"Cash or Credit? The importance of reward medium and experiment timing in classroom preferences for fairness."

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ABSTRACT

The author conducts experiments examining fairness preferences (Andreoni and Miller, 2002) and compares cash versus extra credit points as the reward medium. Additionally, he explores the role that classroom experiment timing—over the course of a semester—can have on outcomes. The results show that subjects are just as rational, if not more so, when the motivation is class points rather than cash. Also, preference classifications show that subjects are significantly more likely to be Selfish (and less likely to be Utilitarian) when the experiment is conducted early in the academic semester. One possible explanation is that is that the ultimate value of an extra credit point is more uncertain early in the semester, thus leading risk-averse students to make more selfish experiment allocations.

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1) Introduction

Experimental economics has proven a valuable tool for classroom instruction. Not only can classroom experiments be enjoyable for both students and instructors, but there is also evidence indicating that experiments can improve student comprehension of important economics concepts (Frank, 1997: Emerson and Taylor, 2004). Many instructors who conduct classroom experiments use class points (or extra credit points) as the reward medium.[1] Because a large body of experimental economics literature is often accessed for classroom discussion and/or comparison with outcomes from a similar class experiment, it is important to understand if differences exist between comparable research (i.e., cash) and classroom (i.e., extra credit) experiments. The potential difference between experimental outcomes comparing cash versus classroom credit (i.e., point) is relatively understudied. If the reward medium affects experimental outcomes, then at least two points are worth highlighting. First, students should be made aware of what differences in results might be expected if the experiment were motivated with cash versus points. Secondly, if the reward medium matters, then this may provide valuable insights into naturally-occurring decision environments that are primarily motivated by non-monetary incentives.

An additional issue that arises in the use of classroom points experiments is the timing of the experiment over the course of the academic session. It would seem that there has been no discussion in the experimental economics or educational community as to whether it matters to conduct the same experiment early versus late in the semester, for example. This is not an irrelevant detail. For example, if one conducts an experiment early in the semester, the potential value of a given number of class points may not be well-known. Late in the semester, however,

[1] Other reward-medium options are to pay the subjects cash (or randomly select one subject to receive a cash payoff based on the experimental outcome), or to just conduct the experiment hypothetically.

it becomes more certain how valuable a given amount of extra points may be. In effect, payoff uncertainty may be present if conducting a "points" experiment early in the session, and so one might expect risk-averse students to behave more selfishly over classroom points.

This purpose of this paper is not to provide an exhaustive comparison of lab experiments and comparable classroom experiments. Rather, this paper presents the results from classroom experiments conducted using the well-known Andreoni and Miller (2002) design to examine preferences for altruism. Because their experiment examines a general issue of "fairness" preferences, it is likely to be of significant interest in a typical economics principles class. I replicate the Andreoni and Miller (2002) cash-reward data and compare this to classroom data generated using extra credit points as the reward medium. The same experiment is also conducted in different classes either early or late in the semester to examine the effect of experiment timing.

In general, the cash experiment replication generates data that indicate less selfish subjects, on average, than what Andreoni and Miller (2002) report—about 40% of our data are best fit with a selfish-type utility function compared to 47% of their subjects. When using extra-credit points as the reward medium in classroom experiments, the results significantly differ based on experiment timing. Early in the semester the experiment generates 50% selfish subjects, compared to only 24% selfish subjects when the exact same experiment is conducted late in the semester. Subject rationality (as determined by the data's consistency with WARP) is not significantly different in the classroom credit experiment compared to the cash experiments. Taken together, these data provide important evidence in support of subject rationality in non-hypothetical classroom experiments. They also provide equally important evidence that experiment timing and the reward medium can affect experimental results.

2. The Reward Medium for Classroom Experiments.

Most discussion of reward media in classroom experiments revolves around the proper or fair way to provide salient incentives for classroom experiments. Some teachers offer a small cash incentive, perhaps to the high payoff outcome in the experiment, or perhaps at a rate that pays only a fraction of experimental earnings (e.g., Holt, 1999). If an instructor does not wish to pay classroom experimental monies out of his/her own pocket, and if the departmental budget is not open to such expenses, a natural alternative for those who desire a non-hypothetical decision environment is to offer some type of class points payoff. Considerable concern has been expressed over the "fairness" of using grades in classroom experiments. Commentary in Fels (1993), and Williams and Walker (1993) leans towards continued use of extra credit points when such points cannot constitute an overly large part of a student's grade (e.g., no more than one full letter grade). When the experiment includes some random element to the outcomes, assuming the entire payoff amount is not randomly determined, there are those who find the random element to the outcomes quite unfair (e.g., Stodder, 1998), while others find it quite parallel to how outcomes are sometime determined in the "real world" (e.g., Bell, 1993). Though I do not recommend it, regular class points based on experiment outcomes is another alternative. Depending on the instructor, the use of regular points versus extra credit points may have little practical effect on the final grading scale, but the idea of having regular points—as opposed to "extra credit"—determined from experiment outcomes can be perceived as even more unfair.[2]

