

Cram Schooling and Academic Achievement

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(Abstract)

Using the 2KJ1 data of Taiwan Youth Project conducted by the Institute of Sociology, Academia Sinica, we deal with the phenomenon of cram schooling and after-school classes within schools. In this paper, three research problems are addressed: (1) cram schooling and after-school classes as reinforcing or remedial measure in the educational system, (2) the academic outcome resulted from cram schooling, and (3) the relative effects on cram schooling and academic achievement (the outcome of entrance examination) among residential settings, school and family context.

We conclude that attending cram classes is more a reinforcing strategy and attending after-school classes is more remedial strategy. The former are positively correlated with students' family SES, urbanization level of residence and academic performance, while the latter having a negative correlation. We indicate a clear effect of students' academic performance in junior high on their outcome of entrance examination for senior high level schools. We find that the high SES families tend to dissuade their children away from vocational track and family SES does not affect the outcome of students' getting into private high, public high or star schools. As to the effects of residential settings, there is a clear difference between Taipei City and Taipei County, and I-Lan has its own pattern. We speculate the educational structure in county level may have impact on their student's probability of attending various types of senior high level schools.

The implications of cram and after-school classes are quite complicated. We can offer some tentative conclusions. Competing for public high or star schools, cram schooling and after-school classes are just mimic behavior with no effect. Competing for public high or private high, cram schooling is more a mimic behavior than after-school classes, since the latter is a more effective strategy to get into public high. Competing for public high or public and private vocational, attending after-school classes is more a mimic behavior than attending cram school. Since we observe no effect of cram and after-school classes in I-Lan county, we may argue that reaching a high attending rate of both classes as in the urban area of I-Lan, cram-schooling and after-school classes will be just a habitual behavior.

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Introduction

One of the major targets for the modernizing state is to decrease illiteracy rate efficiently. Because a low illiteracy rate is not only a symbol of modernity, it is also an indicator of qualified labor force for modern industries. Although the modern educational system was implemented in Taiwan during the period of Japanese occupation, in the 1940s a substantial amount of people did not have the opportunity to enter primary schools in their childhood. Hence, parallel with the development of formal educational system has been the extension school system that is composed of three main categories. The first is the public or private extension schools, ranging from the level of elementary, junior and senior high, to junior college levels. It is established since the 1950s for those who missed attending schools during normal school ages. Secondly, short-term classes not aimed at school diploma are introduced. One important purpose of these classes is to provide learning opportunity of skills required for the job market. Meanwhile, another type of short-term tutorial classes with the intention to prepare students for the entrance examination of high schools or colleges also emerge.

As entrance examinations become more competitive, the market of short-term classes has gradually been taken by tutorial classes, namely the cram school. In addition, all sorts of entrance and qualifying examinations in all levels (e.g., the graduate school or the civil service recruitment) have become more prevalent (Chuang, 1993). For Taiwanese teenagers who are reared in this examination-oriented context, the cram school has almost become a normal track of life (Yi and Wu, 2004). This is indeed a unique phenomenon mostly occurred in East-Asia. Before further discussion, let us briefly review the background of the occurrence for the cram school in Taiwan.

In general, all programs under the extension educational system need to have permit from the government. Since the legitimacy of extension education is primarily a supplement to formal education and not a preparatory course for higher education, therefore, the cram school had not been recognized as a legitimate means by the government until 1972 (Department of Education). Nevertheless, the restrictive regulation failed to meet the urgent demand from the competition in entering higher

education. More under-legitimate cram schools have boomed and soon the government rule was forced to be relaxed. Statistics of the last decade will reveal the amazing growth of this private sector. The cram classes or schools in Taiwan constitute 45% of all short-term classes in 1992 (Ministry of Education, 1996). The actual number of cram schools in Taiwan has increased from a little less than 100 in 1992 to around 600 in 2001, or a sixth times growth in 10 years (Yu, 2003).

Although at the early stage, cram schools are largely for senior high students who want to pass the keen college entrance examination, two important educational policies affect its subsequent development. One is the extension of the compulsory education from primary schools to junior high since 1968. The other is the decision to favor the proportion of vocational high school in relation to the regular high school. Due to the financial situation of the government, the occupational track is encouraged in the private sector and leaves the academic track largely to the public sector. A clear consequence is that in the 1990s, vocational high schools had 70% students and high school of academic track had only 30% (Chang, Hsueh & Huang, 1996). Since a college degree has always been the aspired goal for parents and adolescents alike, to enter into a good senior high school means a necessary start to the targeted competition. The cram classes for junior high students have thus become popular after the 1960s. A retrospective data from an island-wide survey indicates an increase of attending cram classes at junior high from less than 5% of the 1935-41 cohort to almost 20% of the 1957-63 cohort (Yu, 2003). As it develops, about half of students in our samples, born in 1986-87, reported that they attended cram schools in the third year of their junior high. When an activity draws the attendance of half the population, it certainly becomes an important norm in the daily life.

Cram schooling is not only significant at the junior high and senior high level, it also extends to the college level. The competition for taking the entrance test for domestic graduate schools as well as for applying the foreign schools that usually require the GRE, GMAT and TOFLE scores, and the civil service examination all result in a high demand of tutorial classes. As a consequence, cram schools of various types quickly spread out in various parts of Taiwan, and in large cities, certain obvious cram school districts are formed. The intra-competition for students among cram schools has been observed in that advertisements and strategies to induce student's incentive are noticeable, especially among famous chain cram schools (Chuang, 1993).

Although being frequently criticized by educational experts for its non-educational function, cram school remains to be an important extension educational institution in Taiwan. In fact, for many parents and students in middle schools, cram schools may be indispensable. It is often mentioned that educational

reforms in the various forms applied to the entrance examination system, in the lessening of educational tracking in early ages, and in increasing the number of senior high schools and above will dissuade students from cram schooling. However, the reality is not in accordance with the government's effort. A major attribution falls on the constant pressure from the entrance examination for students and parents. As long as families are strong supporters for the "good college diploma" value, cram schools will continue to enjoy its irreplaceable market (Yi and Wu, 2004). Since almost half of the junior high students in Taiwan are attending cram classes, it is important to explore the role of cram schooling in the education system. In addition, whether cram schools will decline as the educational reformist expects is worth systematic observation.

In recent years, cram schools have caused attention from the academic community and few surveys in Taiwan have collected relevant information on cram schooling. From papers released so far, it is clear that cram schooling does affect the adolescents and their families in a significant way. In this paper, we will share the mutual interest in cram schooling among Taiwanese youths with a special emphasis on its potential function toward the subsequent educational achievement.

Our Research Problem

Cram schooling, with its origin in the extension educational system, is an important family strategy to enrich the human and social capital of its children. When sociological work refers to the family's educational resources, it usually means whether parents offer a home environment to better their children's academic skills and orientations. For example, a specific space for study at home, the purchase of reference books, and the availability of newspapers are a few indicators for educational resources of a family (Teachman, 1987). Cram schooling may be regarded as an educational resource external to the family. When parents or youth think that normal study at school and at home is inadequate for the highly competitive entrance examination, an investment in the cram schooling will become a priority.

Cram schooling is financially demanding. The cost of cram classes is higher than the tuition of private schools and much higher than that of public schools. It is apparent that family's financial ability often corresponds to its socio-economic status, and plays a critical role in the process. However, as Teachman argues (1987), family's socio-economic status may have only a moderate correlation with educational resources. Similar argument may also apply to family's investment in cram schools. We should note that parents have different evaluation toward cram schooling. Some hold negative views because of their own ability in providing good

study environment at home and in offering actual academic help. Other parents may simply care less the academic performance of their children. Still another factor is the academic competitiveness within family, class and school. When students are situated in the academically competitive environment, they may be forced to attend cram classes. A few recent studies have shown that family SES, the urbanization level of the residence, and academic competitiveness within school context are significant factors accounting for the attendance of cram classes (Stevenson and Baker, 1992; Sun & Huang, 1996; Chen, 2002; Yu & Lo, 2003). This is true for both junior and senior high students. It is also pointed out that even all above factors are controlled, cram schooling still has had a significant effect on the outcome for the entrance examination (Ibid.).

