CNEP 6372
SEMINAR IN APPLICATIONS OF ADVANCED STATISTICAL TECHNIQUES AND EVALUATION METHODOLOGY
TEXAS A&M UNIVERSITY-CORPUS CHRISTI
3 semester hours
Spring Semester 2014
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I. CATALOG DESCRIPTION OF THE COURSE:
CNEP 6372. Seminar in Applications of Advanced Statistical Techniques and Evaluation Methodology. Three semester hours.

This research methodology course is designed to provide doctoral students with application experience in quantitative, qualitative, and mixed-method data analytic procedures. Students will address promises and pitfalls using advanced univariate, multivariate, and non-parametric techniques introduced in CNEP 6360 and CNEP 6370. Students will act as consultants and evaluators on projects developed by student research teams in the department. This course is designed to help students address data analytic applications relevant to professional consulting and clinical and counseling practice as well as contexts involving program evaluation in a wide range of professional settings. Prerequisites: CNEP 6320; CNEP 6360; CNEP 6370.

II. Rationale
This is an interdisciplinary research course, emphasizing designing quantitative and qualitative research, coding and analyzing data, computing statistical results, and using statistical software. Outcomes include the ability to develop hypotheses, execute statistical tests, analyze the results, and communicate the results.

III. State Adopted Proficiencies
Coursework may be applied toward LPC licensure in the State of Texas.

IV. CACREP Standards and Additional Competencies
1. Understands univariate and multivariate research designs and data analysis methods. (IV-E1)

2. Understands qualitative designs and approaches to qualitative data analysis. (IV-E2)

3. Demonstrate the ability to formulate research questions appropriate for professional research and publication in counseling (IV-F1)

4. Demonstrate the ability to create research designs appropriate to quantitative and qualitative research questions (IV-F2)

5. Demonstrates professional writing skills necessary for journal and newsletter publication (IV-F3).

6. Understand various quantitative methods for evaluating counseling effectiveness (IV-G2)

7. Understand the procedures for reviewing research literature
8. Understanding statistical concepts appropriate for analyzing data from different research designs

9. The student will understand and apply:
   a. design and implementation of quantitative research and methodology
   b. uses and limitations of statistical software (SPSS®).

V. Course Objectives/Learning Outcomes

Course Objectives:

Each student will develop and be able to demonstrate an understanding of the following:

1. Student will understand, apply and interpret correlational and experimental designs using multivariate procedures advanced correlational analyses nonparametric tests ...as they are appropriate to the research questions and hypotheses.

2. Student will conceptualize and analyze qualitative data.

3. Students will have the knowledge and understanding of the following:
   - models and methods of assessment and use of data
   - univariate and multivariate research designs and data analysis methods
   - formulate research questions appropriate for professional research and publication in counseling
   - create research designs appropriate for professional research and publication in counseling
   - qualitative designs and approaches to qualitative data analysis

Student Learning Outcomes

1. Students will design, identify, and evaluate research designs through examination, projects, and homework assignments focused on nonparametric statistics, univariate and multivariate parametric statistics, and covariates in univariate and multivariate parametric statistics.

2. Students will formulate research questions specific to counseling research as evidenced by performance on exams and project with a focus on nonparametric statistics, univariate and multivariate parametric statistics, and covariates in univariate and multivariate parametric statistics.

3. Students will differentiate between descriptive, experimental, and correlational designs focused on nonparametric statistics, univariate and multivariate parametric statistics, and covariates in univariate and multivariate parametric statistics and will demonstrate appropriate application through examination, homework assignments, and project.

4. Students will conduct a research project consistent with guidelines for publication relevant to the counseling profession in the project component of the class.

5. Students will apply quantitative evaluations specific to counseling effectiveness through completion of a research project and examination.

6. Students will complete a literature review on a counseling-related topic as evidenced by completion of a research project.
7. Students will identify differences in quantitative sampling procedures through examination, homework, and project with a focus on nonparametric statistics, univariate and multivariate parametric statistics, and covariates in univariate and multivariate parametric statistics and qualitative research design.

8. Students will utilize statistical concepts appropriate for descriptive, experimental, and correlational designs focused on nonparametric statistics, univariate and multivariate parametric statistics, and covariates in univariate and multivariate parametric statistics in examination, project, and homework assignments.

