

## Memo writing document

### First: what are memos?

On some of your 603 assignments and exams you will be asked to write a 1-page memorandum in response to a hypothetical situation. For example, a possible memo question could take the following form:

The governor of Alabama is worried about increases to violent crimes in intercity areas. He wonders about both the causes of such crimes and possible ways to reduce them. You have been given a dataset detailing the past eight years of Alabama's violent crime rates, police per capita, and other pertinent variables. You should analyze this data and reply to the governor directly, outlining what you believe to be the most prominent causes of the increased crime rate and what you might suggest as possible solutions.

Though you will obviously not be sending your memo directly to the governor of Alabama, you should approach each memo as if you were actually going to send it to the mentioned client. Memos will take the form of a 1-page letter (with the appropriate appendices) which I will describe in greater depth in this document. But before that, rationale...

### Second: why memos?

In 603 you will learn and acquire extremely practical skills: quantitative reasoning, data collection, statistical analysis, etc. These skills will certainly make you more marketable to potential employers, but a large percentage of success in the application of these skills lies in the ability to interpret and explain them to people unfamiliar with complex statistical methods. All of your future employers will ask you questions, but few of them will know (or remember) the quantitative methods used to arrive at statistically sound solutions. For this reason, we want to help you develop both these skills and the ability to summarize and explain them to others. The memos are a wonderful opportunity for you to cater your analyses to diverse audiences; politicians, judges, superheroes, your grandma—you will have the pleasure of translating the exciting principles of this class to these kinds of people and recommending to them your statistically savvy ideas, policies, solutions, and strategies.

### Third: how to write memos.

For the reasons mentioned above, the first principle of memos is *simplicity*—we will expect you to write each one to an audience that knows little (if anything) about statistics. You therefore should not use statistical jargon or complex formulas to explain your methods and recommendations. That being said, it is still important that you include the appropriate and relevant information—memos should take on the following form:

#### I. Introduction

- a. The intro is where you greet your client and briefly discuss the purpose of your memo (i.e. review the original question(s) your client asked). You should also state what materials (i.e. data) you were given to assess the client's question(s). I also recommend that you include a one-or-two-sentence summary of your overall result(s)—kind of like an abstract.

## II. Methods

- a. This is where you talk about what methods and tests you used to analyze the client's question(s). Remember, *no jargon*—this section should include a simple (short) explanation of your statistical procedures and why your methods were the most appropriate given the client's question(s) and the (hypothetical) situation.

## III. Findings

- a. Here you should summarize your results. It is *very* important that in this section you include the numbers you found and *what they mean in the real world*. That is, you should definitely tell the client that the mean you found is about 14 and the standard deviation is about 1.5, but you should also interpret that number by saying something like, "...this indicates that most residents of the Alabama have completed between 12.5 and 15.5 years of education with 14 years being the state average." This will make your memo much more intuitive and help you to keep things simple.
- b. You may have taken several different approaches to the client's question(s) during your analysis and that is excellent. However, you should not feel obligated to explain (in the "Methods" section or in this one) *all* the tests you used and *all* the results you received. You should explain the results that you consider to be the most accurate and, therefore, the most pertinent to the client's request. All your other tests and results should go in an appendix.

## IV. Recommendations/ predictions

- a. This section and the "Findings" section are definitely the most important and should constitute the bulk of your memo. This section is where, based on your methods and results, you directly answer the client's inquiries and make your recommendations. Do not be afraid to use your statistics to back your opinion—that is precisely the point of the entire memo. It is also helpful to make some predictions based on your results. That is, do not just say why you think your client should take a certain action, but tell them what you predict would happen (statistically) if they did (i.e. if the governor of Alabama actually did increase the number of policemen by  $x$  amount, what would happen to the state based on your data and tests?)

## V. Limitations/ conclusion

- a. Here is where you wrap things up. Make sure you talk about the limitations to your analysis. That is, if your client wanted to do some additional tests, tell them what they would need or could use to get better, more accurate results.