Relevant reports on cram schooling in Japan and Taiwan seem to reach similar conclusion. As Stevenson and Baker (1992) suggest, cram schooling is particular for societies with a national entrance examination system and a contest pattern of social mobility in the history. We may anticipate that in a society like Taiwan where the socio-economic advancement is rapid, the proportion of families capable of paying the cram school cost is increasing accordingly. As stated above, the proportion of junior high students attending cram classes in Taiwan is estimated to increase from 20% in the late 1970s to 50% in the late 1990s. The first data are taken from a study based on adult samples and the retrospective collection on earlier junior high experiences is used. This paper, instead, will focus on samples which are at their junior high schools. The time span between two samples as well as the corresponding societal change toward educational expectation is assumed to affect the cram schooling in Taiwan. This paper will address the potential function of cram schools and their possible academic outcome for adolescents in Taiwan. Specifically, three research questions will be focused:

1. Cram schools as reinforcing or remedial measure in the educational system?

Previous studies indicate that students with better educational resources and better academic standing are more likely to attend cram classes. This implies that cram schooling is a reinforcing strategy, making the stronger even stronger. However, since cram schooling is a component of the extension school system, important remedial functions to help the educationally disadvantaged are assumed. We recognize that present entrance examinations lead to a very contestant pattern of educational mobility in Taiwan. But if it is students with better educational resources who utilize cram schooling to advance their academic performance, then the function of formal education should be questioned. An attempt will be made in this paper to contrast the basic reinforcement versus remedy argument. Specific focus will be put in studying possible remaining remedial components in a primarily reinforcing-

oriented environment of cram schooling.

In the general discussion of cram schooling, it should be noted that there are also after-school classes in the evening within the junior high system (Sun & Huang, 1996; Yu, 2003). These classes take various forms. It may be arranged with classes taught by teachers, somewhat like cram classes within the school. It may take place with student's self-study accompanied by teachers or parents only, just to offer a better studying setting. After-school classes are usually much less costly than cram classes, and often times they are supposed to be free of charge. The importance of after-school classes varies according to rural-urban differences with rural areas having more emphasis on the intended within school remedial mechanism. Likewise, families with economic disadvantages or students with inadequate academic performance are also more likely to attend after-school classes. In addition, it has been suspected that classes with reported higher competition tend to attend the after-school classes collectively. We will also have some comparison of after-school classes and cram schooling under the guidance of reinforcement vs. remedy contrast.

2. The possible academic outcome resulted from cram schooling.

It has been documented that family and school are two immediate contexts explaining most of adolescent's academic achievement (Eccles, et al., 1996). In contrast, cram schooling, as an important extension education, has been seriously under-analyzed. It is evident that a direct attention should be placed on the potential contribution of cram schooling in its relation with the intended outcome—to have good performance in the entrance examination. The possible outcome from cram schooling toward adolescent's academic achievement will shed light on the future discussion regarding the educational policy of the extension school system.

3. The relative importance among urbanization, school and family context.

As we have mentioned, the family SES, the urban-rural settings and the family educational resources of students all have some effects on their attendance at cram and after-school classes and their achievement in various entrance examinations. In other words, the interplay among community, school and family context is indeed an important research question to pursue.

In the following, we will first delineate the reinforcement versus the remedy contrast from aspects of family socio-economic background, residential settings around schools, as well as academic standing and academic competitiveness in school.

The Family's Socio-Economic Status (SES) of Adolescents

Numerous studies concur that the family's SES of students is positively correlated with their attendance of cram schools. It appears to be a strong support of

the reinforcement argument for the high SES family. On the other hand, it should be pointed out that for most disadvantageous families, cram schooling is less likely either because of the low income status or the low educational aspiration for their children. For this group, a remedial measure is usually taken by attending the less costly after-school classes in campus. Cram schooling, if used, tends to represent a remedy stand as well. As to the middle class, it has been contended that people in the middle class are an anxious class which is “trapped in the frenzy of effort it takes to preserve their standing” (Bellah et al., 1996). As a consequence, more concern is observed with their offspring’s education (Bourdieu, 1984).

Among students of different family SES background, we propose that the tendency to attend cram classes is the highest for families in the middle stratum, or for families with parents having higher income but moderate education. This is because parents in these families are anxious about preparing children for higher academic achievement than selves. But they worry that the educational resources at home is not enough due to their own less equipped educational background. Hence, cram schooling which is affordable for this group becomes an important mechanism to realize the educational aspiration of both generations. This situation leans toward reinforcement thesis, but with remedial purpose as well. We call it a duo-function.

Urban and Rural Settings

In Taiwan, the majority of junior high students attend schools in their own school district. Urban schools are usually equipped with adequate facilities as well as better teachers. In a sense, it is rural students who need the help of cram schooling because they are the disadvantageous group in the entrance examination. However, cram schools tend to concentrate in urban areas which contain optimal scale of the market demand. It is plausible that urban students attend cram classes in greater numbers and likely with the reinforcement purpose. For students in the fringe of the metropolitan area or in satellite area or median cities, a higher tendency of attending cram classes than rural students is suspected due to its geographical convenience. This pattern is regarded as having the duo-function in that both the reinforcement and the remedy purposes are met. With regard to rural students, the after-school class is considered a feasible substitute for cram classes due to financial and geographical reasons. The rural group is therefore characterized by using the remedial strategy.

Academic Standing and Academic Competition in School

Improvement in the academic standing is undoubtedly the most pursued goal for most schools in Taiwan. Although the objective standard in terms of ranking specific schools is officially forbidden, consensus regarding the relative ranking of school’s academic standing can generally be reached. For illustration purpose, we shall

differentiate school standing into three categories: high, medium and low.

Students with better academic standing are expected to benefit more from learning in school and hence require less assistance from non-school context. These students are confident on their school's academic resources and tend less to participate in cram schooling. It is also reasonable to predict that schools with high academic reputation as well as classes with high academic standing in school may offer their students better pedagogy. Overall, we presume that students in schools with high academic prestige or in classes with best academic standing will less likely to attend the cram school. Nevertheless, if they do (i.e., the probability of students' attending cram school is positively correlated with their school's prestige or class standing), an extreme pattern of reinforcement may be found. In this study, because we are not able to construct successfully an indicator for school prestige, we can only address the findings from student's academic ranking and their class's standing.

As argued before, students in schools of moderate academic prestige or in classes with middle academic standing may exhibit a highest cram schooling inclination. In other words, a nonlinear pattern is hypothesized in that the proportion of students attending cram classes is higher for students with academic ranking in the middle than those in the bottom or on the top. Cram schooling is thus regarded as a remedial strategy for middle-ranking students. With regard to students in schools with low academic standing and low academic competition in school, less cram schooling may be observed and remedial pattern mostly from the after-school classes will be expected.

Similar patterns of cram schooling in the senior high school level also deserve investigation. If students in senior high schools of academic track are still more likely to attend cram schools than those in schools of vocational track, and if students in higher prestige schools tend to use cram schooling more often than those in schools with less prestige, then a pattern of reinforcement sustains. It is very possible that the proportion of students in vocational track or in low prestigious schools have a lower rate of cram schooling, because students in vocational high schools are less likely to take the college entrance examination. And for students in low prestigious schools, perhaps less educational aspiration is shared between families and schools. Therefore, if these students attend cram schools for various purposes, a clear remedial function is revealed. For other students in the middle, especially schools with medium prestige, the highest tendency to attend cram classes may be found. The expectation to improve one's academic competition as well as the dissatisfaction with the present school's educational resources may produce the cram schooling effects for these students. This is consistent with the remedial pattern proposed by our study.

Cram Schooling as a Mimic Behavior

The ultimate goal of cram schooling for junior high students in Taiwan is clearly to enter more prestigious senior high schools. If the majority of students attend cram classes, then cram school should be a de facto part of formal schooling. According to our data, there are roughly up to half of Taiwanese junior high students attending cram classes. If cram schooling is crucial for the result of entrance examination, those attending cram classes should perform better in the entrance examination. This should be true even other factors, such as family's SES, academic standing in school and rural-urban residence, are controlled.

