

**Oklahoma State University**

**Fire Protection & Safety Engineering Technology**

**Student Guideline**  
**for**  
**Written Work**

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## **Introduction**

This guideline is intended for student use for all writing assignments in the OSU Fire Protection and Safety Engineering Technology (FPST) e.g. essays, term papers, and senior projects. Submit all papers into Brightspace in MS Word® format unless otherwise directed by the instructor.

There are two components to written work. The first component of writing is content, what you are writing about, demonstrating your understanding of the subject. The second component of writing is structure, how you present your material, demonstrating your ability to follow rules of convention and the assignment. Failure to complete both components of writing results in poor delivery to the reader and a correspondingly poor grade.

Use of the OSU Writing Center for assistance with content and structure is strongly encouraged. Visit the OSU Writing Center's webpage here: <http://osuwritingcenter.okstate.edu/>. Another excellent online resource for writing development and improvement is the Purdue University Online Writing Lab (OWL) <https://owl.english.purdue.edu/owl/>.

### **Paper Development Grading Criteria**

Every graded step of the assignment must be turned in to receive at least the minimum non-zero score in each category. In all cases, refer to the course syllabus and assignment instructions for specific grading criteria. An example of what to be turned in is included in each step description below along with an accompanying grading matrix.

<b>Paper Development Grade</b>			
		Milestones	Points
Step 1	Week 1	Read FPST Guideline for Written Work	n/a
Step 2	Week 2-3	Create Title and Thesis Statement	12
Step 3	Week 4-5	Literature Review	15
Step 4	Week 6	Create Descriptive Abstract	18
Step 5	Week 7	Create Content Outline	20
Step 6	Week 8 - 10	Create a rough draft	P/F
Step 7	Week 11	Peer Review	5
Step 8	Week 12-14	Revise 2 <sup>nd</sup> draft	20
Step 9	Week 15-16	Submit Final draft	10
Total			100

## **Step 1 – Week 1 – Read this Document**

**Read this entire guideline (emphasis on step 6)** and the instructions for your writing assignment. Grading criteria and examples of what to turn in at each step begin on page 6. Highlight key requirements. Begin researching interesting topics for your paper that fulfil the assignment's requirements. **Set up MS Word® to check for grammar and style errors using appendix 1.1**

Use the APA template provided in to begin your paper. Each step in this guideline should use the APA template in your progress, understanding that several sections may be blank. For senior projects, meet with faculty members and find one who agrees to be your adviser.

[Appendix 1.1 – Changing Settings in MS Word](#)

[Appendix 1.2 – Choose a Writing Style \(Mac\)](#)

## **Step 2 Week 2-3 – Create Title and Thesis Statement**

Create and submit the title and thesis statement for your paper; the title should encompass the topic upon which you will be writing about. Keep track of interesting or useful articles for use in Step 3. Note: your thesis statement may require revision throughout your writing process. Your thesis statement should appear in your introduction section of the final paper. Use the embedded guide to assist you in developing a sound thesis statement. For senior projects, you will likely need to go through multiple revisions with your adviser, so begin early.

Grading – Title (3 points)

0. Little to no effort, e.g. “Hangovers”
1. Minimally complete, e.g. “Preventing Hangovers”
2. Properly developed topic, “Review of Techniques for the Prevention of Hangovers”
3. Compelling and original topic, “Review of Medical Evidence to Support Common Urban Legends for the Prevention of Hangovers”

Use the following appendices assist you in developing your Thesis Statement.

[Appendix 2.1 Creating a Thesis Statement](#)

[Appendix 2.2 Thesis Statement Grading Rubric \(9 points\)](#)

[Appendix 2.3 Example Title and Thesis Statement](#)

## **Step 3 – Week 4-5 – Conduct Literature Review**

Conduct the literature review for your paper. Submit your references for your literature review using the APA 6<sup>th</sup> edition style format. Check with your instructor to determine how many sources required for the assignment to describe the topics discussed in your paper sufficiently.

As a guide,

- lower-division papers should use 3-5 primary sources,
- upper-division papers 5-8 primary sources, and
- senior project 10-20 primary sources.

The use of primary sources is in addition to secondary and tertiary sources you may need to reference in your work. Google and Wikipedia are useful tools for finding a topic for your paper, however, these websites are not appropriate for conducting a literature review for primary sources (with the exception of Google Scholar).

Avoid the temptation to use the citations in Wikipedia as your source; you must find the original source of the information. Your primary tool for conducting a literature review is the OSU Library's BOSS (Big On-line Search System). Use the "Advanced Search" feature and select "journal articles." Before using BOSS, use Appendix 3.1 to help determine appropriate keywords and phrases to search:

Find the BOSS at this link: [OSU Big Orange Search System \(BOSS\)](#)

Use the following appendices assist you in developing your literature review bibliography.

[Appendix 3.1 – Database Search Tips](#)

[Appendix 3.2 – Primary Secondary and Tertiary Sources](#)

[Appendix 3.3 – APA Citation Guide](#)

**Use of the built-in citation and references tool in MS Word® is strongly encouraged.**

Use the following appendices assist you in your citations and creating your reference section.

[Appendix 3.4 – Create a Bibliography](#)

[Appendix 3.5 – Literature Review Grading Rubric \(15 points\)](#)

[Appendix 3.6 – Example Reference Section](#)

#### **Step 4 – Week 6 – Create Abstract**

Create and submit a descriptive abstract for your paper. A descriptive abstract is not a summary of your results; rather it is an explanation of what your report will contain. Be cautious to avoid anthropomorphizing your paper. Your paper cannot perform any of the following actions: describe, explore, cover, etc. For the "Keywords" section of the abstract, include the main search terms used in the BOSS search. Use the embedded guide to assist you in developing a pithy abstract. See paragraph 2.04 of the APA Style Guide for additional information. Abstracts must be between 75 and 150 words.

Use the following appendices assist you in your citations and creating your reference section.

[Appendix 4.1 – Writing Abstracts](#)

[Appendix 4.2 – Abstract Rubric \(18 points\)](#)

[Appendix 4.3 – Example Abstract](#)

### **Step 5 – Week 7 – Create Outline**

Create and submit a content outline for your paper. The content outline should follow the appropriate sections of the style of paper you are submitting. Common APA styles include:

- Empirical Studies (original experimental research – typical for graduate work)
  - Introduction (does not get a heading)
  - Method (describe how the study was conducted, including Literature Review)
  - Results
  - Discussion (Summary, interpretation, implications)
- Literature Reviews (summary of existing work – typical for undergraduate work)
  - Introduction (does not get a heading)
  - Define and clarify the problem
  - Summarize previous investigations/work (Literature Review)
  - Identify relations, contradictions, gaps
  - Suggest next steps in solving the problem identified in the thesis statement
    - See note in Step 8 on argument
- Theoretical Articles (expand, refine, or critique existing theory)
- Methodological Articles (description of an approach or method)
- Case Studies (observational analysis, typically used for proposing empirical studies)

The outline should help you organize your thoughts into a coherent structure. Each section of the content outline must connect to the sources of the literature review.

Use the following appendices assist you in your citations and creating your reference section.

[Appendix 5.1 – Effective Outlines](#)

[Appendix 5.2 – Outline Rubric \(20 points\)](#)

[Appendix 5.3 – Example Outline](#)

### **Step 6 – Week 8-10 - Create a Rough Draft**

Create a rough draft for your paper. As a guide:

- lower division papers should be 5-7 body pages,
- upper division papers should be 10-14 body pages, and
- senior projects should be 20-28 body pages.

Body pages are the main written content of the paper and do not include the title page, abstract, reference pages, figures, tables, or appendices. The rough draft should be mindful of APA style conventions, but the focus of the rough draft is content. Some key elements of APA style:

- Times New Roman 12 point font
- One inch margins
- No graphics on the title page
- All figures and tables follow the Bibliography section and are not in the body of the paper
- Use Active Voice
- Write in the 3<sup>rd</sup> person point of view
- Avoid unnecessary words and meaningless filler phrases

Properly provide a citation for all statements of fact. Direct quotes from another author must be in quotation marks and properly cited. Unless the author has stated something particularly profound, or if paraphrasing would degrade the author's meaning, the points of the work should be paraphrased. Under no circumstance should more than 5% of the paper consist of direct quotes; grade deductions will result from the excessive use of direct quotes.

### **Writing Tips**

- Never begin a sentence with “It is” or “This is.”
  - Ask yourself, “What is” then replace “It” or “This” with the proper subject that you are trying to describe.
  - Avoid ambiguity, your reader cannot ask you a clarifying question.
- Never begin a sentence with “But,” “So,” or “Because.”
  - Consider using “Therefore.”
- Do not use contractions.
- Write in the 3<sup>rd</sup> person, Avoid “I” or “we” and “you.”
  - Consider using “the reader.”
- Avoid colloquialisms, clichés, puns, hyperbole, and rhetorical questions.
  - These are formal writing assignments, do not use phrases such as,
    - “At the end of the day”
    - “cut and dried.”
    - “pros and cons”
    - “As previously stated”
- Do not begin a sentence with a numeral, spell out numbers less than 10, use commas to separate thousands, see APA 4.31-4.38
- Use metric units
- Do not commit [Word Crimes](#).

Use the following appendices assist you in developing your rough draft using proper written English:

[Appendix 6.1 – APA Format Template](#)

[Appendix 6.2 – Writing an Introduction](#)

[Appendix 6.3 – Active vs. Passive Voice](#)

[Appendix 6.4 – Sentence Clarity](#)

[Appendix 6.5 – Prepositional Phrases](#)

[Appendix 6.6 - Split Infinitives](#)

[Appendix 6.7 - Common Grammar and Spelling Errors](#)

[Appendix 6.8 – First vs. Third Person Point of View](#)

[Appendix 6.9 – The Ambiguous Pronoun Reference](#)

[Appendix 6.10 – Avoid Colloquialisms](#)

[Appendix 6.11 – The Oxford Comma](#)

[Appendix 6.12 – Example Rough Draft Paper](#)

### **Step 7 – Week 11 – Peer Review**

Trade rough drafts with a classmate and proofread each other's papers using "Track Changes" in MS Word®. E-mail the file with mark-ups back to your classmate and place a copy in BRIGHTSPACE. Incorporate their edits and acknowledge their efforts in the "Author Note" on the first page. Submit your updated draft to in Brightspace with a note indicating who you have selected as a peer reviewer. Note proofing requirements for group projects below.

Grading – Proofing of peer paper

0. Little to no effort to provide proofing
1. Basic spelling and grammar check
3. Good review of grammar and APA
5. Excellent review of content, grammar, and strict adherence to APA

Use the following appendices to assist you in using track changes for editing.

[Appendix 7.1 Track changes in MS Word®](#)

[Appendix 7.2 Example Draft Paper with Tracked Changes](#)

### **Step 8 – Week 12-14 – Revise paper for 2<sup>nd</sup> Draft**

Create and submit a second draft for your paper. The second draft should focus on incorporating comments and on crisp adherence to the use of proper English and the APA style conventions.

Ensure that the conclusion section has a well-developed argument defending the thesis statement. The thesis statement is the argument; the body of the paper should provide the necessary premises and evidence to support the argument (thesis). See the hyperlinked guides on writing an argument.

<http://www.mesacc.edu/~barsp59601/text/103/notes/1.html>

<http://onlinephilosophyclub.com/elements-of-a-complete-logical-argument.php>

<http://onlinephilosophyclub.com/forums/viewtopic.php?t=2819>

Hiring a copyeditor is strongly encouraged. The OSU Writing Center keeps a list of copyeditors for hire.

Retrieving a copy of the Publication Manual of the American Psychological Association Sixth Edition from the library is strongly encouraged; call number 808.02 P976 2010 (Located on the fourth floor), or purchase from the book store. Use the APA Publication Manual to assist in formatting tables and figures, and to review formatting of headers, cover pages, etc.

A note on the Author Note, the term "supported by" in this context refers to monetary support. An undergraduate paper will not often use "supported by."

### **Remember to update your abstract.**

Review the embedded Written Communication Value Rubric used, in part, in grading your paper. Ensure that your final draft meets the requirements in column four to the best of your ability.



Use the following appendices to assist you in paper editing and improvement.

[Appendix 8.1 Written Communication Rubric \(20 points\)](#)

[Appendix 8.2 Example Paper 2<sup>nd</sup> Draft](#)

### **Step 9 – Week 15 – Submit Final Paper**

Submit your final draft of your paper in Brightspace. Submit senior projects in print and professionally bound. Professionally bound means you pay a service. Using staples, clip-in style binders, or other off-the-self binding applications result in a **significant point reduction**.

### **Group Projects**

In addition to the requirements set forth in steps one through eight, group projects require an additional appendix that details the contributions and roles of each team member. The expectation is that each group member will author portions of the paper. However, the reader should not be able to detect a change in author throughout the paper. The APA style guide's requirement for active voice assists in presenting a single-author tone. English convention is to speak in the passive voice, therefore writing in the active voice assists in speaking directly, rather than the flowing prose of the voice inside the mind. Therefore, groups more easily speak in one voice rather than the individual dialogues in the minds of the authors.

In the content outline, identify the group member to author each section.

In addition to authoring a section of the paper, each group member should be responsible for an aspect of proofreading and editing the group's paper as well as the paper exchanged with another group in the class. Acknowledge the members of the group who proofed your paper in the Author Note.

Proofreading roles may include:

- APA Style
- APA Citations
- Grammar & Spelling
- Technical Content
- Adherence to the requirements of the assignment

**Appendix**

## Appendix 1.1 Changing the Settings in MS Word to Check Grammar

### Why this is important:

MS Word only checks basic spelling and basic grammar by default. However, it also has the capability to help improve writing to a more formal, college level style by giving helpful suggestions and checking for common grammar, style, and punctuation oversights. This handout will detail the steps to change the spell check settings to also perform a grammar check

Note: This will NOT correct errors or always contribute helpful suggestions, but it will help give an idea where common problems occur and where rewording or additional punctuation may help improve the sentence.

### To change the settings on a PC in MS Word (2010/2007 version) -

1. Click “File” at the top left corner and go to “Options”
2. Click “Proofing” from the left side bar
3. Under the section “When Correcting Spelling and Grammar in Word”
  - a. To have Word give suggestions while writing, be sure to have the first 4 check boxes marked – their definitions are listed below
    - i. “Check Spelling as you type” – red lines under misspelled words as you are writing
    - ii. “Use Contextual Spelling”- spelling suggestions based on the context of the sentence
    - iii. “Mark Grammar Errors as you type” –green lines under possible grammar errors as you are writing
    - iv. “Check Grammar with spelling” –Word will check both grammar and spelling during a normal spell check under the review tab
    - v. “Show readability statistics” is optional – brings up a box after a normal spell check that shows you how many words, paragraphs, and characters are in the document and the Flesh Kincaid (estimated) reading level of the paper
4. In the sub-section “Writing Style,” hit the drop down box and choose “Grammar and Style” to check both
  - a. To customize these settings (such as if you are getting the same error over and over and want to stop Word from checking that particular grammatical problem), click on the “Settings” button next to the Writing Style drop down box.
    - i. An example of a reason to customize the settings would be when writing a reflection essay. The check for using first person and passive voice may be needed in a reflection essay, but is typically discouraged in other essays. Thus if you are writing a reflection essay, go into the settings and scroll down to where it says “Passive Voice” or “Use of First Person” and uncheck those boxes.
    - ii. Other things you may want to have MS Word check for:
      1. Comma required before last list item: He needs sugar, salt, and spice.
      2. Punctuation required with quotes: Inside/outside/don’t check (personal preference/professor’s preference)
      3. Spaces required between sentences: 2 (very helpful for consistency)

5. After changing the settings, click the button “Recheck Document” to check the current document using the new settings, then click “ok”. After this, during a normal spell check, Word will also check grammar and style for more formal writing as well.
6. When doing a standard spell check on a PC in Word, and it finds a grammatical error, there is an “Explain” button at the right side of the Spelling and Grammar checking box. This will bring up Word’s help window giving a helpful rule or guide as to why it marked that particular grammatical issue. You can also right click on a green wavy line, and click “About this Sentence” to bring up the same help window.

**To change the settings on a MAC in MS Word (2010/2007 version):**

1. Click on “Word” at the top left corner of the top title bar. Click on “Preferences...” to open the Word Preferences box.
2. Click on “Spelling and Grammar” to open the options box
3. Under the section called “Grammar” look for the sub-section called “Writing Style:”
4. Next to Writing Style, click on the arrows next to “Standard” and change it to “Formal”
  - a. This will change the grammar settings to check for more formal style of writing
  - b. To customize these settings (such as if you are getting the same error over and over and want to stop Word from checking that particular grammatical problem), click on the “Settings” button next to the Writing Style drop down box.
    - i. An example of a reason to customize the settings would be when writing a reflection essay. The check for using first person and passive voice may be needed in a reflection essay but is typically discouraged in other essays. Thus, if you are writing a reflection essay, go into the settings and scroll down to where it says “Passive Voice” or “Use of First Person” and uncheck those boxes.
    - ii. Other things you may want to have MS Word check for under these settings:
      1. Comma required before last list item: He needs sugar, salt, and spice.
      2. Punctuation required with quotes: Inside/outside/don’t check (personal preference/professor’s preference)
      3. Spaces required between sentences: 2 (very helpful for consistency)
5. After changing the settings, click the button “Recheck Document” to check the current document using the new settings, then click “ok”. After this, during a normal spell check, Word will also check grammar and style for more formal writing as well.

## Appendix 1.2 Choose a Writing Style in Word 2011 for Mac

By Geetesh Bajaj and James Gordon from “Office 2011 for Mac All-in-One For Dummies.”

Word 2011 for Mac has writing styles in the Spelling and Grammar preferences. A writing style tells Word in Office 2011 for Mac what rules to follow when checking spelling and grammar. Choose a writing style to be Word’s default by following these instructions:

1. Choose Word→Preferences from the menu bar.
2. In the Authoring and Proofing Tools section, choose Spelling and Grammar.
3. In the Grammar section, click the Writing Style pop-up menu and select a writing style.
  - a. You can tune the settings coarsely by choosing any of these built-in writing style preferences:
    - i. Casual: Word lets a lot of possible mistakes slide. Standard: The grammar checker gets a bit pickier. Formal: Word will be extremely picky.
    - ii. Technical: Grammar checking isn’t as picky as Formal, but different things are looked for than with Standard.
    - iii. Custom: A set of choices that you make.
4. Click OK to close the Spelling and Grammar preferences pane.

Choosing a writing style from the pop-up menu is okay, but you don’t get to see exactly what grammar rules are being checked in your document. If you want, you can fine-tune each of these writing styles to create your own totally customized writing style. All this is done in Word’s Spelling and Grammar preferences pane.

### To see and adjust grammar settings, take the following steps:

1. Choose Word→Preferences from the menu bar.
2. In the Authoring and Proofing Tools section, choose Spelling and Grammar.
3. To the right of the Writing Style pop-up menu, click the Settings button.
4. Choose an option from the Writing Style pop-up menu and click Settings to view the default settings for that style.
  - a. Feel free to modify the settings. Changing presets for a default writing style creates a custom writing style. Another way to create a custom style is to choose Custom from the Writing Style pop-up menu and choose settings as desired.
5. Click OK to close the Grammar Settings dialog.
6. Select a writing style.
  - a. If you customized a writing style and want to use it, choose Custom.

7. Click OK to close the Spelling and Grammar preferences pane.
  - a. Incidentally, if you follow these steps while you have text selected that has a proofing language other than Word's default, the grammar rules and choices will be in the language of the selected text. Each language has its own set of writing style.



## Appendix 2.1 Tips and Examples for Writing Thesis Statements

### Summary:

This resource provides tips for creating a thesis statement and examples of different types of thesis statements.

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**Last Edited:** 2014-02-10 10:44:43

<https://owl.english.purdue.edu>

### Tips for Writing Your Thesis Statement

1. Determine what kind of paper you are writing:
  - An analytical paper breaks down an issue or an idea into its component parts, evaluates the issue or idea, and presents this breakdown and evaluation to the audience.
  - An expository (explanatory) paper explains something to the audience.
  - An argumentative paper makes a claim about a topic and justifies this claim with specific evidence. The claim could be an opinion, a policy proposal, an evaluation, a cause-and-effect statement, or an interpretation. The goal of the argumentative paper is to convince the audience that the claim is true based on the evidence provided.

If you are writing a text that does not fall under these three categories (e.g., a narrative), a thesis statement somewhere in the first paragraph could still be helpful to your reader.

2. Your thesis statement should be specific—it should cover only what you will discuss in your paper and should be supported with specific evidence.
3. The thesis statement usually appears at the end of the first paragraph of a paper.
4. Your topic may change as you write, so you may need to revise your thesis statement to reflect exactly what you have discussed in the paper.

### Thesis Statement Examples

#### Example of an analytical thesis statement:

*An analysis of the college admission process reveals one challenge facing counselors: accepting students with high test scores or students with strong extracurricular backgrounds.*

The paper that follows should:

- Explain the analysis of the college admission process
- Explain the challenge facing admissions counselors

#### Example of an expository (explanatory) thesis statement:

*The life of the typical college student is characterized by time spent studying, attending class, and socializing with peers.*

The paper that follows should:

- explain how students spend their time studying, attending class, and socializing with peers

**Example of an argumentative thesis statement:**

*High school graduates should be required to take a year off to pursue community service projects before entering college in order to increase their maturity and global awareness.*

The paper that follows should:

- Present an argument and give evidence to support the claim that students should pursue community projects before entering college.

Source: <https://owl.english.purdue.edu/owl/resource/545/1/>



## Appendix 2.2

### Thesis Statement Grading Rubric

<b>Rubric</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>Total</b>
<i>Declarative Sentence</i>	The thesis statement is in the form of a declarative sentence that states clearly and concisely states the main point that the author is trying to make Establishes focus that clearly directs the body of the essay	The thesis statement is in the form of a declarative sentence and makes a point, but is a bit too broad Establishes the topic or stance that adequately directs the body of the essay	The thesis statement is in the form of a declarative sentence, but is vague and does not make a concrete point Contains an unfocused topic that lacks clear direction for the body of the essay	The thesis statement is not in a declarative sentence Thesis statement inadequately identifies a topic or fails to establish the direction of the essay	
<i>Effectiveness</i>	The thesis statement attempts to compare/contrast, prove cause/effect, or propose a solution to an issue	The thesis statement addresses the importance of a topic	The thesis statement has a “flat” affect, covering the topic in only vague terms	The thesis statement is completely ineffective	
<i>Spelling, grammar, punctuation</i>	Flawless. Contains no errors in grammar, punctuation, or spelling	Contains one grammar, punctuation, or spelling error that does not detract from the clarity of the statement	Contains some grammar, punctuation, or spelling errors	Contains numerous grammar, spelling, or punctuation errors that significantly detract from the clarity of the statement	
<b>Total</b>					

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers

Rob Agnew

Oklahoma State University

Author Note

TBD

## Review of the Medical Evidence to Support Common Urban

### Legends for the Prevention of Hangovers

Techniques espoused in urban legends purporting prophylaxis against hangovers lack a fundamental understanding of medical science and have little to no effect in preventing the adverse outcomes of excessive consumption of ethyl alcohol.

## **Appendix 3.1 Database Search Tips**

a guide to ways to improve your searching in library databases

### **Introduction**

Searching for information and searching databases effectively and efficiently is not difficult, but to do it well takes practice and understanding a little bit about how databases work.

There are several techniques to consider mastering:

1. Connecting Words - combining search terms with AND, OR, NOT to broaden or narrow your search
2. Truncation/Wildcard Searching - using symbols in place of letters to tell the database to search for variants of a word
3. Stop Words - when searching, databases ignore certain words
4. Phrase Searching - sometimes the order of words does matter
5. Field Searching - target specific database fields for certain pieces of information
6. Subject Searching - searching for subjects (not keywords) can improve the quality of our search results.

### **Before Searching - Brainstorm!**

The first step in the information seeking process is brainstorming. Spend a few minutes thinking about your topic, considering exactly what it is you are looking for information about. I suggest using a sheet of paper and mapping out your topic, using columns to define your search terms, listing as many synonyms (words that mean the same thing, but are spelled differently) as you can for each concept in your topic.

Why? Because when you start searching databases, you want to have a list of terms to plug into your search, to ensure you are thorough in your searching.

- Try to think of variant spelling (color versus colour, or behavior versus behaviour, for example)
- Consider singular versus plural spelling (child versus children versus childrens) Synonyms: intoxication, drunkenness, inebriated, drunk, alcoholism, etc.

Investing 5-10 minutes brainstorming will pay dividends when you begin your search, and it can save you time as well.

### **Brainstorming in Practice**

Suppose you are researching the use of cell phones and driving. If you use the search terms "cell phones and driving" you will generally find information containing the words "cell" "phones" and "driving".

