Beating the House: How Inadequate Penalties for Cheating Make Plagiarism an Excellent Gamble

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Introduction

Confronting plagiarism is, for many faculty, an important rite of passage, marking the first of many difficult decisions concerning a just response to academic misconduct. But seeking justice by recommending disciplinary actions is very different from grading a problem set or critiquing an essay. Discretionary sanctions compel faculty to confront questions that are more moral than scientific in nature. As a result, it is especially difficult to feel confident in a disciplinary decision that is made based on an ethereal sense of right and wrong.

In an effort to bring some clarity to an especially complex moral question, I argue that faculty members have an ethical responsibility to severely discipline students who overtly engage in academic plagiarism.[1] By relying on policies that emphasize leniency, faculty members actually promote rather than discourage plagiarism. Borrowing from the rational choice literature and expected utility methodologies, I contend that the costs imposed upon those who are caught cheating are often insufficient to outweigh the objective benefits of cheating. As such, faculty members often create perverse incentive structures whereby it is rational to engage in unethical conduct. In addition to cracking down on dishonest conduct, instructors must call attention to their stringent policies if college faculty are to curtail the rising tide of plagiarism within academia (McCabe et al. 2001).

Seeking an Ethical Response to Plagiarism

Among scientists (social or natural) a serious consideration of ethical imperatives often feels like an excruciating exercise in futility. As a result, many academics shy away from any analysis that starts with a highly subjective proposition. Making sense of the universe is difficult enough without basing an examination upon an entirely normative supposition. Conscious of the many obstacles to consensus, my analytical observations will rely on a single (and hopefully modest) subjective assumption. For those who find this first principle unacceptable, I fear my general line of argument will seem equally unpersuasive. However, for those who embrace the moral logic underlying the proposition, its application to plagiarism may be somewhat illuminating.

As a first principle, I will argue that it is unethical to knowingly entice students to plagiarize by promoting policies that actually reward dishonesty. As authority figures, instructors are charged with establishing guidelines that uphold important academic principles. However well meaning they may be, when rules quietly, but consistently, benefit those who act dishonestly, class policies breed contempt for the principles they were created to uphold. This general proposition is drawn, in part, from the ancient Hebrew prohibition on tempting the vulnerable: "You shall not . . . place a stumbling block before the blind" (Leviticus 19:14). Talmudic commentaries suggest that the term blind was to be construed metaphorically, referring not simply to the physically disabled, but also to the unsuspecting, the ignorant, or the morally weak (Friedman 2001; 2003).

From an academic perspective, enticing students to engage in misconduct can take many forms ranging from active neglect to ineffective enforcement. An academic who openly refuses to apply sanctions to those who are caught plagiarizing material would undoubtedly fail in his professional obligations by encouraging more students to misbehave. However, I will carry the definition of improper enticement further to include academics whose sanctions are so benign that, when considered *objectively,* the penalties for detection fail to outweigh the potential benefits of successes. Borrowing from statistics and economic decision making theory, I intend to demonstrate mathematically that all but the most aggressive plagiarism sanctions inadvertently reward students who elect to engage in this type of misconduct. While these lesser penalties may be applied with the best of intentions, to the extent that they entice students to engage in plagiarism, they ultimately undermine the very values they were designed to sustain.

Grappling with Utility, Trade-Offs, and Uncertainty

Conspiring to commit plagiarism, like most life decisions, is a conscious choice undertaken by students who believe that, in doing so, they can serve one or more of their personal interests. However, the decision to engage in plagiarism is fraught with risks. Virtually all students are aware that, if their plagiarism is detected, there will likely be consequences. So before deciding to turn in work that is not their own, students must decide whether the perceived risks of being caught outweigh the probable benefits of evasion.

Political scientists and economists often model exactly this kind of decision making using rational choice or expected utility methodologies (Piliavin et al. 1986). Based on a relatively simple set of assumptions, this theoretical approach portrays individuals as utility maximizers striving to capitalize on gains while minimizing costs.[2] According to rational choice theorists, even though individuals often lack critical information they tend to gravitate toward the choices which, given what is known,[3] appear to best serve their interests. This does not mean that decision makers always find the 'optimal' choice, thereby securing the best possible outcome (Buchanan and Tullock 1965).

As an example, concerned that he has been dealt a poor hand, a good blackjack player will rationally risk busting (exceeding 21), in order to improve the odds of beating the dealer. If, by accepting additional cards, the player busts (thereby forfeiting his bet), the decision to assume additional risk might still be described as rational if, on balance, such actions lead to more wins than losses. Incomplete information often renders an individual's best guess ineffective. However, this does not

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necessarily mean that the decision should be described as irrational.

Most models of decision making are particularly sensitive to the question of uncertainty because most life choices involve some level of risk. Indeed, uncertainty is a particularly important component of the decision to commit plagiarism because students cannot possibly know for certain whether their efforts will be successful. It is the process of risk assessment that, weighed against the potential costs and benefits of the action which, drawing from economic theory, motivates students to either engage in plagiarism or complete the work on their own.[4] In order to construct a rational choice theory of plagiarism, it is essential to incorporate elements of perceived risk, known costs, and prospective benefits into an intuitive model of decision making.

