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By

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**Predicting Out-of-Home Placements of Children and
Adolescents with Serious Emotional Disturbance (SED)**

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**Predicting Out-of-Home Placements of Children and
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by

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Dedication

To my daughter, Hannah, and wife, Junyoung,
for their love and patience

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**Predicting Out-of-Home Placements of Children and
Adolescents with Serious Emotional Disturbance (SED)**

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The purpose of the present study was to examine a set of indicators and factors to predict future out-of-home placements for children and adolescents with serious emotional disturbances (SED). Using characteristics of children and families at intake, this study predicted future out-of-home placements after participation in the Children's Partnership, a systems of care program funded by the Center for Mental Health Services (CMHS) that serves children and adolescents with SED and their families in Travis County, Texas.

A series of hierarchical logistic regression analyses were conducted to evaluate both individual predictors and conceptual models. Contrary to expectation, descriptive indicators (diagnostic information and risk factors) and protective indicators (the BERS and the FAD) were not statistically significant predictors of future out-of-home placements. Only two pathological indicators, as a set, showed a

significant contribution to predicting future out-of-home placements. The CAFAS, which is measuring functional impairment of children with SED, demonstrated a strong individual relationship with the dependent variable even after controlling all the other indicators in the model.

In addition to examining a set of indicators to predict out-of-home placements for children with SED, this study also explored profile scores of each predictor at intake for children and adolescents with high risk of future out-of-home placements. Results of independent t-tests were quite consistent with the findings observed in the multivariate logistic regression analysis. The children who had out-of-home placement at follow-up period showed much severer functional impairment at intake measured by the CAFAS, compared those did not have any out-of-home placement. Overall children in placement group enrolled into the Children's Partnership with worse symptoms and lower levels of protective factors, compared to children without any out-of-home placement.

The findings of the study help clinicians identify children with high risk of out-of-home placement from the beginning and it assists them utilize profile information for their service planning and the early intervention. With several limitations, the study also suggests combining both multivariate and univariate analysis technique is preferable to get a better understanding of each relationship observed in both methods.

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CHAPTER ONE

INTRODUCTION

A series of epidemiological research in the 1980's shows that about fourteen to twenty percent of children between ages four to eighteen years have some type of diagnosable mental disorder and about seven percent of children in this population have a serious mental disorder (Stroul, 1996a). The Surgeon General's report on mental health was the first to document the scope of child and adolescent mental health and the need for access to appropriate services (Department of Health and Human Services, 1999). According to the report, approximately nine to thirteen percent of all children in the U.S. are categorized as having a serious emotional disturbance (SED) and seventy percent of this population in need of treatment do not receive mental health services (DHHS, 1999).

Children with serious emotional disturbance (SED) and their families have multiple challenges and needs that are unmet by traditional mental health service systems (Friedman, Kutash, & Duchnowski, 1996; Stroul & Friedman, 1986). The challenges and needs faced by these children and families often bring them into contact with multiple social service agencies including mental health, child welfare, special education, and the juvenile justice system. Children with SED receiving care are often provided inappropriate services in overly restrictive settings (Burns, 1991) and they disproportionately consume limited resources at a time when a large portion

(about 70 to 80 percent) of children with SED do not receive specialized mental health services (DHHS, 1999; Stroul & Friedman, 1986).

Services for children with serious emotional disturbances (SED) have been limited to state hospitals or other restrictive institutional facilities. The children's mental health field has shown increasing interest and progress in serving such children in community-based programs, which offer less restrictive, more normative environments (Stroul & Friedman, 1986).

Since the mid 1980s, an alternative service paradigm has emerged in the children's mental health system to respond to the special challenges for this population. The systems of care approach, originated by Stroul and Friedman (1986), spawned a major shift in children's mental health services for the past two decades. Since its emergence, philosophies and principles of the systems of care have gained acceptance and credibility for improving of mental health services for children with serious emotional disturbance (SED).

The systems of care model claims to provide more effective services to this population and emphasizes delivering a strength-based, family focused, culturally competent, and broad based continuum of services that is coordinated across the multiple children serving agencies (Duchnowski, Kutash, & Friedman, 2002; Stroul 1986).

Statement of the Problem

The systems of care approach is based on the premises of creating effective inter-agency collaboration among the key child-serving systems, inviting the family to participate in every phase of planning and delivery of services, designing individualized services that are culturally competent to the target children and families, and providing services in the least restrictive environments that will produce the best outcomes for children with SED (Duchnowski, et. al., 2002; Stroul, 1996a; Stroul & Friedman, 1986).

One of the goals of this approach is to provide coordinated multi-agency services to help children live and maintain successful lives in the least restrictive setting (i.e., their homes or within their respective communities, as opposed to residential treatment centers or psychiatric hospitals for extended periods of time). The motivation for shifting resources and services away from excessive reliance on restrictive settings and out-of-home placements towards community-based services has been fueled by the assumption that community-based services can be as effective as services provided in the restrictive settings and that it will save the cost over out-of-home placements, which are very expensive (Pires & Ignelzi, 1996; Quinn, 1994). Other supporting assumptions for the community-based approach are: children mainly end up in those restrictive settings because of system deficiencies; resources can be effectively redirected from costly settings to communities where children live their daily lives; and human service agencies can work efficiently together to provide

the best services within the context of their communities (Burns & Friedman, 1990; Stroul & Friedman, 1986).

Since the relatively recent emergence of the systems of care approach in children's mental health, studies on the effectiveness of the systems of care approach for children with serious emotional disturbance (SED) are growing (Evans, Armstrong, Kuppinger, Huz, & McNulty, 1998; Manteuffel, Stephens, & Santiago, 2002; Quinn & Epstein, 1998; Rosenblatt, 1998; Stroul, McCormack, & Zaro, 1996). Yet, in general, there exists a paucity of published research about outcomes of systems of care on out-of-home placements. Much of the work in this area is only available as technical reports or as brief professional conference proceedings, which cannot be obtained easily and often do not provide sufficient information regarding study design and methods (Rosenblatt, 1998).

Little information is known or published to explain indicators or factors that predict out-of-home placements for this population. Several studies attempted to examine the relationships between demographic and pathological indicators with out-of-home placements (Evans, et al., 1998; Min, 2000; Rosenblatt, 1998). Despite the fact that the systems of care approach emphasizes a strength-based approach, there have been very few studies in systems of care research that included strength-based measurements (or resilience factors) to explain their relationships to outcomes of children with SED (Harniss, Epstein, Ryser, & Pearson, 1999; Lindemann, 2000; Reid, Epstein, Pastor, & Ryser, 2000).

Purpose of Study

Traditional approaches to predict utilization of services within restrictive settings and out-of-home placements in children's mental health have failed to include strength-based measurements and competency scales in their prediction modeling. Literature in children's mental health also shows that marginal attention has been given to risk factors or family factors (i.e., family history or family functioning) as predictors of placement outcome for the target population (Chung, 2000; Gonzalez, 1997; Reay, 1999).

The purpose of this study is to examine a set of indicators and factors to predict out-of-home placements for children with serious emotional disturbances (SED). This study uses data collected from the Children's Partnership, a systems of care program funded by the Center for Mental Health Services (CMHS) that serves children and adolescents with SED and their families in Travis County, Texas. Using characteristics of children and families at intake, this study predicts future out-of-home placements after participation in the Children's Partnership. Specific aims of this study are: 1) to examine the relationships between a set of independent variables (diagnostic grouping, risk factors, behavioral and functional impairments, strength-based indicators, and family functioning) and the dependent variable (out-of-home placements); 2) to find an effect of the strength-based measure and family functioning on the dependent variable; and 3) to develop profiles at intake for children and adolescents with high risk of out-of-home placements.

To meet the current gap in the knowledge base, this study adopts a model comparison approach. The impact of including strength-based indicators and family factors along with diagnostic information, risk factors, and behavioral and functional impairments, is studied. By adding a different set of variables in a hierarchical manner (three-stage of hierarchical regression model), this study tries to identify the relative importance of predictors or factors associated with out-of-home placements for the sample.

Possible contributions of the study to the children's mental health research would be: 1) examination of the relationships between a set of predictors and out-of-home placements; 2) examination of effect of strength-based indicators and family functioning in the prediction of placement outcome (this has rarely been done both in the past and current children's mental health research); 3) investigation of relationships among predictors that are associated with out-of-home placements; 4) identification of the relative importance of each individual predictor; 5) development of profiles at intake for children with high risk of future out-of-home placements; and, most importantly 6) provision of clinical implications for the early intervention and service planning for those who show high risk of out-of-home placements at intake.

CHAPTER TWO

LITERATURE REVIEW

Systems of Care Approach

There has been growing recognition that needs of children with serious emotional disturbances (SED) are underidentified and unmet within traditional child-serving systems (Burns, 1991; Knitzer, 1993; Stroul & Friedman, 1986). Knitzer (1982) estimates that two-thirds of youth who require mental health interventions receive minimal services or suffer without.

Responding to Knitzer's findings that mental health services are too minimal and poorly organized to meet the challenges and needs of children and adolescents with emotional disturbance, a national initiative funded investigation efforts to promote systematic changes in providing services to children and their families. The Child and Adolescent Service System Program (CASSP), under the National Institute of Mental Health (NIMH), was established in 1984 to address the complex and multiple needs of children with emotional and behavioral disturbances and their families.

When the CASSP examined the operations of existing mental health delivery systems, immediate attention was given to the restrictiveness of treatment, primarily residential placement, available for the majority of youths with serious emotional disturbance. The CASSP also found that various service agencies, such as mental

health organizations, juvenile justice systems, child protective services, schools, and public health systems, each provided interventions without coordination among other agencies involved in the same child's care (Chung, 2000; Rosenblatt, 1997). The findings of the CASSP provided a foundation for promotion of a systems of care, which is defined as a "comprehensive spectrum of mental health and other necessary services which are organized into a coordinated network to meet the multiple and changing needs of severely emotionally disturbed children and adolescents" (Stroul & Friedman, 1986, p iv).

Stroul and Friedman (1986) conceptualized a system of care as more than a network of individual service components, representing a philosophy about the way in which services should be delivered to children and their families. The systems of care approach emphasizes child-centered, family-focused, and community-based programs with individualized and culturally sensitive services based on strengths and needs of the child and the family (Stroul & Friedman, 1986). Indeed this new approach is based on a core value that integrated, comprehensive, and collaborative services will generate the most positive change in children with emotional and behavioral disturbances when provided in the child's community in the least restrictive manner possible.

Table 1. Guiding Principles for the Systems of Care

1. Emotionally disturbed children should have access to a comprehensive array of services that address the child's physical, emotional, social, and educational needs.
2. Emotionally disturbed children should receive individualized services in accordance with the unique needs and potentials of each child and guided by an individualized service plan.
3. Emotionally disturbed children should receive services within the least restrictive, most normative environment that is clinically appropriate.
4. The families and surrogate families of children with emotional disturbances should be full participants in all aspects of the planning and delivery of services.
5. Emotionally disturbed children should receive services that are integrated, with linkages between child-serving agencies and programs and mechanisms for planning, developing, and coordinating services.
6. Emotionally disturbed children should be provided with case management or similar mechanisms to ensure that multiple services are delivered in a coordinated and therapeutic manner and that they can move through the system of services in accordance with their changing needs.
7. Early identification and intervention for children with emotional disturbances should be promoted by the system of care in order to enhance the likelihood of positive outcomes.
8. Emotionally disturbed children should be ensured smooth transitions to the adult service systems as they reach maturity.
9. The rights of emotionally disturbed children should be protected, and effective advocacy efforts for children and youth with emotional disturbances should be promoted.
10. Emotionally disturbed children should receive services without regard to race, religion, national origin, sex, physical disability, or other characteristics, and services should be sensitive and responsive to cultural differences and special needs.

From A system of care for children and youth with severe emotional disturbance, by B.A. Stroul and R. Friedman (1986, p vii).

The core values in this new approach, as presented in Table 1, provide the foundation for establishing systems of care (SOC). Ten SOC principles offer guidelines for communities across the nation when developing service delivery systems to meet the needs of children and families in their own communities.

With the national initiative (CASSP) promoting systems of care, numerous demonstration projects across the nation were implemented. Large support for this change in mental health services for children with SED was first endorsed in California (Ventura County Demonstration Project and California AB377 Evaluation Project; as cited in Ichinose, Kingdom, & Feltman, 1998; Rosenblatt & Attkisson, 1992; Rosenblatt & Attkisson, 1993) and North Carolina (Fort Bragg Demonstration Project; as cited in Heflinger, Northrup, Sonnichsen, & Brannan, 1998). These two major pilot projects became forerunners of the systems of care movement and introduced the establishment of initial systems of care programs nationwide including: Alaska's Youth Initiative (AYI: Burchard & Clarke, 1990); Kentucky's Interagency Mobilization for Progress in Adolescent and Children's Treatment (IMPACT; Illback, Nelson, & Sanders, 1998); Vermont's New Directions (Burns, Burchard, & Yoe, 1995); Virginia's System of Care (Macbeth, 1993); and Wisconsin's Communities Organized to Maintain Parent and Pre-Adolescents in Safe/Secure Surroundings (COMPASS; Greenly & Robitschek, 1991).

The Center for Mental Health Services (CMHS) has since funded 85 grantees across more than forty States and Territories; there are currently 54 systems of care projects across the nation at the time of this study, in addition to the initial CASSP

systems of care projects mentioned earlier (Center for Mental Health Services, 2003). All children and adolescents included in this study are a sub-sample of the local mental health service program, referred to as the Children's Partnership. The Children's Partnership, which has served children and youth in Travis County, Texas for five years, is one of the CMHS funded programs.

Defining Children with Serious Emotional Disturbance (SED)

There has been no universal definition for children with serious emotional disturbance (SED) or children with emotional and behavioral disorders (EBD) until the early 1990s (Forness & Knitzer, 1992; Friedman, Kutash, & Duchnowski, 1996). The lack of a clear definition for the target population has continued to create challenges for researchers and policy makers (Burns & Friedman, 1990). This problem has led to failures in policy and system development, as well as evaluation of services and management (Forness & Knitzer, 1992; Friedman, Kutash, & Duchnowski, 1996; Knitzer, 1982).