However, if there is information out there on cellular telephones and driving, you might not find it because you searched for "cell phones and driving"

If we were to brainstorm cell phones and driving, we might come up with the following search terms:

**Topic Concept Words**

cell	phones (plural)	driving
cellular	phone (singular)	drive
mobile	telephone (singular)	car (singular and plural)
	telephones (plural)	automobile (singular and plural)
	device (singular and plural)	

Note that there are many other terms we didn't account for if we just searched for "cell phones and driving". We can employ search techniques to search our topic much more effectively and completely.

For assistance on searching by these techniques, please contact your subject specialist librarian, or stop by the OSU Library Reference Desk.

## Appendix 3.2 Primary, Secondary and Tertiary Sources

**Scope:** As you conduct research, you will consult different sources of, secondary, or tertiary sources. What does that mean? This guide explains these terms and gives examples for each category.

### Table of Contents

- Primary sources
- Secondary sources
- Tertiary sources

**Important Note:** The types of information that can be considered primary sources may vary depending on the subject discipline, and also on how you are using the material. For example:

- A magazine article reporting on recent studies linking the reduction of energy consumption to the compact fluorescent light bulb would be a secondary source.
- A research article or study proving this would be a primary source.
- However, if you were studying how compact fluorescent light bulbs are presented in the popular media, the magazine article could be considered a primary source.

## Primary sources

### Definition:

Primary sources are original materials. They are from the time period involved and have not been filtered through interpretation or evaluation. Primary sources are original materials on which other research is based. They are usually the first formal appearance of results in physical, print or electronic format. They present original thinking, report a discovery, or share new information.

**Note:** The definition of a primary source may vary depending upon the discipline or context.

### Examples include:

- Artifacts (e.g. coins, plant specimens, fossils, furniture, tools, clothing, all from the time under study);
- Audio recordings (e.g. radio programs) Diaries;
- Internet communications on email, listservs; Interviews (e.g., oral histories, telephone, e-mail);
- journal articles published in peer-reviewed publications; Letters;
- Newspaper articles written at the time;
- Original Documents (i.e. birth certificate, will, marriage license, trial transcript); Patents;
- Photographs
- Proceedings of Meetings, conferences and symposia;
- Records of organizations, government agencies (e.g. annual report, treaty, constitution, government document);
- Speeches;
- Survey Research (e.g., market surveys, public opinion polls); Video recordings (e.g. television programs);
- Works of art, architecture, literature, and music (e.g., paintings, sculptures, musical scores, buildings, novels, poems).
- Web site.

For more information about identifying and analyzing primary sources, visit this guide:

<http://www.lib.umd.edu/special/research>

## Secondary sources

### Definition:

Secondary sources are less easily defined than primary sources. Generally, they are accounts written after the fact with the benefit of hindsight. They are interpretations and evaluations of primary sources. Secondary sources are not evidence, but rather commentary on and discussion of evidence. However, what some define as a secondary source, others define as a tertiary source. Context is everything.

**Note:** The definition of a secondary source may vary depending upon the discipline or context.

### Examples include:

- Bibliographies (also considered tertiary); Biographical works;
- Commentaries, criticisms;
- Dictionaries, Encyclopedias (also considered tertiary); Histories;
- Journal articles (depending on the discipline can be primary);
- Magazine and newspaper articles (this distinction varies by discipline); Monographs, other than fiction and autobiography;
- Textbooks (also considered tertiary); Web site (also considered primary).

## Tertiary sources

### Definition:

Tertiary sources consist of information which is a distillation and collection of primary and secondary sources.

### Examples include:

- Almanacs;
- Bibliographies (also considered secondary);
- Chronologies;
- Dictionaries and Encyclopedias (also considered secondary);
- Directories;
- Fact books;
- Guidebooks;
- Indexes, abstracts, bibliographies used to locate primary and secondary sources;
- Manuals;
- Textbooks (can also be secondary).

## Comparison across the disciplines

SUBJECT	PRIMARY	SECONDARY	TERTIARY
Art and Architecture	Painting by Manet	Article critiquing art piece	ArtStor database
Chemistry/Life Sciences	Einstein's diary	Monograph on Einstein's life	Dictionary on Theory of Relativity
Engineering/Physical Sciences	Patent	NTIS database	Manual on using invention
Humanities	Letters by Martin Luther King	Web site on King's writings	Encyclopedia on Civil Rights Movement
Social Sciences	Notes taken by clinical psychologist	Magazine article about the psychological condition	Textbook on clinical psychology
Performing Arts	Movie filmed in 1942	Biography of the director	Guide to the movie



## Appendix 3.3 APA Citation Guide (6th Edition)

**OVERVIEW**—The American Psychological Association (APA) style is widely accepted in the social sciences and other fields, such as education, business, and nursing. The APA citation format requires parenthetical citations within the text rather than endnotes or footnotes. Citations in the text provide brief information, usually the name of the author and the date of publication, to lead the reader to the source of information in the reference list at the end of the paper.

**NOTE:** Although the examples in this guide are shown in single space, APA style requires double spacing throughout (e.g. text, references, etc.)

**APA RULES FOR THE REFERENCES PAGE** – The following sections show some of the more commonly used APA citation rules.

**NOTE:** All citations must be in the Hanging Indent Format with the first line flush to the left margin and all other lines indented.

### JOURNALS, MAGAZINES, NEWSPAPERS IN PRINT FORMAT

#### General Form

**Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. Title of Journal, xx, xxx-xxx.**

**NOTE:** The journal title and the volume number are in italics. Issue numbers are not required if the journal is continuously paged. If paged individually, the issue number is required and is in regular type in parentheses adjacent to the volume number.

#### One Author

Williams, J. H. (2008). Employee engagement: Improving participation in safety. *Professional Safety*, 53(12), 40-45.

#### Two to Seven Authors [List all authors]

Keller, T. E., Cusick, G. R., & Courtney, M. E. (2007). Approaching the transition to adulthood: Distinctive profiles of adolescents aging out of the child welfare system. *Social Services Review*, 81, 453- 484.

#### Eight or More Authors [List the first six authors, ... and the last author]

Wolchik, S. A., West, S. G., Sandler, I. N., Tein, J.-Y., Coatsworth, D., Lengua, L.,...Griffin, W. A. (2000). An experimental evaluation of theory-based mother and mother-child programs for children of divorce. *Journal of Consulting and Clinical Psychology*, 68, 843- 856.

### **Magazine Article**

Mathews, J., Berrett, D., & Brillman, D. (2005, May 16). Other winning equations. *Newsweek*, 145(20), 58-59.

### **Newspaper Article with No Author and Discontinuous Pages**

Generic Prozac debuts. (2001, August 3). *The Washington Post*, pp. E1, E4.

## **BOOKS, CHAPTERS IN BOOKS, REPORTS, ETC.**

### **General Form**

**Author, A. A. (Year). Title of work. Location: Publisher.**

### **One Author**

Alexie, S. (1992). *The business of fancydancing: Stories and poems*. Brooklyn, NY: Hang Loose Press.

### **Corporate Author with an Edition and Published by the Corporate Author**

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

### **Anonymous Author**

Dorland's illustrated medical dictionary (31st ed.). (2007). Philadelphia, PA: Saunders.

### **Chapter in a Book**

Booth-LaForce, C., & Kerns, K. A. (2009). Child-parent attachment relationships, peer relationships, and peer-group functioning. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 490-507). New York, NY: Guilford Press.

### **ERIC Document (Education Resources Information Center)**

Shyyan, V., Thurlow, M., & Liu, K. (2005). Student perceptions of instructional strategies: Voices of English language learners with disabilities. Minneapolis, MN: National Center on Educational Outcomes, University of Minnesota. Retrieved from the ERIC database.(ED495903)

## **ONLINE JOURNALS, MAGAZINES, NEWSPAPERS**

### **General Format - Databases**

**Author, A. A., Author, B. B., & Author, C. C. (Year). Title of article. Name of Journal, xx, xxx-xxx. doi:xxxxxxxxx**

### Article Retrieved from an Online Database

**NOTE:** Use the article's DOI (Digital Object Identifier), the unique code given by the publisher to a specific article.

Senior, B., & Swailes, S. (2007). Inside management teams: Developing a teamwork survey instrument. *British Journal of Management*, 18, 138- 153. doi:10.1111/j.1467-8551.2006.00507.x

**NOTE:** Use the journal's home page URL (or web address) if there is no DOI. This may require a web search to locate the journal's home page. There is no period at the end of web address. Break a long URL before the punctuation.

Koo, D. J., Chitwoode, D. D., & Sanchez, J. (2008). Violent victimization and the routine activities/lifestyle of active drug users. *Journal of Drug Issues*, 38, 1105-1137. Retrieved from <http://www2.criminology.fsu.edu/~jdi/>

### Article from an Online Magazine

Lodewijkx, H. F. M. (2001, May 23). Individual-group continuity in cooperation and competition under varying communication conditions. *Current Issues in Social Psychology*, 6(12), 166-182. Retrieved from <http://www.uiowa.edu/~grpproc/crisp/crisp.6.12.htm>

## OTHER ONLINE RESOURCES

### General Form

**Author, A. A. (Year). Title of work. Retrieved from web address**

### Online Report from a Nongovernmental Organization

Kenney, G. M., Cook, A., & Pelletier, J. (2009). Prospects for reducing uninsured rates among children: How much can premium assistance programs help? Retrieved from Urban Institute website: <http://www.urban.org/url.cfm?ID=411823>

### Online Report with No Author Identified and No Date

GVU's 10th WWW user survey. (n.d.). Retrieved from [http://www.cc.gatech.edu/user\\_surveys/survey-1998-10/](http://www.cc.gatech.edu/user_surveys/survey-1998-10/)

**Web Sites in Parenthetical Citations:** To cite an entire Web site (but not a specific document within the site), it is sufficient to give the URL of the site in the text. No entry in the reference list is needed. Example:

Kidpsych is an excellent website for young children (<http://www.kidpsych.org>).

## REFERENCE CITATIONS IN TEXT

APA utilizes a system of brief referencing in the text of a paper, whether one is paraphrasing or providing a direct quotation from another author's work. Citations in the text usually consist of the name of the author(s) and the year of publication. The page number is added when utilizing a direct quotation.

### **Indirect Quotation with Parenthetical Citation**

Libraries historically highly value intellectual freedom and patron confidentiality (LaRue, 2007).

### **Indirect Quotation with Author as Part of the Narrative**

LaRue (2007) identified intellectual freedom and patron confidentiality as two key values held historically by libraries.

### **Direct Quotation with Parenthetical Citation**

Darwin used the metaphor of the tree of life "to express the other form of interconnectedness—genealogical rather than ecological" (Gould & Brown, 1991, p. 14).

### **Direct Quotation with Author as Part of the Narrative**

Gould and Brown (1991) explained that Darwin used the metaphor of the tree of life "to express the other form of interconnectedness— genealogical rather than ecological" (p. 14).

## CITING SECONDARY SOURCES

When citing in the text a work discussed in a secondary source, give both the primary and the secondary sources. In the example below, the study by Seidenberg and McClelland was mentioned in an article by Coltheart, Curtis, Atkins, & Haller.

Seidenberg and McClelland's study (as cited in Coltheart, Curtis, Atkins, & Haller, 1993) provided a glimpse into the world

In the references page, you would cite the secondary source you read not the original study.

Coltheart, M., Curtis, B., Atkins, P., & Haller, M. (1993). Models of reading aloud: Dual-route and parallel-distributed- processing approaches. *Psychological Review*, 100, 589-608.

## Appendix 3.4 Create a Reference Section (Bibliography) in MSWord

A bibliography is a list of sources, usually placed at the end of a document, that you consulted or cited in creating the document. In Microsoft Office Word 2007, you can automatically generate a bibliography based on the source information that you provide for the document.

Each time that you create a new source, the source information is saved on your computer, so that you can find and use any source you have created.

### What do you want to do?

- Add a new citation and source to a document
- Find a source
- Edit a citation placeholder
- Create a bibliography

### Add a new citation and source to a document

When you add a new citation to a document, you also create a new source that will appear in the bibliography.

1. On the **References** tab, in the **Citations & Bibliography** group, click the arrow next to **Style**.



2. Click the style that you want to use for the citation and source.

For example, social sciences documents usually use the MLA or APA styles for citations and sources.

3. Click at the end of the sentence or phrase that you want to cite.
4. On the **References** tab, in the **Citations & Bibliography** group, click **Insert Citation**.



5. Do one of the following:
  - To add the source information, click **Add New Source**.
  - To add a placeholder, so that you can create a citation and fill in the source information later, click **Add new placeholder**. A question mark appears next to placeholder sources in Source Manager.

6. Begin to fill in the source information by clicking the arrow next to **Type of source**. For example, your source might be a book, a report, or a Web site.
7. Fill in the bibliography information for the source.

To add more information about a source, click the **Show All Bibliography Fields** check box.

**NOTE:**

- If you choose a GOST or ISO 690 style for your sources and a citation is not unique, append an alphabetic character to the year. For example, a citation would appear as [Pasteur, 1848a].
- If you choose ISO 690-Numerical Reference and your citations still don't appear consecutively, you must click the ISO 690 style again, and then press ENTER to correctly order the citations.

## Find a source

The list of sources that you consult or cite can become quite long. At times you might search for a source that you cited in another document by using the **Manage Sources** command.

1. On the **References** tab, in the **Citations & Bibliography** group, click **Manage Sources**.



If you open a new document that does not yet contain citations, all of the sources that you used in previous documents appear under **Master List**.

If you open a document that includes citations, the sources for those citations appear under **Current List**, and all sources that you have cited, either in previous documents or in the current document, appear under **Master List**.

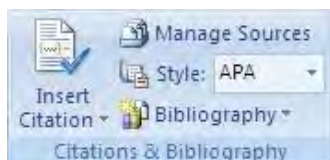
2. To find a specific source, do one of the following:
  - In the sorting box, sort by author, title, citation tag name, or year, and then search the resulting list for the source that you want to find.
  - In the **Search** box, type the title or author for the source that you want to find. The list dynamically narrows to match your search term.

**NOTE:** You can click the **Browse** button in **Source Manager** to select another master list from which you can import new sources into your document. For example, you might connect to a file on a share, on a research colleague's computer or server, or on a Web site that is hosted by a university or research institution.

## Edit a citation placeholder

Occasionally, you may want to create a placeholder citation, and then wait until later to fill in the complete bibliography source information. Any changes that you make to a source are automatically reflected in the bibliography, if you have already created one. A question mark appears next to placeholder sources in Source Manager.

1. On the **References** tab, in the **Citations & Bibliography** group, click **Manage Sources**.



2. Under **Current List**, click the placeholder that you want to edit.

**NOTE:** Placeholder sources are alphabetized in Source Manager, along with all other sources, based on the placeholder tag name. Placeholder tag names are numbers by default, but you can customize the placeholder tag name with whatever tag you want.

3. Click **Edit**.
4. Begin to fill in the source information by clicking the arrow next to **Type of source**. For example, your source might be a book, a report, or a Web site.
5. Fill in the bibliography information for the source. Use the **Edit** button to fill in fields instead of having to type names in the appropriate format.

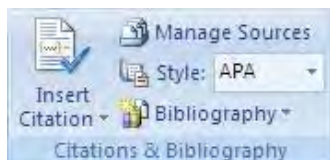
To add more information about a source, click the **Show All Bibliography Fields** check box.

## Create a bibliography

You can create a bibliography at any point after you insert one or more sources in a document. If you don't have all of the information that you need about a source to create a complete citation, you can use a placeholder citation, and then complete the source information later.

**NOTE:** Placeholder citations do not appear in the bibliography.

1. Click where you want to insert a bibliography, usually at the end of the document.
2. On the **References** tab, in the **Citations & Bibliography** group, click **Bibliography**.



3. Click a predesigned bibliography format to insert the Bibliography into the document.

## Appendix 3.5

### Literature Review Rubric

#### Description of Assignment:

Locate research articles on the re-approved topic. Submit the reference sheet listing the articles adhering to APA 6th Edition format. The number of sources should reflect the guideline in the assignment.

#### Grading of Assignment:

The following is a rubric used to assess the literature review. Grades calculated taking the total points earned divided by 15 (the total points possible), resulting in a percentage.

#### Rubric:

	Rating				Score
	5	3	1	0	
Assignment Basics:					
Articles	Information gathered from multiple, research-based sources. Quantity of bona-fide first sources meets or exceeds the assignment criteria	Information gathered from multiple sources. Number of first sources is adequate.	Information gathered from a limited number of sources, some secondary or tertiary sources used.	Information gathered from a limited review with several secondary or tertiary sources.	
Format	Font, spacing, and APA format are correct.	Font and spacing, font and APA, or spacing and APA are correct.	Font, spacing, or APA format is correct.	Font, spacing, and APA format are incorrect.	
Grammar	There is 1 or less grammatical error.	There are 2 grammatical errors.	There are 3 grammatical errors.	There are 4 or more grammatical errors.	
Total Points					



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<http://www.merriam-webster.com/dictionary/urban%20legend>
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Pittler, M. H., Verster, J. C., & Ernst, E. (2005). Interventions for preventing or treating alcohol hangover: systematic review of randomised controlled trials. *British Medical Journal*, 1-4.

Pittler, M. H., White, A. R., Stevinson, C., & Ernst, E. (2003). Effectiveness of artichoke extract in preventing alcohol-induced hangovers: a randomized controlled trial. *Canadian Medical Association Journal*, 1269-1273.

Propatier, S. (2013, December 31). *Skeptoid*. Retrieved from The One And Only Effective Hangover remedy (except for abstaining): <http://skeptoid.com/blog/2013/12/31/the-one-and-only-effective-hangover-remedy-except-for-abstaining/>

Racine, R. (2012, March 22). *VIP Bachelor*. Retrieved from The War on Hangovers: 101 Tips to Prevent and Cure a Hangover: <http://www.vipbachelor.com/343/the-war-on-hangovers-101-tips-to-prevent-and-cure-a-hangover/>

Rohsenow, D., Howland, J., Arnedt, J., Almeida, A., Greece, J., Minsky, S., . . . Sales, S. (2010). Intoxication With Bourbon Versus Vodka: Effects on Hangover, Sleep, and Next-Day Neurocognitive Performance in Young Adults. *Alcoholism: Clinical & Experimental Research*, 509-518.

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Wechsler, H., Dowdall, G., Davenport, A., & Castillo, S. (1995). Correlates of college student binge drinking. *American Journal of Public Health*, 921-926.

## **Appendix 4.1 Writing Abstracts**

### **Types of abstracts**

There are two types of abstracts: informational and descriptive.

#### **Informational abstracts**

- Communicate contents of reports
- Include purpose, methods, scope, results, conclusions, and recommendations
- Highlight essential points
- Are short—from a paragraph to a page or two, depending upon the length of the report (10% or less of the report)
- Allow readers to decide whether they want to read the report

#### **Descriptive abstracts**

- Tell what the report contains
- Include purpose, methods, scope, but NOT results, conclusions, and recommendations
- Are always very short— usually under 100 words
- Introduce subject to readers, who must then read the report to learn study results

## **Qualities of a good abstract**

An effective abstract

- Uses one or more well developed paragraphs, which are unified, coherent, concise, and able to stand alone
- Uses an introduction-body-conclusion structure in which the parts of the report are discussed in order: purpose, findings, conclusions, recommendations
- Follows strictly the chronology of the report
- Provides logical connections between material include
- Adds no new information but simply summarizes the report
- Is intelligible to a wide audience

## **Steps for writing effective report abstracts**

To write an effective report abstract, follow these four steps.

1. Reread your report with the purpose of abstracting in mind. Look specifically for these main parts: purpose, methods, scope, results, conclusions, and recommendations.
2. After you have finished rereading your report, write a rough draft without looking back at your report. Consider the main parts of the abstract listed in step #1. Do not merely copy key sentences from your report. You will put in too much or too little information. Do not summarize information in a new way.

3. Revise your rough draft to
  - Correct weaknesses in organization and coherence,
  - Drop superfluous information,
  - Add important information originally left out,
  - Eliminate wordiness, and
  - Correct errors in grammar and mechanics.
4. Carefully proofread your final copy.

*Source:* <https://owl.english.purdue.edu/owl/resource/656/1/>

## Appendix 4.2

### Abstract - Rubric

Objective: Abstracts typically serve five main goals:

- Help readers decide if they should read the entire text
- Help readers and researchers remember key findings on a topic
- Help readers understand a text by acting as a pre-reading outline of key points
- Index articles for quick recovery and cross-referencing
- Allow supervisors to review technical work without becoming bogged down in details

Notes: The abstract written in third person. No references or quotations are allowed.

Component & Criteria	0	1	2	3	Total
Topic & Purpose	The main idea is unclear or disorganized	Author describes main idea & purpose of the research or project	...& research or project question(s)	... & reasons behind this research or project.	
Scope	The research focus is unclear or missing	Author describes the focus of this research or project	... & where the author concentrates his/her attention	... & foundation for this work.	
Method	The method is missing or incomplete	Author describe what the he/she did (qualitative/quantitative research or project)	...& the kinds of evidence provided (and how it was created/collected/analyzed)	... & how author convinces the reader of the validity of his/her main idea.	
Results	Results are missing or incomplete	Author describes what he/she learned	... & the major results	... & the consequences of the problem or issue that the author is discussing.	
Recommendations	Solutions are absent or weak in development	Author describes solutions to the reader to resolve the problem or issue in the piece	... & recommend action or change based on the research findings or the completed project	... & explain why this matters - Point to at least one significant implication.	
Conclusions	Conclusion is missing or weak in development	Author describes the cause and effect relationship of the problem/issue	... & the conclusions that he/she draws from the research or project	... & how this work will contribute to the field	
<b>Total</b>					

(Adapted from <http://papyr.com/hypertextbooks/comp2/abstract.htm>)

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers

Rob Agnew

Oklahoma State University

Author Note

TBD

### Abstract

Veisalgia, commonly known as the hangover, affects the multitude of binge drinkers throughout the country. College students, being a population sub-set prone to binge drinking commonly suffer the effects of a hangover. Wanting to continue a heavy drinking lifestyle and still perform adequately on exams may lead binge drinkers in the internet age to seek out urban legends or folk remedies to ascertain preventative measures for the ill effects of heavy drinking. This report contains an investigation into popular internet urban legends for hangover prophylaxis and compares the purported method of action against peer reviewed medical science. Examined within this report are several methods of action including, dehydration, depletion of electrolytes, depletion of other vitamins and minerals, abundance of the enzyme ethanol dehydrogenase, and the presence of ethanol contaminants (congeners).

*Keywords:* veisalgia, hangover, prophylaxis, prevention, urban legends

## **Appendix 5.1 Four Main Components for Effective Outlines**

### **Summary:**

This resource describes why outlines are useful, what types of outlines exist, suggestions for developing effective outlines, and how outlines can be used as an invention strategy for writing.

Ideally, you should follow the four suggestions presented here to create an effective outline. When creating a topic outline, follow these two rules for capitalization: For first level heads, present the information using all uppercase letters; and for secondary and tertiary items, use upper and lowercase letters.

### **Parallelism—How do I accomplish this?**

Each heading and subheading should preserve parallel structure. If the first heading is a verb, the second heading should be a verb. Example:

I. CHOOSE DESIRED COLLEGES

II. PREPARE APPLICATION

("Choose" and "Prepare" are both verbs. The present tense of the verb is usually the preferred form for an outline.)

### **Coordination—How do I accomplish this?**

All the information contained in Heading 1 should have the same significance as the information contained in Heading 2.

The same goes for the subheadings (which should be less significant than the headings). Example:

I. VISIT AND EVALUATE COLLEGE CAMPUSES

II. VISIT AND EVALUATE COLLEGE WEBSITES

A. Note important statistics

B. Look for interesting classes

(Campus and Web sites visits are equally significant. They are part of the main tasks you would need to do. Finding statistics and classes found on college Web sites are parts of the process involved in carrying out the main heading topics.)



### **Subordination—How do I accomplish this?**

The information in the headings should be more general, while the information in the subheadings should be more specific. Example:

#### **I. DESCRIBE AN INFLUENTIAL PERSON IN YOUR LIFE**

A. Favorite high school teacher

B. Grandparent

(A favorite teacher and grandparent are specific examples from the generalized category of influential people in your life.)

### **Division—How do I accomplish this?**

Each heading should be divided into 2 or more parts. Example:

#### **I. COMPILE RÉSUMÉ**

A. List relevant coursework

B. List work experience

C. List volunteer experience

(The heading "Compile Résumé" is divided into 3 parts.)

Technically, there is no limit to the number of subdivisions for your headings; however, if you seem to have a lot, it may be useful to see if some of the parts can be combined.