Statisticians and economists have long accounted for uncertainty by describing risk in terms of an *expected value* function. Uncertainties are expressed in terms of a 'typical result,' calculated by averaging all possible outcomes into a single value (Gollier 2001, 3, 4; Hacking 2001, 80). If, under a specified set of conditions, the expected value is positive (meaning that, on average, the venture will pay off), incurring the risk can be described as rational. If, on the other hand, the expected value is negative (meaning that, on average, the venture will not pay off), voluntarily assuming that particular risk would be described as irrational. Again, a positive expected value does not guarantee success. Rather, it indicates that *overall* the risk is profitable.

Figure 1 illustrates how the expected value (denoted as E(x)) is typically calculated. The variable x_i represents the probable worth of any discrete outcome. The variable α_i stands for the perceived probability that value (x_i) will be realized. The overall expected value of an uncertain outcome is the sum of each discrete outcome (x_i) weighted against the perceived probability of its occurrence (α_i)[5] (Fishburn 1982, 2–3; Quiggin 1993, 17–18).

In the abstract, expected value functions are sometimes difficult to conceptualize. When applied to an activity as familiar as casino gambling, its meaning often becomes clearer. Figure 2 uses this statistical function to assess the value of a common wager in roulette. If successful, a one-dollar bet on black pays 1 to 1, which would yield a net profit of one dollar. Of course, like all bets, the outcome is uncertain. So there is a distinct possibility that the same bet could cost a gambler a dollar. Considering that there are 18 black slots, 18 red slots, and (on most roulette wheels) two green slots, the probability of winning is less than 50%. Relying on the expected value equation listed in Figure 1, the actual value of a bet on black is negative five cents. This means that, on average, a gambler stands to lose a dollar with every 20 one-dollar wagers. In this example, there are three discrete outcomes (n = 3). Two outcomes result in the loss of the wager, while one yields a profit. Other wagers have a larger set of discrete outcomes. A roulette bet on 'lucky' number seven pays 35 to 1. However, as there is a high probability that the ball will not fall into the seven slot, the odds of losing the wager are considerable. Since most American roulette wheels have 38 slots (representing 38 discrete outcomes: n = 38) the odds of winning are a mere 2.7%, yielding an expected value of negative three cents.[6]

By itself, elegant economic theories of behavior are of little value unless they stem from a careful analysis of the incentive structures that govern everyday decision making. In order to apply EV calculations to plagiarism, researchers must have some idea of what students value when risking sanctions for misconduct. Although value assessments certainly vary from one student to another, I will argue that, for the most part, a decision to commit plagiarism is motivated by two primary considerations: grades and time.[7] Accordingly, when expected value functions indicate that engaging in plagiarism will (in all probability) raise a student's grade and save her time, assuming the risk of misconduct must be described as rational. Conversely, when the expected value functions indicate that engaging in plagiarism will (in all probability) lower a student's grade and cost her additional time, the decision to assume the additional risk can be described as irrational. It is important to keep in mind that electing to copy a paper is not necessarily irrational if one of the two considerations has a negative expected value. In these conflicting cases, the rationality of committing plagiarism depends on which factor is of more importance at the moment the decision is made. A further discussion of competing goals is considered later in the paper.

Figure 3 utilizes the standard expected value functions as applied to time and grades. While generic expected value functions provide for an unlimited number of discrete events (n), for our purposes there are only two possible outcomes: success or failure. Either the student *successfully* evades detection, thereby reaping the benefit of plagiarism (grade benefit = g_s, time benefit = t_s) or the student *fails* to conceal his misconduct, thereby accepting a sanction (grade benefit = g_f, time sanction = t_f). Since there are only two outcomes, the chances of evading detection (α_s) can be expressed in terms of the probability of being caught ($\alpha_f = 1 - \alpha_s$). Like the roulette bet, the expected value of plagiarism can be expressed (in two dimensions) by summing the products of risk and utility (Michaels and Miethe 1989).

Figure 1
Simple Expected Value Functions

$$E(x) = \sum_{i=1}^{n} x_i \alpha_i = x_1\alpha_1 + x_2\alpha_2 \ldots + x_n\alpha_n$$

Figure 2
Expected Value of Betting Black in Roulette

Bet	Cost	Benefit	Value (x)	Slots	Probability (α)	x * α
Black	\$0.00	\$1.00	\$1.00	18	47.37%	\$0.47
Red	\$1.00	\$0.00	-\$1.00	18	47.37%	-\$0.47
Green	\$1.00	\$0.00	-\$1.00	2	5.26%	-\$0.05
TOTAL				38	100.00%	-\$0.05

Comparing the Expected Value of Plagiarism Under Different Sanction Policies

Having constructed a mathematical model of decision-making based on the

Figure 3
Simple Expected Value Functions of Plagerism

$$E(g) = \sum_{i=1}^{2} g_i \alpha_i = g_s\alpha_s + g_f\alpha_f = g_s\alpha_s + g_f(1-\alpha_s)$$

$$E(t) = \sum_{i=1}^{2} t_i \alpha_i = t_s\alpha_s + t_f\alpha_f = t_s\alpha_s + t_f(1-\alpha_s)$$

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assumption that students value both grades and time, it becomes necessary to determine the probable value for both success (g_s, t_s) and failure (g_f, t_f). The overall costs/benefit of engaging in plagiarism depends upon a number of factors, including the official sanction adopted by individual faculty members. Therefore, in order to assess the expected value of plagiarism, the act must be considered in light of a specific misconduct sanction. Consider the expected value of plagiarism under the following three conditions.

