

## **Academic Honesty and Online Courses\***

Therese C. Grijalva  
Assistant Professor

Department of Economics, Weber State University, Ogden, UT 84408-3807

Joe Kerkvliet  
Professor

Department of Economics, Oregon State University, Covallis, OR 97331-3612

Clifford Nowell  
Professor

Department of Economics, Weber State University, Ogden, UT 84408-3807

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\*Direct correspondence to T. Grijalva, 3807 University Circle, Department of Economics, Weber State University, Ogden, UT 84408-3807; Tel: (801) 626-7567; Email: [tgrijalva@weber.edu](mailto:tgrijalva@weber.edu).

**Title: Academic Honesty and Online Courses**

**Abstract:** Academic dishonesty is an issue of concern for teachers, students, and institutions of higher education. It is often perceived that because students and faculty do not interact directly in web-based classes, cheating will be more abundant than that which would be observed in a traditional classroom setting. In this paper we provide initial evidence of the magnitude of cheating in online courses. To estimate cheating in a single online class, we merge data from a student randomized response survey on cheating behavior with class-specific information provided by faculty. For our sample of students in a large public university, we find evidence that academic dishonesty in a single online class is no more pervasive than in traditional classrooms. We attribute this finding to the way online courses are designed, which may reduce the need for cheating, and that panic cheating, a typical form of cheating found in traditional classes, is less likely to occur in online classes.

**Keywords:** Academic honesty, Cheating, Online classes, Randomized-response method.

## **I. Introduction**

Academic dishonesty is an issue of concern for teachers, students, and institutions of higher education. Studies consistently show that a significant number of students cheat in college (Michaels and Miethe 1989; Whitley, 1998; Brown and Emmett, 2001), and that cheating is pervasive across diverse cultures (Magnus et al., 2002). Academic research on both the extent of cheating and possible motivations behind student cheating help illuminate practitioners on the degree of cheating in different disciplines and by students of different demographic profiles. Unfortunately, most academic research on cheating has been descriptive in nature rather than prescriptive. That is, most studies of student cheating measure the extent of cheating, and only a few suggest what types of teaching pedagogies and policies are effective in reducing cheating.

In this paper we focus on academic dishonesty in a booming area of instruction: online courses. Specifically, to make comparisons with prior studies, we explore online academic dishonesty which includes cheating on exams or assignments, including plagiarism. Currently, statistical evidence on academic dishonesty in online courses is nonexistent, but some claim that because students and faculty do not interact directly in such classes, online classes will invite more cheating than traditional classes. For example, Kennedy et al. (2000:311) state, "Because both students and faculty believe it is easier to cheat in a distance learning class, ... as the number of distance learning classes increases so will academic dishonesty." Conversely, Smith et al. (2003:2) claim that enhanced communication and the breaking down of social barriers leads to less cheating, stating, "This emergence of online identity may make the whole worry of online cheating a moot point. Often stronger one-to-one relationships (instructor-student and student-student) are formed in online courses than in face-to-face classes." In this paper we present the first empirical evidence on academic honesty in online courses.

During the 2002 spring term at a public university, we asked faculty and students to complete a questionnaire about their fall semester 2001 online course experiences. Because students may believe that truthful answers to questions on their own cheating behavior may have undesirable consequences, we used a randomized response (RR) survey method to assure respondents that their answers would be unidentifiable. Kerkvliet (1994), Kerkvliet and Sigmund (1999), Scheers and Dayton (1987), and Nelson and Schaefer (1986) used RR methods to explore overall cheating (i.e., exams, homework assignments, and plagiarism), and our use of RR in this paper facilitates comparison with their results.

To investigate the efficacy of class and testing policies in deterring cheating, we merge information on class policies with students' responses. The results suggest that academic dishonesty in a single online class is no more likely than in a traditional classroom. We attribute this finding to the way online courses are designed, which may reduce the need for cheating, and that panic cheating, a typical form of cheating found in traditional classes, is less likely to occur online.

The next section presents a brief literature review, focusing on current understanding of cheating and suggests why cheating in online class settings is likely to differ from a traditional classroom cheating. Section III presents the statistical procedure used to estimate cheating. Section IV presents our data. Section V contains a discussion of the results, and Section VI presents concluding remarks.