[2] It was, in fact, during a class points experiment several years ago where I had the unpleasant and unique experience of a student wielding a knife during a class cartel experiment when he discovered that he was "cheated" upon. It is unclear whether the issue was the betrayal of his fellow cartel members, or the fact that such betrayal cost him valuable "regular" class points. Though he quickly claimed he was "just joking", I (and presumably no one else in class) never again looked at that student the same.

The debate surrounding the use of class points will not abate, and it is not my purpose to convert anyone to the use of extra credit points as the reward medium for class experiments. But, because there is a large community of instructors who do use class points as a reward, the relevant question for this paper is whether or not the reward medium matters in terms of experimental outcomes. Presumably, the answer to this question is of interest both to those who actively practice the use of class points experiments as well as those who have a general interest in the potential significance of the chosen reward medium for an experiment. Isaac, Walker, and Williams (1994) conclude that results from their large-group public goods experiments are similar using class points or money incentives. Controlled experimental conditions were not present in their study, given that the reward medium effect was not the objective of their research. Li (1991), in an unpublished study, conducts a controlled comparison of the reward medium effect of cash versus extra credit points in public goods experiments and finds no significant difference in the data on several outcome measures. One should not take this, however, to imply that the reward medium does not matter. The present results are important in that they indicate that the timing of the experiment can confound the measurement of a reward medium effect. Indeed, our results show later that, in the Andreoni and Miller (2002) altruism experiments we replicate, one set of classroom credit data is statistically no different from the cash experiment replication, while the other generates significantly different levels of altruism from the subjects.

3. The Experiments

As indicated in the introduction, the cash experiments replicate the design of Andreoni and Miller (2002). Subjects make a series of eleven token allocation decisions designed to alter

the price of giving (see Appendix for the allocation decisions of the cash replication experiment. An additional appendix containing all instructions is available upon request). A standard dictator game is one where the price of giving is one—that is, the slope of the budget constraint in payoff-to-self/payoff-to-other space is minus one. The series of eleven token decisions represent a mix of standard dictator decisions and decisions where the price of giving is greater or less than one.

After making all eleven allocation decisions, each subject's decision sheet is randomly matched with those of two other anonymous subjects. During the first pairing of decision sheets, one subject has a randomly selected allocation decision chosen, and the subject earns the amount determined by that subject's own "hold" decision. The earning from the first pairing are placed into the subject's payoff envelope by an experimenter. The decision sheets are then re-matched such that each subject is matched with a different subject, and this time those subjects who had earnings determined by their own randomly chosen "hold" decision receiving earnings based on the another subject's "pass" decision for another randomly chosen allocation decision (and vice versa). In this way, each subject had one payoff determined by one of their own "hold" decisions, and one payoff determined by someone else's "pass" decision. This was common knowledge, as was the fact that no subject would be matched twice with the same person, and that decisions would remain double-blind anonymous. Decision sheet pairings, random allocation choices, and envelope stuffing were always supervised by a compensated volunteer subject who did not take part in the decision-making portion of the experiment.

This cash replication is conducted in two slightly distinct ways. The first, called "double-blind", was a pure replication of the Andreoni and Miller (2002) experiment with their double-blind payoff procedures, which I call the *Cash Double-Blind* treatment. Here, neither the

subjects nor the experimenters could link any of the subject decisions or payoffs to an individual.[3] Of course, this type of double-blind experiment is not strictly possible when conducting a class points experiment, because the instructor must ultimately attach total experiment points to the individual student. So, a second treatment, called *Cash Quasi Double-Blind*, is also implemented. Here, I implement a final step where, after receiving the payoff envelope, each subject shows her total cash payoff to the experimenter, which allows the experimenter to write total payoff amounts next to each subject's name on an experiment list. Here, the experimenter knows the total payoff of each subject, but with this procedure he cannot identify the exact decisions made by any given subject (i.e., many different combinations of decisions, random pairings, and random decision choices could lead to the same final payoff amount). Thus, the quasi double-blind procedure duplicates the extent of anonymity that can be preserved in the class points experiment, which allows one to separate out the difference in anonymity confound.

