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## Do Literature Review Skills Transfer from One Course to Another?

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Creating literature reviews encompasses skills that are central to psychology students' academic and professional lives, yet writing them consistently challenges students. Research shows that instruction leads to improvement in students' literature reviews within courses (Boscolo, Arfé, & Quarisa, 2007; Granello, 2001), but little work examines how such instruction carries over to other courses. Our study addresses this by comparing literature reviews from two required courses. Students are taught to write reviews in a psychology writing course (PSYC 205), and without additional instruction, students again write reviews in a Statistics and Research Methods course (PSYC 305). Do the skills transfer? A sample of PSYC 305 reviews ( $n = 17$ ) was drawn and their PSYC 205 literature reviews obtained. All reviews were graded using the same rubric. A within-subjects comparison showed that students' PSYC 305 reviews were significantly improved. For a second between-subjects comparison, these PSYC 305 reviews were compared to the 305 reviews of students who did not have PSYC 205. The reviews of those who had PSYC 205 were significantly better than the reviews of those who did not. These combined results suggest that we can teach transferable literature review skills, and, given their importance, we suggest that psychology programmes should.

Reviewing the literature is a fundamental aspect of situating oneself in a discipline (Froese, Gantz, & Henry, 1998). Only after one can engage with others in the literature is one a part of the field (Boice, 1982). Yet writing a literature review is hard for even the experienced writer (Granello, 2001). Not surprisingly, the literature review process consistently challenges students. Students have trouble with all aspects (Goddard, 2003; Granello, 2001), and often produce poor quality work (Froese et al., 1998).

Part of students' difficulty is that they mistakenly think that writing is about generating sentences, whereas experienced writers know that the vast majority of effort comes in preparing to write and revising what is written (Levy & Ransdell, 1995; Torrance, Thomas, & Robinson, 1999). Another difficulty is that writing a literature review requires a number of sophisticated skills, both as a reader and as a writer (Kellogg & Raulerson, 2007; McGinley, 1992). Students must engage in all levels of Bloom's taxonomy of cognitive complexity, from knowledge, through comprehension, application, analysis, and synthesis, to evaluation (Granello, 2001), all requiring practice and experience. Before students even begin writing, they must learn to formulate questions, delve into the database, select relevant and appropriate articles, closely read and evaluate their chosen literature, integrate their sources, and synthesize what they've learned (Boscolo, Arfé, & Quarisa, 2007; Froese et al., 1998; Granello, 2001; Wade, 1995). When they write, students must support their arguments (Wade, 1995), appropriately hedge and situate what they know.

Furthermore, students must follow the stylistic conventions of their discipline, including avoiding language bias, applying proper formatting, and using appropriate in-text citations and reference lists. For psychologists, comfort with the American Psychological Association's (APA) stylistic conventions is necessary, as APA provides the 'most widely used template for scientific thinking and writing in the behavioral sciences' (Luttrell, Bufkin, Eastman, & Miller, 2010, p. 193).

Although APA offers rules for good writing, it does not offer guidance on how to achieve good writing and cognitively complex discourse.

Like instructors elsewhere, Seattle University psychology faculty frequently expressed 'concern about students' ability to conduct meaningful literature reviews' (Froese et al., 1998, p. 102). For example, when students supported their arguments, they typically took their sources at face value and they rarely put their sources in conversation with one another. We wanted students to engage deeply with the literature (Boscolo et al., 2007; Granello, 2001). We realized that writing psychology literature reviews is very different from the writing students did prior to declaring their major (Sternberg & Sternberg, 2010). Furthermore, we realized that developing an understanding of literature reviews does not happen naturally for most students (Froese et al., 1998; Granello, 2001); we needed to provide direct instruction.

### **Writing for Research in Psychology**

Given these issues, we developed a Writing for Research in Psychology course (PSYC 205) to formally teach our students to craft literature reviews that can answer a question with the extant literature or that can identify a gap in a field's understanding and thus serve as the rationale for a research endeavour. In PSYC 205 students would examine the genre, the conventions, and the skills fundamental to composing a literature review.

The PSYC 205 course, taught by psychology faculty, was designed to follow introductory psychology and immediately precede the Statistics and Research Methods sequence (PSYC 303 & 305). PSYC 303 and 305 are required to be taken in consecutive terms with the same instructor. When first introduced, PSYC 205 was not a required course. Now students are required to take PSYC 205 and are advised to take it just before PSYC 303. Occasionally, transfer and study-abroad students must take PSYC 205 and PSYC 303 at the same time.