9. Students will evaluate various coding methods for qualitative research through assignments and research project.

VI. Course Topics

Each student will develop and be able to demonstrate an understanding of:
- Model assumptions involved in univariate and multivariate techniques
- Advanced skills in univariate statistics
- Overview of multivariate techniques
- Designing and analyzing qualitative data

VII. Instructional Methods and Activities

Lectures, Homework, SPSS Exercises, Computations, Exams, and a Research Project

VIII. Evaluation and Grade Assignment

Midterm (60 points)

Research Project (90 points): See Appendix

Homework assignments (60 points)

GRADING POLICIES: Finally, your grade will be assigned based on the following schemata:

A = 189-210
B = 168-188
C = 147-167
D = 126-146
F = 125 & BELOW

You are encouraged to work in groups to complete your homework. Students tend to perform better in this class when small study groups are used for homework and exam preparation. While each student is required to turn in homework, working together is permissible and encouraged. However, exams are to be done individually. Students who work together on their exam have committed a serious infraction and will be referred to the graduate school, consistent with university policy, if cheating is suspected.

For all homework, a point values is given for each graded section. Partial credit is possible for all computations and written responses (e.g., short essay, open-ended questions). Partial credit will be awarded when minor errors due to computation or a qualified understanding of a concept is noted. No credit is given when several minor errors or major errors/omissions are apparent.
WRITING ASSIGNMENTS:

To get full credit on written assignments, use American Psychological Association Publication Manual (6th Ed.) guidelines. All written assignments should use 12 point font, Times New Roman, 1” margins on top and bottom; 1” to 1.25” (default on MS Word) for left and right margins.

Written assignments are weighted equally across three categories: mechanics, structure, and content. Review the rubric in the appendix of this syllabus.

IX. Course Schedule and Policies

Attendance

In the past, successful students have found it useful to be on time and prepared for each class. This is accomplished by:
1. Attending each class
2. Having all assigned readings completed
3. Participation in class discussions.

Students are responsible for all information disseminated in class (even if the student is absent). You are adults and have adult lives and responsibilities. If an emergency arises, take care of yourself and your family. You cannot learn if you are distracted by emergencies. Only family emergencies are considered excused absences. I encourage you to strike a balance between your education and family life. You are responsible for obtaining missed material from fellow classmates.

My attendance policy:
1. Upon your third absence, you will have a 10% deduction in your grade.
2. Four absences will result in an administrative drop or failing grade.

Civility

The demonstration of courtesy may be more of a reflection of an individual than feelings toward others. Civility, therefore is a reflection of one’s professionalism and ethics. When breaches in civility occur (e.g., cell phones, texting, email, talking, etc.), both the learning environment and professional environment may be compromised. I strongly encourage personal and professional boundaries with regards to civility in a graduate class. For many of you, this is the last opportunity to be a student. Enjoy the learning process. While respect may vary toward peers, and even the instructor, respect for the academic environment and the credential pursued should be acknowledged.

Late Work

All late assignments receive a letter grade deduction. No late assignment will be accepted one week after due date. Any assignments not turned in by the last day of class will not be graded.

Academic Integrity/Plagiarism


University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty
includes all forms of cheating, such as illicit possession of examinations or examination materials, forgery, or plagiarism. (Plagiarism is the presentation of the work of another as one's own work.)

Disciplinary action for academic misconduct is the responsibility of the faculty member assigned to the course. The faculty member is charged with assessing the gravity of any case of academic dishonesty, and with giving sanction to any student involved.

Penalties that may be applied by the faculty member to individual cases of academic dishonesty include one or more of the following:

1. Written reprimand;
2. Requirement to re-do work in question;
3. Requirement to submit additional work;
4. Lowering of grade on work in question;
5. Assigning grade of "F" to work in question;
6. Assigning grade of "F" for course;
7. Recommendation for more severe punishment, such as dismissal from the program or from the University.

If the faculty member determines that assigning a grade of "F" to the course is the appropriate penalty and this disciplinary action occurs prior to the deadline for dropping courses, the student forfeits his/her right to drop the course in question.

If the faculty member recommends more severe punishment, such as dismissal from the program or from the University, the faculty member will notify the appropriate chair/college dean, who in turn will notify the Office of Student Affairs. If dismissal from the University is recommended, the Office of Student Affairs will follow its procedure for such cases.

The faculty member must file a record for each case of academic dishonesty, including a description of the disciplinary action taken, along with any materials involved, with his or her college dean, who will forward a copy to the Office of Student Affairs. The office of the academic dean of the college in which the offense took place will maintain records of all cases of academic dishonesty reported for a period of five years. The Office of Student Affairs will also maintain records of such cases for a period of five years. The Office of Student Affairs will inform the Graduate Dean as appropriate.