The points experiment is identical to the procedures of the *Cash Quasi Double-Blind* experiment, with the exception that payoffs were in terms of class points that would be added to the student's Exam #1 (with *no* truncation at 100%). Whereas the average payoff in the cash experiments was about $15 (for a 30 minute experiment), the average payoff in the points experiments was 9 class points. This amount of points was nearly a full grade on the 100 point Exam #1, and in total this average payoff amounted to 2% of the final class points amount (450). With the plus-minus grading system, this implies that the average amount of class points paid out for this experiment was small, but non-trivial. Over the course of a 16 week semester, this class

[3] As in Andreoni and Miller (2002), the payoff envelopes were ultimately handed to subjects, based on claim check number, by an experimenter who arrived to perform this function *after* all payoff envelopes had already been filled with their payoffs. So, the experimenter who handed payoff envelopes to actual subjects was unaware of the envelope contents, and those who were aware of the envelope contents did not see who received which envelope.

points experiment was conducted in some classes in week 3 of the semester (the *Early Points* treatment), while in distinct classes it was conducted in week 14 (the *Late Points* treatment). The students had not yet completed Exam #1 in week 3, whereas all graded items except for the final exam had been completed in week 14 of the semester. All classes were sections of the author's microeconomic principles class—a required business class with varied student representation—and both cash and points experiments were conducted by the same person.

4. Results

Two outcome measures are reported in order to compare the points experiments with the cash experiments, as well as for comparison with Andreoni and Miller (2002). First, subject rationality is examined in Table 1. The data are analyzed in terms of their consistency with the weak axiom of revealed preference (WARP). The data in Andreoni and Miller (2002) are examined for their consistency with other revealed preference axioms, but the conclusions are not significantly altered if one focuses only on WARP violations. The data in Table 1 report the number of violations of WARP at Afriat's (1972) Critical Cost Efficiency Index (CCEI) of .95. The CCEI is a measure of how much a budget constraint would have to shrink to avoid the preference axiom violation, and so we allow for the small amount of decision error of the magnitude suggested by Varian (1991) and reported in the Andreoni and Miller (2002) study.

The data in Table 1 indicate that subjects, in all treatments, are rational in some sense. Though the portion of WARP violations is, on average, a bit higher than in the Andreoni and Miller data, it is still the case that the vast majority of subject behavior is consistent with WARP. In comparing the two cash experiment treatments, we find that subject rationality is not significantly affected by the *Quasi Double-Blind* treatment ($p>.10$ for the binomial test).

Rationality is also not affected in the class points experiments by having the experiment early versus late in the semester (p>.10). Subjects are, however, significantly more rational in the class points experiments than in *Cash Double-Blind* (p=.03 in comparing *Cash Double-Blind* with *Class Points Late*, and p=.10 in comparing *Cash Double-Blind* with *Class Points Early*). Recall, however, that the anonymity condition of the class experiments is more comparable to that in the *Cash Quasi Double-Blind* treatment, and we find no significant differences in subjects rationality in comparing *Cash Quasi Double-Blind* with either of the class points treatments (p>.10).[4] In sum, the only difference we find in subject rationality is that the replication of the anonymous cash experiments in Andreoni and Miller (2002) generates a *lower* percentage of rational subjects than in the other treatments. At the very least, there is no evidence indicating that subjects are less rational in their preferences over fairness in extra credit point classroom experiments.

Table 2 shows the results from a categorization of preferences for self-payoff, x_s, and other-payoff, x_o, into one of three types: preferences of the selfish type ($U=x_s$) , Leontief preferences ($U=\min\{x_s, x_o\}$), or perfect substitute preferences ($U=x_s+x_o$). Andreoni and Miller examine both a strong and weak preference classification for each category, depending on whether choices exactly match those required by their respective utility function. In what follows, we examine choices that do not exactly match these prototypical preferences by calculating the minimum sum of squared deviations of the subject's tokens "held" amount for all allocation decisions from the amounts that one would hold for either of these three preference

[4] For these binomial tests, the subject is the unit of observation, and I use the higher proportion of rational subjects in the pairwise comparison as the probability *p* for the test. For example, in comparing *Class Points Late* with *Cash Double-Blind*, I use the binomial test to test the null hypothesis that the percentage of rational subjects in *Cash Double-Blind* is equal to 88%, which is the percentage of rational subjects in *Class Points Late*.

types.[5] The preference type that minimizes this sum of squared deviations is considered the subject's "weak" preference type. This comparison has the benefit of categorizing all subjects into one of these three categories, but it has the drawback of not differentiating between cases where a subject is relatively more or less close to a given preference type. The portion of our subjects that exactly fit one of these three utility functions (i.e., the "strong" preference classification, 16%-26%) is somewhat less than is reported in the Andreoni and Miller (2002) data (43%).