Two attempts were made at the federal level to define the term Serious Emotional Disturbance (SED). The term was defined first in the Individuals with Disabilities Education Act (IDEA) of 1990 and renamed as Emotional Disturbance (ED) in the Individuals with Disabilities Education Act (IDEA) of 1997. Since then, the term Serious Emotional Disturbance (SED) has often been used interchangeably with Emotional and Behavioral Disorders (EBD), despite the assertion that EBD is

more inclusive than SED and SED eligibility should include behavior disorders (Rosenblatt, 1997).

The other federal-level definition for SED was developed by the Center for Mental Health Services (CMHS) in response to the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act (PL 102-321), enacted in 1992. This law mandated that CMHS develop a definition of children with serious emotional disturbance (SED) to be used by states in their mental health planning and in developing their requests for federal funds for mental health services for the target population (Friedman, Kutash, & Ducknowski, 1996).

Although the two definitions established at the federal level by both the mental health and education field are very similar to each other (see Table 2 for details), a difference exists in terms of their usage. According to Friedman, Kutash, and Ducknowski (1996), the definition established by the Department of Education is designed to be used to determine eligibility for special education or Individual Education Plan (IEP) services funded under IDEA, whereas the CMHS definition is intended to be used as a basis for comprehensive system planning.

Despite efforts to accurately define the target population, recent studies have illustrated that children who have serious emotional disturbance can be best understood as a diverse group (Friedman & Hernandez, 2002; Friedman, Kutash, & Duchnowski, 1996; Stroul, 1996b). Demographics, needs and strengths, level of functioning, family issues and history, and previous service utilization are all areas in which these children vary significantly (Friedman, Kutash, & Duchnowski, 1996;

Stroul, 1996b). As research efforts continue to refine our knowledge about children who have emotional disturbances, some findings have emerged to help explain some of the confusion related to defining the target population (Duchnowski, Johnson, Hall, Kutash, & Friedman, 1993; Marcenko, Keller, & Delaney, 2001; Reay, 1999; Rosenblatt & Rosenblatt, 2000). Implications from study findings for entities that serve children with SED challenge common practice in understanding, planning, service development, coordination, and evaluation (Friedman, Kutash, & Duchnowski, 1996; Manteuffel et al., 2002; Reay, 1999).

For this study, the definition of children with serious emotional disturbance (SED) offered by the CMHS (see Table 2) is adopted, in part, because the Children's Partnership, the setting of the study, is one of the funded programs of Comprehensive Community Mental Health Services for Children Program under the CMHS. Additionally, the CMHS's definition seems to be more inclusive, compared to the definition by the Department of Education under IDEA. While the definition of SED by IDEA primarily focuses on eligibility criteria for specific programs without discussing 'functional impairments', the SED definition by the CMHS clearly states 'functional impairment' as a criterion, not only for eligibility of the programs but also for a comprehensive service planning after program enrollments.

As presented in Table 2 below, the CMHS definition describes two conditions, clinical diagnosis and functioning of children, as critical criteria to be considered when recognizing a child as having a serious emotional disturbance (SED).

Table 2. SED Definition by the Center for Mental Health Services

Children with a serious emotional disturbance are persons:

- from birth up to age 18
- who currently or at any time during the past year,

have had a diagnosable mental, behavioral or emotional disorder of sufficient duration to meet diagnostic criteria specified within the DSM-III-R (and subsequent revisions), that resulted in functional impairment that substantially interferes with or limits the child's role or functioning in family, school, or community activities.

These disorders include any mental disorder (including those of biological etiology) listed in the DSM-III-R or its ICD-9-CM equivalent (and subsequent revisions), with the exception of DSM-III-R "V" codes, substance use, and developmental disorders, which are excluded, unless they co-occur with another diagnosable serious emotional disturbance. All of these disorders have episodic, recurrent, or persistent features; however, they vary in terms of severity and disabling effects.

Functional impairment is defined as difficulties that substantially interfere with or limit a child or adolescent from achieving or maintaining one or more developmentally appropriate social, behavioral, cognitive, communicative, or adaptive skills. Functional impairments of episodic, recurrent, and continuous duration are included unless they are temporary and expected responses to stressful events in the environment. Children who would have met functional impairment criteria during the referenced year without the benefit or treatment or other support services are included in this definition.

Source: Originally from Bazelon Center for Mental Health Law. (1993). Federal definitions of children with serious emotional disturbance (p.25-29).

Recited from Friedman, R. M., Kutash, K., & Duchnowski, A. J. (1996). The population of concern: Defining the issues. In B.A. Stroul & R. Friedman (Eds.), Children's mental health (p 72). Brooks. Baltimore, MD.

Prevalence of Serious Emotional Disturbance (SED)

In the early 1980's, before the children's mental health field defined the term, serious emotional disturbance (SED), Gould, Wunsch-Hitzig, and Dohrenwend (1980) reviewed epidemiological research in children's mental health and concluded that about 12 percent of children showed a clinical maladjustment at any point in time. This finding, despite its narrow focus in school settings without any community studies or functional impairment data, provided a general standard for most of the 1980's (Friedman, Kutash, & Duchnowski, 1996).

At the end of that decade, Costello (1989) reported that the prevalence of diagnosable emotional or mental disorders in children was between 17 percent and 22 percent. To assess the prevalence of diagnosable mental disorders and functional impairments, Costello and colleagues (1988) used two measurement tools, the Diagnostic Interview Schedule for Children (DISC) and the Children's Global Assessment Scale (CGAS). They found that 22 percent of their study sample had a diagnosable disorder on the DISC and 13.3 percent had a CGAS score of 60 or lower, which is the criterion for significant functional impairment (Costello, Edelbrock, Costello, Dulcan, Burns, & Brent, 1988).

According to a comprehensive review of the literature conducted by Friedman, Kutash, and Duchnowski (1996), the prevalence of serious emotional disturbance is estimated to be in the range of 9% to 19%. Their findings were supported by previous research: Stroul (1996a) summarized that about 14 percent to 20 percent of children have some type of diagnosable mental disorders; Jensen,

Watanabe, Richers, Cortes, Roper, and Liu (1995) reported a 15.8 percent prevalence rate of SED; and, Kashani, Beck, Hooper, Fallahi, Corcoran, McAllister, Rosenberg, and Reid (1987) reported that 18.7 percent of children had a diagnosable mental health problem. Based on more recent findings in children's mental health, the authors suggest indications that these prevalence rates are increasing. This implies that recognition must be given not only to the high prevalence estimate of SED but also to a trend toward increasing rates (Friedman, Kutash, & Duchnowski, 1996).

Diagnosis and Functioning of Children and Adolescents

Many professionals have devoted themselves to developing diagnostic systems and assessment tools to measure functioning of children and adolescents. Some tools conceptualize child functioning as the presence of undesirable symptoms, while others attempt to understand it as a function of environmental contexts (Carr, 1999; Husain and Cantwell, 1991). There are also variations of interests for each profession in terms of what to measure and how to measure it. Some focus on psychological functioning, while others are more interested in behavioral functioning (Cluett & Forness, 1998; Vance & Pumariega, 2001).

Based on these various perspectives, four main assessment models (classification model, developmental model, dimensional model, and interactional model) exist within the field of children's mental health literature. The first model, the classification model, focuses mainly on diagnostic information, whereas the

remaining three models address functioning of children in general. The four models are not totally exclusive of each other; they share common characteristics. These four models will now be presented, followed by a discussion of the systems of care approach as a viable assessment modality.

Classification Model

The Classification Assessment Model is based on the medical model of psychological difficulties and was developed by clinical pathologists and psychiatrists to classify clients in terms of group categories (Carr, 1999; Husain & Cantwell, 1991). To classify specific symptoms into a grouped disorder, this model commonly uses binary criteria (i.e., presence or absence of a symptom).

Two popular classification systems have been derived from this model in the mental health field. The World Health Organization's International Classification of Diseases (ICD) is widely used in Europe, while the American Psychiatric Association's (2000) Diagnostic and Statistical Manual of Mental Disorders (DSM) is commonly used in North America.

Both DSM and ICD systems are multiaxial, which allows complex information to be coded briefly without oversimplification. The multiaxial characteristic of this model allows clinicians and researchers to deal with co-morbidity (Carr, 1999). Another feature of the classification model is openness to revision in light of new information and knowledge. Both systems continue to revise

old versions, integrating new information and evolving to keep pace with the most current clinical research findings.

One practical weakness of the classification model is identifying symptoms and problems, rather than quantifying degree of severity (Carr, 1999). While it is very effective for diagnosis, it is less attractive for outcome research because of its inability to detect criteria change within a limited timeframe, compared to other instruments that do a better job of capturing changes in severity and improvements in functioning over a period of time (Paniagua, 2001). Another shortcoming for this model is on an ethical level (Sadler, 1996; Sadler, Hulgus, & Agich, 1994). Since both classification systems (DSM and ICD) are designed as a deficit (medical) model, they are philosophically unacceptable to those who adopt systemic, holistic, or comprehensive frameworks as a basis for assessment and practice [Sadler, 1996; Sadler & Hulgus, 1991; Sadler, Hulgus, & Agich, 1994; also see recent counter response by Spitzer (2001) to Sadler and colleagues, and Wakerfield's (1992) early work on this debate].

In spite of its practical and ethical limitations, it is still important for clinicians and researchers to be familiar with the classification model. Administration and funding of mental health programs have long been framed in terms of the DSM systems (Carr, 1999). As seen in the definitions of serious emotional disturbance of CMHS and IDEA, federal and state agencies are still using DSM criteria either for determining eligibility for specific services or for comprehensive system planning.

Regardless of differing philosophical views on this model, its usefulness for diagnosis, as well as its predominant role with funding streams, cannot be ignored. Yet, the focus should be on how to use the diagnostic information. One potentially useful way to use information gathered using the DSM is to see whether one diagnostic group fares better than another as they receive services from the same mental health program (for example, children with a primary diagnosis of conduct disorder vs. children with a primary diagnosis of depression). It may also be informative to examine how given mental health programs induce different levels of change across diagnostic groups.

Developmental Model

The Developmental Model is best characterized as “a process through which relevant clinical information is obtained to provide answers to ‘developmentally’ related questions” (Johnson & Sheeber, p 44). Though developmental theories have a long history and have provided substantial knowledge in cognitive and behavioral science, the children’s mental health field did not see this approach as an independent assessment model until the 1990s (Carr, 1999).

The Developmental Model is based upon a number of assumptions. First, there is a set of normative criteria that every child is supposed to develop (i.e., cognitive ability for a 3-year old or adaptive behavior for a 12-year old boy). Second, this set of criteria affects the next level of development. The foci of this model rests on assessing the presence or absence of specific developmentally related difficulties,

on delineating factors that have contributed to maintain such problems, and on obtaining information relevant to the development of appropriate intervention strategies (Johnson & Sheeber, 1999).

The developmental assessment model covers a wide range of child functioning. Johnson and Goldman (1990) illustrated some examples of traditional assessment techniques for child functioning. Based on the developmental perspective, they introduced eight spheres of child functioning - motor skills, cognition, language, social and adaptive behavior, personality, temperament/behavioral style, and home environment. Years later, Johnson and Sheeber (1999) narrowed them to four domains of functioning – cognitive/motor development, adaptive behavior, psychopathology, and temperament /behavioral style.

The field of literature identifies more than forty measurement tools associated with this model (Johnson & Goldman, 1990; Johnson & Sheeber, 1999; Volkmar & Marans, 1999; Wapner & Demick, 1999). Exemplary measures derived from this model are the Personality Inventory for Child (PIC) and Denver Developmental Screening Scale (DDSS). Other noteworthy instruments are the Child Development Inventory (CDI) and the American Association on Mental Deficiency Adaptive Behavior Scale (AAMD-ABS).

Even though the term ‘developmental’ connotes that this approach deals exclusively with younger children and their cognitive functioning, proponents of this model believe it also can apply to the assessment of older children and adolescents and to the assessment of behavioral and emotional functioning (Johnson & Sheeber,

1999; Wapner & Demick, 1999). In reality, most instruments based on this model target younger children between the ages of one to eight. Although Johnson and Sheeber (1999) include the Child Behavior Checklist (CBCL), which covers older children under their psychopathology domain, others believe that the CBCL can be best classified as a dimensional assessment model (Carr, 1999; Husain & Cantwell, 1991).

One of the shortcomings of developmental models is an overemphasis on cognitive functional domains. Current mental health research for children and youth focuses more on disruptive behaviors than on cognitive development. This may explain why measurements and assessment tools derived from this model are not adopted often in outcomes studies in the current children's mental health field.

Dimensional Model

Emergence of the dimensional model of assessment was largely influenced by factor analytic approaches in the behavioral sciences. This model assumes that a full assessment of a child's emotional and behavioral symptoms needs to be multi-dimensional. In this model, a dimension means a specific domain of child functioning and each dimension is a subset of the global profile.

Unlike the classification model of assessment, the dimensional model does not yield categorical diagnoses. Rather it rates and quantifies degree of symptoms or potentials to correctly locate children on a continuum of functional domains. This model generally utilizes mathematical and statistical processes to define factors of

disorders and problems (Husan & Cantwell, 1991). Also, the measurements derived from this model are thoroughly examined for their reliability and validity using multivariate analysis methods typically associated with statistical measurement theory. Most of the standardized multi-dimensional measures of child functioning [i.e., the Child Behavior Checklist (CBCL), the Child and Adolescent Functional Assessment Scale (CAFAS), and the Behavioral and Emotional Rating Scale (BERS)] were developed based on this model.

Many measurement tools rooted from the dimensional model of assessment are currently used in mental health research to capture different domains of child functioning. Some focus more on disruptive behaviors, while others focus on psychological disorders. Also there is variation in how many functional domains are assessed by one instrument. Some measures deal only with four or five domains of functioning, while others assess more than eight functional domains at the same time.