In the first model of decision making, our hypothetical student, Rational Joe, considers copying a term paper knowing that if he is caught he will be required to rewrite[8] the essay with a 10% deduction applied to his final paper grade.

Figure 4 illustrates how a smart gambler would approach the issue of plagiarism relying upon expected value calculations as the basis for rational decision-making. Cognizant of the uncertainty involved in committing plagiarism, Rational Joe weighs the risks of detection against the probable benefits of success. As a mediocre student, Joe estimates that, should he choose to do the work himself, with six hours of work (including researching, outlining, writing, and proofing) he can probably expect to earn a 75% on his term paper. However, by copying most of the written material from an authoritative source (web site, encyclopedia, journal article, etc.) Joe feels he can craft an 'A' paper (95%) in little more than an hour.

In order to properly define the actual value of plagiarism (whether ultimately it results in success or failure) we must compare the two possible outcomes to an honest completion of the work. Based on the assumption that students value both grades and time, the expected value of plagiarism must be assessed in two distinct dimensions. If Joe successfully passes off his plagiarized material as his own, he will have saved five hours of his time (t_s = 6 hours of writing −1 hour of plagiarism = +5 hours). In addition, by stealing outside material, Joe estimates that he stands to gain 20% on his overall grade (g_s = 95% expected plagiarized grade –75% expected honest grade = +20%). On the other hand, if Joe fails to pass off the paper as his own work, he stands to waste the time spent crafting a fraudulent paper, and (under this particular policy) he will still be forced to expend six additional hours of work writing the paper for resubmission (t_f = 6 hours of writing the paper –1 hour crafting a fraudulent paper –6 hours rewriting an honest paper = −1 hour). As, in this example, the professor elects to dock one full letter grade from the final paper's score, Joe's mediocre skills will be further handicapped by the penalty for misconduct (g_f = 75% expected honest work –75% resubmitted honest grade –10% known penalty = –10%).

Regardless of whether Joe has committed previous acts of plagiarism, he can still make a reasonable judgment as to the prospects of successfully evading detection. Certainly, experience provides a valuable indicator of risk.[9] As a result, a serial plagiarist will probably have a more precise estimation of risk than a first-time offender. But even if he is a first-time offender, Joe has friends. Based on their experiences, he can make a reasonable judgment as to the probability that his misconduct will be specifically identified. Provided Joe takes the appropriate precautions (like adding a few minor typos to the stolen material, or replacing descriptive terms with the appropriate synonyms) he feels that he stands a fairly good chance at avoiding detection. In this example, Joe places the probability of getting away with plagiarism at three chances in four (α_s = .75).

By combining each of the comparative value elements (g_s, g_f, t_s, t_f) along with the risk estimation (α_s) into the standard EV function, an overall estimate of plagiarism's value will emerge. As the calculations in Figure 4 indicate, simply forcing students to rewrite plagiarized material will not dissuade students from academic theft, even when a penalty is applied. Based upon the conditions listed above, a student can expect that plagiarism will result in an average grade boost of 12% and a time savings of over three hours. In terms of both time and grades, this is an excellent bet. By constructing penalties in this manner, faculty members are practically daring their students to try their luck.

Again, it is important to emphasize that the expected value of plagiarism varies depending on any number of factors, including the penalty for misconduct and the student's personal expectations. However, beyond the specific conditions listed in Figure 4, it becomes quite apparent that virtually all policies that involve the resubmission of a paper for partial credit suffer from the same problem. In almost every circumstance where a student expects to encounter some difficulty with his/her paper grade, the expected value of plagiarism is greater than zero, even when faculty elect to deduct as many as four letter grades (See Figure 8).

As a matter of policy, many faculty members take a hard line against plagiarism by applying penalties that they believe are sufficiently harsh as to discourage this form of academic dishonesty. Even though faculty members do not formally perform expected value calculations to determine the average utility of plagiarism, many intuitively recognize that a resubmission policy does not provide a sufficient disincentive to discourage further misconduct. To further amplify the potential profitability of plagiarism, consider how more stringent sanctions effect the expected value calculations for both grades and time.