## **II. A Model of Cheating.**

Much of the literature on academic dishonesty posits that the decision to cheat is based on a rational comparison of the benefits and costs of cheating. The benefits of successful cheating stem from the possibility that cheating results in higher grades, yielding prestige and

possible post-graduation rewards. The costs are more complex, but are positively related to the likelihood of being caught and the severity of punishment. Further, costs and benefits are filtered through perceived social norms regarding academic dishonesty (Michaels and Miethe, 1989; Ajzen, 1991; McCabe, Trevino, and Butterfield, 2002). As suggested by social learning theory (e.g. see, Michaels and Miethe, 1989) perceived support from peers or pro-attitudes about cheating would act to facilitate cheating. For instance, based on a survey of U.S. and Polish students, Lupton, Chapman, and Weiss (2000) find large differences in students' perceptions of cheating. U.S. students believe that cheating on an exam is more serious than do Polish students. Not surprisingly, the percentage of students cheating on exams was much higher for Polish students compared to U.S. students (61% versus 24%) (see also Magnus et al., 2002). In addition, McCabe, Trevino, and Butterfield (2002) show that academic dishonesty is related to the "cheating culture" that develops on campuses.

Most researchers view the decision to cheat as the result of a cognitive process which involves substantial planning (Bunn, Caudill, and Gropper, 1992; Alschuler and Blimling, 1995; Mixon, 1996), but survey evidence suggests that students break down actual cheating behavior into two categories: planned cheating and panic cheating (Bunn, Caudill, and Gropper, 1992). Although both types of cheating involve weighing costs and benefits, if social norms differ for planned and panic cheating, the subjective costs and benefits, filtered through the social environment, may be different for planned and panic cheating. Planned cheating may involve making crib sheets for tests, copying homework, or plagiarizing a paper; it occurs with full knowledge that it is wrong. Panic cheating, on the other hand, occurs during a test when the student finds herself at a loss for an answer. Although she did not plan to cheat, she looks at another student's paper and copies the answer. Being premeditated, planned cheating may be

viewed as more dishonest than panic cheating, and, as such, perceived as having a greater social cost. It may also be the case that panic cheating is less likely to be detected and more difficult to punish (there is just no way to prove with certainty that cheating occurred). Thus, because costs are lower, panic cheating may be more prevalent. Bunn, Caudill and Gropper (1992) report that the majority of students believe the most common type of cheating is panic cheating with 358 of 476 students at Auburn University stating that they primarily observe panic cheating.

Some type of pedagogies may be more susceptible to one type of cheating. In online classes, planned cheating may be a much greater threat than panic cheating simply because circumstances engendering or facilitating panic cheating may be relatively rare compared to a traditional classroom. In online classes, students are likely to be dispersed across broad geographic regions, and even if students are from the same local area they may never meet. Thus the circumstances leading to panic cheating, particularly during testing, are more limited for online students.

The only evidence that we are aware of regarding online cheating is a study conducted by Kennedy et al. (2000) who explore student and faculty views on cheating, but not actual behavior. Both students and faculty indicated that it would be easier to cheat in web-based distance learning classes. The authors conclude that as distance learning and web based courses proliferate, so will academic dishonesty.

### **III. Survey Methods and Econometric Model**

Collecting data on cheating behavior is fraught with difficulties, primarily due to the sensitive nature of cheating questions and perceived consequences of answering such questions affirmatively. These concerns were especially true in a study asking students to reveal information about their cheating behavior in a specific class. Researchers have tried to minimize

the discomfort created in sensitive questionnaires (e.g., drug use) by using a randomized response (RR) survey method that protects a subject's anonymity. The RR method has been commonly used to draw inferences regarding academic dishonesty (Kerkvliet, 1994; Kerkvliet and Sigmund, 1999; Scheers and Dayton, 1987; Nelson and Shaefer, 1986). Most evidence suggests that RR surveys yield more accurate information than direct questionnaires (Kerkvliet and Sigmund, 1999; Sheers and Dayton, 1987).