However, in the preliminary exploration of our data, it appears that the better a student's academic standing, the more likely he/she attends cram classes. Thus, cram schooling may reflect an extreme pattern of reinforcement and those with better academic performance are the ones with the highest tendency to attend cram classes. If no correlation between cram schooling and the entrance examination result is found (controlling the academic standing in junior high), then it may be concluded that cram schooling is just a mimic or a habitual behavior. In other words, under the existing pressure from the highly competitive entrance examination system in Taiwan, cram schooling is regarded as an additional test-improving mechanism available to students either for reinforcing or for remedial purposes. Therefore, if financial situation permits, no one dares to ignore or to lose this opportunity. As a result, one attends cram classes just because other fellow students attend and the effectiveness of cram schooling is in fact not a major concern. In this paper, the above arguments may also be applied to the discussion on after-school classes in that a mimic behavior may be observed..

Variables and Methods

The Sample and the data

The analysis of the paper is based on our surveys with 2kj1 samples. The samples are selected from the first year students of junior high schools at Taipei City, Taipei County and Yi-lan County in 2000. The sample has been followed up year by year since then. The analysis of the paper relies primarily on the data of the 2kj1 third wave survey conducted in 2002 and supplemented by 2000, 2001 and 2003 survey data.

The Variables

1. Cram classes and after-school classes

In addition to attending or not attending cram classes and after-school classes, we construct another three variables. The first is a combining variable for attending cram

and after-school classes: (1) attending neither cram or after school classes, (2) attending only after-school classes, (3) attending only cram classes and (4) attending both cram and after-school classes. The second is the change of the attendance at cram classes between the first and the second year of junior high: (1) not attending in both years, (2) attending only in the first year, (3) attending only in the second year and (4) attending in both years. The third is the change of the attendance at cram classes between the second and third year of junior high: (1) not attending in both years, (2) attending only in the second year, (3) attending only in the third year, (4) attending in both years.

2. Family socio-economic status

We pick up only two indicator of family socio-economic status. Father's education is classified into five categories: primary school and under, junior high school (including vocational school), senior high school (including vocational school), junior college, college and university and graduate school. Family income has five categories, under 30,000, between 30,000-50,000, between 50,000-60,000, between 60,000 to 80,000, between 80,000 and 100,000, and above 100,000. In multivariate analysis, father's education and family income are treated both as interval variable from the lowest value 1 to highest value 6.

3. Residential settings around schools

Due to that Taipei City and County are largely urbanized, we include some consideration of area socio-economic status in addition to rural-urban division, based on a study of urban ecological structure of Taipei metropolitan area (Chang, 1995). We have thus the following category of areas.

- (1) The old core of Taipei City, including Tatung, and Wanhua districts. It is the earliest developed area of Taipei City and its population has lower socio-economic status on average than the city's other areas.
- (2) The new core of Taipei City, including Chung-cheng, Ta-an, Chung-san and Sung-sang districts. This area had been fast developed between 1950 to 1980 and its residents have higher socio-economic status on average than the city's other areas.
- (3) The suburban area of Taipei City, including Hsin-yi, Peitou, Neihu, Nankang and Wenshan districts. Except Hsin-yi district, all other was incorporated into Taipei city in 1968, and was highly developed in 1980s. There is only one junior high school in Hsin-yi district in our sample. This school is located in the district's fringe, located in hillside and close to Nankang district. We accordingly include it in suburban area.
- (4) The satellite area in Taipei County, including Panchiao, Yunghe, Chunghe and Tanshui Cities. These cities have a large proportion of its residents in service

sector, commuting to work in Taipei City.

- (5) The industrial area of Taipei County, including Sanchung, Hsinshuang, Tucheng and Shulin Cities. These cities are consisted primarily of manufacturing workers working in the area's factories.
- (6) Rural area of Taipei County, including Chinshan, Shihting and Pali.
- (7) Urban area of I-Lan County, including the two cities, I-Lan City and Lotung City.
- (8) Rural area of I-Lan County, including Chiaohsi, Chuangwei, Wuchieh, Tungshan and Suao.

In the discussion of the relations between cram schooling and residential area, we will first observe the difference due to urban and rural differentiation, and then look into the implications derived from the area's socio-economic status.

4. Academic performance and class status

Academic performance has two indicators. The first is student's self-reported academic ranking in class. It consists of five categories, (1) behind the 30th, (2) between the 21st and the 30th, (3) between the 11th and the 20th, (4) between the 6th and the 10th, and (5) between the 1st and the 5th. The second is the subjective evaluation of students on their academic progress. It includes (1) lag far behind, (2) lag some behind but can probably catch up, (3) lag a little but can catch up soon, (4) can mostly catch up, and (5) far ahead. In multivariate analysis, these two variables will be regarded as interval variables, from the worst evaluation as 1 and the best evaluation as 5.

5. Class standing in school

This variable is students' subjective evaluation of the academic performance of their class on average compared to other classes in the same grade of their school. It has five categories: (1) far worse, (2) a little worse (3) similar (4) a little better and (5) far better. In multivariate analysis, this variable is regarded as an interval variable, with the lowest value 1, indicating far worse, to the highest value 5, indicating far better.

6. Achievement in Entrance Examination

For those students entering a school of senior high level, the schools are classified into five categories, star high schools, public high schools (including a couple of private schools with good academic reputation), private high schools, public vocational high schools (including five year junior college) and private vocational high schools (including five year junior college). When we deal with Yi-Lan County

specifically, we divided the schools of senior high level into three categories only, senior high schools (including a few private high schools), public vocational high schools and private vocational high schools, since all star high schools are located at Taipei City and only 7 students in I-lan attend private senior high of vocational track.

Methods

In the paper, we will first treat attending cram and after-school classes as dependent variables. We use cross-tabulation to observe how family SES, residential settings and academic performance of students are related to the attendance at cram or after-school classes. We then use multi-nominal logit model to account for the change of the attendance at cram classes during the three years of junior high.

Second, we will have the outcome of entrance examination for schools of senior high level as dependent variable. Using multi-nominal logit analysis, we try to see what are the effects of family SES, residential settings, academic performance in junior high, and the attendance of cram and after-school classes on the outcome of entrance examination and their implications.

The Attendance of Cram Classes and After-school Classes in Junior High Schools

Our panel surveys have collected data on our student respondents' attendance at cram schools year by year. For our J1 samples, we now have their five-year records of cram schooling from their junior high first year to senior high second year. We can observe our J1 sample's trajectory of cram schooling in Table 1-1. We usually believe that cram schooling is primarily a consequence of entrance examination pressure and may expect that attending cram schooling may be more prevalent in the third year of junior high than in previous years. However, Table 1-1 is indicated a decreasing of cram schooling all the way from the first year to the second year, and to the third year. There is another dramatic downturn when students enter the senior high. We may perhaps conclude that cram schooling is not that serious as we have imaged.

However, we may not able to give a quick conclusion. First, as we mentioned earlier, most junior high schools provide after-school classes for increasing their student's competence in senior high entrance examination. In terms of Table 1-1, only one fourth of students attend after-school classes in the first year, while close to 60% in the third year. Furthermore, some tracking effects have to be explored (Hsieh, 1989; Oakes, 1985). For those who enter senior high school of academic track, their rate of attending cram classes decreases only a little, from 75% to 71%. For those who enter that of vocational track, the rate decreased dramatically from 62% to 41%. We can see a sharper difference between the academic and the vocational tracks in senior high

stage. The difference of rate of attending cram school is approaching 60% for the former and around 10% for the latter. We anticipate that those with best outcome of entering star schools have the best school environment and may not pursuing cram schooling. However, Table 1-2 shows that they have the highest rate of attending cram classes, close to 80%.

