Statistical Analysis of CoPAPIA’s
2009 MA Alumni Survey Results

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Prepared for: ANTH 630 - Quantification and Statistics in Applied Anthropology
University of Maryland, College Park, MD
2 June 2013
Acknowledgments

The author wishes to thank Dr. Sean S. Downey of the University of Maryland, Department of Anthropology for his guidance and support with this project.

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Quantification and Statistics in Applied Anthropology
Research Project

Introduction / Background

Using a data set compiled by the American Anthropological Association’s permanent Committee on Practicing, Applied and Public Interest Anthropology (CoPAPIA), of responses to a 2009 career survey of MS/MA Anthropology recipients, I initially intended to pursue several research questions relating to whether and how attributes such as age, prior educational experience at the graduate level, and family obligations (using family status and number of dependents as a proxy) may play a role in 1) an individual’s motivations for pursuing a graduate degree in Anthropology at the Masters degree level, and 2) the specific experiences and content areas that an individual may seek exposure to as a graduate student in the field of anthropology.

My general hypothesis was that a student’s motivation for pursuing a graduate degree and the specific elements of the graduate student experience that are of most relevance to a student’s goals, will vary by age, prior educational experience at the graduate level, and by virtue of family status and number of dependents.

However, upon receipt and review of the CoPAPIA data set, it became apparent that some of the data that I had intended to use was not relevant to testing my original hypotheses. For example, data on “family status” and “number of dependents” represent an individual’s family situation in 2009, at the time that they responded to the survey, not at the time that they undertook their MS/MA Anthropology degree. It is not possible to determine from the data set, what an individual’s family status or number of dependents were at the time they undertook the degree. So, this data has no relevance to the question of whether family status and dependent care play a role in an individual’s motivations for graduate studies. Furthermore, the data on respondents’ ages is categorical, and presented in wide age ranges. For example, respondents were allowed to choose “20–29 years”, “30-39 years”, etc., and the age range reflects an individual’s age in 2009, at the time of the survey not at the time that they undertook their degree. To determine an individual’s age at the time that they completed the MS Anthropology degree, it would be necessary to subtract the degree year from the age range, resulting in a large number of discrete age ranges (e.g., “21-31 years”; “22-32 years”, etc.).

As such, I modified my original research questions, upon receipt of the data set from the AAA. Although I still tested aspects of my original hypothesis, I have tested other hypotheses about the educational and career experience of MS/MA Anthropology recipients, as outlined in the “Approach” section of the paper.

Materials and Methods

The data set utilized in this project was created by CoPAPIA, which “was established to explore and engage the range of issues emerging as a result of the increasing number of anthropologists in and outside the academy doing practicing, applied and public interest work.”

The data that I utilized represents part of a larger data set resulting from an anonymous online career survey conducted between April and September 2009 by CoPAPIA of individuals “holding Masters

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degrees in anthropology from a North American institution, awarded anytime before 2008”. The purpose of the survey, according to AAA was:

“to better understand where MAs have gone in their careers; the ways in which alumni have benefited from the knowledge and skills they acquired in their Masters programs; and to gather suggestions, ideas, and feedback on how programs, national associations, and professional groups can best serve their needs. The AAA hopes to expand its utility and professional services to MAs and to provide information to anthropology departments on alignments between their curricula and their students’ future careers.”

The CoPAPIA data set covered “three primary topics... MA education, career trajectories, and professional associations. The survey asked 58 numbered questions, many of which had multiple parts, for a combined total of 125 questions. These were of various types and formats, including multiple choice/multiple selection, checklist, Likert-scale, brief response, and open ended.” It is important to note that CoPAPIA has acknowledged that this was a non-random survey, in that “the survey was distributed widely through list serves, alumni lists and groups, websites, relevant organizations, and individuals. Respondents were valuable in forwarding the survey information on to colleagues and other alumni.”

The data set utilized in my research is a subset of the survey data described above, and includes demographic data for individual respondents, as well as responses to survey Questions 1 and 6, which primarily relate to respondents’ education. The data set was provided in the form of an Excel spreadsheet, with rows representing individual respondents, and columns representing specific questions. The data set includes quantitative and categorical data for 883 individuals. The specific survey questions that I obtained response data for, as well as a summary of the variables, scale of measurement and data types may be found in Appendix A.

**Approach**

As indicated in the Introduction, I modified my original research questions, after receiving the data set from AAA. Furthermore, prior to performing any statistical tests, I made the following modifications to the original dataset, in Excel, before importing the data into “R”:

- I removed individuals who did not report the year that they received their MS/MA Anthropology.
- I created a new variable “Years since MA” by subtracting “Year you obtained MS/MA Anthropology” from 2009 (the year of the survey).
- I created a new “yes/no” variable “Earned another graduate degree prior to MS/MA Anthropology?”