In a RR question, subjects are directed with a known probability to answer either a cheating or an unrelated question with a "yes or no" response. The researcher observes the answer (yes or no), but does not know whether the student answered the cheating or unrelated question. Using the known probability of answering the unrelated question, the researcher can estimate the probability of cheating, but cannot specifically identify the admitted cheaters. Accordingly, fear of reprisal is mitigated. Below is an example that demonstrates how a RR question protects anonymity:

Suppose we ask you to do the following: Think of a number between 1 and 9. Just think of the number. **DON'T REVEAL IT.**

- If the number you are thinking of is **1** or **2**, enter "1" below.
- If the number you are thinking of is **3** or **4**, enter "0" below.
- If the number you are thinking of is between **5** and **9**, and you have ever driven faster than the legal speed limit, enter a "1" below.
- If the number you are thinking of is between **5** and **9**, and you have never driven faster than the legal speed limit, enter a "0" below.

- 0
- 1

Since the researcher does not know which number was picked in the respondent's mind, she cannot determine whether the answer relates to the subject's driving behavior, or not. Privacy is protected, but the researcher can use the responses to statistically model the speeding behavior of people on average.

During the 2002 spring term, we sent web-based RR surveys to 1940 students enrolled in undergraduate online courses during the 2001 fall term at a public university. To encourage participation, recipients of the questionnaire who returned it were entered in a lottery with the opportunity to win one of ten hundred dollar prizes. Students who did not respond to the initial e-mail were sent two requests to complete the survey over the next three weeks. Of the 1,940 surveys received by students, 963 were returned, but nearly a quarter of these were not completed, leaving a sample of 725. We also surveyed faculty who had taught online classes during fall 2001 to obtain information on classroom policies. Non-responses from faculty reduced the sample from 725 to 646. Eliminating respondents in classes without tests, yielded a final sample of 555.

The student survey asked socio-demographic questions, a set of class specific questions (e.g., perceptions about fairness of tests and grading and testing locations), and a RR cheating question. The RR question was first explained using the “speeding” example given above. To mitigate differences between student and faculty perceptions of cheating (see Stern and Havlicek, 1986), the survey provided a cheating definition from the university’s academic code. Following Kerkvliet (1994), we used two forms of the survey, with the probability of answering the cheating question varying by form.

In the first form, the RR question read:

Please think of the month in which your mother was born. Don't reveal this month to anyone, just think of it and, based on it, follow the instructions below. Remember we do not know the month your mother was born so we cannot tell which question you answer.

- If your mother was born in **January or February**, please enter a "1" below.
- If your mother was born in **March or April**, please enter a "0" below.
- If your mother was born in any month **May through December** and you have used unauthorized help to complete homework assignments, papers, or exams for this course, please enter a "1" below.

- If your mother was born in any month **May through December** and you have not used unauthorized help to complete homework assignments, papers, or exams for this course, please enter a "0" below.

0

1

In the second form, January or February was replaced with January, February or March, and March or April was replaced with April, May or June. According to state-specific 2000 data on birth and death records, the probability of being born in January or February is 0.149 and the probability of being born in January through March is 0.236.

To investigate the effectiveness of class policies, we asked faculty to indicate if their syllabus contained warnings against and announced punishments for cheating. According to the study by Lupton, Chapman, and Weiss (2000), however, U.S. students only slightly agree that instructor's discussion of cheating issues reduces cheating. We are able to test this directly using the faculty responses.

Assuming the probability of cheating takes the logistic form (see Kerkvliet, 1994), the likelihood of observing the data is given by

$$L(\beta | X) = \prod_{y_i=1} \left[ P_1 + (1 - P_1 - P_2) \frac{e^{\beta' X_{ik}}}{1 + e^{\beta' X_{ik}}} \right] \prod_{y_i=0} \left[ P_2 + (1 - P_1 - P_2) \frac{1}{e^{\beta' X_{ik}}} \right].$$

$P_1$  represents the probability of being born between January and February in survey one (January through March in survey two), and  $P_2$  represents the probability of being born during March and April in survey one (April through June in survey two). The vector  $X_{ik}$  represents the many possible determinants of cheating for the  $i$ th student in the  $k$ th class, and  $\beta$  is a vector of unknown parameters to be estimated.

