

**Case 5 – Cheating**  
**Statistics 8801**  
**Spring Semester 2009**  
to be discussed February 27

Charges were brought against a student in a professional school for cheating. The charges alleged that Candidate X exhibited irregular behavior indicative of copying answers from another examinee during a standardized examination. According to the exam proctor, X had engaged in unusual and suspicious behavior during the examination. On multiple occasions during the exam, X would lift his/her examination booklet in front of his/her face and was observed to be looking at another student's test paper.

The school and the student have taken this matter to court, and each of your groups has been hired by a different party in this dispute to provide statistical expertise to help that group prepare for the trial. The first group is hired by the court itself, the second group by the school, and the third group by the student. The school's goal is to show that X cheated and the student's goal is to defend himself or herself from this allegation. The court's goal is to decide the case fairly.

The exam is multiple choice and it is known how X answered all questions, how all other candidates both at this school and elsewhere answered the questions, and what the correct answers are. The testing company has used this information to perform an "agreement analysis". You each receive the analysis performed by the testing company (found online), with the following cover letter.

Dear Dr. Y:

To investigate possible cheating by student X, an "agreement analysis" has been performed as described in the enclosed document on one pair of examinees who took the exam at your school on the date in question. Agreement analysis is a statistical tool that can provide helpful supporting information for the investigation of observed behaviors that may compromise the validity of examinees' test scores. The agreement analysis compares the degree of agreement that is observed between the wrong answers of two examinees with the degree of agreement that would be expected to occur between two randomly chosen examinees taking the same test independently. Agreement analysis uses only those test items that both examinees in the pair answered incorrectly.

Caution is advised when interpreting the results of these analyses, since there is always some probability that the observed agreement did occur by chance. You should not use the results of the statistical analyses alone for making a decision about suspected irregularity, but should also consider as a major factor in any decision the observations made by the proctor(s) and/or any other relevant, non-statistical information.

The presenter for each group should present as if the audience was the group that hired them, assuming that the audience is intelligent, though not necessarily mathematically sophisticated. Again, the first group is hired by the court itself, the second group by the school, and the third group by the student.

Your job is to help the group that hired you prepare for the trial. Describe briefly the situation and the analysis done by the testing company. Is this analysis appropriate? What evidence does it provide for or against the student? Are there issues or problems with this analysis that your group should be aware of? Are there other analyses that might provide additional statistical evidence for or against X having cheated on these exams, or other issues should your client bring up or be ready to respond to?

Name	email
Sally Gustafson	gusta582
Chen Xing	xingx011
Ji Hoon Ryoo	ryoox001
Shengjie Zheng	zheng077

Name	email
Aysel Yilmaz	yilma005
Julia Molony	molo0018
Qihui Chen	chen1006
Jinghan Meng	mengx035

Name	email
Fanhuan Zhou	zhoux086
Luke Chmura	chmur002
Michael Soma	soma0038
Tianyang Zhou	zhoux228