Dimensional conceptualization offers a useful framework for assessment of children. The use of reliable and valid measurements can be readily incorporated into routine clinical settings. It provides assessment of the status of children on different dimensions and also helps identify changes in each dimension for an outcome study (Carr, 1999). For example, some interventions may bring the same rate of positive improvements across all dimensions of child functioning, while others may work for a specific domain and remain neutral for other functional domains. The dimensional model allows clinicians and researchers to detect this

kind of relationship between treatments and outcomes. This advantage is not easily available from the categorical classification model.

Another advantage of this model is that it gathers assessment data from different informants. In the classification model, assessment of child functioning mainly comes from clinical professionals. However, some measurement tools from the dimensional model adopt a multi-informant method, allowing different respondents to answer the same questionnaire. For instance, Achenbach's Child Behavior Checklist (CBCL) can be administered to caregivers, to teachers using the Teacher's Report Form (TRF), and to children themselves using the Youth Self Report (YSR). These three instruments are measuring virtually the same items and domains of child functioning. By adopting a multi-informant method, the dimensional model accounts for different perceptions of the same child's functioning based on the perspectives of the informant. The multi-dimensional and multi-informant characteristics of this model make this model unique and attractive for use in current outcome studies on children's mental health.

Despite the practical advantages of this model, some shortcomings warrant mention. Development of a dimensional measurement is a very lengthy and complex process that is labor intensive and costly. Sometimes the standardization and refinement process, necessary to establish reliability and validity of the measurement, takes more than 10 years (for example, The CBCL was first introduced in 1983, revised in 1991, and the latest version came out in 2001). One additional drawback

to this method is that it requires a fairly large sample in order to apply the appropriate statistical measures in the standardization process.

Interactional Model

The Interactional Model of assessment is not cited as often as the previous models in the children's mental health literature. This model was developed to overcome limitations of the classification model and the dimensional model. Since the two previous assessment models embrace the assumption that behavioral and psychological problems are inherent characteristics of the child, both models overlook patterns of interaction that involve family members and members of the wider social network where the child experiences everyday life (Carr, 1999).

A core value of the interactional model states that assessment should take into account the relationship between the child and environment (Paniagua, 2001). Though many authors named this assessment model somewhat differently based on their orientations [referred as "Bioecological model" and "Transactional orientation" by Dumas & Nilsen (2003); "Comprehensive assessment model" by Paniagua (2001); and "Ecological model" by Achenbach (1985)], the theoretical background of this model can be found in systems theory (Bertalanffy, 1968) and the ecological perspective (Achenbach, 1985; Bronfenbrenner, 1979), which both emphasize the importance of recognizing larger systems and multiple sources of influence on children's development and adaptation (Dumas & Nilsen, 2003). Unlike other assessment models, this model maintains a balanced emphasis on both undesired

symptoms and on their causes. Collectively, the other three assessment models focus on ‘what is wrong’, but the interaction model attempts to simultaneously capture ‘what is wrong’ and ‘why it is wrong’.

Since inquiry of this model is to assess relationships and interaction patterns that lead children to have undesirable symptoms, measurement methods associated with this model are the least quantitative compared to the developmental and dimensional assessment models (Carr, 1999). Structural analysis, dynamic analysis, and network analysis are examples of how assessment tools are constructed under this model (Dumas & Nilsen, 2003; Wapner & Demick, 1999). Some quantitative measurements reflect this model’s perspective. The Self-report Family Inventory (SFI), which measures family members’ perceptions of communication and interaction style, is an example of this model. Also Olson’s Inventories of Parent-Child and Parent-Adolescent (two subsets from the original Family Inventories) are used to assess child-parent interaction (Touliatos, Perlmutter, & Straus, 2001).

The philosophy of the interactional model fits well into current trends of mental health research. It turns attention away from problems towards solutions, and it adopts both qualitative and quantitative measures to fully address child functioning. It also allows multiple informants to describe the same situation through different lenses.

One major limitation of the interactional assessment model is in its comprehensiveness (Paniagua, 2001). Since this model assesses multiple informants (i.e., clients, clinicians, and family members) and different environments (for

example, the context of family, school, and community), it requires greater resources to cover all the systems associated with assessment domains than the single informant assessment model (i.e., the classification model). That is, this assessment modality is not feasible for communities with limited funding and resources.

Systems of Care as a Comprehensive Assessment Model

In spite of its expansion and popularity in children's mental health for the past two decades, the systems of care approach has not gained a full appreciation of its own measurement modality.

The systems of care approach uses a traditional classification model, despite the risk that diagnostic labels may stigmatize families of children with a mental health disorder. As discussed in the classification model section, systems of care programs are mandated to report DSM–IV diagnostic information to CMHS. A recent review of the Children's Partnership data reveals that 95 percent of all program participants are diagnosed with at least one Axis I disorder within the DSM-IV categories (Haynes, Springer, Casey, Cook, Davis, Johnson, & Yoo, 2001).

The widely cited systems of care approach presents eight service dimensions – mental health, social, educational, health, substance abuse, vocational, recreational, and operational – to help children with serious emotional disturbance and their families function successfully (Lourie, Stroul, & Friedman, 1998; Stroul & Friedman, 1986). Each dimension represents not only service components that should be integrated for children and families, but also indicates functional domains that

children need to improve for success. Once services are designed and provided for each service dimension, it is expected to observe desirable outcomes for each functional dimension, thus making it congruent with a dimensional model of assessment.

The systems of care approach uses a multi-informant method that is a characteristic claimed both by the dimensional and the interactional models. Growing emphasis on multi-informant assessment is based on the assumption that each informant provides a unique and valid perspective on children's emotions and behaviors. The systems of care approach uses two different respondents (i.e., CBCL for the caregiver and YSR for the youth) to measure children's behavioral symptoms. The use of multi-informant instruments allows the examination of differences in each respondent's perception, providing a more comprehensive picture of a child's functioning (Hart & Lahey, 1999; Paniagua, 2001).

Collection of agency level data from partner agencies in the Children's Partnership also reflects a multi-informant assessment. The Children's Partnership has gathered functional assessment data from four different child-serving systems – Education system, Juvenile Court, Child Protective Services (CPS), and Mental Health and Mental Retardation (MHMR). This agency data reveals various functional aspects of children in different settings, and allows examination of whether positive outcomes are present across settings.

In conclusion, the measurement model of systems of care approach seems to fall into a mixed model approach (or comprehensive model). While it is premature

to assert that the systems of care approach is a unique assessment model, it is evident that it has incorporated various components from the four other measurement models. The inclusion of a multiple informant method and use of strength-based measurements (i.e., Behavioral and Emotional Rating Scale -BERS) represents a robust mixed model.

Out-of-Home Placements in Children's Mental Health

Since the mid-1980s, a number of factors have encouraged federal, state, and local interests in developing systems of care for children with serious emotional disturbances (SED) and their families. One of the factors was budgetary constraints related to the number of children in out-of-home placements and its associated costs (Pires & Ignelzi, 1996). States have focused particularly on the excessive amount of money spent on residential treatment and psychiatric hospitalization of children and adolescents with emotional disturbances. States' findings show that many children in very expensive residential treatment or inpatient units are in need of less intensive care. Many of these children could have been more appropriately treated in community-based or home-based programs, which are less costly and can be as effective in helping children with SED (Pires & Ignelzi, 1996).

Knizter (1996) discusses that the same trend has been observed in educational systems, noting that children with SED are disproportionately placed in segregated settings, including high-cost residential placements. The child welfare system also has struggled with the problem of high cost associated with out-of-home placements

and has expressed particular concern regarding the unnecessary use of foster care (Weber & Yelton, 1996). Since both the child welfare and children's mental health systems spend large amounts of their financial resources on placing children outside their homes, there was strong motivation to redirect financial resources on more intensive home-based or community-based services with family preservation services as an alternative to foster placement.

The juvenile justice system is no exception to this placement trend. At national level, an estimated 2,745,000 youth were arrested in 1995 and 40 percent of them (about 1,100,000) were confined to juvenile detention centers or adult jails (Chung, 2000). Based on samples from special education and the juvenile justice system, studies show that of the incarcerated youth, seventy seven percent were identified as youth with emotional and behavioral disorders (EBD) (Leone, Rutherford, & Nelson, 1991; Nelson & Pearson, 1991). A more recent review on the profiles of systems of care sites shows that about 60 percent of the sampled youth had juvenile justice affiliation (Rosenblatt, Robertson, Bates, Wood, Furlong, & Sosna, 1998). Though most of these adolescents are in need of services for emotional and behavior problems (Kauffman, 1994), lack of appropriate alternative services (i.e., community-based services) contributes to longer stays in out-of-home placements, on average, than their peers without EBD (Leone, Rutherford, & Nelson, 1991).

As mentioned in the previous section, the systems of care approach is rooted in the goal of creating effective interagency collaboration among the key child-

serving systems and providing services in the least restrictive environments (Duchnowski, Kutash, & Friedman, 2002; Stroul, 1996a; Stroul & Friedman, 1986). Shifting services and resources from out-of-home placements towards community-based services has been welcomed with the belief that community-based services can be as effective as restrictive services and can be more cost-effective than out-of-home placements (Pires & Ignelzi, 1996; Quinn, 1994). A primary goal of systems of care is to keep youth within their homes and communities to the extent possible. The local communities with systems of care have emphasized the development of services and supports that maximize the chance of serving children and youth within the context of their own families and communities and reducing the necessity for out-of-home and out-of-community placements (Stroul, McCormack, & Zaro, 1996).

In spite of the recent emergence of the systems of care movement, research on the effectiveness of the local systems of care programs is expanding and its preliminary findings have been generally positive (Evans, Armstrong, Kuppinger, Huz, & McNulty, 1998; Manteuffel, Stephens, & Santiago, 2002; Quinn & Epstein, 1998; Rosenblatt, 1998; Stroul, McCormack, & Zaro, 1996). When examining the impact of systems of care programs on out-of-home placements, several studies have shown positive outcomes. For example, Vermont's New Directions found a nearly 20 percent increase in children living at home from the time of referral to about one year following service initiation and the Ventura County Demonstration Project found that 85 percent of the children judged to be at imminent risk of placement remained at home for at least 6 months (Stroul, McCormack, & Zaro, 1996).

However, there are still questions that remain unanswered. Little information is known about what specific factors are associated with out-of-home placements or what circumstances increase or decrease the likelihood of out-of-home placements. Very few studies have been published which explore predictive factors for out-of-home placements with this target population. Besides involvement in systems of care, no specific factors are included to predict incidences of out-of-home placements.

Furthermore, the traditional approach to predict utilization of services within restrictive settings and out-of-home placements in children's mental health has failed to include strength-based measurements and competency scales in their prediction modeling. To date, there has been no published study that includes strength-based measurements to explain the relationship between children's strengths and out-of-home placements, despite the fact that the systems of care approach clearly asserts a strength-based approach.

Predictors of Out-of-Home Placement

When analyzing out-of-home placement in children and adolescents with SED, a myriad of factors affecting out-of-home placement can be considered. A review of the literature reveals that many studies included a wide range of indicators to find their relationships with out-of-home placement or service utilization within restrictive settings: age (Chung, 2000; Gonzalez, 1997; Reay, 1999; Todd, 1994), behavioral and functional impairments (Chung, 2000; Massey & Murphy, 1991;

Quinn, 1994; Reay, 1999), diagnostic information (Quinn & Epstein, 1998; Rosenblatt, Rosenblatt, & Biggs, 2000), family functioning (Greenbaum, Dedrick, Friedman, Kutash, Brown, Lardieri, & Pugh, 1998), gender (Chung, 2000; Todd, 1994), previous placement history (Reay, 1999; Todd, 1994), risk factors (Chung, 2000; Reay, 1999; Rosenblatt, Rosenblatt, & Biggs, 2000), race (Chung, 2000; Todd, 1994), and socioeconomic status (Chung, 2000; Kirkman, 2001).

Potential indicators and factors to predict out-of-home placement derived from previous research inform a conceptual framework (see Figure 1) to include: 1) diagnostic information, 2) risk factors, 3) behavioral/psychological impairments, 4) functional impairment, 5) a strength-based measure for child functioning, and 6) family functioning. The following section will outline the literature regarding these indicators and factors associated with out-of-home placements in children's mental health research.

Diagnostic Information

Even though clinical diagnosis is the key criterion to enroll children and adolescents into systems of care programs and to design a series of services for them and their families, it is rare to find studies that explain a causal relationship between diagnostic information and out-of-home placements. However, many studies include diagnostic information to describe characteristics of their samples and its relationship to specific functional outcomes (Evans, et al., 1998; Quinn & Epstein, 1998; Rosenblatt, 1998).

Quinn and Epstein (1998), based on a sample of more than two hundred children and adolescents from special education, reported that 63 percent of all children had at least one Axis I level diagnosis in the DSM-IV (Depression 31.0%, ADHD 12.5%, Conduct Disorder 11.5%, Oppositional Defiant Disorder 6.1%, PTSD 5.4%, and Other 25.7%) and 24 percent of the sample were diagnosed under one or more Axis II level (Developmental Disorders 14.5%, Personality Disorder 11.5%, Mental Retardation 3.4%).

Out-of-home placement data showed that about 88 percent of the sample had been previously placed in one or more of the following placements: psychiatric hospital (61.8%), correctional facility (36.6%), foster care (25.6%), residential treatment (27.7%), and group home (20.2%) and the average number of placements was four. Though the study did not examine a direct relationship between diagnostic group (i.e., conduct disorder group vs. ADHD group) and out-of-home placements, the authors found that specific DSM diagnoses were not a significant indicator that differentiated various types of placements. Cluster analysis showed that gender, DSM status (i.e., group with Axis I diagnosis vs. group with no DSM diagnoses), medication, living arrangement, and public assistance were the variables to differentiate clusters of various types of out-of-home placements (Quinn & Epstein, 1998).