#### IV. Explanatory Variables

Prior studies of cheating behavior in traditional class settings point to a set of covariates,  $X_{ik}$ , that may aid in explaining cheating behavior in online classes. Based on a review of 107 studies of cheating, Whitley (1998) provides an extensive statistical summary of factors correlated with cheating and highlights the inconsistency across different studies. With few exceptions, factors that appear to be correlated with cheating in one study may not be important in a different study.

Generally, however, most prior studies find that social and academic indicators aid in explaining cheating behavior (McCabe, Trevino, and Butterfield, 2002). Social indicators of cheating may include whether the respondent was aware of others cheating in the class, had a friend or family member in class, or had favorable attitudes about cheating (Whitley, 1998). For instance, Michaels and Miethe (1989) found that cheating is positively related to the percentage of friends who cheat. Similarly, McCabe and Trevino (1993, p. 533) found that peers' behavior provides a kind of normative support for cheating. Houston (1986) reports that cheating is more likely if students are seated next to friends. In this study, we include two social indicators: awareness of others cheating in the class (AWARE) and whether the respondent was taking the class with a friend or family member (FRIEND). Awareness of others cheating would neutralize the social cost of cheating by self-justifying the behavior (Haines et al., 1986). *A priori*, the impact of having a friend in class is not clear. It may facilitate cheating, or increase the guilt associated with individual cheating.

Academic indicators include factors that influence subjective benefits and costs of cheating. Students are more likely to cheat if they think the probability of being caught is small, or if the penalties for cheating are insignificant. We considered a host of academic variables

including whether the instructor included a definition and warning about cheating on the syllabus (PENALTY), and whether exams were taken at a proctored testing center (PROCTOR). If effective, the probability of cheating will be inversely related to these strategies. When exams are given in classes taught online, testing might follow different strategies. First, testing may be open book or perhaps even open “chat room.” Second, students may be required to take exams at a proctored testing center and be required to show valid student identification. In the first case, the opportunity for some types of cheating is essentially eliminated because the behavior is no longer defined as cheating. In the latter testing case, panic cheating (i.e., glancing at a neighbor’s answers) is essentially impossible, leaving planned cheating as the only option.

Other academic indicators may include the status of the instructor and ability of the instructor to communicate with students. Kerkvliet and Sigmund (1999) and Nowell and Laufer (1997) found that students are more likely to cheat in classes taught by graduate teaching assistants and adjunct faculty, perhaps because students believe these teachers are less likely to penalize for cheating. In an online class setting, where students and instructors rarely meet, students probably are less likely to know the employment status of their teachers. Thus, a variable representing instructor status was not included in the reported model specifications.<sup>1</sup> Further, we included students’ perceptions about the ability of their instructor to communicate effectively throughout the semester (COMMUNICATE). Effective communication may reduce any desires or needs for cheating.

It is believed that students performing poorly in a class are more likely to cheat (i.e., they have more to gain), and indeed past studies have found negative relationships between cheating and expected grade in the class and GPA (Kerkvliet, 1994; Kerkvliet and Sigmund, 1999;

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<sup>1</sup> It should be noted that when a dummy variable for instructor type (=1 if adjunct faculty, 0 otherwise) was included in model specifications, the parameter estimate was not statistically different from zero.

Nowell and Laufer, 1997). A student's final grade received in the online class (GRADE) is included as an explanatory variable. Further, we included students' perceptions about the relative fairness of testing instruments and academic workloads (FAIR). If students perceive the academic workload as unreasonably difficult, they may be more inclined to cheat. Whitley (1998) found a positive relationship between cheating and academic workloads. Lack of fairness may also be seen to neutralize the social costs of cheating.<sup>2</sup>

## **V. Results**

We estimated the  $\beta$  vector by maximizing equation (1) with various combinations of the variables discussed above. Convergence was difficult when the number of explanatory variables included in the model was large. As a result, we often were only able to include subsets of variables in any single estimation. After examining multiple specifications of the possible explanatory variables, we paired down our model to a set of five covariates with: FRIEND (=1 if friend in class, 0 otherwise), AWARE (=1 if aware of others cheating, 0 otherwise), PENALTY (=1 if cheating penalty on syllabus, 0 otherwise), PROCTOR (=1 if exams given at proctored testing center, 0 otherwise), COMMUNICATE (=1 if student believed that the instructor communicated effectively), GRADE (based on 4.0 grading scale), and FAIR (=1 if student believed that exams were fair, 0 otherwise).