Source: <https://owl.english.purdue.edu/owl/resource/544/1/>

## Appendix 5.2

Content Outline Grading Rubric						
	4	3	2	1	0	SCORE
<b>Thesis</b>	Final thesis is arguable, concise and tenable.	Final thesis is arguable and tenable, but not quite clear and concise, perhaps wordy.	Final thesis is only somewhat arguable, may not be clear or tenable. May be too factual.	Final thesis is not arguable or tenable...the thesis is a fact.	Student did not hand in an outline. Or Outline has not evolved enough (or at all) from the preliminary stage.	
<b>Formatting</b>	The outline follows the proper formatting requirements. Detailed, appropriate section headings are included. Topic sentences are present for all body paragraphs. Strong transitional sentences are included between sections and/or paragraphs of the outline.	The outline follows the proper formatting requirements. Section headings are included. Topic sentences are present for all body paragraphs. Transitional sentences are included between sections and/or paragraphs of the outline.	The outline has some formatting errors. Some section headings are included. Some topic sentences are present. Some transitional sentences are included between sections and/or paragraphs of the outline.	The outline has several formatting errors. Few section headings are included. Few topic sentences are present. Few transitional sentences are included between sections and/or paragraphs of the outline.	Student did not hand in an outline Or Outline has not evolved enough (or at all) from the preliminary stage.	
<b>Organization and Support</b>	There is a clear link between the thesis and the order of ideas. Section headings are appropriately labeled and strong, connective topic sentences help to promote the argument. Substantial support is present in the form of direct citations and/or paraphrase. Paragraph content summary presents a strong link between the support presented and its relevance to the thesis.	There is a link between the thesis and the order of ideas. Section headings are labeled and topic sentences connect to the argument. Support is present in the form of citations and/or paraphrase. Paragraph content summary presents a link between the support presented and its relevance to the thesis.	There is some confusion between thesis development and the order of ideas. Some section headings are included and some topic sentences are present, but the ideas may not specifically promote the thesis argument. Paragraph content summary is vague and it may not be clear how some information is relevant to the argument.	Section headings do not match thesis. Topic sentences are missing and/or do not connect to the thesis. Some/all information included is not relevant.	Student did not hand in an outline. Or Outline has not evolved enough (or at all) from the preliminary stage.	
<b>Documentation</b>	Each paragraph has correctly documented sources (parenthetical citations) that match the Bibliography.	Each paragraph has documented sources (parenthetical citations) that match the Bibliography; however, there may be 1-2 errors in the parenthetical citations.	Most paragraphs have documented sources (parenthetical citations) that match the Bibliography; however, there may be 3-4 errors in the parenthetical citations.	Some documented sources (parenthetical citations). There is discrepancy between citations in paper and Bibliography. Some parenthetical citations are incorrect.	Student did not hand in an outline. Or Outline has not evolved enough (or at all) from the preliminary stage.	
<b>Conventions</b>	There are no convention errors – student exhibits an understanding of the rules of standard written English.	Few errors – student exhibits a basic understanding of the rules of standard written English.	Errors are noticeable but do not hinder understanding – student exhibits a basic understanding of the rules of standard written English.	Student does not exhibit a basic understanding of the rules of standard written English.	Student did not hand in an outline. Or Outline has not evolved enough (or at all) from the preliminary stage.	

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers

Rob Agnew

Oklahoma State University

Author Note

TBD

Abstract

*(revise as needed as the paper develops)*

Veisalgia, commonly known as the hangover, affects the multitude of binge drinkers throughout the country. College students, being a population sub-set prone to binge drinking commonly suffer the effects of a hangover. Wanting to continue a heavy drinking lifestyle and still perform adequately on exams may lead binge drinkers in the internet age to seek out urban legends or folk remedies to ascertain preventative measures for the ill effects of heavy drinking. This report contains an investigation into popular internet urban legends for hangover prophylaxis and compares the purported method of action against peer reviewed medical science. Examined within this report are several methods of action including, dehydration, depletion of electrolytes, depletion of other vitamins and minerals, abundance of the enzyme ethanol dehydrogenase, and the presence of ethanol contaminants (congeners).

*Keywords:* veisalgia, hangover, prophylaxis, prevention, urban legends

## Review of the Medical Evidence to Support Common Urban Legends for the Prevention of Hangovers

### **I. Introduction – Agnew**

Techniques espoused in urban legends purporting prophylaxis against hangovers lack a fundamental understanding of medical science and have little to no effect in preventing the adverse outcomes of excessive consumption of ethyl alcohol.

### **II. Urban Legends – (Agnew)**

- A. Define urban legends (Merriam-Webster, n.d.)
- B. 101 tips (Racine, 2012)
- C. Hydration and nutrition (Goldfarb, 2014)
- D. Dehydration, clear alcohol, supplements (Propatier, 2013)
- E. Nutrition/Cucumber (Snopes, 2009)
- F. Eating yeast (Goldfarb, 2014)

Hundreds of tips are available on the internet offering to allow one to avoid the ill effects of a hangover. These internet tips fall into a few broad categories for the method of action: hydration, replenishment of electrolytes, replenishment of other vitamins and minerals, abundance of the enzyme ethanol dehydrogenase, and avoidance of ethanol contaminants.

### **III. Veisalgia – (Agnew)**

- A. Define veisalgia (Medicine Net, n.d.)
- B. Mechanisms and Mediators (Swift & Davidson, 1998)
- C. Understanding the physiology of alcohol in the body (Forrest & Reed, 2011) (Paton, 2005)

#### **IV. Hydration – (Agnew)**

A. Kidney output (Swift & Davidson, 1998)

B. Relations, contradictions, and gaps

##### **A. Replenishment of Electrolytes – (Agnew)**

1. Kidney output (Swift & Davidson, 1998)

2. Relations, contradictions, and gaps

##### **B. Replenishment of Vitamins and Minerals – (Agnew)**

1. Artichoke extract (Pittler, White, Stevinson, & Ernst, 2003)

2. Numerous studies reviewed (Pittler, Verster, & Ernst, Interventions for preventing or treating alcohol hangover: systematic review of randomised controlled trials, 2005)

3. Relations, contradictions, and gaps

##### **C. Abundance of Ethanol Dehydrogenase – (Agnew)**

1. Alcohol Metabolism (Edenberg, 2007)

2. Yeast (Pittler, Verster, & Ernst, Interventions for preventing or treating alcohol hangover: systematic review of randomised controlled trials, 2005)

3. Relations, contradictions, and gaps

##### **D. Avoidance of Congeners – (Agnew)**

1. Complex chemical mixtures, distinction with migraine headaches (Evans, Sun, & Lay, 2007)

2. Vodka vs Bourbon (Rohsenow, et al., 2010)

3. Hangovers and congeners (Howland, et al., 2008)

4. Relations, contradictions, and gaps

## **V. Discussion – (Agnew)**

### **A. Total Dose vs. Peak Intoxication – (Agnew)**

1. Lack of literature
2. Relations, contradictions, and gaps

### **B. Abstinence – (Agnew)**

A note on the only guarantee of not incurring a hangover.

## **VI. Conclusion – (Agnew)**

1. Summary of any possible preventive measures for hangovers.
2. Hair of the dog that bit you and other urban legends for curing a hangover (Emery, n.d.)

*Definitional Sources (tertiary)*

(Merriam-Webster, n.d.)

(Medicine Net, n.d.)

*Urban Legend Sources (secondary)*

(Gordon, n.d.)

(Propatier, 2013)

(Racine, 2012)

(Snopes, 2009)

(Goldfarb, 2014)

(Emery, n.d.)

*Medical Sources (primary or first)*

(Forrest & Reed, 2011)

(Paton, 2005)

(Edenberg, 2007)

(Evans, Sun, & Lay, 2007)

(Pittler, Verster, & Ernst, Interventions for preventing or treating alcohol hangover:  
systematic review of randomised controlled trials, 2005)

(Pittler, White, Stevinson, & Ernst, 2003)

(Swift & Davidson, 1998)

(Rohsenow, et al., 2010)

(Howland, et al., 2008)



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Table 1

*TBD*

*Figure 1.* TBD.

Title of Paper Goes Here And I Will Also Add Here the Unnecessary Words APA Format Sixth  
Edition Template So the Document Will Come Up in Searches

Paul Rose

Southern Illinois University Edwardsville

#### Author Note

A brief author note (which should not be included in papers submitted in Paul Rose's classes) goes here. It may include acknowledgment of funding sources, expressions of gratitude to research assistants and contact information for the author who will handle requests. I have a few notes of my own to share here. First, I am very grateful to everyone who has emailed me with suggested improvements; I'm sorry I can't acknowledge you all here. Second, you are hereby granted permission to use this document for learning and research purposes. You may not sell this document either by itself or in combination with other products or services. Third, if you use this document, you use it at your own risk. The document's accuracy and safety have been thoroughly evaluated, but they are not guaranteed. Fourth, if you find this document helpful, I don't want your money, but I would be grateful if you would click on this URL: <http://goo.gl/DGHoZ>. It directs to a harmless Department of Psychology web page at SIUE, but what is more important is that it records click-through data that give me an idea of how many people have found this document helpful. Thanks!

### Abstract

An abstract is a single paragraph, without indentation, that summarizes the key points of the manuscript in 150 to 250 words. For simpler papers in Paul Rose's classes, a somewhat shorter abstract is fine. The purpose of the abstract is to provide the reader with a brief overview of the paper. When in doubt about a rule, check the sixth edition APA manual rather than relying on this template. (I prefer only one space after a period, but two spaces are suggested by the sixth-edition APA manual at the top of page 88.) This document has a history that compels me to give credit where it's due. Many years ago I downloaded a fifth-edition template from an unspecified author's web site at Northcentral University. I modified the template extensively and repeatedly for my own purposes and in the early years I shared my highly-modified templates only with my own students. By now, I have edited this document so many times in so many ways that the current template bears virtually no similarity to the old Northcentral document. I want to be clear, however, that I am in debt to an unknown author who spared me the inconvenience of having to create my own templates from scratch.

*Keywords:* writing, template, sixth, edition, APA format, self-discipline, is, good

Title of Paper Gets Repeated Here Exactly As It Appears On Title Page

This is where the body of your paper begins. Note that the title of your paper appears at the top of your introduction even though other sections begin with headings like “Method”, “Results” and so on. The rest of the text in this template provides hints about properly generating the parts of your APA-formatted paper. Notice that there is no extra spacing between the paragraphs or sections.

The major components of your paper (abstract, body, references, etc.) each begin on a new page. These components begin with centered headings at the top of the first page. (You can see how major components of text get divided in this freely available sample document: <http://www.apastyle.org/manual/related/sample-experiment-paper-1.pdf> ). Some papers have multiple studies in them so the body could have multiple sections and subsections within it.

Sections can have subsections with headings. For example, a Method section might have Participants, Materials, and Procedure subsections. The sixth of the APA manual, unlike earlier editions, tells you to bold headings (but not the title above or anything on the title page). Below are examples.

### **Heading Level 1**

### **Heading Level 2**

**Heading level 3.** (Note the indent and period, and note how the capitalization works. You will probably never go deeper than the third heading level.)

*Heading level 4.*

*Heading level 5.*

## **Citations and References**

Check your assigned reading materials for rules about citations (which occur within the text of the paper) and references (which are listed in their own separate section at the end of the paper). Remember that you can find a lot of answers to formatting questions with a careful online search. When you're looking at information online, you may want to consider where the information is coming from, whether the information might refer to an older edition of APA format and whether other online sources agree with the information you've found. When in doubt, follow the latest edition of the APA manual.

### **About a References Section**

An example of a References section is on the next page. Take note of the "hanging indent" style and double-spacing (with no extra spacing between references). The easiest way to create hanging indents is to type your references without worrying about indentation and when you are finished, select all the references at once and apply the hanging indents using the ruler at the top.

Many APA format rules are not mentioned or demonstrated in this document. You should plan to spend a lot of time looking up formatting rules, just like your professors do when they write papers. If APA formatting is driving you crazy and you want a distraction, how about alleviating people's suffering with a simple click? Check out The Hunger Site (<http://www.thehungersite.com/>).



## References

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\* On p. 189, the 6<sup>th</sup> ed. manual says "We recommend that when DOIs are available, you include them"—so you can skip the DOI if you can't find it. Footnotes like this aren't appropriate in a real references section.

### Footnotes

<sup>1</sup> Some professional journals ask authors to avoid using footnotes. In an undergraduate paper they are almost never necessary.

<sup>2</sup> As of 2013, I do not recommend using the footnote and endnote features in Word if you want to keep your footnotes in APA format.

Table 1

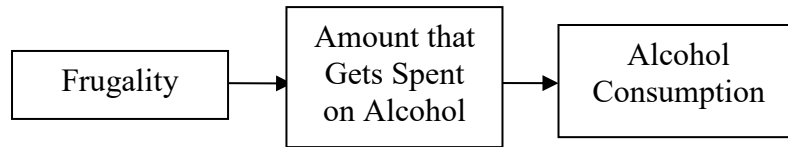
*Correlations Among and Descriptive Statistics For Key Study Variables*

	<i>M (SD)</i>	Sex	Age	Income	Educ.	Relig.	Dist. Intol.
Sex	1.53 (.50)		.07	-.09	.02	.14	.06
Age	31.88 (10.29)			.08	.19*	.20*	.01
Income	2.60 (1.57)				.04	-.14	-.09
Educ.	3.44 (1.06)					-.29*	-.06
Relig.	1.21 (.30)						-.19*
Dist. Intol.	3.75 (1.19)						

*Notes.* *N*'s range from 107 to 109 due to occasional missing data. For sex, 0 = male, 1 = female.

Educ. = education. Dist. Intol. = distress intolerance. Relig. = religiosity.

\*  $p < .05$ .



*Figure 1.* This simple path model, adapted from results in a *Journal of Consumer Behaviour* paper, is an example of a figure.

## Appendix 6.2 Writing an Introduction

The introduction is the broad beginning of the paper that answers three important questions:

- What is this?
- Why am I reading it?
- What do you want me to do?

You should answer these questions by doing the following:

1. Set the context –provide general information about the main idea, explaining the situation so the reader can make sense of the topic and the claims you make and support
2. State why the main idea is important –tell the reader why he or she should care and keep reading. Your goal is to create a compelling, clear, and convincing essay people will want to read and act upon
3. State your thesis/claim –compose a sentence or two stating the position you will support with logos (sound reasoning: induction, deduction), pathos (balanced emotional appeal), and ethos (author credibility).

For exploratory essays, your primary research question would replace your thesis statement so that the audience understands why you began your inquiry. An overview of the types of sources you explored might follow your research question.

If your argument paper is long, you may want to forecast how you will support your thesis by outlining the structure of your paper, the sources you will consider, and the opposition to your position. You can forecast your paper in many different ways depending on the type of paper you are writing.

When writing a research or technical paper, you may need to use a more formal, less personal tone. Your forecast might read like this:

This paper begins by providing key terms for the argument before providing background of the situation. Next, important positions are outlined and supported. To provide a more thorough explanation of these important positions, opposing positions are discussed. The paper concludes with some ideas for taking action and possible directions for future research.

## Development and Details

Choosing a main idea and subpoints, creating an outline, and producing a thesis statement and topic sentences are all great first steps to writing a successful GED essay. The solid foundation you make during the planning phase of your writing process is extremely important. But what comes next? Remember the third criterion that essay readers use to score your essay: development and details. While writing your essay, you must develop and support your ideas with details.

## **Writing a Developed and Detailed Introduction**

You know your introduction needs a clear thesis statement. But what else do you put in the paragraph? To answer that question, think about the purpose of an introduction:

- Introduce your topic
- Create interest
- Provide necessary background information
- Identify your main idea
- Preview the rest of your essay

Your thesis statement will identify your main idea and preview the rest of your essay. Remember that this can be either one or two sentences. You will probably place your thesis at the end of your introduction paragraph. You can use the other sentences in your introduction to introduce your topic, create interest, and provide necessary background information.

Source: <https://owl.english.purdue.edu/owl/owlprint/724/>

## Appendix 6.3 Active vs. Passive Voice

### Active voice

In most English sentences with an action verb, the subject performs the action denoted by the verb.

These examples show that the subject is doing the verb's action.

The man must have eaten five hamburgers

The **man** (subject) is doing the **eating** (verb).

Marilyn mailed the letter.

**Marilyn** (subject) is doing the **mailing** (verb).

Colorful parrots live in the rainforests.

**Parrots** (subject) are doing the **living** (verb).

Because the subject does or "acts upon" the verb in such sentences, the sentences are said to be in the **active voice**.

### Passive voice

One can change the normal word order of many active sentences (those with a direct object) so that the subject is no longer active, but is, instead, being acted upon by the verb - or passive.

Five hamburgers must have been eaten by the man.

**Hamburgers** (subject) *are being* **eaten** (verb).

The letter was mailed by Marilyn.

The **letter** (subject) *was being* **mailed** (verb).

Note in these examples how the subject-verb relationship has changed.

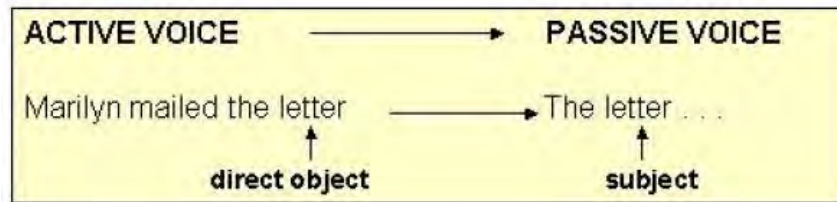
Because the subject is being "acted upon" (or is passive), such sentences are said to be in the passive voice.

NOTE: Colorful parrots live in the rainforests cannot be changed to passive voice because the sentence does not have a direct object.

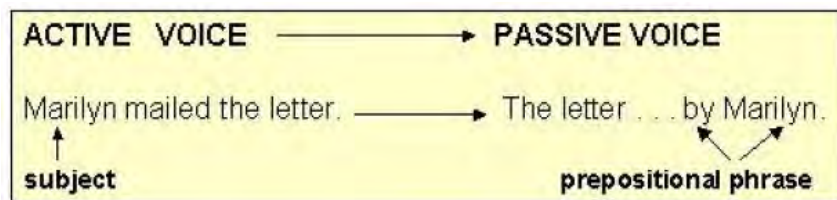
## Changing a sentence from active to passive voice

To change a sentence from active to passive voice, do the following:

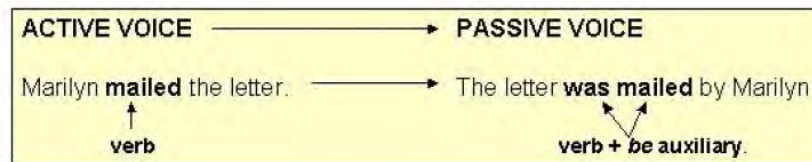
1. Move the active sentence's direct object into the sentence's subject slot



2. Place the active sentence's subject into a phrase beginning with the preposition *by*

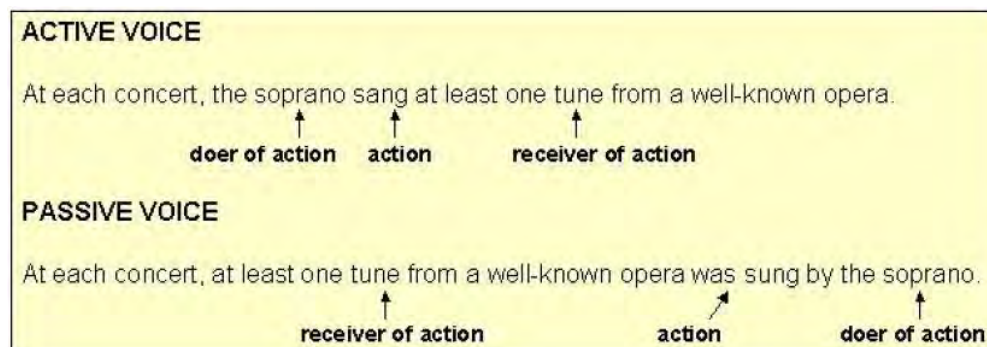


3. Add a form of the auxiliary verb *be* to the main verb and change the main verb's form

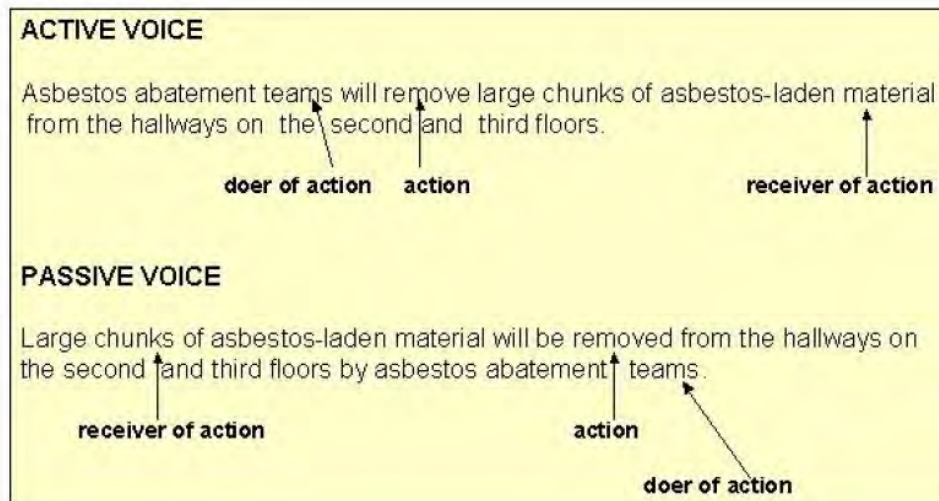


Because passive voice sentences necessarily add words and change the normal **doer-action receiver of action** direction, they may make the reader work harder to understand the intended meaning.

As the examples below illustrate, a sentence in active voice flows more smoothly and is easier to understand than the same sentence in passive voice.



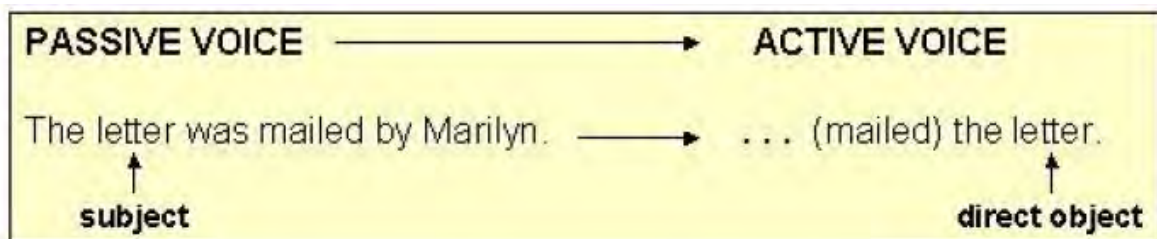




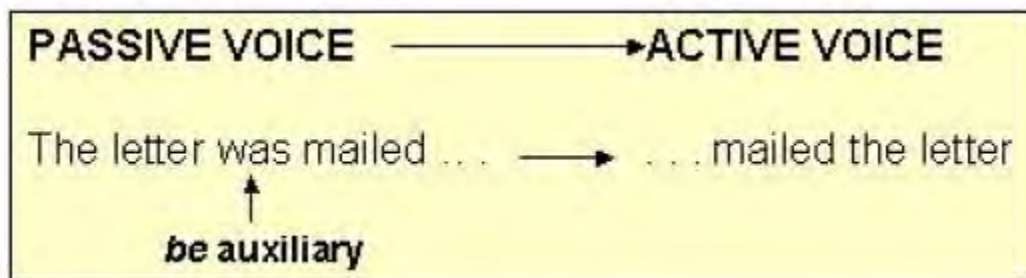
It is generally preferable to use the ACTIVE voice.

To change a passive voice sentence into an active voice sentence, simply reverse the steps shown above.

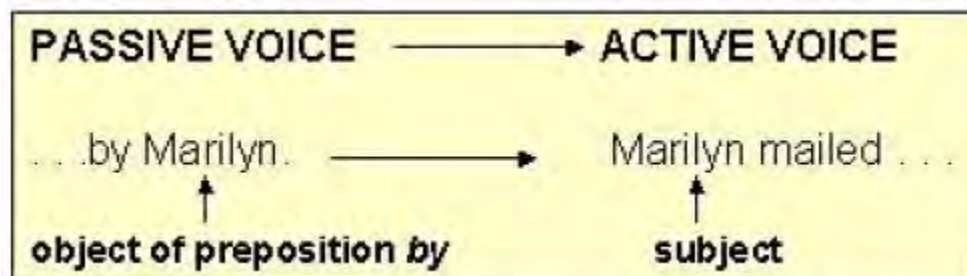
1. Move the passive sentence's subject into the active sentence's direct object slot



2. Remove the auxiliary verb be from the main verb and change main verb's form if needed



3. Place the passive sentence's object of the preposition by into the subject slot.



Because it is more direct, most writers prefer to use the active voice whenever possible.

The passive voice may be a better choice, however,

- when the doer of the action is unknown, unwanted, or unneeded in the sentence.

Examples

The ballots have been counted.

Sometimes our efforts are not fully appreciated.

- the writer wishes to emphasize the action of the sentence rather than the doer of the action

Examples

The high-jump record was finally broken last Saturday.