One study examined the relationship between DSM diagnoses and juvenile system involvement (Rosenblatt, Rosenblatt, & Biggs, 2000). Findings from this study revealed that youth with oppositional defiant disorder (ODD) and conduct

disorder (CD) had higher rates of juvenile system involvement and subsequently higher rates of transition from the community to restrictive settings, such as juvenile detention or correctional facilities. More recently, Teplin, Abraham, McClelland, Dulcan, and Mericle (2002) conducted a comprehensive diagnostic analysis of a large sample of youth in juvenile detention using standardized instruments. They found that the highest rates of diagnoses were for substance use disorders, disruptive disorders, and anxiety disorders. The most important finding from this study is the high rate of psychiatric disorders in both male and female youth in a juvenile detention facility, with approximately 66 percent of boys and 74 percent of girls meeting diagnostic criteria for at least one DSM disorder.

Studies, based on the general population (including adults), reveal that persons with specific mental illnesses, such as psychosis and disruptive behaviors, have a greater likelihood of admissions to psychiatric hospitalization (Korkeila, Lehtinen, Tuori, & Helenius, 1998; Rabinowitz, Slyuzberg, Salamon, Dupler, Kennedy, & Steinmuller, 1995; Segal, Akutsu, & Watson, 1998; Swanson, Estroff, Swartz, Borum, Lachicotte, Zimmer, & Wagner, 1997; Way, Evans, & Banks, 1992).

The literature suggests that persons with psychosis or personality disorders are readmitted more frequently and more rapidly than those with mood disorders (Korkeila, Lehtinen, Tuori, & Helenius, 1998). Swanson et al. (1997) reported that disruptive behavior was associated with utilization of services in restrictive settings, both as a factor bringing people into psychiatric emergency services and as a determinant affecting the clinician's decision to recommend inpatient services.

Risk Factors

Risk factors such as poverty, single-parent household, involvement in child welfare system, physical and sexual abuse history, family history of mental illness or substance abuse, and family history of criminal activities have been documented as significant predictors of SED and subsequent out-of-home placements (Stroul, Cormack, & Zaro, 1996). Knitzer's (1996) review on risk factors, based on early work of Rutter (1979), also points out that not only is the presence or absence of risk factors related to development of emotional and behavioral problems, but the likelihood of problems increases as the number of risk factors increases. In Rutter's study, risk factors included marital discord, low socioeconomic status, large family size, parental criminality, maternal psychiatric disorders, and child welfare involvement.

For the last decade, a number of research efforts have tried to find significant predictors influencing out-of-home placements, including settings like juvenile probation and detention (Chung, 2000; Rosenblatt, Rosenblatt, & Biggs, 2000; Todd, 1994), foster care (Reay, 1999), residential treatment centers (Gonzalez, 1997; Kirkman, 2001; Lyons et al., 1998), residential group home (Pumariiega, Johnson, & Sheridan, 1995), and out-of-home placements in general (Quinn, Newman, & Cumblad, 1995). However, only a few of them included risk indicators in their prediction models. The majority of the studies focused on demographic characteristics and functional impairment to predict future out-of-home placements.

Lyons, Libman-Mintzer, Kiesiel, and Shallcross (1998) developed a standardized instrument to assess risk indicators and used them to characterize youth in residential treatment programs. The instrument was comprehensive in its assessment of risk to self or others, including ratings of suicide, danger to others, crime delinquency, and sexual aggression. Though the study did not attempt to make a direct relationship between risk indicators and placement in residential settings, the authors found that about 39 percent of the sample (n=333) in residential treatment had acute risk(s).

Chung (2000) found that child risk factors including abuse victimization, substance abuse, and out-of-home placements at intake, significantly contributed to a juvenile offender's recidivism status one year following participation in a systems of care program in Santa Barbara County in California. Absence of child risk factors at intake was associated with a lower percentage of recidivism at the one year follow up. The author further hypothesized that family risk factors at intake, such as parental criminality, family violence, family substance use history, and the total numbers of family risks, would significantly affect a juvenile offender's recidivism status at follow up. Although family substance use history yielded the expected result, showing a tendency that presence of substance use history was associated with a higher percentage of recidivism rate, this trend was not statistically significant. Overall, the findings on family risk factors indicated that they did not significantly (or statistically) differ across youths' recidivism.

Rosenblatt et al. (2000) recently presented data that classified youth based on risk factors and emotional and behavioral characteristics. In their study, they presented two sets of risk factors, one for the individual child and the other for the family as a whole. Table 3 illustrates individual child risk factors the authors operationalized. A total child risk factors index was defined as the sum of the above individual risk factors and the possible scores ranged from 0 to 8.

Table 3. Individual Risk Factors

1. Previous residential treatment: previous placement of youth in a residential facility;
2. Previous psychiatric hospitalization: previous admission of youth to a psychiatric hospital;
3. Physically abused: previous physical abuse of youth;
4. Sexually abused: previous sexual abuse of youth;
5. Runaway: documentation of past runaway behavior;
6. Suicide attempt: documentation of suicide attempt(s);
7. Substance use: use of drugs and/or alcohol; and
8. Sexually abusive: documentation of youth's sexual abusiveness toward others.

They also operationalized family risk factors and a total family risk index was conceptualized as the sum of the following family risk factors, which vary from 0 to 7 (see Table 4).

Table 4. Family Risk Factors

1. Psychiatric hospitalization of parent/caregiver: previous psychiatric hospitalization of parent/caregiver;
2. Felony conviction of parent/caregiver: one or more documented felony convictions of parent/caregiver;
3. Sibling institutionalization: previous institutionalization of youth's sibling(s);
4. Sibling in foster care: previous or current placement in foster care of youth's sibling(s);
5. Family mental illness: history of mental illness in family members;
6. Family violence: history of violence within the family; and
7. Family substance abuse: history of substance abuse within the family.

Though the authors provided a clear conceptualization of risk factors for both individual and family level, they did not expand their efforts to include these risk factors in predicting future out-of-home placements.

Behavioral, Psychological, and Functional Impairments

Measures of impairment in psychological and behavioral functioning have a long history in the field of children's mental health, and appear particularly useful in eligibility determination, treatment planning, and outcome evaluation of services for children with SED. One of the ultimate goals of systems of care is to benefit the children served and to assist them in achieving meaningful improvements in their clinical status and levels of functioning. Therefore, it has been a priority for most funded systems of care communities to gather some types of evaluative information on functioning with respect to specific behaviors, symptoms, or global functioning measures (Stroul et al., 1996).

Indicators of behavioral and functional impairments cover a wide range of psychological and behavioral symptoms, including internalizing (withdrawn, anxious, or thought) and externalizing (delinquent, aggressive, or social problems) symptoms as well as specific behaviors (substance abuse, self-harm, behaviors toward others). Outcome studies for behavioral and functional impairments also adopted multiple informant methods, which allowed them to collect the same information from different sources.

Since the beginning of their development, systems of care programs have well documented outcomes of behavioral, psychological, and functional improvement for children served. Using standardized instruments, mainly the Child Behavior Checklist (CBCL) and the Child and Adolescent Functional Assessment Scale (CAFAS), numerous studies have shared their success stories in children's

functioning. Among various indicators that have been identified to assess the impact of systems of care for children and adolescents with SED and their families, behavioral, psychological, and functional outcome indicators have shown the most clear and positive findings.

Since there are large volumes of research which examine indicators of functional impairments in children (Lindemann, 2000), it is beyond the purpose of this study to cover all the studies. Rather this section focuses on studies of the two major standardized measurements [the Child Behavior Checklist (CBCL) and the Child and Adolescent Functional Assessment Scale (CAFAS)], which have been the most widely used to measure behavioral and functional impairments in children's mental health and systems of care programs (Manteuffel, Stephens, & Santiago, 2002; Rosenblatt, 1998). Out of total 15 different instruments that the CMHS adopted to measure various outcome domains in systems of care programs, the CBCL and the CAFAS are designed to assess children's behavioral, psychological, and functional impairments and are currently used in 54 different systems of care projects across the nation.

Rationale for selecting these two instruments is that they have not only shown sound psychometric properties with various clinical samples (e.g., for the CBCL, see Heflinger, Simpkins, & Combs-Orme, 2000; Impara & Murphy, 1994; Macmann, Barnett, Burd, Jones, LeBuffe, O'Malley, Shade, & Wright, 1992; Mattison & Spitznagel, 1999; and for the CAFAS, see Hodges, Doucette-Gates, & Liao, 1999; Hodges, & Wong, 1996; Hodges, & Wotring, 2000), but also

demonstrated their sensitivity to successfully measure designated outcomes (e.g., for the CBCL, see Brady & Caraway, 2002; Brown, & Greenbaum, 1995; Greenbaum et al., 1998; Heflinger, Simpkins, & Combs-Orme, 2000; Leslie, Landsverk, Ezzet-Lofstrom, Tschann, & Slymen, 2000; Massey, & Murphy, 1991; Newton, Litrownik, & Landsverk, 2000; and for the CAFAS, see Hodges, Doucette-Gates, & Kim, 2000; Hodges & Kim, 2000; Hodges & Wong, 1997; Hodges, Wong, & Latessa, 1998; Quist & Matshazi, 2000; Reay, 1999; Robertson, Bates, Wood, Rosenblatt, Furlong, Casas, & Schwier, 1998; Rosenblatt & Rosenblatt, 2002; Walrath, Mandell, & Leaf, 2001). With an introduction of the two scales, the following section also examines the studies that investigated the relationship between indicators of behavioral, psychological and functional impairments and out-of-home placements.

Child Behavior Checklist (CBCL)

The Child Behavior Checklist (CBCL) was designed by Thomas M. Achenbach (1991) "to record in a standardized format the behavioral problems and competencies of children as reported by their parents or others who know the child well" (Impara & Murphy, 1994, p 153). It provides scale scores on a number of empirically derived factors (eight sub-domains). The CBCL consists of social competence (Question I to VIII) and behavior problem items (Item number 1 to 113). The social competence section assesses information related to involvement in organizations, sports, peer relations, and school performance – however, its competency scale has rarely been used to measure outcomes of specific interventions

or to assess the effectiveness of systems of care programs. Although the CBCL does not yield specific diagnoses, the behavior problem section identifies symptoms on a continuum and provides two broad-band (internalizing and externalizing) syndrome scores and eight narrow-band syndrome scores (i.e., attention problems, anxiety/depression, delinquency, or aggression). A total problem score, which has three distinct ranges (nonclinical, borderline, and clinical), can also be generated. It usually takes about 20 minutes for caregivers to complete the CBCL.

Literature on the CBCL provides strong and sound evidence for its reliability (test-retest reliability, stability of ratings, and interrater reliability) and validity (content, construct, and criterion related validity) (Heflinger, Simpkins, & Combs-Orme, 2000; Impara & Murphy, 1994; Macmann, Barnett, Burd, Jones, LeBuffe, O'Malley, Shade, & Wright, 1992; Mattison & Spitznagel, 1999).

Numerous studies adopted the CBCL to show program effectiveness either in a systems of care context or in other clinical settings (Manteuffel, Stephens, & Santiago, 2002; Rosenblatt, 1998). Some of them used the CBCL in restrictive settings and found a relationship between scores on the CBCL and out-of-home placements (Brady & Caraway, 2002; Brown, & Greenbaum, 1995; Greenbaum et al., 1998; Heflinger, Simpkins, & Combs-Orme, 2000; Leslie, Landsverk, Ezzet-Lofstrom, Tschann, & Slymen, 2000; Massey, & Murphy, 1991; Newton, Litrownik, & Landsverk, 2000).

Massey and Murphy (1991) conducted an evaluation study to determine the potential usefulness of the Child Behavior Checklist (CBCL) with children placed in

residential settings. The study showed that the total problem score, the internalizing scale score, and the externalizing scale score on the CBCL were significantly correlated with problem severity, predicted length of stay in residential setting, and a measure of placement appropriateness. These three scores proved to be useful measures of residentially placed children. Based on two broad-band scores, they also categorized children by two groups, 'externalizers' and 'internalizers.' The authors found that externalizers were found to have more disruptive symptoms (such as more obtrusive, hostile, and nonconforming) than internalizers. However, no additional analysis was conducted to predict the likelihood of entering residential placements by the status of those two groups.

Newton, Litrownik, and Landsverk (2000) examined the relationship between change in placements and problem behaviors in the CBCL over a 12-month period among a cohort of foster children. The results suggested that volatile placement histories contribute negatively to both internalizing and externalizing behaviors of foster children, and that children who experience numerous changes in placement may be at particularly high risk for these deleterious effects. Initial externalizing behaviors proved to be the strongest predictor of number of placement changes for the study sample.

Other notable findings from the literature are; 1) those living in family homes were more likely to have scores in the non-clinical range than those in foster homes or group placements (Heflinger, Simpkins, & Combs-Orme, 2000), 2) higher levels of externalizing scores on the CBCL were linked to higher probabilities of

subsequent incarceration (Brown & Greenbaum, 1995), 3) the externalizing score of the CBCL and the number of conduct disorder symptoms were found to be positively related to risk of placement in juvenile detention facilities (Greenbaum et al., 1998), 4) Children with CBCL Total Problem Scale *T*-scores of 60 or greater had significantly more mental health service use than those with a score less than 60 (Leslie et al., 2000).

Child and Adolescent Functional Assessment Scale (CAFAS)

Along with the CBCL, the Child and Adolescent Functional Assessment Scale (CAFAS - Hodges, 1999; Hodges, 2000) has been one of the most widely used instruments in assessing functional impairment in the children's mental health field for the past decade (Manteuffel, Stephens, & Santiago, 2002; Rosenblatt, 1998). Hodges developed the tool to assess a youth's degree of impairment in day-to-day functioning due to emotional, behavioral, psychological, psychiatric, or substance use problems (Hodges, 1999; Hodges 2000).