In this example, Rational Joe considers copying the bulk of his term paper from the Internet. However, in this class, the professor takes a much harder line against plagiarism. Students caught stealing will not be permitted to resubmit a genuine paper for partial credit. Plagiarists will simply receive a zero for their efforts. Again, cognizant of the risks involved in committing plagiarism, Joe again weighs the risks of detection against the probable benefits of success. While he feels his chances of success are still in his favor (α_s = .75), the

Figure 4
Expected Value of Plagiarism if Docked One Letter Grade

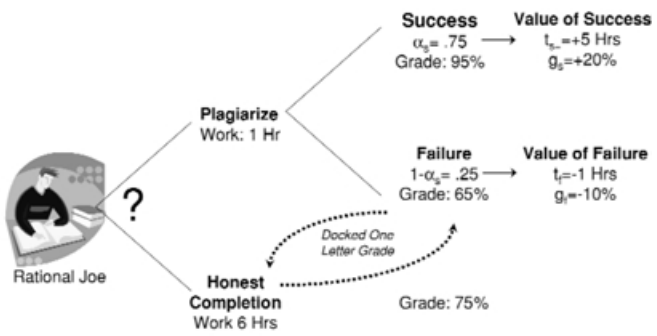

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Figure 5
Expected Value of Plagiarism if the Student Fails the Paper

$$E(g) = g_s\alpha_s + g_f(1-\alpha_s) \qquad E(t) = t_s\alpha_s + t_f(1-\alpha_s)$$

$$(.20)(.75)+(-.75)(1-.75) \qquad (5)(.75)+(5)(1-.75)$$

$$.15-.1875 \qquad 3.75+1.25$$

$$-.0375 \qquad 5$$

$$E(g)<0 \quad \& \quad E(t)>0$$

penalty is much higher than a simple letter grade deduction. Figure 5 outlines the new expected value calculations.

As before, Rational Joe assumes that, with six hours worth of legitimate work, he can probably earn a 75% on the term paper. Again he estimates that, with an hour's worth of reformatting, he can convert a stolen paper into an 'original' work worthy of an 'A' (95%). In calculating the actual value of plagiarism under the professor's stringent policies, we must again determine the actual value of plagiarism in both eventualities. While the comparative benefits of success are the same as before (g_s = +20%, t_s = +5 hours), the cost of failure has risen considerably. Assuming that those caught cheating will not be permitted to resubmit the assignment, the entire value of the paper is at risk. Focusing specifically on grades (g_f), the cost of failure is −75%. Somewhat paradoxically, a stringent policy against the resubmission of plagiarized papers simultaneously lowers the expected value of grades (E(g)) while raising the expected value of time (E(t)). Whereas, under the resubmission policy, Joe may ultimately spend seven hours "writing" two papers (one hour for the fraudulent paper and six hours for the honest paper), under the more stringent policy he knows, whatever the outcome, he will only spend a single hour crafting a stolen paper. Therefore, whether his efforts at plagiarism are a failure or successful, by electing to commit plagiarism, he is guaranteed to save five hours (t_s = t_f = +5 hours).

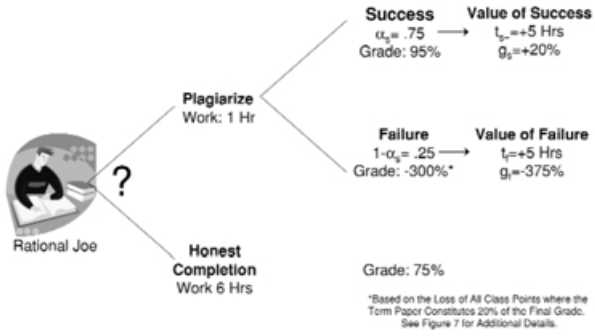
Based on the calculations outlined above, the expected value of committing plagiarism is somewhat mixed. Indeed, by barring the resubmission of term papers, the expected value of plagiarism (as it applies to the final grade) is negative. In this case Rational Joe can expect an average act of plagiarism to result in a 3% decrease in his overall score. Accordingly, if attaining the highest possible grade is the driving motivation behind Joe's flirtation with misconduct, under these conditions plagiarism is inadvisable. However, under the proposition that students value both grades and time, some individuals will rationally accept a diminution of one factor in order to increase the value of another. When considered together, the policy that bars resubmission does not necessarily preclude plagiarism as a profitable alternative. Regardless of the underlying factors constraining their time (jobs, family, video games, procrastination, laziness, etc.), an option which *guarantees* five additional hours of free time might seem very attractive even if it affects their final class grade.

Building on the proposition that it is unethical to entice students to act dishonestly, I would argue that the aforementioned sanctions for plagiarism are inappropriate precisely because they fail to countermand the probable benefits of misconduct. Under the resubmission policy, a student should expect a substantial benefit to both his overall grade and his free time. When faculty bar resubmissions (thereby compelling a forfeiture of the available points), students could still reasonably elect to plagiarize knowing the inevitable benefit to a student's time may well offset the marginal cost to his grade. In order to be certain that a reasonable person could not rationally conclude that plagiarism is profitable, the penalties of misconduct must be raised considerably.