## VI. Appendix

- a. This is where you put *everything else*—all the components and processes that got you to your final results and recommendations. You can reference the appendix in your memo, but do not depend on it—your client should be able to know everything he or she wants to know without ever looking at it. Also, do yourself a favor: *do not* write the appendix after you have finished your memo—it is much more helpful to treat it like a log or a field journal. A good strategy would be to start and develop each memo problem by recording your tests and thoughts in sequential order—tracking your thought process—and including the relevant tables and graphs to document how you arrive at your final results. This document

then becomes your appendix and will make it infinitely easier to write your 1-page memo, which summarizes your entire analysis.

All of this being said, it is helpful for me to think of the memo in my own mind as follows:

I. Introduction	This is what you wanted; this is what you gave me
II. Methods	This is how I did it; this is why I did it that way
III. Findings	This is how it is; this is what that means
IV. Recommendations/ predictions	This is what you should do; this is what will happen
V. Limitations/ conclusion	This is how you could get better results
VI. Appendix	Here are tables, graphs, and everything else I did

I have included a sample memo (with appendix) for you to get the idea. Remember, if you have questions or concerns, run your ideas past your classmates; compare results; argue about appropriate methods; defend your predictions; understand different ways of approaching questions; all of these things will help you both in this class and the real world. And, of course, the TAs and the professor are always here to help.

[Memo Sample]

Communist Party HQ  
23948 Le Boulevard

Most Esteemed Hu Jintao,

To determine why citizens are or are not members of your Communist Party, I was provided with data which described the gender, education level, and parents' education level of about 1,000 respondents. The respondents were from six different cities in China: Beijing, Tianjing, Nanjing, Xian, Changchun, and Wuhan. I found that some of the factors in the data were significant in predicting which citizens would be the most-likely supporters of your party, but I will also describe some limitations of my analysis and suggest improvements that can be made in order to make your recruitment initiatives more effective.

To find which factors were important in predicting membership to your party, I used a statistical test called a "logit" which tests the odds at which certain things occur. Using this test, I compared the different cities to each other and also split up the citizens into two groups: more educated and less educated. By doing this, I was able to pinpoint the cities and citizen groups that would potentially be the most supportive of your party.

My principal finding was that more educated individuals (individuals with 11 years or more of schooling)—in any city—are more likely to be members of your party. For example, in Beijing, more educated individuals were about 22% likely (between 15 and 28% on average) to be members. Wuhan's citizens were also high in likelihood; they were about 20% likely to be members with an average between 12 and 27%. However, in all the other cities of my analysis, the odds of being a party member, even if a person was more educated, were much less. For example, in Nanjing the odds decreased by about 88% (to a probability of about 3%) compared to Beijing and in Tianjing they decreased by about 93% (probability of about 2%). The odds were also much lower for less educated individuals; even within Beijing itself, as education decreased to below 11 years, the odds of being a party member decreased by about 62% (probability of about 9%).

To explain why party membership was so low, even among the more educated, I looked to the factor of parents' education. Jointly, the education of the parents had a significantly negative effect on party membership (the mother's education also having significance by itself): a citizen whose parent's had about 12 years of education was only about .1% (1 out of 1,000) likely to be a member of your party as opposed to a respondent whose parents had no education (about .5% likely). This, along with the above results, suggests that more educated, rural-to-urban migrants living in Beijing (odds of being a party member of about 10:3) or Wuhan (about 10:2) would be the most effective groups to target for recruiting. Changchun (about 10:1) and Xian (100:8) would be less effective and Nanjing (100:3) and Tianjing (100:2) would be the least effective.

However, it is important to realize the limits of this analysis. The PRE value, which assesses how well these factors predict the likelihood of party membership, actually approaches zero. This means that other geographic and demographic factors such as province locations, city populations, rural vs. urban population percentages, average income per capita, and age of respondents are needed to explain more of why party membership is high or low in certain areas. For this reason, I would suggest that further analyses be done before forming extensive recruitment plans.