The eight subscales of the CAFAS, each corresponding to a psychosocial domain, include thinking, behavior toward others, mood/emotions, self-harm, substance use, school roles performance, home roles performance, and community roles performance. The subscales of the eight psychosocial domains have generally been used to identify the nature of problems, while CAFAS total scores have been used to identify their severity (Hodges & Kim, 2000). Each domain has four symptom categories, from minimal or no impairment (0) to severe impairment (30).

That is, total CAFAS scores range from 0 (no disruption of functioning) to 240 (severe disruption or incapacitation). Based on the manual, if scale sum scores range from 100 to 130, youth likely need care which is more intensive and restrictive than outpatient services (Hodges, 1999). In 1997, Hodges modified the CAFAS with the additional Strengths and Goals Functional Assessment Scale (SG-FAS). However, little information is available for its psychometric properties and the scores of SG-FAS have rarely been used in outcome studies. The estimated time to complete the CAFAS is between 25 to 30 minutes by trained interviewers.

Clinical studies of the CAFAS support well its psychometric properties (Hodges, Doucette-Gates, & Liao, 1999; Hodges, & Wong, 1996; Hodges, & Wotring, 2000). According to the literature, reliability of the CAFAS is high for the total score and behaviorally-oriented subscales and it provides discriminant validity and predictive validity (Hodges & Kim, 2000; Hodges, & Wotring, 2000; Quist & Matshazi, 2000).

For the past decade, the CAFAS has been widely used for measuring functional impairment of children and youth, especially in systems of care communities (Hodges, Doucette-Gates, & Kim, 2000; Hodges & Kim, 2000; Hodges & Wong, 1997; Hodges, Wong, & Latessa, 1998; Quist & Matshazi, 2000; Reay, 1999; Robertson, Bates, Wood, Rosenblatt, Furlong, Casas, & Schwier, 1998; Rosenblatt & Rosenblatt, 2002; Walrath, Mandell, & Leaf, 2001). Most of the studies show that the CAFAS is a sensitive measure in assessing program effectiveness (i.e., showing that the intervention brought positive changes in the

CAFAS scores over time). Some studies report that the CAFAS score was a significant predictor for juvenile recidivism and use of restrictive setting services (Hodges, Doucette-Gates, & Kim, 2000; Hodges & Kim, 2000; Hodges & Wong, 1997; Quist & Matshazi, 2000).

Hodges, Doucette-Gates, and Kim (2000) investigated the relationship of the CAFAS score and level of restrictiveness of living arrangements and number of days in out-of-family care. Along with the CAFAS, other variables, such as the CBCL, gender, age, and level of family income were included in a prediction model. One of the findings indicated that the CAFAS score at intake was a significant predictor of restrictive living arrangements between intake and six months and was a more consistent predictor than the CBCL.

Quist and Matshazi (2000) tested the degree to which the CAFAS predicted recidivism among juvenile offenders and indeed found that the CAFAS scores were significantly related to recidivism. The CAFAS score has also been useful for predicting acting out behaviors. Using a large data set from the Center for Mental Health Services (CMHS), Hodges and Kim (2000) investigated the predictive validity of the CAFAS for contact with the law and poor school attendance. The results of a logistic regression showed that the CAFAS total score at intake was a positive predictor of the likelihood of contact with the law and poor school attendance, even after controlling for age, gender, and risk factors. These findings were consistent with research indicating that the CAFAS predicts recidivism in juvenile delinquents.

Hodges and Wong (1997) further explored the CAFAS score in predicting the level of service utilization. Results indicate that the CAFAS total score at intake is a significant predictor of service utilization - utilization indicators included restrictiveness of care, total cost, number of bed days, and total number of days of service received. In this study, only the CAFAS total score and the presence of conduct disorder contributed to the prediction of service utilization and cost at 12 months.

Findings from these studies indicate that both the CBCL and the CAFAS are sound measures of behavioral and functional impairments, with both statistical and clinical sensitivity.

Strength-Based Measure

One of the unique principles of systems of care is its strength-based approach. The strength-based orientation allows the children and families to be seen as individuals with talents and skills, as well as having specific unmet needs (Lourie, Katz-Leavy, & Stroul, 1996). This orientation recognizes the fact that even the most troubled children and their families have strengths, assets, and coping skills that can be built upon when creating services and interventions.

The strength-based orientation of systems of care drove the development of the strength-based assessment tools for children. Compared to traditional assessment tools that have overly focused on pathology and problem symptoms, the strength-based instruments measure the positive behavioral, emotional, and social factors

associated with their healthy functioning and development. Authors (Esptein & Sharma, 1998; Lyons, Kisiel, & West, 1997; Lyons, Uziel-Miller, Retes, & Sokol, 2000) suggested that the assessment of strengths is not only useful for service planning, but also for a more complete understanding of outcomes.

Some of the notable examples of the strength-based assessments are the Behavioral and Emotional Rating Scale - BERS (Esptein & Sharma, 1998), the Child and Adolescent Strength Assessment - CASA (Lyons, Kisiel, & West, 1997), and the Child and Adolescent Needs and Strengths - CANS (Lyons, Sokol, Khalsa, & Lee, 1999). Of those, the BERS has gained popularity and been used most widely for the past 5-6 years, especially among systems of care programs. Currently every CMHS funded site is required to use the BERS and to report results back to the national evaluation. The psychometric properties of the CASA or the CANS have not been well documented, and neither the CASA nor the CANS have been cited as often as the BERS in the literature.

Behavioral and Emotional Rating Scale (BERS)

Epstein and Shamara (1998) developed the BERS to rate a child's behaviors and emotions in a positive way, using a strength-based approach. They divided strengths into five behavioral and emotional domains: interpersonal strength (IS), family involvement (FI), intrapersonal strength(IaS), school functioning (SF), and affective strength (AF). It is designed for caregivers or professionals (i.e., teachers

or service providers) to score the behaviors of children ages 5 to 18. It usually takes about 10 to 15 minutes to complete (Esptein & Sharma, 1998).

The BERS consists of 52 items and each item is rated on a four-point scale: 0 = not at all like the child, 1 = not much like the child, 2 = like the child, and 3 = very much like the child. These raw scores are transformed into standard scores for each subscale, with a mean of 10 and standard deviation (SD) of 3. Subscale standard scores are then summed and converted to a strength quotient (SQ), which has a mean of 100 and SD of 15 (Esptein & Sharma, 1998). Lindemann (2000) suggests that the strength quotient (SQ) can be used for a number of useful purposes: 1) to locate strengths of the child in comparison to the normative national sample, 2) to see changes in the SQ scores over time, or 3) to find a relationship between the SQ and other outcome indicators, such as its relationship with future out-of-home placement.

Epstein, Harniss, Ryser, and Pearson (1999) addressed reliability of the BERS. They investigated test-retest reliability to determine the stability of the measure over time and also examined inter-rater reliability to show that the measure can be used by different individuals. Both reliability coefficients were satisfactory to meet the criteria for its further usage. Harniss et al. (1999) investigated the convergent validity of the BERS. The study reported that the BERS score had a moderate or strong level of convergent validity, when compared to the instruments that measure the same or similar constructs. No specific study was available to show its predictive validity (for example, whether the BERS score predicts future juvenile recidivism or future out-of-home placements).

Due to its recent development, only a limited number of studies that used the BERS have been published in journals. Most of them (6 out of 7 identified journal articles) focused on examination of its psychometric properties (either reliability or validity). Despite the fact that the systems of care approach clearly claims that it is a strength-based approach, very little information is available regarding how the BERS is related to other variables. No specific study was found that examined the relationship between the BERS score with outcome indicators. One study (Reid, Epstein, Pastor, & Ryser, 2000) showed that the BERS discriminated students with learning disabilities (LD) and emotional and behavioral disorders (EBD) from those who were nondisabled. The use of the BERS improved significantly in classifying students with EBD and nondisabled students, but not in classifying students with LD. This suggests that the BERS may be useful in the assessment process for children with SED/EBD.

Family Functioning

One of the most attractive elements of systems of care is a family-focused approach. This section highlights studies related to measures of family functioning. In the context of systems of care, this section addresses; 1) measurement tools that researchers have used to assess family functioning, and 2) its implication for further research.

During the past few decades, researchers have devoted significant efforts toward defining and assessing family functioning (Schwab, Stephenson, & Ice, 1993;

Touliatos, Perlmutter, & Straus, 2001). Literature provides that many different disciplines, from psychology to sociology, have tried to develop ways to define and examine family functioning, although each discipline takes a unique approach to accomplish it. A review of the literature reveals that mainly two standardized instruments, the Family Assessment Device (FAD) and the Family Adaptability and Cohesion Evaluation Scale (FACES), have been used in systems of care research to capture family functioning (Heflinger, Northrup, Sonnichsen, & Brannan, 1998).

The Family Assessment Device (FAD) was developed directly from the McMaster Model of Family Functioning (MMFF) (Epstein, Baldwin, & Bishop, 1983; Touliatos, Perlmutter, & Straus, 2001). The McMaster Model of Family Functioning (MMFF), originally developed in the early 1980s, is based on system theory (Miller, Ryan, Keitner, Bishop, & Epstein, 2000; Schwab, Stephenson, & Ice, 1993), and it is a clinical model based on the assumptions that family functioning is associated with the accomplishment of essential functions and tasks (Grotevant & Carlson, 1989). The crucial assumptions of systems theory which underlie the model are: 1) all parts of the family are interrelated, 2) one part of the family cannot be understood in isolation from the rest of the family system, 3) family functioning cannot be fully understood by simply understanding each of the individual family members or subgroups, 4) a family's structure and organization are important factors that strongly influence and determine the behavior of family members, and 5) the transactional patterns of the family system strongly shape the behavior of family members (Miller, Ryan, Keitner, Bishop, & Epstein, 2000).

The Family Assessment Device (FAD) has been used in a variety of clinical settings, including family practice, psychiatry, and family outcome studies (Schwab, Stephenson, & Ice, 1993), including systems of care sites (Heflinger, Northrup, Sonnichsen, & Brannan, 1998; also see Table 5 on page 54). To understand the family structures, organization and transactional patterns associated with family difficulties, the developers focused on assessing and formulating six dimensions of family life: problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control (Miller, Ryan, Keitner, Bishop, & Epstein, 2000).

The Family Adaptability and Cohesion Evaluation Scale (FACES) is another measure of family functioning used in the systems of care programs (Greenbaum, Dedrick, Friedman, Kutash, Brown, Lardieri, & Pugh, 1998). Family Adaptability and Cohesion Evaluation Scale (FACES) was derived from Olson's Circumplex Model. Olson and Killorin, (1983) presented their "Circumplex Model of Marital and Family System" to conceptualize family functioning using the two axial dimensions, cohesion and adaptability. Circumplex model builds on early family therapy traditions, such as Minuchin's model of family therapy (1974) and Bowen's family system theory (Papero, 1990). The issues of boundaries and balance are core concepts in these family therapy models.

Despite the recent critiques on its conceptual flaws and curvilinear relationship [for example, Franklin and Streeter (1993) found that the FACES III continued to have reliability and validity problems with adaptability subscales even

when using the linear 3-D interpretation; also when Franklin, Streeter, & Springer (2001) reported both corroborating and contradictory results regarding reliability and validity of the new FACES IV, one of their findings supported the fact that overlapping and confounding dimensions have been an on-going problem for the FACES measure.], FACES III (later FACES IV) has been one of the most widely used instruments to assess family functioning for the past two decades.

Measurement tools that have been used for assessing family functioning in systems of care are illustrated in Table 5. Based on the studies (Duchnowski, Hall, Kutash, & Friedman, 1998; Greenbaum, Dedrick, Friedman, Kutash, Brown, Lardieri, & Pugh, 1998; Heflinger, Northrup, Sonnichsen, & Brannan, 1998; Ichinose, Kingdom, & Feltman, 1998; Illback, Nelson, & Sanders, 1998; Rosenblatt, 1998; Santacangelo, Bruns, and Yoe, 1998; Schoenwald, S. K., Borduin, C. M., & Henggeler, 1998) that have reported comprehensive findings of outcome measures in systems of care programs, ten sample programs were selected from the literature. The table summarizes 1) whether the sample programs adopted family functioning as an outcome domain, 2) if they did, what kind of measurement tools they used to assess it, and 3) whether the scale was able to detect changes in family functioning.

<u>Table 5. Programs and Outcomes of Family Functioning</u>			
Program	Family	Measurement	Outcome

	Functioning		
NACTS, FL (84-89)	YES	FACES III	Result of FACES III was not available
ARTS (five selected program, 90-95)	YES	FACES III IOF (Impact On Family Scale)	Both instruments failed to detect changes
Vermont's New Directions Initiative (90-94)	NO	N/A	N/A
Kentucky IMPACT (90-95)	NO	N/A	N/A
Ventura Planning Model, CA (85- 88)	NO	N/A	N/A
Connections, OH (88 -95)	NO	N/A	N/A
Fort Bragg, NC (89-92)	YES	FAD	Very little change (essentially same)
Missouri MST, MS (94-97)	YES	FACES II	Positive changes
DAWN Project, IN (97-99)	NO	N/A	N/A
Children's Partnership, TX (99-03)	YES	FAD	Very little change

Findings from the sample of ten systems of care programs are quite surprising. Half of them did not report or set family functioning as an outcome domain. Also, it is interesting to observe that adopted instruments did not show the positive outcomes in family functioning over time. Heflinger et al. (1998) and Rosenblatt (1998) support that little empirical research has been conducted that deals with family-related constructs such as family functioning in systems of care outcome. Nor has the literature provided guidance regarding how much change in family functioning should be expected in families caring for children and adolescents with SED.

Surprisingly very little information is available to explain the relationship between family functioning and children's outcomes (for example, how family

functioning affects youths' future out-of-home placements). Only one published study (Greenbaum et al., 1998), included family functioning as a predictor of out-of-home placements of youth. The study examined the predictors of readmission to a residential treatment center (RTC) and found that youth from the families with less functional FACES scores had a higher probability for reentering residential treatment center (RTC).

