

# **State of The Science Paper**

## How to Write a State of the Science Paper for Nursing

There are a million correct ways to write a state of the science paper for nursing. For instance, several scholars might want to write a state of the science paper about exercise and depression. There are lots of ways to go with this topic. One person might write about what is known about the physiological consequences of exercise and how that affects depression. Another writer might write about the effects of aerobic exercise on depression, while another might write about isometric exercise and depression. **The final version of your state of the science paper are dependent on the purpose of your state of the science paper and the question that you are trying to answer by writing the state of the science paper.**

**NOTE: The rubric for your state of the science paper is found in the ETSU College of Nursing PhD Handbook.** This guideline is not intended to replace the rubric established by the graduate faculty in the College of Nursing; it is intended to amplify those guidelines. Always follow the directions in the PhD Handbook.

**Definition:** A state of the science paper for nursing is a review of the research about a phenomenon of interest to nursing. A state of the science paper is a high level scholarly activity. A state of the science paper brings together what other researchers have reported. A good state of the science paper makes all that information more accessible to the profession of nursing. The phenomenon of interest should be well circumscribed to make it focus on a relevant research question. The key word in the previous sentence is FOCUS.

**Focus:** Trying to describe the state of the science about depression would take a great deal of time, effort, and paper to write. A state of the science paper about postpartum depression in teenage mothers might be more interesting paper to write and to read. Bring the focus down to a manageable number of publications.

**Synthesis:** A state of the science paper is an integrated synthesis of the available literature. Nothing is more boring than reading a paragraph of a paper that reads like this. Jones (2015) found . . . Smith (2015) reported this . . . Phillips and colleagues (2015) explored . . . I have heard this approach called the litany of articles. I do not remember who said this or where I heard it, so I cannot give credit to the appropriate person.

The word *synthesis* means a combination of ideas to form a whole (Merriam-Webster, 2015). Synthesis is one of the highest skills of the cognitive domain (Bloom, \*\*\*\*). To synthesize research reports you need to collect the articles, read them, put them aside, think about what they are saying as a whole, and then write what that group of articles as a whole is saying.

**Analysis:** Another important component of a State of the Science paper is analysis. When compared to synthesis, analysis means “separating of any material or abstract entity into its constituent elements” (Dictionary.com, 2015). In the analysis process you will answer what is the essence or essential nature of what it is you are studying. Papers that don’t demonstrate analysis of the topic are weak State of the Science papers.

**Critique:** It is important to critique the literature that you use. Sometimes a critique is thought of as finding all the negatives or a scholarly paper, but that misses the mark. A critique expounds on the strengths and weaknesses of a scholarly article. Philosophers, such as Kant and Hegel, used the word critique to refer to a reflective examination of validity and the limitations of a concept, a theory, or scholarly writing.

**Research Question:** Begin this scholarly activity with a clear research question. Ask yourself “Is this feasible? Can I do this in the time I have allotted?” **The big question you have to answer is this one: “Has enough research been done in my area of interest to meaningfully synthesize the literature?”** Hone down your question before you begin. It may take several iterations before you have your final research question for your state of the science paper. A strong, well thought out research question is conducive to a stronger state of the science paper.

**Make friends with a librarian:** Talk with a reference librarian about your topic. I know that we think we can find whatever the librarian can find. Librarians are highly trained professionals who can help us locate books and journal articles. Their knowledge of keywords and MESH terms is invaluable.

**Broad knowledge about your topic:** To write a good state of the science paper, a nursing scholar must become an expert in the specific phenomenon of interest. For instance, if you want to write a state of the science paper about some aspect of sickle cell disease, you must have a good understanding of many aspects of sickle cell disease, such as pathophysiology and epidemiology. Although you might not include the pathophysiology of sickle cell disease in a research synthesis paper, knowledge about the disease process helps you select the appropriate research question for your state of the science paper.

**Keep good records about your literature search:** What databases did you search? How many references came up for your various sets of search terms? How many were English? What were your inclusion and exclusion criteria for the articles you selected? You should set your inclusion and exclusion criteria *a priori*. Set up a system to remember the origin of ideas and quotations that you will use in your paper.

**Writer’s block:** The hardest thing about writing a paper is to put the first word on the page, so I always start with a possible title. I know the title will probably change as I develop the paper. Don’t be afraid to put your ideas on paper before they are fully developed.

**Write an outline for your paper:** Organize your thoughts before you begin writing your paper. A good way to organize your writing is to develop an outline. Locke, Spirduso, and Silverman (2007) provide a detailed guide for preparing an outline. The following table is Table 4.1 from their book.

**Table 4.1** Preparing the Related Literature Section

---

**QUESTION:** Is physical fitness related to cognition in older adults? More specifically, can an aerobic exercise program increase cognitive processing speed in older adults?

**HYPOTHESIS:** Maintenance of physical fitness through a physical training program will significantly decrease (make faster) reaction time in older individuals.

### **First Stage Outline: Develop the Concepts That Provide the Rationale for the Study**

- I. Reaction time is related to physical fitness level.
- II. Maintenance of cognitive function is dependent on maintenance of aerobic capacity of the brain
- III. The aerobic capacity of brain tissue is affected by physical activity-related regional cerebrovascular changes.

### **Second Stage Outline: Development of Subtopics for Each Major Concept**

- I. Reaction time is related to physical fitness level.
  - A. Comparisons of the reaction time of physically active and inactive subjects
  - B. Training effects on reaction time.
  - C. Reaction time of those in poor physical condition (cardiovascular disease, hypertension)
- II. Maintenance of cognitive function is dependent on maintenance of aerobic capacity of the brain.
  - A. Relationship of cognitive function and brain aerobic capacity in aging individuals.
  - B. Relationship of the neurological measure of brain function, electroencephalography (EEG), to cerebral blood flow and cerebral oxygen uptake in older subjects.
- III. The aerobic capacity of brain tissue is affected by physical activity-related regional cerebrovascular changes.
  - A. Increased metabolism in specific regions leads to cerebral blood flow shifts to those regions
  - B. Regional blood flow shifts motor areas of the brain are related to physical movement.
  - C. Exercise is related to changes in brain capillarization.