All analyses involved exploration of a relationship between two categorical variables. As such, my procedure for analysis consisted of the following steps:

1. Produce a two-way table of the relationship between categorical variables. (See Appendices B – F, for details). In each analysis, “no response” data, or responses of “N/A” or “Don’t know” were omitted from the analysis.

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3Ibid.

4Ibid.
2. Plot results on a 100% stacked column graph (See Appendices B – F, for details).
3. Ensure that the expected cell counts for the two-way table meets requirements for a chi-square test, by running a table of expected counts in “R Commander”. (In all cases, expected counts met the requirements for a chi-square test).
5. Determine whether results are significant at p <0.05.

Question #1:
- \(H_0\) = There is no correlation between age range and whether respondents planned or still plan to pursue a doctoral degree.
- \(H_1\) = Age range is likely to be negatively correlated with an individual’s plan to pursue a doctoral degree; older individuals are less likely to have plans to pursue a doctoral degree.

The problem is to determine whether individuals are less likely to plan to pursue a doctorate degree (after earning an MS/MA Anthropology), as they increase in age. My prediction is that the p-value resulting from a chi-square analysis will indicate that the relationship between these variables is significant, as evidenced by a p-value < 0.05, and that interpretation of the graphed conditional distribution of the two variables in a 100% stacked column graph will support an interpretation that as individuals age, and take on more work and life responsibility, they are less likely to plan to pursue a doctorate degree.

Question #2:
- \(H_0\) = There is no correlation between number of years elapsed since earning an MS/MA Anthropology, and a responder’s salary range.
- \(H_1\) = Number of years elapsed since earning an MS/MA Anthropology, will be positively correlated with a responder’s salary range.

The problem is to determine whether individuals who have earned an MS/MA Anthropology will earn a higher salary as more time elapses since the year that they earned an MS/MA Anthropology. My prediction is that the p-value resulting from a chi-square analysis will indicate that the relationship between these variables is significant, as evidenced by a p-value < 0.05, and that interpretation of the graphed conditional distribution of the two variables in a 100% stacked column graph will support an interpretation that over time, individuals who have received an MS/MA Anthropology will increase their salary.

Question #3:
- \(H_0\) = Earning another graduate degree, prior to earning an MS/MA Anthropology, will not be correlated with how a responder ranks the importance of ‘job seeking skills’ in an MS/MA Anthropology curricula.
- \(H_1\) = Earning another graduate degree, prior to earning an MS/MA Anthropology, will be negatively correlated with how a responder ranks the importance of ‘job seeking skills’ in an MS/MA Anthropology curricula, because individuals with another degree are less likely to need job seeking guidance.
The problem is to determine whether individuals who have earned another graduate degree prior to earning an MS/MA Anthropology are less likely to value the importance of learning “job seeking skills” in an MS/MA Anthropology curricula. My prediction is that the p-value resulting from a chi-square analysis will indicate that the relationship between these variables is significant, as evidenced by a p-value < 0.05, and that interpretation of the graphed conditional distribution of the two variables in a 100% stacked column graph will support an interpretation that individuals who have earned another graduate degree prior to earning an MS/MA Anthropology are less likely to value the importance of learning “job seeking skills” in an MS/MA Anthropology curricula because they are more likely to have had job seeking skills (between earning degrees), or because they may have had “job seeking skills” training in their prior graduate program.

Question #4

- H₀ = There is no correlation between whether a responder earned another graduate degree prior to earning an MS/MA Anthropology, and a responder’s salary range.
- H₁ = Earning another graduate degree prior to earning an MS/MA Anthropology, will be positively correlated with a responder’s salary range.

The problem is to determine whether individuals who have earned another graduate degree (in addition to, and prior to the MS/MA Anthropology) are likely to earn more, given their broader educational experience. My prediction is that the p-value resulting from a chi-square analysis will indicate that the relationship between these variables is significant, as evidenced by a p-value < 0.05, and that interpretation of the graphed conditional distribution of the two variables in a 100% stacked column graph will support the interpretation that individuals who have earned another graduate degree prior to earning an MS/MA Anthropology will earn more than an MS/MA Anthropology who has not earned a prior graduate degree.

Question #5

- H₀ = There is no relationship between the percentage of MS/MA Anthropology recipients who are female, and age group of Masters degree recipients.
- H₁ = The percentage of Masters degree recipients who are female, is likely to be inversely related to increase in age group, because, in US universities generally, the percentage of advanced degree recipients who are female has increased over time in many graduate programs.\(^5\)

The problem is to determine whether with the progress of time, females represent a greater percentage of MS/MA Anthropology recipients in a given year, as has been the case with many graduate degree programs generally, in the United States. My prediction is that the p-value resulting from a chi-square analysis will indicate that the relationship between these variables is significant, as evidenced by a p-value < 0.05, and that interpretation of the graphed conditional distribution of the two variables in a 100% stacked column graph will support the hypothesis that with the progress of time, females represent a greater percentage of MS/MA Anthropology recipients, in a given year.

