Kasetsart Journal of Social Sciences 41 (2020) 250–255

Kasetsart Journal of Social Sciences

journal homepage: http://kjss.kasetsart.org

Friends and exam cheating: An experimental study in Thailand

Tanapong Potipiti[a,b,*], Sorravich Kingsuwankul[b,†]

[a] Faculty of Economics, Chulalongkorn University, Bangkok 10330, Thailand
[b] Center for Behavioral and Experimental Economics, Chulalongkorn University, Bangkok 10330, Thailand

Article Info

Article history:
Received 14 June 2018
Revised 31 October 2018
Accepted 1 November 2018
Available online 13 March 2020

Keywords:
cheating,
experiment,
friends,
peer effects

Abstract

This paper investigates the peer effects of friends on exam cheating among Thai students. The peer effects were introduced by recruiting pairs of friends as experimental subjects. In the experiment, the subjects solved math problems and were paid according to their scores. Half of the subjects sat with friends and the other half sat with strangers. The peer effects of friends were studied by comparing the cheating behaviors of these two groups of subjects. The subjects could cheat by overstating their scores, or by copying their answers from the person sitting next to him or her. The findings revealed no significant peer effects on overstating, while there were positive peer effects in terms of copying, which requires some cooperation from peers. Nonetheless, when both overstating and copying opportunities were feasible, the peer effects on copying disappeared as the subjects opted to overstate their own scores.

© 2020 Kasetsart University.

Introduction

Academic dishonesty and exam cheating are prevalent in many countries. Many accounts of cheating have been uncovered by the media around the world (Charuvastra, 2016; Dorn & Edelman, 2018). There are several reasons behind cheating. Students may cheat in order to obtain a higher GPA due to the competitive nature of academia. Cheaters often justify their actions by referring to social norms, where cheating is acceptable. Nepotism and favoritism can also turn exam cheating into the favorable cooperation of friends (Bidgood & Merrill, 2017; Pérez-Peña, 2013). Motivated by this evidence, we designed an experiment to investigate the peer effects among friends on exam cheating.

In experimental studies on cheating, typically, the subjects in the experiment are assigned a task to carry out in exchange for payment, for example, flipping a coin, rolling a die under a cup, or solving simple math problems. After completing the task, the subjects self-report on the outcome of the task, which would then be used for payment calculation. As the outcome is not checked by the experimenters and the subjects' identities are anonymous, the subjects can cheat.

Bucciol and Piovesan (2011) and Houser, Vetter, and Winter (2012) studied cheating using coin flipping experiments. The experimenters fixed a higher payment on one of the outcomes (either heads or tails). Without cheating, the outcome of heads or tails was equally likely. However, Bucciol and Piovesan (2011) and Houser, Vetter, and Winter (2012) respectively found that 84 percent and 74.5 percent of subjects rolled out the sides with higher payoffs. The results from these two studies highly deviate from the outcome under honesty, which implicate cheating. Fischbacher and Föllmi-Heusi (2013) conducted a similar experiment using dice, making the payment for outcome "5" the highest. It was found that 35 percent of the sample reported an outcome of "5". Other studies on cheating and dishonesty have confirmed that in order to get higher monetary payoffs, the subjects would cheat when an opportunity is present. For a more complete survey on cheating experiments, refer to Jacobsen, Fosgaard, and Pascual-Ezama (2018), and Rosenbaum, Billinger, and Stieglitz (2014).

* Corresponding author.
E-mail address: tanapong.p@chula.ac.th (T. Potipiti).
† Co-first authors.
E-mail address: sorravich.k@gmail.com (S. Kingsuwankul).
Peer review under responsibility of Kasetsart University.

https://doi.org/10.34044/j.kjss.2020.41.2.04
2542-3151/©2020 Kasetsart University.

