What Would You Do, If I Get More? An Experimental Test on the Consequences of Envy.

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ความอิจฉาคืออารมณ์ที่ไม่พึงประสงค์ซึ่งมีลักษณะประกอบไปด้วยความรู้สึกด้อยค่า ความเกลียดชัง และความไม่พอใจจากความอยุติธรรม ความอิจฉาเกิดจากการตระหนักรับรู้ถึงบุคคลหรือกลุ่มบุคคลหนึ่งที่ได้ครอบครองสิ่งที่ผู้อิจฉาต้องการ ซึ่งสามารถทำให้ผู้ที่เกิดความรู้สึกอิจฉาตอบสนองต่อความรู้สึกได้ในสองทางทั้งในทางการทำลายผู้อื่นและการพัฒนาตัวเอง งานวิจัยชิ้นนี้ได้ออกแบบการทดลองเพื่อศึกษาความแตกต่างของการตอบสนองต่อความรู้สึกอิจฉานี้ ผลการทดลองได้แสดงให้เห็นว่าความอิจฉาสามารถกระตุ้นคนที่เกิดอิจฉาไปได้ในทั้งสองทาง นอกจากนั้นตำแหน่งโดยเปรียบเทียบของผู้อิจฉาและผู้ที่ถูกอิจฉามีความสำคัญโดยแสดงให้เห็นถึงความเป็นไปได้ในการพัฒนาตนเองผู้ที่เกิดความอิจฉา

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Envy is an unpleasant emotion characterised by the blended feelings of inferiority, hostility, and resentment produced by an awareness of another person or group of persons who enjoy the desired possession which can motivate the envious person in two paths, destructive (named malicious envy) and competitive (benign envy). This research present experimental design which involves real-effort task to study the quantitative difference in both type of envy. The result provides the evidence that envy may incentivise a substantial amount of person to do in both competitive and destructive things to make them feel better after realising their lower position. The self-position and reference agent position are important for the envious person since it is shown the possibility to improve their satisfaction.

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Nattawut Hunyek

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Chapter 1: Introduction

1.1 Introduction

The economics rationality is usually base on the assumption of self-interest hypothesis that all people are exclusively motivated by their own payoff. This assumption eliminates the possibility that other's payoff can influence our satisfaction (called social preference). But, over the decade, experimental economists have gathered a large number of studies which indicate that social preferences shape the decisions of a substantial fraction of people. The important types of social preference are reciprocity, inequity aversion, pure altruism and envious preference (Fehr & Fischbacher, 2002).

An individual with envious preference is the person who compares his/her own payoff to superior. This upward comparison frequently leads the individual to experience a kind of emotion called "envy" that negatively values the payoff of a reference agent. This is consistent with the general definition of envy which was defined as unpleasant experiences that arise from a realisation that one lacks another's superior quality, achievement or possession (Van de Ven, Zeelenberg, & Pieters, 2009).

Since envy makes the individual worse off. Then, the envious person attempts to vanish this feeling by reducing the positional gap between his/her and superior's position. Therefore, envious person is willing to decrease the payoff of a reference agent, regardless of payoff distribution and reference agent's fair/unfair behaviour (Kirchsteiger, 1994; Mui, 1995) Moreover, Zizzo and Oswald (2001) also found that substantial subjects in experiment are willing to pay to reduce other's payoff and there is a positive correlation between the rank of subject and the amount that they are burnt. These show envy can motivate a person to do the destructive action.

Interestingly, Van de Ven et al. (2009) presented the "Envy Subtype Theory" said that envy has two subtypes that motivate envious person differently. On one hand, the experience of malicious envy leads to a pulling-down (destructive) motivation aim to damage the position of the superior.

But, on the other hand, the experience of benign envy leads to a moving-up (competitive) motivation aim to improve envious person's position. This statement of benign envy was confirmed by Van de Ven, Zeelenberg, and Pieters (2010) which found that (benign) envy can drive the willingness to pay off the envy-elicited good. Moreover, benign envy exists in both countries that have separate words to describe two kinds of envy (e.g. Thai, Dutch, and Polish) and countries that have one word to describe (e.g. English, Spanish and Italian).