### **Third Stage Outline: Add the Most Important References That Support Each Subtopic**

- I. Reaction time is related to physical fitness level.
  - A. Physically active individuals have faster reaction time than do sedentary individuals (Clark & Addison, 2003; Cohen, 1993, 1995; Jones, 1998, 1999; Jones & Johnson, 1991; Lloyd, 1994).
  - B. Reaction time is faster after a physical training program (Black, 1992, 1997; Dougherty, 1987; Morgan & Ramirez, 2006; Ramirez, 2003; Richards, 1995, 1997; Richards & Cohen, 1989; Roe & Williams, 1995; Walters, 1991).
  - C. Cardiovascular-diseased patients have slower reaction time than normal individuals (Brown, 1991); Brown, Matthews, & Smith, 1998; Miller, 1991, 1992; Miller & roe, 2005; Smith, Brown, & Rodgers, 1999; Smith & Rodgers, 1998).
- II. Maintenance of cognitive function is dependent on maintenance of aerobic capacity of the brain.
  - A. Both cognitive function and aerobic capacity decrease with age (Gray, 1998; Petty, 2006).

- B. EEG, cerebral blood flow, and cerebral oxidative capacity decrease with age and are related (Doe & Smith, 1999; Doe, Smith, & Snyder, 1997; Goldberg, 1998; Smith & Doe, 1991; Waters, 1989, 1993; Waters & Crosby, 1992).
- III. The aerobic capacity of brain tissue is affected by physical activity-related regional cerebrovascular changes.
- A. Increase regional metabolism leads to blood flow shifts (Green & Neil, 1966; Lewis, 1979; Thomas, 2001).
  - B. Regional blood flow shifts to motor areas of the brain are related to physical movements being controlled (Caplan, Myerson, & Morris, 1991; Goldsmith, 1993, 1994; Johnson, Goldsmith, & Rodriguez, 1990).
  - C. Exercise is related to changes in brain capillarization (Myers & Templeton, 1991; Patrick, 1993; Patrick & Stone, 1995; Robinson & Spencer, 1997).

I found a well-written state of the science paper about depression and type 2 diabetes mellitus (Penckofer, Doyle, Byrn, & Lustman). I am including their outline. These are their words – not mine. The purpose of their paper was “to summarize the links between diabetes and depression and review empirically supported treatments of depression in diabetes” (p. 1). I included their outline.

**Impact of Depression and Diabetes**

**Association between Depression and Diabetes**

*Depression Predicting Incident Diabetes*

*Diabetes Predicting Incident Depression*

**Potential Mechanisms Linking Depression and Diabetes**

**Treatments for Depression among Individuals with Diabetes**

*Antidepressant Medication*

*Cognitive Behavioral Therapy (CBT)*

*CBT Combined With Exercise*

*CBT Delivered via Telephone and Web*

*Collaborative Care*

**Summary of Depression and Treatment Findings**

**Recommendations for Future Research**

**Write a draft:** Create a draft of your state of the science paper. Set it aside for a day or two. Go do something totally fun. Then come back to your draft. Read the draft and see what needs to be changed. Revise the paper. Then let someone else read it. Let them ask questions about things that don’t make sense to them and make other comments about your paper. Make changes to your paper based on their comments. Anticipate that your paper will need to be revised. This is almost always true.

**Journal Selection:** Select two or three journals that might be potential places for you to publish your paper. Explore the journal. Does the journal publish review articles? Has the journal contained a review similar yours recently? If so, they are unlikely to publish another one on the same topic no matter how well written the article is. Obtain their publication guidelines. Query the editor to see if they would be interested in your topic.

## Steps for Writing a State of the Science Paper

- I. Select your phenomenon of interest.
- II. Search the literature. Enlist the help of a librarian.
- III. Develop the purpose of your State of the Science paper. Write, rewrite, and rewrite the purpose of the paper.
- IV. Write, rewrite, and rewrite the question. Make sure your question is congruent with your purpose statement.
- V. Obtain the abstracts for the identified journal articles.
- VI. Develop your inclusion and exclusion criteria a priori.
- VII. Get the full journal articles.
- VIII. Judge the quality of the articles. You will omit some of the articles because of poor quality.
- IX. Construct a table of important characteristics of the articles you have selected for your State of the Science paper.
- X. Synthesize your findings.
- XI. Summarize your findings (Note: Synthesizing and summarizing are not the same thing).
  - A. What is the existing evidence?
  - B. What is the quality of the science?
  - C. What are the gaps in the literature
  - D. What are the research priorities?

## Examples of Published State of the Science Paper

Broome, M. E., Ironside, P. M., & McNelis, A. M. (2012). Research in nursing education: State of the science. *Journal of Nursing Education, 51*(9), 521-524.

Dudgeon, W. D., Phillips K. D., Bopp C. M., & Hand, G. A., (2004). Physiological and psychological effects of exercise interventions in HIV disease. *AIDS Patient Care and STDs 18*(2): 1-16, 2004\

Penckofer, S., Doyle, T., Byrn, M., & Lustman, P. J. (2014). State of the science: Depression and type 2 diabetes. *Western Journal of Nursing Research, 36*(9), 1158-1182.

Schinnick, M. A., Woo, M. A., Menten, J. C. (2011). Human patient simulation: State of science in prelicensure nursing education. *Journal of Nursing Education, 50*(2), 65-72