In addition to experimental studies on cheating, the other strand of related literature is the experimental studies on peer effects. Social scientists have acknowledged the role of peer effects on various economic and social decisions. For instance, Falk and Ichino (2006) found that the peer effects of another subject carrying out the same task were sufficient to boost the productivity of the subjects in the experiment. Recent studies have investigated peer effects on unethical behavior. Weisel and Shalvi (2015) studied cooperative cheating between two random players in a die-rolling experiment. The experiment employed a two-player game. Each player rolled a die privately, and the first player reported the outcome to the second player. Then the second player reported his outcome to the first player. The two players were paid if the two reported outcomes were identical. The two players could cooperate and cheat in order to increase their payment. It was found that the proportion of matched reports was 489 percent higher than that under honesty. Lucifora and Tonello (2015) investigated exam cheating and the role of social interaction in Italy. The randomized experiment consisted of classes proctored by internal and external examiners. The findings revealed that the classes with the internal examiners had higher average scores with lower variance relative to those with the external examiners. This result indicates the possibility of cheating. However, it remains inconclusive whether the students or the internal examiners initiated the cheating. Pascual-Ezama, Dunfield, Liaño, and Prelec (2015) examined peer effects on unethical decisions. In the baseline condition, the subjects solved puzzles in isolation (i.e. no other subject was in the room) and self-reported their performance. In the peer condition, all of the subjects performed the same task individually in a shared room. It was found that in the peer condition, the subjects cheated less in order to preserve their reputation among their peers.

Our paper is different from the existing studies as follows. Unlike existing research, which studied peers by having subjects (unknown to each other) participate in experiments together, we studied the behavior of actual friends. Moreover, while existing research focused on one type of cheating, two types of cheating—overstating one's score and copying answers from neighbors—are investigated in this paper. These two types of cheating are different in the following aspect. While overstating can be done individually, copying requires the cooperation of peers. It was considered interesting therefore to examine and compare the role of peer effects in these two different types of cheating. The experimental results showed that peer effects played a significant role in copying. On the other hand, there were no peer effects on overstating. In addition, we also found substituting effects between these two types of cheating.

Methodology

Experimental Design

This study adopted a one-person game used in Mazar, Amir, and Ariely (2008). The objective of our experiment was to investigate the peer effects of friends on cheating. We induced these peer effects through recruiting and seating arrangements. Pairs of friends were recruited as subjects, and during the experiment, two subjects were seated together at a table. Each subject had only one neighboring subject. Half of the subjects were seated next to their friends (friend condition), while the other half were seated next to strangers (stranger condition). This seating arrangement allowed us to examine the peer effects of friends on cheating by comparing the subjects in the two conditions.

In the experiment, the subjects needed to solve matrices by matching two numbers that added up to 10. Figure 1 shows a sample problem, whose answers are 5.72 and 4.28. The subjects were given 10 minutes to solve 42 problems. The number of problems was set such that most of the subjects could not finish all of the problems within the time limit. Each subject would receive 10 Thai Baht for each matrix solved. When the time was up, the answers were checked and graded either by the subjects themselves or by the experimenters, depending on the treatment specification. After the grading, the subjects were paid based on their scores. All of the subjects were referred to by an ID number in order to maintain their anonymity.

6.22	2.11	5.97
4.33	4.78	5.55
9.48	4.28	5.72
7.77	0.70	9.37

Figure 1 Sample Matrix

Our experiment had three treatments: overstate, copy and overstate-copy treatments. The goal of these treatments was to study the two types of cheating, namely overstating and copying, and their interaction when both cheating opportunities were feasible. This goal was achieved by varying the cheating opportunities in each treatment. For instance, in the overstate treatment, the subjects could only cheat by overstating their scores but not by copying from the subjects next to them, as their problems were different. Similarly, in the copy treatment, the subjects could only cheat by copying from their neighbors but not by overstating, as the answers were checked and graded by the experimenters. Lastly, in the overstate-copy treatment, the subjects could cheat by overstating, as they graded their own answers, and by copying, as their problems were the same as those of their neighbor subjects.

