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RACIAL DISPARITIES IN CHILDREN'S USE OF SPECIAL EDUCATION AND
MENTAL HEALTH SERVICES

A Thesis in
Health Policy and Administration and Demography

by
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ABSTRACT

This dissertation uses event history and multivariate logistic regression analyses to examine the risk of children's use and level of placement in special education and mental health services in the US. Three separate but thematically related studies are presented. The first study examines the dynamics of black and white children's use of special education services. The second study examines factors that explain racial/ethnic disparities in children's use of special education and mental health services. The third study examines factors that explain racial/ethnic disparities in restrictive placement of children in special education and mental health services. The data used in the three studies were collected as part of the Fast Track Project, a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington.

The first study investigates whether the hazards of children's use of special education services vary by race/ethnicity, gender and location. The findings show that racial/ethnic, and gender differences characterize students' use of, and exit from special education services among the high-risk sample used in this investigation. In addition, the shape of the hazards of students' entry and exit from services by race/ethnicity, gender and location is nonlinear, displaying periods of increasing or decreasing risk. The findings highlight the need to develop special education programs and service delivery systems that are cognizant of racial/ethnic and gender differences. The findings also call for a more tailored special education system that takes into account the timing when children are most likely to need services.

The second study has two objectives: 1) to evaluate the factors that explain children's use of special education and mental health services, and 2) to examine whether the factors that explain special education and mental health services use differ by race/ethnicity. Cox regression models are estimated to test the study hypotheses. Results of race-only predictor models show statistically significant racial disparities in special education in two sites (Durham and Washington). Similarly, racial differences in mental health services use were found in Nashville and Pennsylvania. Controlling for several predisposing, enabling and need covariates diminished the observed racial disparities in special education and mental health services use. A policy implication of these findings is that a one-size-fits-all social policy is not likely to achieve the federal government's goal of eliminating racial and ethnic disparities in children's use of social and health services in the US. Partial support was found for the hypothesis that predictors of children's use of special education and mental health services are different amongst the two racial groups analyzed. Variables that predict black children's use of both types of services are generally different from those of whites. The two exceptions are teachers' report of children's behavioral problems and a measure of academic performance, which are the same for each group.

The objectives of the third study are also twofold: 1) to evaluate factors that predict children's placement in restrictive settings of special education and mental health services; and 2) to examine whether restrictive placement predictors in special education and mental health services differ by race/ethnicity. Multivariate logistic regression models were estimated to test the study's hypotheses. Gender disparities in restrictive placement of children in both special education and mental health services persist after "fully" adjusting the models with predisposing, enabling and need factors. Racial/ethnic disparity persists in the full model in the context of restrictive special education placement but is statistically insignificant in the context of inpatient mental health service placement. This suggests that other variables not fully captured in the present study underlie the observed differences in black and white children's level of placement in special education.

In sum, racial/ethnic disparities are found in children's use of special education and mental health services and in restrictiveness of placement. Service use and placement also vary by gender and geographic location, and variables that predict service use and placement vary by race/ethnicity. These findings suggest that children's special education and mental health service delivery systems should be examined so as to be as culturally competent as possible. Policies are needed to address the observed inequalities in children's placement and use of special education and mental health services, as well as the underlying social and economic disadvantages that confront black children and their caregivers/parents.

TABLE OF CONTENTS

	<u>PAGE</u>
LIST OF FIGURES.....	viii
LIST OF TABLES	ix
ACKNOWLEDGEMENTS	xi
DEDICATION.....	xii
CHAPTER 1. INTRODUCTION.....	1
Organization of the Dissertation.....	2
Overview of the Three Journal Articles.....	2
Background and Significance	4
Children’s mental health services need is inseparably linked to their schools.....	5
Very little is known about the processes and factors that predict racial and ethnic disparities.....	5
The need to examine whether service use varies by level of need/severity and type of service.....	6
Children’s placement in special education can best be understood from the individuals’ socioeconomic, demographic, behavioral, health and academic perspectives.....	6
Longitudinal analysis of gender differences in the use of special education and mental health services is lacking.....	7
CHAPTER 2. PRIOR RESEARCH AND THEORETICAL FRAMEWORK.....	8
Prior Research	8
Access and Utilization of Special Education Services.....	8
Mental Health Service Access and Utilization.....	11
Theoretical Framework.....	14
Predisposing, Enabling and Need Factors and Use of Mental health and Special Education Services.....	15
School Contextual Factors and Use of Mental Health Service and Special Education Placement.....	16
The Link Between Mental Health and Special Education Placement.....	17
Chapter 3. DATA AND METHODS.....	18
Data and Sample Description.....	18
Analytical Sample.....	19
Analytical Strategies.....	19
Survival and Hazard Functions.....	19
Cox proportional Hazard Models.....	21
Multivariate Logistic Regression Models.....	22

CHAPTER 4. PAPER ONE: What are the Dynamics of Black and White Children’s Use of Special Education Services?.....	24
Introduction.....	24
Prior Research.....	25
Minority Children are Over-represented in Special Education.....	25
The Over-representation of Minority Varies Across Categories of Special Education Eligibility.....	26
The Over-representation of Minority Groups Reflects Variation Between And Within School Districts.....	27
Students’ Involvement with Special Education also Varies by Gender and Disability.....	27
Remaining Gap in the Literature.....	27
Research Question.....	28
Aims and Objectives.....	28
Hypotheses.....	28
Data and Methods.....	28
Data and Sample Description.....	28
Analytical Sample.....	29
Measures.....	29
Independent and Dependent Variables.....	30
Analytical Strategies.....	30
Results.....	32
Descriptive statistics.....	32
The Dynamics of Children’s Survival and Hazard of Involvement in Special Education by Race.....	33
The Dynamics of Children’s Survival and Hazard of Involvement in Special Education by Gender.....	35
The Dynamics of Racial Differences in Children’s Survival and Hazard of Involvement in Special Education by Location.....	36
The Dynamics of Gender Differences in Children’s Survival and Hazard of Involvement in Special Education by Location.....	38
Racial Profile of Children’s Exit from Special Education.....	40
Gender Profile of Children’s Exit from Special Education.....	43
Discussion.....	46
Summary and Conclusion.....	49
 CHAPTER 5. PAPER TWO: What Factors Explain Racial Disparities in Children’s Use of Special Education and Mental Health Services?.....	52
Introduction.....	52
Prior Research.....	52
Use of Special Education Varies by Race and Ethnicity.....	53
Students’ Involvement with Special Education also Varies by Gender... ..	53
Children’s Use of Mental Health Services.....	53
Service use does not adequately meet mental health needs.....	54
Racial and ethnic disparity in service use is not found in all studies.....	54
Mental health service use varies by location.....	54
Mental health service use may vary by gender.....	55
Mental health service use is determined by multiple factors.....	55
Remaining Questions.....	56
Research Question.....	56
Hypotheses.....	56

Method.....	57
Data and Sample Description.....	57
Analytical Sample.....	58
Measures.....	58
Independent and Dependent Variables.....	59
Analytical Strategies.....	61
Results.....	62
Descriptive statistics.....	62
Children’s Use of Special Education and Mental Health Services.....	63
Children’s Use of Special Education and Mental Health Services by Site ---Race-Only Predictor Model.....	64
Children’s Use of Special Education and Mental Health Services by Site ---Sex-Only Predictor Model.....	65
The Effect of Predisposing Factors on Children’s Use of Special Education and Mental Health Services by Site.....	65
The Effect of Enabling Factors on Children’s Use of Special Education and Mental Health Services by Site.....	68
The Effect of Need Factors on Children’s Use of Special Education and Mental Health Services by Site.....	71
Racial Differences in Predictors of Children’s Use of Special Education and Mental Health Service.....	74
Discussion.....	77
Summary of Findings, Policy Implications and Conclusion.....	81

CHAPTER 6. PAPER THREE: What Factors Explain Racial Disparities in Restrictive
Placement of Children in Special Education and
Mental Health Services?.....

.....	88
Introduction.....	88
Prior Research.....	89
Children’s placement in mental health services sectors varies by race and ethnicity.....	89
Children’s placement in mental health services sectors varies by need.....	90
Patient outcomes and satisfaction varies by mental health placement type	90
Children’s placement in different special education settings varies by race And ethnicity.....	91
Service use intensity within special education placement categories varies by race/ethnicity.....	91
Children’s placement in different special education settings varies by Condition.....	91
Factors that predict children’s special education placement type may vary by race.....	92
Children’s placement in different special education settings varies by gender.....	92
Children’s special education outcomes vary by placement type.....	92
Objectives.....	93
Hypotheses.....	93
Method.....	94
Data and Sample Description.....	94
Analytical Sample.....	95
Measures.....	95
Independent and Dependent Variables.....	96

Analytical Strategies.....	98
Results.....	99
Descriptive Statistics.....	99
Does Restrictiveness of Placement in Special Education and Mental Health Services Differ by Race and Ethnicity?.....	101
Does Restrictiveness of Placement in Special Education and Mental Health Services Differ by Gender?.....	101
Relative effect of Predisposing Factors on Restrictive Placement of Children in Special Education and Mental Health Services.....	102
Relative Effect of Enabling Factors on Restrictive Placement of Children in Special Education and Mental Health Services.....	103
Relative Effect of Need Factors on Restrictive Placement of Children in Special Education and Mental Health Services.....	105
Racial and Ethnic Differences in Predictors of Children’s Restrictive Placement in Special Education and Mental Health Services.....	108
Discussion and Policy Implications.....	112
Summary and Conclusion.....	114
CHAPTER 7. SUMMARY AND CONCLUSION.....	117
REFERENCES.....	125

LIST OF FIGURES

	<u>PAGE</u>
2.1: Theoretical Framework for Analyzing Access to and Use of of Special Education and Mental Health Services.....	15
4.1: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Race.....	34
4.2: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Gender.....	35
4.3: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Race and Location.....	36
4.4: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Gender and Location.....	39
4.5: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Race.....	41
4.6: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Race and Location.....	42
4.7: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Gender.....	43
4.8: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Gender and Location.....	44

LIST OF TABLES

	<u>PAGE</u>
4.1: Demographic Characteristics of the Studied Children.....	33
4.2: Summary of Cox Proportional Hazard Regression Analysis of Children's Entry Into Special Education by Site: Race-Only Predictor Model.....	37
4.3: Summary of Cox Proportional Hazard Regression Analysis of Children's Entry Into Special Education by Site: Sex-Only Predictor Model.....	40
4.4: Summary of Cox Proportional Hazard Regression Analysis of Children's Exit From Special Education by Site: Race-Only Predictor Model.....	43
4.5: Summary of Cox Proportional Hazard Regression Analysis of Children's Exit from Special Education by Site: Sex-Only Predictor Model.....	46
5.1: Descriptive Statistics of Sample Variables.....	63
5.2: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site: Race-Only Predictor Model.....	64
5.3: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site: Sex-Only Predictor Model.....	65
5.4: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site, Controlling for Predisposing Factors.....	67
5.5: Summary of Cox Regression Analysis Children's Use of Special Education and Mental Health Services by Site, Controlling for Predisposing and Enabling Factors.....	69
5.6: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site, Controlling for Need Factors.....	73
5.7: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Race --- Complete Model.....	75
6.1: Descriptive Statistics of Sample Variables.....	100
6.2: Summary of Bivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting --- Race-Only Predictor Model.....	101
6.3: Summary of Bivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting --- Sex-Only Predictor Model.....	102
6.4: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Predisposing Factors.....	103

6.5: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Enabling Factors.....	104
6.6: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Need Factors.....	106
6.7: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services by Race --- Complete Model.....	109

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DEDICATION

This dissertation is dedicated to the Glory of the Almighty God, Jesus Christ of Nazareth, and the Holy Spirit for the establishment of His WORD that “no plans of God can be thwarted (Job 42:2).

CHAPTER ONE

INTRODUCTION

Racial and ethnic disparities in children's use of mental health services and the disproportionate placement of minority students in special education programs in the United States increasingly have attracted research and policy concern (U.S. Department of Health and Human Services [USDHHS], 1999; New Freedom Commission on Mental Health [NFCMH], 2003; Artiles & Trent, 1994; Donovan & Cross, 2002; Losen & Orfield, 2002). In special education, minority children and particularly black children are overrepresented in certain categories of disability (Parrish, 2002; Donovan & Cross, 2002; Fierros & Conroy, 2002). In addition, once minority children enter special education programs, further disparities emerge as they are more likely relative to white children to be placed in restrictive settings such as resource rooms or separate classrooms (Fierros & Conroy, 2002). In contrast, black children are underrepresented among those receiving mental health services (USDHHS & SAMHSA, 2001; Serwatka, Deering, & Grant, 1995). This relative under-utilization of services is especially striking given that black children are at greater risk of mental disorder because of their disproportionate socioeconomic disadvantage.

The processes that lead to these disparate service utilization patterns are not well-understood (Zhang & Katsiyannis, 2002; Coutinho & Oswald, 1998). Identification of the underlying mechanisms that lead to overrepresentation of black students in the different categories of special education programs and underutilization of mental health services is critical for the formulation of ameliorative policies and programs. For example, earlier research has failed to examine the timing of children's involvement in special education and its relationship to their use of mental health services. Understanding the timing of children's involvement in special education and overlap with mental health services use would suggest optimal temporal "windows" for intervention during childhood and adolescence (Weller, Minkovitch & Anderson, 2003). Cross-sectional studies are of limited usefulness in examining the pattern in children's use of services over time, yet most previous research has been cross-sectional.

To fill this gap in the literature, this dissertation research addresses the following central research questions: Why are black children disproportionately represented in both special education and mental health services? Does the socioeconomic disadvantage experienced by black children explain service utilization disparities, or are other factors associated with race/ethnicity also important? What factors explain black children's differential placement in restrictive categories of special education and mental health services relative to white children?

The dissertation relies on unique data that were collected as part of the Fast Track Project (CPPRG, 1992), a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington.

Organization of the Dissertation

This dissertation follows the “multi-article” format endorsed by the HPA Graduate Program Committee and approved by the Penn State Graduate School. Specifically, the dissertation includes three separate but thematically related studies presented in the format of journal articles, which comprise chapters four, five, and six. Chapter one provides an introduction to the dissertation research agenda including the broader background and significance of the research. In chapter two, a common theoretical framework and review of the literature is presented to provide a context for the empirical chapters which follow. Chapter three discusses the data and methods used. A unifying summary and conclusion is provided in the seventh and last chapter. In keeping with the multi-article dissertation format, each journal article/chapter has a unique section for introduction, prior research, methods, results, discussion and conclusion. Reflecting the thematic overlap of the three empirical analyses, some of the material in these article-specific chapters is duplicative.

Overview of the Three Journal Articles (Chapters 4, 5 and 6)

The first paper, *Does the Hazard of Children's Involvement in Special education Vary by Race/Ethnicity and Gender over Time?* examines the dynamics of children's use of special education services. As previously stated, the timing of students' involvement in special education has not been

examined thoroughly (Coutinho & Oswald, 1998a & 1998b), and most earlier studies are cross sectional (Donovan & Cross, 2002; Losen & Orfield, 2002). The longitudinal Fast Track dataset provides the opportunity to analyze the timing of children's involvement in these services. Furthermore, the Fast Track dataset has relatively better measures of children's mental health services use than most other previous studies that examined children's participation in special education. The analysis determines whether black children enter special education at earlier ages and whether disparities in service use vary by race and gender over the year.

The purpose of the second paper, *What are the Factors that Explain Racial/Ethnic Disparities in Children's Use of Special Education and Mental Health Services?* is to evaluate factors that explain racial and ethnic disparities in children's use of special education and mental health services. Minority students are overrepresented in special education programs for mental retardation, emotional disturbance and specific learning disabilities and suffer a disproportionate burden from unmet mental health needs (Donovan & Cross, 2002; Losen & Orfield, 2002; USDHHS, 1999), yet the factors and processes that influence students' disproportionate representation have not been clearly identified (Zhang & Katsiyannis, 2002; Coutinho & Oswald, 1998; USDHHS, 2001). This paper proposes to test whether a range of predisposing, enabling and need factors included in the Fast Track dataset can explain the observed disparities in children's use of mental health services and special education programs.

The aim of the third paper, *What are the Factors that Explain Children's Placement in Different Categories of Special Education and Mental Health Services?* is to evaluate factors that explain placement of children in different categories of special education and mental health services. Minority students in special education suffer from what Fierros and Conroy (2002) have referred to as "double jeopardy." When minority children enter special education, they are more likely to be placed in restrictive settings. Regarding sources of mental health services use, minorities are more likely to use informal sources of mental care than the whites (USDHHS, 1999). In addition, minority ethnic groups are more likely than whites to be placed in restrictive mental health service settings such as inpatient psychiatric

hospitals and foster homes (Snowden & Cheung, 1990). Yet the factors that predict children's placement in the different special education and mental health services settings are not clearly understood.

As a preface to the three empirical papers, background and significance of the study of children's use of mental health and special education services is presented below.

Background and Significance

Elimination of racial and ethnic disparities in children's use of mental health service and special education has become a major policy goal of the federal government of United States (USDHHS, 1999 & 2000; NFCHM, 2003; Institute of Medicine [IOM], 2002; National Research Council [NRC], 2004; Smedley, Stith & Nelson, 2003). Disparities in access to and use of mental health services among children are particularly tragic because childhood represents a window of opportunity for intervening to prevent or reduce the lifelong adverse consequences of mental disorders (USDHHS, 1999). Yet little is known about the actual rates of mental health service use by minority child and adolescents. While such information is available for adults (Cheung & Snowden, 1990), current knowledge about racial/ethnic service representation rates for disabled children is limited (Yeh et al., 2005).

This situation is particularly worrisome as children and youths are the real human capital on which future productivity of an economy depends (Currie & Stabile, 2004). Mental health problems are a major cause of lost work time and health care expenditures. For example, Ettner, Frank and Kessler (1997) show that psychiatric disorders reduce employment and earnings among both men and women. Currie and Madrian (1999) conclude that the labor market consequences of mental health problems are large relative to the consequences of physical health problems, since the former are more likely than the latter to afflict those of working age. In addition, the economic costs of children's mental health disorders are substantial (Foster, Jones, & Conduct Problems Prevention Research Group [CPPRG], 2005; Pelham, Foster, & Robb, 2007). These analysts conclude that annual public costs and expenditures on children's mental health disorder are on the increase, and thus call for early prevention and treatment of children's mental health disorders.

In the context of children's involvement in special education programs, prior research has described minorities' overrepresentation without addressing the factors and processes that produce the disparity (Losen & Orfield, 2002; Coutinho & Oswald, 2005). Identification and understanding of the factors and the processes that lead to overrepresentation in the program is fundamental to the formulation of policies to redress the current situation.

The significance and motivation for the three empirical studies included in this dissertation derive from the following specific issues:

Children's mental health services use is inseparably linked to their schools

Many schools serve as the de facto mental health services providers for children (Burns et al., 1995; Stiffman et al., 2000; Farmer et al., 2003; Power, 2003; Hoagwood & Erwin, 1997). In particular, special education programs involve processing and implementing individualized mental health services for their client children. As black children are overrepresented in special education programs for the "soft" disability conditions of mental retardation, specific learning disabilities, and emotional disturbance, it is pertinent to investigate the relationship between mental health service and special education, and to see whether black children in special education are more or less likely to use mental health services than those outside special education programs.

Very little is known about the processes and factors that predict racial and ethnic disparities

As noted by USDHHS (2001), one of the health policy goals of the government is to establish programs to eliminate racial and ethnic disparities in America. In order to achieve this goal, however, policymakers and health administrators need to identify and better understand the effect of the predisposing, enabling and need factors on children's access to and use of mental health service and their involvement in special education. Hitherto, the processes that lead to overrepresentation of the minority students in special education have not been well-studied. Furthermore, the factors and processes that cause the overrepresentation of black children in the soft disability categories have not been thoroughly investigated (Oswald & Coutinho, 1998a).

The need to examine whether service use varies by level of need/severity and type of service

It is important to evaluate the effect of the level or severity of need on children and adolescents' mental health service use (Koot & Verhulst, 1992; Sturm, Ringel & Andreyeva, 2003). Furthermore, Sturm & Ringel (2004) have claimed that geographic location is a better predictor of mental health service use than racial/ethnicity. Likewise, Yeh et al. (2005) observe that the public mental health sector is independent of other service sectors that serve children and adolescents. In that context, the analysts argue that a child's contact with the juvenile justice may affect that child's use of mental health services. Yet there are little or no empirical studies that examine interrelationships among public agencies that provide children with social services.

Children's placement in special education can best be understood from the individuals' socioeconomic, demographic, behavioral, health and academic perspectives

Earlier attempts to predict students' placement in special education services have relied on aggregate datasets from the community, school and district levels. Yet we know that individual child characteristics are important (Donovan & Cross, 2002). In apparent disregard to the preceding conclusion (excepting Blair & Scott, 2002), most of the studies involving the prediction of children's special education variables (identification, overrepresentation and placement decisions) have all used aggregated data that do not take individual-level behavior and attributes into account (Oswald et al., 1999; Coutinho & Oswald, 1998a & 1998b).

In addition, most of these studies have failed to incorporate measures of students' academic achievements in their analyses. Yet academic achievement is the key parameter with which ability is measured and recommendation for special education placement is based (Hosp & Reschly, 2004; Donovan & Cross, 2002). The Fast Track dataset is rich in individual-level variables that measure students' socioeconomic, demographic, academic, health and behavioral characteristics. In addition, the dataset also provides variables that will allow examination of the relationship between special education placement and other predictors such as family structure, parent variables and neighborhood context.

Longitudinal analysis of gender differences in the use of special education and mental health services is lacking

Prior research indicates that there is gender disproportionality in children's placement and use of special education and mental health services. Specifically, literature shows under-representation of girls in special education, while boys are overrepresented in certain disability conditions and mental health service settings (Oswald et al., 2003; Halfon & Newacheck, 1999; Cabiya et al., 2006). For example, empirical studies show that boys are more likely than girls to be overrepresented in disability conditions such as mental retardation, emotional disturbance and specific learning disability, and yet little or no longitudinal research has been conducted to identify the factors that predict gender differences in these categories of special education. Analyzing gender differences in special education by race and disability conditions will permit educators and policymakers to evaluate questions of gender equity (Oswald et al., 2003). Conroy and Fierros (2002) show, for instance, that between the 1995-1996 and 1998-1999 school years, black male students with mental retardation in Connecticut were less likely than their white counterparts to experience inclusive placement for their special education service. However, during the 1995-1996 school year, black females with mental retardation were less likely than white females to receive special education in inclusive classrooms.

In sum, this dissertation research will provide important new empirical evidence that will illuminate the processes and mechanisms through which racial and ethnic disparities in special education and mental health service are generated. The findings from this research will suggest fruitful areas for policy intervention to address racial and ethnic inequities in children's access and utilization of special education and mental health services in the U.S.

CHAPTER TWO

PRIOR RESEARCH AND THEORETICAL FRAMEWORK

This chapter includes two sections. The first section presents a discussion and synthesis of prior research relevant to the dissertation. Drawing upon this research, the second section presents a theoretical framework that guides the analyses in the three empirical papers included in Chapters 4 through 6.

PRIOR RESEARCH

This section reviews two separate strands of research. The first discusses prior research on race/ethnic disparities in special education programs, while the second focuses on disproportionate patterns in children's and adolescents' access and utilization of mental health services by race/ethnicity.

Access and Utilization of Special Education Services

Research has documented disproportionate representation of the minority children in programs for the soft disability categories of mental retardation, emotional disturbance and specific learning disability (Artiles & Trent, 1994). Minority children in special education are also segregated in more restrictive settings, subject to stigmatizing labels, and differentially limited in their access to needed services (Osher et al., 2004).

Disproportionality reflects placement decisions for specific children, but those decisions also reflect broader forces, such as culture and social capital (Artiles, Osher, & Ortiz, 2003; Skiba, Knesting, & Bush, 2002; Osher et al., 2004; Frohlich, Ross, & Richmond, 2006). In addition, disproportionality also has roots in other social and economic forces such as institutionalized racism (Delpit, 1995); segregation (Artiles et al., 2003) ethnocentrism (Takaki, 1993), and other labor market segmentation (Wilson, 1997). Furthermore, other important factors such as tracking in school (Campbell-Whatley & Comer, 2000; Oaks, 1995), victim-blaming approaches to service delivery (McKnight, 1995; Ryan, 1972), stigmatization of poor individuals with mental illness, and stigmatization of parents of children with disabilities are all contributors to disproportionality (Osher & Osher, 1996).

Patterns of disproportionate enrollment in special education vary by race/ethnicity and gender (Caseau, Luckasson & Kroth, 1994; Jennings, Mendelsohn, May, & Brown, 1988). For example, in their

analysis of data from the Office for Civil Rights (OCR) Fierros and Conroy (2002) found that while black children were overrepresented in emotional and behavioral disturbance (EBD) as well as mental retardation categories, Latino students were underrepresented in these disability conditions. Parish (2002) determined that while Asian American and Latino children were less likely than the white children to be identified as having emotional and behavioral problems, the risk ratio for American Indians was 1.24. In the same analysis, Parish (2002) showed that identification rates also vary by state and school district. For example, risk ratios for black children identified as having emotional and behavioral problems ranged from a high of 6.06 in Nebraska to a low of 0.65 in Idaho, with a black student being at least twice as likely to be identified as a white student in 29 states. Similarly, American Indians with emotional and behavioral disturbance had risk ratios that ranged from a high of 4.83 in Nebraska to a low of 0 in Arkansas. Latino risk ratios ranged from a high of 2.33 in New York to a low of 0.25 in Arkansas. Cohen and Osher (1994) also analyzed data from the Office for Civil Rights project (OCR) and described additional differences among school districts. They showed that black children were more likely to be over-identified in districts in which they constituted a minority of the student population and under-identified in districts in which they were in the majority.

Similarly, Oswald, Best, Coutinho, & Nagle (2003) analyzed the OCR data ,finding that boys are more likely than girls to be identified as disabled, and that disparity is greater for some diagnostic categories. In 1997, boys were about twice as likely as girls to be identified as having learning disability, and the relative risk for boys who were identified as ED was 3.5. Oswald et al. (2003) concluded that the relative risk for boys with moderate mental retardation remained at 1.3 with only occasional exceptions in 1988 and 1990. In a related study, Halfon & Newacheck (1999) reported from analysis of a nationally representative data that boys were 2.34 times more likely than girls to have learning disability and 1.77 times more likely to have mental retardation after controlling for various social and demographic factors. Similarly, analyses by American Psychiatric Association (2000) showed male overrepresentation in the soft disability categories. For example, they showed that the ratio for mental retardation is about 2:1, and it is 4:9 for Attention Deficit Hyperactive Disorder (ADHD).

Coutinho and Oswald (2000) have offered two hypotheses regarding racial and ethnic differences in special education: 1) referral, assessment and eligibility conditions may work differently for different racial and ethnic groups, and 2) the underlying distribution of disabilities may vary across ethnic groups as a result of social and demographic factors that present themselves as disability risk factors. The first hypothesis concerns perceived biases in the processes that measure and provide interpretation for what constitutes ability, achievement and behavior of students. It posits that the processes and interpretation that lead to referral for special education are socially constructed and therefore subject to systematic bias, either overt or inadvertent based on perceptions of teachers and other personnel involved. On the other hand, the second hypothesis conjectures that learning disability could be due to differences in the minority students' social, economic and demographic factors that could inhibit their access to appropriate learning resources during critical development stages. Coutinho, Oswald, & Best (2002) tested these hypotheses and concluded that both individual child characteristics and the communities' sociodemographic characteristics predict the likelihood that a child will be identified as having a learning disability.

Artiles et al. (1998) conducted a discriminant functional analysis to investigate whether family variables and students' sociocultural factors predict their placement patterns in learning disability category on the basis of the students' race and ethnicity. The authors concluded that the factors that predict placement patterns vary by race and ethnicity. Hosp and Reschly (2002) on the other hand, explored the differences in special education programming for black and white students by using analysis of variance. Their results show that the process of determining restrictiveness of placement for learning disabled black is not different from the process among whites. The researchers also noted that the variables that predict restrictiveness of placement of black with learning disability are the same for white students. It is paramount to note that the conclusions from Hosp and Reschly (2002) are at variance with those of Artiles et al (1998) who concluded that "although some factors predicted placement in learning disability programs for all ethnic groups, placement predictors also varied by student ethnicity." The disagreement in findings may be due to differences in the quantification of model variables, model specifications and how criterion variables are scaled. For example, while Hosp and Reschly (2002)

analyze data obtained from the school records of 230 3rd grade- through 5th grade students identified as having a learning disability from four school districts in Delaware, Artiles et al. (1998) use data from a national database of 8th grade students.

Even though the special education policy debate has often focused on overrepresentation, disparately lower levels of services and outcomes are also paramount and have attracted recent research attention (Losen & Orfield, 2002). For instance, Valdes, Williamson, & Wagner (1990) found that fewer black students that suffer from emotional and behavioral disturbance received counseling than their white counterparts. In fact, the average intensity of counseling services received by black children enrolled in special education programs for emotional and behavioral disturbance is lower than their white counterparts in the same programs (Osher et al., 2002).

Analysis of students' outcomes also depicts racial and ethnic disparities. For example, analyses of mobility, dropout, and graduation data has shown that black children and youth are more likely to experience nonnormative mobility and dropout, and are less likely to graduate than their white counterparts (Osher and Osher, 1996; Osher, Morrison, & Bailey, 2003a & 2003b). Anderson, Kutash, & Duchnowski (2001) compared the academic progress of students with emotional and behavioral disturbance and students with learning disability that are in special need programs. They show that learning disability students received, on the average, less than full-time services in special education and demonstrated improved academic performance over time. Ewing-Cobbs, Fletcher, Levin, Iovino, & Miner (1998) examined the academic achievement of brain injured children and adolescents and concluded that the score of the adolescents on computational arithmetic and reading comprehension was lower than for other children.