In PSYC 205 students are taught a literature review process including forming questions, finding appropriate sources, carefully reading, writing an annotated bibliography, synthesizing, integrating, supporting their argument, and presenting their work in APA style. Students draft their first stand-alone literature review, are given teacher and peer feedback, and submit a final draft.

With PSYC 205 completed, students arrive in PSYC 305 (the second half of the Statistics and Research Methods sequence) familiar with literature reviews. In PSYC 305, students again submit a literature review. The assignment details expectations and grading, but students receive no specialized instruction on writing literature reviews and no teacher or formal peer feedback prior to submission. This assignment is one in a series of assignments (e.g., research proposal, human subjects proposal, annotated bibliography, data analysis report, etc.) leading to completion of their independent research project at the end of PSYC 305. Their literature reviews ultimately serve as the introductions to their final APA-style papers in PSYC 305.

With the addition of PSYC 205, it seemed to the psychology faculty that students' literature reviews were improved, but we wanted to confirm this perception objectively.

Prior research investigating the impact of writing instruction on psychology undergraduates' literature reviews is sparse (Fallahi, Wood, Austad, & Fallahi, 2006). Fallahi et al. explored the impact of writing instruction on four technical skills: grammar, mechanics, style, and referencing. They found that skills improved across multiple assignments, especially for referencing – the skill newest to students. Similarly, Goddard (2003) found that students improved in grammar and APA style skills after completing a Writing for Research in Psychology class.

However, we know that writing a literature review requires much more than stylistic knowledge and writing fundamentals. Luttrell et al. (2010) offered a semester-long one-hour course on writing in APA style. They found that although students' knowledge of APA style and conventions improved (as compared to a control group who did not receive APA instruction), the quality of their literature reviews did not. Boscolo et al.'s (2007) writing intervention helped students improve their organization skills but did little for students' integration of the literature.

Even less work has examined how writing instruction carries over to other courses. Poe (1990) suggests that the writing skills students acquire will transfer to other courses, but this is an empirical question: Do literature review skills transfer from one course to another? We hoped that the skills taught in our PSYC 205 would at least hold, if not improve, in a subsequent course. Are

students' PSYC 305 literature reviews as good, or better, than their PSYC 205 reviews? To answer this question, we conducted two different analyses. Using a within-subjects design, we compared the literature reviews completed in PSYC 205 to those completed by the same students in PSYC 305. Using a between-subjects design, we compared these PSYC 305 literature reviews to the reviews of students who took PSYC 305 before the institution of PSYC 205.

## **Method**

### *Participants*

Participants were Seattle University psychology majors. No data regarding students' age, gender, or year in school were gathered.

### *Measures*

The grading rubric was developed by the instructors of the Writing for Research in Psychology course. Papers were graded on four areas, as follows, each worth 10 points: Introduction and Thesis (e.g., having an engaging, clearly described research question); Discussion (e.g., effectively summarizing the research under review); Structure and Organization (e.g., paragraphs have topic sentences supported by the evidence); and Information Literacy (e.g., engaging appropriate articles specifically). In addition, students could lose up to 20 points for poor writing and failure to follow APA style and conventions (essentially a writing penalty). The same rubric was applied to all literature reviews. Please see the Appendix for the full rubric.

### *Design*

Given the wide latitude of individual differences in writing ability and development in cognitive complexity (McGinley, 1992), we initially used a within-subjects design. The scores of the PSYC 205 final drafts were compared to the same students' PSYC 305 literature review scores. Total scores both with and without the writing penalty were compared. In addition, we compared the scores on each section of the rubric.

We also used a between-subjects design to compare the PSYC 305 literature reviews of students who took PSYC 305 before the institution of PSYC 205 to the reviews of students who took PSYC 305 after PSYC 205 was added to the curriculum. We compared total scores both with and without the writing penalty as well as the scores on each section of the rubric.

### *Procedure*

*Within-subjects analyses:* The authors obtained available Writing for Research in Psychology (PSYC 205) ( $n = 17$ ) and Statistics and Research Methods II (PSYC 305) literature reviews ( $n = 17$ ), and assessed them using the rubric. Although the authors knew which were from each course, the individual identity of each paper's author was masked.