Elaborating further about the two types of cheating, overstating was feasible when the subjects were given the opportunity to check and grade their own answers. In this case, the incentive to cheat was straightforward—the subjects could overstate their scores in order to obtain a higher payment. For instance, a subject whose actual score was 15 could lie by reporting 20, and thereby received 200 Thai Baht instead of 150 Thai Baht. The other type of cheating was copying from the neighboring subject. This was made feasible by giving the same set of problems to subjects seated together.

Table 1 summarizes the experimental design. The experiment was conducted in the Faculty of Economics at Chulalongkorn University in Thailand in 2017 and 2018. A total of six experimental sessions (i.e. two sessions for each

treatment) was conducted. There were 48 (96) subjects in each session (treatment). The subjects were undergraduate students from various disciplines. Fifty-six subjects (19.44%) were economic students, and 105 (36.46%) were male. The average age of the subjects was 21 years. The experiment lasted for around 45 minutes. The average payment for each subject was 258 Thai Baht.

Table 1 The Experimental Design

Treatment/Condition	Friend	Stranger
Overstate	can *overstate*, sit with a *friend*	can *overstate*, sit with a *stranger*
Overstate-copy	can *overstate/copy*, sit with a *friend*	can *overstate/copy*, sit with a *stranger*
Copy	can *copy*, sit with a *friend*	can *copy*, sit with a *stranger*

Results and Discussion

First, we provide descriptive statistics of the actual and reported scores from the experiment. Next, we examine the peer effects of friends on overstating and copying.

Descriptive Statistics of the Actual and Reported Scores

Table 2 displays a summary of the actual and reported scores for all treatments. It must be noted that reported scores were not available in the copy treatment as the answers were checked by the experimenters. In the overstate and overstate-copy treatments, the average of the actual and reported scores for all subjects was respectively about 19 and 22. As can be seen in this table, in the overstate and overstate-copy treatments, there was no significant difference in either the actual or reported scores of the subjects in the friend and stranger conditions.

In the copy treatment, the average score of the subjects in the friend condition was 21.04, while the average score of the subjects in the Stranger condition was 16.56. The higher score in the friend condition might indicate copying and the collaboration of friends seated together. Formal investigation on overstating and copying will be discussed further.

Overstating

In this section, we analyze cheating via overstating. In the overstate-copy and overstate treatments, 80 (41.7%) of the 192 subjects overstated their scores. The overstated score of a subject was measured by the difference between the subject's reported and actual scores. On average, the subjects overstated their scores by around 3.2 points. Table 3 shows the summary statistics of the overstated scores in the overstate-copy and overstate treatments. The *p*-values of the mean difference tests of the overstated scores in the friend and stranger conditions are shown in the last row. There were no significant differences in the means of the overstated scores in these conditions. This result suggests no peer effects of friends on overstating.

Table 4 reports on the regression analysis. The dependent variables were the overstated scores. Equations (1) and (2) were estimated using the observations from the overstate-copy and overstate treatments, respectively. The variable nextfriend was 1 if the subject was seated with a friend and 0 otherwise. The coefficients of nextfriend in equations (1) and (2) were not significant; sitting next to a friend had no effects on overstating.

Equations (3) were estimated using observations from the overstate-copy and overstate treatments. For robustness, three additional control variables—male, actualscore and overstate_nextseat—were added. The male variable was 1 for male subjects and 0 otherwise. The actualscore variable was the actual score of the subjects. These male and actualscore variables controlled for the subjects' genders and abilities. The overstate_nextseat variable was the overstated score of the neighboring subjects. After controlling for the additional variables, the coefficient of nextfriend in equation (3) was still not significant as that in equations (2) and (3).

All of the coefficients of the three additional control variables were significant. The coefficient of the male variable was positively significant. This result is in line with Dreber and Johannesson (2008), and Friesen and Gangadharan (2012), who found that the male subjects cheated more. The coefficient of actualscore was negatively significant; subjects with high actual scores had less need to cheat. The coefficient of overstate_nextseat was positively significant, suggesting that there was overstating contagion from neighboring subjects—the subjects overstated more if their neighbors overstated more.