Table 1-1 Trajectory of attending cram and after-school classes, %

<u>All samples</u>	<u>j1jr1</u>	<u>j1jr2</u>	<u>j1jr3</u>	<u>j1sr1</u>	<u>j1sr2</u>
Cram classes	64.36	55.27	51.11	32.20	35.14
After-school classes	25.67		58.79		
<u>Senior high of academic track</u>					
Cram classes	74.90	72.87	70.86	57.75	57.16
After school classes	20.08		44.28		
<u>Senior high of vocational track</u>					
Cram classes	62.35	47.51	40.68	9.18	13.55
After-school classes	25.75		47.40		

Table 1-2 The attendance of cram classes in the first year of senior high

<u>schools</u>	<u>no</u>	<u>yes</u>	<u>total</u>
private vocational	642	27	669
	95.96	4.04	100.00
public vocational	432	82	514
	84.05	15.95	100.00
private high	159	57	216
	73.61	26.39	100.00
public high	266	472	738
	36.04	63.96	100.00
star high	22	86	108
	20.37	79.63	100.00
Total	1521	724	2245
	67.75	32.25	100.00

Pearson chi2(4) = 760 Pr = 0.0 00

Even though there is no academic and vocational tracking in junior high schools. Nevertheless, it is plausible for us to speculate that low academic performance in the first or second year of junior high may divert some student away from competing for better academic achievement and accordingly give up cram schooling. In the following, we will describe the variations of cram schooling related to student's family socio-economic status, the urban vs. rural settings of their residences and some

factors related to characteristics of their schools or classes and their academic performance. We will then discuss some implications of the variations under the guidance of reinforcement vs. remedy contrast in the conclusion of the paper.

Variations According to Family SES

We choose only two indicators of Family SES, father's education and family income. In the first two columns, we can see different patterns on the two types of attendance. The higher the father's education of a student, the more likely he/she attends cram classes and the less likely he/she attends after-school classes. 70% of Students with a father of college degree or above attend cram classes, and only one third of students with father of primary school or lower attend. In contrast, students with father of junior high or lower has a rate of attending after-school classes close to two thirds, while those with father of college or above has a rate lower than half. A similar pattern can also be detected for family's income. Students in a family with lowest income have only 36% attending cram classes, while with an income 80,000 or above have a much higher rate of 65%. The former has a rate of attending after-school classes about 66%, however, the latter's about 60. We may observe further the variation in terms of four categories, those only attending after-school classes, only cram classes, both classes and neither classes. Less than 20% of the students attend neither cram no after-school classes. This means that the majority of our sampled students pursue one way or another to improve their ability in entrance examination for senior high. At the same time, we can also see obvious opposite patterns, a positive relation between only attending cram classes and family SES and a negative relation between only attending after-school classes and family SES.

Table 2-1 The attendance of cram and after-school classes:
by family socio-economic status, N & %

	cram classes	school classes	only school classes	only cram classes	both classes	neither classes
father's education						
primary school	132 33.25	194 66.67	131 45.02	37 12.71	63 21.65	60 20.62
junior high	300 42.86	339 64.08	191 36.11	85 16.07	148 27.98	105 19.85
senior high	486 55.29	383 60.70	172 27.26	149 23.61	211 33.44	99 15.69
junior college	121 68.75	71 51.08	17 12.23	48 34.53	54 38.85	20 14.39
college	195 70.91	84 40.00	23 10.95	97 46.19	61 29.05	29 13.81
graduate school	61 70.11	32 46.38	11 15.94	27 39.13	21 30.43	10 14.49
total	1295 51.51	1103 59.02	545 29.16	443 23.70	558 29.86	323 17.28

family income							
30,000-	175	243	152	46	91	77	
	36.23	66.39	41.53	12.57	24.86	21.04	
30-50,000	291	279	140	88	139	75	
	48.50	63.12	31.67	19.91	31.45	16.97	
50-60,000	269	217	101	87	116	68	
	52.64	58.33	27.15	23.39	31.18	18.28	
60-80,000	221	156	68	83	88	50	
	56.09	53.98	23.53	28.72	30.45	17.30	
80-100,000	150	93	36	62	57	21	
	65.22	52.84	20.45	35.23	32.39	11.93	
100,000+	204	118	47	86	71	32	
	64.15	50.00	19.92	36.44	30.08	13.56	
total	1310	1106	544	452	562	323	
	51.66	58.80	28.92	24.03	29.88	17.17	

Based on these findings we can first suggest that cram schooling has a strong characteristic of reinforcement. In addition, since it is more a strategy by students with lower family SES, attending after-school classes is in some sense a remedial measure. We have proposed that the status inconsistency between higher family income and father's lower education may more likely lead a student to cram schooling. In Table 2-2, we find no clear support to the proposition, since categories of high income and high education are more likely than those of high income and low education. However, we do see that students with low family income and high education father are more likely to attend after-school classes. This finding is also pointing to a contrast of the reinforcing cram classes and the remedial after-school classes.

Table 2-2 The attendance of cram and afterschool classes:
by father's education and family income, mean

father's education	cram classes						after-school classes					
	family income (thousands)						family income (thousands)					
	30-	30-50	50-60	60-80	80-100	100+	30-	30-50	50-60	60-80	80-100	100+
primary school	131	92	66	37	26	26	96	66	48	29	19	16
	.297	.380	.318	.324	.538	.269	.697	.712	.583	.551	.684	.687
junior high	157	180	141	104	40	46	121	140	104	71	30	37
	.312	.433	.560	.432	.450	.434	.652	.600	.605	.690	.700	.702
senior high	132	230	186	132	75	93	97	165	131	94	60	61
	.446	.513	.548	.659	.626	.612	.680	.636	.625	.531	.566	.508
junior college	11	26	42	38	19	36	10	21	32	30	14	28
	.454	.615	.595	.763	.842	.777	.500	.523	.531	.666	.357	.392
university	13	27	50	56	46	70	11	20	36	44	35	56
	.692	.740	.600	.625	.782	.828	.454	.550	.444	.340	.371	.375
graduate school	5	9	5	12	14	40	4	8	4	10	11	32
	.800	.777	.600	.500	.785	.725	.750	.500	.500	.200	.363	.531

Variations Related to Residential Settings

In Table 2-3, we can observe that all areas in Taipei City have higher rate of cram schooling than those in Taipei County. Within Taipei City, the new core has the highest rate, the suburban in the middle and the old core the lowest. Within Taipei County, the satellite area have the highest rate, the industrial area in the middle and the rural area the least. Especially the attending rate of the rural area is 16%, far lower than even rural area in I-Lan. In I-Lan County, the attending rate of urban area is far higher than that of rural area. Taipei metropolitan area and Yi-Lan County's rural areas have both a lower rate than their urban areas.

The different attending rates of cram classes in urban areas of Taipei City and Taipei County reflect a difference of area socio-economic status. The area ranking of SES in Taipei city and the area rate of cram schooling has the same descending order from the new core, the suburban to the old core. In Taipei County, the cram class attending rate of satellite cities is higher than that of industrial area. The population of satellite area has a higher average schooling years and higher proportion of professional or semi-professional workers than the industrial area . The above findings seem to fit the expectation of urban and rural difference in terms of reinforcement proposition.

Table 2-3 The attendance of cram and afterschool classes:
by urban and rural settings, N & %

	cram classes	school classes	only school classes	only cram classes	both classes	neither classes
I-Lan County						
Rural	146	226	110	28	113	46
	46.20	74.83	37.04	9.43	38.05	15.49
urban	179	196	53	24	143	11
	71.89	84.85	22.94	10.39	61.90	4.76
Taipei County						
Rural	28	82	68	9	8	25
	16.37	66.67	61.82	8.18	7.27	22.73
industrial	137	131	88	52	41	53
	39.60	54.81	37.61	22.22	17.52	22.65
satellite	215	184	105	77	75	62
	46.14	56.62	32.92	24.14	23.51	19.44
Taipei City						
Suburan	238	122	58	118	59	70
	57.63	39.10	19.02	38.69	19.34	22.95
new core	263	127	38	114	87	33
	70.32	45.85	13.97	41.91	31.99	12.13
old core	90	73	31	31	41	33
	48.91	53.28	22.79	22.79	30.15	24.26
total						
	1296	1141	551	453	567	333
	51.45	58.63	28.94	23.79	29.78	17.49

However, we also observe that I-Lan's urban area has a rate of cram schooling higher than Taipei's new area, and its rural area has a much higher rate than Taipei

County's. It counters our expectation, since in general we regard that I-Lan County has a lower urbanization level than Taipei Metropolis, sometimes we refer I-Lan as a periphery and Taipei as the core.