Mental Health Service Access and Utilization

Only a small proportion of children with diagnosable mental health needs have access to mental health services that meet their clinical needs (Costello, et al., 1996; Kataoka et al., 2002; Sturm & Ringel, 2004; Angold, et al., 1998; Burns et al., 1995; Farmer et al., 1999; Leaf et al., 1996). In other words, unmet children's mental health service need characterizes America's health care delivery system. Yet

approximately 20 percent of children and adolescents in the general population meet criteria for some forms of mental health disorders (Costello et al., 1996; Costello & Angold, 1995; Burns, Hoagwood, & Mrazek, 1999; USDHHS, 1999). Specifically, Friedman, Katz-Leavy, Manderscheid, & Sondheimer (1996) estimated that about 5% to 9% of the children population meets the criteria for severe emotional disturbance (psychiatric diagnosis plus functional impairment). Besides inadequate access to mental health care by children of color, research studies report that they significantly underutilize mental health services whenever available (Garland et al., 2005). Consequently, racial and ethnic differences in access to and use of mental health services have now become a major public health problem in America (USDHHS, 1999).

The 2001 Surgeon General's Report on Mental Health and its supplement, *Mental Health: Culture, Race, and Ethnicity* (USDHHS, 2001) documented that American minorities experience systemic obstacles in access to mental health resources. The report succinctly concluded that even though similar prevalence rates of mental health disorders have been reported among racial and ethnic groups, they experience lower utilization rates and poorer quality of care and service delivery. Specifically among children, Black and Latino children experience lower rates of mental health service use compared to the white children (Zahner & Daskalakis, 1997) even though the need for service may be higher for minority children.

While some researchers find racial and ethnic disparities in their analyses (Kataoka, Zhang & Wells, 2002; Garland et al., 2005; Hough et al., 2002; Witt, Kasper, & Riley, 2003; Sturm & Ringel, 2004; Cooper-Patrick et al., 1999; Leslie et al., 2003), other research shows no race/ethnic differences in access and utilization of mental health services by children (Burns et al., 1995; Zahner et al., 1992). Garland et al. (2005) have noted that the inconsistency in findings could be due to variations in the definition of mental health services and the factors included or excluded by these researchers in their different empirical models. In addition, while some others have argued that race/ethnicity is important in predicting children and youth's access and utilization of mental health services after adjusting for their demographic and socioeconomic differences (Cohen & Hesselbart, 1993; Costello & Janiszewski, 1990),

a recent study by Sturm and Ringel (2004) concluded that “whether you live in Phoenix or Boston is a better predictor of whether you get mental health services than whether you are black or white, or come from a rich or poor family.”

In general, however, individual child characteristics, family socioeconomic status, and system-level factors have been identified as predictors of access and utilization of mental health services (Aday & Andersen, 1974; Andersen, 1995; Costello, Pescosolido, & Burns, 1998). For example, Witt, Kasper, & Riley (2003) examined the use and correlates of receiving mental health services among community dwelling children with disabilities. The authors reported that differences by age, race, and insurance coverage suggest that inequalities in access exist.

Cohen & Hesselbart (1993) concluded from their longitudinal study that mental health service use rates for youth vary by age, urbanicity, and family income. In particular, they show that children from families with incomes above \$50,000 were more likely to obtain consultation and treatment services than children from families with low incomes below \$12,000. Wu et al. (2001) examined the factors that are associated with use of mental health services for depressed children and adolescents. They concluded that “whether a depressed child receives mental health services (MHS) and the types of treatment received are influenced by different individual and family factors and by the type of symptoms exhibited.” In general, the presence of psychiatric disorder is a determinant of increased child mental health service use (Koot & Verhulst, 1992; Cunningham & Freiman, 1996). Children’s socio-demographic variables that are often related to mental health service use include their gender (Chabra et al. 1999; Zahner & Daskalakis, 1997), age (Cohen & Hesselbart, 1993), race/ethnicity (Chabra et al. 1999; Hoberman, 1992), residence (Cohen & Hesselbart, 1993), and socioeconomic status (Cunningham & Freiman, 1996; Cohen & Hesselbart, 1993). In addition, family factors such as maternal distress, family conflict and burden have been identified as correlates of children’s mental health service use (Garralda, Bowman, & Mandalia, 1999; Angold et al. 1998; Zahner & Daskalakis, 1997).

Sheppard and Benjamin-Coleman (2001) examined the association between race and type of service placement for youth with emotional and behavioral disturbance and reported differences between

black and white youth in the type of out-of-home placement received after controlling for sociodemographic variables and type of disorder. Weller, Minkovitz and Anderson (2003) found differentials in service use by type of insurance status. Garland et al. (2005) tested the hypothesis of racial and ethnic disparities for a variety of outpatient, inpatient and informal sources of mental health services among high-risk children. The analysts reported significant racial/ethnic group differences in the likelihood of receiving mental health services from outpatient and inpatient settings, but not from the informal sector. Leslie et al. (2003) on the other hand, developed logistic regression models to investigate the rates of psychotropic medication use by children in public service sectors. They found significant effects of race/ethnicity in caregiver's report of past-year and lifetime psychotropic medication use controlling for other factors.

Most of the studies discussed above involving mental health service access and utilization are limited in that the data used are cross-sectional, and in that self-reports of mental health status were used to measure children's mental health conditions (Talbot & Flemming, 2003). Few studies have measured children's level of mental health service need based on professional evaluation. In addition, the timing and trajectories of access and utilization of mental health services and special education placement of disabled children and adolescents has not been studied (Weller et al., 2005; Sheppard and Benjamin-Coleman (2001). Furthermore, most of the existing studies have not adequately investigated factors and underlying processes that lead to racial and ethnic discrepancies in access and utilization of mental health services and related resources.

THEORETICAL FRAMEWORK

Drawing on prior research, Figure 2.1 presents the conceptual framework that underlies the empirical chapters of this dissertation. Disparities in access and utilization of special education and mental health services are, overall, nested within the national economic system, health care delivery system, cultural, political and social policy environments (Stevens & Shi, 2002; Institute of Medicine [IOM], 2002; Frohlic, Ross, & Richmond, 2006). But in order to focus on the key variables of interest, we present a reduced-form framework relevant to the research studies included in this dissertation. This

framework provides guidance in model specification as it relates to the identification of key variables that determine children’s use of mental health serviced and their placement in special education programs.

The conceptual framework is based on the Andersen and Aday model and extensions (Andersen 1968, 1995; Andersen & Newman, 1973; Grossman, 1972; Anderson & Bartkus, 1973). This model posits that access to and use of services is dependent on variables in three categories: predisposing, enabling, and need factors (Andersen 1968, 1995; Andersen & Newman, 1973; Grossman, 1972; Solorio et al., 2006).

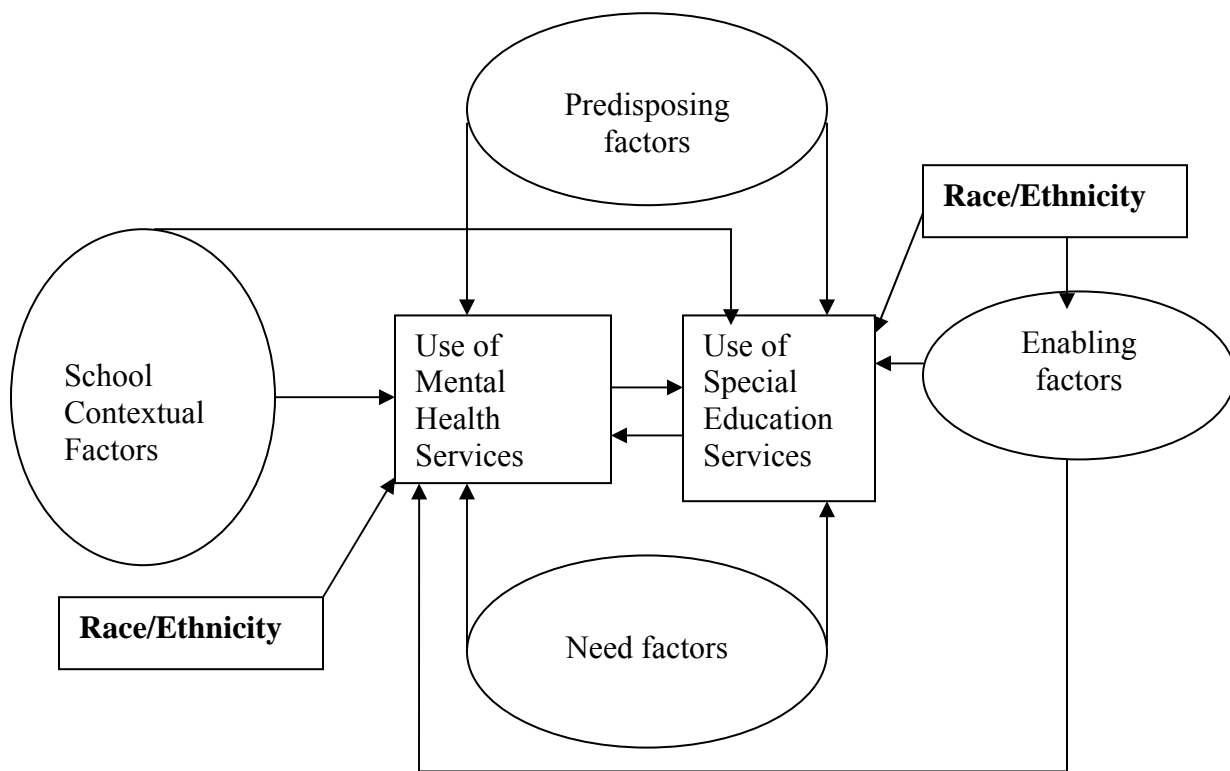


Figure 2.1: Theoretical Framework for Analyzing Access to and Use of Special Education and Mental Health Services.

The specific factors in these areas that relate to mental health and special education services use are discussed below.

Predisposing, Enabling and Need Factors and Use of Mental health and Special Education Services

Predisposing factors include demographics, health beliefs, genetic factors, cultural factors and psychological characteristics of individuals that affect their mental health and special education help-

seeking behavior. Enabling factors on the other hand, are those variables that can enhance or impede individuals' use of health and educational services. These factors include area of residence, and personal and community resources that impact use of those services. For example, we expect that children who have public or private insurance are more likely to have access to health services relative to the uninsured population. Likewise, children who reside in wealthy communities are more likely to have access to services than those that reside in poor communities. In short, the key variables that constitute the enabling factors include health insurance, income, availability of services and personnel. Children whose parents have substantial enabling resources are more likely to have access to and use more social services relative to children without these resources.

How the individual evaluates his or her mental health situation and the degree of functional impairments also determines his or her service seeking behavior. The need factors therefore, are those variables that are related to self-report or parent's report of children's mental health illness; observed learning deficits; and professionals' evaluation of children's mental health and special education service need. Children that are evaluated with severe need for services are most likely to have access and use more services than those with mild disabilities.

School Contextual Factors and Use of Mental Health Service and Special Education Placement

Children's referral for evaluation and their subsequent identification for special education placement derive from their teachers' perceptions and judgment about the students' academic performance, mental health disposition and functional situations (Foster, 1990). Consequently, teachers and school administrators are in the position to play roles that could protect or exacerbate students' academic performance and their behavioral problems (Osher et al., 2004). In that case, the ability of the teachers to interact with students is likely to affect student placement decisions. Other school contextual variables such as the school size, average class size, peer support and the nature of children/teachers' interaction are expected to exert impact on the students' academic performance and the implied special education placement decisions. In addition, as school and class sizes increase, available resources become thinly spread across several students, with the implications that the students' academic

performance may be negatively impacted, thus creating the need for their placement in special education services. Furthermore, as students are screened by their teachers as mentally challenged, there exists the likelihood that they will seek and use mental health services.

The Link Between Mental Health and Special Education Placement

The student's behavioral risk status can affect their decisions to participate in special education services. In other words, their behavioral risk status "creates the opportunity" for them to seek help from mental health service agencies. Children with mental and behavioral disorders are more likely to be placed in special education service with the consequences that they are more likely to have access to and use mental health services. In a nutshell, the depiction of a two-way relationship between special education and mental health service sectors in our conceptual model derives from the fact that special education service process leads to referral for appropriate mental health services based on findings from the psychological assessment procedures. Children's access and use of mental health services on the other hand, can provide some important data necessary for their proper identification and special education placement. In addition, children's utilization of mental health services may consequently reduce their need for special education placement through improved mental health functioning.

Black families and their children face significant barriers in access to and use of mental health services. In most cases, service providers are not readily available in some neighborhoods to provide services in desired quantity and quality. Even if services are readily available, they may not be functionally accessible due to financial barriers or cultural insensitivity on the part of the service providers.

CHAPTER THREE

DATA AND METHODS

This chapter provides a detailed description of the Fast Track Project data set used in the three empirical chapters of this dissertation. In addition, we describe the methods and models specified for each paper presented in the subsequent chapters.

Data and Sample Description

The data used in the analyses were collected as part of the Fast Track Project (CPPRG, 1992), a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington. Schools within the four sites were selected as high-risk based on crime and poverty statistics of the neighborhoods they served. Within each site, the schools were divided into two sets matched for demographics (size, percentage free or reduced lunch, ethnic composition), and the sets were randomly assigned to intervention and control conditions. Using a multiple-gating procedure for each of three annual cohorts, all 9,594 kindergarteners in 54 schools were screened for classroom conduct problems by teachers. Those children scoring in the top 40 percent within cohort and site were then solicited for the next stage of screening for home behavior problems by the parents, and 91 percent agreed (n=3,274) (Lochman, 1995). The teacher and parent screening scores were then standardized and combined into a sum score. Children were selected for inclusion into the study based on this sum score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school (n=59) or refused to participate (n=75), or to accommodate a rule that no child would be the only girl in an intervention group. Ninety-five percent of the selected sample scored in the top 20% on both the parent and teacher screening measures.

The outcome was that 891 children (n's = 445 for intervention and 446 for control) were selected. It should be noted that these levels of problems are defined relative to other children in these high-risk schools. Relative to children across the country, however, the elevated levels of problem behavior are

clearer. For example, on the Teacher Report Form of the Child Behavior Checklist, 48% of the children scored in the clinical range for the aggression subscale (i.e. greater than 63).

In addition to the high-risk children, a smaller representative sample of the other children in the comparison group classrooms was composed of equal numbers of children from each decile of the distribution of reported behavior problems. This combined sampling procedure yielded a total sample of 1,199 children who participated in the Fast Track Project.

Analytical Sample

The data from the control and normative sampled children are used in analysis ($n=755$) for the empirical papers constituting chapters 4-6. After careful screening, however, some students with missing grades reports were dropped from further analysis. Thus, the final analytical sample reduces to 752 students ($n=752$) with black children constituting 46 % ($n=346$), while the remaining 54% ($n=406$) are white.

Analytical Strategies

This section discusses the specific models and analytical procedures applied to the studies presented in chapters four, five and six respectively.

Survival and Hazard Functions

These functions were used to answer the question: what are the dynamics of black and white children's use of special education services (chapter 4) ? The data obtained from school and parent records documents children's use of special education services over the study period. Those data are analyzed to describe the timing of children's entry and exit from special education services. That is, Kaplan-Meier survival functions are estimated to describe the timing of children's involvement in special education. This analysis enables us to examine how the timing of children's involvement in special education differs by race/ethnicity, gender and location over the year.

Overall, the estimated hazard functions are used to assess the risk of children's placement in special education in each discrete time period in the study. The discrete-time hazard function is defined in the context of this study as the conditional probability that an individual child i experiences special

education services in time period j , given that the child had no placement in earlier periods (Singer & Willet, 2003). Practically, the estimated hazard function measures the unique risk of special education service use of child i in period j . Algebraically, the discrete-time hazard is specified as follows:

$$h(t_{ij}) = \Pr[T_i = j | T_i \geq j] \quad \text{Eq. 3.1}$$

Where,

$h(t_{ij})$ = discrete-time population hazard expressed as a function of time t

T = discrete random variable whose values T_i indicate the time period j when an individual child i receives special education placement;

j = time period when an individual child i experiences special education placement.

Empirically, the population hazard $h(t_{ij})$ can be estimated from a sample data as the proportion of the students in the risk set (those that are yet to experience the use of special education services) in a given interval. According to Singer and Willet (1993), the proportions are maximum likelihood estimates of the discrete-time hazard function of student's involvement in special education programs. Formally, we can estimate the discrete-time hazard of a representative student's involvement in special education as follows:

$$\hat{h}(t_j) = \frac{nevents_j}{natrisk_j} \quad \text{Eq. 3.2.}$$

Where,

$nevents_j$ = number of children that experience special education in year j

$natrisk_j$ = number of children that are at risk (eligible) of special education placement in year j .

To assess how long a child will “survive” in special education when placed, we then use the sample survive function which is defined as the probability that individual child i will remain in special education past time j . That is, at the end of year j or j grade, the individual child is still using special education services. The survival probability function can be specified as follows:

$$S(t_{ij}) = \Pr[T_i > j] \quad \text{Eq. 3.3}$$

Where,

$S(t_{ij})$ = the individual child's survival probability function expressed as a function of time. Empirically, the population survival function can only be estimated from the sample data using the following formula:

$\hat{S}(t_j)$ = # of students who have not experienced special education by the end of the time period j divided by the # of students in the data set.

In the presence of censoring the above method becomes difficult to implement. Hence, an indirect method must be used to estimate the values of the survival function in any year for a representative child in the sample. That is, the estimated survival probability in any given year equals the estimated survival probability for the previous year multiply by one minus the estimated hazard probability for that year (Singer & Willet, 2004):

$$\hat{S}(t_j) = \hat{S}(t_{j-1})[1 - \hat{h}(t_j)] \quad \text{Eq. 3.4}$$

Alternatively, we could use the complement of the estimated hazard probabilities to estimate each year's estimated survival probability function as follows:

$$\hat{S}(t_j) = [1 - \hat{h}(t_j)][1 - \hat{h}(t_{j-1})][1 - \hat{h}(t_{j-2})] \dots [1 - \hat{h}(t_1)] \quad \text{Eq. 3.5}$$

In other words, each year's estimated survival probability is the successive product of the complement of the estimated hazard probabilities across the present year and all previous years of the study (lagged hazards across previous years).

Cox proportional Hazard Models

Cox proportional hazard models were used to evaluate factors that explains racial and ethnic disparities in special education and use of mental health services (chapter 5). An extension to the analysis of the first study above is to evaluate predictors that explain children's placement in special education and use of mental health services. In addition, it is hypothesized that race/ethnicity and high level of need are significant risk factors for increased special education placement. Furthermore, the analyses will assist in identifying factors that can explain racial disparities in children's use of mental health and special

education services. To examine the unique contribution of race/ethnicity and level of need to differences in special education placement and mental health service use, the previous analyses are extended to include multivariate regression methods that incorporate child and family factors as covariates.

The Cox regression models are implemented by using a broad range of covariates in the analytical models. The algebraic specification of the Cox proportional hazard models can be generalized as follows:

$$h(t_{ij}) = h_o(t_j).e^{X\beta'} \tag{Eq. 3.6}$$

Where,

$h(t_{ij})$ = the hazard rate for child i in year j

$h_o(t_j)$ = the baseline hazard when all covariates are zero

X = vector of covariates

β = vector of parameters to be estimated.

The linear version of the Cox regression can also be generalized as follows:

$$\log h(t_{ij}) = \log h_o(t_j) + X\beta' \tag{Eq. 3.7}$$

Multivariate Logistic Regression Models

To evaluate factors that explain restrictive placement of children in different categories of special education and mental health services (chapter 6), multivariate regression models seem to be the most appropriate. As shown by prior research (Parrish, 2002; Losen & Orfield, 2002; Fierros & Conroy, 2002), when minority students enter into special education programs, they are more likely to be placed in restrictive settings than their white counterparts. But the factors that predict these differential placements in restrictive settings have not been thoroughly analyzed (Artiles, et al., 1998; Coutinho & Oswald, 1998a & 1998b). Consequently, in the present paper, special education and mental health service placement level will be treated as a categorical response variable. Multivariate logit models will be used to characterize the relationship or association between the log odds of special education and mental health

service placement intensities and a broad range of predictors. The two relevant special education placement intensities that will be analyzed include inclusive/regular classroom setting versus separate classroom placements. To examine racial disparities in the use of mental health service by settings, inpatient and outpatient sectors are considered in the empirical analysis.

Conceptually, multivariate logit models (MVLN) can be thought of as a specification of binary or dichotomous logit models for comparing how often a target event of interest occurs ($y=1$) relative to occurrence of another event ($y=0$) when regressed on several independent variables or predictors (Long, 1997; Long & Freese, 2006; Hosmer & Lemeshow, 2000). Assuming that y is the dependent variable with two possible outcomes. If we let $\Pr(y=1/x)$ be the probability of observing outcome number one given x , we can then formally specify the MVLN as follows:

$$\ln \Omega(X) = \ln \left[\frac{\Pr(y = 1 | X)}{\Pr(y = 0 | X)} \right] = X\beta \quad \text{Eq. 3.8}$$

Where $\ln \Omega(X)$ is the log-odds of special education placement and mental health service use in the restrictive settings relative to the least-restrictive environment. X is a vector of predictors, and β is a vector of parameters to be estimated. Notice that the parameterization in the current model specification is in log-odds scale. It should be noted that multivariate logit model as specified in equation 3.8 above can also be stated compactly as follows:

$$P(y = 1) = \left[\frac{\exp(X\beta)}{1 + \exp(X\beta)} \right] \quad \text{Eq. 3.9}$$

Empirically, the log-odds or the logit of special education placements in regular class versus separate classroom as a function of placement predictors will be estimated using *logit* procedure in STATA (StatCorp, 2005). For the mental health services use settings, outpatient versus inpatient models will be estimated.

CHAPTER FOUR

What are the Dynamics of Black and White Children's Use of Special Education Services?

Introduction

The foundation for federal involvement in special education is the Individuals With Disabilities Education Act (IDEA) and the Education for all Handicapped Children Act (EAHCA) before it. IDEA ensures that all children with special needs have equitable access to educational facilities and services in a regular school setting. Furthermore, IDEA requires that instruction for disabled children be conducted in inclusive classroom settings with minimal restrictions where possible. Prior to IDEA, school districts could simply refuse to provide services to children with disabilities.

Even though IDEA has created opportunities for the education of disabled children in America, controversies remain about the effectiveness of special education and disproportional representation on the basis of race and ethnicity, gender, socioeconomic status, and disability category (Donovan & Cross, 2002; Losen & Orfield, 2002; Parrish, 2002). Minority students, particularly black students with disabilities, experience inappropriate services, low quality instructional programs, and high placement rates in restrictive settings that isolate them from their non-disabled peers (Losen & Orfield, 2002).

Minority children with proven disabilities are often served with low-quality and inadequate services in special education. For instance, black children with diagnosed cases of emotional disturbance often do not receive needed remedial intervention. When they received intervention services, they are reported to receive fewer hours of counseling and other related services relative to white children with similar disabilities (Losen & Orfield, 2002).

The failure of school districts to supply minority students with early intervention services can exacerbate their learning and behavioral difficulties and thus may produce further disparities in other social services agencies such as the juvenile justice system. In addition, the overall consequence of under-serving minorities, and their misplacement in restrictive special education programs can lead to poor academic performance and development of requisite social skills. Studies have indicated that disabled students that receive their services in inclusive settings earned higher grades, achieved higher

scores on standardized tests, and no more commit behavioral infractions than those that are served in separate classrooms (Rea, McLaughlin & Walter-Thomas, 2002; Buyse & Bailey Jr., 1994).

While analyses of cross sectional data collected at the national, regional and district levels have indicated racial disparities in special education services, research that examines disparities at the school level is rare (Coutinho & Oswald, 1998b). Furthermore, even though disproportionality has been the focus of extensive research, the question of whether disparate assignment varies over the years has not received commensurate research attention. It is important to understand whether children's involvement in special education varies by race and ethnicity, gender, and location over time. In other words, it is important to find out through analysis of school-level data the age at which racial disparities of children's use of special education services emerge. Such analyses will provide hints as to whether disparities emerge immediately when children enter school. If disparities exist, do they grow as children advance in age? Consequently, this study presents distributional analyses of children's participation in special education programs in the U.S. by race, gender and location. The analyses use hazard models to explore children's risk of involvement in special education on the basis of their race/ethnicity, gender and location. In this context, the hazard models reveal whether racial and gender disparities exist, and if so, whether the observed disparities change as students age. In addition, the hazard plots help to answer the question of whether racial/ethnic and gender disparities in children's use of special education services emerge immediately that children enter school, and if the gap changes as the children age. Understanding the dynamics of children's use of special education will guide policymakers and service administrators in optimal and efficient targeting and delivery of needed services at the times they are most needed.

Prior Research

A review of the literature indicates differences in children's use of special education services on the basis of their disability, race/ethnicity and gender.

Minority Children are Over-represented in Special Education

Previous research in special education examines the over-identification and overrepresentation of minority children in education programs (Artiles & Trent, 1994). Observed racial and ethnic disparities in

special education are most pronounced with black children who only constitute 16 percent of the total school enrollment but represent 38 percent of the students in special education programs for the mentally retarded (Losen and Orfield, 2002). Disproportionate representation of minorities includes their over-identification and overrepresentation in certain categories of special education, and it also involves segregating and placing them in restrictive settings; applying stigmatizing labels, and limiting their access to needed services (Osher et al., 2004).

Even though disproportionality is often attributed to problems with the assessment process, it is best viewed from a multidimensional perspective involving cultural factors (e.g., bias) as well as the social capital of families and schools (Artiles, Osher, & Ortiz, 2003; Osher et al., 2004). Historically, institutionalized racism (Delpit, 1995); segregation (Artiles et al., 2003); ethnocentrism (Takaki, 1993), and other race-related labor market segmentation (Wilson, 1997) have all worked in concordance to generate the present disproportional representation of the minorities in services for the disabled. In general, while black children constitute only 16 percent of all students, they represent 38 percent of students in special education for the mentally retarded. In addition, their overrepresentation in special services for emotional disturbance (ED) and specific learning disabilities (SLDs) are increasing (Losen & Orfield, 2002).

The Over-representation of Minority Varies Across Categories of Special Education Eligibility

Minority students are overrepresented in special education overall, and especially for the so-called soft disability conditions, and they are underrepresented in programs for the gifted and talented (Artiles & Trent, 1994; Parrish, 2002). For example, Fierros and Conroy (2002) found that black children were overrepresented in emotional and behavioral disturbance (EBD) as well as mental retardation (MR). Similarly Parish (2002) noted that minority children were more likely than the white to be identified as emotional and behavioral disturbance. The author further showed that identification rates also vary by state and school district in the US. For example, state risk ratios for black children identified with emotional and behavioral disturbance ranged from 6.06 in Nebraska to 0.65 in Idaho, with a black student being at least twice as likely to be identified as a white student in 29 states.

The Over-representation of Minority Groups Reflects Variation Between and Within School Districts

Cohen and Osher (2002) document that disparities in identification rates vary by school districts. They showed that black children were more likely to be over-identified in districts in which they constituted a minority of the student population and under-identified in districts in which they are in the majority.

Students' Involvement with Special Education also Varies by Gender and Disability

Oswald, Best, Coutinho, & Nagle (2003) present nationally representative data about the extent of gender disproportionality for different disability conditions (learning disability, mental retardation and emotional disturbance). Boys were more likely than girls to be identified as disabled. For instance, in 1997, boys were about twice as likely as girls to be identified as having learning disability. The relative risk for boys who were identified as having emotional disturbance was 3.5. Between 1996 and 1997, Oswald et al. (2003) concluded that the relative risk for boys with moderate mental retardation remained at 1.3. Halfon & Newacheck (1999) also reported that boys were 2.34 times more likely than girls to have learning disability and 1.77 times more likely to have mental retardation after controlling for various social and demographic factors in their model. Similarly, the American Psychiatric Association (2000) showed that gender ratios for child psychiatric disorders also reflect male overrepresentation in the soft disability category of mental retardation.

Remaining Gap in the Literature

A key research issue yet to be thoroughly addressed involves the timing at which racial/ethnic disparity emerges in children's use of special education services. This issue is important as policymakers and school administrators need to better understand how the pattern of children's use of special education services changes over time. Such understanding will provide effective guidance in optimal resource allocation in special education programs. Consequently, this paper fills the research gap by examining the question of whether the hazard of overrepresentation of minority students in special education varies as they age. This timing issue in students' use of special education services is important because the analysis

of the longitudinal data will show when patterns of children's use of special education appear and whether the processes shaping such disparities of use evolves as the students advance in age. In addition, since the patterns of conditional use of services as characterized by hazard functions indicates when children's use of special education is most likely to occur, and how the risk varies over time, we can be sure that the descriptions of the shapes of estimated hazard functions over time will be useful in understanding minorities' involvement in special education programs over time (Singer & Willett, 1993).

Research Questions

The main research questions for this study are: 1) what is the pattern of children's use of special education with age? 2) Does the pattern of use, and exit from special education vary by race/ethnicity, gender, and site with age?

Aims and Objectives

The specific aims and objectives of the study are: 1) to describe the hazards of children's involvement in special education, and 2) to describe and examine the dynamics of children's use of special education by race/ethnicity, gender and location.

Hypotheses

The study tests the following hypotheses: 1) Black children enter special education at an earlier age and are less likely to exit relative to white children, and 2) the hazard of entering special education for male students is higher than for female students.