By the way, even it is quite clear that envy should occur when there is a gap between persons. But not much study concerns about the quantitative difference in the gap that should affect consequence behaviour. Moreover, many studies create envy from the difference between payoffs that mostly come from luck (Luck-based game) not person's effort. Thus, this research aims to investigate that quantitative difference by using a laboratory experiment.

In the next section, there will start dealing with the definition of envy and how it differences from other similar emotion. Following with theoretical analysis with envy model and how to create costly effort situation in a laboratory. Then there will talk about experimental design, result, and discussion respectively.

1.2 Objective of the Study

To study the effect of the quantitative difference between the payoff of each person that quantitatively influence the consequences of envy.

Chapter 2: Literature Reviews

2.1 The Definition of Envy

In the first step, this section will deal with what envy actually is, in term of definition. And how it is the difference in background between benign envy, malicious envy, and jealousy. Then use this definition to theoretical analysis with envy model.

2.1.1 What is envy?

The definition that widely used in many studies on envy is Smith and Kim (2007)'s definition. They emphasize that envy is an unpleasant and often painful emotion characterised by the blended feelings of "inferiority", "hostility" and "resentment" which produced by an awareness of another person or group of persons who enjoy the desired possession.

Envy is also considered as one of a group of related emotions characterised by negative reactions to the superior fortune of others in the domains that are important to oneself.

2.1.2 Envy Subtype Theory: Envy Proper and Benign Envy

Many studies found that people use the word "envy" in at least two partially senses. First, envy proper is the definition found in the dictionary and it is a main focus of scholarship on envy. This type of envy often called malicious envy since it destructively motivates an envious person to harm others. The harmfulness of envy proper is an interesting question among the various studies. For example, Zizzo and Oswald (2001) experimentally found that envious participants are willing to pay some of their money if it can lead to the destruction of the payoff of the envied person. Wobker (2015) found that one-third of losers in the lottery acted spitefully and reduced the winner's balance by haft.

Next, the brighter side of envy, benign (or non-malicious) envy is different from envy proper in at least one aspect as being free of hostile meaning and closer to admiration. This side of envy has only recently attention, for example, Cohen-Charash (2009) found that although envy leads to a behavioural reaction to harming other, it

also leads to the motivation to improve one's position in the organisation. Van de Ven et al. (2009) support this finding by the result from the experiment conducted in the Netherlands, United States and Spain, which have either one or two words to describe two types of envy.

2.1.3 Envy and Jealousy

These two emotions are quite different in definition, but quite similar in sense of the word that people actually use. By definition, envy involves two people and occurs when one lacks something enjoyed by another. But, jealousy involves at least two persons and occurs when one fears losing someone or something to another. This means, envy focus on something that the envious person lacks. But, jealousy focus on someone who challenging in something that jealousy person already has.

In summary, envy is an unpleasant emotion characterised by the blended feelings of inferiority, hostility, and resentment produced by an awareness of another person or group of persons who enjoy the desired possession. Envy has two subtypes which are benign and malicious envy which motivate an envious person in difference paths since benign envy lacks the feeling of hostility. The motivation of both types of envy is different. Malicious envy motivates a person in a destructive way that leading to hurt other, but benign envy motivates in a competitive way which leading to improve oneself.

2.2 Envy Model

From the definition, envy involves two persons and something that is enjoyed by others is actually affect one own satisfaction. It can easily see that envious person take other's well-being (payoff) as his/her own utility. This is the concept of other-regarding preference or, widely called, social preference.

Assume that there are two persons (X and Y) then the social preference of each individual depends on two components which are his/her own payoff (π_i) and other's payoff (π_j). The utility function is represented by the continuous utility function as follow;

$$U_i = u_i(\pi_i, \pi_j) \quad i, j \in \{X, Y\} \quad \forall i \neq j$$

with;

$$\frac{\partial U_i}{\partial \pi_i} > 0 \tag{1}$$

$$\frac{\partial U_i}{\partial \pi_j} < 0 \tag{2}$$

Where, equation 1 means the more individual i get, the more utility of individual i (monotonic preference). In contrast, equation 2 means the more individual j gets, the less utility of individual i. This implies that both individuals are envious.