Table 2 Average Scores in Each Treatment

Score/Treatment	Overstate-copy			Overstate			Copy		
	All	Friend	Stranger	All	Friend	Stranger	All	Friend	Stranger
Actual scores	18.84	18.62	19.06	18.95	18.62	19.28	18.80	21.04	16.56
Reported scores	22.22	22.35	22.09	22.10	22.35	21.85	-	-	-
# of Obs.	96	48	48	96	48	48	96	48	48

Table 3 Overstated Scores in the Friend and Stranger Conditions

Condition	# of Obs.	Overstate-copy		Overstate	
		Mean	S.D.	Mean	S.D.
Friend condition	48	3.72	7.87	3.45	7.07
Stranger condition	48	3.04	7.26	2.83	7.08
p-value of mean diff. test		.6576		.6664	

Table 4 OLS Regression: Overstated Scores

	Dependent Variable = Overstated scores		
Variable	Equations		
	(1)	(2)	(3)
nextfriend	0.688	0.625	0.532
	(1.546)	(1.445)	(0.929)
male			2.286**
			(0.999)
actual_score			-0.250***
			(0.0748)
overstate_nextseat			0.341***
			(0.104)
constant	3.042***	2.833***	5.711***
	(1.049)	(1.023)	(1.730)
Treatment	Overstate-copy	Overstate	Both
# of Observations	96	96	192
R-squared	0.002	0.002	0.229

Robust standard errors in parentheses. *** $p < .01$, ** $p < .05$, * $p < .1$

The results in Tables 3 and 4 confirm that there were no peer effects of friends on overstating. Moreover, the results suggest that males overstated more than females, and that the subjects with high actual scores overstated less.

Copying

In this section, we analyze cheating via copying. In order to measure copying, we created a similarity index for the answers of subject *i* and subject *j* who sat together as follows:

$$S_{i,j} = \sum_k S^k_{i,j} \quad (1)$$

where $S^k_{i,j} = 1$ if question *k*'s answers of subjects *i* and *j* were the same and $S^k_{i,j} = 0$ otherwise. In case that all of the answers of subjects *i* and *j* were the same, $S_{i,j}$ was equal to 42 (the number of all questions). If all of the answers of both subjects were completely different, $S_{i,j} = 0$. To ensure that the similarity index reflected copying, the exam sheets were designed so that there was no problem number and the problems could be done in any order, i.e. from top to bottom, from left to right. Therefore, it was unlikely that the answers of two subjects would have been similar by chance. By comparing the similarity indices of the subjects seated together in the friend and stranger conditions, we were able capture the peer effects of friends on copying.

Table 5 displays a summary of the similarity indices for the subjects seated together in the overstate-copy and copy treatments. For the overstate-copy treatment, the average similarity indices for the subjects in the friend and stranger conditions were 11.41 and 12.83 respectively. The mean difference test reported no significant difference in the means in the friend and stranger conditions. This result suggests that the peer effects of friends played no role in copying in the overstate-copy treatment.

In the copy treatment, the average similarity index for the subjects in the friend condition was around 16.50, which is significantly higher than that in the Stranger condition, which was around 10.20. The student's t-test indicated a significant mean difference, a difference that suggested that the subjects seated with friends shared more common answers than those seated with strangers. This result suggests that friends seated together copied from each other.

Taking the results of the two treatments together, the peer effects of friends on copying were significant conditional considering that copying was the only feasible option to cheat. In the overstate-copy treatment, the subjects chose to cheat by overstating because it was easier than copying. On the other hand, the subjects copied in the copy treatment where no easier cheating option was available.

The results in Table 5 suggest that *friends* seated together tended to copy. However, the results do not indicate whether *strangers* seated together copied. In order to investigate whether strangers copied, we compared the average similarity indices of the 24 pairs of strangers seated together with those of the other 24 pairs of strangers seated two rows apart in the copy treatment. While the pairs seated together could copy from each other, the pairs seated two rows apart could not. The statistics are shown in Table 6. The mean similarity index for the strangers seated together and that for those seated two rows apart were 10.20 and 10.00. The *p*-value of the mean difference test in the last row indicates no difference between the two means. The answers of the strangers seated together were not more similar than the answers of those seated apart. This result indicates no evidence of copying among strangers seated together.