Data and Methods

Data and Sample Description

The data used in the analyses were collected as part of the Fast Track Project (CPPRG, 1992), a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington. Schools within the four sites were selected as high-risk based on crime and poverty statistics of the neighborhoods they served. Within each site, the schools were divided into two sets matched for demographics (size, percentage free or reduced lunch, ethnic composition), and the sets were randomly

assigned to intervention and control conditions. Using a multiple-gating procedure for each of three annual cohorts, all 9,594 kindergarteners in 54 schools were screened for classroom conduct problems by teachers. Those children scoring in the top 40 percent within cohort and site were then solicited for the next stage of screening for home behavior problems by the parents, and 91 percent agreed (n=3,274) (Lochman, 1995). The teacher and parent screening scores were then standardized and combined into a sum score. Children were selected for inclusion into the study based on this sum score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school (n=59) or refused to participate (n=75), or to accommodate a rule that no child would be the only girl in an intervention group. Ninety-five percent of the selected sample scored in the top 20% on both the parent and teacher screening measures. The outcome was that 891 children (n's = 445 for intervention and 446 for control) were selected. It should be noted that these levels of problems are defined relative to other children in these high-risk schools. Relative to children across the country, however, the elevated levels of problem behavior are clearer. For example, on the Teacher Report Form of the Child Behavior Checklist, 48% of the children scored in the clinical range for the aggression subscale (i.e. greater than 63).

In addition to the high-risk children, a smaller normative sample of first-graders was selected, composed of equal numbers of children from each decile of the distribution of reported behavior problems. This combined sampling procedure yielded a total sample of 1,199 children who participated in the Fast Track Project.

Analytical Sample

For this paper, the data from the control and normative sampled children are used in analysis (n=755). After careful screening, some students with missing grades reports were dropped from further analysis. Thus, the final analytical sample reduces to 752 students (n=752).

Measures

The variables used in analysis include children's special education status, students' grade of entry into special education program, their problem status, and the student's race and gender. The variable

representing a student's first time of entry into a special education program is measured by the grade that the student is placed in special education for mental retardation, emotional disturbance, or learning disability. The Individualized Education Program (IEP) which indicates whether or not a child has a current IEP (IEP=1, if yes and 0, otherwise) is used to indicate students' use of special education services (Jones, 2002). Demographic variables include the child's gender and race/ethnicity. Separate dummy variables are used: whether an African-American or not (1=black and 0=white), and gender (1=male and 0=female). The child's problem status is derived from the standardized sum score of teachers' and parents' screen scores. The sum score is then coded as a dummy variable. Children with sum score higher than the average are coded as 1 and zero otherwise.

Independent and Dependent Variables

The variables representing the students' race/ethnicity and gender are the only predictors used in analysis. Two dependent variables (failure/event variable) are examined: 1) whether a child has a current IEP or not is used as a measure of use of special education, and 2) whether the child has exited from special education programs after entry.

Analytical Strategies

The data obtained from the Fast Track Project was first converted into a survival data format with STATA before employing survival analysis subroutines for analysis. The survival analysis conducted in the present study concerns events of "entry" and "exit" from special education. The analysis time for the failure event "entry into special education¹" is the span of grade at which the student enters kindergarten and the grade in which the student transits to a special education status. Secondly, the analysis time for the failure event "exit from special education" is the span of grade at which the student enters special education or has a current IEP and the grade in which the student leaves special education or has no current IEP. Students whose IEP status are not known after entry into kindergarten and after their 10th grade are considered right-censored cases for the "entry model", while those that their exit status are not

¹ We use the students' IEP status to represent this failure event. The failure event is also used interchangeably to mean students' use of special education services, their placement and involvement with special education programs.

known after entering into special education and after their 10th grade are also considered right-censored cases for the “exit model.”

Overall, we use the dichotomous variable of whether a child has a current IEP or not as the dependent variable (failure event in the language of event history or survival analysis) for the hazard models that examine the dynamics of children use of special education over time. The second failure variable (whether the child has exited from special education) is used as the dependent variable in the hazard models that examine whether children’s exit from special education varies by race/ethnicity and gender and location. Using the two failure variables individually, we estimated the Kaplan-Meier (KM) survival and hazard functions to describe the timing of children’s involvement with special education (entry and exit). The analysis enables us to examine how the timing of children’s use of special education differs by race, gender and location over time.

Empirically, we use the estimated hazard functions to assess the risk of children’s involvement or placement and exit from special education in each discrete time period in the study. It should be noted that the discrete-time hazard function is defined in the context of this study as the conditional probability that an individual child i has an IEP in time period j , given that the child did not experience or had any IEP in any earlier time period (Singer & Willet, 2003)². Practically, however, the estimated hazard function measures the unique risk of a child i ’s special education involvement or exit in time period j .

Algebraically, the discrete-time hazard is specified as $h(t_{ij}) = \Pr[T_i = j | T_i \geq j]$ Eq. 4.1

Where $h(t_{ij})$ = discrete-time population hazard expressed as a function of time t

T = discrete random variable whose values T_i indicate the time period or grade j or when an individual child i receives special education placement or has an IEP

j = time period that an individual child i experiences special education placement or has an IEP.

² Notice that in this definition we are silent about the usual temporal qualifier that accompanies the definition of hazard function. The omission of the temporal qualifier is because we’re dealing with discrete-time period in this study. Consequently, defining hazard strictly as the conditional probability of event occurrence per unit of time is not appropriate in the context of the present study (Singer & Willet, 2003).

Empirically, the population hazard $h(t_{ij})$ is estimated from a sample data as the proportion of the students in the risk set (those that are yet to experience special education in a given grade or time period) during an interval. According to Singer and Willet (1993), the proportions are maximum likelihood estimates of the discrete-time hazard function of students' use of special education programs. Formally, we estimated the discrete-time hazard of a representative student's special education involvement as

$$\hat{h}(t_j) = \frac{nevents_j}{natrisk_j} \quad \text{Eq. 4.2}$$

Where $nevents_j = \#$ of children that experience special education in year j ; $natrisk_j = \#$ of children that are at risk (eligible) for special education in grade j

To assess how long a child will “survives” or stays in special education when placed, we use the sample survive function which is defined as the probability that individual child i will remain in special education past grade j . That is, at the end of grade j , the individual child i is still in special education. The survival probability function is as $S(t_{ij}) = \Pr[T_i > j]$ Eq. 4.3

Where $S(t_{ij}) =$ individual child's survival probability function expressed as a function of time.

Empirically, the population survival function is estimated from the sample data using the following

formula: $\hat{S}(t_j) = \#$ of students who have not experienced special education by the end of the time period j divided by the $\#$ of students in the data set.

All the analyses were conducted using the 8.2 edition of STATA software via its ‘*sts*’ and ‘*stcox*’ procedures. The *sts* procedure was used to estimate the unadjusted survival and hazard functions, while the *stcox* was used to estimate the Cox proportional hazard models.

Results

Descriptive Statistics

Table 4.1 describes the demographic characteristics of the studied children by race/ethnicity, gender and problem status by study location. The total analysis sample appears to be approximately evenly distributed among the four study sites. Specifically, the number of sample size from the different

sites are Durham (n=195), Nashville (n=179), Pennsylvania (n=196), and Washington (n=182), respectively. Overall, the gender distribution of the sampled children shows that 58% of the total sample are males (n=436), and females make up the remaining 42% (n=316). In terms of the students' racial and ethnic origin, 46 % (n=346) are black, while the remaining, 54 % (n=406) are white. Of the total sample, 25% (n=185) can be considered to have high problem status.

Table 4.1: Demographic Characteristics of the Studied Children

Variable	Site								Total
	Durham		Nashville		Pennsylvania		Washington		
	N	%	N	%	n	%	n	%	
	<u>195</u>	25.93	<u>179</u>	23.80	<u>196</u>	26.06	<u>182</u>	24.20	<u>752</u>
<u>Race</u>									
Black	175	0.90	98	0.55	4	0.02	69	0.38	346
White	20	0.10	81	0.45	192	0.98	113	0.62	406
<u>Gender</u>									
Males	118	0.61	97	0.54	110	0.56	111	0.61	436
Females	77	0.39	82	0.46	86	0.44	71	0.39	316
<u>Problem Status</u>									
High	44	0.23	38	0.21	50	0.26	53	0.29	185
Low	151	0.77	140	0.78	145	0.74	128	0.70	564

Note: Total Sample Size (N) = 752 but site-specific sample sizes (n) are used in computing the percentages.

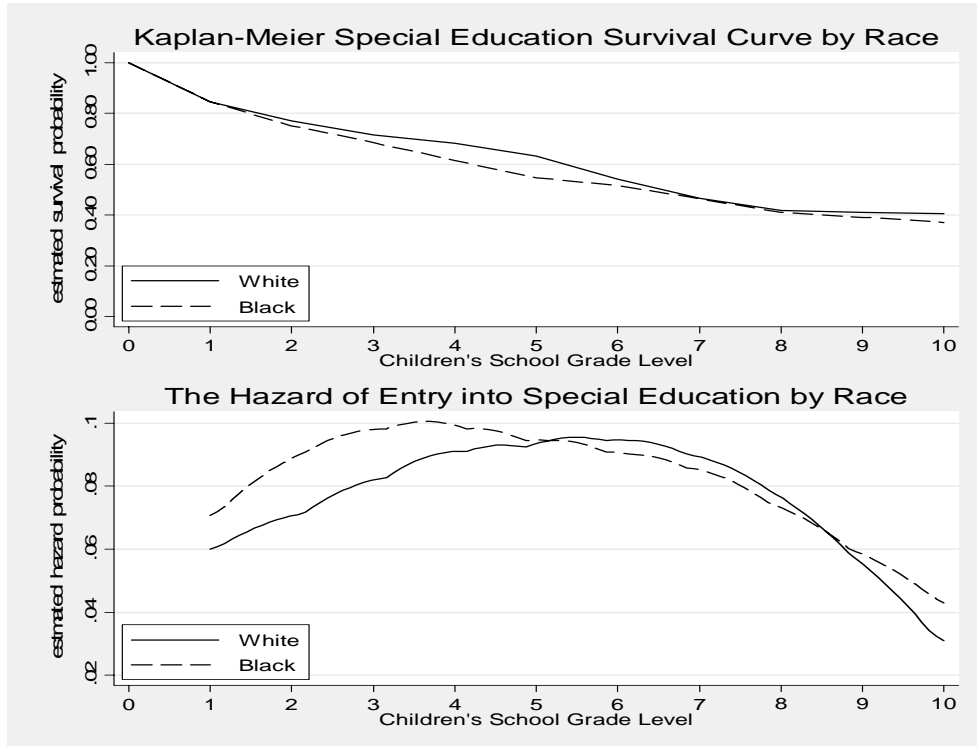
The Dynamics of Children's Survival and Hazard of Involvement in Special Education by Race

Figure 4.1 below depicts the curves of Kaplan-Meier's estimated survival and hazard probabilities of children's involvement in special education between their kindergarten year and when they were in grade 10. The upper panel of the figure shows the unadjusted estimated survival function, while the lower panel depicts the estimated hazard curve. The event or "failure" event of interest here is whether a student has an IEP or not. That is, whether a student is involved with or uses the services of special education program during a particular grade.

As can be inferred from the survival curve, during the children's kindergarten year (the beginning of time) when all of them are yet to have an IEP, they are all "surviving" and have yet to be involved with a special education program. The value of the estimated survival function at this level is one by definition. In other words, there is no racial difference in the proportion of students that are "surviving"

without involvement in special education at kindergarten. With time, however, as the children progress to higher grade level, the number of them that experience special education or uses the services of special education begins to increase, and thus forcing the proportion that are yet to experience the event to decline monotonically.

Figure 4.1: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Race



As shown in the figure, the percentage of students that were yet to have an IEP at the end of grade 10 never fell below 20 percent of the number of children that started in grade 10 together for both black and white students. However, the proportion of students that never got an IEP at the end of their 10th grade is relatively higher for the white children compared to the black. Furthermore, while the racial gap in receipt of special education services exist between the two groups of children starting immediately into their 1st grade through 7th grade, the gap, however vanishes between grades 7 and 8.

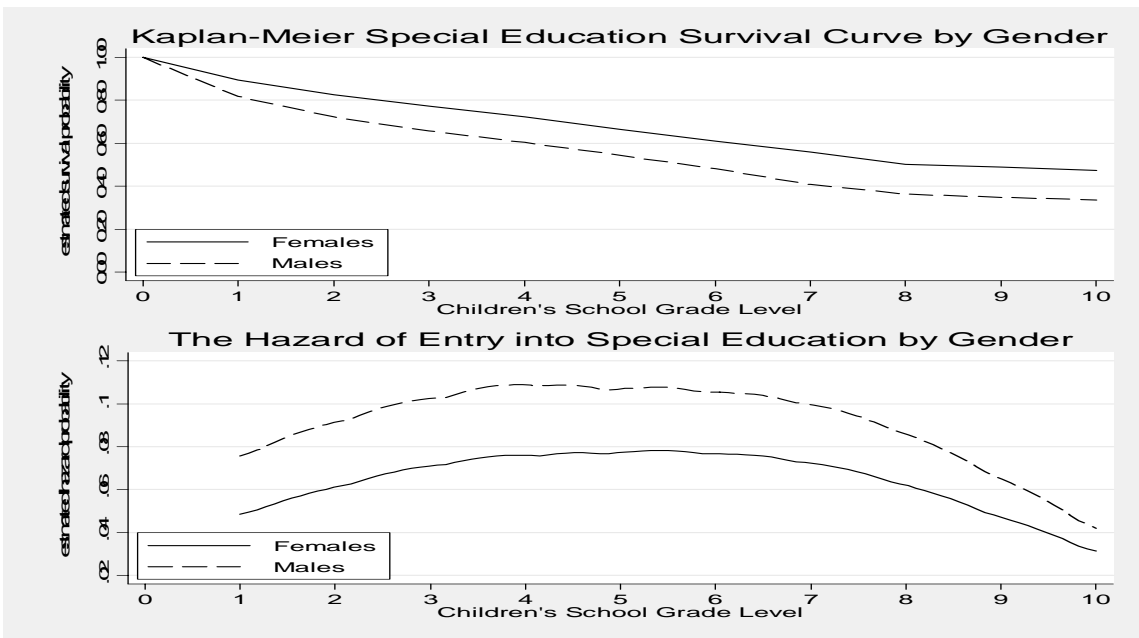
In terms of the conditional probability of receiving special education services, the hazard curve in the lower panel of Figure 4.1 depicts that black children have relatively higher probability of receiving special education services at their early grades (grades 1 and 5) relative to their white counterparts.

Between grades 5 and 8, however, white children have a relatively higher probability of receiving special education compared to the black students.

The Dynamics of Children’s Survival and Hazard of Involvement in Special Education by Gender

Figure 4.2 displays the unadjusted estimates of Kaplan-Meier survival and hazard functions of children’s involvement in special education by gender. As both curves have shown, gender disparity in children’s use of special education services emerge immediately at the beginning of grade 1 through grade 10. It is apparent from the survival curve that the female students depict the highest likelihood of not receiving special education services in each period or grade levels under investigation.

Figure 4.2: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Gender

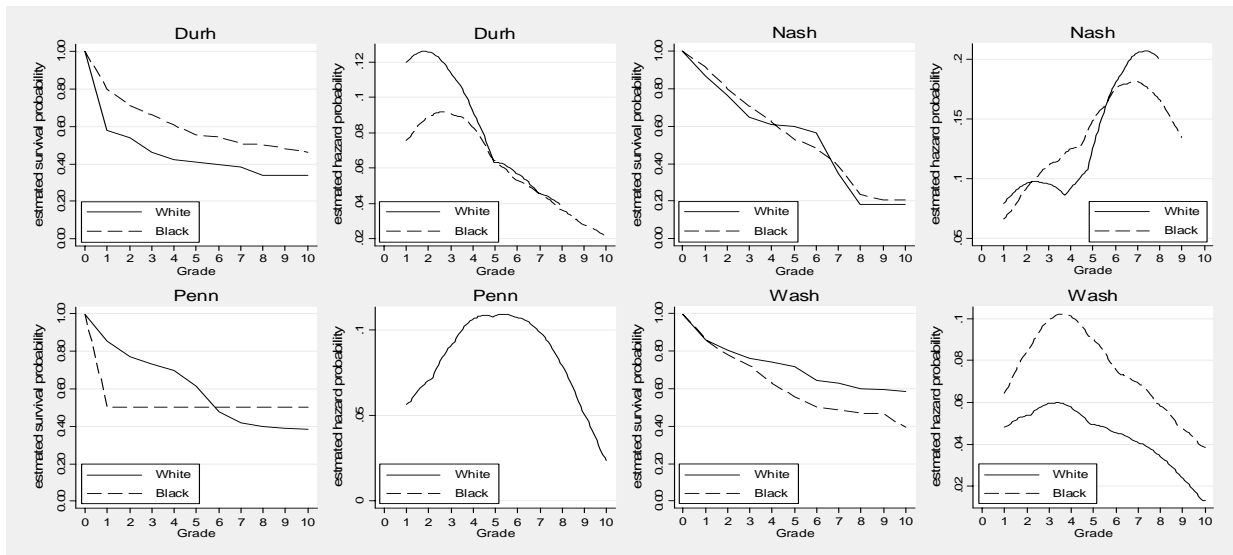


The consequence of the higher probability of the female students failing to have access to special education services is depicted in their lower hazard of involvement with special education. Even though the male students exhibit a relatively higher unique hazards of receiving special education through grades 1 and 10, the gap seems to be higher prior to grade 8 (see the lower panel of Figure 4.2).

The Dynamics of Racial Differences in Children’s Survival and Hazard of Involvement in Special Education by Location

The unadjusted probabilities of children’s involvement with special education services on the basis of the students’ race/ethnicity and their location or place of residence are depicted in Figure 4.3. The curves in the left panel for each site represent the estimated survival distribution functions, while the corresponding right panel curves represent the estimated sample hazard functions. In Durham, both black and white kids display over 6 percent likelihood of involvement with special education while in grade one. Specifically, while in grade one, white kids have about 12 percent likelihood of involvement with special education, while black kids on the other hand have less than 8 percent involvement while in the same grade. The probability of involvement for both kids reaches a peak in their second grade and decline, monotonically over the year. However, the probability of the black children remaining without an IEP is higher than for the white in each grade and beyond their 10th grade.

Figure 4.3: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Race and Location



In Nashville, the hazard of the black children grows over time, reaching its peak in grade seven and declines thereafter. The hazard of the white students on the other hand, depicts an irregular pattern, with a trough in grade four and a peak in grade 7. Even though the hazards for both black and white students reach peak in grade 7, the hazard for whites remains substantially higher than that of blacks.

For students in central Pennsylvania, the hazard for the white kids grows over time, reaching a peak in grade 5, and began to fall monotonically after grade 5. The probability of the few black students in central Pennsylvania to remain without an IEP is constant over time, implying that their hazard probability of experiencing special education services is also constant throughout the study period. In Washington, the hazard of students receiving an IEP increases between grades 1 and 3 and falls thereafter. However, the hazard of the black students grows faster than the hazard for the white students during these periods. Throughout the study period, the probability of black students receiving special education remains higher than the white students. Overall, the probability of receiving an IEP for the black and white students reaches a maximum in grade 3.

Table 4.2 provides site-specific summary of Cox proportional hazard regression results for children’s entry into special education using only race as an independent variable. The analysis highlights whether there are racial differences in students involvement with special education by location. The hazard ratios measure the hazard or relative risk of black students entry into special education compared to their white counterparts.

Table 4.2: Summary of Cox Proportional Hazard Regression Analysis of Children's Entry Into Special Education by Site: Race-Only Predictor Model

Site	Hazard Ratio	Std. Error	Z-value	P-value	[95% Conf. Interval]	
Durham	0.6663	0.1713	-1.5800	0.1140	0.4026	1.1029
Nashville	0.9605	0.1393	-0.2800	0.7810	0.7229	1.2763
Pennsylvania	1.7296	1.0116	0.9400	0.3490	0.5497	5.4423
Washington	1.5532	0.2882	2.3700	0.0180	1.0796	2.2344

In Durham and Nashville, black children have lower risk of entry into special education or lower risk of involvement with special education relative to the white. In other words, the hazard rate of a black student receiving special education services in Durham is about 33% lower than the hazard rate of a white kid. In Nashville, the risk of a black student entering into special education is 99% of that of white kids. Since the hazard ratio is approximately equal to one, it can be stated that being black doesn’t increase or decrease risk of receiving an IEP in Nashville. It must be realized that the hazard ratios for this

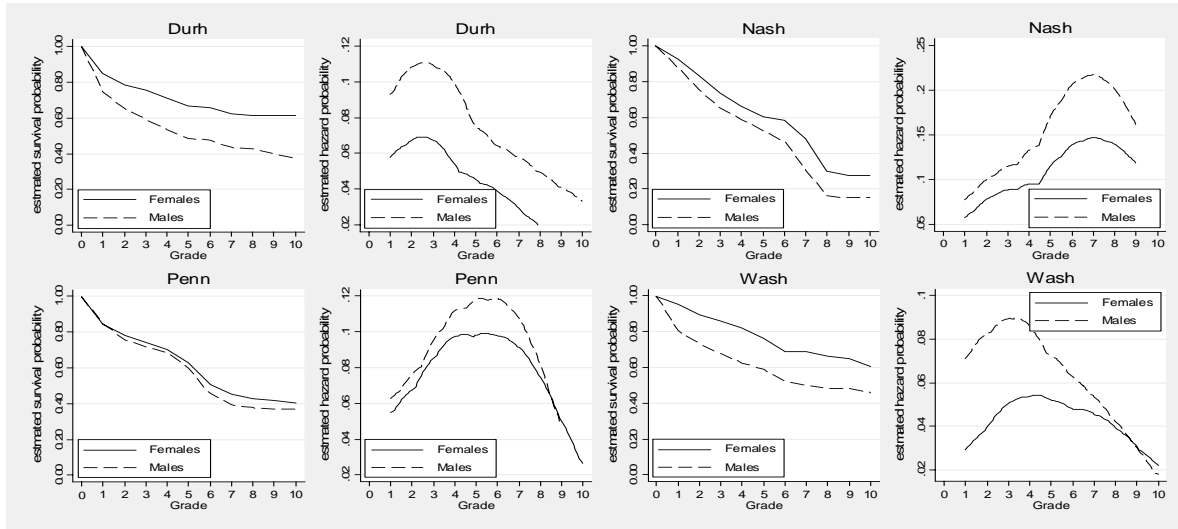
comparison are, however, not statistically significant in both Durham and Nashville. In central Pennsylvania, black children display over seventy percent risk of involvement with special education or receiving an IEP relative to the white. Yet the hazard ratio is not significant statistically. In Seattle, Washington on the hand, being black has a statistically significant effect ($p < .05$) on the hazard rate of receiving IEP. In other words, being black increases the risk or hazard of special education by 55 percent relative to that of the white students.

The Dynamics of Gender Differences in Children's Survival and Hazard of Involvement in Special Education by Location

Figure 4.4 shows the estimated survival and hazard probabilities of children's involvement with special education by gender and location. As shown in the first panel of the figure, the survival probabilities for the female students in Durham remain consistently higher than the males through and beyond their 10th grade. The hazard probability for the female students increases from grade 1 and peaks in the 2nd grade and continues to decline. For the male students, their hazard probability also increases from 1st grade, but reaches its peak in their 3rd grade and declines consistently. Throughout the study period under analysis, the hazard probabilities for the males remain above those of their females in Durham. The highest point of disparity between the hazard of the males and females occur in their 2nd and 3rd grades.

The shape of the hazard for both the male and female students in Nashville show both troughs (periods of low hazards) and peak (periods of high hazards) between grades 3 and 6. In particular, both the male and female students display trough in grades 3 and 4, and peak hazards in their 6th grade. Figure 4.4 also shows that the hazard probabilities for both the males and females increase right from grade 1, and reach a peak in grade 7. Throughout the study period, the hazard probabilities for the males remain consistently higher than the females, but with a wider margin or gap between the 4th and 9th grade.

Figure 4.4: Estimated Sample Survival and Hazard Functions of Children’s Involvement in Special Education by Gender and Location



The survival and hazard plots for males and females in Pennsylvania also show a non-linear pattern of children’s involvement in special education over time (see Figure 4.4 above). Both male and female students display over 4% probabilities of receiving an IEP in their 1st grade. While the males have their lowest probabilities of receiving an IEP in their 9th grade, the females on the other hand, display their lowest probabilities of receiving an IEP in their 10th grade. The estimated hazard probability for both the male and female students started increasing right from 1st grade and reaches a peak in their 5th grade and begin to decline monotonically from that point onward. However, the gender gap in the hazard of students’ receipt of IEP appears to be insignificant in their 8th grade.

The last panel of Figure 4.4 displays the gender profile of survival and hazard probability plots for Washington students. Female students exhibit a consistent higher probability of “surviving” (not experiencing special education event) throughout the study period. Even though the plots show both periods of low and higher probabilities of receiving special education, they do differ appreciably in the students’ early grades. In general, the hazard probabilities for both students increase from their trough in the 1st grade, reaches a peak in the 3rd and 4th grade for the males and females respectively. The highest gender gap in the students’ hazard probabilities of receiving an IEP occur between their 1st and 6th grade.

Nevertheless, the gender gap in the hazard of students' receipt of an IEP appears to be insignificant while in their 9th grade.

Table 4.3 depicts location-specific summary of Cox proportional hazard regression results for children's entry into special education using only gender as a predictor variable. The analysis helps to shed light on whether there are gender differences in students' involvement with special education by location. The table shows that being a male student has a significant effect on the hazard rate of involvement in special education in Durham, Nashville and Washington, respectively. Specifically, the risk of male students having an IEP in Durham is 86% greater than the risk of female students receiving an IEP (HR=1.86, p<0.01). The hazard ratio for the males in Nashville is approximately 1.42 (P<.05). This hazard ratio for the males in Nashville shows that male students have a higher risk of entering into special education, and that risk is about 42% higher than the risk of the females.

Table 4.3: Summary of Cox Proportional Hazard Regression Analysis of Children's Entry Into Special Education by Site: Sex-Only Predictor Model

Site	Hazard Ratio	Std. Error	Z-value	P-value	[95% Conf. Interval]	
Durham	1.8585	0.3534	3.2600	0.0010	1.2803	2.6978
Nashville	1.4196	0.2089	2.3800	0.0170	1.0640	1.8941
Pennsylvania	1.1024	0.1832	0.5900	0.5580	0.7959	1.5269
Washington	1.7334	0.3473	2.7500	0.0060	1.1705	2.5671

In Washington, male children also have a higher risk of entering into special education programs compared to female children. The hazard ratio for the males is about 1.73 (p<.01), therefore male students' relative risk of entering special education in Washington is 73% higher than the risk for females. In Pennsylvania, male students also exhibit higher risk of receiving an IEP compared to female students, but the estimated hazard ratio (1.10) is not statistically significant.

Racial Profile of Children's Exit from Special Education

Figure 4.5 shows the dynamics of children's survival and hazards of exiting from special education by race/ethnicity. The top panel of the figure shows the plot of the survival estimates, the lower panel depicts the plot of the estimated hazard function. It should be noted that both plots convey the same information: the conditional probability or likelihood of children exiting from special education once they

entered. Figure 4.5 shows that once children have entered special education programs, the probability of exiting from those services is higher for white children than the probabilities for black children. The exit probability for white children increases linearly from grade 2, reaches a peak about the 6th and 7th grades, and falls monotonically thereafter. While the shape of the hazard for white children has a curvature, the one for black children increases slowly, reaches a peak in grade 7, and slowly declines. A gap exists in the exit probabilities between black and white students, with the widest point of difference occurring between 5th and 8th grades. Overall, black students have a higher probability of remaining in special education once they are placed in the program.

Figure 4.5: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Race

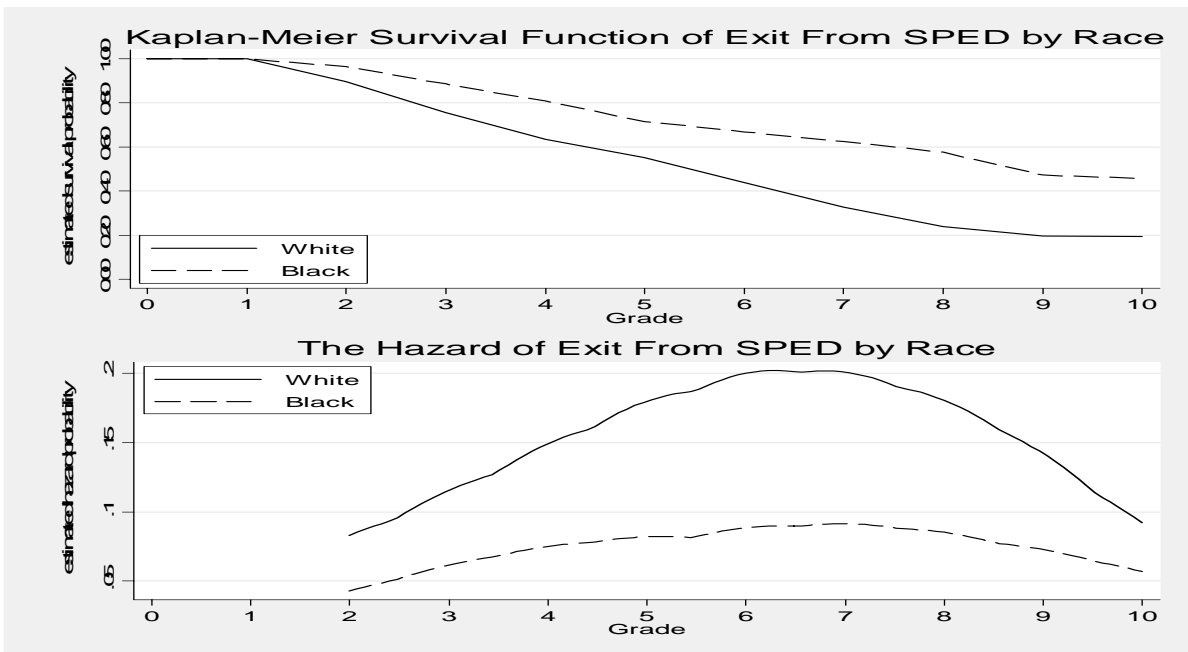


Figure 4.6 shows the dynamics of racial differences in children’s exit from special education over the year by study site. In Durham, the conditional probability of white children exiting from special education is higher than black children. While the hazard of exit increases for both black and white students, the highest likelihood of exit occurs in the 7th grade.