Next, giving a functional form of utility function by using Charness and Rabin (2002)'s model. Then, utility function has the following form;

$$U_i(\pi_i, \pi_j) = \begin{cases} (1-\rho)\pi_i + \rho\pi_j & \text{if} \quad \pi_i \geq \pi_j \\ (1-\sigma)\pi_i + \sigma\pi_j & \text{if} \quad \pi_i < \pi_j \end{cases}$$

where ρ and σ are coefficients capture the concerns for other's payoff. Moreover, this functional form satisfies the property of monotonic preference by assuming that $\rho, \sigma < 1$.

Since (benign) envy is characterised by at least inferiority and resentment. So, envy will occur only when $\pi_i < \pi_j$. And it has to make the assumption that two persons are similar to ensure that resentment will occur.

Specifically, envy is the concerning of other's payoff which measured by $|\sigma|$. With assumptions, this envy coefficient should be non-zero to imply that the envious person does care about other's payoff. But, since, equation 2 tells that the more other person gets, the less utility of envious person. Thus, envy coefficient should be negative ($\sigma < 0$).

Since, by the theory, a person does care about other's payoff. It is the incentive that should motivate an envious person in two ways to reduce this positional gap. There are two possible ways, by reducing other's payoff (malicious envy) and by improving their own self (benign envy).

2.3 Costly Effort Implementation

To reflect the consequence of envy in the laboratory, the ways to duplicate the costly effort that actually happen outside the laboratory are important. Gill and Prowse (2019) said there are two ways to implement costly activities in laboratory experiments. First, by using a monetary cost that mocks the effort by specifying output as a function of how much money the subject contribute and, second, by using a real-effort task.

The monetary function allows the experimenter to fully control over the cost of effort. But the advantage of using a real-effort task over the monetary cost function is the more realistic then increase the likelihood that the motivation that drives behaviour outside the laboratory will carry over the laboratory.

In this research use both monetary cost which mimics the effort of each subject in malicious envy treatment, modified from an original treatment by Zizzo and Oswald (2001) and computerised real-effort task named “Slider Task” by Gill and Prowse (2019) in benign envy treatment.

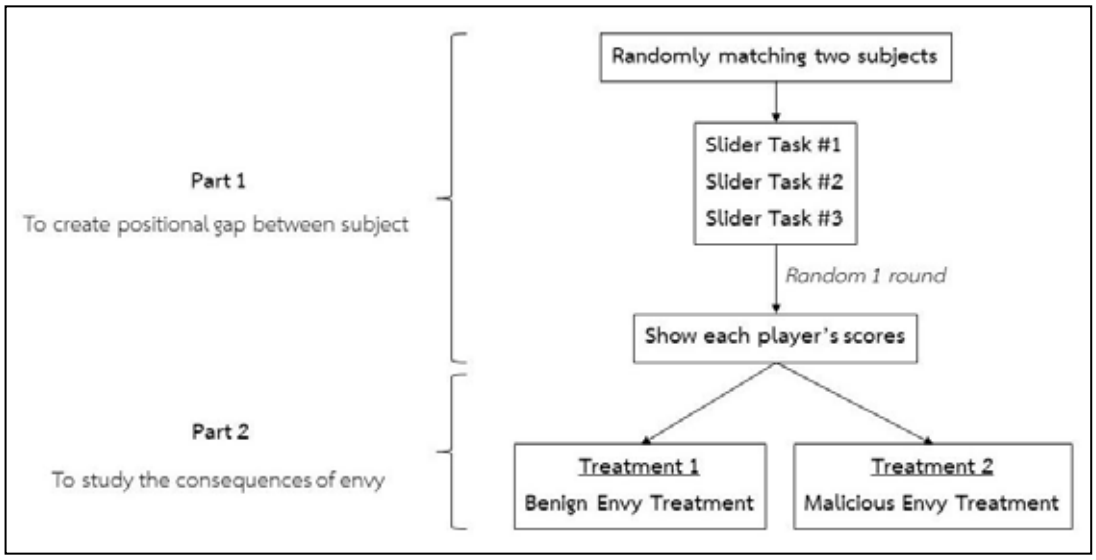
Chapter 3: Experimental Design

Many laboratory experiments examining on the consequence of envy using a luck-based game that endowment for each player come from their own luck e.g. Zizzo and Oswald (2001) and Wobker (2015) which the difference in the endowment of each subject that comes from their luck.