A suspect was questioned for sixteen hours by the police.

- the writer wishes to use passive voice for sentence variety.

Source: <http://www.towson.edu/ows/activepass.htm>

## Appendix 6.4 Sentence Clarity

In order to write clear, effective sentences, you need to avoid the following types of errors:

- Misplaced or Dangling Modifier
- Nonparallel Structure
- Wordiness and Redundancy
- Tense and Voice Shift

### Misplaced or Dangling Modifiers

Misplaced or dangling modifiers are words, phrases, or clauses that confuse the meaning of a sentence. They are easily recognized because their position in the sentence makes the sentence meaningless or unclear.

#### Misplaced Modifier

A misplaced modifier can be a word, phrase, or clause that is incorrectly positioned in a sentence. This handout discusses only prepositional phrases and relative-pronoun clauses (those clauses beginning with *who*, *that*, and *which*) that are often misplaced in a sentence.

Misplaced modifiers can be easily corrected by placing the words, phrases, or clauses next to the words they modify. Look at the following examples.

1. **Example:** The new book was read by every student on the second shelf.

**Explanation:** The students were not on the second shelf, so this prepositional phrase is misplaced. It needs to be placed next to the word it modifies: *book*.

**Correction:** The new book on the second shelf was read by every student.

2. **Example:** The cowboy was thrown by the bull with a leather vest.

**Explanation:** A bull would look rather ridiculous with a vest, so the prepositional phrase is misplaced. It needs to be placed next to the word it modifies: *cowboy*.

**Correction:** The cowboy with a leather vest was thrown by the bull.

3. **Example:** We sold our car to a used car dealer that had a cracked cylinder head.

**Explanation:** A person (the dealer) does not have a cylinder head, so the clause that had a cracked cylinder head must modify the car. The clause needs to be placed right after the word it modifies: *car*.

**Correction:** We sold our car that had a cracked cylinder head to a used car dealer.

4. **Example:** The car was towed off the turnpike which had a flat tire.

**Explanation:** The turnpike did not have a flat tire, so the clause which had a flat tire must modify the car. The clause needs to be placed right after the word it modifies: *car*.

**Correction:** The car which had a flat tire was towed off the turnpike.

### EXERCISES:

Read each pair of sentences and choose the one that does not contain a misplaced modifier by circling either *a* or *b*.

1.     a. Don't give the fish with small bones in it to the cat.  
       b. Don't give the fish to the cat with small bones in it.
2.     a. The train station was located by a river which was made of red brick.  
       b. The train station which was made of red brick was located by a river.
3.     a. He found a pie on the top shelf of the refrigerator baked by his wife.  
       b. On the top shelf of the refrigerator, he found a pie baked by his wife.
4.     a. Mr. Smith spotted a bird sitting on a telephone wire that he could not recognize.  
       b. Mr. Smith spotted a bird that he could not recognize sitting on a telephone wire.
5.     a. We bought a picnic table with collapsible legs from a clerk.  
       b. We bought a picnic table from a clerk with collapsible legs.
6.     a. I gave the scraps of meat to the dog which had been left on the dinner plates.  
       b. I gave the scraps of meat which had been left on the dinner plates to the dog.
7.     a. We watched the man on the roof jump to the ground.  
       b. We watched the man jump to the ground on the roof.
8.     a. From the antique store dealer, we bought a round dining room table with massive oak legs.  
       b. From the antique store dealer with massive oak legs, we bought a dining room table.
9.     a. The boy's mom threw the pants that were old and torn into the garbage can.  
       b. The boy's mom that was old and torn threw the pants into the garbage can.
10.    a. Mr. Jackson with a cane bottom sat in a chair.  
       b. Mr. Jackson sat in a chair with a cane bottom. Sentence Clarity

## Dangling Modifier

Three types of phrases can sometimes be “dangling”:

- prepositional phrase (with a red tie)
- infinitive phrase (to run quickly) (infinitive phrases consist of the word to plus a verb)
- *-ed or -ing* phrase (riding his bike)

These modifying phrases are dangling when they appear at the beginning of a sentence, are followed by a comma, and do not modify the subject of the sentence. To correct a dangling modifier, make sure that the subject (the first noun or subject pronoun after the comma) is the word being described or modified. Dangling modifiers usually require a revision of the entire sentence.

1. **Example:** Riding his bike down the road, a dog attacked Bill.

**Explanation:** Did a dog ride his bike, or did Bill ride his bike? Obviously, Bill did the riding. Therefore, the word Bill should appear after the comma and serve as the subject.

**Correction:** Riding his bike down the road, Bill was attacked by the dog.

2. **Example:** To get a good night’s rest, a firm mattress is important.

**Explanation:** Is the mattress getting a good night’s rest? No, but neither is anything or anyone else. This infinitive phrase does not modify any word in the sentence. You need to revise this sentence, putting in the word that’s being modified: *you*. Place it after the comma and use it as the subject.

**Correction:** To get a good night’s rest, you need to sleep on a firm mattress.

3. **Example:** At the age of sixteen, the present was a watch.

**Explanation:** A birthday present is not sixteen. This prepositional phrase does not modify any word in the sentence. You need to revise this sentence by putting in the word that is being modified: *she*. Place it after the comma and use it as the subject.

**Correction:** At the age of sixteen, she received a watch as a present.

4. **Example:** When a little girl, my brother threw a rock at me.

**Explanation:** Was my brother a little girl, or was I (or *she*) a little girl? Obviously, the phrase when a little girl should modify the word I (or *she*). This sentence has to be rewritten so that the word I (or *she*) can be subject. It should be placed after the comma.

**Correction:** When a little girl, I was hit by a rock thrown by my brother.

5. **Example:** Used for a short time, the Brooks expect a good price for their car.

**Explanation:** The car was used for a short time, not the Brooks, so the word *car* needs to be placed after the comma and used as the subject.

**Correction:** Used for a short time, the Brooks’ car should sell for a good price.

(Notice the word *Brooks’* is used as an adjective to modify the subject word *car*.)

**EXERCISES:**

Read each pair of sentences and choose the one that does not contain a dangling modifier by circling either *a* or *b*.

1.     a. Dancing all night, the dawn was seen by everyone.  
       b. Dancing all night, everyone saw the dawn.
2.     a. To make a light cake, the eggs should be beaten separately.  
       b. To make a light cake, you should beat the eggs separately.
3.     a. Paddling furiously, we were able to reach land..  
       b. Paddling furiously, land was finally reached.
4.     a. While attending the college concert, my stomach hurt.  
       b. While attending the college concert, I got an upset stomach.
5.     a. To do well in school, studying is necessary.  
       b. To do well in school, a person needs to study.
6.     a. By sitting around and talking, our work will never get done.  
       b. By sitting around and talking, we will never get our work done.
7.     a. While waiting for a bus, a passing car splashed me.  
       b. While waiting for a bus, I was splashed by a passing bus.
8.     a. Passed over for promotion, the disappointment was obvious in the young man.  
       b. Passed over for the promotion, the young man was disappointed.
9.     a. Having caught pneumonia, I had to postpone my trip.  
       b. Having caught pneumonia, my trip had to be postponed..
10.    a. After roasting for five hours at 325 degrees, the turkey was delicious.  
       b. After roasting for five hours at 325 degrees, we ate the delicious turkey.

## Nonparallel Structure

When a series of verbs, nouns, adjectives, adverbs, or phrases are joined with a conjunction (FANBOYS: for, and, nor, but, or, yet, so), all the items must be in the same form. For example, balance verbs with verbs, nouns with nouns, adjectives with adjectives, and so forth. When these items are not in the same form, nonparallel structure results. Look at the following examples.

### Coordinated Nouns in a Series

Nonparallel: The ad shows the product's charm, safety, and how strong it was.

Parallel: The ad shows the product's charm, safety, and strength.

### Coordinated Adjectives in a Series

Nonparallel: The case is flexible, sturdy, and has a lot of space.

Parallel: The case is flexible, sturdy, and spacious.

### Coordinated Verbs in a Series

Nonparallel: I checked the counters, talked to the clerk, and to make a decision.

Parallel: I checked the counters, talked to the clerk, and made a decision.

### Coordinated Phrases in a Series

Nonparallel: Their goals were to increase sales, to reduce expenses, and investigating new ideas.

Parallel: Their goals were to increase sales, to reduce expenses, and to investigate new ideas.

OR

Their goals were to increase sales, reduce expenses, and investigate ideas.

Explanation: When dealing with infinitive phrases (to + a verb), you can maintain parallel structure by putting the *to* in front of all the phrases or putting the *to* only in front of the first item of the series. The *to* must be placed either in front of each phrase OR in front of only the first phrase.

This same guidance applies to series of prepositional phrases that all begin with the same preposition. Either use the preposition with all items in the series or use it for just the first item in the series. Look at the following example.

Nonparallel: We went for a swim in the morning, in the afternoon, and the evening.

Parallel: We went for a swim in the morning, in the afternoon, and in the evening.

OR

We went for a swim in the morning, the afternoon, and the evening.

**EXERCISES:**

Read each pair of sentences and choose the one that is parallel by circling either *a* or *b*.

1.     a. Joy is pretty, intelligent, but has a temper.  
       b. Joy is pretty, intelligent, but hot-tempered.
2.     a. Ted was given money for his dorm, for his meals, and for his books.  
       b. Ted was given money for his dorm, to buy his meals, and his books.
3.     a. I enjoy eating hot dogs, drinking lemonade, and to play tennis.  
       b. I enjoy eating hot dogs, drinking lemonade, and playing tennis.
4.     a. In the summer, I work as a typist, babysitter, and house cleaner.  
       b. In the summer, I work as a typist, babysitter, and I clean houses.
5.     a. We will clean under the sink, in the tub, and wash over the stove.  
       b. We will clean under the sink, in the tub, and over the stove.
6.     a. Mary's dad promised to buy a new car and that he would let me drive it.  
       b. Mary's dad promised to buy a new car and to let me drive it.
7.     a. The department store is known for good service, quality merchandise, and the salespeople are courteous.  
       b. The department store is known for good service, quality merchandise, and courteous sales people.
8.     a. Mary will go to the park, the zoo, and to the library.  
       b. Mary will go to the park, the zoo, and the library.
9.     a. On our trip, we met many people who were kind, nice, and helpful.  
       b. On our trip, we met many people who were kind, nice, and helped us.
10.    a. Terry has mastered skills in writing, math, and is excellent in history.  
       b. Terry has mastered skills in writing, math, and history.



## Wordiness and Redundancy

When you write, avoid wordiness and needless repetition. Many times wordiness occurs because of an attempt to lengthen a sentence and make it sound “better.” Look at the following examples.

1. Example: Because Howie was illiterate and could neither read nor write, the other students ridiculed him.  
Explanation: If a person is illiterate, he can neither read nor write, so the words and could neither read nor write are redundant (unnecessary).  
Correction: Because Howie was illiterate, the other students ridiculed him.
2. Example: We two both ate the apple together at the same time.  
Explanation: The word two and the phrase at the same time are redundant because the word **both** means two and the word together means at the same time.  
Correction: We both ate the apple together.
3. Example: During his later years of his elderly life, my grandfather was senile and forgot many things.  
Explanation: The phrase of his elderly life is redundant. It means the same as during his later years. Also, to be senile means to forget things.  
Correction: During his later years, my grandfather was senile.

## EXERCISES:

Read each pair of sentences and choose the one that is not redundant or wordy by circling either *a* or *b*.  
(Hint: Look for the sentence that is written briefly and concisely.)

1.     a. Mom had many various jobs for us to do around the house.  
       b. Mom had various jobs for us to do around the house.
2.     a. In the past, four presidents have been killed.  
       b. In past history, four presidents have been killed.
3.     a. All of a sudden, Jimmy quickly slammed on the brakes and stopped the car.  
       b. Jimmy quickly slammed on the brakes.
4.     a. I never met her until yesterday.  
       b. I never at all met her until the day before today, which was yesterday.
5.     a. In the middle of the center of the ring, the huge, giant elephants danced.  
       b. In the center of the ring, the huge elephants danced.
6.     a. Everyone in the class – the teachers, the parents, and the students – was surprised at the news.  
       b. Everyone in the class was surprised at the news.
7.     a. Cathy occasionally does her homework.  
       b. Cathy occasionally does her homework at times.
8.     a. Future educators need to prepare their students for a constantly changing world.  
       b. Future educators of tomorrow need to prepare their students for a constantly changing world.
9.     a. The game is played with tiny balls.  
       b. The game is played with tiny round balls.
10.    a. After descending down to the river, we boarded a small raft.  
       b. After descending to the river, we boarded a small raft.

## TENSE AND VOICE SHIFTS

When writing, stay in one tense. Needlessly shifting tenses can cause confusion and misunderstanding.

Avoid switching from active to passive voice. Active voice means that the subject is the “doer” of the action whereas passive voice means that the subject is not the “doer” of the action. (See example 2 below.)

1. **Example:** The man will leave tomorrow and went to Ohio.

**Explanation:** One verb is in the future tense; the other is in the past tense. Either make them both future or make them both past.

**Correction:** The man will leave tomorrow and will go to Ohio. (future tense)

2. **Example:** The man made the rocking chair, and the cradle was made by him, too.

**Explanation:** The first verb made is in the active voice: The man made the chair. However, the second verb was made is in the passive voice. The subject of this sentence is cradle; however, the cradle did not make itself.

**Correction:** The man made the rocking chair and made the cradle.

**EXERCISES:**

Read each pair of sentences and choose the one that maintains consistent tense and voice by circling either *a* or *b*.

1.     a. Carl approached the door and opened it without making a sound.  
       b. Carl approached the door and opens it without making a sound.
2.     a. When Professor Callahan explained the algebra problem, Ray understood the formula.  
       b. When Professor Callahan explained the algebra problem, Ray understands the formula.
3.     a. Mary washed the dinner dishes, and they were dried by her, too.  
       b. Mary washed and dried the dinner dishes.
4.     a. Dad leaves at noon and went to the meeting.  
       b. Dad left at noon and went to the meeting.
5.     a. Birds sing in the clearing, and a small stream winds slowly through the valley.  
       b. Birds sing in the clearing, and a small stream wound slowly through the valley.
6.     a. Jennie goes to school and will get her test grade.  
       b. Jennie will go to school and will get her test grade.
7.     a. As soon as I left, I drove home.  
       b. As soon as I will leave, I drove home.
8.     a. Last week, I finished my report and types it, too.  
       b. Last week, I finished my report and typed it, too.
9.     a. Dad fixed the washing machine, and the typewriter was fixed by him, too.  
       b. Dad fixed the washing machine and the typewriter.
10.    a. Barbara left the party and drives to her home.  
       b. Barbara left the party and drove to the home.

## Sentence Clarity Review

**DIRECTIONS:** Choose the sentence that is most clearly written by circling the letter of your choice. (Read all choices before making your decision.)

1.
  - a. The two twins both did their homework.
  - b. The twins both did their homework.
  - c. Last night, the two both did their homework in the evening.
  - d. Last night, the twins did their homework.
2.
  - a. With her bonus money, Mary decided to paint the kitchen, carpet the dining room, and to buy a new stereo
  - b. With her bonus money, Mary decided to paint the kitchen, carpet the dining room, and buy a new stereo.
  - c. With her bonus money, Mary decided to paint the kitchen, put carpet in the dining room, and to buy a new stereo.
  - d. With her bonus money, Mary decided to paint the kitchen, carpeting the dining room, and buying a new stereo.
3.
  - a. The teacher that was explaining the lesson has three different homework assignments.
  - b. Having three different homework assignments, the teacher explained the lesson.
  - c. The teacher explained the lesson, which has three different homework assignments.
  - d. The lesson was explained by the teacher that has three different homework assignments.
4.
  - a. To join the service, a test had to be passed by Helen.
  - b. To join the service, Helen had to pass a test.
  - c. Joining the service, a test had to be passed by Helen.
  - d. A test had to be passed by the service which Helen wanted to join.
5.
  - a. The horse was ridden by the best jockey with the star on his forehead.
  - b. The horse was ridden with the star on its forehead by the best jockey.
  - c. The horse with the star on its forehead was ridden by the best jockey.
  - d. Riding the horse, a star was on its forehead, and the jockey was the best.
6.
  - a. The little baby had a pacifier, a bottle, and a rattle.
  - b. The little baby had a pacifier, had a bottle, and a rattle.
  - c. The little baby had a pacifier, a bottle, and had a rattle.
  - d. The little baby had a pacifier, a bottle, too, and rattles.
7.
  - a. Flying over the Alps, the view is magnificent.
  - b. Flying over the Alps, magnificent is the view.
  - c. While I was flying over the Alps, the view was magnificent.
  - d. Flying, which is over the Alps, is magnificent.
8.
  - a. Tara sings to entertain, for relaxation, and earning money.
  - b. Tara sings to entertain, relaxing, and to earn money.
  - c. Tara sings to entertain, to relax, and to earn money.
  - d. Tara sings to entertain, for relaxation, and to earn money.
9.
  - a. He loves westerns, spy movies, and comedies are lovable.
  - b. He loves westerns, spy movies, and comedies.
  - c. He loves westerns, to see spy movies, and watches comedies.
  - d. He loves watching westerns, to see spy movies, and watching comedies.

10.   a. There is a button on my coat that is round.  
      b. Being round, my coat has a button.  
      c. My coat has a button that is round.  
      d. My coat, which is round, has a button.

DIRECTIONS: Choose the sentence that uses verbs correctly by circling the letter of your choice. (Read all choices before making your decision.)

1.   a. The racers start their engines and checked their lights.  
      b. After Billy left, I cleaned the house.  
      c. Noticing the accident, Tommy quickly raced to the phone and calls the police.  
      d. Many college students were in school today, and they all are finishing their lessons.
2.   a. I changed clothes before I gone out last night.  
      b. We look forward to saw you tomorrow at the party.  
      c. The woman sipped from the mug sits on the table.  
      d. I will go to the bank, withdraw the money, and go to the movies.
3.   a. Forgetting his wallet, John runs home quickly and will get it.  
      b. The girl did not have the necessary skills for the job and was not hired.  
      c. Our class leaves next Friday and returned on Sunday.  
      d. The contestant will raise his hand and answered the difficult question.
4.   a. As soon as I hear from you, I will notify everyone.  
      b. At various times, I run four miles a day and swims twenty laps.  
      c. The teacher usually hands back the test and then went over them.  
      d. On Thursday, my neighbor washed his car and waxes it, too.
5.   a. The students will return next fall and left in the spring.  
      b. The test covered the basic skills and determined the students' final grade.  
      c. My aunt writes to the senator and will get an answer soon.  
      d. Ms. Smith makes the pie and added eggs to the recipe.

## Appendix 6.5 Ways to Eliminate Prepositional Phrases at End of Sentences

Ways to avoid ending a sentence with a preposition

In order to avoid ending a sentence with a preposition, one must first be able to recognize a preposition and understand its usage.

A preposition links nouns, pronouns and phrases to other words in a sentence. They are usually used before nouns to show where something is located or when something happened. Examples of prepositions include: above, below, over, under, at, on, by, before, for, during and until. Note the prepositions in parenthesis in these sentences.

The book is (above) the bed.

The pipe froze (during) the night.

The rule that one should not end a sentence with a preposition comes from the Latin language and is often taught of the English language. The reasoning behind it is: a preposition often begins with a prepositional phrase and requires an object of the preposition. If the preposition is the last word in the sentence, the prepositional phrase cannot be completed. Ending a sentence with a preposition is, therefore, considered grammatically incorrect. However, some grammarians now argue that it is acceptable to end sentences with prepositions.

If a writer wants to eliminate controversy, it is better to avoid prepositions at the end of sentences whenever possible. The obvious and perhaps best way to do this is to simply rearrange the sentence.

Example: What are you thinking of? Revision: You are thinking of what?

Example: What are you doing that for? Revision: You are doing that for what?

Another way is to use additional words or phrases in the sentence to explain what is taking place.

Example: I am not going in. Revision: I am not going in the house.

Example: That is too far above. Revision: That is too far above my head.

Often, the preposition may be eliminated altogether giving the sentence a stronger structure.

Example: Where is he at?

Revision: Where is he?

The *at* is obviously not necessary to the clarity of the sentence and should be eliminated.

There are times, however, when the use of a preposition at the end of a sentence may be acceptable when the sentence would sound awkward or too formal to do otherwise.

Example: I want someone on which I can depend.

Revision: I want someone I can depend on.

The latter sounds more appropriate while the first sentence sounds very formal.

In the end, it is the writer who must decide whether or not to adhere to the prepositional rule. If writing a formal paper or letter, then, of course, don't end sentences with prepositions. For more casual writing, it is acceptable to do so. The key is to make a conscious decision concerning the use of prepositions at the end of sentences.

## Appendix 6.6 Split infinitives

Split infinitives have been (and undoubtedly will continue to be) a hot topic for discussion among language professionals. Some are of the opinion that a split infinitive is and will always be grammatically incorrect. Others see nothing wrong and even prefer splitting infinitives. In technical terms, **no grammar rule exists that prohibits the splitting of infinitives**. Experts on the subject believe the taboo associated with splitting infinitives arose from the notion that English should mimic Latin, and since infinitives consist of only one word, they cannot be split.

Nevertheless, seeing as a number of language authorities still insist that splitting infinitives is wrong, a safe suggestion would be to **avoid splitting infinitives as long as it does not detract from the sentence's meaning or make the wording sound awkward**. Most (if not all) experts also agree that splitting infinitives that have to be or to have as auxiliaries is not wrong.

### Examples

- We would like to quickly conclude the proceedings.
- The child began to slowly and with great unease approach his parents' friend.

These are examples of when the writer could easily rewrite the sentences both to avoid splitting the infinitive and to make the sentences slightly clearer.

- Revised: We would like to conclude the proceedings quickly.
- Revised: The child began to approach his parents' friend slowly and with great unease.

### However,

- To boldly go where no man has gone before.

If we were to rewrite this sentence, it would sound odd.

- Revised: To go boldly where no man has gone before.

Another example where avoiding a split infinitive proves problematic:

- He decided to **gradually** get rid of the grammar notes he had taken.

Were we to rewrite the sentence, a few issues would arise:

- Revised: He decided **gradually** to get rid of the grammar notes he had taken.

This sentence implies that the decision to get rid of the notes was gradual, which is not the case.

- Revised: He decided to get rid of the grammar notes he had taken **gradually**.

This now implies that the notes were taken gradually, and this is again not what the writer originally intended.

- Revised: He decided to get **gradually** rid of the grammar notes he had taken.

This is both unidiomatic and bad English.



- Revised: He decided to get rid **gradually** of the grammar notes he had taken.

This sentence also sounds unnecessarily awkward.

In this case, the best and correct choice would be to split the infinitive.

Note that these sentences (with infinitival auxiliaries) are grammatically correct:

- He seemed to have finally understood the grammar surrounding split infinitives (though technically this sentence could be rewritten as He finally seemed to have understood the grammar surrounding spit infinitives).
- The rule appeared to have been carefully created.

## Practice

Rewrite the following sentences to avoid split infinitives and ambiguity where appropriate.

1. We decided that it would be better to quickly go to the store.
2. She used to secretly enjoy his company.
3. You fail to completely grasp the concept.
4. They seem to always want more.
5. He expects to more than double his profits in the next year.
6. The principal chose to abruptly expel the student for his actions.
7. It's best to always go to bed at a reasonable hour.
8. Will I have to constantly repeat the rule for you to fully understand?
9. They chose to fully accept responsibility for splitting infinitives.
10. The goal is to significantly improve the way this company is run.

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Source: <http://linguistech.ca/Tips+and+Tricks+-+Split+Infinitives>

## Appendix 6.7 Common Grammar, Spelling, and Punctuation Errors

As a professional, you will often need to write memos, letters, and reports. Therefore, being able to write clearly and succinctly is a very important skill. However, keeping your writing relatively free of grammar, spelling, and punctuation errors is probably even more important.

The following are some of the most common errors made by students.

### IT'S vs. ITS

- IT'S means it is
- ITS means belonging to it
- There is no such thing as ITS'

#### Examples:

- IT'S: The grocery store is just around the corner. It's the third store on the right.
- IT'S: That piece of equipment belongs on the main floor. It's used for cutting grooves in metal.
- ITS: Because its industry is in the maturing stage of the lifecycle, the firm has adopted a low-cost strategy.
- ITS: The saw would not cut through walnut. Its blade was dull.

### THERE IS vs. THERE ARE

- THERE IS is singular.
- THERE ARE is plural.

#### Examples:

- THERE IS: There is one reason why this can occur.
- THERE IS: In system software for personal computers, there is one dominant market share leader:
- THERE ARE: There are several reasons why this can occur.
- THERE ARE: In the competition ski boat industry, there are four major competitors.

Frankly, “there is,” “there are,” and “it is” are all passive construction; your writing will be much improved if you avoid such constructions whenever possible.