In Nashville, black students are more likely than white students to exit from special education during the early grades. In the subsequent grades however, white kids are more likely than black kids to exit. The highest likelihood of exit for white kids occurs in their 7th grade, while the highest likelihood of

exit for blacks occurs around grade 3 and grade 8 respectively. In Pennsylvania, the hazard of exit stays constant for black children, while the hazard for white children increases, reaches a peak in the 6th grade, and declines monotonically from there.

The hazard of exit for students from Seattle, Washington shows an interesting pattern of alternating peaks and troughs between grade 2 and grade 7. During their earlier grades, the hazard of exit for the white children is higher than the hazard for black students. In the subsequent grades however, this trend changes in favor of the black children. In general, black children display their highest likelihood of exiting relative to white between grade 4 and grade 8. After their 7th grade, the hazards of exit continue to fall monotonically for both racial groups.

Figure 4.6: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Race and Location

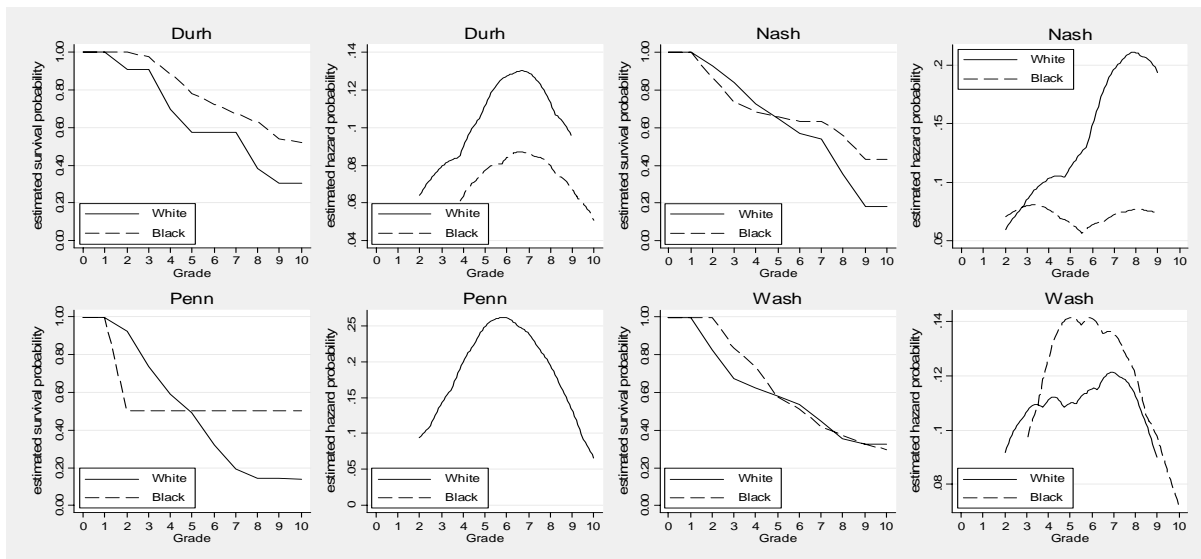


Table 4.4 provides the summary of the Cox proportional hazard regression result for the race-only predictor model of children’s exit from special education. The results show that even though black students in Seattle, Washington have relative higher risk of exiting from special education, that risk is not statistically significant. Conversely, even though black students are less likely than white to exit from special education in Durham, Nashville and Pennsylvania, it is only in Nashville that their lower risk of exit is highly significant ($p < .01$). However, in Durham, black children’s hazard of exit is about 44% lower than the hazard rate of exit for the white children ($HR = .56, p = .09$).

Table 4.4: Summary of Cox Proportional Hazard Regression Analysis of Children's Exit From Special Education by Site: Race-Only Predictor Model

Site	Hazard Ratio	Std. Error	Z-value	P-value	[95% Conf. Interval]
Durham	0.5568	0.1929	-1.6900	0.0910	0.2824 1.0978
Nashville	0.4780	0.1125	-3.1400	0.0020	0.3013 0.7583
Pennsylvania	0.5640	0.5675	-0.5700	0.5690	0.0785 4.0536
Washington	1.1114	0.2987	0.3900	0.6940	0.6562 1.8822

Gender Profile of Children’s Exit from Special Education

Figure 4.7 shows the dynamics of children’s survival and hazard of exiting from special education over the time on the basis of gender.

Figure 4.7: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Gender

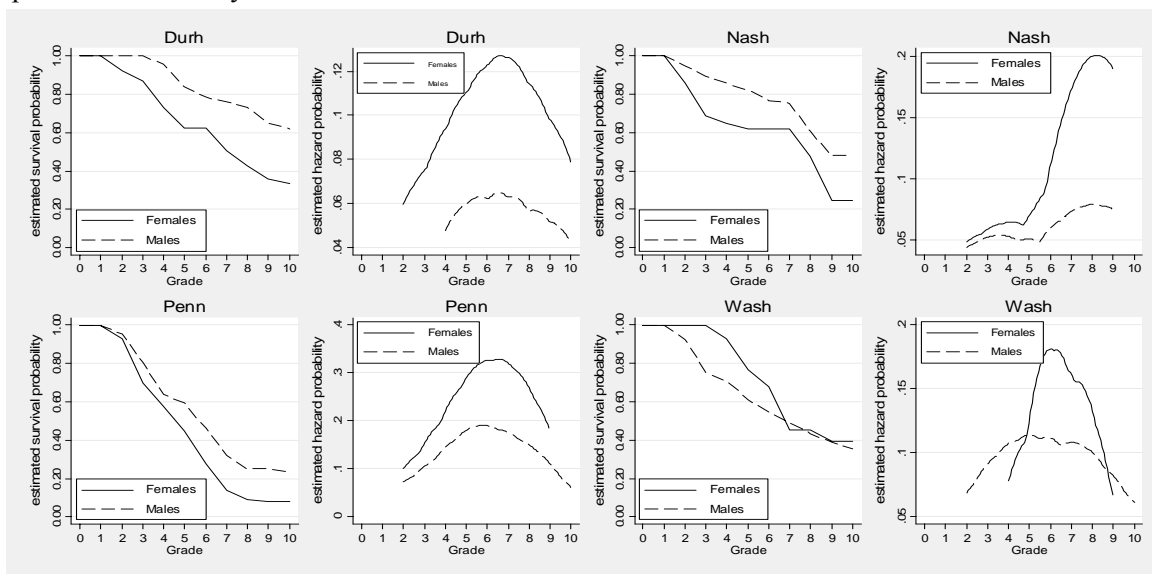


As shown by the survival curve, males are more likely than females to remain longer in special education once they enter. The shape of the hazard plots for both males and females are curvilinear. During the students’ early grades, their probabilities of exiting from special education programs increase for both sexes, reach a peak in grade 7 and then begin to fall slowly. The “widest” point or level of disparity in the

estimated probabilities of exit between the male and female students, irrespective of race occurs about the 5th and 9th grades. However, the single point of widest difference occurs in 7th grade.

Figure 4.8 shows the dynamics of gender profile of the conditional probabilities of exit from special education by location. The plots of the estimated survival and hazard functions of exiting from special education for both the male and female students in the different study sites as displayed in Figure 4.8 shows that the shape of the hazard in all sites are not linear.

Figure 4.8: Estimated Sample Survival and Hazard Functions of Children’s Exit from Special Education by Gender and Location



In Durham, for instance, male students have a higher hazard of remaining longer in special education relative to female students once they have entered. The hazard of the females exiting from special education increases rapidly at the early grades, reaches a peak around the 6th grade and begins to decline rapidly. The hazard for male students also increases rapidly in the early grades, but not as rapidly as the hazard for female students. The hazards of males also reach a peak about their 6th grade and begin to decline slowly. The highest point of differential between the hazard of males and females occur around the 6th or 7th grade.

The hazard plots for both the male and female students in Nashville depict both peak and troughs in an alternative pattern. Like the male students in Durham, the males students in Nashville are also more

likely that the female students to remain in special education once they have entered. Starting from the 2nd grade, the hazards of exit for both sexes increase slowly to a peak about grade 3 or grade 4. However, the hazard for female students tends to decline to a lower level about the 5th grade and increases steeply to another peak about the 8th grade and begins to decline. Likewise, the hazard of male students after attaining an initial peak about the 3rd or 4th grade, begins to decline slowly to a lower level about the 6th grade and start to increase slowly again to another peak around the 8th grade. The greatest differential between the estimated hazard probabilities for the both sexes occur somewhere around the 6th and 8th grades.

In Pennsylvania, male students also depict higher propensity of remaining in special education once they have entered compared to their female counterparts. For both sexes, however, their hazard probabilities of exiting special education increase rapidly during the early grades. Even though both sexes show increasing probability of exiting, the exit probabilities for the females are higher than those for the male students. The hazard for male students reaches its peak about the 5th grade, while the hazard for female students reaches its own peak about the 6th grade. The highest point of difference in the hazard estimates for both sexes occurs between the 4th grade and 8th grade.

Figure 4.8 also depicts an interesting pattern of hazard plots for both male and female students in Seattle, Washington. Before the 4th grade, the hazard of exiting from special education is higher for males relative to females. After the 4th grade, however, the hazard for females rises rapidly and steeply to a peak about the 6th grade and then declines to a lower level in grade 9. After the 9th grade, the hazard for males, declines, but remains above the hazard for females.

Table 4.5 provides the summary of the Cox proportional hazard regression analysis of the unadjusted effect of gender on the hazard rate of students' exit from special education in Durham, Nashville, Pennsylvania and Washington once they have entered the program. The estimated hazard ratios for males are lower than those for the females in Durham, Nashville and Pennsylvania. For instance, in Durham, the risk of the male students exiting from special education is about 54% lower than the risk for the female students ($p < .001$).

Table 4.5: Summary of Cox Proportional Hazard Regression Analysis of Children's Exit from Special Education by Site: Sex-Only Predictor Model

Site	Hazard Ratio	Std. Error	Z-value	P-value	[95% Conf. Interval]	
Durham	0.4639	0.1329	-2.6800	0.0070	0.2645	0.8133
Nashville	0.6169	0.1540	-1.9300	0.0530	0.3781	1.0064
Pennsylvania	0.6268	0.1428	-2.0500	0.0400	0.4010	0.9798
Washington	0.9439	0.2969	-0.1800	0.8540	0.5096	1.7485

In both Nashville and Pennsylvania, the estimated risk of male students exiting special education is around 38% lower than that of females. The male hazard ratio in Nashville (HR=0.61) is statistically significant at $p=.05$, and the Pennsylvania male hazard ratio (HR=.63) is significant at $p<.05$. In Washington gender differences are not significant.

Discussion

The objective of this paper is to investigate whether the hazards of children's use of special education services vary by race/ethnicity, gender and location. We use Fast Track Project data collected from a sample of high risk children at four locations in the United States --- Durham, North Carolina; Nashville, Tennessee; rural central Pennsylvania; and Seattle, Washington. Children's special education placement and service use data collected were analyzed via event history technique. Descriptive analysis of the sub-sample of the Fast Track data used for this study shows that the sampled children were approximately evenly distributed by site. The sample contained relatively more males than females (58% vs. 42%). White children constituted just over half of the sample.

An important objective of this study is to examine the pattern of children's use of special education services over time, and to identify racial/ethnic and gender disparities in service use. Consistent with earlier studies (Losen & Orfield 2002; Coutinho & Oswald, 1998b; Parrish, 2002), children's use of services varied over time by race/ethnicity. In the present analyses, before 5th grade black children are more likely than white students to receive special education services. After the 5th grade, and before they reach 9th grade, white children are relatively more likely than black students to receive these services. A possible explanation for the non-linear racial disparities in children's use of special education services may be that black students are over-identified in the early school years and

therefore are more likely to be enrolled in special need programs. As the more at-risk black children exit from the risk set their survival curve falls, resulting in relatively greater hazards among whites later on.

Besides racial disparity, gender disparity also appears to characterize the patterns of service use by this sample of high-risk students. Male students in the sample display higher hazards of entering special education compared to female students in each grade.

Both the survival and hazard plots show that the patterns of service use by black and white students change over time in the different study sites. In Durham there are more black children than white, yet black students are more likely than white students to remain or “survive” without entering special education in each school grade. This finding contrasts with national data showing that black children are over-identified for special education services (Coutinho & Oswald, 1998b). It may be that in Durham, where the distribution of black in the sample is higher than the white, black children are expected to display higher hazards of service use, all things being equal. This counter-intuitive finding is not totally out of context as inappropriate identification of individuals with ethnically and linguistically diverse backgrounds for special education is rather the rule than exception (Coutinho & Oswald, 1998b; Osher et al., 2004).

Racial disparities in children’s entry into- or use of special education services are seen in Durham, Pennsylvania and Washington, although, it is only in Washington that the difference is statistically significant. The finding that black children in Pennsylvania and Washington have relative higher hazard rates of entering special education may be due to the fact that since there are fewer black children in those sites, they are more likely to be singled out for services than white children. In addition, other school system variables such as stereotypes and prejudices could have “helped” them in identification for special need program, thus boosting their hazard rates of service use over and above the hazard rates for their white counterparts. In Durham, the hypothesis of racial disparity is not supported.

Disproportional representation in special education on the basis of gender has recently been recognized in other studies (Oswald, Best, Coutinho, & Nagle, 2003; Coutinho & Oswald, 2005), and the analyses presented here indicate that gender disparity is prevalent among the high-risk sample of children

in this sample as well. Female students are more likely than their male counterparts to remain without entering special education. Within the overall Fast Track sample, there are gender differences in students' involvement with special education by location. Being a male student is associated with an elevated hazard rate of special education involvement in Durham, Nashville and Washington. This result is consistent with prior findings (Coutinho & Oswald, 2005; Oswald et al., 2003). A possible explanation for the under-representation of females in special education programs may concern teacher biases during the referral and placement process. Earlier studies have posited that the nature of teacher-student interactions during referral and placement process generally lead to over-identification of males and under-identification of females for special education services (Mercer, 1973; Gillespie & Fink, 1974).

An important oversight in previous research has been the failure to examine racial/ethnic and gender differences in exit from special needs programs once children are placed in such programs. The present analyses showed that black children in special education are more likely than whites to remain in the program without exiting. This racial/ethnic disparity in exit is most pronounced when students are in the 7th grade. This raises the question of whether the high exit rates that accompany white children relative to the black children is a good or bad development. If students are receiving needed services in special education that fully resolve their disabilities, there would be little or no need for them to remain in the programs. However, an important question is whether students are fairly and equitably treated irrespective of their race/ethnicity, gender, and socioeconomic status when they enter special programs. Assuming there are no prejudices and biases in exit decisions on the part of authorized service providers, the next question would be: What are the factors that may be responsible for the observed racial and ethnic disparities in students' exit from special education³?

In terms of location specific exit probabilities, black children in Durham display consistently higher probability of remaining in special programs after entry. That is, in Durham, the hazard of exit from special education programs is higher for the white students relative to the black all year/grade through. In other locations (Nashville, Pennsylvania and Washington), the hazard of exit is not consistent

³ These questions are not addressed in the present paper.

for both black and white students as in Durham (see Figure 4.6). For example, in Nashville, the hazard of exit for the black students is above that of the white in their 2nd grade. In comparing the hazards of black children's exit to those of the white through estimation of Cox regression models, it is shown that black children are significantly less likely to exit special education in Durham and Nashville (see Table 4.4) even where they are more in number than white students. Since black children are more likely than white to be identified for the soft disability conditions of mental retardation and emotional disturbance (Losen & Orfield, 2002; Donovan & Cross, 2002), this could be a reason for them to stay longer in special need programs relative to white, especially in locations where they are more numerous compared to whites.

Gender analysis of exit from special need programs shows that, in the aggregate, the likelihood of females exiting is higher compared to males. Even though females are less likely to enter special education, they are more likely than males to exit after they enter. This finding that males are more likely than females to remain in special education is understandable since they are more likely than females to be identified for the soft disability conditions of mental retardation and emotional disturbance (Valdes et al., 1990). These disability conditions may take more service time and treatment intensity to effectively redress in children and adolescents once they are diagnosed.

Location specific plots of the estimated survival and hazard functions by gender show that patterns of exit vary by gender and location over time. For example, in Durham, Nashville and Pennsylvania, female students consistently exhibit higher probability of exit relative to males over time. The results of Cox regression analysis show that the observed disparity in the hazard rate of exit between males and females in the sample is statistically significant in Durham, Nashville and Pennsylvania. In Washington, being male does not increase or decrease the students' hazard rate of exit from special programs (see Table 4.5).

Summary and Conclusion

This study has shown that racial/ethnic and gender differences characterize students' use of, and exit from special education services among the high-risk sample used in this investigation. In addition, the shape of the hazards of students' entry and exit from services by race/ethnicity, gender and location is

nonlinear, displaying periods of increasing or decreasing risk in some instances. The findings of this study highlight the need to develop special education programs and service delivery systems that are cognizant of racial/ethnic and gender differences. The findings of this study also call for a more tailored special education system that takes into account the timing when children are most likely to need services. Such service delivery systems that take into cognizance of the “peak” and “trough” of students’ unique risk of service need and are capable of balancing the “supply” and “demand” sides of special education programs will have minimum waste of resources and improved efficiency and effectiveness. In addition, the findings of this study suggest that developing one-size-fits all special education programs and service delivery systems must be avoided, since children’s use or entry and exit from special education services vary by race/ethnicity, gender and location.

The limitations of this study should be noted. The present study is limited to black and white children, and it would be useful to consider other minority groups in future analysis. Furthermore, this study was limited to only four sites in the US, therefore caution is advised in generalizing the findings to other populations. In predicting students’ hazard rates of entry and exit from special education; we have only considered race/ethnicity- and gender-only predictive models to enable us highlight potential differences in service use based on race, gender and location. It would be useful for future research to control for students’ socioeconomic background, their need for service, and factors that enable their use of special education services.

An important future research question would be what are the factors and processes that can lead to the observed racial/ethnic differences in children use and exit from special education among the high-risk sample used in this study? It is also important to understand the process that leads to overrepresentation of boys in special education. In addition, if other covariates were included in the empirical models to control for students’ need, enabling and predisposing factors, would the observed racial and gender disparities in entry and exit from special education services still persist? These are salient research questions as results from such studies will be useful guides for special education policy

design and programming of service delivery system in a highly diversifying population of American children of 21st century.

CHAPTER FIVE

What Factors Explain Racial Disparities in Children's Use of Special Education and Mental Health Services?

Introduction

Minority children, particularly blacks, are overrepresented in special education placements for several conditions including mental retardation (MR), specific learning disabilities (SLDs), and emotional disturbance (ED) (Oswald, Coutinho, Best & Nguyen, 2001; Losen & Orfield, 2002; Dovovan & Cross, 2002; Artiles & Trent, 1994; Parrish, 2002; Fierros & Conroy, 2002). In the mental health service sector, minority children also tend to be overrepresented in inpatient facilities but are less likely to receive outpatient mental health services (USDHHS, 1999). This under-representation in outpatient care is especially striking given that black children are at greater risk of mental disorder because of racial differences in poverty and other social disadvantage. Although elimination of racial and ethnic differences in children's use of mental health and special education services are major public health and social justice policy goals (USDHHS, 1999; NCMH, 2003; Artiles & Trent, 1994; Donovan & Cross, 2002; Losen & Orfield, 2002), the processes and mechanisms that create and perpetuate these countervailing racial and ethnic disparities in access and utilization of children's social services are not well understood. The present paper identifies the factors that explain racial disparities in children's use of special education and mental health services among high-risk children sampled from four sites in the US.

Prior Research

Despite the inter-relationship between use of special education services and children's mental health services needs (Koot & Verhulst, 1992; Yeh et al. 2005), few studies have examined the factors that predict their use simultaneously (Yeh et al. 2005). In the discussion that follows, prior research on children's use of special education services is reviewed, followed by a summary of research about children's use of mental health services.

Use of Special Education varies by Race and Ethnicity

Children's use of special education services varies by race (Donovan & Cross, 2002; Losen & Orfield, 2002; Osher et al. 2002). Minority children, particularly black children, are more likely than white children to be identified for use of special education services for learning disability, mental retardation and emotional disturbance. Specifically, in 1998, black children were 2.88 times more likely than white children to be identified for special education services as mentally retarded. They are nearly twice (1.92) as likely to be identified for special education services for emotional disturbance (Parrish, 2002; Yeh et al., 2005; Osher et al., 2004). However, in special education, Valdes, Williams, & Wagner (1990) and Osher et al. (2002) show that black students received fewer counseling services and low-quality curriculum compared to their white counterparts.

Students' Involvement with Special Education also Varies by Gender

Oswald, Best Coutinho, & Nagle (2003) reported gender disproportionality for several disability conditions including LD, MR and ED, with boys more likely than girls to be identified as disabled. For instance, in 1997, boys were about twice as likely as girls to be identified as LD. The risk of ED identification for boys was 3.5 times that of girls, and the corresponding risk of MR was 1.3. Halfon & Newacheck (1999) also reported that boys were 2.34 times more likely than girls to have LD and 1.77 times more likely to have MR after controlling for various social and demographic factors in their model. Similarly, the American Psychiatric Association (2000) reported gender ratios for child psychiatric disorders that are consistent with male overrepresentation in these disability categories. The question of why gender differences exist in the use of special education services has yet to receive adequate research focus.

Children's Use of Mental Health Services

The Surgeon General's Report on Mental Health and its supplement, *Mental Health: Culture, Race, and Ethnicity* (USDHHS, 2001) provides authoritative information about children's mental health status and their use of mental health services. Both reports concluded that minority children have lower

rates of mental health service use compared to white children (Zahner & Daskalakis, 1997; Garland et al. 2005) even though these children face the highest need for service (Farmer et al. 2005)

Service use does not adequately meet mental health needs

A key characteristic of America's health care delivery system lies in its in observed unmet mental health service needs for the nation's children, with approximately 20 percent of children in the general population meeting criteria for some form of mental health disorder (Costello et al. 1996; Costello & Angold, 1995; Burns, Hoagwood, & Mrazek, 1999; USDHHS, 1999). Besides experiencing inadequate access to mental health care, children also significantly underutilize mental health services whenever available (Garland et al., 2005).

Racial and ethnic disparity in service use is not found in all studies

While many researchers found racial and ethnic disparities in their analysis (Kataoka, Zhang & Wells, 2002; Garland et al., 2005; Hough et al., 2002; Witt, Kasper, & Riley, 2003; Sturm & Ringel, 2004; Cooper-Patrick et al., 1999; Leslie et al., 2003), other studies failed to identify differences in children's access and utilization of mental health services (Burns et al., 1995; McKay et al., 2001; Zahner et al., 1992). Garland et al. (2005) noted that the inconsistency in findings could be due to variations in the definition of mental health services, methodological approach, and the factors included or excluded by these researchers in their different empirical models.

Mental health service use varies by location

While some analysts have argued that race/ethnicity is the most important predictor of children's use of mental health services (Cohen & Hesselbart, 1993; Costello & Janiszewski, 1990), Sturm and Ringel (2004) concluded that "whether you live in Phoenix or Boston is a better predictor of whether you get mental health services than whether you are black or white, or come from a rich or poor family." Slade (2003) reports that availability and use of mental health services vary by region and urbanicity. Likewise, Simpson, Cohen and Parsons (1997) conclude that place of residence is a significant predictor of mental health service use.

Mental health service use may vary by gender

Girls are less likely to obtain mental health services for externalizing behavior disorder than boys (Zimmerman, 2005). They are also less likely than boys to obtain needed treatment for depression. In some studies, however, gender effects were insignificant (Cohen & Hesselbart, 1993; Koot & Verhulst, 1992; Cunningham & Freiman, 1996), while significant effects were found in others (Bussing, Zima, and Belin, 1998; Busing et al. 2003). In addition, gender disparity varies by condition of impairment. Males with impairment are more likely to receive service than impaired females (Cabiya et al. 2006).

Mental health service use is determined by multiple factors

Individual child characteristics, family socioeconomic status, and system-level factors have been identified as predictors of access and utilization of mental health services (Aday & Andersen, 1974; Andersen, 1995; Costello, Pescosolido, & Burns, 1998). For example, Witt, Kasper, & Riley (2003) examined the use and correlates of receiving mental health services among children with disabilities. The authors reported differences in service use by age, race, and insurance coverage. Cohen & Hesselbart (1993) concluded from their longitudinal study that mental health service use rates for youth vary by age, urbanicity, and family income. Wu et al. (2001) examined the factors that are associated with use of mental health services for depressed children and adolescents. They concluded that “whether a depressed child receives mental health services and the types of treatment received are influenced by different individual and family factors and by the type of symptoms exhibited.” In general, the presence of psychiatric disorder is a determinant of increased child mental health services use (Koot & Verhulst, 1992; Cunningham & Freiman, 1996). Socio-demographic variables that are often related with mental health service use include their gender (Chabra et al. 1999; Zahner & Daskalakis, 1997), age (Cohen & Hesselbart, 1993), race/ethnicity (Chabra et al. 1999; Hoberman, 1992), residence (Cohen & Hesselbart, 1993), and social economic status (Cunningham & Freiman, 1996; Cohen & Hesselbart, 1993). In addition, family factors such as maternal distress, family conflict and burden have been identified as correlates of children’s mental health services use (Garralda, Bowman, & Mandalia, 1999; Angold et al. 1998; Zahner & Daskalakis, 1997).

Remaining Questions

An important US policy goal is to eliminate racial and ethnic disparities in children use of special education and mental health services. In order to achieve this goal, policymakers and health administrators need to identify and better understand the role of the predisposing, enabling and need variables in children's services use. In addition, the need to compare the factors that predict children's use of these services simultaneously derives from the recognition that school setting has recently become a gatekeeper for children's entry into the mental health service sector (Farmer et al., 2005; Koot & Verhulst, 1992). Yet studies that compare factors that predict children's use of special education and mental health services are rarely found in the literature. Identifying the factors that predict children's utilization of the two services can provide information necessary to improve the design of inter-agency collaboration in the delivery of special education and mental health services to high risk children. This paper provides important new empirical evidence that sheds light on the processes and mechanisms through which racial and ethnic disparities in special education and mental health services among disabled children are generated.

Research Questions

This paper addresses the following key research questions: What are the factors that explain racial and ethnic disparities in children's use of mental health and special education services? Are the factors that predict black and white children's use of special education services similar or different from those that predict their use of mental health services?

Hypotheses

This study tests the following hypotheses: 1) white children are more likely than black to use mental health services, while black children are more likely than white to use special education services, 2) male children are more likely than females to use special education and mental health services, 3) racial disparities will be completely explained by controlling for children's predisposing, enabling and need factors, 4) parental social economic status (SES) will only partially explain race/ethnic disparities in special education and mental health services use, 5) the higher the level of need, the higher the hazard of

children's use of mental health and special education services, 6) teacher's rating of students' behavior will explain race/ethnic disparity in special education use more fully than parent's rating, and 7) factors predicting children's use of special education and mental health services vary by race.

Method

Data and Sample Description

The data used in the analyses were collected as part of the Fast Track Project (CPPRG, 1992), a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington. Schools within the four sites were selected as high-risk based on crime and poverty statistics of the neighborhoods they served. Within each site, the schools were divided into two sets matched for demographics (size, percentage free or reduced lunch, ethnic composition), and the sets were randomly assigned to intervention and control conditions. Using a multiple-gating procedure for each of three annual cohorts, all 9,594 kindergarteners in 54 schools were screened for classroom conduct problems by teachers. Those children scoring in the top 40 percent within cohort and site were then solicited for the next stage of screening for home behavior problems by the parents, and 91 percent agreed (n=3,274) (Lochman, 1995). The teacher and parent screening scores were then standardized and combined into a sum score. Children were selected for inclusion into the study based on this sum score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school (n=59) or refused to participate (n=75), or to accommodate a rule that no child would be the only girl in an intervention group. Ninety-five percent of the selected sample scored in the top 20% on both the parent and teacher screening measures. The outcome was that 891 children (n's = 445 for intervention and 446 for control) were selected. It should be noted that these levels of problems are defined relative to other children in these high-risk schools. Relative to children across the country, however, the elevated levels of problem behavior are clearer. For example, on the Teacher Report Form of the Child Behavior Checklist, 48% of the children scored in the clinical range for the aggression subscale (i.e. greater than 63).

In addition to the high-risk children, a smaller normative sample of first-graders was selected, composed of equal numbers of children from each decile of the distribution of reported behavior problems. This combined sampling procedure yielded a total sample of 1,199 children who participated in the Fast Track Project.

Analytical Sample

For this paper, the data from the control and normative samples of children were used in analysis (n=754). After merging special education and mental health service use data, two unmatched cases were dropped from further analysis. Thus, final analytical sample consisted of 752 students (n=752).

Measures⁴

Special education status and level of use were taken from the *School Record Form*. The form is a modified version of the *School Archival Record Surveys* (SARS: Walker et al. 1991). The measure contains a series of items completed by the interviewer by reviewing the child's school records. Key items in the measure include information about the child's involvement in the special education program at the school and the child's special education classification. Other school-related information such as child's absences, academic grades, testing information, suspension, expulsion, and enrollment data, etc. were collected with this instrument.

Special education data include whether the child has current IEP or not (which is required for enrollment in special education), and how many minutes of special education services the child received by current disability classification of mental retardation, learning disability and behavioral and emotional disorder. In addition, information regarding current level of special education placement involving regular education or special education resources, separate or self-contained class was collected, with positive status assigned as applicable.