To confirm that our knowledge of the hypothesis did not affect our assessment of the literature reviews, we enlisted the help of a blind grader. The fellow faculty member was familiar with both the Writing for Research in Psychology and the Statistics and Research Methods classes, but had taught neither to these students. She graded a random sample of 7 corresponding pairs of papers, (i.e., 14 papers), from PSYC 205 and PSYC 305; she did not know which papers were PSYC 205 and which were PSYC 305. These additional data allowed us to assess the fairness of our grading.

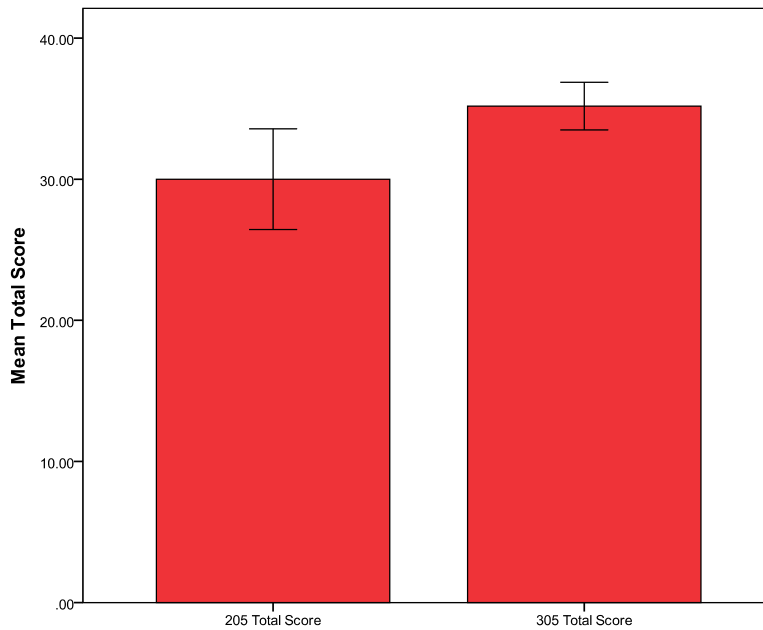
*Between-subjects analyses:* The first author obtained archived Statistics and Research Methods II (PSYC 305) papers ( $n = 16$ ) from before the introduction of PSYC 205 and assessed them using the rubric. To assess the fairness of our grading a blind grader graded these same papers.

## Results

### Within-subjects Analyses

Students' PSYC 305 literature review scores ( $M = 35.18$ ,  $SD = 3.29$ ) were significantly higher than their PSYC 205 reviews ( $M = 30.00$ ,  $SD = 6.95$ ),  $t(16) = -3.42$ ,  $p = .004$  (see Figure 1). The significant difference between these reviews held when ignoring the penalty exacted for poor writing and failure to follow APA style,  $t(16) = -3.54$ ,  $p = .003$ .

Figure 1. Comparison of 205 and 305 total literature review scores ( $n = 17$ ).



Note. Error bars represent 95% confidence intervals.

To determine which specific aspects of the literature reviews had improved, we compared scores on the four rubric sections (Introduction and Thesis, Discussion, Structure and Organization, and Information Literacy). Students' PSYC 305 scores were significantly higher than their PSYC 205 scores for all four sections, with  $ps$  ranging from .006 to .030. The effect sizes were also in the range considered moderate,  $\eta^2 = .28$  to .46 (Ferguson, 2009; Pallant, 2010) (see Table 1).

Table 1. Comparison of aspects of the 200- and 300-level literature reviews ( $n = 17$ ).

	205 M (SD)	305 M (SD)	95% confidence interval	$t$ statistic	Effect size <sup>1</sup>
Introduction & Thesis	8.76 (1.09)	9.50 (.707)	-1.33 to -.145	$t(16) = -2.64$ , $p = .018$	$\eta^2 = .32$
Discussion	8.06 (1.14)	8.76 (.886)	-1.25 to -.160	$t(16) = -2.74$ , $p = .014$	$\eta^2 = .33$
Structure & Organization	8.12 (1.36)	9.09 (1.03)	-1.68 to -.264	$t(16) = -2.91$ , $p = .010$	$\eta^2 = .36$
Information Literacy	7.94 (1.43)	9.00 (.707)	-1.77 to -.344	$t(16) = -3.14$ , $p = .006$	$\eta^2 = .40$
APA Penalty	-2.88 (3.30)	-1.18 (1.22)	-3.22 to -.190	$t(16) = -2.39$ , $p = .030$	$\eta^2 = .28$
Total Score	30.00 (6.95)	35.18 (3.29)	-8.38 to -1.97	$t(16) = -3.42$ , $p = .004$	$\eta^2 = .44$
Total Score – No Penalty	32.88 (4.43)	36.35 (2.47)	-5.55 to -1.39	$t(16) = -3.54$ , $p = .003$	$\eta^2 = .46$

Notes. <sup>1</sup> $\eta^2$  formula =  $t^2 / (t^2 + N - 1)$  (Pallant, 2010).