## APPENDIX

To see the general effects of the variables given on the dependent variables, I ran the following regressions.

Dependent variable: *Communist Party membership*

	(1) – Linear Model	(2) – Logit	(3) – Odds Ratios
Beijing resident	.0176 (.0372)	.1848 (.2832)	1.1417 (.33)
Tianjing resident	-.1295** (.0266)	-2.5029** (.6286)	.0819** (.0509)
Nanjing resident	-.1283** (.0294)	-1.9954** (.5616)	.1314** (.073)
Xian resident	-.1009** (.034)	-1.2838** (.4767)	.31** (.1398)
Changchun resident	-.0835* (.0347)	-.9682* (.4244)	.3791* (.1572)
Father's education	.0029 (.0031)	.0362 (.0399)	—
Mother's education	-.0078* (.0031)	-.1207** (.0437)	—
Years of education	.0179** (.0038)	.3692** (.0946)	—
Gender (female = 1, male = 0)	.0066 (.017)	.0337 (.2408)	—
High education ( $\geq 11$ yrs. = 1, $< 11$ yrs. = 0)	—	—	2.6503** (.7657)
Constant	-.0167 (.0314)	-5.3985** (.9728)	—
<b><i>F-tests and statistics</i></b>			
Mother and Father's education	4.41* (.0124)	—	—
<b><i>Summary Statistics</i></b>			
R <sup>2</sup> / adjusted R <sup>2</sup>	.0781/ .0699	—	—
Pseudo-R <sup>2</sup>	—	.1574	.1219
Number of obs. (n)	1018	1018	1018

*Notes:* Baseline category is Wuhan residents. Heteroskedastic-robust standard errors are given in parentheses under the coefficients and heteroskedastic-robust p-values are given under the F-statistics. Statistical significance is reported at the \*5% and \*\*1% significance levels.

So, from first glance, it looks like education and region are the most significant variables. Gender is highly insignificant and being a Beijing resident is also. Mother's education is significant and including the father's education in an f-test is also significant. This could have theoretical significance because I would expect parents to have more tolerance for the Communist Party and be bigger supporters. However, the fit does not even reach .1 which suggests high levels of omitted variables biases.

I think I will create a binary variable for education level and use it to see how citizens are distributed across the regions. Since gender was not significant in my logit regression and since mother and father's education were not very significant (at least theoretically), I decided to look at the odds and probabilities between the higher and lower educated people between regions. Then, I will look at the odds ratios using highly educated Beijing residents as the baseline.

	B-Hi	B-Lo	T-Hi	T-Lo	N-Hi	N-Lo	X-Hi	X-Lo	C-Hi	C-Lo	W-Hi	W-Lo
Prob.	.2175	.0949	.0195	.0075	.031	.0119	.0702	.0277	.0845	.0336	.1958	.0841
Odds	.278	.1049	.0199	.0076	.032	.012	.0755	.0285	.0923	.0348	.2435	.0918
OR	NA	.3773	.0716	.0273	.1151	.0432	.2716	.1025	.332	.1252	.8759	.3302

B = Beijing, T = Tianjing, N = Nanjing, X = Xian, C = Changchun, W = Wuhan, Hi = Education of 11 years or more, Lo = Education less than 11 years.

Based on my logit regression and these probabilities, odds, and odds ratios, highly educated individuals in Beijing are the most likely to be members of the Communist Party. Also, highly educated individuals in general are more likely to be members of the party and the best areas to focus campaigning would probably be Beijing, Wuhan, Changchun, and Xian. There was little difference between men and women and parent's education bares little substantive significance. However, the parental variable does suggest that citizens coming from uneducated families are more likely to support the regime so I would suggest that rural-to-urban migrants might also be an effective target group.

There are many improvements that could be made to this analysis. I think the largest improvement would be the inclusion of more independent variables, especially since the PRE score approaches zero. The regions of China are distinct and have different relationships to the central government so more geographic and demographic data would be helpful (i.e. provinces, population, rural vs. urban, income average per capita, and age of respondents).