Services Assessment for Children and Adult (SACA: Stiffman, et al. 2000) was used by Fast Track to collect children's mental health services use history from their parents. The SACA assessed

⁴ Detailed specification of the various measures used by Fast Track Project can be found via the internet at www.fasttrackproject.org.

children's lifetime and past-year uses of a variety of mental health services from both the inpatient and outpatient settings. For this paper, the SACA provided both continuous (number of visits) and dichotomous (yes/no) data on children's use of outpatient services involving help from mental health facility, mental health professional, day treatment program, drug/alcohol clinic, in-home therapist, emergency room, family doctor, and respite care providers. Data on inpatient service use was collected from the following settings or sources: overnight in psychiatric hospital, general hospital, residential treatment centers, group home, foster home, emergency shelter, and other overnight stays for mental health problems.

Parent Daily Report Form (PDR: Chamberlain & Reid, 1987), *Teacher Report Form*, a modified version of *Child Behavior Checklist* (TRF: Achenbach, 1991) and *Teacher Observation of Child Adaptation-Revise* (TOCA-R: Werthamer-Larson et al. 1991) were used to collect data on children's behavior problems. Five measures that indicated baseline child behavior problems used in the present study include the following: aggressive-oppositional-disruptive behavior at home (measured by the PDR), aggressive-oppositional-disruptive behavior at school (measured by the TOCA-R); hyperactivity, inattention, and externalizing problems (measured by the TRF). The average t-scores, summed over the different items of the measured behavior problems were used in analysis.

Family Information Form (CPPRG, 1990) was developed by Fast Track Project to collect general data about the target children and their family. This measure provided data on the children's demographic variables, family structure, and parents' social economic status. The *Woodcock-Johnson Psycho-Education Battery-Revised* (WJ-R) was used to measure children's achievement in their various scholastic ability involving calculation, letter-word identification and passage comprehension. For each of the three subtests, a summary score was computed which simply summed all the items for the particular subtests.

Independent and Dependent Variables

Two indicator variables were used as the dependent variables: (1) use of special education services and, (2) use of any mental health services (outpatient and inpatient) in the past year was used to

assess a child's access to and utilization of mental health services. A child's special education status was determined by whether he or she has a current IEP (IEP=1, if yes and 0, otherwise). A child's use of any mental health services takes value of one if the parents indicated that the target child received mental health services from either the inpatient or outpatient sectors in the past year, and zero otherwise.

The independent variables used in analysis were classified into the *predisposing, enabling and need factors* following Anderson & Newman (1973) and Anderson (1995). The *predisposing factors* used include the child's demographic characteristics such as gender, race and ethnicity. Separate dummy variables were used to indicate a child's race/ethnicity -- whether black or not (1=black and 0=white), and gender (1=male and 0=female). In addition, the child's place of residence (site of the study) was measured as a categorical variable (Durh=1, Nash=2, Penn=3 and Wash=4) and included as a predisposing factor in the final analytical model.

Six variables were used to represent a child's *enabling factors*. The variables include mother's education (*mothered*), parents' socioeconomic status (*p1bses*), presence of biological father in the house (*biodad*), mother's age at first birth (*agefb*), other adult present in the house (*otheradlt*), and the number of children or siblings in the house (*children*). The variables representing socioeconomic status, mother's age at first birth, and number of siblings were measured on a continuous scale, while the remaining were assessed as indicator variables. The socioeconomic variable was created from a weighted combination of parent educational achievement and occupational status (Hollingshead, 1979). The age of the mother was measured in years. The number of children was measured as the total number of siblings in the household.

The mother's educational level was originally coded as a categorical variable. It was recoded into a dummy variable such that mothers with some college education and above were coded as 1 and those with high school and below took the value of zero. The variables, presence of biological father and other adult in the house were coded as (yes=1 and no=0) respectively.

Five variables were used to represent a child's need of special education and mental health services. These *need factors* include: child's behavioral problems status (*p1acpbt*), parent daily report of a child's oppositional and aggressive behavior (*pdr1oar*), teacher report of a child's externalizing behavior

(*trf1ext*), teacher report of a child's inattention (*trf1inn*), and Woodcock-Johnson's summary measure of a child's academic intelligence (*wjr1slw*). These variables were all measured on an interval scale. The child's problem status (*p1acpb*) was derived from the standardized t-score of teachers' and parents' screen scores. The *pdr1oar* variable was measured as a tally over three separate days of whether 14 different oppositional and aggressive behaviors were displayed by the child. The *trf1ext* variable was measured as t-score combination of delinquent and aggressive behavior syndromes on the teacher report form, which is the teacher version of CBCL. Likewise, the *trf1inn* was also measured as a t-score of child's inattention scale of the teacher report form. Higher values of these variables indicate worse child's behavior problems.

Missing values on the teacher report forms for externalizing and inattention problems were handled by substituting the sample's mean of these variables for missing cases. An indicator variable (*trfdummy*) was then constructed (missing=1, not missing=0) and included in the estimated regression models. The t-test statistic of the coefficient for the missing data indicates whether or not the data collected with the teacher report forms were missing randomly.

Analytical Strategies

The multi-period special education and mental health service utilization data was first converted into a survival data format with STATA before employing survival analysis subroutines for further analyses. We can implement the hazard or event history models in several ways. One approach is the Cox proportional hazards model. An important advantage of this semi-parametric model is that it does not impose any specific functional form on the baseline hazard or the risk profile of service use across time. In addition, the Cox model allows the hazard of service use to be shifted upward or downward by covariates. When the model parameter estimates are exponentiated, they are better interpreted as hazard ratios or as the proportional effect of the predictor on the risk of a child's use of special education or mental health services at a given point in time. A hazard ratio that is greater than one indicates an increasing hazard of service utilization, and when it is less than one; it depicts a decreasing risk of child use of the service in question.

Algebraically, the Cox proportional hazard models can be generalized as follows: $h(t_{ij}) = h_o(t_j).e^{X\beta'}$ where $h(t_{ij})$ is the hazard rate for child i in year j ; $h_o(t_j)$ is the baseline hazard when all covariates are zero; X is a vector of covariates (predisposing, enabling and need factors); β is a vector of parameters that were estimated. The linear version of the Cox regression can also be generalized as follows: $\log h(t_{ij}) = \log h_o(t_j) + X\beta'$. Empirically, the hazard models estimated in the present study specified multivariate Cox regression models that incorporated the child's predisposing, enabling and need factors as covariates. The models were estimated with STATA's *stcox* subroutine by sequentially incorporating the child's predisposing, enabling and need factors into the estimated equations in that order. The final model ("full model") assess whether there exists differences in model predictors between black and white children in their use of special education and mental health services.

Results

Descriptive Statistics

Table 5.1 describes the characteristics of the study participants. Children were roughly evenly divided between black (46%) and white (54%) sub-groups. Gender distribution shows that 58% of the children are males, while the females constitute 42%. The mean of parent socioeconomic status is in the low range of the socio-economic ladder. This finding is not surprising since the sampled children are from poor communities. Only 20% of the children reported presence of their biological fathers. The participants' mothers are relatively young in age, with the mean age of the mothers at first birth being 23 years. Only 25% of mothers have education beyond high school. Most children lived in mother-only households with only 26% of the children had other adults present in their households. Most children had over 2 siblings. It is evident from the table that the sampled children exhibit a high level of behavioral problems. The mean t-score of a child's measure of behavioral problems is about 56. The mean score of parents' report on child's oppositional and aggressive behavior is 0.24 and while the mean score of teacher report of the child's externalizing behavior is 61. On the average, the sampled children appear to exhibit low level of academic intelligence as measured by Woodcock-Johnson Psycho-Education Battery-

Revised. This finding is not surprising since most of the children were sampled from “troubled” households and communities in terms of distribution of social and economic opportunities. The analysis sample is evenly distributed among the four study sites with Durham (DURH), and rural central Pennsylvania (PENN) contributing 26% each to the total sample. Nashville (NASH) and Washington (WASH) contributed 24% each.

Table 5.1: Descriptive Statistics of Sample Variables (N=752)

Variable	N	Mean
black (black=1, white=0)	752	46%
male (male=1, female=0)	752	58%
p1bses (parent socioeconomic status)	752	25.67
biodad (biological dad in house=1, not in house=0)	627	20%
agefb (age of mother at first birth)	636	22.66
otheradlt (other adult in house=1, not in house=0)	752	26%
Children (number of siblings in the household)	752	2.78
p1acpbt (child behavior problem status)	749	55.87
Pdr1oar (parent daily report on child's oppositional and aggressive behavior)	749	0.24
trf1ext (teacher report of child's externalizing behavior)	648	61.12
trf1inn (teacher report of child's inattention)	648	0.67
Wjr1slw (Woodcock John summary measure of child's intelligence)	751	12.85
Site:		
Durh (Durham)	195	26%
Nash (Nashville)	179	24%
Penn (Rural Pennsylvania)	196	26%
Wash (Seattle)	182	24%
Mother's education:		
7-9 years of schooling	66	9%
10-11 years of schooling	135	18%
high school education only	352	48%
some college education	140	19%
College education	48	6%

Note: The mean is based on valid cases for all variables

Children’s Use of Special Education and Mental Health Services⁵

Controlling for site, the hazard ratio for race (HR=1.11, p=.20) indicates a disparity in their use of special education which is not statistically significant. Male students generally display a significantly higher risk of using special education services relative to the females (HR=1.54, p<.01) irrespective of where they reside. This finding is consistent with previous studies indicating that females are

⁵ Result of this analysis is not presented in a tabular form here. It should be noted that the analysis was based on all the sampled children without recourse to stratification by site.

underrepresented in special education programs (Donovan & Cross, 2002, Oswald et al. 2003, Coutinho & Oswald, 2005). In the case of children’s use of mental health services, black exhibit a weak and decreased risk of service usage relative to white (HR=.86, p=.09). Although the statistical significance of this result is marginal, it is consistent with others who have shown that minority groups, particularly black children, are less likely to have access to and use mental health services among those in need of these services (USDHHS, 1999; 2001; Kataoka, Zhang, & Wells, 2002; Farmer et al. 2005; Garland et al. 2005). Male students in the sample show a highly significant elevation of risk of mental health services use relative to females (HR=1.64, p<0.01).

Children’s Use of Special Education and Mental Health Services by Site ---Race-Only Predictor Model

Table 5.2 shows that black children in Durham have a decreased risk of using special education services (HR=.61, p=.09) relative to white children, while their counterparts in Washington exhibit a significant and increased risk of special education service utilization (HR=1.62, p=.01). It should be noted that being black is not a significant predictor of special education service use in Nashville and Pennsylvania. In Nashville, black children are less likely to use mental health services relative to white (HR=.59, p=.01), while their risk of using the same services is relatively higher in rural Pennsylvania (HR=2.67, p=.03) compared to whites. Interestingly, being black is not a significant predictor of mental health services use in Durham and Washington.

Table 5.2: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site: Race-Only Predictor Model (N=752)

Used SPED	HR	SE_HR	B	SE_B	P
Durham	0.61	0.18	-0.49	0.29	0.09
Nashville	0.95	0.15	-0.05	0.16	0.76
Pennsylvania	1.94	1.29	0.66	0.66	0.32
Washington	1.62	0.32	0.48	0.19	0.01
Used MHS					
Durham	1.48	0.47	0.39	0.32	0.22
Nashville	0.59	0.12	-0.53	0.21	0.01
Pennsylvania	2.67	1.18	0.98	0.44	0.03
Washington	1.09	0.19	0.09	0.17	0.62

Note:
 HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

Children’s Use of Special Education and Mental Health Services by Site ---Sex-Only Predictor Model

The risk of male students using special education services is higher in Durham (HR=2.01, p<0.01), Nashville (HR=1.53, p=.01) and Washington (HR=1.82, p<.001) relative to the females, while the risk of male students using mental health services is higher in all the study sites relative to females. Specifically, male hazards of using mental health services in those sites are Durham (HR=1.47, p=.04), Nashville (HR=2.68, p<.001), Pennsylvania (HR=1.43, p=.03) and Washington (HR=1.51, p=.02) relative to females (see Table 5.3).

Table 5.3: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site: Sex-Only Predictor Model (N=752)

Used SPED	HR	SE_HR	B	SE_B	P
Durham	2.01	0.40	0.70	0.20	0.00
Nashville	1.53	1.53	0.43	0.16	0.01
Pennsylvania	1.12	0.20	0.11	0.18	0.53
Washington	1.82	0.38	0.60	0.21	0.00
Used MHS					
Durham	1.47	0.27	0.38	0.18	0.04
Nashville	2.68	0.62	0.99	0.23	0.00
Pennsylvania	1.43	0.23	0.36	0.16	0.03
Washington	1.51	0.27	0.41	0.18	0.02

Note:

HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

The Effect of Predisposing Factors on Children’s Use of Special Education and Mental Health Services by Site

Table 5.4 shows the relationship between children’s use of special education and mental health services by site, controlling for their demographic characteristics. In Durham, being black weakly decreases a child’s risk of using special education (HR=.62, p=.09) holding gender constant, while being a male strongly increases a child’s hazards of using special education services (HR=2.01), p<.001) controlling for race/ethnicity. In Nashville, male students have a significant and increasing risk of using special education relative to white controlling for their race/ethnicity). In rural Pennsylvania the hazard of children’s use of special education services is not significantly related to their demographic characteristics. In Washington, being black increases a child’s risk of using special education services by

64% (HR=1.64, $p<.01$), while a male student has a strong and statistically significant hazard of using special education services (HR=1.83, $p<.001$) compared to being a female student.

The lower panel of Table 5.4 reports the hazards of children's use of mental health services by site controlling for their demographic characteristics (predisposing factors). A male student in Durham has a relatively higher risk of using any mental health services compared to being a female (HR=1.45, $p=.04$). In Nashville, both the race/ethnic and the gender of the students are statistically significant in predicting their use of mental health services. However, being black decreases the student's use of mental health services (HR=.60, $p=.02$), while being male increases their use (HR=2.65, $p<.001$). Likewise, in Pennsylvania, both the race/ethnic and the gender of the students are statistically significant in predicting their use of mental health services. However, being black relative to white (HR=2.74, $p=.02$) and male relative to female (HR=1.45, $p=.03$) increases the students' mental health service use. In Washington, demographic characteristics of the students are not significantly related to their risk of using mental health services.

Table 5.4: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site, Controlling for Predisposing Factors (N=752)

	Durham					Nashville					Pennsylvania					Washington					
Used SPED	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	HR	SE_H	B	SE_B	P	HR	SE_HR	B	SE_B	P	
Black	0.62	0.18	-0.48	0.29	0.09	0.93	0.15	-0.07	0.16	0.66	1.99	1.32	0.69	0.66	0.30	1.64	0.32	0.49	0.20	0.01	
Male	2.01	0.40	0.70	0.20	0.00	1.54	0.25	0.43	0.16	0.01	1.13	0.20	0.12	0.18	0.50	1.83	0.38	0.61	0.21	0.00	
Used MHS																					
Black	1.42	0.45	0.349	0.32	0.27	0.60	0.13	-0.51	0.21	0.02	2.74	1.22	1.01	0.44	0.02	1.09	0.19	0.09	0.17	0.52	
Male	1.45	0.26	0.37	0.18	0.04	2.65	0.62	0.973	0.23	0.00	1.45	0.24	0.37	0.16	0.03	1.51	0.27	0.41	0.18	2.26	

Note:

HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

The Effect of Enabling Factors on Children's Use of Special Education and Mental Health Services by Site

Table 5.5 summarizes the effect of the enabling factors on children's use of special education and mental health services by study location, controlling for their predisposing factors. The table shows that in Durham, out of the six enabling covariates, only the parent's socioeconomic status has a significant effect on the hazard of children's use of special education (HR=1.03, $p<0.001$). Increasing the socioeconomic status of the parents by one unit is likely to increase the children's hazard of using special education by 3%. The implication of this finding is that, in Durham, children of parents with high socioeconomic status are more likely to use special education services compared to those with low parental socioeconomic standing.

In Nashville, only one enabling factor (number of siblings) predicts children use of special education services (HR=1.14, $p=.04$). This finding is counter-intuitive as it indicates that an additional sibling in the house will increase the hazards of children's use of special education by 14%. An a priori expectation would be that an increase in the number of siblings would reduce the hazards of special education use since the household's available resources would be "diluted" or thinly allocated amongst all the children in the house (Chen & Escarce, 2006).

In Pennsylvania, parents' SES is a significant predictor of a child's use of special education services (HR=.97, $p=0.01$). This result shows that the estimated hazard of children's use of special education services in rural Pennsylvania is 3% lower for each additional unit of parents' socioeconomic status. The interpretation of this finding may be viewed from the perspective of a potential linear relationship between higher socioeconomic status and improvement in available household resources. As SES of parents improves, they are most likely to have the needed resources to provide alternative educational services for their troubled children, and consequently lowering children's reliance on public education system for their special education needs.

Table 5.5: Summary of Cox Regression Analysis Children's Use of Special Education and Mental Health Services by Site, Controlling for Predisposing and Enabling Factors (N=752)

Used SPED	Durham					Nashville					Pennsylvania					Washington					
	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	
<u>Predisposing</u>																					
Black	0.66	0.22	-0.42	0.34	0.22	1.09	0.21	0.09	0.20	0.66	4.71	4.49	1.55	0.95	0.10	1.53	0.36	0.43	0.23	0.07	
Male	1.86	0.43	0.62	0.23	0.01	1.55	0.27	0.44	0.18	0.01	1.08	0.20	0.08	0.19	0.68	1.67	0.40	0.51	0.24	0.03	
<u>Enabling</u>																					
Mothered	0.73	0.18	-0.31	0.25	0.21	0.83	0.24	-0.19	0.29	0.52	1.48	0.39	0.39	0.26	0.13	1.24	0.33	0.21	0.27	0.42	
P1bses	1.03	0.01	0.03	0.01	0.00	1.01	0.01	0.01	0.01	0.20	0.97	0.01	-0.03	0.01	0.01	0.98	0.01	-0.02	0.01	0.08	
Biodad	0.78	0.30	-0.25	0.39	0.52	1.10	0.31	0.10	0.28	0.73	0.86	0.19	-0.15	0.22	0.49	0.91	0.26	-0.10	0.29	0.74	
Agefb	0.98	0.02	-0.02	0.02	0.31	1.00	0.02	0.00	0.02	0.95	1.01	0.02	0.01	0.02	0.58	0.97	0.02	-0.03	0.02	0.20	
Otheradlt	1.36	0.27	0.31	0.20	0.13	1.05	0.18	0.05	0.17	0.77	1.19	0.33	0.17	0.28	0.53	0.77	0.21	-0.26	0.27	0.33	
Children	0.95	0.07	-0.05	0.08	0.52	1.14	0.07	0.13	0.06	0.04	0.98	0.09	-0.02	0.09	0.86	0.79	0.08	-0.23	0.10	0.02	
<u>Used MHS</u>																					
<u>Predisposing</u>																					
Black	0.84	0.33	-0.17	0.39	0.66	0.77	0.20	-0.27	0.27	0.32	2.92	1.55	1.07	0.53	0.04	1.21	0.27	0.19	0.22	0.39	
Male	1.30	0.28	0.26	0.21	0.23	2.72	0.69	1.00	0.25	0.00	1.49	0.27	0.40	0.18	0.03	1.33	0.29	0.29	0.22	0.18	
<u>Enabling</u>																					
Mothered	1.53	0.45	0.42	0.29	0.15	0.37	0.17	-0.98	0.45	0.03	1.21	0.31	0.19	0.26	0.46	1.40	0.35	0.34	0.25	0.18	
P1bses	0.99	0.01	-0.01	0.01	0.44	1.03	0.01	0.03	0.01	0.02	0.99	0.01	-0.01	0.01	0.25	0.99	0.01	-0.01	0.01	0.54	
Biodad	Na	na	na	Na	na	0.45	0.19	-0.80	0.43	0.06	1.45	0.27	0.37	0.18	0.04	2.55	0.62	0.94	0.24	0.00	
Agefb	0.94	0.02	-0.06	0.02	0.01	1.01	0.03	0.01	0.03	0.75	1.00	0.02	0.00	0.02	0.90	0.96	0.02	-0.04	0.02	0.08	
Otheradlt	2.02	0.41	0.70	0.21	0.00	0.65	0.18	-0.43	0.27	0.11	1.20	0.37	0.18	0.31	0.55	0.94	0.23	-0.07	0.25	0.79	
Children	1.17	0.09	0.16	0.08	0.04	1.05	0.10	0.05	0.09	0.61	1.22	0.09	0.20	0.08	0.01	1.01	0.08	0.01	0.08	0.94	

Note:

HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

The parents' SES and the number of siblings are significant predictors of special education services use in Washington. The hazard of special education use (HR=.98, p=0.08) is 2% lower for an additional unit of parents' socioeconomic status. Confirming a prior expectation, the hazard of a child's use of special education services (HR=.79, p=0.02) is 21% lower for an additional sibling in the household. In general, mother's education, presence of biological father, age of mother at first birth, and presence of other adult in the household are not significant predictors of the hazards of children's use of special education services in all the sites examined.

The lower panel of Table 5.5 summarizes the effect of enabling factors on the hazards of mental health services use by sites while controlling for the predisposing factors. The age of the mother (HR=.94, p=0.01), presence of other adult in the house (HR=2.02, p<0.01), and number of siblings (HR=1.17, p=0.04) are significantly related to the hazards of mental health services use in Durham. An additional year in age of the mother at first birth decreases the hazard of mental health services use by 6%. The hazard of using any mental health services by children with other adult present in their household is two times the hazard of the reference group. An additional child in the house increases the hazard by 17%. This finding is counter-intuitive as it invalidates parents' resource dilution theory (Chen & Escarce, 2006).

In Nashville, mother's education (HR=.37, p=0.03), SES (HR=1.03, p=0.02), and presence of biological father (HR=.45, p=0.06) are the three enabling factors that are significantly related to the hazard of mental health services utilization. The hazards of children whose mothers have some college education are 63% lower than those whose mothers have lower level of education. This finding is counter-intuitive because one would expect that children whose mothers have higher level of education would have increasing hazards of using mental health services. Additional unit of parents' SES increases hazards by 30%. As SES increases, use of mental health services is expected to rise. The presence of biological father decreases the hazards by 55%. This finding is clearly intuitive as the presence of biological father could be a source of moral, spiritual and mental support for the children, thus

minimizing mental stress and the attendant psychological and mental problems that could confront the children (Chen & Escarce, 2006).

In rural Pennsylvania, presence of biological father (HR=1.45, p=0.04) and number of children in the house (HR=1.22, p=0.01) are significant enabling factors that increase the hazards of mental health services use. While the presence of biological father increases hazards by 45%, additional sibling increases it by 22%. This finding might be interpreted to mean that father's presence could provide a child with the social and financial capital needed to access and use mental health services. Furthermore, an additional sibling could cause parents to seek mental health services for their troubled children as they probably wouldn't want the mental health problems of the older child "transferred" to the young ones by familiar social relationship or contact in the household. In Washington, the hazard of mental health services use for children that have their biological father present is highly significant and it is two times the hazards of the reference group (HR=2.55, p<0.01). The presence of other adult decreases the hazards by 4% (HR=.96, p=0.08).

In general, mother's education and SES are not significant predictors of mental health services use in Durham, rural Pennsylvania, and Washington, but significantly predict service use in Nashville, along with the presence of biological father, controlling for the child's demographic characteristics. While the age of mother, presence of other adult and number of siblings are significant predictors of the hazard of mental health services use in Durham, they are not significantly related to service use in Nashville. The age of mother and presence of other adult fail to predict service use in rural Pennsylvania. Likewise, the presence of other adult and number of siblings are not significant enabling factors or predictors of mental health service use in Washington.

The Effect of Need Factors on Children's Use of Special Education and Mental Health Services by Site

Table 5.6 summarizes Cox regression results of the effect of need factors on children's use of special education and mental health services controlling for their predisposing and enabling factors. The top panel of the table shows that the teacher report of child's inattention problem (*trflinn*) and the child's

measure of academic performance (*wjrIslw*) are the only enabling factors that are significantly related to special education service use in Durham. As expected, one unit increase in the inattention score (*trflinn*) (HR=1.87, p=0.01) increases a child's hazard of special education service use by 87%. On the other hand, one unit increase in a child's academic performance score (*wjrIslw*) (HR=0.91, p=0.01) decreases use of service by 9%.

In Nashville, parent daily report of a child's oppositional and aggressive behavior (*pdrIoar*), teacher report of a child's externalizing behavior (*trfIext*), including *trflinn* and *wjrIslw* are significantly related to hazards of special education service use. As expected, if *trfIext* score increases by one unit, a child's hazards of special education services use increases by more than two times (HR= 2.88, p=0.06). The finding that an increase in *trfIext* will decrease the hazards of service use by 2% is counter-intuitive (HR=.98, p=.03). Since the hazard is approximately one, it can be concluded that increasing externalizing behaviors (*trfIext*) by one unit may not significantly affect service use in a practical sense. As expected, one unit increase in inattention problems (*trflinn*) score (HR=2.18, p<0.01) increases the hazard by more than two times, and an increase in *wjrIslw* score (HR=0.94, p=0.02) decreases hazards by 6%.

In rural Pennsylvania and Washington, *trflinn* significantly increases a child's hazards of special education service use. It increases it by 87% in Pennsylvania (HR=1.87, p=0.01) and by 91% in Washington (HR=1.91, p=0.03). As anticipated, the academic performance score (*wjrIslw*) significantly decrease hazards by 9% in Washington (HR= .91, p<0.01). As shown by the estimated parameters and the standard errors of the indicator variable for assessing missing data on teacher report (*trfdummy*) of a child's externalizing and inattention problems, it can be concluded that the missing of data in the four study sites are random. It is also apparent from the table that academic performance (*wjrIslw*) is a significant predictor of hazards of special education use in all the sites, except rural Pennsylvania, while inattention problems (*trflinn*) increases the hazards in all the sites examined. Interestingly, the combined teacher and parents measure of a child behavior problem t-score (*placpbt*) is an insignificant predictor of the hazards of special education use in all the study sites.

Table 5.6: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Site, Controlling for Need Factors (N=752)

	Durham					Nashville					Pennsylvania					Washington				
Used SPED	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P
<u>Predisposing</u>																				
Black	0.49	0.17	-0.71	0.35	0.04	1.23	0.25	0.21	0.2	0.31	6.65	6.69	1.9	1.01	0.06	1.48	0.37	0.39	0.25	0.12
Male	1.58	0.37	0.46	0.24	0.05	1.33	0.25	0.29	0.19	0.13	0.89	0.18	-0.12	0.2	0.57	1.29	0.33	0.25	0.26	0.33
<u>Enabling</u>																				
Mothered	0.61	0.16	-0.49	0.26	0.05	0.78	0.24	-0.25	0.32	0.42	1.62	0.44	0.48	0.27	0.07	1.40	0.39	0.34	0.27	0.22
P1bses	1.04	0.01	0.04	0.01	0.00	1.02	0.01	0.02	0.01	0.04	0.98	0.01	-0.02	0.01	0.04	0.99	0.01	-0.01	0.01	0.39
Biodad	0.84	0.34	-0.18	0.41	0.66	1.27	0.37	0.24	0.29	0.41	0.70	0.16	-0.35	0.23	0.12	0.83	0.25	-0.19	0.30	0.54
Agefb	0.98	0.02	-0.02	0.02	0.41	1.00	0.02	0.00	0.02	0.90	1.02	0.02	0.02	0.02	0.34	0.98	0.02	-0.02	0.03	0.41
Otheradlt	1.26	0.27	0.23	0.21	0.28	0.94	0.17	-0.06	0.18	0.73	1.12	0.34	0.11	0.3	0.71	0.76	0.22	-0.27	0.29	0.34
Children Need	0.93	0.07	-0.07	0.08	0.37	1.10	0.07	0.10	0.07	0.14	0.94	0.08	-0.06	0.09	0.52	0.74	0.08	-0.30	0.11	0.01
p1acpbt	1.02	0.01	0.02	0.01	0.14	1.00	0.01	0.00	0.01	0.84	1.01	0.01	0.01	0.01	0.18	1.02	0.01	0.02	0.01	0.19
pdr1oar	0.49	0.34	-0.71	0.70	0.31	2.88	1.65	1.06	0.57	0.06	0.61	0.37	-0.49	0.6	0.42	0.85	0.69	-0.17	0.81	0.84
trf1ext	1.01	0.01	0.01	0.01	0.57	0.98	0.01	-0.02	0.01	0.03	1.00	0.01	0.00	0.01	0.84	1.01	0.01	0.01	0.01	0.57
trf1inn	1.87	0.42	0.63	0.22	0.01	2.18	0.41	0.78	0.19	0.00	1.87	0.47	0.63	0.25	0.01	1.91	0.56	0.65	0.29	0.03
wjr1slw	0.91	0.03	-0.09	0.04	0.01	0.94	0.02	-0.06	0.02	0.02	0.99	0.03	-0.01	0.03	0.66	0.91	0.03	-0.09	0.03	0.00
Trfdummy	0.86	0.33	-0.15	0.39	0.70	0.83	0.20	-0.19	0.24	0.44	0.67		-0.39	0.39	0.31	0.85	0.28	-0.16	0.33	0.63
<u>Used MHS</u>																				
<u>Predisposing</u>																				
Black	0.65	0.26	-0.43	0.41	0.29	0.60	0.21	-0.38	0.29	0.14	2.06	1.13	0.79	0.55	0.19	0.79	0.22	0.03	0.24	0.41
Male	1.16	0.26	0.15	0.22	0.50	3.62	1.24	1.02	0.28	0.00	1.22	0.24	0.28	0.19	0.32	1.08	0.28	0.09	0.23	0.76
<u>Enabling</u>																				
Mothered	1.36	0.40	0.31	0.30	0.30	0.34	0.22	-0.55	0.48	0.09	1.19	0.33	0.21	0.26	0.53	1.70	0.48	0.38	0.26	0.06
P1bses	1.00	0.01	0.00	0.01	0.97	1.03	0.01	0.04	0.01	0.05	1.00	0.01	0.00	0.01	0.90	0.99	0.01	0.01	0.01	0.50
Biodad	na	Na	na	na	Na	0.35	0.17	-1.09	0.46	0.03	1.11	0.22	0.07	0.20	0.61	1.89	0.50	0.59	0.26	0.02
Agefb	0.95	0.02	-0.05	0.02	0.03	1.01	0.04	-0.01	0.03	0.70	0.99	0.02	0.00	0.02	0.74	0.96	0.03	-0.04	0.03	0.16
Otheradlt	1.54	0.34	0.43	0.22	0.05	0.26	0.16	-0.55	0.29	0.03	0.81	0.47	0.00	0.34	0.71	0.60	0.31	-0.18	0.26	0.32
Children Need	1.14	0.09	0.13	0.08	0.09	1.03	0.11	0.01	0.10	0.77	1.11	0.09	0.12	0.08	0.23	1.00	0.10	0.12	0.09	0.98
p1acpbt	1.01	0.01	0.01	0.01	0.19	1.00	0.02	-0.01	0.02	0.88	1.04	0.01	0.04	0.01	0.00	1.03	0.02	0.03	0.02	0.10
pdr1oar	1.09	0.83	0.08	0.76	0.91	3.31	2.89	1.49	0.77	0.17	3.01	1.69	0.87	0.55	0.05	2.37	1.98	1.30	0.75	0.30
trf1ext	1.04	0.01	0.04	0.01	0.00	1.04	0.01	0.05	0.01	0.01	1.01	0.01	0.01	0.01	0.45	1.04	0.02	0.06	0.01	0.02
trf1inn	1.23	0.27	0.21	0.22	0.35	0.91	0.29	0.07	0.27	0.76	1.96	0.47	0.52	0.23	0.01	1.29	0.41	0.03	0.29	0.43
wjr1slw	1.00	0.03	0.00	0.03	0.96	0.91	0.04	-0.11	0.04	0.03	1.05	0.03	0.04	0.03	0.08	0.96	0.03	-0.02	0.03	0.17
trfdummy	1.69	0.57	0.53	0.33	0.12	0.38	0.20	-0.85	0.44	0.06	0.67	0.25	-0.37	0.36	0.28	1.17	0.38	0.04	0.28	0.62

Note:

HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

The lower panel of Table 5.6 shows that externalizing problems (*trfIext*) is the only need factor that significantly predicts the hazards of mental health services use in Durham (HR=1.04, $p<0.01$). A unit increase in the score of that variable increases hazards by 4%. It also increases hazards by 4% in Nashville. Expectedly, an improvement in a child's academic performance decreases hazards of mental health services use by 9% (HR=.91, $p=0.03$) in Nashville.