Three separate model specifications are presented in Table 1. All social, academic and student performance indicators are included in Model 1. The variables representing the students

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<sup>2</sup> Although past evidence suggests demographic and economic variables are inconsistent predictors of academic dishonesty (Whitley, 1998), we explored the influence of gender, age, average number of hours worked during a week, marital status, number of credit hours enrolled in for the semester, and financial responsibility for tuition payments on the probability of cheating. Haines et al. (1986) and Diekhoff et al. (1996) found that cheating was more common among males and for those who received more financial support from parents. Somewhat counterintuitive, Diekhoff et al. (1996) also found that those who worked fewer hours per week were more likely to cheat. In our preliminary statistical experiments none of the demographic variables were related to cheating in online classes; thus, these variables were dropped from the model specifications reported here. These findings are

perception of the fairness of the course and instructor's ability to communicate (FAIR and COMMUNICATE) are dropped in Models 2 and 3, while FRIEND and PROCTOR are also excluded in Model 3. Overall, Models 1 and 2 are significant with the likelihood ratio test statistics (12.72 and 10.08, respectively) exceeding the  $\chi^2$  critical values at the 0.10 level of significance. Consistent with other studies we found that respondents who were doing poorly in class were more likely to cheat than those who were doing well in class. The coefficient on GRADE is negative across all model specifications and statistically significant from 0 at  $P < 0.10$ . We also found that being aware of others cheating in the class was directly correlated with cheating. Being aware of others cheating may act to reduce the social costs of cheating. This finding is consistent with past research, which generally indicates a positive relationship between cheating and perceptions of peers' academic honesty (Michaels and Meithe, 1989; McCabe and Trevino, 1993; and McCabe, Trevino, and Butterfield, 2002).

Across the three model specifications, we found no consistent relationship between most of the academic indicators and the likelihood of cheating. Although, the coefficient on PENALTY is positive and statistically different from 0 at  $P < 0.10$  in Model 1 only. This finding is consistent with student beliefs that faculty discussions about academic honesty will not reduce cheating (e.g. see Lupton, Chapman and Weiss, 2000). The coefficient on PROCTOR is not statistically significant. It is conceivable that students who were not required to take exams in a proctored setting had no need to cheat; therefore, you would expect to see a positive relationship between PROCTOR and the likelihood of cheating. Note, however, because panic cheating in the form of peeking at a neighbor's exam is not feasible for online class exams held at proctored testing centers, cheating would be reduced. Lastly, having a friend in class, and perceived class

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consistent with past research, which generally indicates no systematic relationship between academic dishonesty and economic variables (Whitley, 1998).

fairness and instructor's ability to communicate do not appear to be significantly correlated with cheating.

The probability that the  $i$ th respondent has cheated in a single online class,  $\pi_i$ , is given by

$$\pi_i = \frac{e^{\beta'X_i}}{1 + e^{\beta'X_i}}.$$

Evaluating this expression using the parameter estimates for each observation and taking the average, yields an estimate of the probability of cheating of approximately 3% across all model specifications. How does the cheating rate compare to other studies of cheating in traditional class settings? To make this comparison we must focus only on studies that estimated cheating in a single class. We are aware of only a few studies that estimate cheating in a single class. Kerkvliet and Sigmund (1999) estimate cheating at 1.9% using a direct response questionnaire and 13% using the randomized response technique, but with wide variation from one class to another. Karlins, Michaels, and Podlogar (1988) estimate cheating at 3% during a single semester. Our estimate of online cheating of 3% suggests that cheating in the online setting is quantitatively different from the level of cheating in the traditional classroom.

Further, because college professors and officials have seen increases in the number of students directly "cutting and pasting" material from the Internet into their papers (Young, 2001), we analyzed a subset of the sample to include only those students that had a written paper assignment for their online class (those who might plagiarize). By doing this, we can infer if cheating is more likely a result of plagiarism. For a sample size of 387, the estimate of cheating increases to over 4 percent.