This paucity of studies suggests that more investigations should explore family functioning in relationship to successful child and family outcomes. This gap prevents understanding of the magnitude of the association, the direction of relationship, and the causality of these two variables.

Conceptual Framework

A comprehensive discussion of all the theories and conceptual frameworks related to serious emotional disturbance (SED) and its association with the out-of-home placements is beyond the scope of this paper. The use of specific mental health services (i.e., services at restrictive settings or at out-of-home placements) is so dynamic and complex that no single theory or conceptual framework successfully explains them (Min, 2000). However, a brief review of the conceptual framework is a requisite for a reasonable discussion of predictors of out-of-home placements. This section first presents a conceptual framework used in this study. Then a review of relevant literature organized around the variables included in this study is outlined.

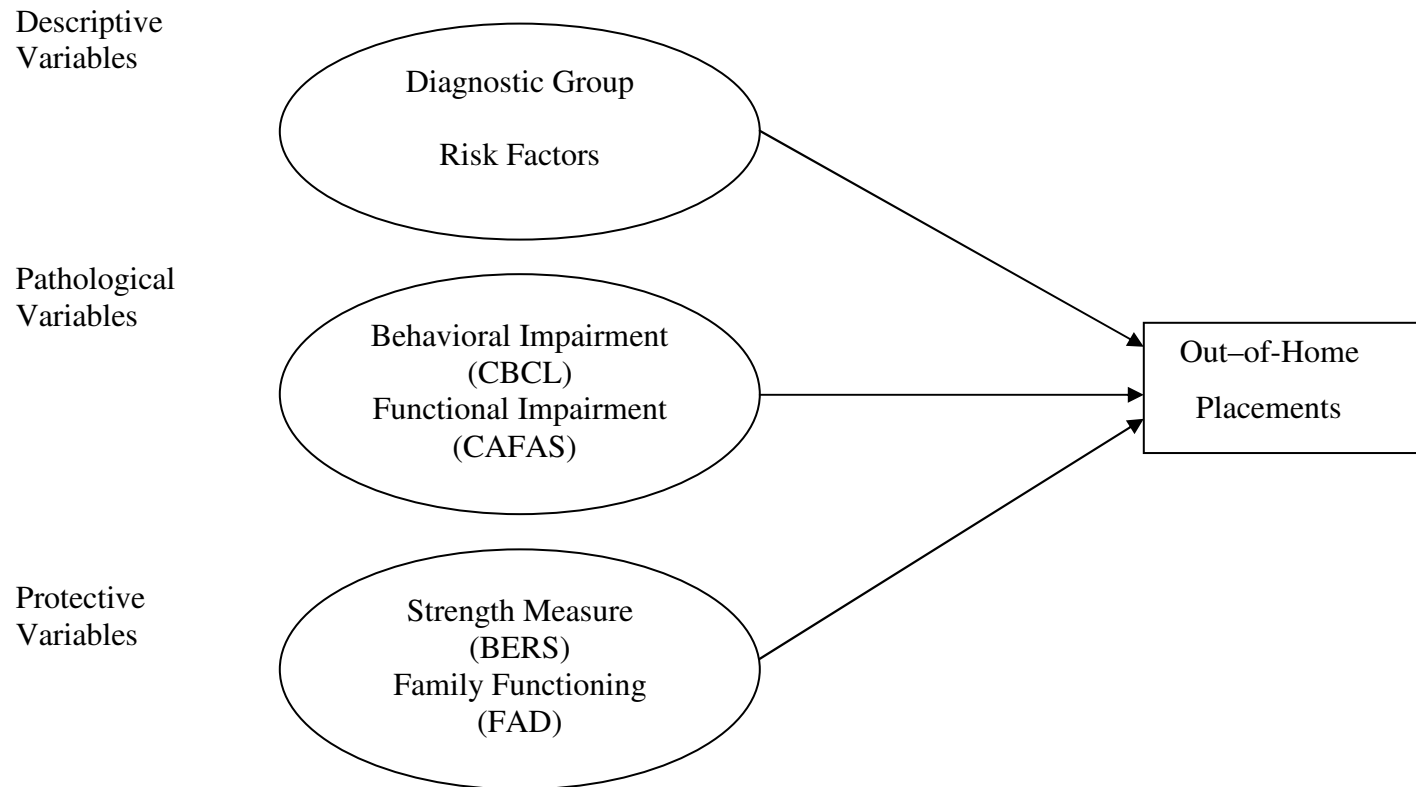
Although various theories and paradigms have been proposed in the health and mental health literature [see “health service utilization model” by Anderson & Newman (1973); “social control theory” in Greenly & Mullen (1990)] to understand the dynamics of specific services utilization, these frameworks are mainly focused on characteristics of the general population, without expanding their discussions of how their frameworks are applicable for understanding children and adolescents and the given outcomes.

Traditional approaches to understanding the utilization of services within restrictive settings or out-of-home placements in children’s mental health have been framed largely under the pathological paradigm (Lindemann, 2000), seeing individual deviant characteristics as main predictors of services use in restrictive settings while ignoring the contribution of the strengths and resilience factors. Also, a review of literature in children’s mental health reveals that marginal attention has been given to the family (the system where the given child maintains everyday life and shares history, risk factors, and functions) factors as predictors of placement outcomes for the target population (Chung, 2000; Gonzalez, 1997; Reay, 1999). Furthermore, studies on predictors of out-of-home placements have commonly been atheoretical. Selection of explanatory variables has relied mainly on the results of previous research or clinical observations (Min, 2000).

To meet the current gap in research, this study includes strength-based indicators and family factors, which have been ignored or minimally addressed in predicting out-of-home placements in children’s mental health research, along with

predictors examined in the previous research, such as diagnostic information, risk factors, and behavioral and functional impairments. Selection of six predictors (diagnostic information, individual/family risk factors, behavioral impairments, functional impairments, a strength-based measure, and family functioning; see Figure 1) in this study is based on the previous research and conceptual framework borrowed from ecological perspectives (see Amatea & Sherrard, 1993; Astor, Pitner, & Duncan, 1998; Auerswald, 1968; Bronfenbrenner, 1979; Bubolz, & Sontag, 1993; Keeney & Sprenkle, 1982; and Kemp, Whittaker, & Tracy, 1997) and the integrative assessment model (Lindemann, 2000; Rhee, Furlong, Turner, & Harari, 2001).

Figure 1. Conceptual Framework of the Study



Ecological Perspectives

An ecological perspective emerged in the late nineteenth century and reemerged in the 1960s with heightened awareness of the interdependence of human behaviors and the environment with an interest in understanding phenomena from holistic and systems perspectives (Bubolz, & Sontag, 1993). Historically the major focus in the behavioral sciences prior to ecological thinking had been on individual functioning as reflected in such approaches as psychoanalytic theory and classical behaviorism, as well as learning theory (Andreae, 1996). By attending exclusively to the individual, these perspectives largely depend on simple linear causality and failed to examine the contexts and the process by which the current behavior occurs (Andreae, 1996). The ecological perspective, by comparison, is more holistic and better attuned to targeted interpersonal relationships and stresses the reciprocity of behaviors between people and environments (Bronfenbrenner, 1979; Bubolz, & Sontag, 1993; Germain & Gitterman, 1980; Germain & Gitterman, 1996).

The ecological perspective posits that behaviors of individuals cannot be fully understood without considering larger environments in which they live. Ecological thinking focuses on the reciprocity of person-environment exchanges, in which each shapes and influences the other over time. This mode of thought also markedly differs from linear thinking. In summary, linear thinking explains some simple human phenomena, but ecological thinking explains more complex phenomena using a larger environmental context. Because it emphasizes the interdependence of individuals and environments, ecological theory is especially

suitable as a ‘metaphor’ for social work, given its commitment to the person-environment concept (Germain & Gitterman, 1996; Kemp, Whittaker, & Tracy, 1997).

Moving from an exclusive focus on the individual to recognition of the importance of the family and other environments that impact the development and functioning of children and adolescents is critically important. As seen in Figure 1, the rationale for including family-related risk factors and family functioning in this study is based on the ecological perspective, which attempts to incorporate influences of family systems on children’s outcomes (i.e., out-of-home placements).

Integrative Strength and Pathology Based Assessment Model

Integrative Strength and Pathology Based Assessment (ISPBA, see Lindemann, 2000; Lyons, Uziel-Miller, Reyes, & Sokol, 2000; Rhee, Furlong, Turner, & Harari, 2001) is the other theoretical model that this study has incorporated into its conceptual framework. The ISBPA consists of two complimentary approaches: Strength-Based Assessment (SBA) and Pathology-Based Assessment (PBA). The ISBPA model is based on the notion that comprehensive assessment includes both positive (strength-based) and negative (pathology-based) information about child functioning (Lindemann, 2000). The underlying logic of the ISBPA is that the combined information from two perspectives is more useful and valid than only one of them. While PBA derives from a medical model, focusing on problems and abnormalities in development and functioning of children and

adolescents, SBA derives from the research tradition commonly related to resilience and protective factors, emphasizing the positive behavioral, emotional, and social factors associated with healthy functioning and development of children and adolescents (Leffert, Benson, Scales, Sharma, Drake, & Blyth, 1998; Lindemann, 2000).

Some examples of PBA measures, to name a few, include: the Child Behavior Checklist (CBCL; Achenbach, 1991); the Children's Depression Inventory (CDI; Kovacs, 1992); the Child Severity of Psychiatric Illness (CSPI; Lyons, 1998); and the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1995). These measures can be used both in assessing specific problems for intervention and monitoring treatment outcome (Lindemann, 2000). Some of the notable examples of the strength-based assessments (SBA) are the Behavioral and Emotional Rating Scale (BERS; Esptein & Sharma, 1998), the Child and Adolescent Strength Assessment (CASA; Lyons, Kisiel, & West, 1997), and the Child and Adolescent Needs and Strengths (CANS; Lyons, Sokol, Khalsa, & Lee, 1999).

The major limitation of traditional PBA measures is that they provide little information about strengths and potentials of children and adolescents other than indicating the absence of pathological symptoms (Lindemann, 2000). However, the strength-based orientation allows the children and families to be seen as individuals with talents and skills, as well as having specific unmet needs (Lourie, Katz-Leavy, & Stroul, 1996). Combined with PBA, assessment of strengths is not only useful for

service planning but also for a more complete understanding of outcomes (Esptein & Sharma, 1998; Lindemann, 2000; Lyons et al., 2000).

One of the unique principles of systems of care (upon which this study is grounded) is the strength-based approach, which recognizes that even the most troubled children and their families have strengths, assets, and coping skills that can be built upon when creating services and interventions. The strength-based orientation of systems of care motivated adoption of the strength-based assessment tools for the children and adolescents they serve (Lindemann, 2000). In compliance with federal requirements, the Children's Partnership has been using two PBA (CBCL and CAFAS) measures and one SBA (BERS) measure and this study will include all three measures to predict the out-of-home placements of children with SED. By adopting both pathological and strength-based assessment models, this study examines how these two distinctive approaches are individually associated with the outcome variable (i.e., out-of-home placements), investigates which one is a stronger predictor than the other, and finally, observes the relationship (magnitude and strength) between two complimentary measures. This specific analysis has rarely been conducted and, therefore, offers a contribution to the field.

Research Questions

The aim of this study is to examine a set of indicators and factors to predict out-of-home placements for children and adolescents with serious emotional disturbances (SED). Based on the previous research and the conceptual framework,

this study adds a different set of variables in a hierarchical manner: 1) the first stage with two descriptive indicators (diagnostic grouping variable and number of risk factors), 2) the second stage with two pathological indicators (behavioral impairment measured by the CBCL and functional impairment measured by the CAFAS), and 3) the third stage with two protective indicators (strength-based indicator measured by the BERS and family functioning measured by the FAD). With grouped variables (three stages with 2 variables in each stage), the study investigates the following grouped-level research questions:

1. Will all six predictors (diagnostic grouping, risk factors, behavioral impairments, functional impairments, strength-based indicator, and family functioning), as a set, significantly predict future out-of-home placements for children with SED enrolled in a systems of care ?
2. Will each stage, as a group, have an individual ability to predict the out-of-home placements? and
3. Will there be statistically significant relationships among the six predictors?

The major research questions mentioned above deal with grouped variables – the first two research questions investigate the relationship between a set of predictor variables and the out-of-home placement, and the last research question tests relationships among all predictors, without considering relationship with the dependent variable. In addition to the grouped-level research questions described

above, this study also poses individual-level research questions to examine the relationship between each predictor variable with the dependent variable:

- 4a. Will the children with disruptive behavior disorders have a higher chance of being in future out-of-home placements than children with no disruptive behavior disorders?
- 4b. Will the children with more numbers of risk factors have a higher chance of being in future out-of-home placements than children with less numbers of risk factors?
- 4c. Will the children with severe behavioral impairments have a higher chance of being in future out-of-home placements than children with fewer severe behavioral impairments?
- 4d. Will the children with severe functional impairments have a higher chance of being in future out-of-home placements than children with fewer severe functional impairments?
- 4e. Will the children with more strength have a reduced chance of being in future out-of-home placements than children with fewer strengths? and
- 4f. Will the children with a higher level of family functioning have a reduced chance of being in future out-of-home placements than children with a lower level of family functioning?

With these proposed research questions, both with individual and grouped predictors, the findings of this study can provide implications and contributions to the children's mental health field as follows: 1) identification of the relative importance of each individual predictor, 2) investigation of effects of a strength-based indicator and family functioning in the prediction of placement outcome,

which has rarely been done both in past and current children's mental health research,

3) development of intake profiles for children with high risk of future out-of-home placements; and perhaps most importantly 4) provision of clinical implications for the early intervention and service planning for those children who show high risk of out-of-home placements at intake.

CHAPTER THREE

METHODOLOGY

Study Setting

All children and adolescents included in this study are a sub-sample of the local mental health wraparound service program, referred to as the Children's Partnership. The Children's Partnership is part of an ongoing evolution of change and growth in children's mental health services within the state of Texas. The Children's Partnership provides community-based services to children and adolescents with a diagnosis of serious emotional disturbance (SED), or for whom there is good reason to suspect a condition of serious emotional disturbance because of specific behaviors or other underlying conditions.