In this final example, Rational Joe considers copying the bulk of his term paper from a web site. However, in this class the professor takes a very hard line against academic theft. Students caught engaging in an overt act of plagiarism will simply be failed in the course outright. Regardless of the student's previous score or his performance on a final exam, the plagiarist receives an 'F' for his misconduct. Still, cognizant of the risks involved in committing plagiarism, Joe again weighs the risks of detection against the probable benefits of success. Not withstanding the stiff penalties for plagiarism, he feels his chances of success are still in his favor (α_s = .75). Figure 6 summarizes the new expected value calculations.

Rational Joe still assumes that, with six hours worth of legitimate work, he can probably earn a 75% on the term paper. Again, he estimates that, with an hour's worth of reformatting, he can convert a stolen paper into an 'original' work worthy of an 'A' (95%). In calculating the actual value of plagiarism under the professor's 'draconian' policies, we must again determine the actual value of plagiarism in both eventualities. The comparative benefits of success are the same as before (g_s = +20%, t_s = +5 hours). The costs of failure have yet again risen considerably. In the previous examples, the penalties for plagiarism were limited to sanctions against the stolen paper itself. In the first example this involved a mere deduction from the final product. In the second example, the professor precluded Joe from resubmitting his paper, thereby depriving him of

Figure 6
Expected Value of Plagiarism if the Student Fails the Class



$$E(g) = g_s\alpha_s + g_f(1-\alpha_s) \qquad E(t) = t_s\alpha_s + t_f(1-\alpha_s)$$

$$(.20)(.75)+(-3.75)(1-.75) \qquad (5)(.75)+(5)(1-.75)$$

$$.15-.9375 \qquad 3.75+1.25$$

$$-.7875 \qquad 5$$

$$E(g)<0 \quad \& \quad E(t)>0$$

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all the possible points from the assignment. Under this third policy, a plagiarist would forfeit not only his paper grade, but also all of his class points accumulated to date, and all of the points he is likely to amass in the future.

When, as a matter of policy, plagiarists are failed outright for their misconduct, calculating the cost of failure (g_f) becomes much more complicated. By engaging in an overt act of plagiarism, the student risks not only the assignment grade, but also points earned in other parts of the course. Figure 7 illustrates how the true costs of detection can be calculated across all four components of a hypothetical course.

Figure 7
Calculating the Cost of Failure (g_f) Under a Grand Forfeiture Policy

			Honest Work		Plagiarism (Success)		Plagiarism (Failure)	
	Grade %	Total Points	Points	Percent	Points	Percent	Points	Percent
First Midterm	25%	250	187.5	75%	187.5	75%	0.00	0%
Second Midterm	25%	250	187.5	75%	187.5	75%	0.00	0%
Term Paper	*20%*	*200*	*150.0*	*75%*	*190.0*	*95%*	*0.00*	*0%*
Final Exam	30%	300	225.0	75%	225.0	75%	0.00	0%
	100%	1,000	750.0	75%	790.0	79%	0.00	0%
Net Effect			+0.00		+40.00		-750.00	
Net Effect/Paper			0%		20%		-375%	

In this example, the term paper represents 20% of the overall course grade worth a maximum of 200 points. With an honest effort, the ordinary student can earn 150 points (75%). If the student successfully conceals his plagiarism, he stands to receive 190 points, constituting a 20% increase over an honest effort. If his plagiarism is detected, he will not only receive a zero on the term paper, but he will forfeit any additional points awarded for the first and second midterm and the final exam. Assuming the mediocre student performs consistently (75%), the penalties for plagiarism will cost him 750 points overall. When measured against the performance on the term paper, a failure to conceal his plagiarism will cost him 375% (0.00-750.00/200.00 = –3.75) or the equivalent of a 37 letter grade deduction on the original term paper.

Again, the expected value calculations yield a mixed result. The expected impact on the grade is negative while the known impact on time is still positive. However, unlike the expected value functions listed in Figure 5 (where the probable impact on the grade was negligible), the best forecasts indicate that, on average, the student's grade will suffer dramatically. According to the expected value calculations, on average Joe will lose more than 78% of the overall term paper grade for each act of plagiarism. While it may be theoretically possible for an individual to rationally assume such an extraordinary risk to save five hours of his time, as a practical matter, this penalty all but forecloses plagiarism as a logical gamble.

Although the weight of the term paper does affect the cost of failure, the overall results are the same. In each case, the cost of failure is so dramatic that a decision to risk detection is patently irrational. If Joe's paper constituted only 10% of the overall course grade (rather than the aforementioned 20%), a decision to risk detection would be even more costly. In order to gain 20 additional points on a paper worth 100 possible points, Joe would still risk his entire 750 point reserve. Under this condition, the net value of plagiarism would stand at –750% (0.00-750.00/100.00 = –7.50). Accordingly, the expected value of plagiarism would be a loss of 172% of the overall term paper grade. If the paper comprised as much as 50% of the overall course grade, a decision to risk detection would be somewhat less costly. In an effort to gain 100 additional points on a paper worth 500 possible points, Joe would again risk his entire 750 points. But alas, under this stringent forfeiture policy the cost of failure is still dramatic. If detected, Joe stands to lose 150% of his overall term paper grade (0.00-750.00/500.00 = –1.50). When the fraudulent term paper is worth half of the overall grade the expected value of plagiarism is still a loss of 22.5% of the overall term paper grade. While it is admittedly more advantageous to cheat if the paper is worth a larger percentage of the grade, in each example the forfeiture policy renders overt acts of plagiarism unprofitable.