But by the definition of envy involve with the effort of each person, especially benign envy that it motivates a person to improve their own self. By using luck-based game may difficult to reflect such effort since they cannot improve themselves by increasing their luck. The possible way is to create a situation that subjects can increase their real-effort and differences in their own real-effort between subjects should create envy.

So, the experimental design will start with matching up two subjects then create the positional gap between them by using computerised real-effort task named Slider Task to create envy and end up with the consequences of envy which have two treatments (benign and malicious envy treatment), experiment framework in figure 1.

Figure 1 Experiment Framework



3.1 Slider Task

This research used “Slider Task” developed by Gill and Prowse (2019) to create wealth distribution and study the effects of benign envy that incentivise people to take more effort to improve their own self.

This task consists of a single screen displaying a number of “slider” programmed in z-Tree (Fischbacher, 2007).

When the task starts, the screen shows multiple sliders that all initially posits at zero. By using a mouse or arrow keys on the keyboard, the subject can position each slider at any integer location between 0 and 100. Each slider can be adjusted and readjusted infinitely. The current position of each slider shows at the right of each slider.

The point score in the task is the number of sliders that positioned at 50 within 1 minute. The screen shows the subject’s current point score and the amount of time remaining on the top of the screen.

After timeout, the point score accumulated and show on the screen in each round. And this point scores can be interpreted as the effort exertion of each subject in that round then another Slider Task will start in one minute after. In this research, the subject has a chance to play three Slider Tasks and the point score that will use in part 2 will be randomly selected one of three rounds.

3.2 Treatments

3.2.1 Benign Envy Treatment

Each subject has a chance to complete another “Slider Task” for one round. The point score from this round will be topping up of part 1 scores. This treatment design to reflect the benign envy by giving subjects a chance to improving themselves.

3.2.2 Malicious Envy Treatment

Each subject has a chance to deduct other player’s score. The cost of deduction a score is 1 score. This treatment design to indicate the malicious envy by

giving subjects a chance to destroy others by using their own effort which come from Slider Task in part 1 of the experiment.

3.3 Experiment Hypothesis

For benign envy treatment, take an extended decision-theoretic model of the real-effort task, originally from de Araujo et al. (2015). To choose the effort e, individual i solves the following problem;

$$e_i^*(w) = \max_{e \in [0, E_i]} w \cdot e - c_i(e) - c_i(\pi_j - \pi_i)$$

Where w is a piece rate payment, $c_i(e)$ is the cost of effort to completing the task, $c_i(\pi_j - \pi_i)$ is the psychological cost from the realisation of comparative payoff. All cost function is differentiable. And E_i is the maximum effort level that person can choose to exert.

By assuming that $\pi_j > \pi_i$, this means comparative payoff is negative and envy could arise by its definition. Since the payoff of each player from part 1 is exogenous then the rationally optimal exert should not be affected by $c_i(\pi_j - \pi_i)$ term. Intuitionally mean that this realisation from the past should not affect how much exert at the moment.

And for malicious envy treatment, it is quite easy to think rationally that it does not make any sense to deduct other's payoff since it also will make subject worse off.

Chapter 4: Results

The data analysed collected from five experimental sessions conducted at the faculty of economics, Chulalongkorn University. Each session contains with same two treatments but the difference in order. Session 1 and 3 started with malicious envy treatment then following with benign envy treatment while in another section start with benign envy treatment then following with malicious envy treatment. The slider task included 48 sliders and the task length is 60 seconds. The sliders were displayed on the 11-inch widescreen laptop computer. To move the slider, the subject was able to use touchscreen, trackpad or arrow keys on the keyboard.