Any student who has been penalized for academic dishonesty has the right to appeal the judgment or the penalty assessed. Students who wish to appeal an academic dishonesty decision should contact the Office of Student Affairs for guidance.

**Dropping a class**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class.
## Tentative Schedule

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<tr>
<th>Date</th>
<th>Reading</th>
<th>Assignment/Presentation</th>
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<tbody>
<tr>
<td>1/28</td>
<td>Review: Correlational Designs</td>
<td>Data cleaning, Assign HW 1</td>
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<tr>
<td>2/4</td>
<td>Ch. 12</td>
<td>Nonparametric tests, HW 1 due, Assign HW 2</td>
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<tr>
<td>2/11</td>
<td>Ch. 20</td>
<td>Logistic Regression, HW 2 due, Assign HW 3</td>
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<td>2/18</td>
<td>Ch. 21</td>
<td>MANOVA, HW 3 due, Assign HW 4</td>
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<td>2/25</td>
<td>Ch. 16</td>
<td>ANCOVA/MANOVA, HW 4 due, Assign HW 5</td>
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<td>3/4</td>
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<td>Canonical correlation, HW 5 due, Assign HW 6</td>
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<td>3/11</td>
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<td>Spring Break</td>
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<tr>
<td>3/18</td>
<td>Ch. 22</td>
<td>PCA/EFA, HW 6 due</td>
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<tr>
<td>3/25</td>
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<td>Review</td>
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<td>4/1</td>
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<td>Midterm</td>
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<td>4/8</td>
<td>handout</td>
<td>The qualitative proposal, Assign quant/qual projects</td>
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<tr>
<td>4/15</td>
<td>Saldaña ch. 1-2</td>
<td>Intro to coding</td>
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<td>4/22</td>
<td>Saldaña ch. 3</td>
<td>First cycle coding methods</td>
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<td>4/29</td>
<td>Saldaña ch. 4</td>
<td>Second cycle coding methods</td>
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<td>5/6</td>
<td>handout</td>
<td>Issues in qualitative research</td>
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<tr>
<td>5/13</td>
<td></td>
<td>Review</td>
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<tr>
<td>5/20</td>
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<td>Project due</td>
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## Textbook(s)

*Required:*

In addition, a number of supplementary articles may be discussed during the course. These will be used to supplement the texts and to exemplify how certain examined statistical methods are used in psychological research. Each of these supplementary readings will be made available by the instructor.

SOFTWARE:

SPSS® Graduate Pack V.12.0 or higher

Software is also loaded on several computers on campus and Metroplex.

There is a Student Pack that is also sold. Do not purchase this as it will not run all of the analyses we will be doing in this class.

XI. References/Resources


INTERNET RESOURCES:

http://www.anselm.edu/homepage/jpitoch/biostatstime.html -- History timeline for statistics

http://www.psychstat.smsu.edu/introbook/sbk00.htm A very good on-line text for introductory statistics.

http://research.ed.asu.edu/siip/ -- Many resources for statistics, including databases.


http://www.statistics.com/ -- Information about statistics software (major packages like SAS, SPSS and S-PLUS, shareware and smaller packages too), as well as about statistics analysis, data analysis and short courses in statistics.

http://www.dartmouth.edu/~chance/ -- The Chance Database; includes videos and audio on topics related to chance, statistics, probability, randomness, etc. An excellent site.

http://nilesonline.com/data/ -- Where to find data on the Internet; many sources, from agriculture to education to economics and more.

http://www.fedstats.gov/ -- More than 70 agencies in the United States Federal Government produce statistics of interest to the public. The Federal Interagency Council on Statistical Policy maintains this site to provide easy access to the full range of statistics and information produced by these agencies for public use.
XII. Grade Appeals

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

XIII. Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101. If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
Appendix

You have two options with this paper (approximately 15 pages):

1) Write an APA style quantitative Methods, Results and Discussion (APA 2.06 -2.08).
   a. Being with an introductory paragraph on your topic and research questions/hypotheses
   b. Describe your methods using APA style headings. Be sure to identify all appropriate areas.
   c. Use a statistical analysis from this class
   d. Write a results section in APA style
   e. Discussion should include the following:
      i. A summarization of your findings without statistical data
      ii. Implications to counseling or counselor education
      iii. Limitations
      iv. Suggestions for further research
      v. Conclusion

2) Write an APA style qualitative Methods section

I. Introduction
   Describe the substantive focus of the research
   Significance of the Research
      Why should it be done? Who will benefit and how many will benefit? How will the field or subject benefit from your research? Frame it as a larger theoretical policy problem and thereby develop its significance
   Pose initial research question and sub-questions
   Theoretical Sensitivity
      Why am I a good research instrument
      personal experience
      professional experience
      personal knowledge of the literature (Forecast the literature to be discussed in the second section.)
      analytic rigor
   Discuss the parameters of the study.