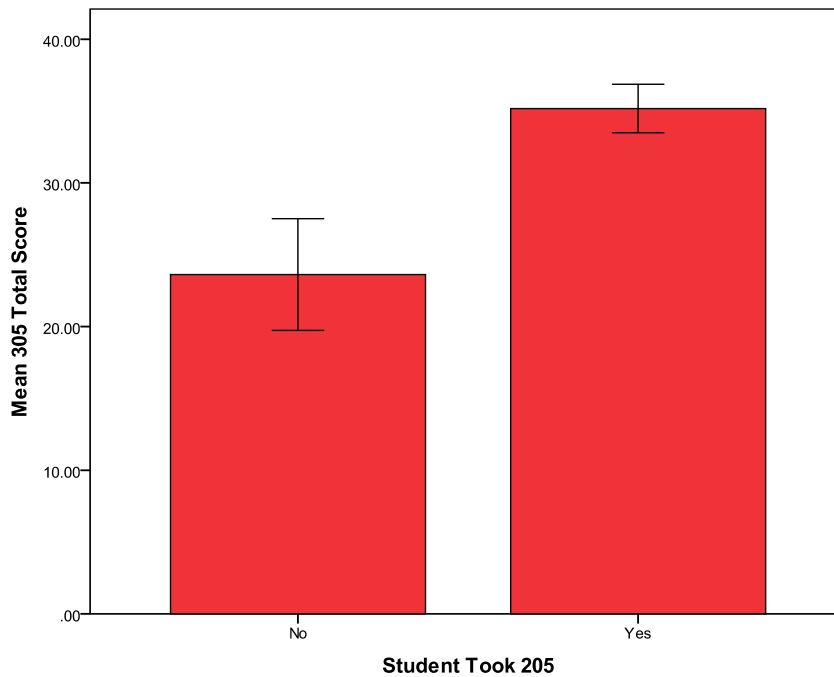
## Do Literature Review Skills Transfer?

The blind grader verified the fairness of our grading. For the 205 literature reviews, our grading correlated at  $.820$ ,  $p = .024$  (without the APA penalty,  $r = .733$ ,  $n = 7$ ,  $p = .061$ ). For the 305 literature reviews, the correlation was  $.704$ ,  $p = .077$  (without the APA penalty,  $r = .763$ ,  $n = 7$ ,  $p = .046$ ).

### Between-subjects Analyses

The literature reviews completed by PSYC 305 students who took PSYC 205 were significantly higher ( $M = 35.18$ ,  $SD = 3.29$ ) than the PSYC 305 reviews of those who did not take PSYC 205 ( $M = 23.63$ ,  $SD = 7.30$ ),  $t(20.58) = -5.80$ ,  $p < .001$  (see Figure 2). The significant difference between these reviews held when ignoring the penalty exacted for poor writing and failure to follow APA style,  $t(18.85) = -4.83$ ,  $p < .001$ .

Figure 2. Comparison of 305 total literature review scores ( $n = 16$ ) for those without and with 205 first.



Note. Error bars represent 95% confidence intervals.

Table 2. Comparison of the PSYC 305 literature reviews of those with ( $n = 17$ ) and without ( $n = 16$ ) PSYC 205.