As to the attendance of after-school classes, the pattern of area differences is not just an opposite to that of cram class attendance. In Taipei City, the old core has the highest rate, the suburban area the lowest rate. In Taipei County, the rural area has the highest rate, the satellite area comes the next. In I-Lan County, the urban area has a higher rate than the rural area. We can describe the pattern as follows. In rural areas or the most disadvantageous area in a metropolis, junior high students are most likely to attend after-school classes and least likely to attend cram classes. Nevertheless, The highest SES area not only has the highest attending rate of cram classes, but also a higher attending rate of after-school classes. This implies that the most advantageous area has a very competitive climate, since its students have both a higher tendency to attend cram classes and to attend after-school classes.

In terms of the categories combining cram and after-school classes, we observe first that the higher rate of only attending after-school classes and higher proportion of students attending neither cram nor after-school classes in rural or lower SES areas than in urban or higher SES areas. Second, the rate of only attending cram schooling is higher in urban or higher SES areas than in rural or lower SES areas.

We may treat Taipei City and County as a unit and I-Lan County as another unit for observing the regional variations of cram schooling and after school classes. Within each unit, the variations are related not only to urban and rural settings but also to the socio-economic statuses of urban areas. In general, the urban areas or higher SES areas have a higher rate of attending cram classes, a lower rate of attending after-school classes than rural areas or lower SES areas. In addition to this general pattern, however, we mentioned that Yi-Lan County has a higher rate of student's attending cram and after-school classes than Taipei Metropolitan area. It in some sense does not fit to our expectation and we are now not able to offer explanations. We can only highlight this as an indication of island wide phenomenon of extra-curriculum preparation for entrance examination.

Variations Related to Student's Academic Ranking and Class Standing

Now let us have a look at the relation between academic performance and cram schooling and after-school classes. In Table 2-4, we can see the rate of attending cram classes or after-school classes in terms of the academic ranking and subjective evaluation of academic progress. First, we observe different patterns of the relation of academic performance to cram schooling and to after-school classes. There is clear positive relation between academic performance and cram schooling. About 70% of

Table 2-4 The attendance of cram and afterschool classes:
by academic ranking and class standing

academic ranking	cram classes	school classes	cram classes	school classes	only school classes	only cram classes	both classes	neither classes
30-	46	116	42	104	87	13	17	80
	15.38	54.46	14.74	52.79	44.16	6.60	8.63	40.61
21-30	79	115	242	306	200	81	106	124
	28.11	56.93	34.52	59.88	39.14	15.85	20.74	24.27
11-20	347	330	473	361	154	154	207	82
	47.21	58.41	57.68	60.47	25.80	25.80	34.67	13.74
6-10	588	409	326	203	72	121	131	32
	65.63	58.18	71.49	57.02	20.22	33.99	36.80	8.99
1-5	270	206	276	188	65	100	123	28
	69.59	63.58	69.17	59.49	20.57	31.65	38.92	8.86
total	1330	1176	1359	1162	578	469	584	346
	51.17	58.59	51.07	58.78	29.24	23.72	29.54	17.50
academic progress								
far behind	43	116	77	181	152	28	29	113
	13.96	51.10	16.59	56.21	47.20	8.70	9.01	35.09
some behind	335	356	392	348	191	141	157	128
	40.12	57.33	45.74	56.40	30.96	22.85	25.45	20.75
a little behind	188	177	156	133	58	50	75	23
	55.62	66.79	59.32	64.56	28.16	24.27	36.41	11.17
catch up soon	713	501	681	470	170	232	300	77
	67.58	59.15	67.36	60.33	21.82	29.78	38.51	9.88
far ahead	51	26	54	29	6	19	23	5
	80.95	55.32	80.60	54.72	11.32	35.85	43.40	9.43
total	1330	1176	1360	1161	577	470	584	346
	51.17	58.59	51.09	58.73	29.19	23.77	29.54	17.50
class standing								
much lower	202	171	152	122	75	62	47	53
	50.63	56.44	46.48	51.48	31.65	26.16	19.83	22.36
a little lower	307	236	373	266	137	151	129	71
	52.48	53.51	55.26	54.51	28.07	30.94	26.43	14.55
similar	446	379	440	375	193	155	182	142
	49.89	55.90	47.72	55.80	28.72	23.07	27.08	21.13
a little better	276	267	312	305	134	83	171	51
	53.49	65.93	54.93	69.48	30.52	18.91	38.95	11.62
much better	99	121	82	92	38	19	54	29
	48.77	67.98	48.81	65.71	27.14	13.57	38.57	20.71
Total	1330	1174	1359	1160	577	470	583	346
	51.21	58.55	51.09	58.70	29.20	23.79	29.50	17.51

*The attendance rate is base on the data of J1jr3's record. The first two columns's independent variables refer to J1jr2's academic performance and the other columns refer to J1jr3's.

the students with an academic rank in the upper ten attend cram class. In contrast, only around 15 % of those ranked lower than thirtieth attend cram classes. Similarly, the students who believe their academic progress is far ahead of their class mates have the highest rate of attending cram classes, reaching 80%. For those who believe their

progress is far behind their classmates, only around 15% attend cram classes. However, there are little variations in attending after-school classes in terms of academic performance. Students within the top five have a highest attending rate of 66% while those behind the thirtieth have a lowest rate of 54%. In the five categories of academic progress, the far ahead students have an attending rate of 55%, while those far behind are 51%. The catching up category has the highest rate of 66%.

When we look into the more detailed categories of cram and after-school classes, we observe that the percentage of not attending both classes has a negative relation with academic performance. For those far behind in both performance and progress, 35% or 40% do not attend both cram and after-school classes. Those on the top have a percentage only around 9. We also observe that academic ranking and progress have a negative relation to only attending after-school classes, and a positive relation to only attending cram classes, and to attending both classes.

We also have a variable of class standing in the school. It has no clear relations to cram schooling. However, we can detect that the higher a student's evaluation on their class, he/she is not more likely to attend only after-school classes, while more likely to attend after-school classes in addition to cram classes. We speculate that the students evaluating higher of their class may probably consider that all the classmates can benefit or cheer up mutually. Their attending after-school classes does not divert them away from cram schooling.

It is reasonable to argue that cram schooling is a factor of improving students' academic performance. However, the students with the poorest academic performance are much more likely to pursue neither cram nor after-school classes and to pursue only after-school classes, and those ranked in the middle tend more to pursue only after-school classes. It seems plausible for us to argue that academic performance is also a factor of leading one to pursue cram and after-school classes or not. Those far behind may find no use of cram schooling to improve their academic competence, and they may pursue only the lower cost's after-school classes or just give up all extra effort for entrance examination. Those in the middle, similar to those on the top, are anxious to enhance their academic ability, and nevertheless they are also more likely to attend after-school due to the lower cost.

In the beginning, we mentioned that there is a decreasing cram-schooling from the first to the third year of junior high. We also suggest that educational aspiration and academic performance are probable reasons for explanation of the decline. Based on Table 2-5, we can give some explanations. As described in the section of variables and methods, we construct two variables, one for the change of cram schooling from the first to second year and another for the change from the second to third year. Both variables have four categories, never attending cram schools in either year, attending

in the first (or the second) year but not attending in the second (or the third) year, attending in the second (or the third) year but not in the first (or the second) year, attending in both years. In the multi nominal logistic analysis, we have attending cram classes in both years as basecategory.