In rural Pennsylvania, *placpbt* (behavioral problem status), *prdIoar* (parent daily report of oppositional and aggressive behavior) and *trfIinn* (teacher report of inattention problems) are significant predictors of the hazards of mental health service use. While a unit increase in *placpbt* score increases hazards by only 4% (HR=1.04, $p<0.01$), a unit increase in *prdIoar* increases hazards by more than three times (HR=3.01, $p=.05$). Likewise, a unit increase in the score of *trfIinn* increases the hazards by 96% (HR=1.96, $p=0.01$). Only *trfIext* significantly predicts the hazards of mental health services use in Washington. As a child's *trfIext* score increases by one unit, hazards of mental health service use increases by only 4% (HR=1.04, $p=0.02$). Overall, out of the five variables analyzed as need factors, the teacher report on a child's externalizing problem (*trfIext*) shows to be a significant predictor of mental health service use in three of the four study sites. One unit increase in the value of the measure significantly increases the hazards of mental health service use in Durham, Nashville and Washington.

Racial Differences in Predictors of Children's Use of Special Education and Mental Health Service

Table 5.7 summarizes the result of the analysis of full models for black and white children that examined the question of whether predictors of children's use of special education and mental health services use vary by race/ethnicity. The upper left and right panel of the table contains the Cox regression results for black and white children's use of special education services. The hazard rate of a male black child's use of special education is 44% higher than for females (HR=1.44, $p=0.02$). In Nashville, the likelihood of a black child's use of special education is about 83% (HR=1.83, $p<0.01$) higher compared to the hazards of those in Durham

(reference site). In rural Pennsylvania, the hazard rate is more than seven times (HR=7.86, p=0.04) the hazard among blacks in Durham.

Table 5.7: Summary of Cox Regression Analysis of Children's Use of Special Education and Mental Health Services by Race -- Complete Model (N=752)

Used SPED	Black					White				
	HR	SE_HR	B	SE_B	P	HR	SE_HR	B	SE_B	P
Male	1.44	0.22	0.37	0.15	0.02	1.00	0.14	0.00	0.14	0.97
Mothered	0.82	0.15	-0.20	0.19	0.28	1.20	0.22	0.18	0.19	0.33
Nashville	1.83	0.27	0.61	0.15	0.00	0.89	0.31	-0.12	0.34	0.73
Pennsylvania	7.86	7.68	2.06	0.98	0.04	0.65	0.22	-0.44	0.33	0.19
Washington	1.22	0.27	0.20	0.22	0.36	0.41	0.14	-0.89	0.34	0.01
Enabling										
P1bses	1.02	0.01	0.02	0.01	0.00	0.99	0.01	-0.01	0.01	0.36
Biodad	0.91	0.23	-0.10	0.25	0.70	0.85	0.14	-0.16	0.17	0.35
Agefb	0.98	0.01	-0.02	0.01	0.14	1.01	0.02	0.01	0.02	0.39
otheradlt	1.21	0.17	0.19	0.14	0.18	0.76	0.14	-0.27	0.19	0.15
Children	0.97	0.05	-0.03	0.05	0.57	0.93	0.06	-0.07	0.06	0.25
Need										
p1acpbt	1.01	0.01	0.01	0.01	0.19	1.02	0.01	0.02	0.01	0.01
pdr1oar	0.95	0.44	-0.05	0.46	0.92	0.71	0.31	-0.34	0.43	0.44
trf1ext	1.01	0.01	0.01	0.01	0.37	0.99	0.01	-0.01	0.01	0.11
trf1inn	1.94	0.29	0.66	0.15	0.00	1.78	0.30	0.58	0.17	0.00
Wjr1slw	0.93	0.02	-0.07	0.02	0.00	0.95	0.02	-0.06	0.02	0.01
trfdummy	0.91	0.19	-0.10	0.21	0.64	0.85	0.19	-0.17	0.23	0.47
Used MHS										
Male	1.54	0.32	0.21	0.17	0.04	1.44	0.21	0.43	0.14	0.01
Mothered	1.18	0.36	0.12	0.24	0.59	1.22	0.23	0.15	0.18	0.30
Nashville	0.60	0.15	-0.48	0.20	0.05	0.88	0.37	-0.11	0.40	0.76
Pennsylvania	7.09	4.36	1.76	0.56	0.00	1.01	0.41	0.10	0.39	0.98
Washington	1.54	0.44	0.42	0.22	0.14	1.07	0.45	0.08	0.40	0.87
Enabling										
P1bses	0.99	0.01	0.01	0.01	0.36	1.00	0.01	0.00	0.01	0.71
Biodad	1.12	0.38	-0.08	0.32	0.74	0.97	0.15	-0.07	0.15	0.84
Agefb	0.99	0.02	-0.03	0.02	0.71	0.98	0.02	-0.02	0.02	0.14
otheradlt	0.77	0.25	0.17	0.17	0.42	0.58	0.19	-0.50	0.22	0.10
Children	1.03	0.08	0.04	0.06	0.66	1.11	0.07	0.13	0.06	0.07
Need										
p1acpbt	0.99	0.01	0.01	0.01	0.41	1.03	0.01	0.03	0.01	0.00
Pdr1oar	8.07	5.47	1.13	0.53	0.00	2.40	1.05	0.61	0.42	0.05
trf1ext	1.05	0.01	0.04	0.01	0.00	1.03	0.01	0.03	0.01	0.00
trf1inn	1.28	0.28	0.24	0.17	0.25	1.35	0.24	0.19	0.17	0.09
Wjr1slw	0.94	0.03	-0.03	0.02	0.03	0.99	0.02	-0.01	0.02	0.58
trfdummy	1.19	0.36	0.27	0.24	0.57	0.84	0.19	-0.19	0.22	0.44

Note:

HR is the hazard ratio; SE_HR is the standard error of HR; B is the estimated beta; SE_B is the standard error of the estimated beta; and P is the p-value.

The probability of white kids using special education in Washington is about 59% (HR=.41, p=0.01) lower than their counterparts in Durham.

If a child is black, the parent's SES increases his/her probability of using special education services by 20% per unit increase in that measure (HR=1.02, p<0.01). None of the variables included in the current model as enabling factors significantly predicts a white kid's use of special education services. Teacher report of inattention problem (*trflinn*) and measure of intelligence or academic performance (*wjrIslw*) are the only two need factors that significantly predict a black child's use of special education. While *trflinn* increases their hazard rate by 94% (HR=1.94, p<0.01), *wjrIslw* decreases it by 7% (HR=0.93, p<0.01). For a white student, three variables representing need factors significantly predict their likelihood of using special education. The combined measure of parent and teacher report of a child's behavior problem (*pIacpbt*) increases hazard rate by 2% (HR=1.02, p=0.01), while *trflinn* increases it by 78% (HR=1.78, p<0.01) per a unit increase in those measures. Academic intelligence (*wjrIslw*) on the other hand, lowers the hazard by 5% (HR=0.95, p=0.01).

The lower left and right panel of Table 5.7 contains the Cox regression results for black and white children's use of mental health services. The hazard rate of a male black child's use of mental health services is 54% higher than the female (HR=1.54, p=0.04). In Nashville, the likelihood of a black child's use of mental health services is about 40% lower (HR=0.60, p<0.05) compared to the hazards of those in Durham. In rural Pennsylvania, the hazard rate is about seven times (HR=7.09, p<=0.01) the hazard of the black children in Durham. The probability of a white male using mental health services is about 44% higher (HR=1.44, p=0.01) than the females.

None of the variables included in the estimated model as enabling factors significantly predicts a black student's use of mental health services. For white students, the number of siblings in the household (*children*) increases the hazard rate of using mental health services by 11% (HR=1.11, p=07). As previously noted, this finding is not intuitive because of the possibility of resource constraints that additional siblings may produce.

Parent daily report of aggressive and oppositional problem (*pdr1oar*), teacher report of externalizing problems (*trf1ext*) and the measure of academic performance (*wjr1slw*) are the three need factors that significantly predict a black child's use of mental health services. The *pdr1oar* increases hazards by more than 8 times (HR=8.05, $p<0.01$) while *trf1ext* increases it by 5% (HR=1.05, $p<0.01$) per one unit increase in those measures. The *wjr1slw* on the other hand, decreases the hazards by 6% (HR=0.94, $p<0.03$). For whites, four variables representing need factors significantly predict their likelihood of using mental health services. They include *placpbt* which increases hazard rate by 3% (HR=1.03, $p<0.01$); *pdr1oar* increases it by more than two times (HR=2.40, $p=.05$); *trf1ext* also increase the hazard by 3% (HR=1.03, $p<0.01$), and *trf1inn* increases the hazard by 35% (HR=1.35, $p=0.09$).

Overall, being male increases both black and white children's hazards of using mental health services. Two need factors involving teacher report of inattention and measure of academic ability are common predictors for both black and white students' use of special education services. Likewise, parent daily report of oppositional and aggressive problems and teacher report of externalizing behavior are the only two common predictors that significantly affect the hazards of black and white children's use of mental health services.

Discussion

The main objectives of this paper were twofold: 1) to evaluate the factors that explain racial and ethnic disparities in children's use of special education and mental health services, and 2) to examine whether the factors that explain special education and mental health services use differ by race. The first hypothesis was that white children are more likely than black to use mental health services, while black children are more likely than white to use special education services. The result of analysis using service use data across study sites shows that the risk of black children's use of special education services irrespective of their place of residence is about 11% (HR= 1.22, $p=0.20$) higher than the hazards for white children, but the estimate is not statistically significant. We find that white children are more likely to use mental health services

compared to black children in this sample, since black children exhibit a weak and decreased risk of mental health service use relative to white (HR=.86, p=.09). This finding is consistent with prior literature showing that minority groups, particularly black children, are less likely to have access to and use mental health services, even when they exhibit highest level of service need (USDHHS, 1999 & 2001; Kataoka, Zhang, & Wells, 2002; Farmer et al. 2005; Garland et al. 2005).

This finding then raises questions about the factors that put the minority groups at disadvantage of access to and use of mental health services. Several factors such as biases in the health system, attitudes, preferences and personality of the individuals that can not be addressed in the current paper due to data limitations have been advanced as some of the factors that create racial differences in use of health and social services (USDHHS, 1999; Zimmerman, 2005; Diala et al. 2001; Whaley, 2004; Godwin, Hoven, Lysons, & Stein, 2002). Whether these factors will significantly predict children's use of special education and mental health services warrants further study.

Results from analyses using non-site stratified data supports the hypotheses that male children are most likely to use both special education and mental health services. For instance, the hazard of males relative to the females of using special education services (HR=1.54, p<.01) is about 54% higher irrespective of where they are resident. This finding corroborates earlier findings that boys are more likely to use special education programs than girls (Donovan & Cross, 2002, Oswald et al. 2003, Coutinho & Oswald, 2005; Koot & Verhulst, 1992). Regarding mental health services, males experience an elevated hazard (HR=1.64, p<0.01) that is 64% higher than females' hazard. This finding also confirms conclusion from earlier studies that girls are underserved in mental health services sectors as they are less likely to obtain needed treatment for certain mental and behavioral problems (Zimmerman, 2005; Cohen & Hesselbart, 1993; Cabiya et al. 2006).

The role of race/ethnicity in predicting children's use of special education and mental health services was shown to vary from site to site. While race/ethnicity significantly predicts the risk of a child's use of special education services in Durham and Washington, it is not significant in Nashville and Pennsylvania. Conversely, while the race and ethnicity variable is a significant predictor of mental health services use in Nashville and Pennsylvania it is not in Durham and Washington. This finding is not surprising given the understandable regional differences in racial composition, availability and access to mental health and special education services in the US.

In terms of gender differences in use of services by site, being male significantly predicts students' use of special education services in all the sites except Pennsylvania. Most interestingly, being male increases a child's hazard of using mental health services in all the study sites. These findings further confirm that girls are "truly" underserved by the nation's mental health and special education systems. Yet elimination of all forms of discriminations and disparities in the provision of social and health services to all Americans has been a central policy thrust of the federal government (USDHHS, 2000; IOM, 2002).

Racial disparities in use of special education services persisted in Durham and Washington as we controlled for the child's gender. Likewise, gender disparity in use of special education persisted in Durham, Nashville and Pennsylvania as we controlled for race and ethnicity of the participants. In terms of mental health service use, racial differences vanished in Durham and Washington, but persisted significantly in Nashville and Pennsylvania as we controlled for a child's gender. This finding shows that a child's gender can explain racial and ethnic differences in children's use of mental health service in Nashville and Pennsylvania. In terms of gender disparity in mental health service use, the race and ethnicity of a child can only explain it in Washington, but not in Durham, Nashville and Pennsylvania as gender differences persisted significantly in those sites as we controlled for race/ethnicity in the model (see Table 5.4).

As we controlled for the child's enabling factors (Table 5.5), racial disparity in use of special education became insignificant in Durham and persisted in Washington with a slight reduction in the hazard ratio from 1.62 to 1.53. Even though it is only the parents' SES that is significant in this model in the context of Durham, it could be generally stated that children's enabling factors (collectively) are only likely to explain racial disparities in Durham. For the mental health service sector, racial disparity vanished in Nashville and persisted in Pennsylvania as we controlled for enabling factors. This result collectively show that in the context of this data, enabling factors can explain racial disparity in children's use of mental health service in Nashville but not in Pennsylvania. Interestingly, as we controlled for enabling factors, the risk of black using MH services relative to whites increased by more than two times in Pennsylvania. This implies that as we even controlled for potential differences in children's socioeconomic disadvantages, racial and ethnic disparities in MH services use continued to be statistically significant in rural Pennsylvania.

As we controlled for children's need factors (including predisposing and enabling factors) in the model, racial disparity in use of special education "disappeared" in Washington and persisted in Durham (Table 5.6). Curiously, racial disparity in use of special education became significant in Pennsylvania in the full model. This finding shows that the enabling and need variables examined in the present study cannot fully explain racial disparities in children's use of special education in Durham and Pennsylvania. Indeed, the Durham result shows that black children in need of special education services are less likely to use such services compared to white children after controlling for their predisposing, enabling and need factors. But they have higher hazards of using those services in Pennsylvania. However, the enabling and need covariates that are statistically significant could be judged as capable of explaining racial disparity in children's use of special education in Washington. In terms of mental health service use, racial and ethnic differences vanished in Nashville and Pennsylvania as we controlled for need factors, while it remained insignificant in Durham and Washington. This finding could

mean that the observed racial differences in children's use of mental health service in Nashville and Pennsylvania could be due to differences in their need factors.

As indicated in Table 5.7, six variables including the child's gender (male), whether the child is resident in Nashville or Pennsylvania relative to Durham, *SES*, *trflinn* and *wjr1slw* are the significant covariates that predict the hazard of black children's use of special education. As for the whites, only four variables (residence in Washington relative to Durham, *p1acpbt*, *trflinn* and *wjr1slw*) are significant in predicting their use of special education. Interestingly, *trflinn* and *wjr1slw* scores are common to the two racial groups in predicting their hazards of special education use. In both cases, the higher the children's *trflinn* score the higher their hazards of using of special education. Conversely, as their *wjr1slw* score increases per unit, the hazards of their using special education decreases correspondingly.

Six variables (*male*, residence in Nashville, Pennsylvania relative to Durham, *pdr1oar*, *trf1ext* and *wjr1slw*) were significant in predicting the hazards of black children's use of mental health service in the final model (Table 5.7). Likewise, six variables (*male*, *children*, *p1acpbt*, *pdr1oar*, *trf1ext*, and *trflinn*) were significant in predicting the hazards of white children's use of mental health service. Interestingly, three variables (*male*, *pdr1oar*, and *trf1ext*) are common to the two racial groups in predicting their hazards of using mental health services.

Table 5.7 further reveals that in predicting the hazards of black children's use of special education and mental health service, four variables are significantly common to the two sectors. These include gender, resident in Nashville and Pennsylvania as opposed to Durham, and the child's measure of intelligence. For white children, the two common variables that significantly predict their hazards of using the two services include their behavioral risk and inattention problem scores.

Summary of Findings, Policy Implications and Conclusion

Studies have examined racial/ethnic and gender differences in identification and referral of children for special education services (Donovan & Cross, 2002; Losen & Orfield, 2002;

Oswald, et al. 2001; Coutinho, Oswald, & Best, 2002), and others have investigated differences by race/ethnicity and gender in children's use of mental health services (Garland, et al. 2005; Zimmerman, 2005; Cabiya et al. 2006), however none have simultaneously examined factors that predict race/ethnic differences in children's use of both these types of services. Yet, children's school settings have been identified as a pathway in their access to and use of mental health services (Burns et al. 1995; Farmer et al. 2005). This study has filled the research gap in an important way by using Cox proportional hazard models to identify variables that independently predict children use of special education and mental health services. In addition, the study identified some variables that are independently common predictors of racial and ethnic disparities in children's use of both types of services. Variables that are significant in predicting children's use of the two services on the basis of race/ethnicity were identified and compared.

In race-only predictor models, we found statistically significant racial disparities in special education in two sites (Durham and Washington). Similarly, racial differences in mental health services use were found only in Nashville and Pennsylvania. However, as we analyzed "full" models with several predisposing, enabling and need covariates included, racial disparity in special education services use vanished in Washington and remained insignificant in Nashville. Likewise, differences in mental health services use disappeared in Nashville and Pennsylvania as the model was "fully" controlled and remained insignificant in Washington and Durham. The policy implication of these findings is that a one-size fits-all social policy is not likely to achieve the federal government's commendable goal of eliminating racial and ethnic disparities in children's use of social and health services in America (Finn, Rotherham & Hokanson Jr., 2001). Therefore, we suggest that social and public policy thrusts aimed at eliminating racial disparities must fully account for regional differences in racial composition, availability of special education and mental health services, and other important social and economic issues that may relate importantly to access and use of these services by vulnerable populations (Alegria, Perez, & Williams, 2003).

Our findings from sex-only models indicate significant gender disparities in children's use of special education and mental health services in all the sites, excluding Pennsylvania where special education service use is not significantly related to gender. These findings indicate the need to understand the underlying social, economic and clinical processes that generate the observed disparities in use of special education and mental health services among children on the basis of their gender. Furthermore, the findings suggest the need for policymakers to design gender-focused and gender-friendly special education and mental health service delivery systems that must take into account regional variations in the supply and demand of these social services (Coutinho, Oswald, Best, 2002; Coutinho & Oswald, 2005; Slade, 2003; Sturm, Ringel, & Andreyeva, 2003).

The study's hypothesis that racial disparities will vanish when we control for children's predisposing, enabling and need factors was not fully supported by our data in the context of special education services. While racial disparity vanished in Washington, it remained significant in Durham and Pennsylvania. In the context of mental health services, the hypothesis was supported as racial differences vanished in Nashville and Pennsylvania having "fully" controlled the models. This finding indicates that, in sites, where racial disparities diminished or attenuated as a result of adjusting for predisposing, enabling and need factors; race and ethnicity is partly a marker for other types of disadvantages that are related to clinical, social, economic, and family structures, that in turn, serve as barriers to effective access to and use of services by high-risk children investigated in this study (Newacheck, Hung, & Wright, 2002). From a public policy perspective, concrete social actions are needed to address these underlying contributors to racial disparities in access to and use of special education and mental health services by minority children whose parents have suffered long-standing social, political and economic discrimination in this country (USDHHS, 1999 & 2003; Newacheck, Hung, & Wright, 2002; Alegria, Perez, & Williams, 2003; Donovan & Cross, 2002; Losen & Orfield, 2002).

Our results provide support for the hypothesis that the higher the need level, the higher the level that children tend to use special education and mental health services. For instance, one need factor as represented by a child's inattention problem measure significantly increased children's use of special education in all the sites examined. Likewise, a children's need factor as represented by teacher report of externalizing behavior significantly increased their use of mental health services in all the sites, excluding Pennsylvania. This finding is consistent with the conclusions from earlier studies that there is a significant association between severity of need and children's use of special education and mental health services (Koot & Verhulst, 1992; Wu et al., 2001; Burns et al., 1995).

The hypothesis that parental SES will only partially explain race/ethnicity disparities in special education and mental health service use was supported in the context of special education. Our findings showed that even though parental SES is a significant predictor of children's use of special education in Durham, Nashville and Pennsylvania after adjusting for other covariates, racial/ethnic disparities remain significant in Durham and Pennsylvania. However, we reject the hypothesis in the context of mental health service use in Nashville. Racial disparity vanished as parental SES significantly predicts use of mental health service holding other covariates constant. This finding again attests to the suggestion that to improve minority population's access to socioeconomic and health opportunities in the US, concrete public policies must be put in place to readdress their age-long political, social and economic disadvantages (Smedley et al., 2003; Alegria, Perez, & Williams, 2003; Shone, Dick, Klein et al. 2005; Fennell, 2005).

The hypothesis that teacher's rating of behavior problem will explain race/ethnic disparity in special education use more fully than parent's rating is not supported by the data. For instance, even though racial disparity is statistically insignificant in Nashville, the effect of parent rating of their children behavior problems (*pdrloar*) on special education use is higher (HR=2.88) than those of teachers' ratings of children's externalizing (*trf1ext*: HR=0.98) and inattention problems (*trf1innt*: HR=2.18). Despite the fact that racial disparity is insignificant in

this site (Nashville), it could be stated that parent's reports of a child's problem has higher effect on children's hazards of special education use than teacher's evaluations. This finding is not unexpected as discriminatory screenings or evaluations of the minority children for special education by teachers have been identified as one of the possible causes of their overrepresentation in special education programs (Losen & Orfield, 2002; Donovan & Cross, 2002). This result suggests that an important policy instrument that can be use to circumvent overrepresentation of minorities in special education is for policymakers to insist that referrals to special education rely more heavily on parents' reports of their children's behavioral problems in referral and placement decisions than the teachers' evaluations. Indeed, tangible involvement of parents in the design, planning, referral and placement of children in special education can attenuate the effect of biases and discrimination in the disproportional representation of minority students in special need programs (Donovan & Cross, 2002; Ladner & Hammons, 2001).

Our data partially support the hypothesis that predictors of children's use of special education and mental health services are different amongst the two racial groups analyzed. Variables that predict black children's use of both types of services are different from those of whites except in two cases where teachers' report of children's behavioral problems and measure of academic performance commonly predict use of special education are the same for each group. These two variables can be manipulated by policymakers to mitigate minorities' overrepresentation in special education programs. For example, racially conducive and culturally competent school and learning environments can improve children's academic performance and learning experience that can subsequently lead to decreased participation in special need programs. Likewise, racial and culturally sensitive early intervention and prevention services aimed at reducing children's inattention problems could also lead to significant reduction in children's use of special education services (Koot & Verhulst, 1992; Donovan & Cross, 2002).

Interestingly, being a male significantly increases a child's hazards of using mental health services (both black and white students). In addition, parent daily report of oppositional and

aggressive problems and teacher report of externalizing behavior are predictors that significantly affect the hazards of black and white children's use of mental health services simultaneously. From a policy perspective, this finding suggests that both parents and teachers need to pay careful attention to the mental health needs of female children. A deliberate policy of periodic screening or evaluation of females to uncover their mental health care needs could dilute the observed gender disparities in use of mental health services among this high-risk sample.

The central purpose of this study was to identify correlates that explain racial/ethnic disparities in children's use of special education and mental health services among students that have been screened by their parents and teachers of being at risk of behavioral and mental health problems. We then estimated Cox regression models with several predisposing, enabling, and need factors to test the hypothesis of racial and ethnic disparities in use of these social services.

Results of unadjusted service use models show that racial disparities in children's use of special education and mental health services are not a "global phenomenon" as the hazards of using the services were only significant in two of the study sites (Durham and Washington for special education; Nashville and rural Pennsylvania for mental health services). Whereas, unadjusted models indicate existence of gender disparities in use of special education in three sites of the study, differences in use of mental health services between male and female students were highly significant in all the study locations.

Even though earlier studies (Copper-Patrick, et al. 1999; Bussing, Zima, & Belin, 1998; Weller, Minkovitz, & Anderson, 2003) have identified predisposing, enabling and need factors that are significantly associated with children's use of mental health services, few studies have examined these factors vis-à-vis students' use of special education services, especially among students with reported high-risk behavioral problems. The present study has filled this missing gap in the literature by the concurrent examination of the effect of predisposing, enabling, and need factors on children's use of special education and mental health services. Our results show that the effects of these factors in predicting children's use of these social services and their

relevance in explaining racial and ethnic disparities vary by service sector, study location, and also by race and ethnicity.

A few limitations of this study need to be noted. The study was limited to analysis of black and white children's use of both types of services. It would be useful to consider other minority groups in future analysis in view of the rapidly diversifying character of American population in this century. Furthermore, we have only limited data with which to study high-risk populations of students in four sites/states. This calls for a caution in generalizing the findings to the general population of children. In predicting children's hazard rates of using special education and mental health services, we have only considered some predisposing, enabling and factors available in our data. Yet other empirically and theoretically known predictors of racial disparities in children's use of these social services (e.g. health system factors, personality, cultural and attitudinal variables, sources of referral, etc.) were unavailable for analysis.

An important future research topic would be to examine the factors and processes that can lead to the observed gender differences in children use of special education and mental health services. Furthermore, it would be useful to examine what factors could predict or explain racial and gender disparities in placement of students in different settings of special education and mental health services.

CHAPTER SIX

What Factors Explain Racial Disparities in Restrictive Placement of Children in Special Education and Mental Health Services?

Introduction

Racial and ethnic disparities in children's use of mental health and special education services and the overrepresentation of the minority groups in the most restrictive settings have increasingly attracted research and policy concern (Sheppard & Benjamin-Coleman, 2001; Coutinho & Oswald, 1998b; Fierros & Conroy, 2002; Osher et al. 2004; U.S. Department of Health & Human Services [USDHHS], 1999; New Freedom Commission on Mental Health [NFCMH], 2003; Artiles & Trent, 1994; Donovan & Cross, 2002; Losen & Orfield, 2002). Once children are identified for special education and mental health services, minority children are most likely to be placed in restrictive settings (Oswald & Coutinho, 1998b; Benjamin-Coleman, 2001; Chow, Jaffee, & Snowden, 2003).

Overrepresentation of minority children in restrictive special education settings violates the intention of the Individuals' with Disabilities Education Act (IDEA: Palmaffy, 2001; Ladner & Hammons, 2001; Alegria, Perez, & Williams, 2003), which was enacted to ensure that disabled children receive appropriate education services in the least-restrictive settings possible (Coutinho & Oswald, 1998b; Donovan & Cross, 2002; Alegria et al. 2003). Empirical research has shown that disabled students benefit most from special education services when provided in inclusive settings as opposed to pulled-out programs (Buysse & Bailey, 1994), and the disproportionate placement of minority students in resource rooms or separate schools for their education needs raises serious questions about the equity of special education services provided to children of color (Losen & Orfield, 2002; Ladner & Hammons, 2001). Similarly, minority children and particularly black children are more likely than white children to be placed in restrictive mental health service settings such as inpatient psychiatric hospitals and residential facilities (USDHHS, 1999 & 2001; Snowden & Cheung, 1990; Chow, Jaffee, & Snowden, 2003; Bickman et al. 1995),

and are underrepresented in outpatient mental health treatment even though outpatient settings are known to be efficacious (Snowden & Cheung, 1990; USDHHS, 1999 & 2001).