We now investigate copying between friends using regression. Table 7 displays the regression results. Equations (1) and (2) were estimated using observations from the overstate-copy and copy treatments, respectively. The dependent variables of the two equations were similarity indices. The nextfriend dummy variable was equal to 1 for the friend pairs seated together. The nextfriend variable had significant effects on the similarity indices in the copy treatment only. This result is consistent with that of Table 5.

Equation (3) was estimated using observations from the overstate-copy and copy treatments. For robustness, three additional variables—nmale, |diffscore| and nextfriend_overstate—were added. The nmale variable was the number of males in each pair. For example, nmale = 2 for a pair of two males. The |diffscore| variable was the absolute score difference of each pair. Variables nmale and |diffscore| controlled for the gender and differences in the ability of the subjects in each pair. The nextfriend_overstate variable was a dummy variable which was equal to 1 for each pair in the overstate-copy treatment under the friend condition. This variable controlled for the opportunity for overstating in the friend condition. From the estimated coefficients for equation (3), the nextfriend variable was still significant. The peer effects on copying were robust to additional control variables. The coefficient of nmale was not significant; gender played no role in copying. The coefficient of |diffscore| was negative and significant; pairs with high differences in scores had fewer similar answers. This result was expected as a pair with perfect copying would have no score difference. The coefficient of nextfriend_overstate was negative and significant; the opportunity to overstate decreased copying and the answers' similarities.

Table 5 Similarity Indices in the Overstate-copy and Copy Treatments

Condition	# of Obs.	Overstate-copy		Copy	
		Mean	S.D.	Mean	S.D.
Friend condition	24	11.41	7.56	16.50	8.20
Stranger condition	24	12.83	5.81	10.20	6.42
p-value of mean diff. test		.4711		.0050***	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 6 Similarity Indices for the Strangers in the Copy Treatment

Seating arrangement	# of Obs.	Mean	S.D.
Two strangers seated together	24	10.20	6.42
Two strangers seated two rows apart	24	10.00	6.04
p-value of mean diff. test		0.91	

Table 7 OLS Regression: Similarity Indices

	Dependent Variable = Similarity index		
Variable	Equation		
	(1)	(2)	(3)
nextfriend	-1.417	6.292***	4.414**
	(1.948)	(2.128)	(1.825)
nmale			1.833
			(1.174)
|diffscore|			-0.332***
			(0.116)
nextfriend_overstate			-4.702**
			(2.156)
constant	12.83***	10.21***	12.86***
	(1.187)	(1.312)	(1.457)
Treatment	Overstate-copy	Copy	Both
# of Observations	48	48	96
R-squared	0.011	0.160	0.201

Robust standard errors in parentheses
*** $p < .01$, ** $p < .05$, * $p < .1$

As a summary of this section, the results in Table 5, 6, and 7 show that there were peer effects from friends in terms of copying. However, when a subject could choose between copying from friends or overstating, the subject chose overstating rather than copying. Moreover, no evidence of copying among strangers was found.

Conclusion

This paper studied the peer effects of friends on exam cheating using an experiment in a laboratory setting. The peer effects were induced by recruiting subjects for the experiment that were friends in real life. The peer effects on two types of cheating, namely overstating one's own scores and copying from one's neighbor, along with the interaction of overstating and copying, were studied. While overstating can be done individually, copying requires some cooperation from peers.
We found that on average the subjects overstated their scores by about 17 percent in order to increase their payoffs. Nonetheless, we did not find any significant peer effects on overstating. Friends seated together did not overstate more than the others. On the other hand, we found significant peer effects on copying among friends in the treatment where copying was the only way to cheat—friends seated together copied more than the others. On the other hand, no evidence of copying among strangers was found. Moreover, the peer effects on copying among friends disappeared when both overstating and cheating opportunities were feasible, as the subjects could opt to cheat by overstating, which entailed less effort. Last, we would like to acknowledge a limitation of this work concerning external validity. Due to various uncontrolled factors, the behaviors of people in real life can be different from those of subjects in an experiment.