Table 2-5 Change of cram class attending in junior high: a multi-nominal logit model

	Model I		Model II	
	coefficient	SD	coefficient	SD
not attending in both years/attending in both years				
aspiring to senior high			aspiring to senior high	
of academic track(1)	-0.452	(.111)***	of academic track(3)	-0.365 (.118)**
academic ranks(1)	-0.323	(.049)***	academic ranks(2)	-0.637 (.051)***
family income(2)	-0.076	(.020)***	family income(2)	-0.069 (.019)***
father ' s education	-0.192	(.046)***	father ' s education	-0.262 (.045)***
constant	1.467	(.178)***	constant	3.019 (.202)***
not attending cram classes in the first (second) year / attending in both year				
aspiring to senior high			aspiring to senior high	
of academic track(1)	-0.427	(.136)**	of academic track(3)	-0.676 (.172)***
academic ranks(1)	-0.281	(.060)***	academic ranks(2)	-0.317 (.071)***
family income(2)	-0.060	(.024)*	family income(2)	0.009 (.024)
father ' s education	-0.144	(.055)**	father ' s education	-0.158 (.061)**
constant	0.558	(.213)**	constant	0.400 (.278)
not attending cram classes in the second (third) year / attending in both year				
aspiring to senior high			aspiring to senior high	
of academic track(1)	0.164	(.199)	of academic track(3)	-0.544 (.207)**
academic ranks(1)	-0.069	(.081)	academic ranks(2)	-0.170 (.092)
family income(2)	-0.113	(.034)**	family income(2)	-0.037 (.031)
father ' s education	0.113	(.070)	father ' s education	0.118 (.071)
constant	-1.766	(.304)***	constant	-1.280 (.361)***
N of cases	2222		N of cases	2305
Log Likelihood	-2498		Log Likelihood	-2438
Pseudo R-Squared	0.043		Pseudo R-Squared	0.082

*** p-value < 0.001 ** p-value < 0.01 * p-value < 0.05

(1) means junior high's first year (2) means junior high's second year

In the first model of Table 2-5, We observe no impact of academic ranking on taking cram classes only in the second year in contrast to that in both years. We can detect that students of higher family income is more likely to attend cram schools in both year and less likely only in the second year. This may imply that higher income family may lead a student to attend cram classes earlier. In Model II we find that aspiring to senior high school of academic tracking also leads to a similar pattern for a change between the second and third year.

In Model I, for those attending cram classes in the first year but drop out in the second year, compared to those attending in both years, they have lower aspiration to senior high school of academic tracking, lower academic performance in the first year, lower family income and lower father's education. In Model II, except family income,

all other variables show similar results as in Model I. Furthermore, in both Model I & II, the lower the student's educational aspiration, the lower their academic ranking, and the lower their family income and father's education, they are more likely not to attend cram classes across their junior high year. In short, family socio-economic status do have influence on the student's attendance at cram classes, nevertheless, lower educational aspiration, academic standing and family SES seem independently to dissuade student's effort in pursuing cram schooling.

Cram Schooling and Outcome in the Entrance Examination

One of the major objectives of cram and after-schooling is preparing students for the entrance examination of schools of higher level. As we suggested in the section of research issue that we may find no effect of cram schooling on the performance of entrance examination if we control variables such as family SES and academic performance in school. If this is true, then we may argue that cram schooling is just a mimic or habitual behavior under entrance examination pressure. We will tackle this issue in terms of the sample of Taipei metropolitan area and I-Lan County separately. The rationale is that in the entrance examination for schools of senior high level, Taipei metropolitan area and I-Lan County have separate system. According to our survey data, I-lan County has much higher proportion of schools in public sector, including both in academic and in vocational track. Students in I-Lan County rarely register in schools of Taipei Metropolitan. Several of senior high schools of Taipei metropolitan area have the best performance on college entrance examination and it has much higher proportion of schools in private sector compared to I-Lan County. In the multi-nominal logistic analysis, we have five models with differences of variables related to the attendance of cram or after-school classes. Model I has only the variable of attending cram classes. Model II has only that of attending after-school classes. Model III adds to Model I an interaction term of academic ranks and cram classes. Model IV adds to Model II an interaction term of academic ranks and after-school classes. Model V includes only four categories of combining cram and after-school classes. We observe the simpler analysis of I-Lan case first in Table 3-1. In I-lan county, schools of senior high level are classified into senior high schools, public vocational high schools and private vocational high schools and public vocational is the basecategory of the dependent variable. In Table 3-1, except that female more likely to attend private than schools, all other variables appear no effect on student's attending public or private vocational schools. We may argue that it does not matter for students in I-Lan to choose public or private vocational schools. When senior high schools are contrasted to public vocational schools, under control of other variables, we observe several signification correlations between some independent

variables and entrance examination performance. Students with higher educated father are more likely to attend senior high than public vocational. Rural students are more likely to attend public vocational than urban students. Students with better academic performance in school are more likely to attend senior high than public vocational. Nevertheless, we find no significant effect of cram or after-school classes.

Table 3-1 Multinomial Logistic Analysis of outcome of entrance examination:
I-Lan County

	Model I		Model II		Model III		Model IV		Model V	
	Coef.	SD	Coef.	SD	Coef.	SD	Coef.	SD	Coef.	SD
Private vocational/Public vocational										
Sex	1.658	(.350)***	1.612	(.427)***	1.652	(.350)***	1.625	(.364)***	1.645	(.367)**
Father ' s education	0.266	(.162)	0.262	(.192)	0.237	(.162)	0.258	(.172)	0.292	(.176)
Family income	0.067	(.063)	0.058	(.079)	0.069	(.063)	0.061	(.066)	0.073	(.066)
Rural	0.648	(.373)	0.748	(.458)	0.715	(.383)	0.756	(.381)*	0.761	(.397)
Academic ranking	-0.212	(.197)	-0.135	(.243)	-0.048	(.243)	0.034	(.450)	-0.148	(.206)
Class standing	-0.061	(.153)	0.025	(.197)	-0.064	(.153)	0.023	(.163)	0.050	(.166)
Cram classes	0.069	(.340)			1.150	(1.065)				
After-school classes			-0.088	(.493)			0.468	(1.423)		
Cram*ranking					-0.398	(.372)				
Cram*standing							-0.203	(.496)		
Neither classes									-0.374	(.613)
Only after-school									0.332	(.389)
Only cram									1.018	(.596)
Both classes (contrast category)										
Constant	-4.256	(.977)***	-4.681	(1.36)***	-4.732	(1.087)***	-5.163	(1.66)**	-5.146	(1.144)**
Public High /Public vocational										
Sex	0.013	(.288)	0.163	(.301)	-0.019	(.290)	0.173	(.301)	0.155	(.304)
Father ' s Education	0.367	(.140)**	0.433	(.151)**	0.368	(.140)**	0.429	(.151)**	0.432	(.154)*
Family income	0.000	(.060)	-0.012	(.065)	-0.002	(.061)	-0.009	(.065)	-0.004	(.066)
Rural	-1.333	(.336)***	-1.310	(.352)***	-1.410	(.340)***	-1.302	(.353)***	-1.203	(.361)**
Academic ranking	1.713	(.179)***	1.864	(.192)***	1.391	(.252)***	2.051	(.465)***	1.819	(.193)**
Class standing	0.262	(.148)	0.352	(.155)*	0.263	(.150)	0.352	(.155)*	0.337	(.159)
Cram classes	0.445	(.334)			-1.359	(1.153)				
After-school classes			-0.153	(.400)			0.580	(1.756)		
Cram*ranking					0.515	(.331)				
After-school*standing							-0.223	(.501)		
Neither classes									-0.854	(.700)
Only after-school									-0.163	(.395)
Only cram									0.814	(.533)
Both classes (contrast category)										
Constant	-7.313	(.961)***	-8.050	(1.134)***	-6.103	(1.137)***	-8.685	(1.873)***	-8.032	(1.092)**
N of Cases	440		415		440		415		415	
Log Likelihood	-297		-274		-295		-274		-271	
Pseudo R-Squared	0.322		0.336		0.327		0.336		0.345	

p-value < 0.001 ** p-value < 0.01 * p-value < 0.05

We now turn to the more complex case of Taipei metropolitan area. In Table 3-2's multi- nominal logit model, we have public high schools as the basecategory and construct four categories of the outcome variable, star schools/public high, private high/public high, private high/public high, and private vocational/public high. In the category of private vocational/private high, we find a significant correlation with family SES. Students with less educated father and lower family income are more likely to attend private vocational than public high. As to residential setting, the likelihood of their students to attend private vocational schools are in a order as rural

area, industrial area, old core, satellite area, suburban area, and new core are similar to suburban area. Furthermore, students with lower academic ranking or in academically lower classes are more likely to attend private vocational schools. There shows the effect of cram classes but no effect of after-school classes. Those attending cram classes are less likely to attend private vocational. Those attending neither cram nor after-school classes are most likely to attend private vocational, and those attending only after-school classes are more likely to attend private vocational than those attending cram classes.