In total, fifty-four subjects which come from various department of Chulalongkorn University voluntarily participate in one of five sections of the experiment. Every subject got a chance to practice the slider task for 60 seconds and able to ask any questions to experimenter during this practice stage. When every subject is ready, the first treatment will be started. The points score from this practice stage will not be calculated as a reward. At the end of the experiment, the reward calculation is 100 Thai baht (THB) plus 5 THB per points score with minimum 150 THB and maximum 500 THB and it was privately paid to each subject right after the end of the experiment.

In this paper, the term “points score” and “effort” will be used interchangeably to denote the number of sliders correctly positioned by the subject since the term “points score” is the measurable performance in a task that corresponds to “effort” which subject took during the experiment.

4.1 Descriptive Analysis

Table 1 summarises the observed efforts in each round. We see that the mean points score tend to increase over round, from an average of 10.129 sliders in the first round to 14.333 sliders in the final round. This increasing in the effort is interpreted as

a learning-by-doing effect. The maximum observed effort is 23 sliders which imply no upper limit constrained by the design of the task since it appears that no subject was able to complete all 48 sliders in 60 seconds. There are four observations with zero points score. These subjects appear to have a difficult time to posit slider correctly until a few rounds of experiment.

Table 1: Summary of effort by round

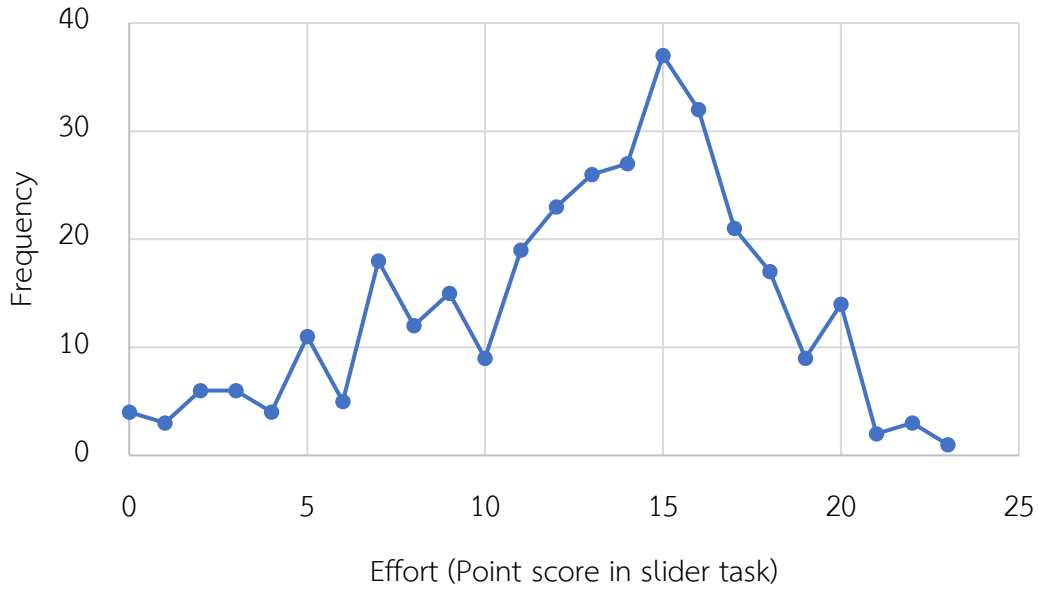
Round	Subject	Mean	S.D.	Min	Max
1	54	10.12963	4.597154	0	18
2	54	11.90741	4.787044	0	22
3	54	11.90741	4.938369	0	20
4	54	13.38889	4.755996	0	22
5	54	14.14815	4.598636	3	22
6	54	14.33333	4.522481	2	23

Figure 2 shows the distribution of points score. This figure was drawn by using all 324 subject-round observations of points score. We see a substantial amount of variation in effort provision. Specifically, there are a small group of people exert very low and very high points score while most of the subject's effort lies between 10 to 20 points score. So, there are differences in effort provision even subjects have only 60 seconds to complete each slider task.

