few adults under the age of 65 (less than 10%) report a preference for morning (Peterson & Rocchi, 1998). Teens (age 18 and younger) seem to have an even stronger preference for non-morning hours. It seems that the preference for “optimal” times of the day corresponds to peak cognitive performance. It is likely that poor cognitive function at non-optimal times of the day is related to a general decrease in physiological alertness, because self-reported time-of-day preferences correspond to fluctuations in physiological measures such as body temperature and heart rate (Horne & Ostberg, 1976). If cognitive performance is influenced by these changes in alertness, one might expect that performance might be enhanced by substances that increase alertness.

The most widely used stimulant in the general population is caffeine, which is available in many food sources, such as coffee, tea, and chocolate (Lieberman, 1992). Participants report that a moderate dose of caffeine makes them feel more awake, alert, and attentive. The purpose of this study was to determine if caffeine improves one measure of cognition—memory—when ingested in the morning (the less optimal time for most teens), compared to the afternoon. This study has practical implications for researchers interested in studying factors that improve cognition, alertness, and physical performance. Although the test in the present study determines memory performance, results may suggest further research should be conducted related to how caffeine affects reaction times in driving, how caffeine might be used in dementia and Alzheimer’s patients, and much more.

Methods: the "HOW" section (min: 1 page)

- Explain the study design (survey, interview, focus groups, etc.)
 - Explain procedures for data collection (primary or secondary) and include how and why you chose the data source
 - Identify the study population (ex: age, gender, and other characteristics) & give rationale
 - Define how Risk Factor(s) (IV) and Outcome (DV) were measured
 - Explain the analytical methods used. Describe any calculations you performed with enough detail so that a knowledgeable person with access to your original information can verify the results you report
 - Explain why the analyses you carried out were appropriate for your study design.
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Outline Example for Research Question: How is [caffeine consumption](#) associated with [memory](#)?

METHODS

A. Participants (Population)

1. Characteristics of sample

- a. n = 20
- b. between ages 14 and 16
- c. all female
- d. no mental impairments, no history of drug abuse, or any other problems that might result in impaired performance on the memory test

2. Recruitment

- a. One female Advisory was given a letter of consent informing them of the purpose, methods, and confidentiality of the study
- b. May not be the best representative sample, but was chosen for convenience

B. Procedure

1. Study Design: Cross-sectional (Survey)

- a. Questions about caffeine consumption that day
- b. Quick memory test performed after the survey
- c. May have limited reliability because it relies on self-reported information
- d. Small sample who had ingested caffeine products may cause data to be statistically insignificant

2. Procedure (Data Collection)

- a. Memory Test: California Verbal Learning Test (CVLT)
 - i. participants are read 16 words and are tested for memory
 - ii. measures free recall immediately & after delays of 10 min.
 - iii. measures yes/no recognition or words including "distracter" words
- b. Caffeine Consumption Survey
 - i. 3 questions about caffeine consumption
 - ii. 2 questions about preferences for time-of-day of greatest alertness

C. Data Analysis

1. 2x2 table set up with:

- a. RF: no caffeine; NO RF: caffeine
- b. Outcome: Below avg. memory (bottom 50%); No Outcome: Above avg.

2. Relative Risk calculations performed

Results: what did you find? (min: 1 page)

- Present the clear, concise, and comprehensive answer to your research question
- Present any other findings that are meaningful and very aligned to your research question
- Use text, tables, and graphs (minimum = 2)
- Try not to repeat information in your text that is shown in your tables and figures; instead summarize the findings from each table and figure.
- Do not include tables listing each participant and their data points – that is your database, not your results!

Written Example for Research Question: How is caffeine consumption associated with memory?

RESULTS

The purpose of this study was to determine if caffeine improves one measure of cognition—memory—when ingested in the morning (the less optimal time for most teens), compared to the afternoon. Table 1 shows that that subjects who self-reported that they consumed caffeine did perform 40 percent better on memory tests relative to subjects who had not consumed caffeine.

Table 1: 2x2 Table for Caffeine Consumption's Effect on Memory Performance for 19 high school female subjects all tested at 8am

	Outcome: Performed Below Average on Memory Test	No Outcome: Performed Above Average on Memory Test	Total
Risk Factor: Subjects who did <u>not</u> consume caffeine (n=13)	6	7	13
Non-RF: Subjects who <u>did</u> consume caffeine (n=6)	2	4	6
Total	8	11	18

Table 1: This table was used to calculate relative risk of not consuming caffeine on performance on a memory test in the morning. Relative risk was 1.4. All subjects were 15-16 year old females.

In addition, we found that there was an overall improvement in performance in the afternoon subjects compared to the morning subjects, whether or not they had consumed caffeine (see Table 2). This supports the hypothesis that teens are more alert and able to recall information on a cognitive memory test during their preferred optimal learning times of the day, which are after the morning hours. However, this does not prove that caffeine can effectively ameliorate this problem of decreased alertness and memory recall in the morning.

Table 2: (not shown here)

Discussion: What do your results mean? “SO WHAT?” (min: 2 pages)

- Describe how your results fit or do not fit with previous research studies
 - Emphasize the new and important aspects of your project, and the conclusions that justifiably can be drawn from the findings
 - Describe the meaning and implications of your results. Provide sufficient detail to support your interpretation.
 - Discuss the strengths and limitations of the study (ex: sample size)
 - Address alternative ways to approach the question (It's ok to explain that your method was the most feasible, realistic, or available way for you to conduct the study)
 - Explain how your conclusions could lead to follow-up research
 - Outline any unanswered questions related to the project and explain how those could be addressed in a subsequent study
 - Discuss ways in which you might improve upon or modify the study to move the results forward
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References (minimum 3 'in-texted cited' sources for Primary)

- Include as a separate page at the end of your paper
- Whenever you use information from other sources you must include the author's last name and the year of publication for the source in the text, e.g., (Jones, 1998), and a complete reference should be listed at end of your paper. (see MLA guide sheet for more explanation)

Example: Can you find the journal article in this source list?