As with the other disciplinary strategies, the expected value of plagiarism varies depending on the student's personal expectations (see Figure 8). The circumstances that might motivate a traditionally poor student to risk sanctions might not compel a typically strong student to cheat. The potential benefits of cheating rise as a student's expected grade falls. Except in cases where time is inordinately valuable (i.e. a student suddenly realizes that his term paper is due in 90 minutes), it is never rational for an 'A' student to risk sanctions, given the perceived benefits of completing the work honestly. By contrast, traditionally mediocre students have much less to lose and much more to gain by risking detection.

Figure 8 compares the expected value of plagiarism based on the three aforementioned disciplinary strategies. The four diagonal lines moving from the top left corner to the bottom right trace the expected value functions for different penalties when weighed against what a student would earn with an honest effort. The top line indicates the expected value of plagiarism where the faculty member deducts 10% from the resubmitted paper. The bottom line indicates the expected value of plagiarism under the grand forfeiture policy. The dotted horizontal line represents a neutral expected value. The vertical arrow shows the expected value of plagiarism for Rational Joe, given that he would normally expect a 75% on an honest term paper. The calculations in Figure 8 clearly illustrate the differences between the various plagiarism policies. Whereas the expected value of misconduct is very often positive, under the most costly sanction policy a conscious decision to commit plagiarism is patently irrational. Even for students who anticipate failing the paper outright (expected grade = 50%), by electing to commit plagiarism, they can anticipate an overall loss of 29% over their best honest effort.

Building upon the proposition that disciplinary schemes ought to preclude cheating as a rational alternative to honest work, there is only one sanction that adequately punishes students for trying to pass off another person's work as their own. However well intentioned, the calculations listed in Figure 8 suggest that by applying too modest a punishment to those who steal their work, faculty are inadvertently creating rational incentives for students to behave dishonestly. Drawing from our first principle, to knowingly entice students into academic fraud in this manner is patently unethical.

Avoiding the 'Dr. Strangelove' Effect

The use of punitive sanctions to constrain the behavior of others is far from

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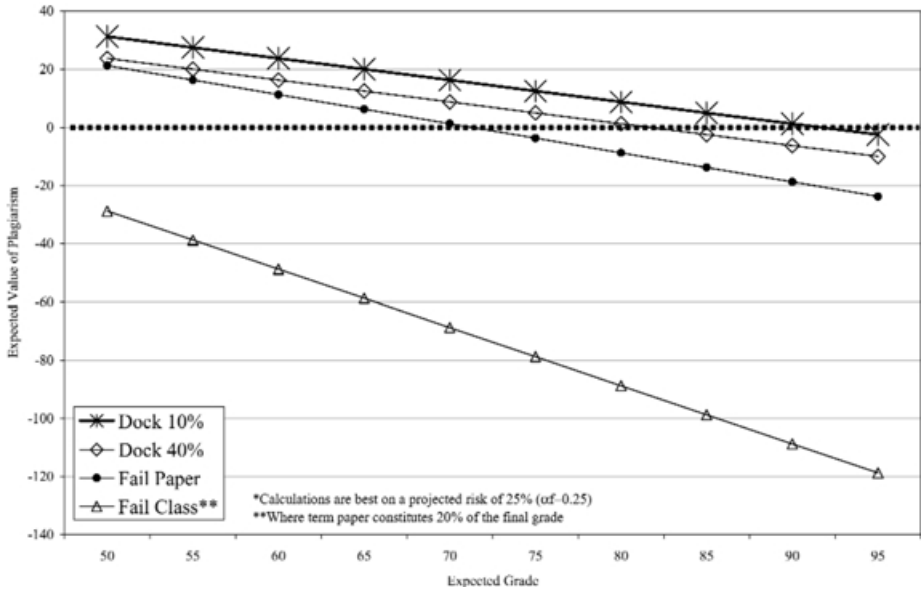
Figure 8
Comparitive Penalties for Plagarism*



revolutionary; the notion of crime and punishment is as old as civilization itself. Nevertheless, all deterrent policies share one critical weakness: unless the focus of the sanction is fully cognizant of the penalty for 'misbehavior,' the threat itself is ineffective (Braumoeller and Gaines 2001).[10]

The shortcomings of an invisible sanction are vividly illustrated in Stanley Kubrick's classic cinematic comedy *Dr. Strangelove*. Shot at the height of the Cold War, the film depicts a crisis in American leadership that is brought on by a deranged general who, without authorization from the president, orders a nuclear strike on the Soviet Union. Hoping the unauthorized attack can be prevented, the American president telephones the Soviet premier to alert him to the approaching bombers. In the course of the diplomatic squabbling, the Soviet ambassador informs the Americans that, should the bombers reach their target, the Soviets would activate a secretly developed doomsday weapon which would effectively destroy all life on earth. Setting aside the obvious concerns over the American's defective chain of command, the president's chief scientific advisor, Dr. Strangelove, makes another troubling observation: "The entire point of a doomsday machine is lost if you keep it a secret."[11] By failing to disclose that they possessed such a terrible weapon, the device had no deterrent capabilities. At best, a secret doomsday device is merely a weapon of vengeance, not a mechanism for peace.