Results

- **Question #1**: A chi-square test of independence was performed to examine the relationship

\(^5\) Institute of Education Statistics Digest of Education Sciences: 2011 (Ch. 3)
between age range and whether individuals planned or still plan to pursue a doctoral degree. The relationship between these variables was significant (at p< 0.05), X² (16, N=740)=66.57, p = 3.954e-8.

- **Question #2**: A chi-square test of independence was performed to examine the relationship between the number of years elapsed since earning an MS/MA degree in Anthropology, and salary range. The relationship between these variables was significant (at p <0.05), X² (24, N = 798) = 165.27, p = 2.2e16.

- **Question #3**: A chi-square test of independence was performed to examine the relationship between earning another graduate degree, prior to earning an MS/MA Anthropology, and how a responder ranks the importance of ‘job seeking skills’ in an MS/MA Anthropology curricula. The relationship between these variables was not significant (at p<0.05), X² (2, N=780)=0.58, p=0.75.

- **Question #4**: A chi-square test of independence was performed to examine the relationship between whether a respondent earned another graduate degree prior to earning an MS/MA degree in Anthropology, and salary range. The relationship between these variables was not significant (at p<0.05), X² (4, N=786)=2.26, p = 0.69.

- **Question #5**: A chi-square test of independence was performed to examine the relationship between sex and age range of MS/MA Anthropology recipients. The relationship between these variables was significant (at p < 0.05), X² (4,N=813)=19.89, p=5.254e4.

**Interpretation**

- **Question #1**: The null hypothesis is rejected, as the chi-square result and p-value provide evidence of an inverse relationship between the percentage of individuals who intend to pursue a doctoral degree and increasing age; older individuals are less likely to have plans to pursue a doctoral degree. The results are supported by the graph of the conditional distribution (Figure 1).

- **Question #2**: The null hypothesis is rejected, as the chi-square result and p-value provide evidence that the number of years elapsed since earning an MS/MA Anthropology is positively correlated with an increase in salary range. The results are supported by the graph of the conditional distribution (Figure 2).

- **Question #3**: The null hypothesis cannot be rejected, as the chi-square result and p-value do not provide sufficient evidence that earning a graduate degree prior to earning an MS/MA Anthropology is correlated with how respondents ranked the importance of ‘job seeking skills’ in the MS/MA Anthropology curricula. The outcome is potentially explained by the possibility that many respondents did not work between earning their graduate degrees, and therefore, they may have felt that learning job-seeking skills was still an important part of their MS/MA Anthropology experience. Or, they may not have had sufficient job seeking skills training in other graduate programs completed prior to the MS/MA Anthropology. Further analysis would be required to test this hypothesis, and the dataset does not lend itself easily to undertaking this more detailed analysis.

- **Question #4**: The null hypothesis cannot be rejected as the chi-square result and p-value do not provide sufficient evidence that there is a relationship between earning another graduate degree prior to the MS/MA Anthropology, and salary range at the time of the survey.
• **Question #5:** The null hypothesis is rejected, as the chi-square result and p-value provide evidence that the percentage of Masters degree recipients who are female is inversely related to an increase in age group. The results are supported by the graph of the conditional distribution (Figure 5).

**Conclusion**

The chi-square analyses provided evidence in support of the predicted outcome to three of the five research questions. In two cases, the null hypothesis failed to be rejected. It is important to recall that the CoPAPIA data set was not a simple random sample, as required for chi-square analyses. For purposes of the analysis, the data is the best available, and is assumed to be reasonably representative of that which would have been collected in a true simple random sample.
References


Appendix A
Summary of Data Set

I utilized the following demographic data from the original CoPAPIA data set:

**Demographic Data**

- Year of anthropology Masters degree receipt
- Age range
- Sex
- Educational profile, both before and after Masters degree (includes up to five degrees, years of completion, and specializations)
- Additional degrees or certificates
- Current annual salary range

The original data set included responses to the following questions:

**Section I. Education Questions**

**Question 1** What were your reasons for pursuing an MS/MA anthropology? To answer, please select your level of agreement with each of the following statements:

- Strongly Agree
- Somewhat Agree
- Neutral
- Somewhat Disagree
- Strongly Disagree
- N/A

(i) Planned or still plan to pursue a doctoral degree

**Questions 4-6.** Anthropology MA programs provide broad educational and training opportunities, and many additional skills are learned both inside and outside of programs. In order to provide feedback for MA programs, please rank the importance of the following knowledge areas and skills for inclusion in anthropology MA curricula, based on your experience.