In the category of vocational high vs. public high, we find some effect of family SES. In the first three models is showed that the lower a student's family income, the more likely he/she attends public vocational than public high. In the first four models is indicated that the lower a student's father's education the more likely, he/she attends public vocational high than public high. There is no effect of residential setting. However, there is the effect of academic performance in junior high. Students are more likely to attend public vocational than public high, if their academic ranking is lower or his class has a lower academic standing. According to the first two and the fifth models, there are effects of both cram classes and after-school classes. The likelihood to attend public vocation increased in the order of attending both classes, only cram classes, only after-school classes, and neither class.

In the category of private high vs. public high, we detect no family SES effect. But academic ranking in junior high matters, the better the ranking, the more probable to attend public high. As to residential setting, there is no significant difference among three areas in Taipei City, but we find that students in satellite area and in rural area attend private high more likely. The industrial area in Taipei County has positive but non-significant coefficients in all five models. It may be plausible to infer that there is a county and city difference in entering public and private high schools. In the effect of cram and after-school classes, students attending neither classes fare worst since they are most likely to attend private high schools. Those attending only after-school classes are similar to those attending both classes. However, those attending only cram classes are more likely to attend private high schools.

Looking at the category of star school vs. public high, we first observe that father's education does not correlated with their child's likelihood to enter star schools or public high. But the higher the family income of students, the more likely they attend star schools. As to residential settings, there are no differences among areas of Taipei City. However, junior high students of Taipei County are less likely to attend star schools than those of Taipei City. Furthermore, the likelihood declines in the order of satellite area, industrial area and rural area. There is an extreme large coefficient and standard error for rural area. The reason is that there is no one in our

samples of rural area in Taipei County attending star schools. Looking into academic performance, we detect that the better the academic performance of students or the better the academic standing of their class, they are more likely to attend star schools. Interestingly, there are no any effect of cram and after-school classes on the possibility of a student's attending star schools or public high.

According to the analyses of Taipei metropolitan area, we may first emphasize that lower family SES, rural or lower SES and worse academic performance all lead to the more likelihood of entering private vocational schools. It is the academically and socially most disadvantageous students most likely to attend private vocational schools. The effect of academic performance is quite obvious that students with better academic performance in junior high are more likely to attend star high than public high and are more likely to attend public high than private high and public vocational.

As to the effects of family SES and rural urban settings, we have to elaborate a little more. In the outcome categories of public vocational, private high and star schools vs. public high. Only in public vocational vs. public high there is a significant effect of father's education. Since father's education is also significantly correlated with the outcome category of private vocational vs. public high, it is quite plausible for us to argue that the more educated father tend to dissuade their children away from vocational track. In addition, the effect of family income is also significant but weaker. Nevertheless, students with higher family income are somewhat more likely to attend star schools. Urban and rural settings seem to work more obviously in differentiating outcomes of entrance examination for star schools, public high and private high. We observe first a differentiation between Taipei City and County. Compared to students of Taipei City, students of Taipei County are less likely to enter public high and star schools and more likely to attend private high. We also detect that the likelihood of attending star schools decline from satellite, industrial, and to rural area in order.

Finally, let us pay some attention to the effect of cram and after-school classes. We observe no such effect on the outcome of star schools vs. public high. However, compared to attending both classes, attending only cram classes leads students more to private high than public high, while attending only after-school classes has similar chance to get into public high. Attending both classes seems to increase students' probability to enter public high rather than public vocational, while there is only a slight difference between attending only cram classes and attending after-school classes. In our statistical analysis, we are not able to detect the effect of cram and after-school classes on the likelihood of entering private high, public vocational and private vocational. In an analysis not shown, it makes no difference on entering public high or private-high whether attending cram and after-school classes. Attending only after-school classes will lead students to public vocational more than to private high.

Table 3-2 Multinomial Logistic Analysis of the Outcome of Entrance Examination:
Taipei Metropolitan Area

Indep Var	Model		Model		Model		Model		Model	
	Coef.	SD	Coef.	SD	Coef.	SD	Coef.	SD	Coef.	SD
private vocational/public high										
sex	0.437 (.181)*		0.408(.208)*		0.418 (.181)*		0.406 (.207)		0.380 (.211)	
father's education	-0.317 (.079)***		-0.300(.091)***		-0.325 (.079)***		-0.299 (.091)***		-0.246 (.092)**	
family income	-0.064 (.032)*		-0.090(.037)*		-0.065 (.033)*		-0.092 (.037)*		-0.084 (.038)*	
new core (contrast category)										
old core	0.841 (.356)*		1.033(.397)**		0.882 (.359)*		1.025 (.397)**		0.919 (.405)*	
suburban	-0.231 (.286)		-0.169(.322)		-0.232 (.287)		-0.191 (.324)		-0.235 (.327)	
satellite	0.809 (.284)**		0.863(.328)**		0.821 (.285)**		0.854 (.328)**		0.713 (.334)*	
industrial	1.169 (.314)***		1.332(.362)***		1.163 (.315)***		1.321 (.361)***		1.160 (.367)**	
rural	2.306 (.427)***		2.536(.478)***		2.258 (.426)***		2.500 (.476)***		2.118 (.494)***	
academic ranking	-2.123 (.115)***		-2.126(.131)***		-1.893 (.146)***		-2.309 (.191)***		-2.055 (.132)***	
class standing	-0.421 (.086)***		-0.442(.099)***		-0.425 (.086)***		-0.439 (.099)***		-0.461 (.100)***	
cram classes	-0.984 (.189)***				0.547 (.692)					
after-schoolclasses			-0.378(.211)				-1.377 (.772)			
ranking*cram					-0.489 (.219)*					
ranking*after-school							0.334 (.243)			
neitherclasses									1.538 (.346)***	
only after-school									0.808 (.297)**	
only cram									0.308 (.285)	
both classes (contrast category)										
constant	8.029 (.626)***		7.711(.713)***		7.354 (.673)***		8.278 (.837)***		6.787 (.729)***	
public vocational/public high										
sex	-0.335 (.178)		-0.227(.209)		-0.343 (.179)		-0.228 (.209)		-0.249 (.210)	
father's education	-0.199 (.077)*		-0.190(.090)*		-0.205 (.077)**		-0.191 (.090)*		-0.167 (.091)	
family income	-0.064 (.033)*		-0.056(.037)		-0.065 (.033)*		-0.057 (.037)		-0.055 (.038)	
new core (contrast category)										
old core	-0.121 (.358)		0.040(.414)		-0.087 (.359)		0.033 (.414)		-0.004 (.419)	
suburban	-0.384 (.263)		-0.208(.302)		-0.389 (.263)		-0.218 (.303)		-0.272 (.304)	
satellite	-0.003 (.272)		0.174(.323)		0.002 (.273)		0.168 (.323)		0.062 (.327)	
industrial	0.261 (.301)		0.637(.349)		0.253 (.301)		0.627 (.349)		0.485 (.354)	
rural	0.826 (.428)		0.855(.507)		0.801 (.428)		0.835 (.506)		0.522 (.523)	
academic ranking	-1.146 (.102)***		-1.165(.117)***		-1.000 (.140)***		-1.280 (.169)***		-1.147 (.118)***	
class standing	-0.215 (.087)*		-0.217(.100)*		-0.218 (.087)*		-0.212 (.100)*		-0.239 (.101)*	
cram classes	-0.546 (.190)**				0.382 (.671)					
after-schoolclasses			-0.432 (.212)*				-1.172 (.771)			
ranking*cram					-0.252 (.194)					
ranking*after-sch							0.215 (.223)			
neitherclasses									1.233 (.363)***	
only after-school									0.784 (.308)*	
only cram									0.656 (.278)*	
both classes (contrast category)										
constant	5.511 (.613)***		5.008(.705)***		5.012 (.667)***		5.414 (.820)***		4.258 (.717)***	
private high/public high										
sex	0.378 (.198)		0.343(.231)		0.358 (.199)		0.340 (.231)		0.316 (.232)	
father's education	-0.074 (.084)		-0.078(.097)		-0.083 (.084)		-0.081 (.097)		-0.076 (.098)	
family income	0.013 (.033)		0.008(.039)		0.012 (.034)		0.008 (.039)		0.011 (.039)	
new core (contrast category)										
old core	-0.134 (.433)		0.037(.487)		-0.092 (.436)		0.038 (.487)		0.009 (.490)	
suburban	-0.470 (.308)		-0.575(.356)		-0.474 (.310)		-0.573 (.356)		-0.592 (.357)	
satellite	0.930 (.288)**		1.051(.334)**		0.945 (.290)**		1.054 (.335)**		1.031 (.337)**	
industrial	0.445 (.351)		0.769(.400)		0.438 (.353)		0.763 (.401)		0.714 (.404)	
rural	1.076 (.517)*		1.188(.601)*		1.031 (.518)*		1.173 (.601)		1.150 (.616)	
academic ranking	-1.565 (.119)***		-1.513(.133)***		-1.312 (.160)***		-1.575 (.177)***		-1.520 (.136)***	
class standing	-0.123 (.095)		-0.060(.110)		-0.126 (.096)		-0.055 (.110)		-0.079 (.111)	
cram classes	-0.286 (.213)				1.270 (.730)					
after-schoolclasses			-1.215(.242)***				-1.575 (.841)			
ranking*cram					-0.485 (.227)*					
ranking*after-school							0.075 (.263)			
neitherclasses									1.603 (.374)***	
only after-school									-0.190 (.379)	
only cram									0.936 (.300)**	