The processes that lead to overrepresentation of the minority students in more restrictive special education placements have not been thoroughly studied (Oswald & Coutinho, 1998b) nor have the mechanisms related to black children's relative over-use of inpatient and residential mental health facilities and under-use of outpatient services (Garland et al., 2005; USDHHS, 1999). Previous attempts to predict students' placement in special education services have generally relied on aggregate data, which lack relevant information about individual children including their academic achievement (Donovan & Cross, 2002; Hosp & Reschly, 2004). Moreover, no study has simultaneously evaluated the factors that predict and perpetuate disparities across different special education and mental health service placements. This paper sheds new light on these issues by using the behavioral model of health services utilization developed by Andersen (1968, 1995) to frame analyses predicting children placements in different levels of special education and mental health services.

Prior Research

Prior research on children's placement in different categories of mental health services is discussed below, followed by a summary of key findings regarding children's placement in different special education settings.

Children's placement in mental health services sectors varies by race and ethnicity

Several studies have found that minority children are overrepresented in inpatient mental health treatment settings, and conversely underrepresented in outpatient treatment (USDHHS, 1999 & 2001). Snowden & Cheung (1990) show that blacks are underrepresented in some outpatient treatment facilities, and are overrepresented in the inpatient psychiatric care treatment relative to the whites. Research by Cunningham and Freiman (1996) also supports these findings, showing that black children were less likely than white children to make an outpatient mental health visit. Chabra et al. (1999) found that few black children were in psychiatric inpatient care

because of their lack of health insurance, however Firestone (1990) reported that there are many black children in residential treatment centers which is second to inpatient psychiatric hospitalization in terms of placement restrictiveness.

Sheppard and Benjamin-Coleman (2001) examined the association between race and type of service placement for youth with emotional and behavioral disturbance. They found that black youth were more likely than whites to be placed in correctional facilities and foster care while white children were more likely to be hospitalized. Garland et al. (2005) studied racial and ethnic disparities in the use of a variety of outpatient, inpatient and informal sources of mental health services among high-risk youths. They reported significant racial/ethnic group differences in the likelihood of receiving mental health services from outpatient, but not from the informal sector and 24-hour-care services.

Children's placement in mental health services sectors varies by need

Children's level of need or disability conditions are significantly associated with the type of placement they receive. For example, Witt, Kasper and Riley (2003) found that children with conditions such as poor psychosocial adjustment were more likely to be placed in inpatient sector for their mental health service needs. Likewise, Weller, Minkovitz, & Anderson (2005) concluded that need factors were the strongest predictors of type of placement a child received. In particular, the authors concluded that activity limitations are significantly associated with type of placements. Hough et al (2002) also concluded that there is a significant relationship between adolescents' diagnosis of any mental health problem and their use of specialty inpatient and outpatient placement settings. Having any mental health diagnoses increases the odds of receiving services from both sectors.

Patient outcomes and satisfaction varies by mental health placement type

Bickman et al. (1995) evaluated the effectiveness and global satisfaction of managed mental health services of the Forth Bragg Experiment and concluded that outpatient services were generally rated higher than the inpatient services. In terms of the efficacy or effectiveness of

services, there also exists variation between the different placement settings. Overall, there is strong evidence of efficacy for outpatient treatment (USDHHS, 1999).

In the next subsection, children's placement patterns in the different categories of special education programs are briefly summarized.

Children's placement in different special education settings varies by race and ethnicity

There is overwhelming evidence that minority students are more likely than white students to be placed in restrictive special education environments (Donovan & Cross, 2002; Losen & Orfield, 2002; Fierros & Conroy, 2002). Fierros & Conroy (2002) noted that once minority children are identified for special education, they are more likely to be removed from the general education classroom and placed in restrictive settings. Studies by Serwatka, Deering, and Grant (1995), Harry (1992), and Grossman (1995) also find that minority students are more likely than whites to be placed in exclusive settings such as resource rooms, separate school facilities, and separate classrooms.

Service use intensity within special education placement categories varies by race/ethnicity

Half of all special education students in 2003-04 received 80% of their instruction in regular classrooms, but the majority of these "fortunate" students were white (US DoE, 2005). In contrast, minority children were more likely to spend less than 40 percent of their day in regular classrooms⁶. In addition, black special education students are more likely to be placed outside the regular classrooms.

Children's placement in different special education settings varies by condition

In 2004, about 14% of mentally retarded children received instruction in the least restrictive settings, while about half were in the most restrictive settings. Among the emotionally disturbed, about 32% received services in the least restrictive setting, while about 28% had the

⁶ US Department of Education has traditionally defined restrictiveness of placement in the context of percentage of day that a student receives instruction outside a regular classroom setting. For example, a least restrictive setting is when a student spends less than 20% of a day outside regular classroom, and most restrictive setting is when a student spends over 60% of a day in outside regular classrooms receiving special education services.

most restrictive placements. The percentages for learning disabled students were 51% and 12% respectively (US DoE, 2005). In sum, mentally retarded and emotionally disturbed students are more likely to have restrictive placements than learning disabled students (Serwatka, et al., 1995; Coutinho & Oswald, 1998b).

Factors that predict children's special education placement type may vary by race

Hosp and Reschly (2002) found that the process of determining restrictiveness of placement for learning disabled blacks and whites were similar, however their findings are at odds with those of Artiles et al (1998). The latter concluded that "although some factors predicted placement in LD programs for all ethnic groups, placement predictors also varied by student ethnicity." The disagreement in findings may be due to differences in the quantification of model variables, model specifications and how criterion variables are scaled.

Children's placement in different special education settings varies by gender

Girls are generally underrepresented in special education services (Oswald et al., 2003); but when in special education they are more likely to be placed in more restrictive settings (Gillespie & Fink, 1974; Wehmeyer & Schwartz, 2001). Factors that predict gender disparities are not yet clearly understood (Fierros & Conroy, 2002; Donovan & Cross, 2002; Coutinho, Oswald, & Best, 2002; Coutinho & Oswald, 2005).

Children's special education outcomes vary by placement type

Studies examining academic outcomes and behavior among children in different placement settings find that students in the inclusive settings performed better than those in pull-out programs (Rea, McLaughlin, & Walter-Thomas, 2002; Buysse & Bailey Jr., 1994). For example, Rea et al. (2002) show that students in the least restrictive settings earned higher grades, achieved higher or comparable scores on standardized tests compared to those in the pull-out restrictive settings. These students also tended to commit fewer behavioral infractions.

In summary, minority students in special education and mental health services experience what Fierros & Conroy (2002) have called "double jeopardy." That is, they are more likely than

white children to receive special education services in most restrictive settings, and when they seek mental health services, they are more likely to be placed in psychiatric hospital and residential centers (USDHHS, 1999 & 2001).

Most existing analyses use cross-sectional data that describe race/ethnic disparities in placement but do not examine the underlying process that lead to those disparities. In addition, most studies have relied on aggregate data, and there is a need for studies incorporating individual- and household level factors (Coutinho & Oswald, 1998b). The present study uses a unique longitudinal dataset from the Fast Track project to rigorously investigate the effects of predisposing, enabling and need factors on children's mental health and special education placement. Understanding the processes and factors that underlie children's differential placement will guide the development of cultural- and race/ethnic-sensitive policy and service delivery programs (Yeh, Takeuchi, & Sue, 1994).

Objectives

The main objectives of the study are to (1) evaluate factors that predict children's placement in restrictive settings of mental health and special education services and (2) examine whether restrictive placement predictors in special education and mental health services differ by race.

Hypotheses

The study tested the following hypotheses: (1) Black children are more likely than white children to be placed in restrictive special education and mental health service settings, (2) male children are more likely than females to be placed in restrictive special education and mental health settings, (3) children with greater needs are more likely to be placed in the most restrictive settings, and (4) factors that predict restrictive placement of black children in special education and mental health services differ from those for white children.

Method

Data and Sample Description

The data analyzed were collected as part of the Fast Track Project (CPPRG, 1992), a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington. Schools within the four sites were selected as high-risk based on crime and poverty statistics of the neighborhoods they served. Within each site, the schools were divided into two sets matched for demographics (size, percentage free or reduced lunch, ethnic composition), and the sets were randomly assigned to intervention and control conditions. Using a multiple-gating procedure for each of three annual cohorts, all 9,594 kindergarteners in 54 schools were screened for classroom conduct problems by teachers. Those children scoring in the top 40 percent within cohort and site were then solicited for the next stage of screening for home behavior problems by the parents, and 91 percent agreed ($n=3,274$) (Lochman, 1995). The teacher and parent screening scores were then standardized and combined into a sum score. Children were selected for inclusion into the study based on this sum score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Deviations were made when a child failed to matriculate in the first grade at a core school ($n=59$) or refused to participate ($n=75$), or to accommodate a rule that no child would be the only girl in an intervention group. Ninety-five percent of the selected sample scored in the top 20% on both the parent and teacher screening measures. The outcome was that 891 children (n 's = 445 for intervention and 446 for control) were selected. It should be noted that these levels of problems are defined relative to other children in these high-risk schools. Relative to children across the country, however, the elevated levels of problem behavior are clearer. For example, on the Teacher Report Form of the Child Behavior Checklist, 48% of the children scored in the clinical range for the aggression subscale (i.e. greater than 63).

In addition to the high-risk children, a smaller normative sample of first-graders was selected, composed of equal numbers of children from each decile of the distribution of reported behavior problems. This combined sampling procedure yielded a total sample of 1,199 children who participated in the Fast Track Project.

Analytical Sample

Data from the control and normative sampled children were used in the present analyses (n=754). After merging special education and mental health service use data, two unmatched cases were dropped from further analysis. Thus, the number of children in the analytical sample is 752 .

Measures⁷

Special education status and placement type were taken from the *School Record Form*. The form is a modified version of the *School Archival Record Surveys* (SARS: Walker et al. 1998). The measure contains a series of items completed by the interviewer by reviewing the child's school records. Special education data includes whether the child has a current IEP, and how many minutes of special education were received per week by disability classification (mental retardation, learning disability and behavioral and emotional disorder). Children with either a current IEP or a reported number of minutes of service were considered to be enrolled in special education.. Information regarding current level of special education placement involving regular education or special education resources, separate or self-contained class was also collected.

Services Assessment for Children and Adult (SACA: Stiffman, et al. 2000) is a parental report instrument that assessed children's lifetime and past-year uses of a variety of mental health services from both the inpatient and outpatient settings. The SACA provided both continuous (number of visits) and dichotomous (yes/no) data on children's use of outpatient services

⁷ Detailed specification of the various measures used by Fast Track Project can be found via the internet at www.fasttrackproject.org.

involving help from mental health facilities, mental health professionals, day treatment programs, drug/alcohol clinics, in-home therapists, emergency rooms, family doctors, and respite care providers. Data on inpatient service use was collected from the following settings or sources: overnight in psychiatric hospital, general hospital, residential treatment centers, group home, foster home, emergency shelter, and other overnight stays for mental health problems.

Parent Daily Report Form (PDR: Chamberlain & Reid, 1987), *Teacher Report Form*, a modified version of *Child Behavior Checklist* (TRF: Achenbach, 1991) and *Teacher Observation of Child Adaptation-Revise* (TOCA-R: Werthamer-Larson et al. 1991) were used to collect data on children's behavior problems. Five measures that indicated baseline child behavior problems used in the present study include the following: aggressive-oppositional-disruptive behavior at home (measured by the PDR), aggressive-oppositional-disruptive behavior at school (measured by the TOCA-R); hyperactivity, inattention, and externalizing problems (measured by the TRF). The average t-scores, summed over the different items of the measured behavior problems were used in analysis.

Family Information Form (CPPRG, 1990) was developed by Fast Track Project to collect general data about the target children and their family. This measure provided data on the children's demographic variables, family structure, and parents' social economic status. The *Woodcock-Johnson Psycho-Education Battery-Revised* (WJ-R) was used to measure children's achievement in their various scholastic ability involving calculation, letter-word identification and passage comprehension. For each of the three subtests, a summary score was computed which summed all the items for the particular subtests.

Independent and Dependent Variables

Two categorical dependent variables were constructed to indicate level of placements in special education and mental health services. For special education services placement (variable=*spededcat*), students that were placed in regular classrooms for their special education services assumed a categorical value of 0 (least restrictive settings) while those that had their placement in

separate or resource rooms took the value of 1 (most restrictive setting). For mental health services placement (variable= *usemhscat*), children that obtained past-year mental health services from any outpatient services sectors were given a categorical value of 0 (least restrictive setting) while those that secured their mental health services from any inpatient services sectors took the value of 1 (most restrictive setting).

For the purpose of the present study, the independent variables used in analysis were classified into the *predisposing, enabling and need factors* following Anderson & Newman (1973) and Anderson (1995). The *predisposing factors* used in empirical models include the child's demographic characteristics such as their gender, race and ethnicity. Separate dummy variables were used to indicate a child's race/ethnicity -- whether black or not (1=black and 0=white), and gender (1=male and 0=female). In addition, the child's place of residence (site of the study) was measured as a categorical variable (Durham=1, Nashville=2, Pennsylvania=3 and Washington=4) and included as a predisposing factor in the final analytical models.

Six variables were used to represent a child's *enabling factors*. The variables include mother's education (*mothered*), parents' socioeconomic status (*plbses*), presence of biological father in the house (*biodad*), mother's age at first birth (*agefb*), other adult present in the house (*otheradlt*), and the number of children or siblings in the house (*children*). The variables representing socioeconomic status, mother's age at first birth, and number of siblings were measured on a continuous scale, while the remaining were assessed as indicator variables. The socioeconomic variable was created from a weighted combination of parent educational achievement and occupational status (Hollingshead, 1979). The age of the mother was measured in years. The number of children was measured as the total number of siblings in the household.

The mother's educational level was recoded such that mothers with some college education and above were coded as 1, and those with high school and below were coded zero. The variables, presence of biological father and other adult in the house were coded as (yes=1 and no=0) respectively.

Eight variables were used to represent a child's need of special education and mental health services. These *need factors* include: child's behavioral problems status (*p1acpbt*), parent daily report of a child's oppositional and aggressive behavior (*pdr1oar*), teacher report of a child's externalizing behavior (*trf1ext*), teacher report of a child's inattention (*trf1inn*), Woodcock-Johnson's summary measure of a child's academic intelligence (*wjr1slw*), child diagnoses of mental retardation (*diag_mr*), learning disability (*diag_ld*) and behavioral and emotional disturbance (*diag_beh*). The first five need variables were measured on interval scale, while the diagnoses variables were constructed as dummies.

The child's problem status (*p1acpb*) was derived from the standardized t-score of teachers' and parents' screen scores. The *pdr1oar* variable was measured as a tally over three separate days of whether 14 different oppositional and aggressive behaviors were displayed by the child. The *trf1ext* variable was measured as a t-score combination of delinquent and aggressive behavior syndromes on the teacher report form, which is the teacher version of CBCL. Likewise, the *trf1inn* was also measured as a t-score of child's inattention scale of the teacher report form. Higher values of these variables indicate worse child's behavior problems.

Missing values on the teacher report forms for externalizing and inattention problems were handled by substituting the sample mean of these variables for missing cases. An indicator variable (*trfdummy*) was then constructed (missing=1, not missing=0) and included in the estimated regression models. The t-test statistic of the coefficient for the missing data indicates whether or not the data collected with the teacher report forms were missing randomly.

Analytical Strategies

We used multivariate logistic regression models to examine the relative risks of placing children in the restrictive settings of special education and mental health services as opposed to the least-restrictive settings. A key advantage of this modeling approach is that it allows us to compare the risk or odds of placement in one setting as opposed to the alternative. Conceptually, multivariate logit models (MVLM) can be thought of as a specification of binary or dichotomous

logit models for comparing how often a target event of interest occurs ($y=1$) relative to occurrence of another event ($y=0$) when regressed on several independent variables or predictors (Long, 1997; Long & Freese, 2006; Hosmer & Lemeshow, 2000). Assuming that y is the dependent variable with two possible outcomes. If we let $\Pr(y=1/x)$ be the probability of observing outcome number one given x , we can then formally specify the MVLM as follows:

$$\ln \Omega(X) = \ln \left[\frac{\Pr(y = 1 | X)}{\Pr(y = 0 | X)} \right] = X\beta, \text{ where } \ln \Omega(X) \text{ is the log-odds of special education}$$

placement and mental health service use in the restrictive settings relative to the least-restrictive environment. X is a vector of predictors, and β is a vector of parameters to be estimated. Notice that the parameterization in the current model specification is in log-odds scale. It should be noted that multivariate logit model as specified above can also be stated compactly as follows:

$$P(y = 1) = \left[\frac{\exp(X\beta)}{1 + \exp(X\beta)} \right], \text{ where } P(y=1) \text{ is the probability of the target outcome.}$$

Empirically, we estimated the log-odds or the logit of special education placement in self-contained/separate classrooms versus regular classrooms as a function of predisposing, enabling and need predictors. Likewise, the effects of predisposing, enabling and need factors on children's placement in the inpatient versus outpatient settings were examined using the STATA's *logit* subroutine or procedure. The estimated coefficients show the independent effect of a given predictor on the log odds of a child's placement in the most restrictive setting relative to the least restrictive settings (Hosmer and Lemeshow, 2000; Long & Freese, 2005).

Results

Descriptive Statistics

Table 6.1 describes the characteristics of the study participants. 46% of the children are black, while the remaining 54% are white; 58% of the children are males. The mean parental socioeconomic status is in the low range, which is not surprising since the sampled children are from poor communities. Only 20% of the children reported presence of their biological fathers.

Children in the sample exhibit high a level of behavioral problems, with the mean t-score of the behavioral problem measure 56 . The mean score of parents’ report on child’s oppositional and aggressive behavior is 0.24 and while the mean score of teacher report of the child’s externalizing behavior is 61.

Table 6.1: Descriptive Statistics of Sample Variables (N=752)

Variable	N	Mean
black (black=1, white=0)	752	46%
male (male=1, female=0)	752	58%
p1bses (parent socioeconomic status)	752	25.67
biodad (biological dad in house=1, not in house=0)	627	20%
agefb (age of mother at first birth)	636	22.66
otheradlt (other adult present in the house=1, not present=0)	752	26%
children (number of siblings in the household)	752	2.78
p1acpbt (child behavior problem status)	749	55.87
pdrloar (parent daily report on child's oppositional and aggressive behavior)	749	0.24
trfl ext (teacher report of child's externalizing behavior)	648	61.12
trfl inn (teacher report of child's inattention)	648	0.67
wjr1slw (Woodcock John summary measure of child's intelligence)	751	12.85
diag_mr (child diagnosis of mental retardation, 0/1)	752	3%
diag_ld (child diagnosis of learning disability, 0/1)	752	18%
diag_beh (child diagnosis of emotional and behavioral disorder, 0/1)	752	7%
Site:		
Durham	195	26%
Nashville	179	24%
Pennsylvania	196	26%
Washington	182	24%
Mother's education:		
7-9 years of schooling	66	9%
10-11 years of schooling	135	18%
high school education only	352	48%
some college education	140	19%
college education	48	6%

Note: The mean is based on valid cases for all variables

The mean score of the teacher report on a child’s inattention problem is 0.67 on that measure’s scale. On the average, the sampled children appear to exhibit low level of academic intelligence as measured by Woodcock-Johnson Psycho-Education Battery-Revised. The largest special education category is learning disabled (18%), with those diagnosed with emotional and

behavioral disorders comprising 7% of the sample, and those with mental retardation comprising 3%.

Does Restrictiveness of Placement in Special Education and Mental Health Services Differ by Race and Ethnicity?

Table 6.2 summarizes the unadjusted odds ratios of children’s placement in special education and mental health services on the basis of their racial and ethnic affiliation. The risk of black children relative to white of being placed in self-contained classrooms versus regular classrooms is three times higher (OR=3.20, p<0.001). Similarly, the risk of black children receiving mental health services from the most restrictive inpatient setting as opposed to the least restrictive outpatient sector is about two times higher than the risk for the white children (OR=1.82, p<0.001).

Table 6.2: Summary of Bivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting --- Race-Only Predictor Model (N=752)

Self-Contained Special Education	OR	Std. Err.	Z	P
Black	3.20	0.29	12.94	0.00
Inpatient MHS				
Black	1.82	0.15	7.32	0.00

Note:

Self contained placement in special education is compared to regular classroom placement
 Inpatient mental health service setting is compared to outpatient setting
 OR is the odds ratio; Std. Err. is the standard error, z is the z-statistic; and P is the p value
 Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

Does Restrictiveness of Placement in Special Education and Mental Health Services Differ by Gender?

Table 6.3 contains the unadjusted data of children’s relative risk of placement in the restrictive settings of special education and mental health services on the basis of their gender. The relative risk of male children being placed in self-contained classrooms as opposed to regular classrooms is about two times higher than their female counterparts (OR=1.77, p<0.001). Similarly, the relative risk of male children receiving help from the restrictive mental health service sector is close to two times higher than the females (OR=1.69, p<0.001).

Table 6.3: Summary of Bivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting --- Sex-Only Predictor Model (N=752)

Self-Contained Special Education	OR	Std. Err.	Z	P
Male	1.77	0.18	5.71	0.00
Inpatient Mental Health Service				
Male	1.69	0.16	5.58	0.00

Note:

Self contained placement in special education is compared to regular classroom placement

Inpatient mental health service setting is compared to outpatient setting

OR is the odds ratio; Std. Err. is the standard error, z is the z-statistic; and P is the p value

Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

Relative Effect of Predisposing Factors on Restrictive Placement of Children in Special Education and Mental Health Services

Table 6.4 contains the data on the effect of predisposing factors on children’s placement in the restrictive settings of special education and mental health services. Gender, racial and ethnic disparities continue to persist holding other predisposing factors constant. While being black compared to white, and being male compared to female do increase the students’ relative risk of restrictive placement; living in Pennsylvania and Washington as opposed to living in Durham significantly reduce their relative risk of placement in restrictive special education setting.

As the lower panel of table 6.4 indicates, besides the race/ethnic variable, all other predisposing factors modeled are highly significant in predicting children’s restrictive placement in mental healthcare sector. The table shows that racial and ethnic disparity has become insignificant while gender disparity persists holding other predisposing factors constant. Interestingly, living in Nashville, Pennsylvania and Washington as opposed to Durham significantly decrease children’s risk of restrictive mental health placement.

Table 6.4: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Predisposing Factors (N=752)

Self-Contained SPED	OR	Std. Err.	z	P
<u>Predisposing Factors</u>				
Black	2.15	0.25	6.48	0.00
Male	1.49	0.16	3.80	0.00
Nash	1.02	0.11	0.18	0.86
Penn	0.52	0.09	-3.89	0.00
Wash	0.42	0.06	-6.31	0.00
<u>Inpatient MHS</u>				
<u>Predisposing Factors</u>				
Black	1.07	0.13	0.58	0.56
Male	1.70	0.17	5.39	0.00
Nash	0.53	0.06	-5.21	0.00
Penn	0.44	0.07	-5.28	0.00
Wash	0.18	0.03	-11.28	0.00

Note:

Self contained placement in special education is compared to regular classroom placement

Inpatient mental health service setting is compared to outpatient setting

OR is the odds ratio; Std. Err. is the standard error, z is the z-statistic; and P is the p value

Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

Relative Effect of Enabling Factors on Restrictive Placement of Children in Special Education and Mental Health Services

The data in Table 6.5 contains the effect of the enabling factors on children's placement in the restrictive settings of special education and mental health services as opposed to the least restrictive environment holding the effects of the predisposing covariates constant. The upper panel of the table contains the results for self-contained versus regular classroom special education placements, while the lower panel contains the results for inpatient versus outpatient mental health placements. Out of the six enabling factors analyzed, only the number of children in the household (children) appears insignificant in predicting restrictive placement in special education. Nevertheless, since the relative risk ratios of parents' SES (OR=0.99, p<0.001) and age of mother (agefb: OR=0.98, p=.10) are approximately equal to 1.00, these are not substantively influential.

Table 6.5: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Enabling Factors (N=752)

Self-Contained SPED	OR	Std. Err.	Z	P
<u>Disposing Factors</u>				
Black	1.90	0.27	4.51	0.00
Male	1.47	0.17	3.28	0.00
Nashville	0.94	0.12	-0.46	0.64
Pennsylvania	0.58	0.11	-2.85	0.00
Washington	0.40	0.07	-5.60	0.00
<u>Enabling Factors</u>				
Mothered	1.37	0.20	2.20	0.03
P1bses	0.99	0.00	-3.06	0.00
Biodad	0.68	0.11	-2.33	0.02
Agefb	0.98	0.01	-1.67	0.10
Otheradlt	1.31	0.14	2.58	0.01
Children	1.04	0.04	1.09	0.28
<u>Inpatient MHS</u>				
<u>Disposing Factors</u>				
Black	0.81	0.12	-1.41	0.16
Male	1.80	0.21	5.01	0.00
Nashville	0.47	0.07	-5.13	0.00
Pennsylvania	0.58	0.11	-2.87	0.00
Washington	0.14	0.03	-9.37	0.00
<u>Enabling Factors</u>				
Mothered	2.33	0.35	5.68	0.00
P1bses	0.97	0.01	-6.69	0.00
Biodad	0.65	0.11	-2.59	0.01
Agefb	0.99	0.01	-0.58	0.56
Otheradlt	1.00	0.12	0.00	1.00
Children	1.03	0.04	0.69	0.49

Note:

Self contained placement in special education is compared to regular classroom placement

Inpatient mental health service setting is compared to outpatient setting

OR is the odds ratio; Std. Err. is the standard error, z is the z-statistic; and P is the p value

Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

The relative risk of placing children in a restrictive special education setting as opposed to the least restrictive setting is higher for those children whose mothers have higher level of education (OR=1.37, p<0.001) and come from households with other adults present (OR=1.31, p=0.01). The presence of biological father decreases the relative risk of children's placement in

self-contained classrooms (OR=0.68, p=0.02). In other words, children whose biological fathers are present have about 32% lower relative risk of placement in self-contained classrooms. Overall, the relative risk of black children receiving restrictive placement in self-contained classrooms as opposed to regular classrooms remains highly significant compared to white children (OR=1.90, p<0.001).

Three enabling factors (mothers' education, parents SES, and presence of biological father) appear statistically significant in predicting placement in the inpatient versus outpatient settings. Since the odds ratio of parents' SES is approximately equal to one (OR=0.97, p<0.001), this does not appear to be an important factor in this predominantly disadvantaged sample. Overall, racial and ethnic disparity in restrictive inpatient placement versus least restrictive outpatient setting is insignificant after controlling for predisposing and enabling factors.

Relative Effect of Need Factors on Restrictive Placement of Children in Special Education and Mental Health Services

Table 6.6 shows the effect of need factors on children's placement in restrictive settings of special education and mental health services as opposed to the least-restrictive settings holding the effects of the predisposing and enabling variables constant. The upper panel of the table contains the result for self-contained special education placement versus the regular classroom placement, while the lower panel contains the result for the restrictive inpatient mental health services placement versus the least restrictive outpatient placement. Teachers' report of a child's inattention problem (trflinn) and diagnoses of mental retardation (diag_mr), learning disabilities (diag_ld) and emotional and behavioral problems (diag_beh) are significant predictors of a child's relative odds of placement in self-contained classrooms for special education services.

Table 6.6: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services Setting, Controlling for Need Factors (N=752)

Self-Contained SPED	OR	Std. Err.	Z	P
<u>Predisposing factors</u>				
Black	1.48	0.23	2.49	0.01
Male	1.33	0.17	2.15	0.03
Nashville	1.89	0.27	4.38	0.00
Pennsylvania	0.55	0.12	-2.80	0.01
Washington	0.62	0.12	-2.56	0.01
<u>Enabling Factors</u>				
Mothered	1.40	0.22	2.08	0.04
Plbses	0.98	0.01	-3.06	0.00
Biodad	0.79	0.14	-1.31	0.19
Agefb	1.00	0.01	-0.19	0.85
Otheradlt	1.46	0.17	3.31	0.00
Children	1.04	0.04	0.95	0.34
<u>Need Factors</u>				
p1acpbt	0.99	0.01	-1.16	0.25
pdrloar	0.62	0.20	-1.45	0.15
trfl ext	1.01	0.01	1.61	0.11
trfl inn	1.62	0.21	3.77	0.00
wjr1slw	1.00	0.01	0.19	0.85
diag_mr	1.53	0.30	2.16	0.03
diag-ld	0.36	0.05	-7.24	0.00
diag_beh	3.33	0.50	8.07	0.00
Trfdummy	0.86	0.16	-0.77	0.44
<u>Inpatient MHS</u>				
<u>Predisposing Factors</u>				
Black	0.86	0.16	-0.79	0.43
Male	2.96	0.47	6.84	0.00
Nashville	0.41	0.07	-5.05	0.00
Pennsylvania	1.00	0.24	0.01	1.00
Washington	0.12	0.03	-7.65	0.00
<u>Enabling Factors</u>				
Mothered	2.82	0.51	5.72	0.00
Plbses	0.97	0.01	-5.37	0.00
Biodad	0.63	0.13	-2.25	0.02
Agefb	0.99	0.01	-0.49	0.63
Otheradlt	1.26	0.18	1.62	0.11
Children	0.99	0.05	-0.30	0.76

Need Factors

p1acpbt	0.96	0.01	-5.55	0.00
pdr1oar	3.53	1.09	4.09	0.00
trfl ext	1.00	0.01	-0.16	0.87
trfl inn	1.66	0.24	3.51	0.00
wjr1slw	0.93	0.02	-4.41	0.00
diag_mr	1.12	0.28	0.46	0.64
diag-ld	1.41	0.21	2.26	0.02
diag_beh	1.04	0.15	0.26	0.79
trfdummy	0.00	0.00	-3.48	0.00

Note:

Self contained placement in special education is compared to regular classroom placement

Inpatient mental health service setting is compared to outpatient setting

OR is the odds ratio; Std. Err. is the standard error, z is the z-statistic; and P is the p value

Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

Greater inattention problems increases the relative risk of placement in the restrictive setting (OR=1.62, $p<0.001$). Similarly, children having mental retardation (OR=1.53, $p=0.03$) and emotional and behavioral problem (OR=3.33, $p<0.001$) diagnoses increase the relative risks of restrictive special education placement.