### EFFECT vs. AFFECT

- EFFECT is usually used as a noun, meaning consequence or result (NOTE: effect can also be used as a verb, which means to cause to happen; for example, to effect change)
- AFFECT is usually used as a verb, meaning to influence or to produce an effect on (NOTE: affect can also be used as a noun, meaning an emotional state)

#### Examples:

- EFFECT: One effect of the GM strike will be lower profits for the company this year.
- EFFECT: Switching from one supplier of nuts and bolts to another will have few effects on firms in this industry.
- AFFECT: The goal of the UAW is to affect management's policies regarding safety and compensation.
- AFFECT: Washing used motor oil into drainage ditches typically affects the local water supply.

### **FEWER vs. LESS**

- FEWER means a smaller number of persons or things
- LESS means more limited in quantity or a smaller proportion

#### **Examples:**

- FEWER: After the layoff, the company had fewer employees.
- FEWER: Our company has fewer managers than yours, although we have more employees.
- LESS: My father cries at sad movies. My mother is less emotional.
- LESS: Although John has been at the company twice as long as Alice, he has had less training than she has.

### **NUMBER vs. AMOUNT**

- NUMBER means the total of individuals or units taken together
- AMOUNT means the total quantity

#### **Examples:**

- NUMBER: A number of employees called the human resources department to complain about the new compensation and benefits packages.
- NUMBER: The management team came up with a number of alternatives for dealing with the complaints.
- AMOUNT: A large amount of cyanide has to be used in mining gold.
- AMOUNT: While we know the courts imposed a fine on Smithfield Foods, the amount of the fine is confidential.

### **i.e. vs. e.g.**

- i.e. stands for id est, which means that is in Latin. You use this when you are going to further explain a comment you have just made. It is typically used within parentheses. A comma should immediately follow it and immediately precede the explanation.
- e.g. stands for exempli gratia, which means for example in Latin. You use this when you are going to provide one or more examples of something you have just said. It is typically used within parentheses. A comma should immediately follow it and immediately precede the example(s).

#### **Examples:**

- i.e.: You should evaluate the company's strengths and weaknesses (i.e., those things at which it excels and those things at which it does not excel) as well as the opportunities and threats in its outside environment.
- i.e.: Environmental activist organizations (i.e., those whose agenda is primarily focused on environmental issues) spend lots of time and money lobbying members of Congress.
- e.g.: Environmental activist organizations (e.g., Sierra Club, National Wildlife Federation) spend lots of time and money lobbying members of congress.
- e.g.: Professors from some of the top business schools in the country (e.g., Harvard, Wharton, Darden) are studying environmental ethics as they pertain to business strategy.

## QUOTATION MARKS

- Periods and commas always go inside quotation marks.
- Question marks, semicolons, and colons go inside quotation marks when they are part of the quote, but outside when they are not part of the quote.

(NOTE: Other English-speaking and -writing countries do not follow the same rules as the U.S. in this regard.)

### Examples:

- PERIOD: Chris said, "Corporate mission statements can help set the tone for the corporate culture."
- PERIOD: Unethical treatment of employees can sometimes be due to a culture of "corporate greed."
- COMMA: Although the professor referred to his students as "lazy and unmotivated," many of them worked part-time jobs and didn't have time to get enough sleep each night.
- QUESTION MARK: Do you think your company's culture is one of "corporate greed"?
- QUESTION MARK: Myesha asked, "Do you think corporate vision requires a long-term focus?"
- COLON: Many managers succumb to the "Peter Principle": they are promoted to a level at which they become incompetent.

## CONSCIOUS vs. CONSCIENCE vs. CONSCIENTIOUS

- CONSCIOUS means being aware of oneself and one's environment
- CONSCIENCE means the faculty that allows you to distinguish between right and wrong
- CONSCIENTIOUS means thorough and painstaking; careful

### Examples:

- CONSCIOUS: Companies must be conscious of the effects their competitors are having on the marketplace.
- CONSCIOUS: The manager of our department is always conscious of the impact of our long work hours on our families.
- CONSCIENCE: After dumping toxic chemicals into the New River, the plant's manager had a guilty conscience and confessed to the EPA.
- CONSCIENCE: Cheating on an exam should weigh heavily on your conscience.
- CONSCIENTIOUS: Jennifer is a conscientious employee who always does a complete and timely job.
- CONSCIENTIOUS: Conscientious students are those who devote a significant amount of time to their homework and their class projects.

## DOMINANT vs. DOMINATE

- DOMINANT is an adjective meaning exercising the most influence or control; having more power than all others
- DOMINATE is a verb meaning to exercise control by using one's power and/or authority

### Examples:

- DOMINANT: The dominant player in PC operating system software is Microsoft.
- DOMINANT: The company in this industry which is able to develop high-tech products the most quickly will be dominant.
- DOMINATE: The company in this industry which is able to develop high-tech products the most quickly will dominate its competitors.
- DOMINATE: Virginia Tech dominated most of its competitors in football last year.

## **COMMAS AND CONJUNCTIONS**

Place a comma before a conjunction (e.g., “and,” “but”) when it joins two complete sentences (each with its own subject and verb). Do not place a comma before a conjunction unless what follows the conjunction is a complete sentence. (Exception: place a comma before a conjunction when it precedes the last item in a list.)

## Appendix 6.8 First vs. Third Person: Point of View and Voice

### Summary:

APA (American Psychological Association) style is most commonly used to cite sources within the social sciences. This resource, revised according to the 6th edition, second printing of the APA manual, offers examples for the general format of APA research papers, in-text citations, endnotes/footnotes, and the reference page. For more information, please consult the Publication Manual of the American Psychological Association, (6th ed., 2nd printing).

Writing in APA is more than simply learning the formula for citations or following a certain page layout. APA also includes the stylistics of your writing, from point of view to word choice.

### Point of View and Voice

When writing in APA Style, you can use the first person point of view when discussing your research steps ("I studied ...") and when referring to yourself and your co-authors ("We examined the literature ..."). Use first person to discuss research steps rather than anthropomorphising the work. For example, a study cannot "control" or "interpret"; you and your co-authors, however, can.

In general, you should foreground the research and not the researchers ("The results indicate ..."). Avoid using the editorial "we"; if you use "we" in your writing, be sure that "we" refers to you and your fellow researchers.

It is a common misconception that foregrounding the research requires using the passive voice ("Experiments have been conducted ..."). This is inaccurate. Rather, you would use pronouns in place of "experiments" ("We conducted experiments ...").

APA Style encourages using the active voice ("We interpreted the results ..."). The active voice is particularly important in experimental reports, where the subject performing the action should be clearly identified (e.g. "We interviewed ..." vs. "The participants responded ...").

Consult the Purdue Online Writing Lab (OWL) for more on the distinction between passive and active voice.

### Clarity and Conciseness

Clarity and conciseness in writing are important when conveying research in APA Style. You don't want to misrepresent the details of a study or confuse your readers with wordiness or unnecessarily complex sentences.

For clarity, be specific rather than vague in descriptions and explanations. Unpack details accurately to provide adequate information to your readers so they can follow the development of your study.

**Example:** "It was predicted that marital conflict would predict behavior problems in school-aged children."

To clarify this vague hypothesis, use parallel structure to outline specific ideas:

"The first hypothesis stated that marital conflict would predict behavior problems in school-aged children. The second hypothesis stated that the effect would be stronger for girls than for boys. The third hypothesis stated that older girls would be more affected by marital conflict than younger girls."

To be more concise, particularly in introductory material or abstracts, you should pare out unnecessary words and condense information when you can (see the OWL webpage on Conciseness in academic writing for suggestions).

Example: The above list of hypotheses might be rephrased concisely as:

"The authors wanted to investigate whether marital conflict would predict behavior problems in children and they wanted to know if the effect was greater for girls than for boys, particularly when they examined two different age groups of girls."

Balancing the need for clarity, which can require unpacking information, and the need for conciseness, which requires condensing information, is a challenge. Study published articles and reports in your field for examples of how to achieve this balance.

## Word Choice

You should even be careful in selecting certain words or terms. Within the social sciences, commonly used words take on different meanings and can have a significant effect on how your readers interpret your reported findings or claims. To increase clarity, avoid bias, and control how your readers will receive your information, you should make certain substitutions:

- Use terms like "participants" or "respondents" (rather than "subjects") to indicate how individuals were involved in your research.
- Use terms like "children" or "community members" to provide more detail about who was participating in the study
- Use phrases like "The evidence suggests ..." or "Our study indicates ..." rather than referring to "proof" or "proves" because no single study can prove a theory or hypothesis

As with the other stylistic suggestions here, you should study the discourse of your field to see what terminology is most often used.

## Avoiding Poetic Language

Writing papers in APA Style is unlike writing in more creative or literary styles that draw on poetic expressions and figurative language. Such linguistic devices can detract from conveying your information clearly and may come across to readers as forced when it is inappropriately used to explain an issue or your findings.

Therefore, you should:

- minimize the amount of figurative language used in an APA paper, such as metaphors and analogies unless they are helpful in conveying a complex idea
- avoid rhyming schemes, alliteration, or other poetic devices typically found in verse
- use simple, descriptive adjectives and plain language that does not risk confusing your meaning.

## Appendix 6.9 The Ambiguous Pronoun Reference

Because a pronoun REFERS to a noun or TAKES THE PLACE OF that noun, you have to use the correct pronoun so that your reader clearly understands which noun your pronoun is referring to.

Therefore, pronouns should:

### 1. Agree in number

If the pronoun takes the place of a singular noun, you have to use a singular pronoun.

INCORRECT: If a student parks a car on campus, they have to buy a parking sticker.

CORRECT: If a student parks a car on campus, he or she has to buy a parking sticker.

Remember: the words everybody, anybody, anyone, each, neither, nobody, someone, a person, etc. are singular and take singular pronouns.

INCORRECT: Everybody ought to do their best.

CORRECT: Everybody ought to do his or her best.

INCORRECT: Neither of the girls brought their umbrella.

CORRECT: Neither of the girls brought her umbrella.

**NOTE:** Many people find the construction "his or her" wordy, so if it is possible to use a plural noun as your antecedent and thus you can use "they" as your pronoun, it may be wise to do so. If you do use a singular noun and the context makes the gender clear, then it is permissible to use just "his" or "her" rather than "his or her."

### 2. Agree in person

If you are writing in the first person (I), don't confuse your reader by switching to the second person (you) or third person (he, she, they, it, etc.). Similarly, if you are using the second person, don't switch to first or third.

INCORRECT: When a person comes to class, you should have your homework ready.

CORRECT: When a person comes to class, he or she should have his or her homework ready.



### 3. Refer clearly to a specific noun.

Don't be vague or ambiguous.

INCORRECT: Although the motorcycle hit the tree, it was not damaged.

(Is "it" the motorcycle or the tree?)

INCORRECT: I don't think they should show violence on TV.

(Who are "they"?)

INCORRECT: Vacation is coming soon, which is nice.

(What is nice, the vacation or the fact that it is coming soon?)

INCORRECT: George worked in a national forest last summer. This may be his life's work.

(What word does "this" refer to?)

INCORRECT: If you put this sheet in your notebook, you can refer to it.

(What does "it" refer to, the sheet or your notebook?)

### 4. Avoid unclear pronoun references

Be sure that the pronouns you use refer clearly to a noun in the current or previous sentence. If the pronoun refers to a noun that has been implied but not stated, you can clarify the reference by explicitly using that noun.

*This, that, these, those, he, she, it, they, and we* are useful pronouns for referring back to something previously mentioned. Be sure, however, that what you are referring to is clear.

Unclear (unclear pronoun reference):

With the spread of globalized capitalism, American universities increasingly follow a corporate fiscal model, tightening budgets and hiring temporary contract employees as teachers. This has prompted faculty and adjunct instructors at many schools to join unions as a way of protecting job security and benefits.

Clearer:

With the spread of globalized capitalism, American universities increasingly follow a corporate fiscal model, tightening budgets and hiring temporary contract employees as teachers. This trend has prompted faculty and adjunct instructors at many schools to join unions as a way of protecting job security and benefits.

Unclear (unclear pronoun reference):

Larissa worked in a national forest last summer, which may be her career choice.

Clearer:

Larissa worked in a national forest last summer; forest management may be her career choice.

Source: <https://owl.english.purdue.edu/owl/resource/595/01/>

## Appendix 6.10 Avoiding Colloquial (Informal) Writing

While it may be acceptable in friendly e-mails, blogs and social media, a major pitfall that has been bringing down the quality of formal, written text is the use of excessive colloquialism. Here are some steps/tips that you can follow to help to improve your writing.

### Basic Steps

1. Know the meaning of colloquialism. This can best be described as "writing in the way that one would speak." It is an informal, slang style of English that should be reserved primarily for speech, as it can seem unprofessional and sloppy in written text. A casual tone can be interpreted positively in person with face-to-face contact but can be perceived negatively in writing.
2. Understand basic English punctuation. This might seem of negligible value at first, but when people speak, we usually disregard certain rules that are mandatory in writing. For example, we usually omit pauses that are required in formal writing, which are usually denoted by commas.
3. Avoid using common colloquial words/expressions, as listed below. Again, these are words that, while acceptable in speech, should not be used in formal writing.
4. Avoid using "filler" words. These words are not necessary and should be removed.
  - *Basically* – At best, it can be used to begin a sentence, but there are better choices available to replace the word, if it is not omitted entirely. E.g. "A microphone is ~~basically~~ a device that is used to record sound."
  - *Even* – Often, this word is found as an "additive" to a series, as in the following example, but is generally not needed. E.g. "The basket contained eggs, sandwiches, and ~~even~~ utensils."
  - *Just* – When used in the same context as BASICALLY, this is another overused filler word that one should omit. E.g. "When pouring the solution, ~~just~~ be certain not to spill its contents."
  - *Well* – Generally used to begin a sentence following a question. E.g. "Why is global warming a problem? ~~Well~~, one major issue is the..."
5. Avoid contractions. Some people suggest that when writing formal papers, write out your contractions. This depends on how formal you need to be. If you need to exterminate contractions, here are some suggestions: Replace *can't* with cannot, *doesn't* with does not, and so on. For example, instead of writing "Therefore, this *can't* be used as evidence in the case", write "Therefore, this cannot be used as evidence in the case."
6. Limit your use of subjective pronouns. If you are writing a formal, objective piece of writing, then you should avoid using the words "I", "me", "you", and "we". To avoid this, try writing from the third-person perspective. Formal business letters are an exception, as well as instructional text, such as this article.
7. Avoid splitting infinitives. An infinitive is a verb preceded by the word "to," such as "to go" or "to want". When writing, some experts suggest that you should keep your infinitives together, rather than separating them with other words. For example, substitute "He tried to not sneeze in the library but failed" with "He tried not to sneeze in the library but failed."
  - If you wish to use it for emphasis, as in, "He meant to never sneeze but sometimes couldn't help it", most professional editors would accept that. Note that this is now considered an archaic rule and professionals at all levels of writing will use either form as it suits their purpose.

8. Avoid ending your sentences with a preposition. In most cases, it is inappropriate to end a sentence with a preposition [i.e. down, during, in, into, of, since]. For example, replace "What is the bag filled with?" with "What is inside the bag?"
  - There is much controversy over the formality/informality of ending a sentence with a preposition. There are cases where an additional preposition may be regarded as a filler word, as in "Where are you at?", but others where "less is more" applies. A good example is Winston Churchill's playoff on this rule, with his quote, "This is the sort of English up with which I will not put", in place of "This is the sort of English I shall not put up with." For clarity reasons, the latter is preferable.
9. Avoid clichés. Clichés are phrases that have been exhausted to the point where they have completely lost originality.
  - Hercules was as strong as an ox.
  - I have to give an arm and a leg to find a parking spot during the holiday season.
  - There are loads of websites on the Internet.

### Common Colloquial Words & Expressions

- *A lot* – This phrase should be replaced with a stronger something less informal, such as "several", or "many". Keep in mind that "alot" is not a word.
  - "He has ~~a lot of~~ reasons for justifying his actions."
  - "He has several reasons for justifying his actions."
- *Ain't* – The word "ain't" has been incorrectly used as a contraction for "am not", "is not", "are not", "has not", and "have not". "Ain't" should never appear within formal writing.
  - "This ~~ain't~~ working."
  - "This is not working."
- *Alright* – This word is always non-standard, and should not be used in formal writing. It is a compound of "all right".
  - "~~Alright~~, I am ready to go."
  - "All right, I am ready to go."
- *Anyways* – The word "anyways" is also always nonstandard and should usually not be used in formal writing. You should always use "anyway".
  - "~~Anyways~~, thank you for your time."
  - "Anyway, thank you for your time."
- *Could of, would of, should of* – These are incorrect phrases, usually the result of trying to write what one hears (or thinks one hears). The phrases "could have", "would have", and "should have" are correct.
- *Get* – From time to time, this word replaces "understand".
  - "Do you ~~get~~ the homework?"
  - "Do you understand the homework?"
- *Got* – In this context, "got" should be replaced with "have".
  - "Do you ~~got~~ an extra pen?"
  - "Do you have an extra pen?"
- *Gonna, Wanna* – These are the condensed versions of "going to" and "want to", respectively, which should be revised in formal writing accordingly.
  - "I am ~~gonna~~ go to the supermarket."
  - "I am going to go to the supermarket."

- *Kinda, kind of* – The use of these words to mean "somewhat" or "rather" is informal and should be avoided. KIND OF, when meant as "type of", is acceptable, but is somewhat overused in language. Consider replacing with "type of".
  - "It is ~~kind of~~ cold outside."
  - "It is rather cold outside."
  - "A parakeet is a ~~kind of~~ bird."
  - "A parakeet is a type of bird."
- *Like* – Consider replacing with "as if", "similar to", or "such as", depending on the context.
  - "It is ~~like~~ he never existed."
  - "It is as if he never existed."
- *Okay* – This word is a derivative of "O.K.", which appeared as an abbreviation for "oll korrekt" (a conscious misspelling of "all correct") in 1839. It is similar to "alright."
  - "Is everyone ~~okay~~?"
  - "Is everyone all right?"
- *Pretty* – Using this word tends to weaken one's argument, when used in place of "very", and should be either replaced or eliminated entirely.
  - "I think that this is a ~~pretty good~~ investment that your company should consider."
  - "I think that this is a very worthwhile investment that your company should consider."
- *Real, really* – Replace the word "real", as used in this context.
  - "The coffee is ~~real~~ hot!"
  - "The coffee is very hot!"
- *Sorta, sort of* – Similar to KINDA and KIND OF, these should be replaced when used to mean "rather" or "somewhat".
  - "The project is ~~sorta~~ long."
  - "The project is somewhat long."
- *Use to* – The proper form of this phrase, in writing, should be "used to". In speech, the d is sometimes silent, which makes for the confusion in writing.
  - "As a child, I ~~use to~~ go to nursery school."
  - "As a child, I used to go to nursery school."

## **Tips**

- Remember that less is more. Having a long, verbose paragraph does not necessarily mean that it is meaningful. You can help to eliminate wordiness by writing in active tense, as opposed to passive tense.
- Keep slang usage to a minimum. You might try chatting with your friends online by using proper writing styles! If you do not like writing formally, then limit yourself to using only proper styles. That is, leave out the capitalization/punctuation.
- Your writing will sound stronger if you remove adverbial phrases and replace them with more meaningful words. For example, "very good" can be replaced with "excellent," "very nice" becomes "delightful," "very bad," becomes "terrible," "definitely true," becomes "obvious," and so on. As a general guideline, try to avoid the "-y" words.
- Similarly, limit your use of "absolute" terms, such as "everyone", "always", "never". Unless you are relaying an indisputable fact, these highly opinionated words will weaken your writing. For example, "He always buys the most expensive shoes" could be revised to "He usually buys the more expensive shoes."
- Try not to think of proper writing as strictly "academic". It makes you appear more intelligent. More importantly, it eliminates the risk of "slipping out" bad habits in situations where it is critical to convey properness, such as writing a college essay, or a job résumé.
- Expand your vocabulary! Mastering new verbs can allow you to bring color to a paper by eliminating the need to employ the same words over and over again.
- Read! Reading will not only help to improve your vocabulary, but it will also help you to distinguish between formal and informal writing.
- Use a thesaurus. If you find that you are using a particular word too often, you might replace it with another term.

## **Warnings**

- When using a thesaurus, make sure that the word matches closely to the meaning of the word that you want to convey! Make sure that you look up the synonym in the dictionary to ascertain that the meaning is correct. For example, you would not want to improve your problem when you actually mean to fix it!
- Highly formal writing can become dry and boring for readers, despite their interest in the content. Make an effort to gauge your intended audience and write something that they will enjoy reading.

## Appendix 6.11 The Oxford Comma

*Also known as The Serial Comma*

An Oxford (serial) comma simply means that a comma will separate each element in a series of three or more, even before the coordinating conjunctions *and* and before *or*. The following are simple examples of serial commas:

Lions, tigers, and bears.

Apples, oranges, and bananas.

Morning, afternoon, or night.

Here is an example of a serial comma used within a sentence:

There has never before been such widespread focus in the educational community on early childhood teacher quality, standards, and accountability (Scott-Little, Lesko, Martella, & Milburn, 2007).

Additionally, **note that Oxford commas should also be used to separate authors' names in citations and reference list entries.** Thus, while the Oxford comma is used for the list within the sentence above, it is also used to separate the authors' names in the parenthetical citation.

In APA style, you always want to have a comma before the *and* or the *or*.

Omitting the Oxford Comma can lead to confusion (and inappropriate humor).

WITH: After beating the Steelers, Tim Tebow thanked his parents, God, and Ms. Trunchbull.

WITHOUT: After beating the Steelers, Tim Tebow thanked his parents, God and Ms. Trunchbull.

WITH: Lets eat, Grandma!

WITHOUT: Lets eat Grandma!

WITH: We invited the rhinoceri, Washington, and Lincoln.

WITHOUT: We invited the rhinoceri, Washington and Lincoln.

WITH: A woman: without her, man is nothing.

WITHOUT: A woman without her man is nothing.

WITH: The criminal, said the judge, was an idiot.

WITHOUT: The criminal said the judge was an idiot.

WITH: My heroes are my parents, Superman, and Wonder Woman.

WITHOUT: My heroes are my parents, Superman and Wonder Woman.

WITH: We invited the strippers, JFK, and Stalin.

WITHOUT: We invited the strippers, JFK and Stalin.

WITH: Has blade, named Sting.

WITHOUT: Has blade named Sting.

WITH            Stop clubbing, baby seals.  
WITHOUT:      Stop clubbing baby seals.

WITH:           Symptoms include: Nausea, inability to eat, diarrhea  
WITHOUT:      Symptoms include: Nausea, inability to eat diarrhea

WITH:           We are going to learn to cut and paste, kids!  
WITHOUT:      We are going to learn to cut and paste kids!

WITH:           Hunters, please use caution when hunting pedestrians using walking trails.  
WITHOUT:      Hunters, please use caution when hunting, pedestrians using walking trails.

For more information on proper comma usage, go to <https://owl.english.purdue.edu/owl/resource/607/1/>

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers

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Author Note

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### Abstract

Veisalgia, commonly known as the hangover, affects the multitude of binge drinkers throughout the country. College students, being a population sub-set prone to binge drinking, commonly suffer the effects of a hangover. Wanting to continue a heavy drinking lifestyle and still perform adequately on exams may lead binge drinkers in the internet age to seek out urban legends or folk remedies to ascertain preventative measures for the ill effects of heavy drinking. This report contains an investigation into popular internet urban legends for hangover prophylaxis and compares the purported method of action against peer reviewed medical science. Examined within this report are several methods of action including, dehydration, depletion of electrolytes, depletion of other vitamins and minerals, abundance of the enzyme alcohol dehydrogenase, and the presence of ethanol contaminants (congeners).

*Keywords:* veisalgia, hangover, prophylaxis, prevention, urban legends

## Review of the Medical Evidence to Support Common Urban Legends for the Prevention of Hangovers

Viewing any televised sporting event in the United States (US) provides ample evidence to support the view that conspicuous consumption of alcoholic beverages is as much a part of Americana as apple pie. The inevitable result for many that partake in the consumption of large quantities of alcohol is the hangover, and as Frank Sinatra is attributed with saying, “I feel bad for people who don’t drink. When they wake up in the morning, that’s as good as they’re going to feel all day.” Researchers conclude that, in the United States, many college-age students partake in binge-drinking bouts that lead to the unfortunate condition of a hangover (Wechsler, Dowdall, Davenport, & Castillo, 1995). Wechsler et. al surveyed nearly 18,000 college students to understand the correlations between individuals and binge drinking. They conclude the following factors are most significant in contributing to binge drinking (expressed as odds ratio): uses marijuana 7.13, lives in a fraternity or sorority 6.96, parties are very important 5.38, and uses cigarettes daily 4.02.