Most studies of academic cheating are based on surveys conducted in class or institution-wide. Because the purpose of our paper is to present evidence of cheating in online classes as compared to traditional classes we wanted to insure our survey results were not biased due to the

online nature of the survey. To test for this bias, a written version of the survey was administered in a classroom setting to 50 students who took online classes. Results indicated no difference in the predicted likelihood of cheating or in the means of variables gathered online and in the class.

## **VI. Discussion**

This paper presents preliminary statistical evidence on academic dishonesty in online classes, and compares the estimated incidence of cheating in online classes to that found in traditional classes. Our estimate that only 3-4% of students cheated suggests that academic dishonesty in a single online class is not greater than estimates of cheating in a traditional class. Until now, the supposition was that, because of decreased monitoring and interaction present in online classes, cheating in this setting would be greater than in traditional classrooms. Our paper suggests that as online education expands, there is no reason to suspect that academic dishonesty will become more common. The results show that social and academic indicators that correlate with cheating in a traditional class setting also correlate with cheating in an online setting.

There are perhaps several ways to explain the difference between what we would have expected to find versus what we found for an estimate of online cheating. First, our results are specific to one university and replication of this study at other universities would be valuable. It may be that university-specific conditions lead to less cheating and our paper does not control for this possibility by comparing traditional with online students at the same university.

Second, although some evidence does suggest that honor codes do reduce the severity of cheating (McCabe and Trevino, 1993), the evidence on the impact of deterrents on cheating are not clear (Houston, 1983). Most studies do find that severity of punishment and the probability of being caught are correlated with cheating behavior, but this is not always the case for all types

of students (Whitley, 1988). Thus, the supposition that the lack of supervision will translate into greater cheating may be overstated.

Third, as suggested by the survey results of Bunn, Caudill, and Gropper (1992), cheating likely occurs when students panic during an exam (i.e., it isn't premeditated). Because the online setting is less conducive to panic cheating—there are simply fewer or no opportunities for panic cheating—it is conceivable that panic cheating is limited to traditional class testing situations. Houston (1976, 1986) has shown that increasing the space between students has some deterrent effect on cheating and the online setting may reflect this phenomenon. However, Kerkvliet and Sigmund (1999) do not find evidence of this, although their variable measuring spacing may have contained considerable error.

Finally, because faculty may be more aware of cheating in the online setting, they may design assignments and exams to reduce the likelihood of cheating. For instance, the instructor may give challenging or time-intensive exams, and allow students to use outside material or work together. Because faculty presume cheating may be more of an issue in the online setting they may behave in a fashion that reduces cheating.

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**Table 1: Logit Results**

<b>Variable</b>	<b>Mean [standard deviation]</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
CONSTANT	—	0.87 (0.82) <sup>a</sup>	1.45 (0.48)	-050 (0.26)
<i>Social Indicators</i>				
FRIEND	0.10 [0.30]	2.27 (0.29)	3.55 (0.16)	—
AWARE	0.01 [0.10]	8.44* <sup>b</sup> (0.09)	4.74** (0.04)	3.72 (0.49)
<i>Academic and Individual Performance Indicators</i>				
PENALTY	0.37 [0.48]	5.68* (0.06)	3.51 (0.19)	1.12 (0.49)
PROCTOR	0.70 [0.46]	-4.46 (0.17)	-2.68 (0.17)	—
GRADE	3.24 [1.37]	-1.69* (0.08)	-1.60* (0.09)	-1.15*** (0.01)
COMMUNICATE	0.67 [0.53]	-3.78 (0.23)	—	—
FAIR	0.78 [0.59]	-1.85 (0.37)	—	—
Observations	555	555	555	555
Total Log-likelihood	—	-248.11	-249.43	-251.87
Likelihood Ratio Statistic <sup>c</sup> = $-2(L_R - L_U)$	—	12.72*	10.08*	5.20
Estimate of the Probability of Cheating	—	0.028	0.031	0.034

<sup>a</sup> P-values in parentheses.

<sup>b</sup> \*, \*\*, \*\*\* denotes significance at the 0.10, 0.05, and 0.01 levels, respectively.

<sup>c</sup>  $L_R$  and  $L_U$  are the values of the log likelihood function for the restricted and unrestricted models, respectively, where the restricted model restricts all parameters to zero. The statistic is distributed as  $\chi^2$  with  $r$  (the number of restrictions) degrees of freedom.