In 1997, a pilot integrated funding project targeting services to children with serious emotional disturbance and their families was funded by the Robert Wood Johnson Foundation. Based on the success of that pilot, the Children's Mental Health Partnership, families and public agencies partnered to secure an additional seven million dollar grant from the Substance Abuse and Mental Health Services Administration (SAMHSA). Five years later, the Children's Partnership continues to evolve, seeking to expand its reach to children and families across the Austin-Travis County area (Haynes, Springer, Casey, Cook, Davis, Johnson, & Yoo, 2001).

The Children's Partnership is based on a system of care theory model. The program theory asserts that to serve children with serious emotional disturbance, service delivery systems need to offer a wide array of community-based service options that center on children's individual needs; include the family in treatment planning and delivery; and are provided in a culturally competent manner. Also, an emphasis is placed on serving children in the least restrictive setting that is clinically appropriate (Stroul & Friedman, 1986). In addition, because many children with a serious emotional disturbance use a variety of services and have contact with several child serving agencies, service coordination and interagency collaboration are critical. The program theory holds that if services are provided in this manner, outcomes for children and families will be better than can be achieved in more traditional service settings (Friedman, Kutash, & Duchnowski, 1996; Stroul & Friedman, 1986).

Sample

The sample for this study includes the children and adolescents receiving community-based services in Travis County under the auspices of the Children's Partnership - a collaboration of state and local health and human service agencies. Specific criteria for eligibility to participate in the study include children and adolescents who are: 1) currently residing in out-of-home placement, or placement is considered imminent; 2) involved in at least two human service systems; 3) experiencing serious problems in functioning in the domains of personal, family, school, and community; 4) posing no immediate risk of harm to self or others; 5)

being between infancy to 22 years of age. All variables of interest, except diagnostic information, were captured by the responses from the caregivers of the sample. Majority of the caregivers (80%) was a biological mother who had legal custody of the sample.

Study Design

This study utilizes a non-experimental cohort research design. Since this study does not have any control or comparison group, it seems inevitable to choose a non-experimental cohort design that follows the same sample over time to identify factors (independent variables) leading to an outcome of interest (dependent variable) (Kazdin, 1998). The term ‘cohort’ refers to any sampled group that has shared the same major life events or interventions during a designated interval (Kiecolt & Nathan, 1985). This study examines children who received services from the Children’s Partnership program from their intake to 12 months following intake.

Data Source and Data Collection

This study collects data from three different sources. Data for all independent variables are collected through face-to-face interviews at intake by trained evaluators affiliated with the University of Texas at Austin, School of Social Work, Center for Social Work Research. The data collectors receive about 27 hours of training (Haynes, Springer, Casey, Cook, Davis, Johnson, & Yoo, 2001). There are six steps (pre-training and five phases) to the training that include:

- Pre-training - review of the instruments
- Part I reviews such topics as:
 - Review of Children's Partnership
 - Overview of the national evaluation
 - Presentation of data collection model
 - Elements of interview
 - Experiential exercises
- Part II consists of homework such as completing mock interviews using the instruments
- Part III trains on administration of the CAFAS, the most intensive part of instrument training
- Part IV involves group discussions related to increasing competency in use of the data collection instruments
- Part V includes practice with actual families and preparation for the first intake interview

Two local agencies, Austin Travis County Mental Health and Mental Retardation (ATCMHMR) and Austin Travis County Juvenile Probation (ATCJP), provide data for out-of-home placement history at 12 months following intake (dependent variable). Out-of-home placement data includes stays in psychiatric hospitalization, residential treatment center, foster home, emergency shelter, juvenile detention center, and any correctional facility. They derive their data either from their administrative records or archival data provided by the contracted agencies.

Variables and Measurements

Unit of Analysis

Unit of analysis of this study is children and families receiving community-based services in Travis County under the auspices of the Children's Partnership.

Independent Variables

Based on the literature review and the conceptual framework, a total of six independent variables will be examined in this study to determine the extent to which they predict the dependent variable (out-of-home placement). Table 6 illustrates how these variables are operationalized and coded in the study. A detailed discussion of each variable follows Table 6 below.

Table 6. Variables and Coding

Variables	Coding
Independent variables	
Diagnostic Group	Group diagnosed with any disruptive behavior disorders = 1 Group diagnosed with any other disorders = 0
Risk Factors	Sum of eleven binary risk indicators from the Descriptive Information Questionnaire (DIQ) It ranges from 0 to 11
Behavioral Impairment	CBCL total problem score
Functional Impairment	CAFAS total score
Strengths Measure	BERS Strength Quotient
Family Functioning	FAD global functioning scale
Dependent Variables	
Out-of-Home Placement	Presence of any out-of-home placement for 12 months after intake = 1 Absence of any out-of-home placement for 12 months after intake = 0

Diagnostic Group

The diagnostic grouping variable is coded as binary, which differentiates a group of children diagnosed with disruptive behavior disorders (i.e., any presence of conduct disorder, oppositional defiant disorder, impulse control disorder, attention-deficit hyperactivity disorder, or bi-polar disorder) from the group with non-disruptive behavior disorders (i.e., PTSD or substance use disorders). This binary coding scheme is mutually exhaustive, meaning children diagnosed with any of the four disruptive behavior disorders are classified as one group, while children with any other disorder are classified as the other group. For children with multiple clinical diagnoses, the presence of any disruptive behavior disorders would place the child in the disruptive behavior group.

Risk Factors

Risk factors are operationalized with the similar scheme that Rosenblatt et al. (2000) presented in their study (see Tables 3 and 4). Indicators of risk factors in this study come from the Descriptive Information Questionnaire (DIQ) developed by MACRO (1998), the contracted agency for the national longitudinal evaluation of the Children's Partnership, to capture all the descriptive data elements required by the Center for Mental Health Services (CMHS). The descriptive data includes demographic information, previous service history, child's presenting problems, risk

factors of the child and family, medical concerns, and other background information regarding a child and family. Eleven risk indicators in the DIQ include:

- 1) Previous psychiatric hospitalization
- 2) Physically abused
- 3) Sexually abused
- 4) Runaway
- 5) Suicide attempt
- 6) Substance use
- 7) Sexually abusive
- 8) History of family violence
- 9) Felony conviction of parent/caregiver
- 10) History of family mental illness
- 11) History of family substance abuse

All eleven items are asked in binary response format (i.e., choice of ‘yes’ or ‘no’ for the question like “Has the child ever had a previous psychiatric hospitalization?”). The first seven items assess risk factors concerning the child, while the last four items measure risk factors of the family where the child maintains daily life. In this study the risk factor is operationalized as the sum of the above eleven risk indicators with possible scores ranging from 0 (sample with no risk indicators) to 11 (sample with maximum risk indicators).

Behavioral Impairment

Behavioral impairment is measured by the Child Behavior Checklist (CBCL) (Achenbach, 1991). The Child Behavior Checklist (CBCL) is one of the most

widely used measures in child psychology (Lindemann, 2000). As mentioned in Chapter II, the CBCL (ages 4 – 18) is designed to record children's competencies and behavioral and emotional problems in a standardized format as reported by their caregivers. The behavior problem section (Items 1 through 113) identifies symptoms on a continuum and provides two broad-band (internalizing and externalizing) syndrome scores and eight narrow-band syndrome scores (withdrawn, somatic complaints, anxiety/depression, social problems, thought problems, attention problems, delinquent behavior, and aggressive behavior).

Although the CBCL is designed to be self-administered, there are situations in which an interviewer administers it. To assess the effect of interviewer differences (interrater reliability), Achenbach (1991) compared scores obtained by three interviewers on 241 matched children and found the overall intraclass correlation coefficient was .96 for the problem items, indicating a very high interrater reliability in scores obtained for each item relative to scores obtained for each other item. Achenbach (1991) also reported that the test-retest reliability of CBCL scale scores was supported by a mean test-retest of $r=.89$ for the problem scales over a seven day period. Regarding its construct validity, the CBCL scores were correlated with assessment tools that measures similar constructs (i.e., Conners's Parent Questionnaire and the Quay-Peterson's Revised Behavior Problem Checklist). The correlation between the CBCL and Conner's syndrome scales ranged from .59 to .86 and correlations of the CBCL with corresponding Quay-Peterson scales ranged from .52 to .88 (Achenbach, 1991).

The items of the CBCL were factor analyzed to empirically identify the forms of psychopathology that actually occur in children. The CBCL produces continuous raw scores and t-scores in each domain. The t-scores, which have a uniform mean of 50 and a standard deviation of 10, are normed separately for boys and girls and for younger (ages 4 to 11) and older (ages 12 to 18) children, based on a nationally-representative sample (Achenbach, 1991). A total problem score, which is standardized and has three distinct ranges [nonclinical (T scores under 60), borderline (T score between 61 to 63), and clinical (T scores over 63)], can also be generated.

For the analysis, the total problem score is used to predict out-of-home placement. This score is a standardized T score ranging from 0 to 100; the higher the score is the more severe the behavioral and emotional problems. The rationale for using the standardized T score is that it makes it easier to compare findings to samples across studies.

Functional Impairment

Functional impairment is captured by the Child and Adolescent Functional Assessment Scale (CAFAS) (Hodges, 1999; Hodges, 2000). The CAFAS is designed to assess a degree of impairment of children and adolescents in day-to-day functioning due to emotional, behavioral, psychological, psychiatric, or substance use problems (Hodges, 1999). It is important to distinguish that social functioning and symptomatology are different constructs. Although the CBCL captures

information about specific behaviors and symptoms, the CAFAS is designed to assess the effects of the child's challenges and behaviors on his/her ability to function successfully in various life domains (MACRO, 2000). The eight subscales of the CAFAS, each corresponding to a psychosocial domain, include thinking, behavior toward others, mood/emotions, self-harm, substance use, school roles performance, home roles performance, and community roles performance. The subscales of the eight psychosocial domains have generally been used to identify the nature of problems, while CAFAS total scores have been used to identify their severity (Hodges & Kim, 2000). Each domain has four symptom categories, from minimal or no impairment (0) to severe impairment (30). That is, total CAFAS scores range from 0 (no disruption of functioning) to 240 (severe disruption or incapacitation). The estimated time to complete the CAFAS by trained interviewers is between 25 to 30 minutes.

Regarding its reliability, Hodges and Wong (1996) reported that the most behaviorally oriented scales had the highest reliability, with correlations for the total CAFAS score ranging from .92 to .96 across four different samples. The authors also reported good interrater reliability, with intraclass correlations for total scores ranging from .84 to .89 using mental health workers, service providers, lay raters, and graduate students. A variety of studies (Hodges, Doucette-Gates, & Liao, 1999; Hodges, & Kim, 2000; Hodges, Wong, & Latessa, 1998; Hodges & Wotring, 2000) demonstrated the construct, concurrent, and discriminant validity of the CAFAS when used with clinical samples. The CAFAS total score showed a significant

relationship with number and types of services used, amount of service used, and cost of services within systems of care (Hodges, Doucette-Gates, & Liao, 1999). Logistic regression analyses revealed that youth with higher CAFAS scores were more likely to have difficulties in school, problems with the law, and poor social relationships (Hodges & Wong, 1996).

In the prediction model in this study, the total CAFAS score (sum of the eight domain scores ranging from 0 to 240) is used to predict future out-of-home placement. Based on the literature (Hodges, Doucette-Gates, & Kim, 2000; Hodges & Kim, 2000; Hodges & Wong, 1997; Quist & Matshazi, 2000), it is expected that children with a higher sum score (revealing greater functional impairment) of the CAFAS at intake would have a higher chance of having out-of-home placements within the 12-month follow-up period.

Strengths-Based Measure

Children's strengths are measured by the Behavioral and Emotional Rating Scale (BERS) to predict out-of-home placement. The BERS is developed to rate a child's behaviors and emotions in a positive way, using a strength-based approach (Epstein & Shamara, 1998; Lindemann, 2000). It is designed for caregivers or professionals to score the behaviors of children ages 5 to 18; completing it usually takes about 10 to 15 minutes (Epstein & Sharma, 1998).

The BERS consists of 52 items and each item is rated on a four-point Likert scale: 0 = not at all like the child; 1 = not much like the child; 2 = like the child; and

3 = very much like the child. These raw scores are transformed into standard scores for each subscale [interpersonal strength (IS), family involvement (FI), intrapersonal strength(IaS), school functioning (SF), and affective strength (AF)], with a mean of 10 and standard deviation (SD) of 3. Subscale standard scores are then summed and converted to a strength quotient (SQ), which has a mean of 100 and SD of 15 (Epstein & Sharma, 1998). The strength quotient (SQ) can vary from 34 to 164. Higher strength quotient scores represent that children have more strengths to cope with struggles and difficulties they face.

The BERS has demonstrated test-retest reliability, interrater reliability, and internal consistency (Epstein, Harniss, Ryser, & Pearson, 1999). The authors investigated test-retest reliability to determine the stability of the measure over time and found the coefficients for the BERS subscales ranged from .85 to .99 with a 10-day interval between the two ratings. When tested using a sample of 96 students with emotional and behavioral disorders rated by their special education teachers, the BERS showed good interrater reliability ranging from .83 to .98 (Epstein, Harniss, Ryser, & Pearson, 1999). Internal consistency (Cronbach's alpha) for the all items was .83 or higher.

Two studies (Epstein, Ryser, & Peterson, 2002; Harniss, Epstein, Ryser, & Pearson, 1999) support the validity of the BERS. Harniss et al. (1999) investigated the convergent validity of the BERS by comparing BERS scores with the measures of the same or similar constructs. Findings revealed that the BERS subscale scores had moderate (.33) to high (.80) correlation coefficients with those of the Walker-

McConnell Scale of Social Competence and School Adjustment – Adolescent Version and Teacher Report Form. Regarding its criterion validity, Epstein et al. (2002) reported the BERS scores were significantly different ($p < .001$) for two distinct groups, one of youth with emotional and behavioral disorders (EBD) and the other group without EBD. No specific study was available to demonstrate its predictive validity (for example, whether the BERS score predicts future juvenile recidivism or future out-of-home placements).