This handout provides an example of a Works Cited page in MLA 2009 format.

Works Cited

- "Blueprint Lays Out Clear Path for Climate Action." *Environmental Defense Fund*. Environmental Defense Fund, 8 May 2007. Web. 24 May 2009.
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- Ebert, Roger. "An Inconvenient Truth." Rev. of *An Inconvenient Truth*, dir. Davis Guggenheim. *Rogerebert.com*. Sun-Times News Group, 2 June 2006. Web. 24 May 2009.
- GlobalWarming.org*. Cooler Heads Coalition, 2007. Web. 24 May 2009.
- Gowdy, John. "Avoiding Self-organized Extinction: Toward a Co-evolutionary Economics of Sustainability." *International Journal of Sustainable Development and World Ecology* 14.1 (2007): 27-36. Print.

Abstract (1 paragraph)

- What is an Abstract? A short, clear, and carefully written summary of your research study! (see examples below)
 - Comes at the beginning of paper (before Introduction)
 - Concisely summarizes:
 - Purpose (research question)
 - Methods
 - Results
 - Key conclusions from Discussion
 - You'll need to create a title for your paper as well. This should include the variables you studied—both risk factor(s) and outcome! (see examples below)
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Abstract Examples

Energy Epidemic: Teen Perceptions and Consumption of Energy Drinks

Abstract

Teenagers are attracted to the boosts of energy and social popularity energy drinks provide, but are not aware of the risks of consuming them. This multi-variable study examined youth consumption of energy drinks, reasons for use, awareness of ingredients, side effects, and warnings. The results indicate teenagers are using energy drinks for a variety of self-reported purposes, most frequently studying and social functions. Energy drink usage was dependent on age and gender. Older students were the most likely to consume energy drinks. Females drink fewer energy drinks than males (both per month consumption and trial incidence). The study showed that 45.5% of students consume energy drinks at least once a month; 36.5% consume two or more energy drinks in a single day. Several findings are of particular concern: 1) This study documented high incidence of energy drink consumption by children, on both a trial and regular basis. By age 12, one in three surveyed students had tried energy drinks. By age 14, 80% had tried an energy drink. Over half of 16-year-olds surveyed consume one or more energy drinks per month. 2) Males have a higher incidence of trial (70.7% of males vs. 50.8% of females) and routine consumption than females. 3) The sample studied showed a lack of awareness of levels of stimulants in, and risk pertaining to consumption of energy drinks. This naiveté makes youth vulnerable to marketers' emphasis on positive effects of energy drinks, while unaware of negative side effects and associated risks.

Adolescent Smokers' Perceived Risk of Cigarette Use

Abstract

Little is known about risk perceptions of adolescents already engaged in risk behaviors. This study aimed to quantify adolescent smokers' perceived risk of smoking and to explore the association of demographic and social characteristics with this perceived risk. Data were obtained from the 2007 Minnesota Student Survey, administered to a total of 136,549 students in grades 6, 9, and 12. The 15,562 students who identified themselves as smokers were included in this study. The association between perceived risk of smoking and demographic and social characteristics was explored through bivariate and multivariate analyses. Among all smokers, 10.0% perceived no risk, 14.8% perceived slight risk, 29.3% perceived moderate risk, and 45.9% perceived high risk of smoking. Perceptions of smoking risk varied significantly across demographic and social groups in bivariate and multivariate analyses. Holding lower perceptions of smoking risk was associated with being younger, male, African American, receiving free or reduced-price lunch, having a

lower GPA, more frequent cigarette use, friends' approval of smoking, and lack of information about drugs and alcohol. Sources of drug information associated with higher perceived risk of smoking were friends/peers, school, and media. Adolescent smokers' perceived risk of smoking varied from no to high risk. Variations in smoking risk perception across demographic and social groups point to potential targets for smoking education as well as strategies likely to increase the effectiveness of smoking education.

Does Facebook Prevent Alzheimer's? The Relationship Between Online Social Networking and Cognitive Function in Senior Citizens

Abstract

Alzheimer's disease (AD) is a form of dementia, where there is loss of cognitive function. About 30% of senior citizens (ages 60 and over) in the U.S. are diagnosed with AD, and the number will increase rapidly due to longer life spans. Many researchers agree that AD will become the most prevalent chronic illness that future generations will face. Studies have shown that constant mental activity, novelty-seeking learning, and social interactions are great factors in preventing cognitive function loss, particularly AD. Online social networks such as Facebook, require members to learn to use the sites and various computer aspects and to interact with other members. The problem examined was whether elderly people that use online social networks have higher cognitive function levels than those that do not. It was hypothesized that active elderly online social networkers do retain higher levels of cognitive function, and therefore have lower chances of developing AD. Exactly 213 senior citizens were surveyed whether or not they used an online social network(s), and given a cognitive function test called the Mini Mental State Exam (MMSE), validated and extensively used in both clinical practice and research. Higher scores on the test indicated higher levels of cognitive function. A t-Test was run, and it showed that the online social networking senior citizens have statistically significant higher levels of cognitive function than the non-networking. A positive correlation between online social networking and cognitive function levels can be seen. Online social networking might be an effective prevention method for AD.