	305 Without 205 <i>M (SD)</i>	305 With 205 <i>M (SD)</i>	95% confidence interval	<i>t</i> statistic	Effect size <sup>1</sup>
Introduction & Thesis	7.34 (1.66)	9.50 (.707)	-3.09 to -1.22	$t(20.01) = -4.80$ , $p < .001$	$\eta^2 = .42$
Discussion	7.09 (1.58)	8.76 (.886)	-2.57 to -.772	$t(31) = -3.79$ , $p = .001$	$\eta^2 = .31$
Structure & Organization	7.03 (1.41)	9.09 (1.03)	-2.93 to -1.18	$t(31) = -4.80$ , $p < .001$	$\eta^2 = .42$
Information Literacy	6.19 (1.71)	9.00 (.707)	-3.77 to -1.85	$t(19.73) = -6.10$ , $p < .001$	$\eta^2 = .54$
APA Penalty	-4.03 (2.07)	-1.18 (1.22)	-15.70 to -7.41	$t(24.06) = -4.79$ , $p < .001$	$\eta^2 = .42$
Total Score	23.63 (7.30)	35.18 (3.29)	-12.25 to -4.83	$t(20.58) = -5.80$ , $p < .001$	$\eta^2 = .51$
Total Score – No Penalty	27.81 (6.66)	36.35 (2.47)	-5.55 to -1.39	$t(18.85) = -4.83$ , $p < .001$	$\eta^2 = .42$

Notes: <sup>1</sup> $\eta^2$  formula =  $t^2 / (t^2 + N - 1)$  (Pallant, 2010).

We compared scores on the four rubric sections (Introduction and Thesis, Discussion, Structure and Organization, and Information Literacy) to determine which specific aspects of the literature reviews had improved. Students' PSYC 305 with 205 scores were significantly higher than their PSYC 305 without 205 scores for all four sections, with *ps* .001 or less. The effect sizes were also in the range considered moderate,  $\eta^2 = .31$  to  $.54$  (Ferguson, 2009; Pallant, 2010). Please see Table 2.

The blind grader verified the accuracy of the first author's grading. The correlation was .958,  $n = 33$ ,  $p < .001$  (without the APA penalty,  $r = .943$ ,  $n = 33$ ,  $p < .001$ ).

## Discussion

Students struggle with writing in general and with literature reviews in particular. Our hope was that students would retain what they learned in Writing for Research in Psychology (PSYC 205) and apply their knowledge to the literature review assignment in Statistics and Research Methods II (PSYC 305). We found that students transferred their learning from their stand-alone literature reviews in PSYC 205 to their literature review introductions in PSYC 305. In fact, PSYC 305 students scored significantly better than their PSYC 205 reviews. Specifically, students performed slightly better in all four areas of assessment: Introduction and Thesis, Discussion, Structure and Organization, and Information Literacy. When we compared the literature reviews of students who had never taken PSYC 205 to the literature reviews of students who had taken PSYC 205, we again saw significant differences. The reviews of those who had taken PSYC 205 were significantly better on all dimensions. The observed changes are especially remarkable given that students do not receive instruction on literature reviews in PSYC 305 and that the course has multiple competing demands; while expanding their Statistics and Research Methods knowledge base, students complete a research project from idea to presentation, and the literature review is but one assignment along the way.

We should consider the possibility, however, that improvement may not be caused solely by PSYC 205. It is possible that students received further instruction and practice on literature reviews in courses between their PSYC 205 and PSYC 305 experiences. However, this is highly unlikely; our lower-level electives do not have literature reviews as part of their curriculum, and students are advised to take PSYC 205 just before beginning Statistics and Research Methods. In addition, students do not take the senior seminar, which requires a literature review, until the end of their programme.

Maturation or shifts in thinking about research as a result of the Statistics and Research Methods sequence may have contributed to some of the observed changes. However, maturation cannot account for all of the effects. The between-subjects analysis comparing students at the same place in their programmes indicates that PSYC 305 students who had taken PSYC 205 first do significantly better on their literature reviews than PSYC 305 students who had not taken PSYC 205.

Although our results provide evidence both that the Writing for Research in Psychology course is doing its job, and that students are retaining what they learn, there is still room for improvement. We want students to evaluate and synthesize the research in their sources (Sternberg & Sternberg, 2010), but they are still developing the understanding necessary to evaluate the articles. In their uncertainty, they often rely on the authors' stated conclusions (Froese et al., 1998). This is not surprising; Kuhn (1989) observed that adults often have difficulty with supporting evidence and causal explanations. Nonetheless, critical reading and understanding is an area needing continued work.

In terms of Bloom's taxonomy, students appear to have knowledge and comprehension (Granello, 2001), but few have analysis or evaluation. As students mature they develop their ability to 'weigh and evaluate competing arguments or knowledge claims according to the rules of evidence or general principles of inquiry' (Wade, 1995, p. 25). And as they develop the ability for greater cognitive complexity, their ability to write cognitively advanced reviews – reviews that 'organize, integrate, and evaluate previously published material' (Granello, 2001, p. 293) – will grow as well.