4.2 Response to incentive

After finishing three rounds of slider task in each treatment, every subject was anonymously paired with a new subject by zTree algorithm. All subject was intervened by showing their points score and their paired another subject's points score on the screen. The points score that was shown were randomly chosen from one of three round before. In this section, we study the response in effort exertion to that incentive.

Figure 2: Distribution of effort



4.2.1 Benign envy treatment

In this treatment, after intervened by such intervention. All subject got a chance to do more slider task for 60 seconds (we call this round as benign envy round). The points score from this round was counted in reward calculation. Thus, we use this panel data on repeated effort exertion treatment to estimate how effort exertion responds to such an incentive.

From the fact that the subject's score and another's were shown before starting benign envy round. Table 2 provides initial evidence that effort exertion in benign envy round is significantly higher than all three rounds before. This implies the response to such incentive make subject exerts more effort in benign envy round.

Moreover, we are unable to reject the difference between effort exertion of round 2 and round 3 while we see the difference between round 1 and other rounds. We conclude this finding that the subject is more familiar with the task when doing more rounds. This cause the points score goes higher over rounds (learning-by-doing effect). But after the few rounds, the subject is fully understanding the task and cannot

make any higher points score anymore. This implies the diminishing in marginal productivity in the slider task.

Table 2: Wilcoxon signed rank sum test on effort of benign envy treatment

	Effort			
	Round 1	**Round 2**	**Round 3**	**Benign Envy Round**
Round 1	-	0.008	0	0
Round 2	-	-	0.383	0.0001
Round 3	-	-	-	0.0048

Notes: Ho: median of (Row) – (Column) = 0 vs Ha: median of (Row) – (Column) < 0

Table 3 presents the results of regressions of effort. Column (1) is the regression result base on full 54 observations while column (2) and (3) base on group of envious subjects (who got relatively lower score compares to another subject) and non-envious subjects, respectively. All regression was including control variables to control for heterogeneity among the subject.

We can see that all model shows a positive and statistically significant natural logarithmic round trend which confirms the diminishing in marginal productivity in the slider task.

The response to incentive capture by “benign envy round” dummy variable. Column (2) shows the positive and statistically significant effect of benign envy round while column (3) shows no significant. These mean that after the intervention envious subjects took significantly more effort about 1.25 points score on average while non-envious subjects do not. This shows the effect of benign envy that makes the envious person to improve themselves.

Table 4 further explores the effect of score that was shown before starting benign envy round. It presents the random effect regressions on the effort which column (1) is the regression result base on full 54 observations while column (2) and (3) base on group of envious and non-envious subjects, respectively.

Table 3: Random effects regressions for effort of benign envy treatment

	(1)	(2)	(3)
VARIABLES	**Effort (Points Score)**		
ln(Round)	1.213***	1.232*	1.196**
	(0.398)	(0.681)	(0.471)
Benign Envy Round	0.888*	1.259*	0.545
	(0.454)	(0.719)	(0.593)
Order	0.645	-1.706	2.794***
	(1.324)	(1.582)	(0.977)
Age	0.559**	1.486**	0.379**
	(0.242)	(0.583)	(0.177)
Income	8.38e-05	0.000318**	-0.000104
	(0.000112)	(0.000152)	(0.000116)
CBEE	2.906**	2.119	3.722***
	(1.318)	(2.103)	(1.164)
Sex	1.266	-0.385	1.920**
	(1.086)	(1.895)	(0.920)
CONSTANTS	-5.676	-26.58**	0.283
	(5.455)	(10.55)	(4.363)
Round-Observations	216	104	112
Observations	54	26	28
Random Effect	YES	YES	YES
Overall R-squared	0.202	0.322	0.349

Notes: “order” is dummy variable indicates the order of treatment in such a session which equal to one if that session starts with malicious envy treatment. “CBEE” is dummy variable stand for “Center of Behavioral and Experimental Economics” which equal to one if such specific subject had experience of participation in any other experiment before. “Sex” is a dummy variable which equals one if such a specific subject is female. Robust standard errors are in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% level, respectively.

