First Name:_____ Last Name:_____

Student ID #: _____

PSC 041 Research Methods in Psychology WQ 2024

Unit 1 Exam Version A

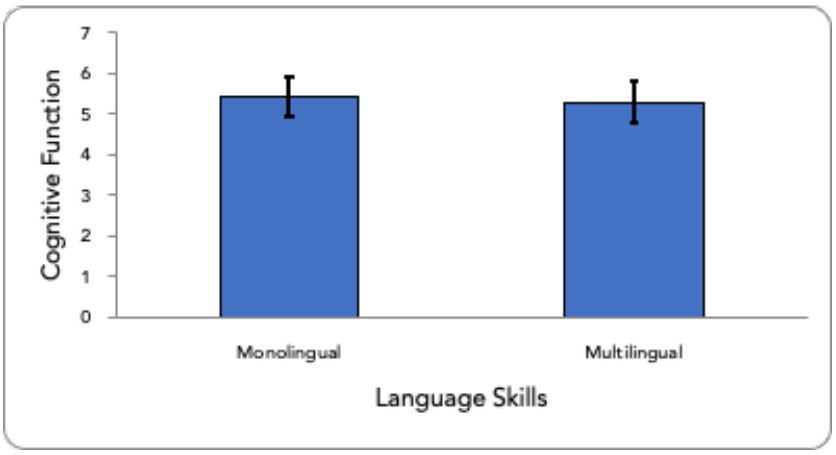
Research Summary

Please answer the following questions in the space provided. Only write on the lines.

Adapted from: Nichols, E. S., Wild, C. J., Stojanoski, B., Battista, M. E., & Owen, A. M. (2020). Bilingualism affords no general cognitive advantages: A population study of cognitive function in 11,000 People. *Psychological Science, 6,* 1–20. doi: 10.1177/0956797620903113

It is a common belief that knowing more than one language affords advantages in life. The authors of the article cite popular notions of social, employment, and lifestyle benefits among bilinguals and multilinguals. In the current study, increased cognitive performance was examined as potentially being related to speaking more than one language.

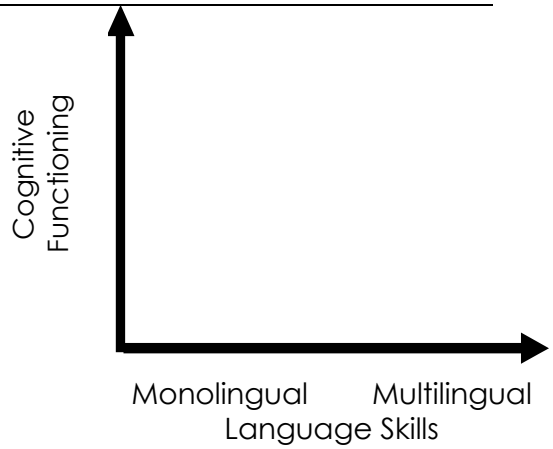
The researchers hypothesized that cognitive functioning would be higher among participants who spoke two or more languages, as compared to their monolingual counterparts. Cognitive functioning is a set of mental skills including flexible thinking and self-control. Researchers recruited 11,041 participants through adverts on social media sites. Each participant was asked to complete twelve different tasks designed to measure cognitive functioning. These included tasks that measured their ability to show self-control by following multi-step directions and those that timed their ability to solve complex problems that required flexible thinking. Each task was scored on a scale from a low of 0 to a high of 10. A composite score was calculated for each participant by calculating the average of his, her, or their results. Participants also completed a questionnaire including demographic questions such as number of languages spoken. Monolingual participants' cognitive functioning (M = 5.42, SD = 1.31) were compared to those of participants who indicated that they spoke two or more languages (M = 5.29, SD = 1.23).
Results indicated no significant differences between the groups' scores (t = 0.98, p > .05). The authors concluded that speaking more than one language does not afford any significant advantage over monolingualism in terms of cognitive functioning.



Hypotheses

10 pts 1. Write a specific null hypothesis for this research (be sure to use the variable names).

10 pts 2. Sketch the null hypothesis:



10 pts 3. Write a specific directional research hypothesis for this research (be sure to use the variable names or levels).