<table>
<thead>
<tr>
<th>Knowledge/skills area</th>
<th>More Important</th>
<th>Average Importance</th>
<th>Less Important</th>
<th>N/A, Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Job-seeking skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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7 Ibid.
A summary of the data that I relied upon from the data set, in my analyses is as follows:

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale of Measurement</th>
<th>Data type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range</td>
<td>Ordinal</td>
<td>Categorical</td>
<td></td>
</tr>
<tr>
<td>Years since receiving MS/MA Anthropology*</td>
<td>Interval</td>
<td>Quantitative</td>
<td>*Computed by subtracting “Year of MS/MA Anthropology” from 2009 (the year of the survey)</td>
</tr>
<tr>
<td>Year of degree</td>
<td>Interval</td>
<td>Quantitative</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Nominal</td>
<td>Categorical</td>
<td></td>
</tr>
<tr>
<td># Degrees</td>
<td>Interval</td>
<td>Quantitative</td>
<td></td>
</tr>
<tr>
<td># Degrees prior to MS</td>
<td>Interval*</td>
<td>Quantitative</td>
<td>*Computed as a new variable from the data, by comparing year of MS Anthropology with year of other degrees earned, to determine how many degrees were earned prior to the MS Anthropology.</td>
</tr>
<tr>
<td>Salary range</td>
<td>Ordinal</td>
<td>Categorical</td>
<td></td>
</tr>
<tr>
<td>Planned or still plan to pursue a doctoral degree?</td>
<td>Ordinal</td>
<td>Categorical</td>
<td></td>
</tr>
<tr>
<td>Importance of job seeking skills in MA curricula?</td>
<td>Ordinal</td>
<td>Categorical</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B
Two way table and graph of results of analysis of Question 1

Table 2 - Two-way table of individual responses:

<table>
<thead>
<tr>
<th>Planned or still plan to pursue a doctoral degree</th>
<th>Age range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 to 29</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>58</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>28</td>
</tr>
<tr>
<td>Neutral</td>
<td>17</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>6</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>13</td>
</tr>
</tbody>
</table>

Figure 1 - Graph of conditional distribution:
Appendix C
Two way table and graph of results of analysis of Question 2

Table 3 - Two-way Table of individual responses:

<table>
<thead>
<tr>
<th>Salary Range</th>
<th>1 to 4</th>
<th>5 to 9</th>
<th>10 to 19</th>
<th>20 to 29</th>
<th>30 to 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$20,000</td>
<td>70</td>
<td>39</td>
<td>12</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>$20,000 - 34,999</td>
<td>55</td>
<td>25</td>
<td>17</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>$35,000 - 49,999</td>
<td>52</td>
<td>60</td>
<td>46</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>$50,000 - 74,999</td>
<td>37</td>
<td>54</td>
<td>69</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>$75,000 - 99,999</td>
<td>12</td>
<td>29</td>
<td>27</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>$100,000 - 149,999</td>
<td>5</td>
<td>5</td>
<td>14</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>$150,000+</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 2 - Graph of conditional distribution:
Appendix D

Two way table and graph of results of analysis of Question 3

Table 4 - Two-way table of individual responses:

<table>
<thead>
<tr>
<th>Ranking of the importance of “job seeking skills” in MS/MAs Anthropology curricula</th>
<th>Earned another graduate degree, prior to earning an MS/MA Anthropology?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Less Important</td>
<td>80</td>
</tr>
<tr>
<td>Average Importance</td>
<td>307</td>
</tr>
<tr>
<td>More Important</td>
<td>361</td>
</tr>
</tbody>
</table>

Figure 3 - Graph of conditional distribution:
Appendix E

Two way table and graph of results of analysis of Question 4

Table 5 - Two-way table of individual responses:

<table>
<thead>
<tr>
<th>Salary Range</th>
<th>Earned another graduate degree prior to MS/MAs Anthropology?</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$20,000</td>
<td></td>
<td>117</td>
<td>8</td>
</tr>
<tr>
<td>$20 - 34,999</td>
<td></td>
<td>101</td>
<td>3</td>
</tr>
<tr>
<td>$35 - 49,999</td>
<td></td>
<td>178</td>
<td>7</td>
</tr>
<tr>
<td>$50 - 74,999</td>
<td></td>
<td>203</td>
<td>8</td>
</tr>
<tr>
<td>$75,000+</td>
<td></td>
<td>153</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 4 - Graph of conditional distribution:
Appendix F
Two way table and graph of results of analysis of Question 5

Table 6 - Two-way table of individual responses:

<table>
<thead>
<tr>
<th>Age Range</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>101</td>
<td>212</td>
<td>95</td>
<td>101</td>
<td>40</td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>102</td>
<td>51</td>
<td>47</td>
<td>39</td>
</tr>
</tbody>
</table>

Figure 5 - Graph of conditional distribution: