

# [The Determinants and Social Benefit of Student Summer Activity]

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[An Analysis of the Determinants of Summer Activity Participation by Elementary and Secondary Students, and the Resulting Social Benefit of Summer Activity Participation on Crime]

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# Table of Contents

## Contents

Table of Contents	2
Table of Figures	4
Acknowledgements	5
Abstract	6
Introduction	7
Summary Results	8
Background and Relevant Literature	9
Motivating Study 1: Alexander, Entwisle, and Olson (2007)	9
Motivating Study 2: Cooper and Charlton (2003)	12
Motivating Study 3: Jacob and Lefgren (2003)	13
Other Studies	13
Theory	15
Theory for Stage 1: Determinants of Participating in a Summer Activity	15
Theory for Stage 2: Social Benefit Analysis	16
Data	16
Sources	16
Current Population Survey Data	17
Uniform Crime Report Data	18
Additional Data	18
Analysis	18
Stage 1: Determinants of Participating in a Summer Activity	18
Stage 2: Social Benefit Analysis	38

Results	42
Stage 1: Determinants of Participating in a Summer Activity	42
Regression: Propensity to Participate in Any Summer Activity	42
Interpretation of Results	49
Stage 2: Social Benefit Analysis	50
Regression Method	51
Regression Set 1: Gender	52
Regression Set 2: Gender and Age	53
Regression Set 3: Race	55
Discussion of Results	56
Conclusion	57
Works Cited	60
Data Sources	62

## Table of Figures

TABLE 1--ALEXANDER, ENTWISLE, AND OLSON (2007)	11
TABLE 2 DEPENDENT VARIABLES	19
TABLE 3--INDEPENDENT VARIABLES1	24
TABLE 4--INDEPENDENT VARIABLES2	26
TABLE 5--INDEPENDENT VARIABLES3	29
TABLE 6--INDEPENDENT VARIABLES4	31
TABLE 7--INDEPENDENT VARIABLES5	33
TABLE 8--INDEPENDENT VARIABLES6	34
TABLE 9--INDEPENDENT VARIABLES7	36
TABLE 10--INDEPENDENT VARIABLES8	38
TABLE 11--SOCIAL BENEFIT ANALYSIS INDEPENDENT VARIABLES	40
TABLE 12--SOCIAL BENEFIT WITH DIFFERENT CONTROLS	52
TABLE 13--GENDER ONLY REGRESSIONS	53
TABLE 14--GENDER AND AGE REGRESSION, FEMALE	54
TABLE 15--GENDER AND AGE REGRESSIONS, MALE	55
TABLE 16--RACE REGRESSIONS	56

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## **Abstract**

Using data from 1996, this study first identifies the socioeconomic determinants of a child's participation in an organized summer activity. Models are produced for summer activity in general and for different types of summer activities. The results indicate the importance of caregiver supervisory capability in choosing whether to send a child to a summer program. In the second stage of the project, actual state values of summer activity participation are related to state crime statistics, controlling for the state demographic profile. The results indicate that participation in summer activity is related to a reduction in crime rates under certain conditions.

## Introduction

For almost a quarter of the year, many students in the US are given a summer vacation. Students might participate in a number of activities over the course of the season, such as attending a summer camp, going to summer school, or working for pay. Some students just stay at home and experience a summer vacation in the truest sense of the term—they lounge around and do the colloquial nothing. And just as students take a break from the academic rigors of the classroom during the summer, it seems that many social scientists have chosen to sanctify the concept of summer vacation in their own way by deciding not to research the intricacies of students' summer vacation. What do children do in the summer? Why do they make the choices they do about their summer activities? Is summer activity related to other important student-related outcomes? So far, the few answers to these questions that do exist are very particular in scope, focusing on one or several summer programs serving a relatively small segment of the overall student population. To date, questions about summer activity have only been asked once on a Census survey, in 1996, and there is no indication that future surveys are being planned to ascertain more recent summer activity trends.

This lack of research on summer activity is particularly shocking given the data that has been collected on the academic achievement gap and the role the summer plays in its exacerbation. The concept of summer learning is central to this latter research. Summer learning loss occurs when students lose knowledge, most often measured through standardized test scores, over summer vacation. Research on the impact of summer learning loss spans a number of areas, including the socioeconomic academic achievement gap, general math and reading skills declines, and child obesity (National Summer Learning Association, "Know", 2009). Other research has been done into the time children spend in school, summer school funding, and the impact of summer programs outside summer school offerings (National Summer Learning Association, "Research", 2009).

But studies have not linked summer programs directly to social benefits. Large literatures on the social benefits of education and on human capital exist, but the effects of summer programming have rarely been measured in the same light. This paper attempts to fill some of that gap by measuring the impact student participation in summer programs has on society.

In the quantitative analysis conducted for this research project, this paper first identifies major determinates of whether a child participates in a summer program. In the second stage of the analysis, the actual state averages of summer activity participation variables are then related to juvenile crime statistics separated by state to measure one aspect of the social benefits of student summer activity.

In the first section, this paper briefly describes the summary results of the analysis. The paper then steps back to discuss the relevant literature in depth. A theoretical section is then introduced to further elucidate the motivation for the analysis. Next, the data section posits what ideal data would be for the social benefit analysis and then describes the actual data available and used in this project. The analysis section provides a detailed account of the different models used. A more detailed results section follows. The paper ends with a conclusion including policy implications and potentially fruitful extensions of the research.

## **Summary Results**

### Stage 1: Determinants of Student Participation in Summer Activities

- Single parents are much more likely to enroll their children in a summer program than are married parents. A single father is more likely than a single mother to enroll children in a summer program.
- Higher parental education attainment is associated with a higher likelihood for children to participate in summer activities.
- Females are more likely than males to participate in a summer activity.

- Asians and Pacific Islanders are the only race exhibiting significantly different summer activity enrollment patterns. They are less likely to enroll their children in summer activities.
- An employed mother is more likely to send her children to a summer program. However, the more hours the mother works, the less likely her children's summer participation becomes. The exact opposite of this pattern is true for the father.
- Socioeconomic determinants of the propensity to participate in a summer activity seem to be linked by an underlying need to supervise the children.

#### Stage 2: The Social Benefit of Student Summer Activity

- Overall, summer camp appears to reduce crime rates while summer school appears to increase crime rates.
- The number of weeks during which a child is enrolled in a summer program has ambiguous effects on crime rates.
- Summer activity seems to reduce the crime rate of high school students more than other age groups.

## **Background and Relevant Literature**

This paper utilizes analyses from two related, but distinct fields. The first field is child and family policy. The first stage of the analysis investigates how families make decisions with regards to time use during the summer. Academics are not entirely divorced from this story, especially since many summer programs are directly or indirectly related to academics or other school activities, and thus it is important to look into studies of summer learning. The second applicable field is social benefit analysis. With regards to the first field, social benefit analysis has linked the family and education policy to a number of social outcomes. Those same methods of linking individual decisions to a social outcome are utilized in this paper.

### ***Motivating Study 1: Alexander, Entwisle, and Olson (2007)***

A nascent body of literature focuses on summer learning. One study using longitudinal data from a selection of Baltimore public schools measured the effects of summer learning loss on test

scores [Alexander, Entwisle, and Olson (2007)]. Using data from the Baltimore Beginning School Study youth panel, student participants were selected from 20 Baltimore public schools of similar demographic compositions. The study used test score and socioeconomic data from 790 students from 1<sup>st</sup> grade until 9<sup>th</sup> grade, and then used survey data to determine student outcomes when participants were between the age of 22 and 23. The longitudinal study began in 1982. Over the course of the study, schools altered the testing schedule. In grades 1-5, participants took a fall test and a spring test. In grades 6-9, students only took one test per year. Thus, for the first five years, the researchers were able to determine how student test scores changed over the course of the school year (how much change was measured in the spring end-of-the-school-year test relative to the fall beginning-of-the-school-year test) and how much students' scores changed during the summer vacation (how much change was measured in the fall test relative to the previous spring test). The research found that almost 73 percent of student test score improvement occurred during the school year of grades 1-5, while much less test score improvement occurred over the course of the summer intermissions between those grades (a little over 4 percent). Improvement over grades 6-9, both in the summer and during the school year, accounted for a little over 23 percent of the total test score improvement from grade 1 to grade 9. The researchers disaggregated the data by socioeconomic status, and found that students of relatively higher socioeconomic status gained much more from the summer academically than their lower socioeconomic counterparts. The study strongly points to the impact the summer can have on improving student test scores, and the very low to negative impact it is currently having on poorer children.

**Table 1.** Reading Comprehension Test Score Decomposition over the First Nine Years of School by Family SES

Reading Comprehension CAT Score Gains, Years 1–9	Total	Family SES			Gap High-Low
		Low SES	Mid SES	High SES	
Initial Test Score, Fall 1st Grade	279.81	271.99	277.89	298.47	26.48*
Winter Gain (5 winters)	194.97	191.30	210.19	186.11	-5.19
Summer Gain (4 summers)	11.12	-1.90	4.12	46.58	48.48*
Gain Over Years 6–9	61.69	60.95	60.73	64.34	3.39
Test Score, End Year 9 (N)	547.55 (787)	522.33 (397)	552.94 (204)	595.49 (186)	73.16*

*Note:* Significant t-tests for mean differences between Low SES and High SES groups are shown in Gap column.  
\*  $p \leq .05$  (two-tailed tests).

**Table 1--Alexander, Entwisle, and Olson (2007)**

Alexander, Entwisle, and Olson (2007) points to a number of implications for this paper’s research question. If students’ test scores are tied to summer experiences, then summer experiences can be differentiated by socioeconomic status. These different experiences could be manifested in one or more of three ways: 1) The **home experience** may be different across students; 2) **Informal summer activities**, be they occurrences within the neighborhood, programming through religious organizations, or other familiar and regular activities in which students participate, may be related to socioeconomic status; and 3) Participation in **formal summer activities** may be determined by a student’s social class. If Alexander, Entwisle, and Olson (2007) is correct, then participation in formal summer activities could be dependent on social class, controlling for the home experience and informal summer activities. This paper does in fact find that socioeconomic factors are related to student participation in formal summer activities. However, since the data available did not contain some measure of academic achievement, this study is unable to link participation in summer activities to changes in test scores.

## ***Motivating Study 2: Cooper and Charlton (2003)***

A second widely-cited meta-analytic study combined the results of 41 studies involving 26,500 students from the years 1967-1995 from a variety of different school districts and summer programs in the US [Cooper and Charlton (2003)]. The authors divide the results of the analysis into several divisions showing the impact of a number of factors on the final evaluations of student performance. These divisions include the methodology of the study, student characteristics, the context of the programs, the features of the programs, and the method of measurement of outcomes. In terms of methodology, the authors did find that the way in which attendance is measured significantly impacts the final result. The authors discovered a high impact in programs that required parental involvement, but the values produced were also highly volatile and, in the end, unreliable. The curriculum content was a significant or nearly significant factor in the outcomes produced at summer school. The positive effects of summer school were greatly enhanced by programs that provided individual attention to students. Class size was also found to be an important factor, but not as significant as the individualization of teaching. Summer schools in all community settings showed positive effects on student outcomes, but programs conducted in large cities fared worse than their counterparts in small cities, suburbs, and rural communities. In terms of participant status, the authors find that socioeconomic status plays a very significant role in the outcomes produced. Students from middle class families gained more from summer school than their poorer counterparts. Overall, the results point to the importance of summer programming in students' academic achievement.

The prevalence of this positive result in assessments of individual summer programs improves the prospects of finding a similar pattern in national surveys. But it also demonstrates the importance of the particular characteristics of a child's community, type of summer program attended, and child's demographic background on the child's achievement. This paper investigates

whether those same background statistics impact a child's likelihood of participating in a summer program in the first place, a prerequisite to experiencing any direct benefits from such programs.

### ***Motivating Study 3: Jacob and Lefgren (2003)***

Jacob and Lefgren studied the relationship between student crime and the academic year schedule. The researchers merged data from the National Incident Based Reporting System (NIBRS) with school calendars from 29 different jurisdictions from around the US. The authors' goal was to link crime data to teacher in-service days to see if there was any difference in crime patterns when school was in and out of session. Crime is also split into two categories: violent crime and property crime. Jacob and Lefgren find that during school days, juvenile property crime decreases by 14 percent. However, violent crime increases by 28 percent on those same days. The authors conclude that school days allow students to coordinate more serious criminal activity.

Some of the methodology from this paper is employed in this project. Crime is likewise divided into violent and property crime, as defined by the FBI's Uniform Crime Reports. However, the data used in this paper is aggregated by the year, rather than by the day. This prevents such a close analysis with respect to the contemporaneous nature of crime, but the use of state level data allows more general conclusions to be drawn than those found in Jacob and Lefgren (2003).

### ***Other Studies***

The studies on summer learning loss draw data from specific localities and demonstrate measurable relationships between participation in summer activities and student academic achievement. But few studies relate summer activities to specific social benefits outside, or related to, academic achievement. A few studies do look at the effects of summer activities on child obesity (von Hippel, Powell, Downey, and Rowland 1997), which does have external social effects, such as higher risks of obesity-related disease (Narayan, Boyle, Thompson, Sorenson, and Williamson 2003)

and higher monetary costs on society due to disease (Jackson 2008), as well as effects on a child's academic performance, social interaction, and career development (Ballard and Alessi 2006). But these studies on summer learning do not explicitly connect outcomes to their social benefits or costs as determined in other literature, and most do not extend summer learning activities to social outcomes outside of academic achievement.

However, there is also a large literature on social benefit analysis with respect to education. McMahon's analysis of education fits under an international development perspective (1999). His work shows the relationship between education and various measures of economic growth, health, democracy and human rights, poverty, the environment, and crime. Behrman and Stacey's compilation of essays on the social benefits of education include "the benefits of education other than the enhancement of labor market productivity and earnings".<sup>1</sup> Their analyses include the relationship between education and the formation of preferences, health, family structure, child welfare, and crime. Becker spends some time on specific examples of the effects of education, but he mostly develops the concept of human capital and the investment value of education (1993). Riddell provides a great description of the mechanism through which education brings about social benefits, but his work, like those of many other researchers, focuses on the social benefits of higher education (2004). None of the literature places a similar social value on summer learning.

The major obstacle to this project is the state of current summer-related data and studies. In the area of summer activity, research on US children's activities is severely lacking (ECS 2009). While studies show that over the summer months students can suffer a significant loss, or very slowly gain, academic skills, few, if any, studies have linked summer school and other summer programming for children to an actual social benefit. Current research has attempted to answer the question: What happens to children over the summer? Two questions are still left partially or wholly

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<sup>1</sup> Behrman and Stacey (1997), 1.

unanswered: What should students do during the summer? And why should students do anything? Some analyses of individual programs, in an attempt to answer the first question, try to identify a best-practices model for summer programming. While addressing both questions, this paper primarily seeks to answer the latter query: Why should children do anything in the summer? By analyzing data directly linking summer programming to social benefits resulting from student attendance, this paper aims to contribute to the ongoing debate over summer programming nationally, and to education policy more generally.

## **Theory**

The theoretical framework for this project in part draws from child and family policy research, in part from human capital research, and in part from social benefit analysis research, which are all inherently related through the field of education. This project will extend the theoretical approaches specifically to the topic of student summer activity.

### ***Theory for Stage 1: Determinants of Participating in a Summer Activity***

Is a child's participation in a summer activity related to his or her socioeconomic background? The studies cited above imply that the answer is yes. Cooper and Charlton (2003) demonstrates a link between socioeconomic status and summer academic achievement, while Alexander, Entwisle, and Olson (2007) shows a link between socioeconomic status and differences in summer learning loss. Based on these findings, there seems to be strong evidence pointing to a relationship between socioeconomic status and student participation in summer activities. Thus the first stage of the analysis links socioeconomic statistics to the propensity for children to attend a summer program. But not all summer programs are the same. By differentiating between summer

school, summer camp, summer employment, internships, and community service, this paper further elucidates the differences in summer program participation based on socioeconomics. In addition, the duration of summer program participation may also play an important role in a participant's development. By differentiating between populations by number of weeks attending a summer program, the analysis adds further information to the discussion around disparities based on socioeconomic statistics. All of these different ways of measuring summer activity also enriches the next stages of the analysis, building to linking summer activity to a social benefit.

### ***Theory for Stage 2: Social Benefit Analysis***

Some activities can produce a significant benefit beyond an individual one. These positive externalities are also known as social benefits. Social benefit analysis has often been connected to education. The social benefit used in this paper is juvenile crime. Social benefits are not limited to crime and can also include health, environmental impact, effects on the family, and the prospects of economic growth [McMahon (1999); Behrman and Stacey (1997); Lochner and Moretti (2004)]. For the scope of this paper, student summer activity is linked only to juvenile crime statistics. The social benefit conferred through summer programming may be realized through one of four mechanisms: 1) Improved cognitive skills that help children make better choices overall; 2) Improved non-cognitive skills, such as self-confidence, that also play a role in decision-making; 3) More time spent under adult supervision to keep children out of trouble; and 4) Behavioral effects that impact a summer program participant's future decisions.

## **Data**

### ***Sources***

As mentioned above, there is not much data available on student summer activity, especially on a national scale. The data used in this study come from the Current Population Survey

(CPS) from October 1996. A supplement provided to survey participants asked about child summer activity. Unfortunately, the Census Bureau has yet to revisit this topic in a second survey. The CPS data consists in large part of socioeconomic statistics including race, sex, grade level, school information, household information, information about children's parents and grandparents, and labor market variables, as well as the summer activity statistics.

For the social benefit analysis, juvenile crime statistics are taken from the Uniform Crime Report carried out by the FBI from the year 1996. This dataset includes information on age, sex, and race. Unfortunately, the data is not listed by individual incident. Thus the crime statistics cannot be differentiated by one background characteristic while controlling for the others. The only two statistics that are linked are age and sex.

### **Current Population Survey Data**

The data from the CPS is used to determine the relationship between student summer activity and participants' socioeconomic backgrounds (Stage 1). Multiple regressions are run using the CPS data since multiple dependent variables are used as measures for summer activity. The dependent variables used are: participation in any summer activity; participation in summer school; participation in summer camp; summer employment; participation in summer community service; participation in a summer internship; and total number of weeks spent in summer activities. The independent variables include several socioeconomic variables. The dependent and independent variables are listed and explained below.

## **Uniform Crime Report Data**

The data from the Uniform Crime Report is used to draw out dependent variables for the social benefit analysis. Crime statistics for juveniles age 0 to 18 were used and could be disaggregated by offense, age, gender, gender and age, and race.

## **Additional Data**

Additional data is required to control for economic and state effects in the social benefit analysis. These controls mainly came from the state averages for population statistics present in the 1996 Current Population Survey. One other control, State Spending on Elementary and Secondary Education, was taken from a historical Census report on state and local government spending.

For data source locations, see the Data citation section at the end of the paper.

## ***Analysis***

The quantitative analyses were conducted using a combination of STATA version 11 and Microsoft Excel 2007.

### **Stage 1: Determinants of Participating in a Summer Activity**

Each regression takes the basic form:

Summer Measure =  $\beta_1$  \*Gender +  $\beta_2$  \*Race +  $\beta_3$  \*Income +  $\beta_4$  \*Grade Level +  $\beta_5$  \*School Variables +  $\beta_6$  \*Household Variables +  $\beta_7$  \*Parent/Grandparent Variables + State Effects +  $\alpha$

Ideally, a measure for access to summer activities or details on how admissions decisions are made by summer programs would allow for more concrete analysis of the determinants of summer activity participation. Since no such measure is included with the data, the effects of admissions

protocols are indeterminable and thus may be biasing some coefficients upwards. The next subsections describe the independent and dependent variables used in detail.

### Dependent Variables

The Stage 1 analysis includes seven different dependent variables, as described below in Table 2. The first variable, Summer\_All, is a generated variable that marks the children who participated in one of the five activities indicated by the next five variables (summer school, summer camp, summer employment, summer community service, and summer internships).

**Table 2 Dependent Variables**

Dependent Variable	Definition	Values
Summer_All	Indicates participation in any of the five types of summer activity indicated by the next five dependent variables	1 = Participated in a summer program 0 = Did not Obs: 28204 Mean: 0.257
Summer_School	Indicates enrollment in summer school	1 = Participated in summer school 0 = Did not Obs: 28149 Mean: 0.0376
Summer_Camp	Indicates participation in summer camp	1 = Participated in summer camp 0 = Did not Obs: 28117 Mean: 0.229

Summer_Work	Indicates paid summer employment for 10 or more hours per week	1 = Employed 0 = Not employed Obs: 28185 Mean: 0.0103
Summer_Service	Indicates participation in summer community service	1 = Participated in community service 0 = Did not Obs: 28180 Mean: 0.00983
Summer_Internship	Indicates participation in summer internship	1 = Interned 0 = Did not Obs: 28182 Mean: 0.00192
Summer_Weeks	Number of weeks child participated in above summer programs	Min: 0 Max: 12 Obs: 28175 Mean: 1.01

**Table 2--Continued**

These first six dependent variables are all binary—1 indicates participation, and 0 indicates non-participation. The analyses for these variables were thus conducted using two different regression types. First, OLS regressions were used to produce linear probability models relating each dependent variable to the independent variables described in the next section. However, the linear probability model is not restricted to producing dependent variable values between 0 and 1. This means that the linear probability model could potentially return a percent likelihood of attending a summer program either less than 0 or greater than 1, both of which do not make conceptual sense.

To remedy this situation, a probit model was also created for each of the first six variables, since the probit does restrict estimated dependent variable values to be between 0 and 1.

The final dependent variable, Summer\_Weeks, is not a binary variable. Thus an OLS regression was used relating Summer\_Weeks to the same independent variables used in the other models. A probit regression was not run for this variable since it was not applicable.

All of these dependent variables were drawn from the October 1996 CPS. Only the Summer\_All dependent variable was generated for the purposes of this paper. The dependent variables were recoded so that “not applicable” and “out of universe” responses were included as non-participation responses. Responses indicating that the respondent did not remember or refused to answer the question about summer participation were changed to missing values.

### **Independent Variables**

Most of the independent variables used here are included in similar analyses in other studies. Gender, race, and income are included because disparities often exist along sex, race, and social class lines. Grade level is included because, as students age, they are generally given more summer activity options to choose from and may have greater incentives to attend a summer program<sup>2</sup>. School variables may play some role in the options a student has when selecting a summer program—differentiation between school types, such as public and private, may indicate the relative resources schools use to promote, organize, and manage summer programming opportunities. Household variables try to control for many issues, such as the amount of attention available to each child in the household, the household structure, and the relative resources of the family. Parent/Grandparent variables allow for deeper analyses of the roles adults’ backgrounds and

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<sup>2</sup> Such incentives could include needing to pass a class to graduate or move on to the next grade level, improving skills, participating in prestigious summer programs, competing athletically, and graduating from high school early, among others.

contemporaneous labor situations play in a child being active during the summer. These latter variables include adult labor hours, a proxy for amount of time spent away from home during the week.

The expanded form for the regressions is:

$$\begin{aligned} \text{Summer} = & \beta_1 * \text{Female} + \beta_2 * \text{Hispanic} + \beta_3 * \text{Black} + \beta_4 * \text{AmericanIndian\_Aleut\_Eskimo} + \\ & \beta_5 * \text{Asian\_PacificIslander} + \beta_6 * \text{Foreign\_Born} + \beta_7 * \text{Grade\_Level} + \beta_8 * \text{Grade\_Level2} + \\ & \beta_9 * \text{Regular\_School} + \beta_{10} * \text{SchoolType\_OutOfUniverse} + \beta_{11} * \text{SchoolType\_Private} + \\ & \beta_{12} * \text{Household\_Income} + \beta_{13} * \text{Household\_Members} + \beta_{14} * \text{Home\_Business} + \beta_{15} * \text{Phone\_in\_Home} + \\ & \beta_{16} * \text{Rent\_Residence} + \beta_{17} * \text{No\_Pay\_Residence} + \beta_{18} * \text{Metro\_Area\_Size} + \beta_{19} * \text{Single\_Father} + \\ & \beta_{20} * \text{Single\_Mother} + \beta_{21} * \text{NoParent} + \beta_{22} * \text{Grandfather} + \beta_{23} * \text{Grandmother} + \beta_{24} * \text{Father\_Edu} + \\ & \beta_{25} * \text{Mother\_Edu} + \beta_{26} * \text{Grandfather\_Edu} + \beta_{27} * \text{Grandmother\_Edu} + \beta_{28} * \text{Father\_Foreign\_Born} + \\ & \beta_{29} * \text{Mother\_Foreign\_Born} + \beta_{30} * \text{Grandfather\_Foreign\_Born} + \beta_{31} * \text{Grandmother\_Foreign\_Born} + \\ & \beta_{32} * \text{FatherEmployed} + \beta_{33} * \text{MotherEmployed} + \beta_{34} * \text{FatherRetired} + \beta_{35} * \text{MotherRetired} + \\ & \beta_{36} * \text{FatherDisabled} + \beta_{37} * \text{MotherDisabled} + \beta_{38} * \text{Father\_Labor\_Hours} + \beta_{39} * \text{Mother\_Labor\_Hours} + \\ & \beta_{40} * \text{Father\_Ambiguous} + \beta_{41} * \text{Mother\_Ambiguous} + \text{State Effects} + \alpha \end{aligned}$$

To best discuss all of the variables selected for this regression, this paper organizes them into eight categories: 1) Child demographics; 2) Child educational situation; 3) Household information; 4) Parental and grandparental presence; 5) Parental and grandparental education attainment; 6) Parental and grandparental foreign born status; 7) Parental labor situations; and 8) Special parental factors and state effects.

### ***Child Demographics***

This set of independent variables includes child gender, race, ethnicity, and birth country. The race and ethnicity variables are limited to those measured by the Census in 1996. For race, the response options were White; Black; American Indian, Aleut, and Eskimo; and Asian and Pacific Islander. For ethnicity, the only options were Hispanic and non-Hispanic. Many birth country options were available. However, since there were very few children from many of the country options, this variable was converted into a binary variable denoting whether the child was born in a foreign

country. With respect to demographics, the base reference case is a non-Hispanic white male born in the US.

Since economic disparities in the US often exist across gender, racial, and ethnic lines, these variables were included in the regression to determine whether demographics play a similar role in summer activity participation rates. Table 3 below includes each of the variables used in this category, the reason why they were used, the values associated with the variables and the percentage in the affirmative (1 value) for dummy variables, and hypotheses for the signs of the variables' coefficients. The only variable for which the sign is ambiguous is that associated with gender. Higher female academic achievement may be a reason to participate or an excuse not to participate in summer programming. Additionally, if many summer activities focus on male-dominated sports, females may be less likely to participate in a summer program. For the other variables, the hypotheses are that the sign on the coefficients are negative, reflecting the potential decreased access to summer programs as a result of minority status. The same negative sign is hypothesized for the Foreign\_Born variable, since those from other countries, aside from perhaps suffering from discriminatory processes, may also be less knowledgeable about US summer programs, or may hold different expectations for summer activities than available in the US

**Table 3--Independent Variables1**

Independent Variable	Why Used	Values	Hypothesis
Female	Programming access disparities can occur across gender lines.	1 = Female 0 = Male 49.13% Female	+/-  Females may or may not be more likely to participate in summer programs due to higher academic achievement. Females may also be less likely to participate if many summer activities are marketed to males.
Hispanic	Programming access disparities can occur across ethnic lines.	1 = Hispanic 0 = Non-Hispanic 11.81%	-  Hispanics may encounter higher barriers to participate in summer programming.
Black	Programming access disparities can occur across racial lines.	1 = Black 0 = Non-Black 13.68%	-  Blacks may encounter more barriers to participate in summer programming.
AmericanIndian_Aleut_Eskimo	Programming access disparities can occur across racial lines.	1 = Native American 0 = Non-Native 2.05%	-  Native Americans may encounter more barriers to participate in summer programming.
Asian_PacificIslander	Programming access disparities can occur across racial lines.	1 = Asian/Pacific Islander 0 = Non-Asian/Pacific Islander 3.85%	-  Asian/Pacific Islanders may encounter more barriers to participate in summer programming.
Foreign_Born	Programming access disparities may exist between children of different countries of origin.	1 = Foreign born 0 = Born in US 3.62%	-  Foreign born children may encounter more barriers to participate in summer programming.

### ***Child Educational Situation***

This set of independent variables includes five variables describing the child's grade level and type of school attended. Both Grade\_Level and Grade\_Level2 were used to describe the relationship between a child's grade level and the propensity to participate in a summer activity. Grade\_Level simply reflects the grade of the child, modified to include nursery and kindergarten (so that the corresponding numeric value for 8<sup>th</sup> grade would actually be 10 in this case). Grade\_Level was altered from the CPS measure so that part-time and full-time nursery and kindergarten were each into one value by grade, rather than by attendance. Grade\_Level2, or the square of the child's grade level, was also included since participation in summer activities increases as children age up to around the high school level, when it sharply drops. The grade level squared term will compensate for that change, and thus its hypothesized sign is negative. For the grade level terms, a 0 value is also included that signifies children who are not in a traditional grade. Since there were a significant number of these children, providing a 0 value for them in the grade level variables keeps them in the sample while marking them as unaffected by their grade level situation. It is just important to recognize that the base comparative case for the grade level variables is a child without a defined grade level. Thus the coefficients also capture the relative importance of being in a school setting.

The other three variables describe the type of school the child attends. Regular\_School is the most general school type. For specific school types, the options were public, private, and out of universe (or neither of the others). A significant number of children attended non-public and non-private schools, which could potentially be capturing students being homeschooled, children in non-traditional programs, or children not yet enrolled. By including this dummy variable, such children are marked as unique for analytical purposes. The base case here is a non-traditional grade level and a non-regular public school. Table 4 provides information for each of these variables.

Independent Variable	Why Used	Values	Hypothesis
Grade_Level	Ordinal variable to determine impact grade level has on summer program participation.	0 = Other 1 = Nursery 2 = Kindergarten 3-14 = 1 <sup>st</sup> -12 <sup>th</sup> grade	+  As child ages, s/he is more likely to participate in a summer program.
Grade_Level2	Squared Grade_Level. Grade level correlation with summer program participation is not linear.	Grade_Level values squared.	-  Once the child reaches high school, s/he is less likely to participate in summer programs.
Regular_School	Dummy to control for the most general type of school child attends during the school year. May indicate the types of participatory programs likely to be selected by the child's parents.	1 = Yes 0 = No 59.86%	+  Children attending traditional schools may be more likely to attend traditional summer programs.
SchoolType_OutOfUniverse	Dummy to control for children attending school considered neither private nor public.	1 = Yes 0 = No 27.42%	-  Children not attending traditional schools may be less likely to participate in traditional summer programming.
SchoolType_Private	Dummy to control for children attending private school.	1 = Yes 0 = No 11.03%	+  Student who attend private schools may come from families willing to expend more resources on their children's academic attainment, or the private school may offer more summer programming than non-private institutions.

**Table 4--Independent Variables2**

### ***Household Information***

This set of seven variables describe the child's household income, the number of people the child lives with, whether a business is present in the home, whether a phone is present within a home, ownership status of the residence, and the size of the surrounding community. A home business also includes family farms. Household\_Income measures income in distinct brackets and is therefore not a continuous measure, but it is ordinal.

The variables Home\_Business, Phone\_in\_Home, and Metro\_Area\_Size, although seemingly related, each explain different factors involved in the summer decision-making process. Home\_Business, while capturing some of the rural geographic placement of the children in the sample due to the inclusion of home farms, primarily captures the particular effects of having a parents' place of work located within the home on student summer activity. Phone\_in\_Home denotes whether a phone is present in the household. This variable also could be capturing geographic factors in that rural locations were significantly less likely to have telephone service in 1996. Interestingly, a new Telecommunications Act was passed in 1996 to provide increased access to telephone service, including in rural areas.<sup>3</sup> This variable thus does capture some rural effects, and also some poverty effects, but also captures one potential barrier to entry into summer programs. Reminders to sign up for summer school may be transmitted through phone calls, and inquiries into summer program offerings are more easily accomplished by phone. This variable may have the most impact on number of weeks of summer participation, since families without phones may be more likely to enroll their children in programs after the program's official start date if information is not readily available to those families desiring to place their children in a summer

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<sup>3</sup> See: Telecommunications Act of 1996, Pub. LA. No. 104-104, 110 Stat. 56 (1996). Accessed 30 Mar 2010. <http://www.fcc.gov/Reports/tcom1996.pdf>.

program. The final variable, `Metro_Area_Size`, measures the population size in the surrounding metropolitan area and should capture most of the effect due to rural location. By including all of these variables, the analysis is able to disentangle the effects of each individual variable.

The residency variables are included to capture the effects of residential transiency. A family that owns a home may consider their residency status more permanent and may thus be more involved in their community and its offerings. A family that is renting or not paying anything to live in their home may be more likely to move, and thus such families' interest in placing their child in a long-term summer program may be lower. Thus such families may choose either short-term summer activities or no activities if they fear that their investment in such activities could be easily wiped out by the need to suddenly move (this would be much more pertinent for families not paying for their residence).

The base case for this category of variables is no home business, no phone in the home, and family ownership of the home. The variables are described in Table 5 below.

**Table 5--Independent Variables3**

Independent Variable	Why Used	Values	Hypothesis
Household_Income	Programming access disparities is likely related to income disparities.	Min: 1 Max: 14 Mean: 8.85	+  Access to certain summer programming may require payment. Also, areas of higher wealth may provide more summer programming.
Household_Members	The number of household members may affect availability of caregiving and/or transportation for the child.	Min: 2 Max: 16 Mean: 4.52	+/-  The more family members present, the more support a child may have to get to/from a summer program. However, this additional family support may also encourage parents to leave their children in the home during the summer.
Home_Business	The presence of a home business may impact parental decisions to remove children from the household for long periods of time during the summer.	0 = No 1 = Yes 17.8%	+/-  Parents may desire that children of age help with the family business during the summer. On the other hand, parents may also want to place their children under 3 <sup>rd</sup> party care while the parents work at home.
Phone_in_Home	The presence of a phone within the home may impact child access to summer programming.	0 = No 1 = Yes 91.8%	+  Having a phone allows parents to more quickly locate and enroll children in summer activities. Additionally, the presence of a phone provides the family with another avenue to learn of summer programming initiatives.
Rent_Residence	Home renting may make the family's residency situation less stable.	0 = No 1 = Yes 33.4%	-  Families who are renting may be less likely to invest in long-term summer programming for their children.
No_Pay_Residence	Not paying for residency may make the family's situation less stable.	0 = No 1 = Yes 1.95%	-  Families who are not paying for residency may be much more likely to suddenly move, and thus may be unwilling to invest resources in summer programming for their children.
Metro_Area_Size	The size of the metropolitan area captures some geographic effects on summer opportunities.	Min: 0 Max: 6 Mean: 2.60	+  Larger metropolitan areas are more likely to have a number of summer activities available for children.

### ***Parental and Grandparental Presence***

This set of five variables, described in Table 6 includes the parental situation for the child and whether and which grandparent lives with the child. The presence of parents and grandparents in the home captures some of the attention a child receives in the household. Single parents may be more likely to place children in summer programs to ensure supervision for their children. Children not raised by a parent may also be more likely to be enrolled in a summer program for the same reason, but this effect seems much more ambiguous. The presence of grandparents may actually decrease the likelihood for children to attend a summer program since supervision may be provided for at home. However, if the grandparents are in need of care and require enough attention, children may be more likely to attend summer programs to reduce parents' supervisory requirements. The base case for these variables is having both parents and having neither grandparent present in the household.

**Table 6--Independent Variables4**

Independent Variable	Why Used	Values	Hypothesis
Single_Father	The presence of only one parent may impact the family's decision to enroll children in a summer program.	0 = No 1 = Yes 4.00%	+  Having just one parent increases the supervisory responsibility of the parent, and summer programs can mitigate some of that responsibility.
Single_Mother		0 = No 1 = Yes 21.9%	
NoParent	The lack of parents in the household likely impacts the family's decision to enroll children in a summer program.	0 = No 1 = Yes 6.20%	+  The child's caregivers are likely not to be the optimal option given the age or maturity of the caregivers (if the primary caregivers are grandparents or siblings). Caregivers may be more likely to mitigate supervisory responsibility by enrolling the child in summer programming.
Grandfather	The presence of a grandparent in the household may impact the family's available attention for children, either by increasing it if the grandparent is able to supervise the child or decreasing it if the grandparent requires care.	0 = No 1 = Yes 4.00%	+/-  Depending on the level of attention the grandparent requires, children may be more or less likely to participate in a summer program, with children being more likely to attend as the attention requirement for the grandparent increases.
Grandmother		0 = No 1 = Yes 5.29%	

### ***Parental and Grandparental Education Attainment***

This set of four variables denotes parental and grandparental education attainment. Education attainment as recorded by the Census is organized into ordinal brackets starting at the value 31. Education attainment for absent parents is marked as 0. Parents with high education attainment might value activities for their children that further the children's educational attainment, such as academic-focused summer programs. Grandparental education also indicates whether there is a family legacy of high education attainment, which would enhance the parental desire to place children in academic-oriented programs. Additionally, as far as education is a reflection of ability and societal good fortune, more highly educated parents and grandparents may be better able to locate and/or access summer programs. It is likely that the coefficients for the parental education attainment variables will be greater than their grandparental counterparts due to the parents having direct control over the children's summer activity enrollment. The variables are described in Table 7.

**Table 7--Independent Variables5**

Variable	Why Used	Values	Hypothesis
Father_Edu	Parental education likely impacts parental decision-making and may also capture parental valuation of education.	Min: 0 Max: 46 Mean: 28.8	+  A higher level of parental and grandparental education may indicate a greater familial desire to enroll children in summer programming, especially those that are academic in nature. Additionally, if education is also a reflection of ability, higher education may indicate a greater ability for the family to find summer programs in which children can participate. The coefficients of the parental education variables are likely to be of greater magnitude than their grandparental counterparts due to generational proximity to the children.
Mother_Edu		Min: 0 Max: 46 Mean: 35.7	
Grandfather_Edu	Like parental education, grandparental education may also reflect familial decision-making, but it additionally captures the family's education history, and may indicate a long-held familial respect for education.	Min: 0 Max: 45 Mean: 1.55	
Grandmother_Edu		Min: 0 Max: 44 Mean: 2.06	

***Parental and Grandparental Foreign Born Status***

This set of four variables indicates whether child's parents and grandparents were born in the United States or abroad. Individuals born abroad may not have access to the same summer programming as those born domestically. Prejudice may be a factor, but the primary driver of any existing difference between those born domestically and those born abroad would likely be cultural. Parental practices in other countries with regard to children in the summer may not match those of the US. If parents are children of grandparents born abroad, then foreign practices may still influence parental child raising decisions. Since the country of origin variable that was measured by the Census included many countries of origin, and since there were often few affirmative

respondents for each country, this variable was converted to a simple foreign born status binary variable, with the two responses recoded to be foreign born or not foreign born. Thus all four of these variables are binary. The sign for each variable’s coefficient is ambiguous, since foreign practices may be as likely to increase child summer programming attendance as decrease it. The base case for this set of variables is for each parent and grandparent to be born in the US. The variables are described in Table 8.

**Table 8--Independent Variables6**

Variable	Why Used	Values	Hypothesis
Father_Foreign_Born	Cultural differences between parents born abroad and those born at home may cause differences in how families spend their summers.  Grandparents born in foreign countries may have brought raised their children through foreign practices, which would likely affect how their children would raise their own offspring.	0 = No  1 = Yes  11.1%	+/-  Familial cultural differences may lead to either increased or decreased child summer programming attendance. The coefficients on the grandparental variables are likely to be less than those on the parental variables due to generational proximity.
Mother_Foreign_Born		0 = No  1 = Yes  12.1%	
Grandfather_Foreign_Born		0 = No  1 = Yes  0.322%	
Grandmother_Foreign_Born		0 = No  1 = Yes  0.436%	

***Parental Labor Situation***

This set of eight variables includes parental employment, retirement, and disability situation, as well as parental labor hours. All of these variables capture aspects of how much attention a parent has to give to their children, and thus relates to the parental decision to enroll

children in summer programming. Employment status and labor hours are included separately in case some parents who were employed had not put in any hours in their job for a significant amount of time for some reason (such as an employer-sanctioned hiatus). Including these measures separately also disentangles the effect being employed has from the effect of the employment hours.

The expected relationship between both employment status and labor hours and child propensity to attend a summer program is positive. The less time a parent has to spend with the child, the more likely that parent is to enroll the child in a summer program. The effect of disability status is more ambiguous. If one of the child's parents is disabled, that parent may not be as able to care for the child and thus seek programs in which the child can be watched. On the other hand, the child may play an important role in helping the parent through the disability, thus reducing the likelihood the child attends a summer program. Retirement status has a similar ambiguous effect. If the retired parent is able to care for the child, then the child would be less likely to attend a summer program. But if the retired parent is too old to care for the child, then the child would be more likely to participate in a summer program.

The base case for this set of variables is having both parents unemployed, both parents not retired, and both parents without disability. The variables are described in Table 9.

**Table 9--Independent Variables7**

Variable	Why Used	Values	Hypothesis
FatherEmployed	Parental employment status likely impacts the familial decision to enroll the child in summer programming.	0 = No 1 = Yes 65.8%	+  Employed parents may be more likely to enroll their children in organized summer activities to reduce supervision requirements.
MotherEmployed		0 = No 1 = Yes 57.4%	
FatherRetired	Depending on the physical abilities of the parental retirees, the parental retirement status likely has an impact on the familial decision to enroll the child in summer programming.	0 = No 1 = Yes 0.847%	+/-  If retired parents are able to care for the child, this would reduce the need to enroll children in summer programming to provide supervision. If the retired parents are unable to care for the child, then child summer program participation is likely to be higher.
MotherRetired		0 = No 1 = Yes 0.936%	
FatherDisabled	Parental disability may impact child participation in summer activities, depending on the way in which the family deals with the disability.	0 = No 1 = Yes 1.51%	+/-  If disabled parents are unable to care for their children, then the likelihood that their children participate in summer activities is likely higher. If disabled parents rely on their children to cope with the disability, child participation in summer activities is likely lower.
MotherDisabled		0 = No 1 = Yes 1.83%	
Father_Labor_Hours	The number of hours per week a parent works likely impacts the decision to place children in summer activities.	Min: 0 Max: 137 Mean: 30.1	+  The more hours parents work, the greater the need there is for child supervision, which can be accomplished during the summer through organized summer programming.
Mother_Labor_Hours		Mean: 19.1 Min: 0 Max: 128	

### ***Special Parental Factors and State Effects***

This final set of 53 variables includes parental ambiguities and state effects. The variables `Father_Ambiguous` and `Mother_Ambiguous` mark children who had two or more individuals in their household that could have been their fathers or mothers. Some households contained multiple families, but the Census data does not directly link families to each other. So, for example, in a household containing two two-parent families and two children, it is not possible to determine which child is the offspring of one of the set of parents. Children under these familial circumstances have averaged values for parental-specific variables across their possible parent set. Returning to the example, each of the two children would report the average of the two fathers' education attainment as their male parental education attainment. The two ambiguity variables simply mark these rare cases as being different from the others in the sample. The sign of these variables' coefficients is ambiguous. If more adults are present in the household, the children may not need to attend summer programs to be supervised. However, the presence of multiple families in one household may lead to the entry of more information about community offerings into the household. In addition, there may be more support in such households to transport children to summer programming.

For the state effects, 51 dummy variables were produced to denote each state and Washington, D.C. These variables control for any fixed effects specific to each state. For the purposes of this paper, the coefficients of these variables are not reported.

The base case with regards to these variables is not having any parental ambiguities. The state base case is chosen arbitrarily. The variables are described in Table 10.

**Table 10--Independent Variables8**

Variable	Why Used	Values	Hypothesis
Father_Ambiguous	Some children living in multi-family households could not be linked to only one father or one mother. This dummy variable marks such children.	0 = No 1 = Yes 0.369%	+/-  Potentially increased information on community offerings as well as a higher level of support for children to be transported to summer programs may lead to increased child attendance at summer activities. But if there is enough supervision at home, children may be less likely to participate in summer programs.
Mother_Ambiguous		0 = No 1 = Yes 0.826%	
State Effects (51 dummy variables, one for each state and D.C.)	Controls for any state fixed effects.	0 = Does not live in state 1 = Lives in state	+/-  Sign depends on the state.

## Weight

The October 1996 CPS contains weight variables within the dataset. For the purposes of this paper, the household weight variable was used in the linear probability models and the Probit models. The weight used is in the form of a pweight, or sampling weight, and the weight variable denotes the inverse of the probability that the household was included in the sample.

## Stage 2: Social Benefit Analysis

In Stage 2, the actual state averages of the dependent variables from the Current Population survey data—Summer\_All, Summer\_School, Summer\_Work, Summer\_Service, Summer\_Internship, Summer\_Camp, and Summer\_Weeks— are the primary investigative independent variables. The dependent variables in Stage 2 are the various per capita crime statistics disaggregated by sex and age, just by sex, and just by race. Other state controls are included in these social benefit analyses. A

set of these controls are the actual state averages of the independent variables used in Stage 1. Thus, these controls encompass the average state demographics, socioeconomics, child statistics, parental statistics, and grandparental statistics. The second set of controls in fact only includes one variable—State Education Spending on Elementary and Secondary Education. This was the only budget item that was deemed to be reasonably exogenous from the crime dependent variables being analyzed. However, there may arguably be some connection between state spending on elementary and secondary education that goes beyond what is proper for a robust regression. For example, states with higher juvenile crime rates may choose to spend more on K-12 education. This is the reason why this paper leaves out other available information on state spending, such as spending on police or the judicial system. However, this paper argues that states would likely combat higher juvenile crime rates by spending more on other state and local services that directly target criminal activity, such as the police, rather than education spending. For this reason, this paper includes state spending on elementary and secondary education as a control. For some of the earlier regressions, results are reported both with and without these controls included.

The simplified regressions for Stage 3 take the form:

$$\text{Crime Per Capita} = \beta_1 * \text{Summer Variable Average by State} + \beta_2 * \text{Child Demographic Averages by State} + \beta_3 * \text{Parental Variables Averages by State} + \beta_4 * \text{Grandparental Variables Averages by State} + \beta_5 * \text{State Spending on Elementary and Secondary Education Per Capita} + \alpha$$

Per capita crime rates are used to allow for more effective comparison across states, which vary greatly by population. By using the state averages of the dependent variables from Stage 1, this social benefit analysis can determine if there is any relationship between student summer activity in a state and the incidence of juvenile crime in the same state. Using state averages of the independent variables from Stage 1 as controls in Stage 3 allows the summer activity effects to be disentangled from those associated with the socioeconomic makeup of the state. Finally, the use of state spending on K-12 education also allows the summer activity coefficients to be more

representative of the pure effects of summer programming, rather than also accounting for an otherwise omitted effect from state monetary investment. The variables used in the regression are listed in Table 11.

**Table 11--Social Benefit Analysis Independent Variables**

Independent Variable	Why Used	Values	Hypothesis
Summer Variable Average by State	Main investigative variables used to see if student summer activity is related to juvenile crime.		-  Summer activity is hypothesized to reduce juvenile crime.
Child Demographic Averages by State	Disentangles the effects of summer variables on crime from the relationship a child's demographics have with juvenile crime.		Variable dependent
Parental Variables Averages by State	Disentangles the effects of summer variables on crime from the relationship a child's parental situation has with juvenile crime.		Variable dependent.
Grandparental Variables Averages by State	Disentangles the effects of summer variables on crime from the relationship a child's grandparental situation has with juvenile crime. Grandparental variables also control for longer term patterns in families' values.		Variable dependent, but coefficients of lesser magnitude that those of counterpart parental variables due to farther generational proximity to children.
State Spending on Elementary and Secondary Education Per Capita	Controls for effects of state monetary investment in education.	Min = 796.512  Max = 1941.587  Mean = 1050.506	+/-  Increased state investment in education ideally decreases the incidence of juvenile crime. However, some studies have shown a relationship between school attendance and an increase in crime. See Jacob and Lefgren (2003).

The crime dependent variables are divided into two categories: Violent and Property crime. This is in following with Jacob and Lefgren (2003). According to the FBI, the Uniform Crime Reports, from which the juvenile crime is collected, defines violent crime as consisting of “murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault.”<sup>4</sup> Property crime consists of “burglary, larceny-theft, motor vehicle theft, and arson.”<sup>5</sup> Since Jacob and Lefgren (2003) did find that schooling during the normal academic year did have an impact on violent and property crime in different ways, this paper investigates the impact summer activity has on juvenile violent and property crime.

The dependent variables for the social benefit analysis, namely the crime variables, can be broken down by gender, age and gender, and by race. For age, the FBI crime reports place juveniles in brackets before reporting their actual age. Crime for 0 to 9-year-olds, 10 to 11-year-olds, and 12 to 13-year-olds are the first three age values. At age 14, the age measure continues to ascend by one year increments. However, the Census data reported child grade levels, not age. Thus the FBI crime data for age is transformed into grade level data for the purposes of this paper. Zero to 9-year-olds are categorized as zero to 4<sup>th</sup> graders. Ten to 13-year-olds are considered to be in 5<sup>th</sup> through 8<sup>th</sup> grade. And 14 through 18-year-olds are included in 9<sup>th</sup> to 12<sup>th</sup> grade. While not perfect due to students who either skip grades or are held back in grade level, this transformation allows the Census data to be compared to the crime data.

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<sup>4</sup> FBI. “Violent Crime”.

<sup>5</sup> FBI. “Property Crime”.

# Results

## Stage 1: Determinants of Participating in a Summer Activity

### Regression: Propensity to Participate in Any Summer Activity

The first regression relates the propensity to participate in any summer activity (Summer\_All) to the socioeconomic independent variables from the Census survey. This paper continues to divide each regression into multiple sections for presentation purposes. Each section contains a brief interpretation of the results. Both the linear probability model (LPM) and the Probit models are included in the tables for each section. None of the regressions will include the final category, Special Parental Factors and State Effects, since these are markers and controls that are inessential to an analytical understanding.

### Child Demographics

Variables	Summer_All	
	LPM	Probit
Female	-0.0256*** 0.00501	-0.126*** 0.0234
Hispanic	0.0159 0.00968	0.0622 0.0508
Black	4.29E-05 0.00831	0.00269 0.0404
AmericanIndian_Aleut_Eskimo	-0.019 0.0241	-0.0542 0.107
Asian_PacificIslander	-0.0418*** 0.0155	-0.182** 0.0813
Foreign_Born	-0.0314** 0.0151	0.00397 0.0707
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Female, Asian\_PacificIslander, and Foreign\_Born all statistically significant at the 95 percent confidence level, and the first two variables are statistically significant at the 99 percent level. All three variables are negatively related to summer activity participation. Females are 2.56 percent less likely than males to participate in a summer program. Asians and Pacific Islanders are 4.18 percent less likely than members of other races to attend a summer program. Children born abroad are 3.14 percent less likely to participate in summer activity than those born in the United States. The regression indicates that there are generally not statistically significant differences between the propensity to attend summer programs based solely on races, aside from Asians and Pacific Islanders.

### Child Educational Situation

Variables	Summer_All	
	LPM	Probit
Grade_Level	0.0718*** 0.00733	0.249*** 0.0255
Grade_Level2	-0.00432*** 0.000539	-0.0154*** 0.00184
Regular_School	0.279*** 0.0143	1.867*** 0.0949
School_Type_OutOfUniverse	0.117*** 0.0111	-0.0598 0.119
School_Type_Private	0.0299*** 0.00929	0.0685* 0.0374
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

All of the child education measures are significant at the 99 percent level. Grade\_Level has a positive coefficient, whereas Grade\_Level2 has a negative one. This reflects the increase in summer

activity participation as children age, and then the drop in participation once children reach a certain age. The other three variables are all associated with increased likelihood to participate in summer programming. Those attending regular school are 27.9 percent more likely than those not attending regular schools to participate in summer activities. Those attending non-public and non-private schools are 11.7 percent more likely to participate than public school students. Those attending private school are 2.99 percent more likely than public school students to participate.

### Household Information

Variables	Summer_All	
	LPM	Probit
Household_Income	0.00647*** 0.000975	0.0296*** 0.00479
Household_Members	-0.00910*** 0.00188	-0.0508*** 0.00972
Home_Business	0.0247*** 0.00742	0.0906*** 0.0316
Phone_in_Home	-0.000134 0.00879	0.101* 0.0542
Rent_Residence	-0.0135** 0.00638	-0.0852*** 0.0319
No_Pay_Residence	-0.0117 0.0185	-0.0885 0.101
Metro_Area_Size	-0.00211 0.00159	-0.00966 0.00749
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Household\_Income, Household\_Members, and Home\_Business are all statistically significant at the 99 percent level. Rent\_Residence is significant at the 95 percent level. For each step up in the household income bracket, the propensity to participate in summer activity increases

by 0.647 percent. Each additional household member decreases the propensity to participate in summer activity by 0.910 percent. The presence of a home business increases the propensity to attend a summer program by 2.47 percent. Renting a residence decreases the likelihood of attending a summer program by 1.35 percent.

More members in a household may be providing enough necessary supervision for a child so that summer activity is no longer necessary for supervisory purposes. The positive coefficient on Home\_Business may that parents who work at home seek time away from their children during the summer. The negative coefficient on Rent\_Residence may indicate the hypothesized relationship that decreased residential permanency leads to less familial investment in a child’s summer programming.

### Parental and Grandparental Presence

Variables	Summer_All	
	LPM	Probit
Single_Father	0.517*** 0.0563	2.693*** 0.274
Single_Mother	0.362*** 0.0551	1.592*** 0.264
NoParent	0.690*** 0.0599	3.121*** 0.315
Grandfather	-0.675*** 0.232	-2.957** 1.331
Grandmother	0.244 0.231	1.076 1.243
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

All of the variables in this set except for Grandmother are statistically significant at the 99 percent level. Having a single parent increases the propensity to participate in summer

programming significantly. A child raised by a single father is 51.7 percent more likely to attend a summer program than a child raised by a father and a mother, while a child raised by a single mother is 36.2 percent more likely to participate. A child not raised by his/her parents is 69 percent more likely to attend a summer program. The signs of these values may indicate that single parents or non-parent caretakers may not have as much time or child-raising ability as two traditional parents combined, and thus are more likely to enroll children in summer programming. The presence of a grandfather is also significant, reducing the likelihood of attending a summer program by 67.5 percent, perhaps indicating that grandfathers living in the household are able to care for their grandchildren during the summer.

### Parental and Grandparental Education Attainment

Variables	Summer_All	
	LPM	Probit
Father_Edu	0.00944*** 0.00138	0.0422*** 0.00648
Mother_Edu	0.0137*** 0.0014	0.0709*** 0.00677
Grandfather_Edu	0.0164*** 0.00603	0.0714** 0.0339
Grandmother_Edu	-0.00583 0.00595	-0.0268 0.0318
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

All of these variables except for Grandmother\_Edu are statistically significant at the 99 percent level. All of the coefficients are positive, indicating that increased familial education increases the propensity of attending a summer program significantly. It seems that the education

level of the grandfather is most important, in that each additional increase in education attainment bracket value increases the likelihood of the child to attend summer programming by 1.64 percent. The mother's education attainment impact is 1.37 percent, and the father's impact is 0.944 percent.

### Parental and Grandparental Foreign Born Status

Variables	Summer_All	
	LPM	Probit
Father_Foreign_Born	-0.0148 0.0107	-0.0753 0.053
Mother_Foreign_Born	-0.0129 0.0105	-0.102* 0.0541
Grandfather_Foreign_Born	0.0519 0.0514	0.249 0.218
Grandmother_Foreign_Born	0.02 0.039	0.138 0.185
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

It appears that parental and grandparental foreign born statuses are not statistically significant. However, this may be a result of the lack of potential information this variable could capture. Cultural differences do exist across countries, but placing all foreigners into one category together ignores the differences between foreigners. While this variable still does capture the effects of parents and grandparents not being born in the United States, other issues that may be significant, such as language differences, are not effectively captured here.

### Parental Labor Situations

Variables	Summer_All	
	LPM	Probit
FatherEmployed	-0.0377** 0.0163	-0.193** 0.0815

MotherEmployed	0.0291*** 0.00949	0.168*** 0.0443
FatherRetired	-0.0148 0.0353	0.00169 0.154
MotherRetired	-0.00241 0.0294	0.0288 0.133
FatherDisabled	-0.0501** 0.0232	-0.239** 0.114
MotherDisabled	-0.0509*** 0.019	-0.157 0.0966
Father_Labor_Hours	0.00102*** 0.000212	0.00454*** 0.000949
Mother_Labor_Hours	-0.000478** 0.000232	-0.00325*** 0.00102
Observations	25990	25990
R-squared/ Pseudo-R-Squared	0.307	0.3607

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

All of the variables here are statistically significant except for the parental retirement variables. MotherEmployed, MotherDisabled, and Father\_Labor\_Hours are statistically significant at the 99 percent level while FatherEmployed, FatherDisabled, and Mother\_Labor\_Hours are significant at the 95 percent level. Parental disability makes child attendance at summer programs less likely, both by a little over 5 percent, perhaps because children of disabled parents are needed to help out in the home. FatherEmployed and MotherEmployed work in opposite directions from each other, but they also hold opposite signs to their respective labor hours measure. The mother being employed increases the chances the child attends a summer program, but the more hours the mother works, the less likely the child attends a program. The father being employed decreases the chances the child attends a summer program, but the more hours the father works, the more likely

the child attends a program. The differences between the mother and the father may indicate different preferences by gender.

## **Interpretation of Results**

There could be many interpretations for the results found in this section. Without perfect data, perfect results are impossible to come by. And since the data collected on child summer activity is far from perfect, the results should be taken more as guides for further research rather than as robust findings with policy implications. It may be that a causal relationship does exist between some of the socioeconomic variables and the propensity to participate in summer activities, but before any such relationship can be determined, the potential for that relationship must be identified. That is what this paper seeks to do in this section.

With those caveats in mind, a number of interesting results were found. Gender disparities do exist with regards to summer programming participation. Females are less likely to participate in summer programming than males. This could be a result of the programs available during the summer marketing more toward boys, or a byproduct of higher female academic achievement—parents may not believe their female child needs to attend a summer program if she is already excelling in school. Racially, disparities exist only with regards to Asians. Asians and Pacific Islanders are less likely to participate in summer programming. This result could be a reflection of culture or, like in the case of females, a reflection of higher academic achievement within a societal group. The age of a student is also related to the likelihood for the student to attend a summer program. As students age, they become more likely to participate up to a point, when the likelihood begins to decrease. By surveying the raw data, that turning point seems to be during or around the high school years.

Household statistics also matter. As the number of members present in a household increases, the likelihood for a child of the household to participate in summer programming decreases. This may be due to the increased attention a child can receive in such a household. Household income does increase the likelihood for a child to attend a summer program. But perhaps most interesting is the effect single parents have on the decision to enroll children in summer programs. Children with single parents are much more likely to be enrolled in summer programs than children with both parents in the home. For the most part, these effects are larger than those effects of parental education, which also play a significant role.

Finally, parental labor status has an interesting effect on the likelihood to attend summer programs. If the father is employed, the child is less likely to participate in a summer program, but if the father works long hours, the child is more likely to participate. The opposite is true in the case of the mother. These results may be related to notions of a traditional familial gender relationship.

These results overall seem to point to the importance that available caregiver attention has on familial decision-making with regards to the summer. Household members, parental status, and labor information are likely significant because they all directly or indirectly relate to how much attention or supervision can be provided for the child at home. In most cases, if that supervision cannot be provided in the home, the child is more likely to attend a summer program.

## ***Stage 2: Social Benefit Analysis***

In this paper, the social benefit analysis consists of relating student summer activity to juvenile crime. Does increased local participation in summer programs reduce juvenile crime? To answer this question, 146 different regressions were run on different combinations of the criminal's age, race, and gender with the different summer measures available. Because most children who participated in a summer program were enrolled in either summer camp or summer school, the

regression shown in this section include four summer measures: Summer\_All, Summer\_School, Summer\_Camp, and Summer\_Weeks. Summer\_All and Summer\_Weeks are each used in regressions alone. Summer\_School and Summer\_Camp are combined in their regressions to determine their impact on juvenile crime when taking the other program offering into account. But before the results are introduced, the regression method itself is analyzed.

## **Regression Method**

In the social benefit analyses, per capita measures of juvenile crime cannot be regressed on a summer measure alone. Without other controls, the summer measure will be capturing the effects of omitted variables and thus its coefficient will not reflect the summer measure's true impact on juvenile crime. This can be seen in Table 12. If no other variables are used, the coefficient of Summer\_All is positive, thus indicating that increased participation in summer activities is related to increased juvenile crime. Table 12 depicts what happens when the analysis includes more proper control variables. The coefficient on Summer\_All is now negative, indicating that increased child summer activity participation is related to less crime. Regressing with all of the controls, including government spending, still produces a negative coefficient on Summer\_All. The value is the decrease in juvenile male crime per capita. A 10 percent increase in student summer activity seems to be related to a reduction in the crimes committed by males per capita by 0.00152, or by about 3 crimes for every 2000 people in a state.

**Table 12--Social Benefit with Different Controls**

Dependent Variable	Total Male Crime Per Cap
<b>Controls</b>	<b>Summer_All</b>
Without other variables	0.00744***
	0.0016
With Child Demographic Controls	-0.00236
	0.0021
Add Household Controls	-0.0223***
	0.0031
Add Government K-12 Spending	-0.0152***
	0.0031
Standard errors in second rows	
*** p<0.01, ** p<0.05, * p<0.1	

The regressions shown in the rest of this section include all of these controls. For this paper’s purposes, only the coefficients on the summer measure involved are reported, along with its standard error, on order to focus on the relationship the specific summer measure has with juvenile crime.

### **Regression Set 1: Gender**

In this first set of regressions, juvenile crime is divided into four categories by gender and by type of crime. These dependent variables are related to gender-specific summer measures. Table 13 summarizes the results from these regressions.

From the right side of the table, it seems that the incidence of female crime actually rises as summer participation increases. The only case where this is not true is with regards to the violent crime rate and the Summer\_Weeks measure. The duration of the summer activity seems to decrease the female juvenile violent crime rate by a small amount. The left side of the table tells a different story for males. It seems that summer activities decrease both the male violent and property crime rate significantly. Perhaps most interestingly, males are affected differently by summer school and summer camp. Summer school enrollment actually increases the male crime

rate whereas summer camp participation decreases the male crime rate. Without other controls for either of these variables, such as some measure for the quality of the available summer programs, it is difficult to tell whether the relationship is causal.

From this analysis of general gender trends, it seems that summer activities increase the female crime rate while they decrease the male crime rate, although the male crime rate increases with a higher propensity to enroll in summer school.

**Table 13--Gender Only Regressions**

Summer Variables	Male Violent Crime	Male Property Crime	Female Violent Crime	Female Property Crime
Male Summer_All	0.000114	-0.00668***		
	0.000073	0.00058		
Female Summer_All			0.0000775***	0.00209***
			0.000015	0.00023
Male Summer_School	0.00109***	0.00301***		
	0.00014	0.0011		
Male Summer_Camp	-0.000292***	-0.00799***		
	0.000067	0.00053		
Female Summer_School			0.000359***	0.00522***
			0.000048	0.00074
Female Summer_Camp			0.000133***	0.00178***
			0.000013	0.0002
Male Summer_Weeks	-0.0000911***	-0.000760***		
	0.000013	0.0001		
Female Summer_Weeks			-0.0000115***	0.000412***
			0.000002	0.000029
Standard errors reported in second row				
*** p<0.01, ** p<0.05, * p<0.1				

## Regression Set 2: Gender and Age

In the second regression set, male and female crime is broken up type of crime and the age of perpetrator. Table 14 summarizes the female crime regression results. The values of the summer measures' coefficients are small overall. For the youngest group of female students, summer activity appears to increase criminal activity. As females age, it seems that summer activities have more of a negative relationship with the crime rate. For female high school students, summer activity in

general and summer school and summer camp specifically have negative relationships with the female crime rate.

**Table 14--Gender and Age Regression, Female**

Summer Variables	Female Summer_All	Female Summer_School	Female Summer_Camp	Female Summer_Weeks
Female Grade0_4 Violent Crime	1.42E-08 0.0000024	0.0000106*** 0.0000064	0.00000021 0.0000022	-6.67E-08 0.00000041
Female Grade0_4 Property Crime	0.0000385*** 0.0000023	0.000113*** 0.0000059	0.0000388*** 0.000002	0.00000616*** 0.0000038
Female Grade5_8 Violent Crime	0.0000563*** 0.0000022	-0.00000746 0.0000069	0.0000602*** 0.0000019	-0.00000341*** 0.0000037
Female Grade5_8 Property Crime	-0.0000969* 0.000052	-0.000905*** 0.00018	0.0000224 0.000049	0.0000571*** 0.0000076
Female Grade9_12 Violent Crime	-0.0000878*** 0.0000032	-0.000124*** 0.0000097	-0.0000338*** 0.0000031	-0.00000323*** 0.0000045
Female Grade9_12 Property Crime	-0.000521*** 0.000042	-0.00123*** 0.00011	-0.000504*** 0.000036	0.00000415 0.0000054
Standard errors reported in second row				
*** p<0.01, ** p<0.05, * p<0.1				

The effect on male crime rates also seems low, as shown in table 15. Children in the middle age bracket exhibit positive relationships between crime and participation in summer activities, while the youngest and oldest group exhibit negative relationships. Except for the high school property crime rate, increased summer school participation is related to an increase in male crime. Except for the male violent crime rate for the middle age group, increased summer camp participation is related to lower crime rates. Although for females the Summer\_Weeks variable seemed to have an ambiguous relationship with crime rates, the Summer\_Weeks variable for males mirrors the relationship seen in the all summer activity variable for males.

**Table 15--Gender and Age Regressions, Male**

Summer Variables	Male Summer_All	Male Summer_School	Male Summer_Camp	Male Summer_Weeks
Male Grade0_4 Violent Crime	-0.000236***	0.000180***	-0.000255***	-0.0000501***
	0.0000012	0.0000022	0.0000011	0.0000021
Male Grade0_4 Property Crime	-0.000229***	0.000121***	-0.000228***	-0.0000338***
	0.000012	0.000022	0.000012	0.0000022
Male Grade5_8 Violent Crime	0.000209***	0.0000569***	0.000151***	0.0000355***
	0.000007	0.000017	0.0000082	0.0000016
Male Grade5_8 Property Crime	0.000709***	0.00200***	-0.000249**	0.000330***
	0.000095	0.00022	0.0001	0.000019
Male Grade9_12 Violent Crime	-0.000145***	0.000416***	-0.000201***	-0.0000417***
	0.000013	0.000029	0.000097	0.0000018
Male Grade9_12 Property Crime	-0.00165***	-0.000808***	-0.00144***	-0.000317***
	0.000084	0.0002	0.000066	0.000012
Standard errors reported in second row				
*** p<0.01, ** p<0.05, * p<0.1				

### Regression Set 3: Race

When disaggregated by race and crime type, a more distinct relationship emerges between summer activity and juvenile crime. In these regressions, racial crime rates are related to racial summer activity participation. For all groups, increased summer activity is related to lower crime rates. For Blacks and Asians, summer school participation is related to higher crime rates, whereas for Native Americans summer school participation is related to lower crime rates. For all races, summer camp is related to lower crime rates. The duration of summer programming seems to have different effects on different races. For Whites and Blacks, longer summer programs are related to decreased crime rates while for Asians and Native Americans, the opposite is true. The results can be seen in Table 16.

**Table 16--Race Regressions**

Summer Variables	Summer_All	Summer_School	Summer_Camp	Summer_Weeks
White Violent Crime	-0.000128*** 0.00004		-0.0000852 0.000093	-0.000144*** 0.000038
White Property Crime	-0.00436*** 0.00068		-0.00173 0.0016	-0.00416*** 0.00065
Black Violent Crime	-0.000575*** 0.000016	0.000629***	-0.000547*** 0.000029	-0.0000596*** 0.0000026
Black Property Crime	-0.00129*** 0.000062	0.00104***	-0.00164*** 0.00011	-0.000119*** 0.0000095
Asian Violent Crime	-8.47E-08 0.00000034	0.00000996***	-0.00000945*** 0.0000007	0.000000164*** 0.000000053
Asian Property Crime	-0.00000115 0.0000035	0.000114***	-0.000110*** 0.0000071	0.000000158 0.000000055
Native American Violent Crime	-0.0000276*** 0.00000058	-0.0000126***	-0.0000378*** 0.00000056	0.000000308*** 0.000000066
Native American Property Crime	-0.0000785*** 0.0000089	-0.000247***	-0.0000961*** 0.0000063	0.0000226*** 0.00000026
Standard errors reported in second row				
*** p<0.01, ** p<0.05, * p<0.1				

## Discussion of Results

The same caveats to the conclusions drawn here exist as they do in the previous results section. The strength of this paper is in its identification of potential causal relationships rather than its determination of causality. This paper presents evidence that there is a social benefit to student summer activity. Male crime rates seem to be impacted more than female crime rates, but this is likely because males are more likely to commit crimes than females. Student in high school also seem to be impacted more, but perhaps for the same reason as before—high school students are more likely to commit crimes than younger students. When disaggregated by race, higher summer activity seems to be related to lower juvenile crime rates across all races. However, when summer activity is itself disaggregated, it seems that summer camp is much more effective than summer school to reduce crime rates. In fact, summer school in many cases increased juvenile crime rates.

This may be reflecting the findings from Jacob and Lefgren (2003) that schools may allow children to coordinate criminal activity.

The social benefit measured in this paper is the effect student summer activity has on juvenile crime rates. Several social benefit analyses have attempted to monetize such benefits. With respect to crime, such a process would include valuing lost labor productivity and lost social efficiency due to crime. Many such analyses require guessing by the researcher. This paper is less interested in a hypothetical monetary savings involved with lower crime rates than with exploring avenues to achieve decreased crime rates.

## **Conclusion**

For every year, there is a summer. And for every summer, there will be children on break and out of school. The academic achievement gap has been a puzzle for the US to bridge, yet still little research has been done on how students spend almost a quarter of the year. This paper attempts to shed some light on what kind of children participate in summer programming, and perhaps on the way identifies some standout determinates in the a child's likelihood to participate in summer programming. Children from higher income families and with more educated parents tend to participate in summer programs more than others. But children of families with one parent or less are much more likely to participate in summer programming. The decision to enroll a child in a summer program appears to be heavily related to the amount of supervision time the caregiver is able to provide the child. Thus families with a business in the home are more likely to place the child outside the home during the summer months. Single parent households, where the parent is likely strained by responsibility, are very likely to drop the children off to participate in some summer activity. The Stage 1 analysis of this paper points to potential determinants of summer student activity that could prove worthwhile targets for future research.

Stage 2 built on Stage 1 by linking student summer activity to a social benefit. In many cases, the more children who participate in summer programming, the lower the juvenile crime rate is. However, it appears that some groups are more susceptible to the influence of summer programming. High school student crime rates have the most significant relationship to increased high school summer activity participation. And some types of summer programming are better than others. Summer school does not seem to provide much social benefit, and in some cases may produce a social harm. Summer camps, however, do seem to be related to decreases in juvenile crime rates.

But these conclusions are tentative at best, mostly because of the utter lack of useful data on a national scale. The Census asked families about child summer activities only once. Without even one attempt to follow up the original questionnaire in 1996, it is impossible to link summer participation to long-term outcomes on a national scale. Current research focuses on particular programs or localities, and some papers try to unite these studies together to estimate some national impact of student summer activity. In an environment where summer school programs are often quickly placed on the chopping block when finances become tight, further research is needed to discover what the impacts of such policies are. By adding just a few questions to some of the current longitudinal studies being conducted on cohorts of children, researchers and policymakers could easily have access to more updated and reliable data on which to make these important decisions.

Even with some of the data that is currently available, there are many opportunities to extend research. This paper could be extended to analyze other social benefits, such as juvenile health outcomes. Summer activity may affect student health either through physical activity or through behavioral training. Another idea to extend the above analysis on crime would be to extend crime outcomes into the future. For example, if the Uniform Crime Report from 2001 was used, the

student sample from this paper would just be aged five years. Crime rates for their age group in 2001 can be related to the summer measures from this paper. This project hesitated to include such an analysis due to the likelihood that too much noise would intercede during the five year period between 1996 and 2001. Another interesting avenue of research may be to analyze the effects on volunteers in working with children during the summer. This could be considered a type of social benefit, although perhaps less orthodox than the crime or health effects. However, there is significant research in the field of psychology that has looked at volunteer motivations. Perhaps analyzing such benefits from the “giving” side, rather than simply the volunteers’ “receiving” side may prove enlightening.<sup>6</sup>

The main problem with all research concerning students in the summer comes is recurring. The lack of data on the subject is unsustainable in a policy world that emphasizes research-backed proposals. Perhaps if more data were collected, and if the secrets of the summer were unlocked with some acceptable certainty, the achievement gap that has been the bane of education researchers and policymakers may reveal itself as a case of misallocated attention. But education reform cannot stand for long on a cloud of speculation.

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<sup>6</sup> See Clary and Snyder (1999).

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