In desperation, many sufferers of hangovers look to the internet for a cure to what ails them, even invoking, “the hair of the dog that bit you” as a possible remedy (Emery, n.d.). The origin of this phrase dates back to Roman times and the homœopathic idea of *Similia similibus curantur*, or like cures like (Bartleby.com, n.d.). Rather than cure a hangover, the wise searcher of urban legends seeks to prevent. However, the pessimist would conclude that the techniques espoused in urban legends purporting prophylaxis against hangovers lack a fundamental understanding of the body of medical science and have minimal effect in preventing the incidence of the adverse outcomes of excessive consumption of ethyl alcohol.

Explored within this report are numerous urban legends for preventing hangovers. While none of the claimed preventative measures have the ear catching sound of hair of the dog, some techniques are strange to hear, including consuming the yeast that makes the alcohol. Sorting the urban legends into similar groups based upon method of purported action and then analyzing the legends against peer reviewed medical research provides a basis for analysis of the efficacy of alleged cures. Providing techniques for hangover prevention supported by medical science conclude the report.

### **Urban Legends**

With the advent of the internet and the “Information Age” came copious quantities of misinformation. Not long after the internet’s surge in popularity, dispelling urban legends became the dedicated mission of the website Snopes.com in 1995. Merriam-Webster defines urban legends as, “an often lurid story or anecdote that is based on hearsay and widely circulated as true” (Merriam-Webster, n.d.). While the internet led to a surge in urban legends, Merriam-Webster states the term has been in use since 1968. The term “folk remedy,” especially in 1968, is a suitable synonym to refer to purported hangover prevention techniques.

The website VIP Bachelor offers 101 Tips to Prevent and Cure a Hangover (Racine, 2012). This list includes twelve prevention tips specifically, but offers other prevention tips intermingled in the section on hangover cures. The first preventative measure is staying hydrated, recommending a glass of water between each alcoholic beverage. Hydration appears as a common theme in four of the six urban legend articles reviewed, including Offman (n.d). The next most common prophylactic is the avoidance of congeners, or contaminants in the alcoholic beverage typically associated with either brown spirits or “cheap” varieties as described by Stephen Propatier (2013). The article by Carey Jones (2014) adds to the list of

preventative measures by including the consumption of food before or during the consumption of alcohol along with the replenishment of electrolytes; Racine (2012) also supports these cures. Some less commonly reported preventative measures include the use of supplements, avoiding mixing types of spirituous liquors, and consuming yeast.

While hundreds of tips are available on the internet offering advice to avoid the ill effects of a hangover, these internet tips fall into a few broad categories for the method of action. As Summarized in Table 1 below, the various preventative measures fall into a few broad categories that include increasing the abundance of the enzyme alcohol dehydrogenase, avoiding congeners, supplementing electrolytes, the consumption of food, adequate hydration, avoiding mixing of various types of spirits, and the taking of supplements. Provided in the following sections is an examination of each of these urban legends and its efficacy by a comparison to medical and scientific publications on each method of action.

### **Veisalgia**

In order to evaluate folk remedies regarding hangovers to medical research in a proper way, an understanding of the medical definition is necessary. The medical term for a hangover is *veisalgia*, which is, “From the Norwegian *kveis* (uneasiness following debauchery) + the Greek *algia* (pain)” (Medicine Net, n.d.). Drs. Swift & Davidson (1998) define a hangover as a spectrum of symptoms ranging from fatigue, headache, increased blood pressure and heartbeat, irritability, etc. resulting from the consumption of ethyl alcohol. This study from nearly 20 years ago reviewed 38 published articles on hangovers and concluded that the medical community does not understand well the process or processes that lead to a hangover. They did describe several leading theories on causation which included some similar to the urban legends such as dehydration, electrolyte imbalance, low blood sugar, and congeners. With respect to

dehydration, 50 grams of alcohol (roughly 4 drinks) results in 600-1000 mL of urine production. The doctors also describe several other contributing theories including alcohol withdrawal symptoms, a toxic byproduct of alcohol metabolism (acetaldehyde), synergy with nicotine, and individual genetic differences.

More recently, Dr. Paton (2005) expanded on several of the metabolic processes related to ethanol and their effect on the body. The metabolism of ethanol to the intermediary acetaldehyde provides an opportunity for further reactions with the body. In 50% of Japanese people, and a portion of other people from south Asia, lack an enzyme that metabolizes acetaldehyde resulting in veisalgia symptoms (headache, flushing, fast heartbeat) rather quickly. This lead to speculation that acetaldehyde is responsible for hangovers. Dr. Paton provides a cautionary note that the rate of alcohol consumption can overtax these metabolic pathways and may result in increased intoxication and worse symptoms of hangover. Additionally, the rate of absorption of ethanol may overwhelm the metabolic pathways. Higher proof beverages absorb more quickly, and consumption with food slows absorption. In heavy drinkers who develop a tolerance for ethanol through additional metabolic pathways such as cytochrome P450, additional adverse health effects occur including reduction in glucose production and an increase of lactic acid that effects the kidneys.

The medical documentation in general does not point to a specific cause of the common hangover, but does recognize some of the suspected causes connected to urban legends. The following section of this report analyzes the various claims of hangover prevention against specific medical studies related to the causative agent.

## Alcohol Dehydrogenase

In an interview with Esquire magazine, Jim Koch, the proprietor of the Boston Brewing company (famous for the Sam Adams brand of beer) stated that he avoids hangovers (and even getting intoxicated) by eating Fleischmann's dry yeast (*Saccharomyces cerevisiae*) at a dosage of, “One teaspoon per beer, right before you start drinking” (Goldfarb, 2014). Mr. Koch hypothesizes that since yeast must survive in an environment containing ethanol, the organisms produce alcohol dehydrogenase and thereby increase the amount of dehydrogenase available to the human consumer and thereby reducing the level of intoxication and resulting hangover.

In an article for the website Skeptioid.com, Stephen Propatier (2013) attempts to debunk several hangover myths. In doing so, he claims that acetaldehyde production is the cause of hangovers. Which is consistent with Dr. Paton's hypothesis. However, Mr. Propatier does not explain his theory, nor does he specifically discuss yeast. Combining the alcohol and acetaldehyde enzyme theories and seeking validation requires that brewer's yeast produces both enzymes. The fact that *Saccharomyces cerevisiae* produces both alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) is well-reported (Wang, Bai, & Weiner, 1996) (Edenberg, 2007). Shown in Figure 1 below is the process of ethanol metabolism via ADH and ALDH.

The urban legend of the consumption of yeast to prevent hangover appears to have a basis in science. However, a plausible causal mechanism is insufficient to prove the theory true or false. Pittler, Verster, & Ernst (2005) reviewed 296 published studies related to hangover prevention. Of the fifteen relevant articles, the researchers deemed eight scientifically valid randomized controlled trials. The researchers investigated numerous dietary supplements for hangover prophylaxes including the consumption of yeast. The conclusion of their research is, “No compelling evidence exists to suggest that any conventional or complementary intervention

is effective for preventing or treating alcohol hangover” (Pittler, Verster, & Ernst, 2005, p. 1). However, this general conclusion is somewhat inconsistent with the specific finding of the yeast trials, which stated, “The difference in the change for the symptoms discomfort, restlessness, and impatience was statistically significant in favour [*sic*] of the yeast preparation” (Pittler, Verster, & Ernst, 2005, p. 2).

The statements of, “no compelling evidence” and, “statistically significant in favor” in the Pittler et al work appears somewhat contradictory with respect to yeast as a hangover prophylactic. However, Pittler et al. explain their reasoning for asserting the lack compelling evidence on two grounds. First, only a single double blind randomized trial exists in the literature, so therefore there is not a body of evidence. Secondly, at present, there is no way to measure objectively the severity of hangover symptoms and all such studies must rely on self-reporting surveys for data collection. These self-surveys therefore are not repeatable.

Given the testimony of a well-known beer celebrity who, as part of his job must drink copious amounts of beer, the scientific logic of the metabolic processes of alcohol digestion in humans and yeast, and at least one double blind study, the notion of consuming yeast prior to a bout of drinking seems a plausible preventive measure for veisalgia.

## **Congeners**

Congeners are complex chemical mixtures resulting from the process of fermentation and / or aging of spirits (Evans, Sun, & Lay, 2007). Several urban legend sources cite congeners as the method of action for the production of hangovers and postulate that “cheap” spirits and dark spirits have higher concentrations of these chemical compounds (Propatier, 2013). The term cheap when applied to liquor is synonymous with poor quality. However, to identify impurities

in the spirit would require lab testing and cannot be determined by price alone. Propatier offers that methanol contamination is associated with low-quality moonshine and Rohsenow, et al. (2010) confirm methanol's contribution to hangover severity due to the byproduct of methanol production being formaldehyde and formic acid.

Both Rohsenow, et al. and Howland, et al. (2008) review several previous studies comparing Vodka vs Bourbon or similar clear vs dark spirits for both incidence and severity of hangover. Their literature review reveals mixed results and their own trials both indicated no significance between the two spirit categories, especially with respect to incidence of hangover. However, both sets of researchers indicate a possible connection with severity of hangover in relation to relative concentration of congeners with Bourbon having significantly higher quantities of congeners than vodka. The urban legends related to clear and / or expensive liquors have little support in the scientific literature, but do offer some indication that mitigating the severity of a hangover is possible through the judicious selection of beverage.

## **Electrolytes**

Electrolytes are charged molecules in the human body that regulate nerve function through ionic potential and include sodium, potassium, calcium, and bicarbonate (Nordqvist, 2016). Several urban legend sources encourage the consumption of electrolyte replacement drinks either before a bout of alcoholic beverages (Jones, 2014) (Racine, 2012). The excess urine production induced by alcohol consumption mentioned above depletes the body of electrolytes (Swift & Davidson, 1998). Electrolyte depletion leads to electrolyte imbalance that results in several symptoms related to veisalgia. Several sports drinks offer electrolyte replacement, typically for electrolytes lost from sweating and physical activity. However, since



the urban legends regarding electrolytes either encourages the drinking of electrolyte rich drinks before or after a bout of drinking alcohol, and urban legends regarding hydration before a bout of alcohol consumption, differentiating the effects of water vs. electrolyte drinks difficult.

Therefore, conclusions regarding electrolyte replacement drinks are discussed in the hydration section of this work.

## **Food**

Several sources indicate the consumption of food either before or during the consumption of alcohol, i.e. with a meal, mitigates the onset of hangover symptoms (Jones, 2014). One source even goes so far to mention with specificity the consumption of cucumbers (Snopes, 2009).

There is clear support in the medical literature for this method of prophylaxis (Evans, Sun, & Lay, 2007) (Howland, et al., 2008) (Paton, 2005). Specifically, Alex Paton M.D. states, “Food, and particularly carbohydrate, retards absorption [of alcohol]: blood concentrations may not reach a quarter of those achieved on an empty stomach” (2005, p. 85). Since food decreases the rate of absorption, the body’s supplies of enzymes ADH and ALDH are sufficient to metabolize alcohol without the necessity of cytochrome P450 metabolizing alcohol. Metabolism of alcohol by cytochrome P450 results in several adverse effects on the body, most notably the production of lactic acid and ketones, which likely contribute to veisalgia.

In addition to moderating the absorption rate of alcohol, consumption of food prior to a bout of drinking may also provide a prophylaxis from hangover. Heavy consumption of alcohol inhibits hepatic gluconeogenesis and puts the imbiber at risk of hypoglycemia (Paton, 2005).

Additionally, the consumption of food high in fructose allows the body to more efficiently

metabolize ethanol (Evans, Sun, & Lay, 2007). Therefore, consuming foods containing glucose and fructose may offer some prevention against hangover symptoms.

## **Hydration**

Hydration is the most often cited urban legend for preventing (and treating) hangovers, comprising 2/3 of the articles reviewed in Table 1. As noted previously, Swift & Davidson report that alcohol consumption induces dehydration through increased kidney output by the inhibition of the antidiuretic hormone vasopressin (1998). They report that the consumption of four drinks totaling 50 grams of alcohol in 250 mL of water results in the production of up to 1,000 mL excreted water. Evans, Sun, & Lay confirm that headache is a known symptom of dehydration, and that dehydration plays a role in the occurrence of Alcohol Hangover Headache (2007).

Proper hydration before / during / after a bout of alcohol consumption may assuage dehydration related headache, it may not, however, relieve the symptoms from other causative agents. Hydration using electrolyte beverages may enhance this prophylactic effect, as mentioned earlier, but again, this is a mitigation of severity not incidence. Hydration does not address adverse effects from methanol or the production of acetaldehyde.

## **Mixing**

A common mnemonic proverb amongst consumers of alcoholic beverages is, “Liquor, then beer – You’re in the clear! Beer before liquor – Never sicker” (Racine, 2012). This investigation found no studies researching this urban legend. However, based upon the idea of metabolism rate affecting hangover severity, one can postulate that after several rounds of beer,

the rate at which ALDH can metabolize acetaldehyde may be near peak, and the addition of hard liquor, particularly via “shots,” could overwhelm the available ALDH causing acetaldehyde to persist longer in the body and simultaneously activate the cytochrome P450 pathway, introducing ketones into the body as well. Therefore, the mnemonic may have a plausible prophylactic effect on veisalgia.

## **Supplements**

In addition to many urban legend type articles suggesting the use of supplements to prevent hangover (Propatier, 2013) (Racine, 2012), a search of Amazon.com finds numerous products claiming prophylaxis from hangover. These products include creative names such as PreToxx, Rally Capsules, and RU-21 KGB Hangover Prevention. The ingredient lists include Kudzu Flower, Milk Thistle, Vitamin Complexes, etc. While double blind research studies on these ingredients are sparse, Pittler, White, Stevinson, & Ernst (2003) studies artichoke-extract for the prevention of hangovers. They plainly state, “Our results suggest that artichoke extract is not effective” (p. 1269).

In a broader review, Pittler, Verster, & Ernst reviewed numerous published studies testing supplements for preventing the signs and symptoms of alcohol-induced hangover (2005). The studies under review included exotic ingredients including linolenic acid, *Cynara scolymus*, *Puntia ficus-indica*, etc. As with the previously reviewed study, this study found no effect from these supplements. Since the consumer takes these supplements before the bout of drinking, and alcohol increases urinary output, the body likely excretes the water-soluble vitamins and other substances before they could be of benefit to the body. A small consolation is that the consumer

uses water to take these supplements and therefore may increase their overall hydration before drinking.

## **Discussion**

### **Total Dose vs. Peak Intoxication**

Several factors inhibit the scientific study of hangovers including genetic variability and alcohol tolerance differences between study participants. Additionally, human studies are difficult, expensive, and require careful oversight from an Institutional Review Board (IRB). Besides variability amongst participants, alcohol metabolism is a complex biochemical reaction influenced by hydration level, food consumption, contaminants in the beverage besides ethanol. Given all of these limitations, there is a lack of medical literature that fully explains the causes and controls of alcohol-induced hangover.

Specifically, the medical literature lacks an analysis of total dose of alcohol delivered vs. peak intoxication of the participants. Given the research that indicates food acts to slow metabolism of alcohol and that the moderated rate of absorption allows for ADH and ALDH to keep pace with the ethanol dose entering the body, one may conclude a connection between the level of intoxication (drunkenness) and the severity of hangover. For example, if a person were to consume six alcoholic beverages in quick succession vs. the same six drinks paced out at one-hour intervals, the peak intoxication of the individual would be vastly different. Since the acute physiological response is different between the two alcohol challenges, it follows that the sub-acute response is different. While the hydration challenge is the same due to equal doses, the amount of acetaldehyde and ketones produced would differ. This difference in metabolism may lead to a difference in severity of hangover, but not necessarily incidence.

### **Other modes of action**

Urban legends regarding prevention of hangovers have some connection to medical research, but the medical evidence suggests additional causal factors not addressed in the myths; specifically, disruption of sleep and other biological rhythms (Swift & Davidson, 1998). Besides the intuitive sleep disturbance from waking to void the bladder due the dehydration effect of alcohol consumption, the quality of sleep is also affected. Alcohol reduces rapid eye movement (REM) or dreaming sleep and changes circadian rhythms of body temperature and cortisol production, similar to a jet-lag effect.

The effects of alcohol consumption on several neurotransmitters and hormones that show evidence for the induction of hangover headaches include histamine, serotonin, and prostaglandins (Parantainen, 1983). Even with this evidence, “The etiology of hangover headache remains unknown” (Swift & Davidson, 1998, p. 57). This shows that the urban legends only begin to address the causal factors in the spectrum of veisalgia symptoms.

### **Precautions**

Besides veisalgia or hangover, alcohol consumption includes several other risk factors. The primary acute risk factor related to the consumption of alcohol is injury or death related to impaired motor function. Reduced motor function inhibits balance and reaction time leading to injuries from falls to death to one’s self or others when combined with the operation of a motor vehicle. Each year in America, nearly 10,000 people die due to alcohol related motor vehicle incidents (NHTSA, 2015).

Alcohol consumption has the potential to induce other diseases in the body including Fetal Alcohol Syndrome (FAS), which causes devastating birth defects. “Alcohol enters the fetus readily through the placenta and is eliminated by maternal metabolism” (Paton, 2005, p. 85). Chronic alcohol use has the potential to induce chronic liver diseases including Steatosis, Steatohepatitis, and Cirrhosis (Forrest & Reed, 2011).

Sufferers of hangovers commonly self-administer over the counter analgesics (painkillers). While these painkillers reduce symptoms of alcohol hangover headache by reversing the vasodilation effects of the alcohol, they may lead to other adverse health outcomes. There is specific medical evidence that Acetaminophen (APAP, Tylenol<sup>®</sup>, or Excedrin<sup>®</sup>) has a synergistic effect with chronic alcohol consumption resulting in both renal (kidney) and hepatic (liver) toxicity (Fore, et al., 2001). Therefore, hangover sufferers should choose another analgesic relief.

Finally, no work on hangovers is complete without a note on the only guarantee of not incurring a hangover - abstinence. Based on the myriad of adverse effects on the body through the metabolism of ethanol, the only way to ensure a hangover free morning is to abstain from the consumption of alcohol. Though abstaining is a difficult choice, given the incidence of alcohol related traffic deaths, sober designated drivers are a welcome service to the community.

### **Conclusion**

Upon investigation, several urban legends related to the prevention of hangovers appear to combat specific physiological processes associated with ethanol metabolism. No single suggested remedy appears to be effective against the incidence of hangover, but do seem to have the ability to affect the severity of the hangover. The research is silent on the effectiveness of

using some of these techniques in combination to reduce hangovers to a “tolerable” level.

Alcohol metabolism proves to include too many factors to effectively study given the difficulty of human studies, and the ambiguity of severity vs incidence. Moderation or abstinence seems to be the most logical conclusion for the reduction or elimination of hangover symptoms.

The prospect of consuming yeast, along with a sugary electrolyte beverage before a meal of pasta, all in an effort to stave off a hangover seems to diminish the enjoyment of a few drinks with friends. Therefore, imbibers are likely to proceed with activities leading to hangovers and thereby look to remedies rather than prophylactics. Future researchers should investigate hangover cures. A specific remedy of interest is the “Hair of the Dog” as noted by Swift and Davidson, “The fact that ethanol readministration fends off hangover effects may be further evidence of methanol's contribution to the hangover condition, given ethanol's ability to block methanol metabolism and thereby slow the production of formaldehyde and formic acid” (1998, p. 58)

For a final thought on hangovers, the wit of Robert Benchley is appropriate, “A real hangover is nothing to try out family remedies on. The only cure for a real hangover is death.”

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**Table 1**

*Urban Legends by Article*

Article	Urban Legend						
	<i>Alcohol Dehydrogenase</i>	<i>Congeners</i>	<i>Electrolytes</i>	<i>Food Consumption</i>	<i>Hydration</i>	<i>Mixing</i>	<i>Supplements</i>
Goldfarb, 2014	x						
Jones, 2014			x	x	x		
Offman, n.d.		x			x	x	
Propatier, 2013		x			x		x
Racine, 2012		x	x	x	x	x	x
Snopes, 2009				x			

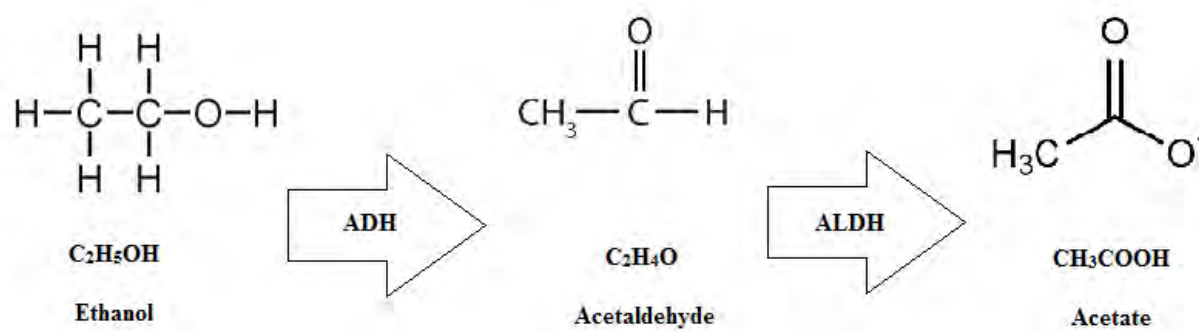


Figure 1. Metabolism of ethanol.

## Appendix 7.1 Track changes while you edit in MS Office Word (2013, 2016)

You can easily make and view tracked changes and comments while you work in a document. By default, Microsoft Office Word 2010 uses balloons to display deletions, comments, formatting changes, and content that has moved. If you want to see all of your changes inline, you can change settings so that tracked changes and comments display the way you want.

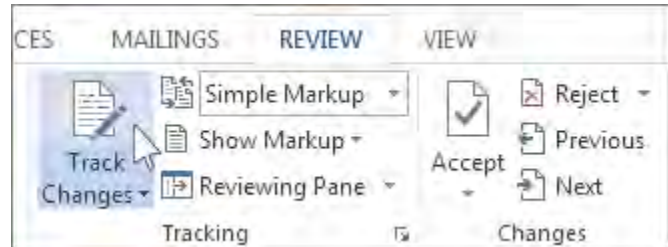
### 1. Turn *Track Changes* on or off

On the **Review** tab, in the **Tracking** group, choose **Track Changes**.

When you turn on *Track Changes*, Word marks up new changes made to the document.

When you turn off *Track Changes*,

Word stops marking up new changes. Any changes that were already tracked remain marked up in the document until you remove them.



### 2. Show changes (revisions) in document

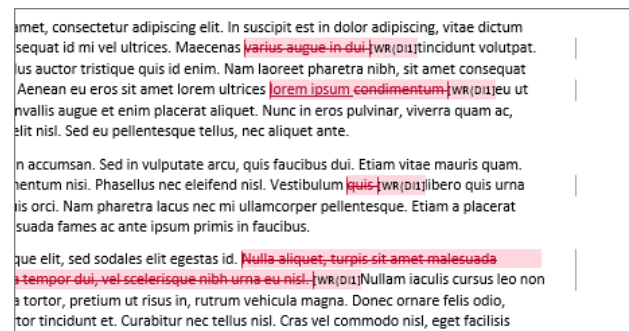
When you turn on *Track Changes*, Word marks up and shows any changes that anyone makes to the document.

On the **Review** tab, in the **Tracking** group, in the **Simple Markup** list, choose a view option.

**Simple Markup** is the default option and indicates where changes are with a red line in the margin.

**No Markup** hides markup to show what the incorporated changes will look like.

**Note:** You can see the markup again by choosing **Simple Markup** or **All Markup**.

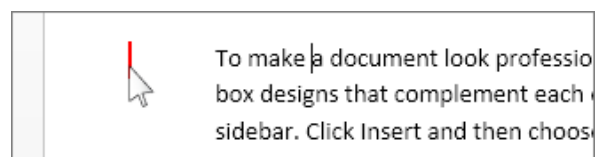


**All Markup** shows all edits with different colors of text and lines.

**Original** shows the document in its original form.

In the **Show Markup** list, choose the revisions you'd like to see—Comments, Ink, Insertions and Deletions, Formatting, Balloons, Specific people.

The line at the margin to show a tracked change is at that location

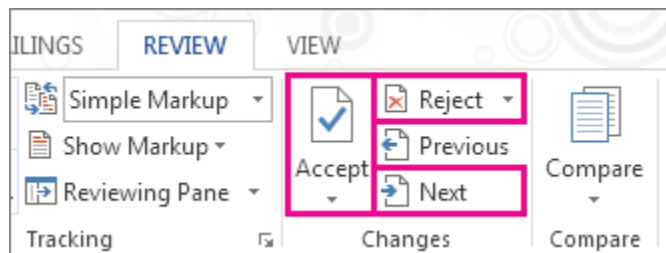


### 3. Remove tracked changes

The only way to remove tracked changes in a document is to accept or reject them. Choosing **No Markup** in the **Display for Review** box helps you see what the final document will look like—but it only hides tracked changes temporarily. The changes are not deleted, and they'll show up again the next time anyone opens the document. To delete the tracked changes permanently, accept or reject them.