The results from strong or weak preference-type categorizations, which are shaded in Table 2, highlight a main result from of this paper. A large majority of the subjects are classified into Selfish or Leontieff preference types. Subjects are somewhat less selfish in *Cash Double-Blind* than what Andreoni and Miller (2002) report, but their results are largely replicated. Removing a small degree of subject anonymity in *Cash Quasi Double-Blind* generates somewhat more Leontieff, but less Perfect Substitute, preference types. The data do not, however, indicate that subjects behave more selfishly (i.e., consistency with Selfish preferences) in *Cash Double-Blind* compared to *Cash Quasi Double-Blind.* This is at odds with Hoffman et al. (1994), which reports a well-known finding that subjects in dictator games behave more selfishly in a double-blind treatment relative to traditional single-blind experiments where decisions are not anonymous to the experimenter. If we examine only the subset of dictator games (budget sets 6, 7, and 9 data at the bottom of Table 2), the data still fail to replicate this finding of Hoffman et al. (1994) ($p=.02$ for the one-tailed test of means of dictator offers in the two treatment). However, the *Cash Quasi Double-Blind* is admittedly different (i.e., more anonymous with respect to the experimenter) than the baseline single-blind treatment that generated the more generous dictator

[5] Budget sets 6, 7, and 9 (the dictator games) are removed from the preference classifications in Table 2 because any allocation of tokens is consistent with substitute preferences.

offers in Hoffman et al. (1994). The present experiment merely shows that increasing the anonymity so that experimenters are blind to decisions and outcomes—not just blind to decisions—does not generate more selfish behavior in this more general environment.

In examining the class points experiments, we find that subjects are somewhat more Selfish, less Leontieff, and less Utilitarian (i.e., substitute preference) for early-in-semester experiments relative to late-in-semester experiments. That is, the distribution of preference types for the classroom experiment is more similar to the analogous cash experiment (i.e., *Cash Quasi Double-Blind*) when conducted early in the semester, but quite different when conducted late in the semester. The one exception is the larger overall proportion of Substitute preference classifications in the *Cash Double-Blind* treatment. This result is consistent with what one would conclude from examining the subset of class points data from the dictator game budget sets (budget sets 6, 7, and 9). Dictator offers are higher late in the semester versus early in the semester for the points experiments (p=.00 for the two-sample test of mean differences in dictator offers).

A more formal and controlled econometric analysis is found in Table 3, which presents results from a multi-nomial logit analysis of the determinants of one's preference type. Marginal effects listed in Table 3 are all relative to the reference treatment *Cash Double-Blind*, and these results add more statistical support for the apparent treatment effects seen in Table 2. Subjects have a significantly higher probability of being classified as *Selfish* in an early-semester classroom points experiment, relative to the *Cash Double-Blind* treatment, and they are less likely to be classified as having *Substitute* (Utilitarian) preferences. They are significantly less likely to be classified as *Selfish* or *Substitute* in a late-semester classroom points experiment, but more likely to be *Leontieff*, compared to *Cash Double-Blind*. Finally, subjects are more likely to

be classified as *Leontieff*, but less likely to be classified as having *Substitute* preferences, when partial experimenter anonymity is removed in *Cash Quasi-Double-Blind*. Subjects behavior is most likely to fit the *Substitute* preference category in the *Cash Double-Blind* reference treatment, but the relative proportions of each classification in Table 2 indicate that the *Selfish* and *Leontieff* preference categories describe most of the subjects in any treatment.[6] The marginal effect patterns also support the Table 2 result that early-semester class points experiments are more likely to generate *Selfish*, and less likely to generate *Utilitarian*, subject behavior relative to late-semester points experiments.