Children with learning disabilities are significantly less likely to be placed in self-contained classrooms (OR=0.36, $p<0.001$). Overall, racial and ethnic disparity in restrictive placement persists even after controlling for the children's predisposing and enabling factors. Students with higher level of intelligence (wjr1slw) are relatively less likely to be placed in the restrictive inpatient mental health services setting as opposed to the outpatient setting (OR=0.93, $p<0.001$). Students exhibiting greater oppositional and aggressive behavior have a significant greater risk of experiencing inpatient admission (OR=3.53, $p<0.001$).

Students diagnosed with mental retardation and emotional and behavioral problems display insignificant differences in placement, while those with learning disabilities show a highly significant risk of inpatient placement. The child's t-score measure of problem status (p1acpbt) equally predicts placement in either the inpatient or outpatient settings (OR=.96, $p<0.001$). Overall, the result of children's restrictive inpatient placement fails to provide support

for racial disparities between black and white children in mental health treatment from inpatient versus outpatient settings after controlling for differences in children's predisposing, enabling and need factors.

Racial and Ethnic Differences in Predictors of Children's Restrictive Placement in Special Education and Mental Health Services

Table 6.7 summarizes the result of the analysis that examined the question of whether predictors of children's placement in the restrictive settings of special education and mental health versus the least-restrictive vary by race and ethnicity of the children. The left hand side of the upper panel of the table contains the result for self-contained special education placement versus regular classroom placement for the black, while the right hand side contains the result for the white children. Similarly, the left hand side of the lower panel of the table contains the result for the inpatient mental health service placement versus the outpatient placement for the black, while the right hand side contains the result for the white children. Black children in Nashville display a higher relative risk of separate classroom placement in special education compared to those in Durham (OR=1.98, $p<0.001$). Conversely, those in Pennsylvania display lower relative risk of restrictive placement compared to Durham residents (OR=0.08, $p<0.001$). For white children, those in Washington have relatively lower risk of restrictive placement compared to Durham residents (OR=0.31, $p=0.02$). Being male raises the risk of white children receiving education services in separate or self-contained classrooms compared to the females (OR=1.89, $p=0.01$).

Three enabling factors are significantly related with black children's placement in restrictive setting for their special education needs. These are mothers' level of education (mothered) and presence of other adults in the house (otheradlt) which independently increase blacks' relative risk of restrictive placement. For white children, only the presence of biological father (biodad) appears to be a significant predictor of restrictive placement in special education among the enabling factors controlling for children's disposing and need factors.

Table 6.7: Summary of Multivariate Logistic Regression Analysis of Children's Placement in Different Categories of Special Education and Mental Health Services by Race --- Complete Model (N=752)

Self-contained	Black				White			
	OR	SE	Z	P	OR	SE	Z	P
<u>Predisposing Factors</u>								
Male	1.13	0.20	0.68	0.50	1.89	0.43	2.78	0.01
Nashville	1.98	0.33	4.15	0.00	1.44	0.69	0.76	0.45
Pennsylvania	0.08	0.06	-3.39	0.00	0.51	0.24	-1.43	0.15
Washington	0.85	0.20	-0.67	0.50	0.31	0.16	-2.31	0.02
<u>Enabling Factors</u>								
Mothered	1.65	0.34	2.42	0.02	1.31	0.43	0.83	0.41
Plbses	0.98	0.01	-3.16	0.00	0.99	0.01	-1.28	0.20
Biodad	1.17	0.34	0.53	0.59	0.65	0.16	-1.73	0.08
Agefb	1.02	0.02	1.00	0.32	0.97	0.02	-1.34	0.18
Otheradlt	1.53	0.21	3.05	0.00	1.26	0.30	0.97	0.33
Children	1.05	0.05	1.01	0.31	1.05	0.08	0.66	0.51
<u>Need Factors</u>								
placpbt	1.01	0.01	1.18	0.24	0.97	0.01	-3.10	0.00
pdrloar	0.55	0.23	-1.42	0.16	2.57	1.59	1.52	0.13
trfl ext	1.01	0.01	1.55	0.12	1.01	0.01	0.57	0.57
trfl inn	1.60	0.26	2.84	0.01	1.78	0.41	2.52	0.01
wjrslw	1.01	0.02	0.60	0.55	0.97	0.03	-1.19	0.24
Diag_mr	1.62	0.39	1.98	0.05	2.74	1.09	2.53	0.01
Diag-ld	0.40	0.08	-4.88	0.00	0.28	0.07	-5.36	0.00
Diag_beh	4.44	0.86	7.71	0.00	2.53	0.68	3.44	0.00
Trfdummy	0.79	0.18	-1.01	0.31	1.74	0.60	1.60	0.11
<u>Inpatient MHS</u>								
<u>Predisposing Factors</u>								
Male	3.30	0.75	5.23	0.00	3.02	0.97	3.43	0.00
Nashville	0.31	0.06	-5.60	0.00	0.57	0.57	-0.56	0.58
Pennsylvania	na	na	na	na	1.40	1.28	0.37	0.71
Washington	0.23	0.08	-4.29	0.00	0.07	0.08	-2.54	0.01
<u>Enabling Factors</u>								
Mothered	1.57	0.43	1.63	0.10	4.91	2.06	3.79	0.00
Plbses	0.96	0.01	-3.88	0.00	0.98	0.01	-1.52	0.13
Biodad	ns	Ns	ns	ns	1.08	0.28	0.29	0.77
Agefb	0.97	0.02	-1.56	0.12	1.03	0.02	1.12	0.26
Otheradlt	0.84	0.14	-1.02	0.31	3.63	1.67	2.80	0.01
Children	0.99	0.07	-0.11	0.91	1.14	0.15	1.03	0.30
<u>Need Factors</u>								
placpbt	0.98	0.01	-2.15	0.03	0.93	0.01	-4.95	0.00
pdrloar	1.43	0.62	0.83	0.41	109.36	85.85	5.98	0.00
trfl ext	0.96	0.01	-3.56	0.00	1.02	0.01	1.31	0.19
trfl inn	1.73	0.35	2.71	0.01	2.28	0.69	2.73	0.01
wjrslw	0.98	0.02	-0.94	0.35	0.88	0.03	-3.54	0.00
Diag_mr	0.92	0.27	-0.28	0.78	1.40	1.11	0.42	0.67
Diag-ld	1.02	0.23	0.08	0.94	1.32	0.35	1.02	0.31

Diag_beh	0.93	0.18	-0.37	0.71	1.64	0.45	1.81	0.07
trfdummy	0.00	0.00	-2.75	0.01	0.00	0.00	-2.66	0.01

Note:

Self contained placement in special education is compared to regular classroom placement

Inpatient mental health service setting is compared to outpatient setting

OR is the odds ratio; Std. Err. Is the standard error, z is the z-statistic; and P is the p value

Bold-face figures are statistically significant at 1%, 5% or 10% respectively.

Among the need factors, four covariates are significant predictors of restrictiveness in blacks' special education placement. The teacher's report on a child's inattention problems (trflinn: OR=1.60, p=0.01) and disability diagnoses involving mental retardation (diag_mr: OR=1.62, p=0.05) and emotional and behavioral disorder (diag_beh: OR=4.44, p<0.001) are positively related with restrictive placement. A black child that has been diagnosed with learning disability (diag_ld) has a significantly lower relative risk of restrictive placement in special education services (OR=0.40, p<0.001). Similarly, the teacher's report of a white child's inattention problems (trflinn: OR=1.78, p=0.01); and diagnosis of mental retardation (diag_mr: OR=2.74, p=0.01) and emotional and behavioral disorder (diag_beh: OR=2.53, p<=0.001) significantly increase the relative risk of placement in self-contained special education as opposed to inclusive regular classroom. A white student who is diagnosed with learning disability (diag_ld) has a significant lower risk of restrictive placement in special education (OR=0.28, p<0.001). A one-unit increase in a white child's t-score of problem status (p1acpbt) leads to an equal risk of placement in restrictive or inclusive settings of special education (OR=0.97, p<0.001).

In the context of restrictive inpatient versus the least-restrictive outpatient mental healthcare placement, being black or white male as opposed to female significantly increases the relative odds of restrictive inpatient placement by a factor of three. Black children resident in Nashville and Washington as opposed to those living in Durham display significantly lower odds of inpatient placement. Likewise, white children resident in Washington are relatively less likely to be placed in inpatient mental healthcare setting compared to those in Durham.

Only few enabling factors significantly predict both black and children's placement in inpatient mental healthcare setting. Higher level of maternal educational level as opposed to lower level un-intuitively increases both blacks' and whites' relative risk of inpatient placement. Similarly, increased number of adults in the house is also associated with an increased risk of inpatient mental health placement among white children.

An increase in the teacher's score of a child's inattention problem significantly increases the relative odds of both black and white children's placement in inpatient settings. Among the need factors examined, parents report of children's oppositional and aggressive problems has the highest relative risk of increasing restrictive inpatient placement for the sample of white children investigated. An increase in the t-score of children's behavioral problem status displays an equal relative risk of restrictive placement for both black and white in mental health sector. A one-unit increase in white children's measure of academic performance lowers their relative risk of inpatient placement by 20%. White children who are diagnosed with emotional and behavioral problems are most likely to be placed in an inpatient mental healthcare setting compared to the outpatient sector.

Overall, among the predisposing and enabling variables analyzed, there are no significant predictors that are common to both black and white children's restrictive special education placement decisions. Interestingly, teacher's reports of children's inattention problems and diagnoses of mental retardation, learning disability and emotional/behavioral problems are common significant predictors of black and white children's restrictive special education placement decisions. In the context of inpatient placement decisions, two predisposing variables that are common to the two races include gender (male) and residence status in Washington. Similarly, maternal education is a significant enabling factor that is common to both black and white children's inpatient placement decisions. The teacher's report of a child's inattention problem is also a common predictor of inpatient placement for both races. In fact, the predictive

significance of this need variable cuts across the two different restrictive service placement decisions and races examined with this sample.

Discussion and Policy Implications

The results of this study are consistent with the hypothesis that black children are more likely than white children to be placed in the restrictive settings of special education and mental health services. Disproportionate placement of black children in self-contained classrooms as opposed to inclusive special education settings is at odds with the least-restrictive instructional environment requirement of federal IDEA legislation (Palmaffy, 2001; Donovan & Cross, 2002). In addition, such placement alternative is likely to segregate them from their non-disabled peers thereby preventing them from reaping the benefits associated with inclusiveness. From a policy perspective, special education administrators and children's caretakers need to work together in the design and implementation of children's Individualized Educational Plan (IEP), and the type of placement that may be needed to achieve both the short- and long-term goals and objectives of the IEP. Such collaborative effort may mitigate biased representation and placement of minority children in segregated settings of special education (Hosp & Reschly, 2002).

Regarding the higher relative risk of representing black children in the restrictive inpatient mental health service settings as opposed to the least restrictive outpatient settings, the question that needs to be addressed is whether there is a correlation between race/ethnicity, type and severity of mental health problems on one hand, and placement types or settings on the other hand. In other words, it needs to be known whether black children that received inpatient treatment actually need such placement for their mental health treatment. The data used in the present analysis cannot completely address this issue. Nevertheless, in terms of policy design, mental health service providers and children's caretakers must collaborate to ensure that the treatment setting that a child is placed is the level that is clinically required to ensure effective and efficient treatment outcomes for the child.

The results from the sex-only models provide support for the hypothesis that male children are more likely than the females to be placed in restrictive settings of special education and mental health services. While in these two service sectors, boys exhibit a higher relative risk of restrictive placement compared to the girls. Even though it has been documented that boys display a higher level of externalizing behavior than the girls and as such experience disproportional referral and representation in special education (Koot & Verhulst, 1992; Hosp & Reschly, 2002; Osher et al, 2002; Fierros & Conroy, 2002), the present analysis was not structured to show the correlation between gender-specific behavioral problems and intensity of placement. Hence, the question that needs further analysis is: what are the factors that explain gender disparities in children's restrictive placement in these service sectors? In other words, it needs to be understood whether gender-specific behavioral problems or factor are associated with the type of placement children receive. However, it is imperative for providers of special education and mental health services to work mutually and collaboratively with children's caretakers to ensure that children's are placed at the relevant level for their needs without recourse to gender biases.

The results from the "full" model provide support for the conjecture that children with higher level of service needs are more likely to be placed in the most restrictive settings. For example, service needs as represented by the teacher's report of a child's inattention problem increases a child's relative likelihood of restrictive placement in both special education and mental health services per a unit increase in the scale of that measure. This result is consistent with the hypothesis that children with higher level of needs are more likely to be placed in restrictive settings. This finding is not surprising because it is expected that children who display significant high level of need for a particular type of services may need to be placed in restrictive settings for intensive administration of individualized treatment protocols.

In order to mitigate potential misplacement of children in special education and mental health services, the need for early childhood screenings to uncover psychosocial and behavioral

problems cannot be overemphasized. As a matter of policy, parents must be educated and encouraged to periodically have their children screened for psychosocial and behavioral problems so that effective treatment and placement decisions can be made. The design and frequency of screening and evaluation programs needs to be worked out collaboratively between relevant service provider agencies involved with services delivery to disabled children.

The present study lends support to the hypothesis that predictors of restrictive placement differs by race/ethnicity. It must be noted, however, that there are also a few predictor variables that are common to both black and white children that also cut across the two service sectors analyzed. The finding that predictor variables differ by race/ethnicity is likely to have its meaning in the socio-emotional/behavioral and cultural differences that characterize the background of the sampled children (Artiles, Aguirre-Munoz, & Abedi, 1998). The implication of this result may be a need for ethnic-specific and appropriate special education and mental health service delivery systems for disabled minority children (Yeh, Takeuchi, & Sue, 1994). Such parallel approach to service delivery to minority groups, particular to Asian-Americans in the context of mental health, has achieved some measure of effectiveness (Yeh, Takeuchi, & Sue, 1994).

Summary and Conclusion

The main objectives of this study were two fold: 1) to evaluate factors that predict children's placement in restrictive settings of special education and mental health services; and 2) to examine whether restrictive placement predictors in special education and mental health services differ by race/ethnicity. Using Fast Track dataset, multivariate logistic regression models were estimated to test the study's hypotheses. The hypotheses of racial and gender differences in children's restrictive placement were not rejected with the unadjusted race- and sex-only models. Interestingly, gender disparities in restrictive placement of children in both special education and mental health services persisted after "fully" adjusting the models with predisposing, enabling and need factors. Racial and ethnic disparity on the other hand, persists in the full model in the context of restrictive special education placement but remains insignificant in the context of

inpatient mental health service placement; suggesting that other variables not fully captured in the present study may yet underlie the observed differences in black and white children's level of placement in the two service sectors examined. Furthermore, the variables that predict children's placement in the restrictive settings of special education and mental health vary by race and ethnicity.

The present study contributes meaningfully to current literature by being the first known study that simultaneously examined the correlates of children's relative risk of receiving placement in restricting settings of special education and mental health services. The understanding that children who are placed at certain levels in special education programs are more likely to have access to and use mental health services demands that this type of empirical analysis involving determinants of inter-agency service use and placement of children is warranted (Farmer et al. 2005, Witt, Kasper, & Riley, 2003). The study, through the technique of multivariate logistic regressions has been able to identify independent variables that are service- and race-specific in predicting children's placement in most restrictive versus least restrictive settings of special education and mental healthcare sectors.

Several study limitations deserve mention. There are other factors that can affect the decisions to place children, particular minority children in different placement categories of special education and mental health services that are presently beyond the scope of this paper. For instance, stereotyping, biased referrals, inadequate social support on the part of classroom teachers, class size, poor classroom management by teaching personnel, cultural differences, and weak parent advocacy have been theorized as potential predictors of special education placement (Osher et al, 2004, Donovan & Cross, 2002). It will be useful to test these factors in future studies to see if they are significant predictors of racial/ethnic disparity in special education placement. Similarly, bias, prejudice, stereotyping and poor cultural competencies on the part of healthcare providers, lack of insurance and poverty have been identified as leading causes of

disparities in use of mental health services. Future restrictive mental health service placement that can incorporate these factors into analysis may be useful to policymakers (IOM, 2002).

The present study has broadly defined restrictiveness to include self-contained classroom versus regular classroom, and inpatient versus outpatient settings. It may be useful to disaggregate inpatient and outpatient into their micro sub-sectors for further analyses. Likewise, future research in restrictive special education placement needs to consider other placement levels such as resource rooms and separate facilities. In addition, it may be useful to analyze placement intensities by disability conditions for special education and mental/behavioral problems that lead to seeking help from mental healthcare system. In sum, future research needs to address questions such as: Does length or duration of service use affect placement intensities? Does type of service used affect restrictive placement? Does age at initial use of service affect the type of placement a child receives? What are the factors that predict gender disparities in restrictive special education and mental health service use placement?

CHAPTER SEVEN

SUMMARY AND CONCLUSION

A common theme motivating the empirical research in this dissertation concerns race/ethnic disparities in children's use of special education and mental health services in the US (Losen & Orfield, 2002; Donovan & Cross, 2002; USDHHS, 1999; NFCHM, 2003). Previous research has shown that black and other minority children are overrepresented in special education programs (Parrish, 2002; Osher et al., 2004) and are more likely than white children to end up in restrictive placement settings (Fierros & Conroy, 2002; Coutinho & Oswald, 1998b), a situation that has been described as "double jeopardy" (Fierros and Conroy, 2002). Conversely, minority children are disproportionately underserved in mental health settings (Burns et al., 2004; Zahner et al., 1992; Kataoka et al., 2002). Among children receiving mental health services, black children are more likely than white to be placed in restrictive placements such as therapeutic foster care, residential treatment facilities, and inpatient hospitalization (Tuma, 1989; Sheppard & Benjamin-Coleman, 2001). The processes that lead to these disparities in special education and mental health services use among minority children are not well understood (Zhang & Katsiyannis, 2002; Coutinho & Oswald, 1998a & 1998b; Sheppard & Benjamin-Coleman, 2001), and the goal of this dissertation was to study these processes in depth with a more detailed dataset than has generally been used.

Most prior studies involving children's involvement in special education and mental health services use have relied on cross-sectional data (Donovan & Cross, 2002; Losen & Orfield, 2002). As a result, research on the timing of children's use of mental health and special education services is lacking (Oswald et al., 2003; Weller et al., 2003; Foster, 1998 & 2000), even though it is important to examine how service use pattern changes over time in order to design effective and efficient services delivery and intervention strategies and policies. This dissertation research examined the intersection of race and ethnicity in children's placement and use of special

education and mental health services by addressing the following questions: 1) What are the dynamics of black and white children's use of special education services? (Chapter Four); 2) What factors explain racial disparities in children's use of special education and mental health services? (Chapter Five); and 3) What factors explain racial disparities in the restrictive placement of children in special education and mental health services as opposed to the least restrictive settings? (Chapter Six).

In addressing these research questions, data from the subsample of non-intervention participants in the Fast Track Project were analyzed. The Fast Track Project is a longitudinal study of children at risk for emotional and/or behavioral problems conducted in four locations: Durham, North Carolina; Nashville, Tennessee; rural Pennsylvania; and Seattle, Washington (CPPRG, 1992). The conceptual framework for this research was based in the behavioral model of service utilization (Andersen, 1968 & 1995). This model and its extensions posit that access to and use of services is dependent on variables in three categories: predisposing, enabling, and need factors (Andersen & Newman, 1973; Grossman, 1972; Solorio et al., 2006; Phillips et al., 1998). Empirically, data analyses included event history techniques and multivariate logistic regression methods.

Results from distributional analyses of children's use of special education services by race/ethnicity, gender and location confirm that racial and ethnic differences exist in the sample of high-risk children investigated. In addition, the results from both the Cox and multivariate regression models tend to support the findings from the distributional survival analyses that differences in use of services differ by race and ethnicity, gender and location. Nevertheless, the observed racial/ethnic disparities in children's use of special education and mental health services were not found to be a global phenomenon! While unadjusted analyses of children's use of special education and mental health services including all the children in the sample without regard to study site show significant racial/ethnic disparities, as control variables are introduced for

differences in children's predisposing, enabling and need factors, the observed differences attenuated or diminished in some sites and persisted in others.

Race/ethnic differences were found in the timing of program participation. Specifically, black children exhibit higher probabilities of participation in special education programs between 1st and 5th grades, while the probabilities of white children using special education services are above those of blacks starting in grade 5 through the 8th grade. The implication here is that the shape of the hazard of children's use of special education services varies by race and ethnicity and changes over the years. Likewise, the probabilities of exiting special education also differ by race and ethnicity. Interestingly, white children display higher probabilities of exiting special education relative to black children once they have entered. Surprisingly, unlike the alternating hazard functions of children's use of special education services on the basis of race/ethnicity, the estimated hazard function of white children's exit from special education remains above that of the black children throughout the periods under investigation. The proverbial adage of "early to bed, early to rise" fails to hold in this situation. It is expected that children that entered special education earlier should also exhibit relatively higher risk of exiting. But this is not the case here. The question then is why is it that black children enter special education in the early grades and yet display higher risk of remaining in the program compared to white children? Similarly, while male children are more likely than their female counterparts to enter special education, female children are more likely to exit from the program. These findings call for future studies that must attempt to unravel the lack of correspondence between the probabilities of entry- and exit from special education services on the basis of race/ethnicity and gender. In addition, future studies need to assess factors that are likely to predict racial/ethnic and gender disparities in children's entry- and exit from special education on the basis of geographic location.

Like the special education sector, children's use of mental health services varies by race/ethnicity, gender and geographic location. Overall, black children were found to exhibit decreased marginal risk of using any mental health services compared to white children. This

finding is in agreement with other studies that have shown that minority children, particularly black children are less likely to have access to and use mental health services among those clinically proved to be in need of mental healthcare (Kataoka, Zhang, & Wells, 2002). It is noteworthy, however, that the observed racial/ethnic differences in children's use of mental health services varied by geographic location.

Besides the question of overrepresentation of minority children in special education programs (Losen & Orfield, 2002), and their under-representation in mental healthcare system (Kataoka et al., 2002), it has been reported that once these group of children enter these service systems, they face what I call "double troubles". This is a situation whereby minority children, especially black children are supposedly overrepresented in certain categories of special education and are underserved in mental healthcare, and are more likely than white children to be placed in restrictive settings of these service sectors. Overall, results from unadjusted models of restrictive placement show that black children are more likely than white children to be placed in the restrictive settings of special education and mental health services as opposed to the least restrictive settings. However, as controls were added to restrictive placement models for differences in children's predisposing, enabling and need factors, the effect of race/ethnicity attenuated in the case of mental health services, but persisted for special education placement.

While some variables that predict children's use of special education and mental health services and their placement in the restrictive settings of those service sectors were found to be different for black and white children, others were similar. Overall, being male increased both black and white children's hazards of using mental health services. Two enabling factors, teacher report of inattention and measure of academic ability, were common predictors for both black and white students' use of special education services. Likewise, parent daily report of oppositional and aggressive problems and teacher report of externalizing behavior are the only two common predictors that significantly affect the hazards of black and white children's use of mental health services.

Among the predisposing and enabling variables analyzed, there are no significant predictors that are common to both black and white children's restrictive special education placement decisions. Interestingly, need factors such as teacher's reports of children's inattention problems and diagnoses of mental retardation, learning disability and emotional/behavioral problems are common significant predictors of black and white children's restrictive special education placement decisions. In the context of inpatient mental health treatment decisions, two predisposing variables that are common to the two races include gender (male) and residence status in Washington. Similarly, maternal education is a significant enabling factor that is common to both black and white children's inpatient placement decisions. The teacher's report of a child's inattention problem is also a common predictor of inpatient placement for both races. In fact, the predictive significance of this need variable cut across the two different restrictive service placement decisions and races examined with this sample.

In sum, racial and ethnic disparities exist in children's use of special education and mental health services and their placement in restrictive settings. Furthermore, differences in service use and placement vary by gender and geographic location. Likewise, variables that predict service use and placement vary by race and ethnicity. The consistency of these findings suggests that children's special education and mental health service delivery systems should be examined so as to be as culturally competent as possible. In other words, the goal should be service delivery systems that "respect" differences in children's cultural and social background.

Overall, we suggest that the different tiers of government should initiate specific social and public policies such as the following to address the observed inequalities in children's placement and use of special education and mental health services among the high-risk sample investigated. The suggested policies and programs are based on our findings as supported by prior research (Alegria, Perez, & Williams, 2003; Frohlich, Ross, & Richmond, 2006) that social factors (race/ethnicity, SES, geographic location, & gender) are significant predictors of children's use of special education and mental health services. In addition, our findings show that

children's placement in restrictive settings of special education and mental health services is significantly determined by social factors. Consequently, we suggest that:

- 1) Government should initiate and faithfully implement generous mental health insurance programs specifically designed for minority children. Such insurance schemes are more likely to effectively address service access bottlenecks that are the result of child poverty or lack of adequate financial or economic power of parents to access special education and mental health services for their children.
- 2) Address the broad cultural, social and economic processes that generate and perpetuate racial and ethnic differences in children's placement and use of these services. For example, government can initiate and implement housing and employment policy and programs that recognize elimination of discrimination and biases against minority groups as a fundamental priority.
- 3) Collaboration between minority families with school-age children or children's caregivers and relevant children's service providers and administrators on level of placements and intensities of service use must be emphasized as a matter of policy.
- 4) Government should develop culturally-competent and racial/ethnic-specific special education and mental health services programs for minority groups.
- 5) Special education and mental health service administrators and providers should embark on vigorous educational programs to help parents to be attentive to the special education and mental health services needs of their children, both male and female, and develop gender-friendly special education and mental health services programs.
- 6) Parents of minority children must be empowered socially and culturally to enable them to fully participate in decision-making process concerning placement and intensity of service use by their children.

- 7) National policies and programs aimed at reducing children's special education and mental health service use inequalities must reflect regional differences in racial/ethnic composition and local resource availability.

Some of the limitations of the study should be mentioned. The present study has only considered black and white children in analysis, yet there are other minority groups in the population that deserve attention. The sample used in analysis includes high-risk children, with the implication that generalization of the findings to the general population needs to be undertaken with caution. There are several other factors that can affect the decisions to place children, particular minority children in different placement categories of special education and mental health services that are presently beyond the scope of this paper. For instance, stereotyping, biased referrals, inadequate social support on the part of classroom teachers, class size, poor classroom management by teaching personnel, cultural differences, and weak parent advocacy have been theorized as potential predictors of special education placement (Osher et al, 2004; Donovan & Cross, 2002). Similarly, bias, prejudice, stereotyping and poor cultural competencies on the part of healthcare providers, lack of insurance and poverty have been identified as leading causes of disparities in use of mental health services. Even though this study has identified variables that significantly predict children's placement and use of special education and mental health services, yet the linkage or relationship between the two service sectors was not investigated. It will be useful for future study to empirically examine the linkage between the two sectors.

The present study has broadly defined restrictiveness to include self-contained classroom versus regular classroom, and inpatient versus outpatient settings. It may be useful to disaggregate inpatient and outpatient into their micro sub-sectors for further analyses. Likewise, future research in restrictive special education placement needs to consider other placement levels such as resource rooms and separate facilities. In addition, it may be useful to analyze placement intensities by disability conditions for special education and mental/behavioral problems that lead

to seeking help from mental healthcare system. Despite these limitations, this research adds to current literature on children's placement and use of special education and mental health services by identifying factors that predict service placement and use of services by high-risk black and white children. However, opportunities for further research in this area of inquiry exist. We suggest that future research should specifically attempt to address the following:

- 1) Consider other minority and racial groups in future studies.
- 2) Include children's poverty and insurance status, provider-level and system-level predictors in all future data analyses.
- 3) Extend restrictive placement analysis to include other levels of placement types.
- 4) Examine entry into special education and mental health services under the methodological framework of competing risk (for what problems/diagnoses do children enter into these services?).
- 5) Examine children's exit from special education and mental health services under the methodological framework of competing risk (for what reasons did children exit from these services?).
- 6) Undertake service use and placement effectiveness studies --- do children in special education perform better in terms of academic, social and behavioral problems remediation relative to non-special education children? Likewise, do children who use mental health services perform better than those who did not?
- 7) Empirically examine the linkage between special education placement and children's use of mental health services - -are children in special education programs more likely to use any mental health, inpatient and outpatient mental health services relative to those who are not?

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EDUCATION

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PUBLICATIONS

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- Frechette, Darren, L. and **Sule Ochai**, and Jonathan Tuthill. (2002). "Agricultural Trade Options." *Farm Economics*, Cooperative Extension, College of Agricultural Science, Penn State University, State College, Issue #1.

SELECTED PRESENTATIONS

- Ochai, S. (2007). "Racial and Ethnic Disparities in Children's Restrictive Placement and Their Use of Special Education and Mental Health Services in the U.S." Paper Presented at a Job-Talk, African Population and Health Research Center (APHRC), Nairobi, Kenya, June 5.
- Ochai, S. (2005). "An Empirical Investigation of Racial and Ethnic Differences in Access to Health Care Services Using MEPS Dataset." Paper Presented as a Requirement for Health Policy and Administration 528 (Health Data Analysis, Spring 2005), The Pennsylvania State University, State College, PA.
- Ochai**, Sule, Jamison Conley, & Frank Gross. (2005). "HIV/AIDS as a Risk for Non-Hodgkin's Lymphoma: Management and Policy Strategies." Paper Presented as a Requirement for Health Policy and Administration 540 (Epidemiologic Research Methods, Spring 2005), The Pennsylvania State University, State College, PA.