Conflicts of Interest

There is no conflicts of interest.

Acknowledgments

We would like to thank the National Research Council of Thailand and The Thailand Research Fund for funding this study under the SIAM Lab project (Research and Cooperation for Corruption Free Thailand. Project Code: SRI59X0604).

References

Bidgood, J., & Merrill, J. B. (2017, December 22). As computer coding classes swell, so does cheating. *The New York Times*. Retrieved from https://www.nytimes.com/2017/05/29/us/computer-science-cheating.html

Bucciol, A., & Piovesan, M. (2011). Luck or cheating? A field experiment on honesty with children. *Journal of Economic Psychology*, *32*(1), 73–78. https://doi.org/10.1016/j.joep.2010.12.001

Charuvastra, T. (2016). *Medical students busted for hi-tech cheating.* Retrieved from http://www.khaosodenglish.com/life/2016/05/09/1462778826/

Dorn, S., & Edelman, S. (2018). *The disgraceful cheating scandal at one of America's best high schools.* Retrieved from https://nypost.com/2018/01/27/cheating-still-rampant-at-disgraced-stuyvesant-school/

Dreber, A., & Johannesson, M. (2008). Gender differences in deception. *Economics Letters*, *99*(1), 197–199. doi: 10.1016/j.econlet.2007.06.027

Falk, A., & Ichino, A. (2006). Clean evidence on peer effects. *Journal of Labor Economics*, *24*(1), 39–57. https://doi.org/10.1086/497818

Fischbacher, U., & Föllmi-Heusi, F. (2013). Lies in disguise—An experimental study on cheating. *Journal of the European Economic Association*, *11*(3), 525–547. doi: 10.1111/jeea.12014

Friesen, L., & Gangadharan, L. (2012). Individual level evidence of dishonesty and the gender effect. *Economics Letters*, *117*(3), 624–626. doi: 10.1016/j.econlet.2012.08.005

Houser, D., Vetter, S., & Winter, J. (2012). Fairness and cheating. *European Economic Review*, *56*(8), 1645–1655. doi: 10.1016/j.euroecorev.2012.08.001

Jacobsen, C., Fosgaard, T. R., & Pascual-Ezama, D. (2018). Why do we lie? A practical guide to the dishonesty literature. *Journal of Economic Surveys*, *32*(2), 357–387. doi: 10.1111/joes.12204

Lucifora, C., & Tonello, M. (2015). Cheating and social interactions. Evidence from a randomized experiment in a national evaluation program. *Journal of Economic Behavior & Organization, 115*, 45–66. doi: 10.1016/j.jebo.2014.12.006

Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research*, *45*(6), 633–644. doi: 10.1509/jmkr.45.6.633

Pascual-Ezama, D., Dunfield, D., Liaño, B. G.-G. de, & Prelec, D. (2015). Peer effects in unethical behavior: Standing or reputation? *PLOS ONE*, *10*(4), e0122305. doi: 10.1371/journal.pone.0122305

Pérez-Peña, R. (2013, February 1). Harvard forced dozens to leave in cheating scandal. *The New York Times*. Retrieved from https://www.nytimes.com/2013/02/02/education/harvard-forced-dozens-to-leave-in-cheating-scandal.html

Rosenbaum, S. M., Billinger, S., & Stieglitz, N. (2014). Let's be honest: A review of experimental evidence of honesty and truth-telling. *Journal of Economic Psychology*, *45*, 181–196. doi: 10.1016/j.joep.2014.10.002

Weisel, O., & Shalvi, S. (2015). The collaborative roots of corruption. *Proceedings of the National Academy of Sciences*, *112*(34), 10651–10656. doi: 10.1073/pnas.1423035112