### Limitations

The study had some methodological shortcomings. Not all subscale scores and papers were retained by all PSYC 205 instructors, reducing our possible sample size and the power of our statistical tests. One PSYC 305 instructor allowed literature reviews to be a shared assignment, although only one person from each partnership was randomly selected for inclusion in the dataset ( $n = 7$ ). When these PSYC 305 participants were removed from the analysis, however, the pattern of results held. In the future, copies of all PSYC 205 and PSYC 305 papers and completed rubrics should be retained, and all reviews should be individually submitted.

### Future Research

As university teachers, we plan to review the rubric used to ensure that it measures what we view as important. We also plan to discuss and norm our grading. A seminar to discuss the teaching of writing has been scheduled. Further galvanizing teachers' investment in undergraduate writing has been a welcome byproduct of this research.

We would like to continue to follow our students' progress with writing in the discipline. Because literature reviews are required in our final required course Senior Seminar, we could look for improvement there as well.

### Conclusion

Faculty are often frustrated with students' poor writing (Fallahi et al., 2006; Goddard, 2003; Granello, 2001; Poe, 1990), yet paradoxically we do not teach students the very writing skills we want them to have. A Writing for Research in Psychology course was developed to help students develop in the discipline generally and write literature reviews specifically. Our study showed that the literature review skills students acquired in this course carried over to a subsequent course.

Given that writing is approximately 30% of a typical professional's job (Faigley & Miller, 1982) and that 'writing is an important and frequently used skill across all major types of occupations and employers of college-trained people' (p. 564), part of becoming a professional in any field is learning how to write (Madigan, Johnson, & Linton, 1995). Like Fallahi et al. (2006), 'we believe that writing instruction by psychology professors is worth the time and effort to help undergraduate psychology students develop better writing skills' (p. 171). Our results suggest that we can teach transferable literature review skills, and we believe that given their importance, we should.

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## APPENDIX. Grading Criteria for Literature Reviews

Introduction and Thesis										
10	9	8	7	6	5	4	3	2	1	0
Engages audience's interest; provides needed context for audience, ends with a clear statement of writer's specific question/critique/response to literature under review. Clearly describes and explains the research question and shows its significance.			Explanation of issues may be too vague or too long; question/response/critique may be too general or poorly focused.				Paper begins without providing context for audience; audience needs assignment to figure out what writer is doing.			
Discussion										
10	9	8	7	6	5	4	3	2	1	0
Presents well-supported claims and research sub-questions by effectively summarizing and responding to specific ideas from the literature under review. Discussion reflects significance of research question.			Some good insights and summary; makes a claim but development of claim may have gaps or lack some support; engages articles from course but connections may be fuzzy; may have unsupported generalization.				Fails to summarize articles or fails to make a claim; no clear development and support.			
Structure and Organization										
10	9	8	7	6	5	4	3	2	1	0
Clear, well-organized prose; effective transitions; paragraphs have topic sentences related to thesis/claim; topic sentences supported by evidence; effectively uses quotations; reader doesn't get lost.			Reader occasionally gets lost because of unclear sentences or confusing organization; may rely overmuch on summary.				Reader often gets lost; prose is hard to follow and understand.			



Information Literacy										
10	9	8	7	6	5	4	3	2	1	0
Selects appropriate articles in relationship RELATION? to research question. Demonstrates awareness of the specific context of each piece of literature under review (journal, researchers' body of work, theoretical and methodological approach, etc.) by engaging each article specifically and appropriately within the discussion.			Selects appropriate articles to place in conversation with research question but does not engage their specific methodological or theoretical approaches specifically.				No clear awareness of the appropriateness or context of journal articles selected to place in conversation with research questions (seems to just be meeting quota of articles needed).			
Penalty for Errors in Spelling, Grammar, APA Conventions										
0	-1	-2	-4	-6	-8	-10	-15	-20		
Flawless paper or an occasional but minor error. Essay follows APA conventions.			Some distracting spelling, punctuation, or apostrophe errors, occasional grammar mistakes. Several APA errors (in citation, MS form, reference list, etc.)				Paper seriously marred by editing errors or grammatical mistakes. No clear and consistent adherence to APA conventions.			

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