The principle of a clear and credible deterrent is applicable in a wide variety of circumstances including the fight against plagiarism (McCabe and Linda 1993). Heretofore the 'value' of plagiarism has been measured in terms of fixed assumptions, based upon *known* penalties and discrete outcomes. Rational Joe considers stealing his paper from an obscure academic journal. He expects a good grade if he successfully passes off the article as his own. In the event he is detected, *he knows for a fact the professor will administer a given penalty.* By weighing the value of success against a *known* penalty for failure, Joe calculates whether the plagiarism gamble will likely serve his primary interests (e.g., higher grades and more free time). But imagine, for a moment, how Rational Joe's assessment of the plagiarism dilemma might change if the penalty for detection is, itself, an unknown. Zimring and Hawkings argue that deterrence is ineffective if the individual is not confronted with the consequences of misconduct: "If the individual is to be kept law-abiding, the process of simple deterrence must confront him at every turn—making each form of forbidden conduct a risk not worth taking" (Zimring and Hawking 1973, 75). Accordingly, Joe's ability to rationally steer clear of plagiarism would be seriously compromised if the consequences for misconduct were unknown.

Adding an additional level of uncertainty to the plagiarism calculations does not preclude Rational Joe from assessing plagiarism's value.[12] It simply degrades his ability to make a definitive judgment. In some circumstances this ambiguity might be useful. Faculty members who insist upon a resubmission policy are well advised to conceal their guidelines, lest bright young students realize the abject profitability of engaging in plagiarism under these conditions. For those who take a hard line against plagiarism, the act of obscuring the strict penalties is akin to building a secret doomsday device. Whether their decisions are guided by risk assessment models or by their intuition, students will systematically underestimate the consequences for plagiarism, thereby making a rational decision based on a faulty premise. If the primary purpose of the punishment is to prevent students from flirting with misconduct, then it makes absolutely no sense to conceal the specific consequences of plagiarism.

College faculty members often include a boilerplate warning against plagiarism in their course syllabi. However, warning students against committing academic theft is not quite the same as explicitly spelling out the consequences should the student be caught plagiarizing a term paper. Deterrence is most effective when the consequences from action are stark, unambiguous, and salient.

Final Thoughts on the Meaning of Plagiarism

Risk assessment models can be very useful when comparing the value of plagiarism to the costs of detection. The results of the analysis seem to indicate that, for many students, a mere slap on the wrist is not enough to discourage further misconduct. By raising the stakes and calling attention to the consequences for plagiarism, there is every reason to believe college faculty can make inroads on a serious academic problem. Nevertheless, rational choice theory and statistical analysis cannot take the place of sound common sense in determining what constitutes a serious case of academic plagiarism.

Stealing an entire term paper from the Internet is not the same as improperly attributing a single source, or neglecting to apply quotation marks. Regardless of how sophisticated the methodology, individual faculty members will still have to make subjective judgments separating minor mistakes from outright fraud. In so doing, they must ensure that the punishment meets the crime.

Consider the application of this expected value theory in the absence of

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proportionality. Death penalty advocates often justify capital punishment in terms of its deterrent effect.[13] By applying the ultimate punishment to a small group of criminals, fewer people will choose to kill with premeditation. Similarly, executing jay-walkers would certainly keep pedestrians off the street. Yet, the thought of killing people for violating traffic laws runs counter to our intangible sense of justice. The fact that a given punishment tends to reduce an undesirable behavior does not, in and of itself, justify its application.

It logically follows that an appropriate punishment must simultaneously meet two criteria. First, it must be potent enough to render the misconduct generally ineffective, thereby compelling students to meet their goals honestly. For students who download their papers off the Internet, all but the most strenuous policies fail this test. Second, the punishment must also discriminate between minor missteps and fraud. Failing to quote a line from a textbook should not necessarily be treated the same as copying an entire term paper from the *American Political Science Review*. While mathematical functions can help clarify the first principle, defining serious misconduct remains a matter of some discretion.

Notes

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1. Admittedly, the technical definition of plagiarism is quite broad, referring to the appropriation of any phrases, passages, or ideas without a proper attribution. At an extreme, a student who inadvertently neglects to cite a popular Shakespearean reference in his term paper is technically guilty of plagiarizing. However, in the context of this analysis, plagiarism is defined more narrowly, referring to the purposeful theft of academic material constituting a substantial portion of a given assignment. Under this definition, students who elect to copy their term papers from material found online are guilty of plagiarism, even if they cobbled the final version together from a dozen different undisclosed web sites. Toward the conclusion of the paper I provide some final thoughts on differentiating between technical mishaps and outright fraud.