These results indicate that classroom points can be a significant motivator for subjects. In fact, early in the semester subjects behave more selfishly over points than they would over cash in an otherwise similar experiment. Perhaps the most surprising finding involves experiment timing. Preferences over classroom points change significantly depending on the timing of the experiments during the academic session. So, while points are certainly a salient reward, preferences towards them are not independent of factors that change over the course of the session.

5. Concluding Remarks

The main result to be made from these experiments is simple. Though the results from a classroom experiment using extra credit points as the reward medium *may* replicate those from a cash experiment equivalent, they may also vary significantly given the timing of the class experiment. To some, it may be a predictable result that students behave more selfishly when the experiment is conducted early in the semester, and they behave more egalitarian (Leontieff) late

[6] The one exception is in *Class Points Late*, where a slightly higher percentage of subjects are classified as weak substitute preference types than weak selfish. However, if one considers the *strong* preference classification, then no subjects in this treatment are classified strongly into the perfect substitute classification.

in the semester. Two possible explanations arise. First, the value of a given number of extra credit points is more uncertain early in the semester than late in the semester. So, risk-averse students will seek to maximize own-points in the uncertain reward environment, resulting in more selfish behavior early in the semester. Alternatively, a given class of students may form some social bonds later in the semester. If this reduction in social distance generates less selfish behavior (see Hoffman et al., 1996; Cox and Deck, 2005), then one would also expect to see less selfish preference classifications for experiments given late in the semester (and perhaps more egalitarian preferences). Some students might develop a feeling of greater isolation in the classroom as the session progresses, and so it is not immediately apparent that students will perceive a reduction in social distance as the semester progresses.

Unfortunately, the present design and data are not suitable to test or distinguish between these alternative hypotheses. These results are, nonetheless, important to those who question the viability of classroom points as a reward medium in experiments—subjects exhibit rational preferences over an important behavioral concept (fairness) when points are the reward. The results also imply that instructors must use caution in making unqualified comparisons of classroom outcomes to comparable research experiments, because unintended confounds may exist over the course of an academic session, among other things.

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TABLE 1: Violations of WARP
(violations reported for CCEI<.95)

	Experiment Treatment			
	Cash Double-Blind (N=30 subjects)	*Cash Quasi Double-Blind* (N=30 subjects)	*Class Points Early* (N=80 subjects)	*Class Points Late* (N=42 subjects)
# subjects with WARP violation(s)	7 (23%)	5 (17%)	12 (15%)	5 (12%)
Average # violations (at CCEI=.95 level) per subject with a violation	1.00	1.20	1.42	1.40
% subjects for which the data are rationalizable with a quasi-concave utility function.	77%	83%	85%	88%

TABLE 2: Categorizing Subject Preferences
(Percentage of subjects fitting weak and strong forms of preference type)

	Experiment Treatment (Dictator budget sets 6, 7, and 9 removed)			
	Cash Double-Blind Weak (Strong)	*Cash Quasi Double-Blind* Weak (Strong)	*Class Points Early* Weak (Strong)	*Class Points Late* Weak (Strong)
Selfish	27% (13%)	30% (13%)	41% (9%)	14% (12%)
Leontief	33% (3%)	47% (3%)	41% (3%)	43% (14%)
Perfect Substitutes	20% (3%)	3% (3%)	3% (4%)	17% (0%)
TOTALS (weak or strong)				
Selfish	40.00%	43.33%	50.00%	26.20%
Leontief	36.67%	50.00%	43.75%	57.10%
Perfect Substitutes	23.33%	6.67%	6.25%	16.70%
	Dictator Offers (only budget sets 6, 7, and 9)			
Average Dictator Offer	34%	27%	28%	38%

TABLE 3: Multinomial logit results:
Marginal effects of treatments on preference category
(N=182)

Treatment	***Selfish*** (p-value)	***Leontieff*** (p-value)	***Substitute*** (p-value)
Cash Quasi-Double Blind	.03 (.78)	.17 (.07)*	-.20 (.00)***
Points Early	.12 (.04)**	.08 (.17)	-.20 (.00)***
Points Late	-.16 (.06)*	.23 (.01)***	-.07 (.06)*
Chi-squared (df=4) = 15.12 (p-value=.004)			

*, **, *** refer to significance at the .10, .05, and .01 levels, respectively.

APPENDIX

Claim Check Number _____

DECISION SHEET

Directions: Please fill in all the blanks below. Make sure the number of tokens listed under *Hold* plus the number listed under *Pass* equals the total number of tokens available. Remember, all points are worth $0.10 (10 cents) to all subjects.