#### Accept or delete a single tracked change

- Open your document.
- On the **Review** tab, in the **Changes** group, choose **Next** or **Previous**.
- Choose **Accept** or **Reject**.



#### Accept or delete all tracked changes

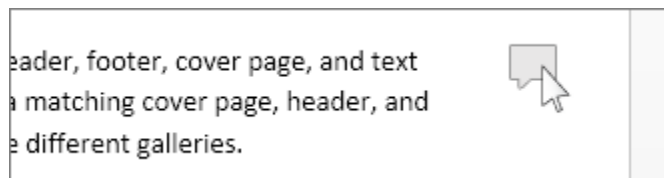
- Open your document.
- On the **Review** tab, in the **Changes** group, do one of the following:
  - In the **Accept** list, choose **Accept All Changes**.
  - or
  - In the **Reject** list, choose **Reject All Changes**.

Word either accepts the change or removes it, and then moves to the next change.

### 4. View or Delete Comments

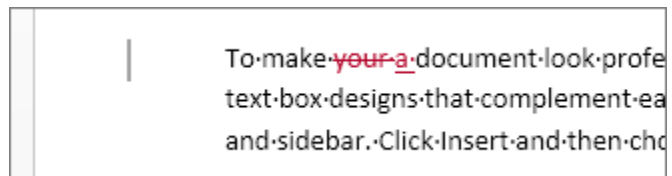
#### View comments

Word shows a balloon where someone's made a comment. To see a comment, choose the comment balloon.



To see the changes, click the line near the margin. That action switches Word into All Markup view.

Track changes showing in **All Markup** view



#### Delete a single comment

Choose a comment, and on the **Review** tab, in the **Comments** group, choose **Delete**.

### Delete all comments

On the **Review** tab, in the **Comments** group, in the **Delete** list, choose **Delete All Comments in Document**.

**Tips:** Before you share the final version of your document, it's a good idea to run Document Inspector. This tool checks for tracked changes and comments, hidden text, personal names in properties, and other information you might not want to share widely.

On the **File** tab, choose **Info > Check for Issues > Inspect Document**.

Source: <https://support.office.com/en-us/article/track-changes-in-word-197ba630-0f5f-4a8e-9a77-3712475e806a>

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers  
Rob Agnew  
Oklahoma State University

Author Note

Special thanks to Lindsay Clark for proofreading and editing this manuscript.



### Abstract

Veisalgia, commonly known as the hangover, affects ~~the~~a multitude of binge drinkers throughout the country. College students, being a population sub-set prone to binge drinking, commonly suffer the effects of a hangover. Wanting to continue a heavy drinking lifestyle and still perform adequately on exams may lead binge drinkers in the internet age to seek out urban legends or folk remedies to ascertain preventative measures for the ill effects of heavy drinking. This report contains an investigation into popular internet urban legends for hangover prophylaxis and compares the purported method of action against peer reviewed medical science. Examined within this report are several methods of action including, dehydration, depletion of electrolytes, depletion of other vitamins and minerals, abundance of the enzyme alcohol dehydrogenase, and the presence of ethanol contaminants (congeners).

*Keywords:* veisalgia, hangover, prophylaxis, prevention, urban legends

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## Review of the Medical Evidence to Support Common Urban Legends for the Prevention of Hangovers

Viewing any televised sporting event in the United States (US) provides ample evidence to support the view that conspicuous consumption of alcoholic beverages is as much a part of Americana as apple pie. The inevitable result for many that partake in the consumption of large quantities of alcohol is the hangover, and as Frank Sinatra is attributed with saying, “I feel bad for people who don’t drink. When they wake up in the morning, that’s as good as they’re going to feel all day.” Researchers conclude that, in the United States, many college-age students partake in binge-drinking bouts that lead to the unfortunate condition of a hangover (Wechsler, Dowdall, Davenport, & Castillo, 1995). Wechsler et. al surveyed nearly 18,000 college students to understand the correlations between individuals and binge drinking. They concluded the following factors are most significant in contributing to binge drinking (expressed as odds ratio): uses marijuana 7.13, lives in a fraternity or sorority 6.96, parties are very important 5.38, and uses cigarettes daily 4.02.

In desperation, many sufferers of hangovers look to the internet for a cure to what ails them, even invoking, “the hair of the dog that bit you” as a possible remedy (Emery, n.d.). The origin of this phrase dates back to Roman times and the homœopathic idea of *Similia similibus curantur*, or like cures like (Bartleby.com, n.d.). Rather than cure a hangover, the wise searcher of urban legends seeks to prevent. However, the pessimist would conclude that the techniques espoused in urban legends purporting prophylaxis against hangovers lack a fundamental understanding of the body of medical science and have minimal effect in preventing the incidence of the adverse outcomes of excessive consumption of ethyl alcohol.

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Explored within this report are numerous urban legends for preventing hangovers.

While none of the claimed preventative measures ~~have~~has the ~~ear~~ear-catching sound of ~~hair~~of the dog, some techniques are strange to hear, including consuming the yeast that makes the alcohol. Sorting the urban legends into similar groups based upon method of purported action and then analyzing the legends against peer reviewed medical research provides a basis for analysis of the efficacy of alleged cures. Providing techniques for hangover prevention supported by medical science concludes the report.

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### Urban Legends

With the advent of the internet and the “~~Information~~Information Age” came copious quantities of ~~misinformation~~. Not long after the internet’s surge in popularity, dispelling urban legends became the dedicated mission of the website Snopes.com in 1995. Merriam-Webster defines urban legends as “an often lurid story or anecdote that is based on hearsay and widely circulated as true” (Merriam-Webster, n.d.). While the internet led to a surge in urban legends, Merriam-Webster states the term has been in use since 1968. The term “~~folk remedy~~,” especially in 1968, is a suitable synonym to refer to purported hangover prevention techniques.

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The website *VIP Bachelor* offers 101 Tips to Prevent and Cure a Hangover (Racine, 2012). This list includes twelve prevention tips ~~specifically~~, but offers other prevention tips intermingled in the section on hangover cures. The first preventative measure is staying hydrated, ~~recommending~~which includes consuming a glass of water between each alcoholic beverage. Hydration appears as a common theme in four of the six urban legend articles reviewed, including Offman (n.d). The next most common prophylactic is the avoidance of congeners, or contaminants in the alcoholic beverage typically associated with either brown spirits or “cheap” varieties, as described by Stephen Propatier (2013). ~~The An~~ article by ~~Carey~~

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Jones (2014) adds to the list of preventative measures by including the consumption of food before or during the consumption of alcohol along with the replenishment of electrolytes; Racine (2012) also supports these cures. Some less commonly reported preventative measures include the use of supplements, avoiding mixing types of spirituous liquors, and consuming yeast.

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While hundreds of tips are available on the internet offering advice to avoid the ill effects of a hangover, these internet tips fall into a few broad categories for the method of action. As Summarized in Table 1 below, the various preventative measures fall into a few broad categories that include increasing the abundance of the enzyme alcohol dehydrogenase, avoiding congeners, supplementing electrolytes, the consumption of food, adequate hydration, avoiding mixing of various types of spirits, and the taking of supplements. Provided in the following sections is an examination of each of these urban legends and its efficacy by a comparison to medical and scientific publications on each method of action.

### Veisalgia

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In order to evaluate folk remedies regarding hangovers to medical research in a proper way, an understanding of the medical definition is necessary. The medical term for a hangover is veisalgia, which is: "From the Norwegian *kveis* (uneasiness following debauchery) + the Greek *algia* (pain)" (Medicine Net, n.d.). Drs. Swift & Davidson (1998) define a hangover as a spectrum of symptoms ranging from fatigue, headache, increased blood pressure and heartbeat, irritability, etc, resulting from the consumption of ethyl alcohol. This study from nearly 20 years ago reviewed 38 published articles on hangovers and concluded that the medical community does not understand well the process or processes that lead to a hangover. They ~~did~~ ~~described~~ several leading theories on causation which included some similar to the urban legends such as dehydration, electrolyte imbalance, low blood sugar, and congeners. With

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respect to dehydration, 50 grams of alcohol (roughly 4 drinks) results in 600-1000 mL of urine production. The doctors also describe several other contributing theories including alcohol withdrawal symptoms, a toxic byproduct of alcohol metabolism (acetaldehyde), synergy with nicotine, and individual genetic differences.

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More recently, Dr. Paton (2005) expanded on several of the metabolic processes related to ethanol and their effects on the body. The metabolism of ethanol to the intermediary acetaldehyde provides an opportunity for further reactions with the body. In 50% of Japanese people, and a portion of other people from south Asia, lack an enzyme that metabolizes acetaldehyde resulting in veisalgia symptoms (headache, flushing, fast heartbeat) rather quickly. This lead to speculation that acetaldehyde is responsible for hangovers. Dr. Paton provides a cautionary note that the rate of alcohol consumption can overtax these metabolic pathways and may result in increased intoxication and worsen symptoms of hangover. Additionally, the rate of absorption of ethanol may overwhelm the metabolic pathways. Higher proof beverages absorb more quickly, and consumption with food slows absorption. In heavy drinkers who develop a tolerance for ethanol through additional metabolic pathways such as cytochrome P450, additional adverse health effects occur including reduction in glucose production and an increase of lactic acid that effects the kidneys.

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The medical documentation in general does not point to a specific cause of the common hangover, but does recognize some of the suspected causes connected to urban legends. The following section of this report analyzes the various claims of hangover prevention against specific medical studies related to the causative agent.

### Alcohol Dehydrogenase

In an interview with Esquire magazine, Jim Koch, the proprietor of the Boston Brewing company (famous for the Sam Adams brand of beer) stated that he avoids hangovers (and even getting intoxicated) by eating Fleischmann's dry yeast (*Saccharomyces cerevisiae*) at a dosage of, "One teaspoon per beer, right before you start drinking" (Goldfarb, 2014). ~~Mr.~~Koch hypothesizes that since yeast must survive in an environment containing ethanol, the organisms produce alcohol dehydrogenase, ~~and~~thereby increasinge the amount of dehydrogenase available to the human consumer and ~~thereby~~reducing the level of intoxication and resulting hangover.

In an article for the website Skeptioid.com, Stephen Propatier (2013) attempts to debunk several hangover myths. In doing so, he claims that acetaldehyde production is the cause of hangovers. Which is consistent with Dr. Paton's hypothesis. However, ~~Mr.~~Propatier does not explain his theory, nor does he specifically discuss yeast. Combining the alcohol and acetaldehyde enzyme theories and seeking validation requires that brewer's yeast produces both enzymes. The fact that *Saccharomyces cerevisiae* produces both alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) is well-reported (Wang, Bai, & Weiner, 1996) (Edenberg, 2007). Shown in Figure 1 below is the process of ethanol metabolism via ADH and ALDH.

The urban legend of the consumption of yeast to prevent hangover appears to have a basis in science. However, a plausible causal mechanism is insufficient to prove the theory true or false. Pittler, Verster, & Ernst (2005) reviewed 296 published studies related to hangover prevention. Of the fifteen relevant articles, the researchers deemed eight scientifically valid randomized controlled trials. The researchers investigated numerous dietary supplements for hangover prophylaxes including the consumption of yeast, concluding that "[n]o compelling...  
The conclusion of their research is,"No compelling evidence exists to suggest that any

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conventional or complementary intervention is effective for preventing or treating alcohol hangovers?” (Pittler, Verster, & Ernst, 2005, p. 1). However, this general conclusion is somewhat inconsistent with the specific finding of the yeast trials, which stated, “The difference in the change for the symptoms discomfort, restlessness, and impatience was statistically significant in favour [*sic*] of the yeast preparation” (Pittler, Verster, & Ernst, 2005, p. 2).

The statements of, “no compelling evidence” and, “statistically significant in favor” in the Pittler et al. (2005) work appears somewhat contradictory with respect to yeast as a hangover prophylactic. However, Pittler et al. the authors explain their reasoning for asserting the lack compelling evidence on two grounds. First, only a single double-blind randomized trial exists in the literature, so, therefore, there is not a body of evidence. Secondly, at present, there is no way to measure objectively the severity of hangover symptoms, and all such studies must rely on self-reporting surveys for data collection. These self-surveys, therefore, are not repeatable.

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Given the testimony of a well-known beer celebrity who, as part of his job must drink copious amounts of beer, the scientific logic of the metabolic processes of alcohol digestion in humans and yeast, and at least one double blind study, the notion of consuming yeast prior to a bout of drinking seems a plausible preventive measure for veisalgia.

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## Congeners

Congeners are complex chemical mixtures resulting from the process of fermentation and/or aging of spirits (Evans, Sun, & Lay, 2007). Several urban legend sources cite congeners as the method of action for the production of hangovers and postulate that “cheap” spirits and dark spirits have higher concentrations of these chemical compounds (Propatier, 2013). The term

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~~cheap~~ when applied to liquor is synonymous with poor quality. However, to identify impurities in the spirit would require lab testing and cannot be determined by price alone. Propatier offers that methanol contamination is associated with low-quality moonshine<sub>2</sub> and Rohsenow<sub>7</sub> et al. (2010) confirm methanol's contribution to hangover severity due to the byproduct of methanol production being formaldehyde and formic acid.

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Both Rohsenow<sub>7</sub> et al. and Howland<sub>2</sub> et al. (2008) reviewed<sub>ed</sub> several previous studies comparing Vodka ~~vs-and~~ Bourbon or similar<sub>2</sub> clear ~~vs-versus~~ dark spirits for both incidence and severity of hangover. Their literature review reveals mixed results and their own trials both indicated no significance between the two spirit categories, especially with respect to incidence of hangover. However, both sets of researchers indicate a possible connection with severity of hangover in relation to relative concentration of congeners with ~~Bourbon-bourbon~~ having significantly higher quantities of congeners than vodka. The urban legends related to clear and ~~or~~ expensive liquors have little support in the scientific literature<sub>7</sub> but do offer some indication that mitigating the severity of a hangover is possible through the judicious selection of ~~beverage~~.

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## Electrolytes

Electrolytes are charged molecules in the human body that regulate nerve function through ionic potential and include sodium, potassium, calcium, and bicarbonate (Nordqvist, 2016). Several urban legend sources encourage the consumption of electrolyte replacement drinks either before a bout of alcoholic ~~beverages~~ (Jones, 2014) (Racine, 2012). The excess urine production induced by alcohol consumption mentioned above depletes the body of electrolytes (Swift & Davidson, 1998). Electrolyte depletion leads to electrolyte imbalance that results in several symptoms related to veisalgia. Several sports drinks offer electrolyte

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replacement, typically for electrolytes lost from sweating and physical activity. However, since the urban legends regarding electrolytes either encourages ~~the~~ drinking of electrolyte rich drinks before or after a bout of drinking alcohol, and urban legends regarding hydration before a bout of alcohol consumption, differentiating the effects of water vs. electrolyte drinks difficult. Therefore, conclusions regarding electrolyte replacement drinks are discussed in the hydration section of this work.

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## Food

Several sources indicate the consumption of food either before or during the consumption of alcohol, i.e. with a meal, mitigates the onset of hangover symptoms (Jones, 2014). One source even goes so far as to mention with specificity the consumption of cucumbers (Snopes, 2009). There is clear support in the medical literature for this method of prophylaxis (Evans, Sun, & Lay, 2007) (Howland, et al., 2008) (Paton, 2005). Specifically, Alex Paton, M.D. states, "Food, and particularly carbohydratess?, retards absorption [of alcohol]: blood concentrations may not reach a quarter of those achieved on an empty stomach" (2005, p. 85). Since food decreases the rate of absorption, the body's supplies of enzymes ADH and ALDH are sufficient to metabolize alcohol without the necessity of cytochrome P450 metabolizing alcohol. Metabolism of alcohol by cytochrome P450 results in several adverse effects on the body, most notably the production of lactic acid and ketones, which likely contribute to veisalgia.

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In addition to moderating the absorption rate of alcohol, consumption of food prior to a ~~bout of~~ drinking may also provide a prophylaxis from hangover. Heavy consumption of alcohol inhibits hepatic gluconeogenesis and puts the imbiber at risk of hypoglycemia (Paton, 2005). Additionally, the consumption of food high in fructose allows the body to more efficiently

metabolize ethanol (Evans, Sun, & Lay, 2007). Therefore, consuming foods containing glucose and fructose may offer some prevention against hangover symptoms.

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## Hydration

Hydration is the most often cited ~~urban legend~~method for preventing (and treating) hangovers, comprising 2/3 of the articles reviewed in Table 1. As noted previously, Swift & Davidson (year) report that alcohol consumption induces dehydration through increased kidney output by the inhibition of the antidiuretic hormone vasopressin (1998). They reported that the consumption of four drinks totaling 50 grams of alcohol in 250 mL of water results in the production of up to 1,000 mL excreted water. Evans, Sun, & Lay (year) confirm that headache is a known symptom of dehydration, and that dehydration plays a role in the occurrence of Alcohol Hangover Headache (2007).

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Proper hydration before / during / after a bout of alcohol consumption may assuage dehydration related headache; it may not, however, relieve the symptoms from other causative agents. Hydration using electrolyte beverages may enhance this prophylactic effect, as mentioned earlier, but again, this is a mitigation of severity not incidence. Hydration does not address adverse effects from methanol or the production of acetaldehyde.

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might be over using bout

## Mixing

A common mnemonic proverb amongst consumers of alcoholic beverages is, “Liquor, then beer – You’re in the clear! Beer before liquor – Never sicker” (Racine, 2012). This investigation found no studies researching this urban legend. However, based upon the idea of metabolism rate affecting hangover severity, one can postulate that after several rounds of beer,

the rate at which ALDH can metabolize acetaldehyde may be near peak~~;~~ ~~and~~ the addition of hard liquor, particularly via “shots,” could overwhelm the available ALDH causing acetaldehyde to persist longer in the body and simultaneously activate the cytochrome P450 pathway, introducing ketones into the body as well. Therefore, the mnemonic may have a plausible prophylactic effect on veisalgia.

### Supplements

In addition to many urban legend ~~type~~ articles suggesting the use of supplements to prevent hangover (Propatier, 2013) (Racine, 2012), a search of *Amazon.com* finds numerous products claiming prophylaxis from hangover. These products include creative names such as PreToxx, Rally Capsules, and RU-21 KGB Hangover Prevention. The ingredient lists include Kudzu Flower, Milk Thistle, Vitamin Complexes, etc. While ~~double~~ ~~double~~-blind research studies on these ingredients are sparse, Pittler, White, Stevinson, ~~&~~~~and~~ Ernst (2003) studies artichoke-extract for the prevention of hangovers. They plainly state, “Our results suggest that artichoke extract is not effective” (p. 1269).

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In a broader review, Pittler, Verster, ~~&~~~~and~~ Ernst (2005) reviewed numerous published studies testing supplements for preventing the signs and symptoms of alcohol-induced hangover (2005). The studies under review included exotic ingredients including linolenic acid, Cynara scolymus, ~~and~~ *Puntia ficus-indica*,~~ete~~. As with the previously reviewed study, this study found no effect from these supplements. Since the consumer takes these supplements before ~~the bout~~ ~~of~~ drinking, and alcohol increases urinary output, the body likely excretes the water-soluble vitamins and other substances before they could be of benefit to the body. A small consolation is

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that the consumer uses water to take these supplements and, therefore, may increase their overall hydration before drinking.

## Discussion

### Total Dose vs. Peak Intoxication

Several factors inhibit the scientific study of hangovers including genetic variability and alcohol tolerance differences between study participants. Additionally, human studies are difficult, expensive, and require careful oversight from an Institutional Review Board (IRB). Besides variability amongst participants, alcohol metabolism is a complex biochemical reaction influenced by hydration level, food consumption, contaminants in the beverage besides ethanol. Given all of these limitations, there is a lack of medical literature that fully explains the causes and controls of alcohol-induced hangover.

Specifically, the medical literature lacks an analysis of total dose of alcohol delivered ~~vs.~~ versus peak intoxication of the participants. Given the research that indicates food acts to slow metabolism of alcohol and that the moderated rate of absorption allows for ADH and ALDH to keep pace with the ethanol dose entering the body, one may conclude a connection between the level of intoxication (drunkenness) and the severity of hangover. For example, if a person were to consume six alcoholic beverages in quick succession ~~vs.~~ versus the same six drinks paced out at one-hour intervals, the peak intoxication of the individual would be vastly different. Since the acute physiological response is different between the two alcohol challenges, it follows that the sub-acute response is different. While the hydration challenge is the same due to equal doses, the amount of acetaldehyde and ketones produced would differ. This

difference in metabolism may lead a difference in severity of hangover, but not necessarily incidence.

### **Other modes of action**

Urban legends regarding [the](#) prevention of hangovers have some connection to medical research, but the medical evidence suggests additional causal factors not addressed in the myths; [specifically](#), disruption of sleep and other biological rhythms (Swift & Davidson, 1998). Besides the intuitive sleep disturbance from waking to void the bladder due the dehydration effect of alcohol consumption, the quality of sleep is also affected. Alcohol reduces rapid eye movement (REM) or dreaming sleep and changes circadian rhythms of body temperature and cortisol production, similar to a jet-lag effect.

The effects of alcohol consumption on several neurotransmitters and hormones that show evidence for the induction of hangover headaches include histamine, serotonin, and prostaglandins (Parantainen, 1983). Even with this evidence, “The etiology of hangover headache remains unknown” (Swift & Davidson, 1998, p. 57). This shows that the urban legends only begin to address the causal factors in the spectrum of veisalgia symptoms.

### **Precautions**

Besides veisalgia or hangover, alcohol consumption includes several other risk factors. The primary acute risk factor related to the consumption of alcohol is injury or death related to impaired motor function. Reduced motor function inhibits balance and reaction time leading to injuries from falls to death to one’s self or others when combined with the operation of a motor

vehicle. Each year in America, nearly 10,000 people die due to alcohol related motor vehicle incidents (NHTSA, 2015).

Alcohol consumption has the potential to induce other diseases in the body including Fetal Alcohol Syndrome (FAS), which causes devastating birth defects. “Alcohol enters the fetus readily through the placenta and is eliminated by maternal metabolism” (Paton, 2005, p. 85). Chronic alcohol use has the potential to induce chronic liver diseases including Steatosis, Steatohepatitis, and Cirrhosis (Forrest & Reed, 2011).

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Sufferers of hangovers commonly self-administer over the counter analgesics (painkillers). While these painkillers reduce symptoms of alcohol hangover headache by reversing the vasodilation effects of the alcohol, they may lead to other adverse health outcomes. There is specific medical evidence that Acetaminophen (APAP, Tylenol®, or Excedrin®) has a synergistic effect with chronic alcohol consumption resulting in both renal (kidney) and hepatic (liver) toxicity (Fored, et al., 2001). Therefore, hangover sufferers should choose another analgesic relief.

Finally, no work on hangovers is complete without a note on the only guarantee of not incurring a hangover—abstinence. Based on the myriad of adverse effects on the body through the metabolism of ethanol, the only way to ensure a hangover-free morning is to abstain from the consumption of alcohol. Though abstaining is a difficult choice, given the incidence of alcohol related traffic deaths, sober designated drivers are a welcome service to the community.

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### Conclusion

Upon investigation, several urban legends related to the prevention of hangovers appear to combat specific physiological processes associated with ethanol metabolism. No single

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suggested remedy appears to be effective against the incidence of hangover, but do seem to have the ability to affect the severity of the hangover. The research is silent on the effectiveness of using some of these techniques in combination to reduce hangovers to a “tolerable” level. Alcohol metabolism proves to include too many factors to effectively study given the difficulty of human studies, and the ambiguity of severity vs incidence. Moderation or abstinence seems to be the most logical conclusion for the reduction or elimination of hangover symptoms.

The prospect of consuming yeast, along with a sugary electrolyte beverage before a meal of pasta, all in an effort to stave off a hangover seems to diminish the enjoyment of a few drinks with friends. Therefore, imbibers are likely to proceed with activities leading to hangovers and thereby look to remedies rather than prophylactics. Future researchers should investigate hangover cures. A specific remedy of interest is the “Hair of the Dog” as noted by Swift and Davidson, “The fact that ethanol readministration fends off hangover effects may be further evidence of methanol's contribution to the hangover condition, given ethanol's ability to block methanol metabolism and thereby slow the production of formaldehyde and formic acid” (1998, p. 58)

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For a final thought on hangovers, the wit of Robert Benchley is appropriate, “A real hangover is nothing to try out family remedies on. The only cure for a real hangover is death.”