II. Research Design
   Statement of the Problem or Focus of the Study.
   Research Question and sub-questions
   Depth vs Breadth
   Site and Sample Selection
      Where will you conduct your study and why that site (how does it relate to your question)?
      Who will you study and how will studying this person (or these people) help you to answer your question?
Describe the overall research strategy and give a rationale for it. This is an overview. Extended discussion of research tactics should be covered under the appropriate headings (observations, interview, document collection). Create a conceptual diagram.

**Example of a conceptual diagram**

**Stage one - 5 Participants**
- Interview (SOT)
- Observe
- Document collection

**Stage two - Case Study**
- interview (conversational)
- observe (extended)
- document collection

**Stage three - Focus Group**
- interview (SOI)
Research Strategies
In what sequence will you execute your study and why?
How will you ensure that they context is fairly and accurately represented (answer the question between sites and within sites)?

Researcher’s role management
participant observer, detached observer, or somewhere between the two
entry
reciprocity
ethics

Theoretical position as it influences your research design
Appropriateness of the methodology for answering your research question includes adequate
description of your particular theoretical approach (for example):
Ethnography Phenomenology Heuristics
Ethnomethodology Symbolic interaction Ecological psychology
Systems theory Chaos theory Hermeneutics
Orientalism Oral history Semiotics
Conversational analysis (discourse analysis)

Data Collection: How will you collect data that will answer your question?
Observation: who, when, where, why, and with what anticipated outcome
When you observe, how will you deal with the following issues:
Pay attention to interactions, language, individuals, groups, routines,
interpretations by actors, rituals, social organization, temporal sequences, nonverbal communication, symbolic space, the setting, unplanned activities, what doesn’t happen. Focus on one of these factors at a time. Shift your focus, as reason seems to dictate
context
duration of the study
unit of study
narrative Vs descriptive approach

Interview: who, when, where, why, and with what anticipated outcome
When you interview, how will you deal with the following issues:
ensuring privacy
type of interview format
questions which may originate from personal experience (list them)
questions which may originate from your literature review (list them)

Document collection: what, when, where, why, and with what anticipated outcome
When you collect documents, how will you deal with the following issues?
Make a list of the documents that you intent to collect and state how they will help to answer your research question or one of your research subquestions.
storage and retrieval
ensuring privacy
credibility issues journals -- specific content and purpose
What will be the relationship between various data collection types?
How will you ensure trustworthiness?

Is the data reliable (Does it show a pattern?) and valid (truthful or accurate)? How do you plan to reduce researcher bias?

**prolonged engagement**
Have you actually documented patterns in the data over time?

**persistent engagement**
Have you dealt with discrepant data? How have you resolved the inconsistent data with patterned data? Why did you decide that some data was not worthy of consideration?

**triangulation**
How did you compare the data from different sources? Did you use several types of methods? Did you use more than one researcher? Did you use more than one theoretical perspective?

**peer debriefing**
Did you subject your data and your inferences about your data to scrutiny by qualified colleagues in your field? How often and how thoroughly were your data inspected?

**member checks**
Did you allow the people that you have used as participants to read the data that you collected from them and the conclusions that you have drawn from the data? When were the member checks performed and at what particular point in your research? Did you record their reactions to the data and your interpretations of the data? Have you included this information in your report? Why or why not?

**audit trail**
Have you made a clear reference trail back to your raw data? Is the audit trail well enough organized that another researcher could determine whether your inferences are reasonable given the available data?

How will you deal with potential **evidentiary inadequacies** of research design?

1. Inadequate amounts of evidence
2. Inadequate variety in kinds of evidence
3. Faulty interpretive status of evidence
4. Inadequate disconfirming evidence
5. Inadequate discrepant case analysis

**Managing and Recording Data**

In what ways will you record each type of data?
How do you plan to store the data once collected?
How will you be able to retrieve the data?
How will you structure your audit trail (give an example)?