1) Divide 75 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 2 points each.

2) Divide 40 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 3 points each.

3) Divide 75 tokens: *Hold* _____@ 2 points each, and *Pass* _____@ 1 point each.

4) Divide 60 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 2 points each.

5) Divide 40 tokens: *Hold* _____@ 3 point each, and *Pass* _____@ 1 point each.

6) Divide 60 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 1 point each.

7) Divide 100 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 1 point each.

8) Divide 60 tokens: *Hold* _____@ 2 points each, and *Pass* _____@ 1 point each.

9) Divide 80 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 1 point each.

10) Divide 40 tokens: *Hold* _____@ 4 points each, and *Pass* _____@ 1 point each.

11) Divide 40 tokens: *Hold* _____@ 1 point each, and *Pass* _____@ 4 points each.

ADDITIONAL INSTRUCTIONS APPENDIX (NOT FOR PUBLICATION)

INSTRUCTIONS (DOUBLE-BLIND TREATMENT)

Welcome

This is an experiment about decision making. You will be paid in cash for your participation, and the amount of money your will earn depends on the decisions that you and the other participants make. The entire experiment should last less than one hour. At the end of the experiment you will be paid privately and in cash.

Your Identity

You will never be asked to reveal your identity to anyone during the course of the experiment, nor will any other participant know of your cash payoff in today's experiment. Your name will never be recorded by anyone. Neither the experimenter nor the other subjects will be able to link you to any of your decisions or to your payoff amount. In order to keep your decisions private, please *do not reveal your choices to any other participant.*

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NOTE: **QUASI-DOUBLE BLIND TREATMENT replaces the sentence "Neither the experimenter….. or to your payoff amount." with the sentence "Neither the experimenter nor the other subjects will be able to link you to any of your decisions." The oral description of the payment procedures also make it clear that in Quasi-Double Blind the subjects will have their payoff amount written next to their name for accounting purposes only. Because subjects make two decisions, and matching is random with another subject for each decision, it is then impossible to discover a subject's specific decisions, even knowing her final payoff amount. All other instructions are identical between the cash Double-Blind and cash Quasi-Double Blind treatments.**

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Claim Check

Attached to this page is a number on a colored piece of paper. This is your Claim Check. Each participant has a different number. You may want to verify that the number on your Claim Check is the same as the number on the top of page 4.

You will present your Claim Check to an assistant at the end of the experiment to receive your cash payment.

Please remove your Claim Check now and put it is a safe place.

EXPERIMENT SPECIFICS

This experiment will ask you to make a series of choices about how to divide a set of tokens between yourself and one other subject. You and the other subject will be paired randomly and you **will not** be told each other's identity.

As you divide the tokens, you and the other subject will each earn points. Every point that the subjects earn will be worth 10 cents. For example, if you earn 58 points you will make $5.80 in the experiment.

Each choice you make is similar to the following:

Example: Divide 50 tokens: *Hold* _____ @ 1 point each, and *Pass* _____ @ 2 points each.

In this choice you must divide 50 tokens. You can keep all the tokens, keep some and pass some, or pass all the tokens. In this example, you will receive 1 point for every token you hold, and the other player will receive 2 points for every token you pass. For example, if you hold 50 and pass 0 tokens, you will receive 50 points, or 50×$.10=$5.00, and the other player will receive no points and $0. If you hold 0 tokens and pass 50, you will receive $0 and the other player will receive 50×2=100 points, or 100×$.10=$10.00. However, you can choose to hold any number of tokens between 0 and 50. For example, you could choose to hold 29 tokens and pass 21. In this case you would earn 29 points, or 29×$.10=$2.90, and the other subject would receive 21×2=42 points, which is 42×$.10=$4.20.

Here is one other example:

Example: Divide 40 tokens: *Hold* _____@ 3 points each, and *Pass* _____@1 point each.

In this example every token you hold earns you 3 points, and every token you pass earns the other subject 1 point. Again, each point you earn is worth $.10 to you, and each point the other subject earns is worth $.10 to him/her.

Important Detail*:* In all cases you can choose any number to hold and any number to pass, but the number of tokens you hold plus the number of tokens you pass *must* equal the total number of tokens to divide. Please feel free to use a calculator or paper and pencil to calculate points and to assure that all of the tokens have been allocated.