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**Table 1**

*Urban Legends by Article*

Article	Urban Legend						
	Alcohol Dehydrogenase	Congeners	Electrolytes	Food Consumption	Hydration	Mixing	Supplements
Goldfarb, 2014	x						
Jones, 2014			x	x	x		
Offman, n.d.		x			x	x	
Propatier, 2013		x			x		x
Racine, 2012		x	x	x	x	x	x
Snopes, 2009				x			

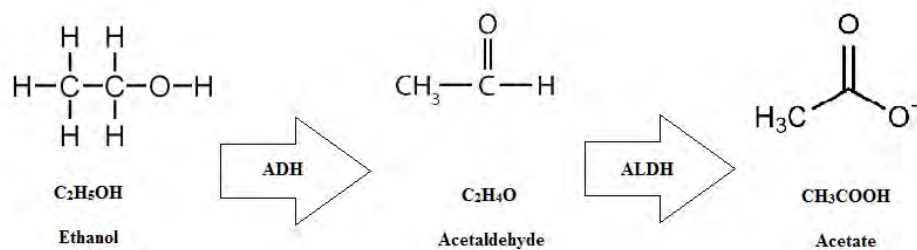


Figure 1. Metabolism of ethanol.

## WRITTEN COMMUNICATION VALUE RUBRIC

*for more information, please contact [value@aacu.org](mailto:value@aacu.org)*



### Definition

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

*Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.*

	Capstone 4	Milestones 3                      2		Benchmark 1
<b>Context of and Purpose for Writing</b> <i>Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).</i>	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
<b>Content Development</b>	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
<b>Genre and Disciplinary Conventions</b> <i>Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).</i>	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
<b>Sources and Evidence</b>	Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	Demonstrates an attempt to use sources to support ideas in the writing.
<b>Control of Syntax and Mechanics</b>	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.

Review of Medical Evidence to Support Common Urban Legends  
for the Prevention of Hangovers

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Author Note

Special thanks to Lindsay Clark for proofreading and editing this manuscript.

### Abstract

Veisalgia, commonly known as the hangover, affects a multitude of binge drinkers throughout the country. College students, being a population sub-set prone to binge drinking, commonly suffer the effects of a hangover. Wanting to continue a heavy drinking lifestyle and still perform adequately on exams may lead binge drinkers in the internet age to seek out urban legends or folk remedies to ascertain preventative measures for the ill effects of heavy drinking. Reported in this paper is an investigation into popular internet urban legends for hangover prophylaxis and compares the purported method of action against peer reviewed medical science. Examined within this report are several methods of action including, dehydration, depletion of electrolytes, depletion of other vitamins and minerals, abundance of the enzyme alcohol dehydrogenase, and the presence of ethanol contaminants (congeners). All of these remedies are rooted in some scientific or medical truth, but their effectiveness is difficult to ascertain in the complex human metabolic system.

*Keywords:* veisalgia, hangover, prophylaxis, prevention, urban legends

## Review of the Medical Evidence to Support Common Urban Legends for the Prevention of Hangovers

Viewing any televised sporting event in the United States (US) provides ample evidence to support the view that conspicuous consumption of alcoholic beverages is as much a part of Americana as apple pie. The inevitable result for many that partake in the consumption of large quantities of alcohol is the hangover, and as Frank Sinatra is attributed with saying, “I feel bad for people who don’t drink. When they wake up in the morning, that’s as good as they’re going to feel all day.” Researchers conclude that, in the US, many college-age students partake in binge-drinking bouts that lead to the unfortunate condition of a hangover (Wechsler, Dowdall, Davenport, & Castillo, 1995). Wechsler et al. surveyed nearly 18,000 college students to understand the correlations between individuals and binge drinking. They concluded the following factors are most significant in contributing to binge drinking (expressed as odds ratio): uses marijuana (7.13), lives in a fraternity or sorority (6.96), parties are very important (5.38), and uses cigarettes daily (4.02). These findings suggest that both social factors and consumption of other drugs are strongly correlated with alcohol consumption.

In desperation, many sufferers of hangovers look to the internet to cure what ails them, even invoking, “the hair of the dog that bit you” as a possible remedy (Emery, n.d.). The origin of this phrase dates back to Roman times and the homœopathic idea of *Similia similibus curantur*, or *like cures like* (Bartleby.com, n.d.). Rather than cure a hangover, the wise searcher of urban legends seeks to prevent. However, the pessimist would conclude that the techniques espoused in urban legends purporting prophylaxis against hangovers lack a fundamental understanding of the body of medical science and have minimal effect in preventing the incidence of the adverse outcomes of excessive consumption of ethyl alcohol.



Explored within this report are numerous urban legends for preventing hangovers. While none of the claimed preventative measures has the ear-catching sound of *hair of the dog*, some techniques are strange to hear, including consuming the yeast that makes the alcohol. Sorting the urban legends into similar groups based upon method of purported action and then analyzing the legends against peer reviewed medical research provides a basis for analysis of the efficacy of alleged cures. Providing techniques for hangover prevention supported by medical science concludes the report.

### Urban Legends

With the advent of the internet and the Information Age came copious quantities of misinformation. Not long after the internet's surge in popularity, dispelling urban legends became the dedicated mission of the website Snopes.com in 1995. Merriam-Webster defines urban legends as "an often lurid story or anecdote that is based on hearsay and widely circulated as true" (Merriam-Webster, n.d.). While the internet led to a surge in urban legends, Merriam-Webster states the term has been in use since 1968. The term *folk remedy*, especially in 1968, is a suitable synonym to refer to purported hangover prevention techniques.

The website *VIP Bachelor* offers 101 Tips to Prevent and Cure a Hangover (Racine, 2012). This list includes twelve prevention tips, but also offers other prevention tips intermingled in the section on hangover cures. The first preventative measure the article offers is staying hydrated, which includes consuming a glass of water between each alcoholic beverage. Hydration appears as a common theme in four of the six urban legend articles reviewed, including Jones (2014), Offman (n.d), Propatier (2013), and Racine (2013). The next most common prophylactic is the avoidance of congeners, or contaminants in the alcoholic beverage typically associated with either brown spirits or "cheap" varieties, as described by Propatier

(2013). Additional preventative measures include the consumption of food before or during the consumption of alcohol along with the replenishment of electrolytes; Jones (2014), Racine (2012). Some less commonly reported preventative measures include the use of supplements, avoiding mixing types of spirituous liquors, and consuming yeast; Propatier (2013) and Racine (2012).

While hundreds of tips are available on the internet offering advice to avoid the ill effects of a hangover, these internet tips fall into a few broad categories for the method of action. As Summarized in Table 1 below, the various preventative measures fall into a few broad categories that include increasing the abundance of the enzyme alcohol dehydrogenase, avoiding congeners, supplementing electrolytes, the consumption of food, adequate hydration, avoiding mixing of various types of spirits, and the taking of supplements. Provided in the following sections is an examination of each of these urban legends and its efficacy by a comparison to medical and scientific publications on each method of action.

### **Veisalgia**

In order to evaluate folk remedies regarding hangovers to medical research in a proper way, an understanding of the medical definition is necessary. The medical term for a hangover is veisalgia, which is “[f]rom the Norwegian *kveis* (uneasiness following debauchery) + the Greek *algia* (pain)” (Medicine Net, n.d.). Drs. Swift & Davidson (1998) define a hangover as a spectrum of symptoms ranging from fatigue, headache, increased blood pressure and heartbeat, irritability, etc. resulting from the consumption of ethyl alcohol. This study from nearly 20 years ago reviewed 38 published articles on hangovers and concluded that the medical community does not understand well the process or processes that lead to a hangover. They described several leading theories on causation which included some similar to the urban legends such as

dehydration, electrolyte imbalance, low blood sugar, and congeners. With respect to dehydration, 50 grams of alcohol (roughly 4 drinks) results in 600-1000 mL of urine production (Swift & Davidson, 1998, p. 56). The doctors also describe several other contributing theories including alcohol withdrawal symptoms, a toxic byproduct of alcohol metabolism (acetaldehyde), synergy with nicotine, and individual genetic differences.

More recently, Dr. Paton (2005) expanded on several of the metabolic processes related to ethanol and their effects on the body. The metabolism of ethanol to the intermediary acetaldehyde provides an opportunity for further reactions with the body. Approximately 50% of Japanese people, and a portion of other people from south Asia, lack an enzyme that metabolizes acetaldehyde resulting in veisalgia symptoms (headache, flushing, fast heartbeat) rather quickly. This lead to speculation that acetaldehyde is responsible for hangovers. Dr. Paton provides a cautionary note that the rate of alcohol consumption can overtax these metabolic pathways and may result in increased intoxication and worsen symptoms of hangover. Additionally, the rate of absorption of ethanol may overwhelm the metabolic pathways. Higher proof beverages absorb more quickly, and consumption with food slows absorption. In heavy drinkers who develop a tolerance for ethanol through additional metabolic pathways such as cytochrome P450, additional adverse health effects occur including reduction in glucose production and an increase of lactic acid that effects the kidneys (Paton, 2005, p. 86).

Medical documentation in general does not point to a specific cause of the common hangover but does recognize some of the suspected causes connected to urban legends. The following section of this report analyzes the various claims of hangover prevention against specific medical studies related to the causative agent.

## Alcohol Dehydrogenase

In an interview with Esquire magazine, Jim Koch, the proprietor of the Boston Brewing company (famous for the Sam Adams brand of beer) stated that he avoids hangovers (and even getting intoxicated) by eating Fleischmann's dry yeast (*Saccharomyces cerevisiae*) at a dosage of, “One teaspoon per beer, right before you start drinking” (Goldfarb, 2014). Koch hypothesizes that since yeast must survive in an environment containing ethanol, the organisms produce alcohol dehydrogenase, thereby increasing the amount of dehydrogenase available to the human consumer and reducing the level of intoxication and resulting hangover.

In an article for the website Skeptioid.com, Propatier (2013) attempts to debunk several hangover myths. In doing so, he claims that acetaldehyde production is the cause of hangovers; which is consistent with Dr. Paton’s hypothesis (2005). However, Propatier does not explain his theory, nor does he specifically discuss yeast. Combining the alcohol and acetaldehyde enzyme theories and seeking validation requires that brewer’s yeast produces both enzymes. The fact that *Saccharomyces cerevisiae* produces both alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) is well-reported (Wang, Bai, & Weiner, 1996) (Edenberg, 2007). Shown in Figure 1 below is the process of ethanol metabolism via ADH and ALDH.

The urban legend of the consumption of yeast to prevent hangover appears to have a basis in science. However, a plausible causal mechanism is insufficient to prove the theory true or false. Pittler, Verster, & Ernst (2005) reviewed 296 published studies related to hangover prevention. Of the fifteen relevant articles, the researchers deemed eight scientifically valid randomized controlled trials. The researchers investigated numerous dietary supplements for hangover prophylaxes including the consumption of yeast, concluding, “[n]o compelling evidence exists to suggest that any conventional or complementary intervention is effective for

preventing or treating alcohol hangovers” (Pittler, Verster, & Ernst, 2005, p. 1). However, this general conclusion is somewhat inconsistent with the specific finding of the yeast trials, which stated, “The difference in the change for the symptoms discomfort, restlessness, and impatience was statistically significant in favour [*sic*] of the yeast preparation” (Pittler, Verster, & Ernst, 2005, p. 2).

The statements “no compelling evidence” and “statistically significant in favor” in the Pittler et al. (2005) appears somewhat contradictory with respect to yeast as a hangover prophylactic. However, the authors explain their reasoning for asserting the lack compelling evidence on two grounds. First, only a single double-blind randomized trial exists in the literature, so, therefore, there is not a body of evidence. Secondly, at present, there is no way to measure objectively the severity of hangover symptoms, and all such studies must rely on self-reporting surveys for data collection. These self-surveys, therefore, are not repeatable.

Given the testimony of a well-known beer celebrity who, as part of his job must drink copious amounts of beer, the scientific logic of the metabolic processes of alcohol digestion in humans and yeast, and at least one double blind study, the notion of consuming yeast prior to a bout of drinking seems a plausible preventive measure for veisalgia.

### **Congeners**

Congeners are complex chemical mixtures resulting from the process of fermentation or aging of spirits (Evans, Sun, & Lay, 2007). Several urban legend sources cite congeners as the method of action for the production of hangovers and postulate that *cheap* spirits and dark spirits have higher concentrations of these chemical compounds (Propatier, 2013). The term cheap when applied to liquor is synonymous with poor quality. However, to identify impurities in the spirit would require lab testing and cannot be determined by price alone. Propatier offers that

methanol contamination is associated with low-quality moonshine, and Rohsenow et al. (2010) confirm methanol's contribution to hangover severity due to the byproduct of methanol production being formaldehyde and formic acid.

Both Rohsenow et al. and Howland et al. (2008) reviewed several previous studies comparing vodka and bourbon or similar, clear versus dark spirits for both incidence and severity of hangover. Their literature review revealed mixed results and their own trials both indicated no significance between the two spirit categories, especially with respect to incidence of hangover. However, both sets of researchers indicate a possible connection with severity of hangover in relation to relative concentration of congeners with bourbon having significantly higher quantities of congeners than vodka. The urban legends related to clear and expensive liquors have little support in the scientific literature but do offer some indication that mitigating the severity of a hangover is possible through the judicious selection of beverage.

### **Electrolytes**

Electrolytes are charged molecules in the human body that regulate nerve function through ionic potential and include sodium, potassium, calcium, and bicarbonate (Nordqvist, 2016). Several urban legend sources encourage the consumption of electrolyte replacement drinks either before a bout of alcoholic beverages (Jones, 2014; Racine, 2012). The excess urine production induced by alcohol consumption mentioned above depletes the body of electrolytes (Swift & Davidson, 1998). Electrolyte depletion leads to electrolyte imbalance that results in several symptoms related to *veisalgia*. Several sports drinks offer electrolyte replacement, typically for electrolytes lost from sweating and physical activity. However, since the urban legends regarding electrolytes encourage drinking of electrolyte rich drinks before or after a bout of drinking alcohol, and urban legends regarding hydration before a bout of alcohol

consumption, differentiating the effects of water vs. electrolyte drinks difficult. Therefore, conclusions regarding electrolyte replacement drinks are discussed in the hydration section of this work.

## **Food**

Several sources indicate the consumption of food either before or during the consumption of alcohol, i.e. with a meal, mitigates the onset of hangover symptoms (Jones, 2014). One source even goes so far as to mention with specificity the consumption of cucumbers (Snopes, 2009). There is clear support in the medical literature for food consumption as a method of prophylaxis (Evans, Sun, & Lay, 2007; Howland, et al., 2008; Paton, 2005). Specifically, Alex Paton, M.D. states, “Food, and particularly carbohydrate, retards absorption [of alcohol]: blood concentrations may not reach a quarter of those achieved on an empty stomach” (2005, p. 85). Since food decreases the rate of absorption, the body’s supplies of enzymes ADH and ALDH are sufficient to metabolize alcohol without the necessity of cytochrome P450 metabolizing alcohol. Metabolism of alcohol by cytochrome P450 results in several adverse effects on the body, most notably the production of lactic acid and ketones, which likely contribute to veisalgia.

In addition to moderating the absorption rate of alcohol, consumption of food prior to drinking may also provide a prophylaxis from hangover. Heavy consumption of alcohol inhibits hepatic gluconeogenesis and puts the imbiber at risk of hypoglycemia (Paton, 2005). Additionally, the consumption of food high in fructose allows the body to more efficiently metabolize ethanol (Evans, Sun, & Lay, 2007). Therefore, consuming foods containing glucose and fructose may offer some prevention against hangover symptoms.

## Hydration

Hydration is the most often cited method for preventing (and treating) hangovers, comprising 2/3 of the articles reviewed in Table 1. As noted previously, Swift & Davidson (1998) report that alcohol consumption induces dehydration through increased kidney output by the inhibition of the antidiuretic hormone vasopressin (1998). They reported that the consumption of four drinks totaling 50 grams of alcohol in 250 mL of water results in the production of up to 1,000 mL excreted water. Evans, Sun, & Lay (2007) confirm that headache is a known symptom of dehydration, and that dehydration plays a role in the occurrence of Alcohol Hangover Headache

Proper hydration before, during, and after consumption of alcohol may assuage dehydration related headache; it may not, however, relieve the symptoms from other causative agents. Hydration using electrolyte beverages may enhance this prophylactic effect, as mentioned earlier, but again, this is a mitigation of severity not incidence. Hydration does not address adverse effects from methanol or the production of acetaldehyde.

## Mixing

A common mnemonic proverb amongst consumers of alcoholic beverages is “Liquor, then beer – You’re in the clear! Beer before liquor – Never sicker” (Racine, 2012). This investigation found no studies researching this urban legend. However, based upon the idea of metabolism rate affecting hangover severity, one can postulate that after several rounds of beer, the rate at which ALDH can metabolize acetaldehyde may be near peak; the addition of hard liquor, particularly via “shots,” could overwhelm the available ALDH causing acetaldehyde to persist longer in the body and simultaneously activate the cytochrome P450 pathway,



introducing ketones into the body as well. Therefore, the mnemonic may have a plausible prophylactic effect on veisalgia.

### Supplements

In addition to many urban legend articles suggesting the use of supplements to prevent hangover (Propatier, 2013) (Racine, 2012), a search of *Amazon.com* finds numerous products claiming prophylaxis from hangover. These products include creative names such as PreToxx, Rally Capsules, and RU-21 KGB Hangover Prevention. The ingredient lists include Kudzu Flower, Milk Thistle, Vitamin Complexes, etc. While double-blind research studies on these ingredients are sparse, Pittler, White, Stevinson, and Ernst (2003) studies artichoke-extract for the prevention of hangovers. They plainly state, “Our results suggest that artichoke extract is not effective” (p. 1269).

In a broader review, Pittler, Verster, and Ernst (2005) reviewed numerous published studies testing supplements for preventing the signs and symptoms of alcohol-induced hangover. The studies under review included exotic ingredients including linolenic acid, *Cynara scolymus*, and *Puntia ficus-indica*. As with the previously reviewed study, this study found no effect from these supplements. Since the consumer takes these supplements before drinking, and alcohol increases urinary output, the body likely excretes the water-soluble vitamins and other substances before they could be of benefit to the body. A small consolation is that the consumer uses water to take these supplements and, therefore, may increase their overall hydration before drinking.

## **Discussion**

### **Total Dose vs. Peak Intoxication**

Several factors inhibit the scientific study of hangovers including genetic variability and alcohol tolerance differences between study participants. Additionally, human studies are difficult, expensive, and require careful oversight from an Institutional Review Board (IRB). Besides variability amongst participants, alcohol metabolism is a complex biochemical reaction influenced by hydration level, food consumption, contaminants in the beverage besides ethanol. Given all of these limitations, there is a lack of medical literature that fully explains the causes and controls of alcohol-induced hangover.

Specifically, the medical literature lacks an analysis of total dose of alcohol delivered versus peak intoxication of the participants. Given the research that indicates food acts to slow metabolism of alcohol and that the moderated rate of absorption allows for ADH and ALDH to keep pace with the ethanol dose entering the body, one may conclude a connection between the level of intoxication (drunkenness) and the severity of hangover. For example, if a person were to consume six alcoholic beverages in quick succession versus the same six drinks paced out at one-hour intervals, the peak intoxication of the individual would be vastly different. Since the acute physiological response is different between the two alcohol challenges, it follows that the sub-acute response is different. While the hydration challenge is the same due to equal doses, the amount of acetaldehyde and ketones produced would differ. This difference in metabolism may lead a difference in severity of hangover, but not necessarily incidence.

### **Other modes of action**

Urban legends regarding the prevention of hangovers have some connection to medical research, but the medical evidence suggests additional causal factors not addressed in the myths, specifically, disruption of sleep and other biological rhythms (Swift & Davidson, 1998). Besides the intuitive sleep disturbance from waking to void the bladder due the dehydration effect of alcohol consumption, the quality of sleep is also affected. Alcohol reduces rapid eye movement (REM) or dreaming sleep and changes circadian rhythms of body temperature and cortisol production, similar to a jet-lag effect.

The effects of alcohol consumption on several neurotransmitters and hormones that show evidence for the induction of hangover headaches include histamine, serotonin, and prostaglandins (Parantainen, 1983). Even with this evidence, “The etiology of hangover headache remains unknown” (Swift & Davidson, 1998, p. 57). This shows that the urban legends only begin to address the causal factors in the spectrum of veisalgia symptoms.

### **Precautions**

Besides veisalgia or hangover, alcohol consumption includes several other risk factors. The primary acute risk factor related to the consumption of alcohol is injury or death related to impaired motor function. Reduced motor function inhibits balance and reaction time leading to injuries from falls to death to one’s self or others when combined with the operation of a motor vehicle. Each year in America, nearly 10,000 people die due to alcohol related motor vehicle incidents (NHTSA, 2015).

Alcohol consumption has the potential to induce other diseases in the body including Fetal Alcohol Syndrome (FAS), which causes devastating birth defects as, “Alcohol enters the fetus readily through the placenta and is eliminated by maternal metabolism” (Paton, 2005, p.

85). Chronic alcohol use has the potential to induce chronic liver diseases including Steatosis, Steatohepatitis, and Cirrhosis (Forrest & Reed, 2011).

Sufferers of hangovers commonly self-administer over the counter analgesics (painkillers). While these painkillers reduce symptoms of alcohol hangover headache by reversing the vasodilation effects of the alcohol, they may lead to other adverse health outcomes. There is specific medical evidence that Acetaminophen (APAP, Tylenol<sup>®</sup>, or Excedrin<sup>®</sup>) has a synergistic effect with chronic alcohol consumption resulting in both renal (kidney) and hepatic (liver) toxicity (Fored, et al., 2001). Therefore, hangover sufferers should choose another analgesic relief.

Finally, no work on hangovers is complete without a note on the only guarantee of not incurring a hangover – abstinence. Based on the myriad of adverse effects on the body through the metabolism of ethanol, the only way to ensure a hangover-free morning is to abstain from the consumption of alcohol. Though abstaining is a difficult choice, given the incidence of alcohol related traffic deaths, sober designated drivers are a welcome service to the community.

### **Conclusion**

Upon investigation, several urban legends related to the prevention of hangovers appear to combat specific physiological processes associated with ethanol metabolism. No single suggested remedy appears to be effective against the incidence of hangover, but do seem to have the ability to affect the severity of the hangover. The research is silent on the effectiveness of using some of these techniques in combination to reduce hangovers to a “tolerable” level. Alcohol metabolism proves to include too many factors to effectively study given the difficulty

of human studies, and the ambiguity of severity vs incidence. Moderation or abstinence seems to be the most logical conclusion for the reduction or elimination of hangover symptoms.

The prospect of consuming yeast, along with a sugary electrolyte beverage before a meal of pasta, all in an effort to stave off a hangover seems to diminish the enjoyment of a few drinks with friends. Therefore, imbibers are likely to proceed with activities leading to hangovers and thereby look to remedies rather than prophylactics. Future researchers should investigate hangover cures, specifically the *Hair of the Dog* since, “The fact that ethanol readministration fends off hangover effects may be further evidence of methanol's contribution to the hangover condition, given ethanol's ability to block methanol metabolism and thereby slow the production of formaldehyde and formic acid” (Swift & Davidson, 1998, p. 58).

Borrowing from the wit of the American humorist Robert Benchley, “A real hangover is nothing to try out family remedies on. The only cure for a real hangover is death.” Clearly, the hangover is a significant malady in the American populace and significant research into its prevention and cure exist. However, given the difficulty of conducting clinical research on humans, this riddle may never be solved.

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**Table 1**

*Urban Legends by Article*

Article	Urban Legend						
	Alcohol Dehydrogenase	Congeners	Electrolytes	Food Consumption	Hydration	Mixing	Supplements
Goldfarb, 2014	x						
Jones, 2014			x	x	x		
Offman, n.d.		x			x	x	
Propatier, 2013		x			x		x
Racine, 2012		x	x	x	x	x	x
Snopes, 2009				x			

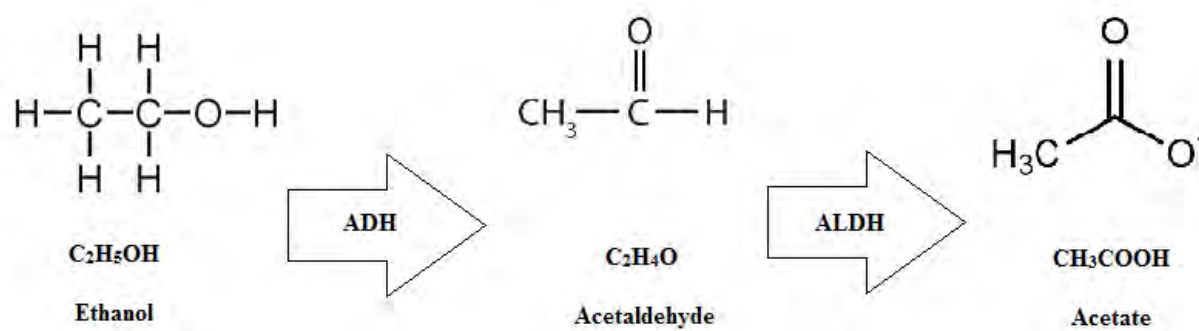


Figure 1. Metabolism of ethanol.