both classes (contrast category)					
constant	4.001 (.672)***	4.038(.765)***	3.258 (.736)***	4.292 (.861)***	3.034 (.785)***
star high/public high					
sex	0.045 (.268)	-0.109(.315)	0.044 (.268)	-0.113 (.315)	-0.074 (.317)
father's educatio	0.210 (.109)	0.084(.126)	0.212 (.109)	0.081 (.126)	0.108 (.128)
family income	0.044 (.042)	0.101(.050)*	0.042 (.042)	0.100 (.050)*	0.099 (.050) *
new core (contrast category)					
old core	-0.218 (.464)	0.015(.525)	-0.241 (.466)	0.019 (.523)	0.017 (.533)
suburban	0.162 (.346)	-0.089(.398)	0.164 (.348)	-0.085 (.398)	0.086 (.415)
satellite	-1.336 (.419)**	-1.735(.481)***	-1.337 (.419)**	-1.727 (.481)***	-1.572 (.491)**
industrial	-1.578 (.576)**	-2.600(.835)**	-1.592 (.575)**	-2.591 (.834)**	-2.336 (.843)**
rural	-33.623(61222805)	-33.083(4500728)	-32.792(4034955.8)	-33.047 (4432047.3)	-34.812 (11983555)
academic ranking	2.173 (.269)***	2.580(.356)***	1.741 (.520)***	2.710 (.557)***	2.622 (.360)***
class standing	0.306 (.125)*	0.260(.142)	0.309 (.125)*	0.259 (.142)	0.285 (.145)*
cram classes	0.395 (.335)		-2.262(2.845)		
after-schoolclasses		0.514(.327)		1.579(3.361)	
ranking*cram			0.549 (.599)		
ranking*after-school				-0.219 (.702)	
neitherclasses					-1.000 (.639)
only after-school					-0.776 (.512)
only cram					-0.697 (.371)
both classes (contrastcategory)					
constant	-13.102 (1.562)***	-14.333(1.934)***	-11.006(2.592)***	-14.946 (2.782)***	-14.097(1.925)***
N of Cases	1529	1113	1529	1113	1113
Log Likelihood	-1581	-1150	-1577	-1148	-1134
Pseudo R-Squared	0.289	0.291	0.290	0.292	0.301

*** p-value < 0.001 ** p-value < 0.01 * p-value < 0.05

Conclusion

In response to our research problems, we will first discuss the implications of our findings on patterns of student's attending cram schooling and after-school classes. Family SES, urbanization level, area's socio-economic status and academic ranking of students are all positively correlated with their attending cram classes. Class academic standing does not show variations on attending cram classes. Nevertheless, students in better standing classes tend more to attend both cram and after-school classes. In addition, our analysis of dropping-out cram schools indicates that low family SES and academic performance in school are both significant factors. All the findings seem to highlight that attending cram classes is a very reinforcing measure, since the most advantageous are most inclined to adopt the measure and the most disadvantageous are dissuaded from it.

The attendance of after-school classes tells a different story, correlated negatively with family SES, urbanization level and academic ranking. Although the variations related to area's SES are not that clear, it is still plausible for us to argue that taking after-school classes is more a measure adopted by the disadvantageous and has much more remedial implication. The high rate of attending after-school in urban I-Lan may run counter to the above inference. However, urban I-lan also has the highest rate of cram schooling. We may speculate that families in the major city of peripheral region

of Taiwan may be more alerted of their disadvantage in island wide educational competition, and accordingly are more inclined to pursue possible measures to advance their children's academic ability. For major cities in peripheral region, both cram and after-school classes perhaps have a duo implication of reinforcing and remedy.

Next, we will address the effect of cram-schooling and after-school classes on the academic outcome, together with the functioning of family SES, residential settings around school, and academic performance in junior high. We would like first to indicate a fact that the most disadvantageous fare worst in their outcome getting into the senior high level and they are in the majority registered in private vocational schools. We will then discuss the effect of each factor as follows. A clear effect of academic standing is easily detected. In I-Lan, academic ranking in junior high is a factor demarcating whether students enter the public high or the public and private vocational. In Taipei metropolitan area, academic ranking is correlated positively with a student's possibility to enter star school, public high, public vocational, private high and private vocational in order. Students in classes of better academic standing also are likely to attend public and private vocational schools after the entrance examination.

As to the effects of family SES, the most clear finding is that students with higher SES (a stronger effect of father's education than family income) are less likely to attend public and private vocational than public high schools. However, there is no effect on whether they attend public high or private high. We may argue that for students with similar academic standing, those in higher SES families, especially those with higher educated parents, will more likely pursue academic rather than vocational track.

We also find some interesting area variation. In I-Lan county, there is an urban and rural difference with urban students more attending academic high and rural students more attending vocational high. In Taipei metropolitan area, we first observe a difference between the city and the county. Students in Taipei County are less likely to attend star schools, public high and private high and more likely to attend private high and private vocational. A further area difference appears in Taipei County, i.e., a declining rate of attending star schools from satellite, industrial to rural area. Even though Taipei metropolitan area is regarded as one area in this study, there is still different distribution of types of senior high level schools for the city and the county. It is apparent that public high schools in Taipei County have been established mostly in recent years, all star schools are located within Taipei city and the proportion of private high and vocational schools is higher in Taipei County. We may speculate that the structure of each county may have effects on their student's probability of getting

into various types of senior high level schools.

Finally, how do we address the cram and after-school classes after our analysis under the control of family SES, residential settings and academic performance? According to our Taipei data, because those attending neither classes fare worst in the outcome of senior high level examination, these classes are in a way functional to students' academic achievement. When we look into details, it is quite complicated. Those attending only after-school classes are more likely to get into private vocational, compared to those attending only cram classes. It seems that cram schooling is a better strategy for advancing academic achievement. However, we find just a small difference on getting into public high vs. public vocational between attending only after-school classes and attending only cram classes. Furthermore, attending only cram classes lead students more to private high rather than public high, compared to attending only school classes. Attending either classes also do not account for the outcome of entering star schools or not. According to above findings, we offer some tentative conclusions. Competing for public high or star schools, cram schooling and after-school classes are just mimic behavior with no effect. Competing for public high or private high, cram schooling is more a mimic behavior than after-school classes, since the latter is a more effective strategy for getting into public high. Competing for public high or public and private vocational, attending after-school classes is more a mimic behavior than attending cram school. When we observe no effect of cram and after-school classes in I-Lan County, we may argue that reaching a high attending rate of both class as in urban area of I-Lan, cram-schooling and after-school classes will be just a habitual behavior.

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