EARNING MONEY IN THIS EXPERIMENT

You will be asked to make 11 allocation decisions like the examples we discussed on the previous page. We will calculate your payments as follows: These payments are independent of the initial $5 you received for showing up on time.

After your and everyone else's decision forms have been collected, we will shuffle the forms and randomly pair your form with that of another subject in this experiment. Using a table of random numbers, we will select <u>one</u> of your decisions to carry out. You will then get the points you allocated in the "hold" portion of your decision, and the other subject will get the points you allocated on the "pass" portion of your decision. These points will be worth 10 cents each, as was the case in the examples shown on the previous page. The earnings from your points will be placed in your earnings envelope.

Next you will be paired again with a different subject in the experiment. This time we will randomly choose <u>one</u> of the other subject's decisions. You will earn the points allocated in the "pass" portion from the other subject's decision sheet. Again these points will be worth 10 cents each. Your earnings from this pairing will also be placed in your earnings envelope.

(Note: half of the subjects will receive their cash payoff from the counterpart's "pass" portion during the first shuffle, and the cash payoff from the "hold" portion of their own decision sheet during the second random matching of subjects and counterparts. In any event, each subject will earn a cash payoff that results from one of his/her own randomly chosen "pass" decisions, and also from one randomly chosen "hold" decision from being matched *with a different* counterpart).

The monitor chosen at the beginning of the experiment will verify tat these procedures are followed.

After all the calculations have been made, another experimenter who was not involved in the experiment until this time will ask you to bring up your claim check and will hand you your earnings envelope. This will again help to guarantee your privacy.

On the following page are the choices we would like you to make for this experiment. Please fill out the form, taking the time you need to be accurate. When all subjects are done we will collect the forms.

Thank you very much for your participation.

<u>DECISION SHEET (in preceding Appendix) FOLLOWS THIS PAGE FOR SUBJECTS</u>

INSTRUCTIONS (Classroom POINTS TREATMENTS)
Note: Instruction are the same for the EARLY POINTS and LATE POINTS treatments. The experiments differ only in the timing of the experiment within the academic semester.

Welcome

This is an experiment about decision making. You will be paid in Econ 2030 [**micro-economics principles]** class points for your participation in this experiment, and the amount of points you will earn depends on the decisions that you and the other participants make. Each class point that you earn in today's experiment will be added to the points score you receive on Exam #1 in our class (with **no maximum** to the score one could have. Even if your Exam #1 score plus today's class points from the experiment sum to more than 100, I will still include all points in determining final grades). The entire experiment should last about one-half hour. At the end of the experiment you will be informed of your class points privately.

Your Identity

You will never be asked to reveal your identity to anyone during the course of the experiment, nor will any other participant know of your points payoff in today's experiment. Your name will never be recorded in connection with your decisions. Neither the experimenter nor the other subjects will be able to link you to any of your decisions. In order to keep your decisions private, please *do not reveal your choices to any other participant.*

Claim Check

Attached to this page is a number on a colored piece of paper. This is your Claim Check. Each participant has a different number. You may want to verify that the number on your Claim Check is the same as the number on the top of page 4.

You will present your Claim Check to an assistant at the end of the experiment to receive your payment of class points.

Please remove your Claim Check now and put it is a safe place.

EXPERIMENT SPECIFICS

This experiment will ask you to make a series of choices about how to divide a set of tokens between yourself and one other subject. You and the other subject will be paired randomly and you **will not** be told each other's identity.

As you divide the tokens, you and the other subject can each earn class points. Every 10 experiment-points (e-points) that the subjects earn will be worth 1 class point. Equivalently, this means that each e-point is worth .10 class points (I will keep track of fractional class points). For example, if you earn 50 e-points you will make 5 class points in the experiment (the equivalent of one-half letter grade on Exam #1).

Each choice you make is similar to the following:

Example: Divide 50 tokens: *Hold* _____ @ 1 e-point each, and *Pass* _____ @ 2 e-points each.

In this example choice you must divide 50 tokens. You can keep all the tokens, keep some and pass some, or pass all the tokens. In this example, you will receive 1 e-point for every token you hold, and the other player will receive 2 e-points for every token you pass. For example, if you hold 50 and pass 0 tokens, you will receive 50 e-points, or 50×.10=5 class points, and the other player will receive no e-points and therefore no class points. If you hold 0 tokens and pass 50, you will receive no class points and the other player will receive 50×2=100 e-points, or 100×.10=10 class points. However, you can choose to hold any number of tokens between 0 and 50. For example, you could choose to hold 29 tokens and pass 21. In this case you would earn 29 e-points, or 29×.10=2.9 class points, and the other subject would receive 21×2=42 e-points, which is 42×.10=4.2 class points.