2. Kelley argues that there are essentially six steps in developing a rational choice theory of political behavior, including identifying agents, goals, and environmental features that will aid or impede achieving goals, determining the agent's information quality, identifying steps an agent may take within their information bounds, and finally identifying the decision that most efficiently serves the aforementioned goals (Kelley 1996, 97).

3. Admittedly, a model based on the perceived consequences of failure (knowledge) is different than a model based on the actual consequences of failure (reality). To the extent that individuals fail to account for the price of failure, their decisions will not necessarily reflect their best interests. Toward the end of the paper I will directly confront the gap between perception and reality.

4. The use of economic theory to assess the value of plagiarism does not foreclose the possibility that many students incorporate moral considerations into their choice to commit plagiarism. The reliance on economic theory permits a more objective assessment of the incentive structures so as to evaluate whether they entice all students (both moral and immoral) to cheat.

5. Typically, the sum of all perceived probabilities add up to 100% ($\alpha_1 + \alpha_2 \ldots \_\alpha_n = 1$).

6. With a few very rare exceptions, a *vast* majority of casino games have a negative expected value, and yet, every year millions of Americans choose to gamble. This seemingly irrational behavior calls economists attention to two important realities. First, underlying incentive structures are complex, not always focusing on economic gain. While a vast majority of gamblers are acutely aware that the odds are stacked against them, many participate in games of chance because it provides a source of entertainment. Second, although most tourists are accurately aware that the odds are stacked against them, some nevertheless operate under the delusion that they have a 'system' to beat the casino. Although some very skilled card counters can get a small edge on the house, a vast majority of such persons underestimate their risk (Zimring and Hawkins 1973, 105). Accordingly, the best models of decision-making must account for the possibility that perceived risk is not the same as actual risk (Piliavin et al. 1986).

7. It is important to note that economic models of decision making cannot possibly account for every idiosyncratic factor which might influence an individual to engage in misconduct. Theoretically, a student considering copying a paper off the Internet might be dissuaded from committing plagiarism if his dial-up connection were to fail. Economic models are not designed to perfectly predict human behavior. Rather, rational choice models attempt to capture the most important factors concerning a decision, accounting for factors like priorities, uncertainty, and misinformation. If properly constructed, the economic model will provide a plausible map of decision making which can fairly be applied to most people, most of the time.

8. Admittedly, a student who commits plagiarism does not really rewrite the paper as the very term seems to imply a secondary act of creativity.

9. Presumably, the ability to accurately assess risk is a skill that varies depending on any number of factors (personal experience, class standing, statements by the professor, etc.). Nevertheless, even experienced plagiarists cannot be certain that an attempt to deceive the professor will be successful. Having attempted to commit plagiarism on five previous occasions, a student's ability to assess risk might very well be heightened. However, better information does not eliminate uncertainty. Rather it makes the decision to engage in indeterminate behavior more rational. Accordingly, more acute risk assessment does not preclude the need to weigh the benefits of success against the costs of failure.

10. In "Actions Do Speak Louder than Words: Deterring Plagiarism with the Use of Plagiarism-Detection Software," Bear F. Braumoeller and Brian J Gaines conduct an innovative study of plagiarism by testing whether the use of detection software tends to deter students from committing modest or overt acts of academic theft. Although the paper focuses primarily on increasing the risk of detection (α_f), the results are consistent with the rational choice model outlined in Figure 3. When informed that their work will be checked for evidence of plagiarism, students tend to complete the papers honestly. In expected value terms, Braumoeller and Gaines raised the value of risk (α_f), thereby reducing the overall profitability of misconduct.

11. Kubrick masterfully explains the Soviet's motivation for concealing the doomsday machine by revealing that the party had planned on announcing the project for the premier's birthday. It appears the Soviet premier had a predilection for surprises.

12. As with any risk assessment calculation, uncertainty can be incorporated into the model by replacing known values with estimations. If Joe is uncertain as to the sanction for being caught, he can estimate the penalty in terms of its own expected value function. Εαχη οφ τηε γραδε πεναλτιεσ ουτλινεδ ιν τηε σχενάριοσ αβοωε ($\gamma\phi1 = 10\%$, $\gamma\phi2 = -75\%$, $g_{f3} = -375\%$) would be assigned its own probability (α_{fx}). By taking a weighted average of the discrete possibilities (from 1 to n) Joe can calculate an expected value for an unknown grade penalty. Admittedly, performing an expected value calculation of plagiarism (EV(g)) based on an expected value calculation of the grade penalty (EV(g_f)) is itself risky. With each compound estimation, the probability of correctly assessing the value of risk decreases.

13. I fully acknowledge that the social science research concerning the death penalty's deterrent effects are hotly disputed among experts. By invoking the argument of its proponents, it is not my intention to endorse any specific position.

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