Predictor Variable

10 pts 4. Name the predictor / independent variable

10 pts 5. How did the researchers operationally define the predictor / independent variable? Describe it using your own words. *Be sure to include the levels or values and indicate how the codes will be interpreted.*

5 pts 6. The predictor / independent variable is (fill in the box)

- ☐ **Categorical**
- ☐ **Continuous**

5 pts 7. How was the predictor / independent variable measured? (fill in the box)

- ☐ **Observation**
- ☐ **Self-Report**
- ☐ **Physiological**
- ☐ **It was manipulated** (under the experimenter's control)

Outcome Variable

10 pts 8. Name the outcome / dependent variable

10 pts 9. How did the researchers operationally define the outcome / dependent variable? Describe it using your own words. *Be sure to include the levels or values and indicate how the codes will be interpreted.*

5 pts 10. The outcome / dependent variable is (fill in the box)

- ☐ **Categorical**
- ☐ **Continuous**

5 pts 11. How was the outcome / dependent variable measured? (fill in the box)

- ☐ **Observation**
- ☐ **Self-Report**
- ☐ **Physiological**
- ☐ **It was manipulated** (under the experimenter's control)

Use this information just for Q12.
Another researcher wants to extend this finding using different methods to address a similar research question. This researcher asks participants to evaluate their own mental skills. Each participant is asked to rate their cognitive functioning on a scale of 1 (very low) to 10 (very high).

5 pts 12. How was this new outcome / dependent variable measured? (fill in the box)

- ☐ **Observation**
- ☐ **Self-Report**
- ☐ **Physiological**
- ☐ **It was manipulated** (under the experimenter's control)

Summarize the findings (from original prompt)

5 pts 14. Is this a value, causal, or associative claim? (fill in the box)

- ☐ **Value**
- ☐ **Causal**
- ☐ **Associative**

10 pts 15. How do you know? (include specific information from the prompt)

10 pts 16. Does this interpretation follow from this study: "We found a clear advantage to speaking multiple languages over speaking a single language" Why or why not?

Multiple choice/ fill in the blank / short answer.
Select the single best answer. Indicate your choice by filling in the box to the left of your selection. Write short answers in the space provided.
2.5 points each.

17. Which of the following is the best operational definition for the construct "attention"
    - ☐ self-report of a participant's opinion about how much attention they have
    - ☐ average heart rate over a 24-hour period
    - ☐ length of time (in seconds) that a participant maintains eye fixation on a moving target
18. If you question the construct validity of a study, which of the following questions would you be asking?
    - ☐ How well do the results generalize to the overall population?
    - ☐ Which statistic should be computed?
    - ☐ Were the variables measured accurately?
    - ☐ Does the predictor variable cause changes in the outcome variable?
19. Which of the following is a definition for internal validity?
    - ☐ the degree to which a test or instrument is capable of measuring a concept, trait, or other theoretical entity
    - ☐ the degree to which a study or experiment is free from flaws and can therefore be taken to represent the true nature of the phenomenon.
    - ☐ the extent to which the results of research or testing can be generalized beyond the sample that generated them.

20. Nathan Experimenter wants to know what students eat in the dining halls. What is the best method match?
    - ☐ observation
    - ☐ survey
    - ☐ physiological monitoring

21. Natalie Experimenter wants to know if students enjoy sitting with strangers in the dining halls. What is the best method match for enjoyment?
    - ☐ observation
    - ☐ survey
    - ☐ physiological monitoring

22. What sort of evidence are testimonials from individuals?
    - ☐ empirical
    - ☐ rational
    - ☐ anecdotal
    - ☐ scientific

23. When considering association claims, which of the following of Mill's criteria must be established?
    - ☐ Temporal precedence
    - ☐ Covariance
    - ☐ Ability to rule out alternate explanations

24. Covariance refers to
    - ☐ two variables changing together.
    - ☐ the amount that two variables vary.
    - ☐ one variable causing a change in another variable.
    - ☐ None of these

25. Which of the following examples is most likely to be legitimate science rather than pseudoscience?
    - ☐ Testimonials that herbal supplements make people feel younger
    - ☐ Effectiveness of a vaccine established by a randomized controlled study
    - ☐ Predictions of personality traits based on the position of the sun at a person's birth.
    - ☐ Effectiveness of using crystals to enhance well-being by feeling channeled energy

26. An important characteristic of science is that it is empirical. Which of these statements describes this characteristic?
    - ☐ Scientific inquiry has value independent of any economic value that may result from the research
    - ☐ All natural, social, and psychological phenomena are causally determined by preceding events or natural laws
    - ☐ Science is based on objective, reproducible evidence and not on pure reason, emotion, or subjective experience
    - ☐ All scientific knowledge is open to further testing and revision
    - ☐ A theory or hypothesis is not scientific unless it can be proven false

27. I believe that fairies exist. I believe that fairies are very shy and that they do not show themselves to people.
    Therefore, if fairies do actually exist, you won't see any fairies.
    But also, If fairies do not exist, you won't see any fairies.
    Because these two predictions are the same, which characteristic of science does my belief violate? Write a single word:

    _____

28. A researcher wants to know how many carbonated drinks are consumed by children under the age of five in a week. What type of claim will the researcher make?
    - ☐ Value claim
    - ☐ Association / correlation claim
    - ☐ Causal claim