Here is one other example:

Example: Divide 40 tokens: *Hold* _____@ 3 e-points each, and *Pass* _____@1 e-point each.

In this example every token you hold earns you 3 e-points, and every token you pass earns the other subject 1 e-point. Again, each e-point you earn is worth .10 class points to you, and each e-point the other subject earns is worth .10 class points to him/her.

Important Detail*:* In all cases you can choose any number to hold and any number to pass, but the number of tokens you hold plus the number of tokens you pass *must* equal the total number of tokens to divide. Please feel free to use a calculator or paper and pencil to calculate points and to assure that all of the tokens have been allocated. It is also important for you to realize that the class points you receive from this experiment ***will count*** in the actual determination of your grade (that is, each class point earned will be added to your Exam #1 score, with no maximum limit—your score can go above 100 if that is the case, and this will still benefit your final point and grade total).

EARNING CLASS POINTS IN THIS EXPERIMENT

You will be asked to make 11 allocation decisions like the examples we discussed on the previous page. We will calculate your payments as follows:

After your and everyone else's decision forms have been collected, we will shuffle the forms and randomly pair your form with that of another subject in this experiment. Using a table of random numbers, we will select <u>one</u> of your decisions to carry out. You will then get the tokens and resultant e-points you allocated in the "hold" portion of your decision, and the other subject will get the tokens and resultant e-points you allocated on the "pass" portion of your decision. These points will be worth .10 class points each, as was the case in the examples shown on the previous page. These class points earnings will then be written on a slip of paper and placed in your earnings envelope.

Next we will take the decision forms again and you will be paired *with a different* subject in the experiment. This time we will randomly choose one of the other subject's decisions. You will receive the tokens and resultant e-points allocated in the "pass" portion from the other subject's decision sheet (and the counterpart gets the tokens and resultant e-points from the "hold" portion of his/her decision this time). Again these points will be worth .10 class points each. Your class points earnings from this pairing will be written on a separate slip of paper and also placed in your earnings envelope.

(Note: half of the subjects will receive the e-points from the counterpart's "pass" portion during the first shuffle, and the e-points from the "hold" portion of their own decision sheet during the second random matching of subjects and counterparts. In any event, each subject will earn e-points from one of their randomly chosen "pass" decisions, and also from one randomly chosen "hold" decision from a matching *with a different* counterpart).

The monitor(s) chosen at the beginning of the experiment will verify that these procedures are followed.

After all the calculations have been made, another experimenter who was not involved in the experiment until this time will ask you to bring up your claim check and will hand you your earnings envelope. I will then record your total class points earnings next to your name. Note that this process helps guarantee the privacy of your decisions. By using this process, I will know only what your final points outcome is, and I will not be able to link your points outcome to your individuals decisions, because decisions are only known by claim check number, which I will never see and which will never be recorded next to your name (and never be included in the data set from this experiment). **In other words, your individual decisions will remain anonymous not only to other subjects, but even to me (the experimenter).**

On the following page are the choices we would like you to make for this experiment. Please fill out the form, taking the time you need to be accurate. When all subjects are done we will collect the forms.

Thank you very much for your participation.

Claim Check Number _____

DECISION SHEET

Directions: Please fill in all the blanks below. Make sure the number of tokens listed under *Hold* plus the number listed under *Pass* equals the total number of tokens available. Remember, all e-points are worth 0.10 class points.

1) Divide 75 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 2 e-points each.

2) Divide 40 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 3 e-points each.

3) Divide 75 tokens: *Hold* _____@ 2 e-points each, and *Pass* _____@ 1 e-point each.

4) Divide 60 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 2 e-points each.

5) Divide 40 tokens: *Hold* _____@ 3 e-point each, and *Pass* _____@ 1 e-point each.

6) Divide 60 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 1 e-point each.

7) Divide 100 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 1 e-point each.

8) Divide 60 tokens: *Hold* _____@ 2 e-points each, and *Pass* _____@ 1 e-point each.

9) Divide 80 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 1 e-point each.

10) Divide 40 tokens: *Hold* _____@ 4 e-points each, and *Pass* _____@ 1 e-point each.

11) Divide 40 tokens: *Hold* _____@ 1 e-point each, and *Pass* _____@ 4 e-points each.