The effect of subject own scores and another paired subject’s score are captured by “Self-Scores” and “Other’s Scores” variable. In column (2), we can see that subject own scores have positive and statistically significant effect on effort, but another paired subject’s scores have negatively significant effect on effort for the

envious subject. It means that the extra-efforts which envious subject took more in benign envy round base on the score that they saw before starting the round. Specifically, the envious subject will take more effort about 0.39 points score per one their own score that they have seen and take less effort about 0.14 points score per one another subject's score that they have seen.

Table 4: Further random effect regressions for effort of benign envy treatment

	(1)	(2)	(3)
VARIABLES	**Effort (Points Score)**		
ln(Round)	1.001***	1.132	0.999**
	(0.378)	(0.691)	(0.422)
Self-Scores	0.240***	0.389***	0.0678
	(0.0413)	(0.113)	(0.0639)
Other's Scores	-0.134***	-0.141*	-0.00948
	(0.0487)	(0.0838)	(0.111)
Order	0.618	-1.469	2.738***
	(1.220)	(1.437)	(0.978)
Age	0.522**	1.337**	0.374**
	(0.223)	(0.540)	(0.175)
Income	8.63e-05	0.000293**	-0.000102
	(0.000104)	(0.000141)	(0.000113)
CBEE	2.783**	2.009	3.644***
	(1.246)	(1.933)	(1.159)
Sex	1.253	-0.216	1.889**
	(0.994)	(1.731)	(0.909)
CONSTANTS	-4.711	-23.37**	0.539
	(5.090)	(9.912)	(4.330)
Round-Observations	216	104	112
Observation	54	26	28
Random Effect	YES	YES	YES
Overall R-squared	0.273	0.384	0.362

Notes: Control variable description is noted below table 3. Robust standard errors are in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% level, respectively.

Intuitively, envious subjects try to improve themselves after they are known their relatively lower position. But if another subject's score is too high, its negative effect on effort will dominate the intention to improve their position and, in the result, they got lower or not much higher improvement. This implies that benign envy will work with person who got lower position, but not too low. Since it can make the envious person give up improving themselves and stuck with such lower position.

4.2.3 Malicious Envy Treatment

In this treatment, after intervened by such intervention. All subject got a chance to deduct another paired subject's scores. The price per one deducted score is one subject own score. The remaining points score was counted in reward calculation at the end of the experiment.

In summary, there are 12 of 54 subjects (22.22 percent) who chose to deduct another subject's score which the number of envious subjects who chose to deduct 6 of 25 subjects (24 percent) and non-envious subjects who chose to deduct is 6 of 29 subjects (20.69 percent). The average of the deduction is 0.833 points score for the ungrouped subject, 1.24 points for the envious subject and 0.48 points for non-envious subjects while the minimum deduction was zero and the maximum was 13 points score. Table 5 shows the statistical evidence of the existing deduction in all subject groups. We further test with the two-sample Wilcoxon rank-sum (Mann-Whitney) test. And the result shows that there is no difference in deduction between envious subject and non-envious subject. This simple finding shows deduction exists in all subject groups and no difference among them.

Table 5: Wilcoxon signed-rank test on deduction

	Group	P-value
Deduction	All	0.0005
	Envious subject	0.0146
	Non-envious subject	0.0145

Notes: Ho: deduction = 0

Furthermore, Table 6 presents the result of regressions of deduction. The only difference between both models in each column is model in column (2) contain with interaction terms which indicate the effect of subject own score and another paired subject's score for the envious subject. Column (1) shows that subject own scores have positive and statistically significant effect on deduction. This means that the amount of deduction that subject chose to deduct another subject's score depends on their own score. Moreover, there are no significant in interaction term which means there is no difference in the effect of subject own score between envious and non-envious subject. Specifically, the subject will deduct another subject's score about 0.29 points score per one their own score.

Intuitively, if a person has a chance to destroy others there is a substantial amount of person who chose to destroy others even it is costly and no matter the relative position of that person. Moreover, the higher score subjects are able to do more destructive action since the higher score subject can bear the higher cost of destructive action.