**Data Analysis Strategies**

How will you analyze the data?
State specifically how you will proceed to analyze each type of data (observation, interview, documents) during each stage of analysis. For example:
open coding
Explain how you scanned the documents, returned to words or sentences that were significant, listed all possible meanings for these words, and validated the meanings through additional data collection or analysis. Use specific examples (hypothetical examples are acceptable).

axial coding
Explain how you have used the paradigm model to analyze your data into initial patterns. Give specific examples related to (A) causal conditions (B) phenomenon (C) context (D) intervening conditions (E) action interaction strategies (F) consequences. Show how this conceptual template helped you to organize your data.

selective coding
Explain how you identified a rough storyline, related subsidiary categories around the core category (the one that is abstract enough to encompass them all), validated the categories against the data, and filled in the categories (theoretical sampling).

Grounding the theory
How did you validate your theory against the data?
Explain domain and dimensional analysis if you intend to use them.

Management plan, time line, and feasibility analysis
How and when will you proceed with your methods from start to finish?
Include a pert chart
State how many hours will be required for each stage and then state how you will fit these demands into your schedule.

References

Note: Qualitative research terms are not common knowledge and do differ in meaning depending upon which author you are citing; therefore, it is not sufficient to merely refer to a term. Always explain exactly what you mean by each qualitative term the first time you use it in a qualitative research proposal. In addition, you should state how that term is relevant to your study.
Homework 1

1. Download the BDI database from my website

2. Recall the four steps to data cleaning: (4 points, 1 point each)
   a. Run descriptives;
   b. Evaluate and omit/replace missing data;
   c. Identify equality of measures after data omission/imputation;
   d. Address any issues regarding normality by analyzing distributions and conducting any necessary transformations.

3. How would you address the following issues: missing values, normality, homogeneity of covariances/variances? Submit appropriate output. (3 points)

4. Perform a transformation to address nonnormality. Were you able to address the issue? Explain what you did and attach appropriate output. (3 points)

Homework 2


2. Using the data from your output, re-compute the chi-square by hand. (4 points)

3. Review the scenario on p. 311 Lesson 35 Exercise file 1 in Green and Salkind (do not do the problems).

4. Conduct a logistic regression (2 points)

5. Write a results section in APA style. (4 points)
Homework 3

1. p. 231 Green and Salkind, do problems 5 and 6.

2. Make sure you (a) ran a MANOVA, (b) a discriminant analysis post hoc, and (c) reported power using a sensitivity analysis. (6 points, 2 points each)

3. Make sure your results are written in APA style. (4 points)

Homework 4

1. p. 221 Green and Salkind, Lesson 27, Exercise File 2, items 6-8. (6 points, 2 points each)

2. Write a results section in APA style. (4 points)

Homework 5

1. Use the HSB data set available on my website and the following scenario:
   
   You would like to examine the relationship between literacy and self-esteem. Two measures were used to evaluate literacy: (a) reading and (b) writing. Two measures were utilized to evaluate self-esteem: (a) self-concept and (b) locus of control. Higher scores on reading and writing indicate higher achievement. Higher scores on self-concept indicate stronger self-concept. Higher scores on locus of control indicate more internal locus of control.

2. Perform a canonical correlation exploring the relationship between self-esteem and literacy. (4 points)

3. Write a results section in APA style. (6 points)

Homework 6

1. p. 323 Green and Salkind, Lesson 36, Exercise File 1, items 1-3. (3 points)

2. Conduct a Cronbach’s alpha on the relevant subscales. (3 points)

3. Report your results in APA style. (4 points)
# Final Project Rubric (90 Points)

<table>
<thead>
<tr>
<th>Content</th>
<th>Poor</th>
<th>Adequate</th>
<th>Exceptional</th>
<th>Weight</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>Introduction</strong></td>
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<td>Title page/Abstract</td>
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<td>Completeness of literature review</td>
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<td>Addresses gap in the literature</td>
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<td>Research hypotheses/questions</td>
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<td><strong>Methods</strong></td>
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<td>Participants</td>
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<td>Measures</td>
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<td>Procedure</td>
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<td>Sample size</td>
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<td>Data analysis</td>
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<td><strong>Discussion</strong></td>
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<td>Addresses all aspects of findings</td>
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<td>Implications for counseling</td>
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<td>Addresses limitations</td>
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<td>Addresses suggestions for further research</td>
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<td>Conclusion</td>
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<td>Paper follows a logical flow</td>
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<td>Evidence of original and critical thinking</td>
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