In summary, we can see that the intensity of incentive response does not quite difference, especially for the envious subject. In average, the envious subject took more effort to improve their own position about 1.259 points score. In the same time, envious subject deducted other's score about 1.24 points score. These imply no quantitative difference among them which confirmed by Wilcoxon signed-rank test which also show the same result that there is no difference between deduction and extra-effort that subject took more compared to their average effort before the intervention.

Table 6: The regressions for deduction on malicious envy treatment

	(1)	(2)
VARIABLES	Deduction	
Envious Subject?	2.469*	1.316
	(1.329)	(2.164)
Self-Score	0.292**	0.169*
	(0.126)	(0.0844)
Other's Score	-0.0858	-0.0367
	(0.0751)	(0.0529)
Envious Subject * Self Score		0.243
		(0.274)
Envious Subject * Other's Score		-0.150
		(0.218)
Order	-1.107*	-1.095*
	(0.587)	(0.595)
GPA	-1.994***	-1.825**
	(0.737)	(0.729)
Age	9.12e-05	8.09e-05
	(0.000112)	(0.000103)
Income	0.904*	0.926
	(0.523)	(0.553)
CBEE	1.279	1.339
	(0.927)	(0.946)
Sex	-0.409	-0.449
	(0.269)	(0.300)
CONSTANTS	10.93***	12.63**
	(3.675)	(5.081)
Observations	53	53
R-squared	0.448	0.464

Notes: Control variable description is noted below table 3. Robust standard errors are in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% level, respectively.

Chapter 5: Discussions and Conclusion

5.1 Discussion and conclusion

This paper investigates the quantitative difference on the consequences of envy which there are two sub-types of envy named benign envy and malicious envy. The estimation results show that envies can lead people to improve themselves and it also can lead people to destroy referenced other too. The intensity of improvement and destruction is no difference. So, these imply that envious person can do both competitive and destructive things to make themselves into a better position or just to feel better depend on the situation that which ways they can choose. This result is important to social welfare since individual improvement may lead to better overall social welfare. But, the destruction to another person even it may lead the envious person to feel better which improve individual satisfaction, but it makes overall social welfare to decrease.

Moreover, the results also show the importance of self-position and reference agent position. If the reference agent has too high in position compare it, envious person. Then envious person tends to take less effort since it is quite impossible to reduce that positional gap. We conclude this phenomenon that to take more effort envious person to have to realise the possibility to reduce the positional gap by using their own position compare to another's position. If they see the possibility, then they will take more effort based on their own performance and the effort will increase. But if they can not see this possibility, they will give up improving themselves and take effort not much different from their own performance.

Surprisingly, the envious person did not realise that destroying another subject in this experiment cannot improve their own position because they need to pay by their own score which equals to amount that they destroyed. We conclude this finding that for some people seeing others being destroyed make them feel more satisfied.

This satisfaction dominates the cost of destructive behaviour and makes this person better off.

To summarise, this paper provides evidence that envy may incentivise a substantial amount of person to do in both competitive and destructive things to make them feel better after realising their lower position. The self-position and reference agent position are important for the envious person since it is shown the possibility to improve their satisfaction.

5.2 Research Limitation and Future research suggestion

1) We controlled the learning-by-doing effect base on the data and estimation method, not by the experimental procedure. By adding the control group which does not get intervened, we can see treatment effect from benign envy and malicious envy more clearly. But it will cost experimenter more since they have to recruit more subject to get enough data for analyses.

2) They are no choice for the subject to choose which ways to go. In this paper, each treatment gives the subject a chance to do competitively or destructively but not let them choose. This restriction may lead to problems that the experiment cannot simulate the real-world situation.

3) We fixed the monetary reward is 5 THB per points score and the cost of the deduction is 1 point score per 1 deducted score. By changing this number, we could expect to see the change in the subject's behaviour. For example, if the monetary reward is lower to 2 THB per point score then we should expect to see less effort from the subject.

4) We did not study (but try to control for) the difference in characters of the subject that should lead to difference or indifference outcome. More analyses are needed in future research.

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