Similar to the CBCL, the standardized strength quotient, a standardized sum score of the five sub-domains of the BERS, is used to predict the dependent variable and to compare findings of this study to studies across different settings and samples. According to Lindemann (2000), the strength quotient (SQ) can be used for a number of useful purposes: 1) to locate strengths of the child in comparison to the normative national sample; 2) to see changes in the SQ scores over time; and 3) to find a relationship between the SQ and other outcome indicators, such as its relationship with future out-of-home placement.

Family Functioning

The Family Assessment Device (FAD) is used to assess family functioning. The FAD is a 60-item questionnaire designed to evaluate family functioning (i.e., how families interact, communicate, and work together) based on the six dimensions (problem solving, communication, roles, affective responsiveness, affective

involvement, and behavior control) in the McMaster Model of Family Functioning (Epstein, Baldwin, & Bishop, 1983; Touliatos, Perlmutter, & Straus, 2001).

The FAD is comprised of seven subscales, one for each of the six dimensions and one overall general functioning scale (FAD-GFS). Each item is rated with a four-point Likert scale with response options ranging from ‘strongly disagree (1)’ to ‘strongly agree (4)’. When administered by an interviewer, it takes about 10 minutes to complete.

The psychometric properties of the FAD have been described in detail in previous studies (Epstein, Baldwin, & Bishop, 1983; Miller, Epstein, Bishop, & Keitner, 1985; Miller, Ryan, Keitner, Bishop, & Epstein, 2002). Internal consistency (Cronbach’s alpha) of the FAD is reported to be .92 for the general functioning scale (FAD-GFS) and to range from .72 to .83 for the six original dimensions (Epstein, Baldwin, & Bishop, 1983). Test-retest reliability over a period of 1 week is reported to range from .66 to .76. The FAD has been found to have low correlations ($r=.06$ to $.19$) with social desirability bias and moderate levels ($r=.47$ to $.59$) of association when correlated with measures of similar constructs (Miller, Epstein, Bishop, & Keitner, 1985). With empirical evidence of its utility in different settings, the FAD has been translated into fourteen languages and has been used in over forty research studies (Miller, Ryan, Keitner, Bishop, & Epstein, 2002).

Unlike the CBCL and BERS, the FAD does not yield standardized sum scores of all sub-domains. Instead, it generates a general functioning scale (FAD-GFS), an abbreviated version of the complete measure that consists of only 12 items

of the FAD. When studies deal with general family functioning, the mean of the FAD-GFS (ranging from 1 to 4) is typically used (MACRO, 1998). For the analysis of this study, the general functioning score (FAD-GFS) is used to predict out-of-home placement. Although studies reveal mixed results regarding its clinical sensitivity over time (refer to Table 5 on page 54), it seems to be worth including in the prediction model because the study design does not attempt to detect changes in the FAD-GFS scores over time. Rather, this study examines how the index of family functioning (FAD-GFS) at intake affects future out-of-home placements for children and adolescents with SED.

Dependent Variable

The single dependent variable of this study, out-of-home placement, is operationalized as a binary code. The children served by the Children's Partnership have been placed in six different types of restrictive settings: 1) residential treatment center, 2) psychiatric hospital, 3) foster home, 4) emergency shelter, 5) juvenile detention center, and 6) correctional facility. If a child experiences any of these six out-of-home placements at the 12-month follow-up, the case is coded as 1 and the absence of any out-of-home placements is coded as 0.

Research Questions and Hypotheses

The purpose of this study is to examine a set of indicators and factors to predict out-of-home placements for children and adolescents with serious emotional disturbances (SED). Using a model comparison approach, this study adds a different set of variables in a hierarchical manner: 1) the first stage with diagnostic grouping and risk factors (descriptive variables), 2) the second stage with indicators of behavioral and functional impairments (pathological variables), and 3) the third stage with strength-based measure and family functioning (protective variables). With grouped variables (three stages with 2 variables in each stage), the study investigates research questions and corresponding hypotheses as described below.

Research Question 1 and Hypothesis 1

Research Question 1: Will all six predictors (diagnostic grouping, risk factors, behavioral impairments, functional impairments, strength-based indicator, and family functioning), as a set, significantly predict future out-of-home placements for children with SED receiving care from the Children's Partnership?

Hypothesis 1: A set of six independent variables (diagnostic grouping, risk factors, behavioral impairments, functional impairments, strength-based indicator, and family functioning) will have a statistically significant relationship (e.g., $p < .05$ of Chi-Square difference test for changes between a null model with no predictor and a full prediction model with six predictors) to predict future out-of-home placements for children with SED receiving care from the Children's Partnership.

Research Question 2 and Hypotheses 2a, 2b, and 2c

Research Question 2: Will each stage, as a group, have an individual ability to predict future out-of-home placements for children with SED receiving care from the Children's Partnership?

Hypothesis 2a: A group of two descriptive variables (diagnostic group and risk factors) at the first stage will have a statistically significant relationship to predict future out-of-home placements for children with SED receiving care from the Children's Partnership.

Hypothesis 2b: After controlling for two descriptive variables at the first stage, a group of two pathological variables (behavioral impairment measured by the CBCL and functional impairment measured by the CAFAS) at the second stage will have a statistically significant relationship to predict future out-of-home placements for children with SED receiving care from the Children's Partnership.

Hypothesis 2c: After controlling for four variables at the previous two stages, a group of two protective variables (strength-based functioning measured by the BERS and family functioning measured by the FAD) at the third stage will have a statistically significant relationship to predict future out-of-home placements for children with SED receiving care from the Children's Partnership.

Research Question 3 and Hypothesis 3

Research Question 3: Will there be statistically significant relationships among six predictors?

Hypothesis 3: Each individual predictor will be significantly correlated with each other.

All research questions mentioned above deal with grouped variables – the first two research questions investigate the relationship between a set of variables and the dependent variable, out-of-home placement. The last research question tests relationships among all predictors, without considering relationship with the dependent variable. The research question three, identifying relationships among

predictors (i.e., directions and magnitudes of the relationship between pathological indicators and protective variables), has rarely been done in previous research.

In addition to the grouped-level research questions described above, this study also poses an individual-level research question to examine the relationship between each predictor variable with the dependent variable.

Research Question 4 and Hypotheses 4a, 4b, 4c, 4d, 4e, and 4f

Research Question 4: Will each predictor variable, after controlling for the other five predictors, have a statistically significant relationship with out-of-home placement?

Hypothesis 4a: Children diagnosed with any disruptive behavior disorder (conduct disorder, oppositional defiant disorder, impulse control disorder, or attention-deficit/hyperactivity disorder) at intake will have an increased chance of being placed in future out-of-home placements than children with no disruptive behavior disorder diagnosis.

Hypothesis 4b: Children with an increased number of risk factors (sum of risk indicators assessed by the DIQ) will have an increased chance of being placed in future out-of-home placements than children with fewer or no risk factors.

Hypothesis 4c: Children with severe behavioral and psychological impairments (higher problem score measured by the CBCL) will have an increased chance of being placed in future out-of-home placements than children with fewer severe behavioral impairments.

Hypothesis 4d: Children with severe functional impairments (higher sum scores measured by the CAFAS) will have an increased chance of being placed in future out-of-home placements than children with less severe functional impairment.

Hypothesis 4e: Children with more strengths (higher strength quotient measured by the BERS) will have a decreased chance of being placed in future out-of-home placements than children with fewer strengths.

Hypothesis 4f: Children with a higher level of family functioning (higher score measured by the FAD-GFS) will have a decreased chance of being placed in future out-of-home placements than children with a lower level of family functioning.

Data Analysis

Hierarchical Logistic Regression – Research Questions 1, 2, and 4

A multiple logistic regression analysis is be used to test research questions and corresponding hypotheses 1, 2, and 4. The nature of the independent variables (multiple independent variables with metric and non-metric structure) and the dependent variable (binary non-metric) fits well with the logistic regression method (Hair, Anderson, Tatham, & Black, 1998; Stevens, 1996). More specifically, this study adopts a model comparison approach for the logistic regression by inputting independent variables in a hierarchical manner. The independent variables, starting with a diagnostic grouping variable, are entered into the prediction model in a specified order based on the researcher's conceptual framework, which is grounded in a review of the relevant literature. This model comparison approach (three-stage hierarchical logistic regression method) has a major advantage over a simple logistic regression (a method that enters all independent variables together at the same time). It allows one to see changes of model fit for each additional independent variable(s) selected by the researcher, not just mathematically selected by the statistical software (Hair, Anderson, Tatham, & Black, 1998; Stevens, 1996).

At the first stage, descriptive variables (diagnostic group and risk factors) are entered into the model to predict out-of-home placement for children with SED receiving care from the Children's Partnership. Two pathological measures (CBCL and CAFAS) are entered in the second stage. At the third stage, two protective variables [strength-based measures (BERS) and family functioning (FAD-GFS)] are added. Each stage is compared to each other to determine which one is the most parsimonious representation of the data. In the interest of parsimony, if the last model (model with all six independent variables) does not significantly improve residuals in the prediction of the dependent variable, it will be rejected in favor of the simpler (the second or the first) model.

Three major assumptions associated with the use of any multivariate analysis include normality, homoscedasticity, and linearity (Hair, Anderson, Tatham, & Black, 1998). Normality is the fundamental assumption in multivariate analysis, referring to the shape of the data distribution for an individual metric variable (i.e., number of risk factors, CBCL score, CAFAS score, BERS score, and FAD-GFS score in this study) and its correspondence to the normal distribution.

Homoscedasticity is an assumption associated primarily with the dependence relationship between variables, implying that dependent variable(s) exhibit equal levels of variance across the range of predictor variables (Hair, Anderson, Tatham, & Black, 1998). Linearity is an implicit assumption of all multivariate techniques based on correlational measures, including multiple regression, logistic regression, and structural equation modeling. Because correlations represent only the linear

relationship between variables, non-linear effects will not be captured in the correlation value, resulting in an underestimation of the actual strength of the relationship (Hair, Anderson, Tatham, & Black, 1998).

In addition to the three major assumptions associated with any multivariate analysis described above, multicollinearity is a key issue in interpreting results of any regression analysis. Multicollinearity occurs when there are high intercorrelations (commonly $r = .90$ or higher) among the predictors (Hair, Anderson, Tatham, & Black, 1998; Stevens, 1996). This undesirable phenomenon is a data problem, not a problem of model specification (Hair, Anderson, Tatham, & Black, 1998). It brings a real problem for the researcher using multiple regression for three reasons: 1) limiting the size of R (total variance explained by the predictors), 2) making it difficult to understand the importance of the predictors due to the confounded correlation among them, and 3) increasing the variance of the regression coefficients (the greater the variance, the more unstable the prediction will be) (Stevens, 1996).

A multiple logistic regression is robust to violations of these three statistical assumptions, and as a result, the research can be less concerned about them (Hair, Anderson, Tatham, & Black, 1998). While some multivariate analyses, such as discriminant function analysis and multiple regression with all metric variables, rely on strictly meeting the assumptions of normality and homoscedasticity that are not met in many situations, logistic regression does not face these strict assumptions and is much more robust when these assumptions are not met, allowing its appropriate

application in more situations (Hair, Anderson, Tatham, & Black, 1998). Since the necessary condition for any heteroscedasticity (violation of homoscedasticity) is that the dependent variable must be metric, this assumption cannot be applied to this study because the study uses a non-metric (binary dichotomous) variable as the dependent variable.

Acknowledging these advantages of logistic regression (absence of violation in homoscedasticity and linearity and robustness over the problems with normality), this study focuses on the issues related to multicollinearity of all independent variables. Multicollinearity among the predictors are tested with two common measures [tolerance value and its inverse - the variance inflation factor (VIF)] for assessing both pairwise and multiple-variable collinearity (Hair, Anderson, Tatham, & Black, 1998). These measures examine the degree to which each independent variable is explained by the other independent variables. A common cutoff threshold is a tolerance value of .10, which corresponds to a VIF value above 10 (Hair, Anderson, Tatham, & Black, 1998). When multicollinearity is detected (i.e., situations such as correlation $r > .90$, a tolerance value smaller than .10, or VIF value greater than 10), remediation techniques [i.e., omitting variable(s) with high correlation from the prediction model or using simple correlation coefficients] will be adopted to correct the problems.

Correlation Analysis – Research Question 3

To test research question 3 and its corresponding hypothesis, a series of bivariate correlation analyses were conducted. Statistical assumptions associated with this correlation analysis are the same as in any multivariate analysis (i.e., normality, heteroscedasticity, and linearity). Multicollinearity is not an issue for this analysis because the research question does not include any dependent variables and only examines whether there is any significant relationship ‘among’ predictor variables using bivariate correlations.

For normality, the Kolmogorov-Smirnov statistic, the test for the difference from a normal distribution, is used along with normal P-P plot, skewness, and kurtosis statistics. When any violation of normality is identified, techniques of remediation (i.e., transformation of data) were adopted to see if these remedies bring a better understanding of the relationships. Decisions regarding remediation for any abnormality are based on practical implications, as well as diagnostic statistics. Homoscedasticity, also referred to as homogeneity of variance, is evaluated for each pair of the independent variables, using both graphical (i.e., scatter plot and box plot) and statistical methods (i.e., Levene statistic generated from SPSS). When a violation of homoscedasticity is detected, heteroscedastic variables were remedied through data transformations similar to those used to achieve normality. To examine linearity, two graphical methods (scatter plot and residual plot) will be used to find any non-linearity among the variables. If a nonlinear relationship is detected, remediation procedures, such as transformation of data or creation of new variables

to present the nonlinear portion of the relationship, will be attempted to achieve linearity.

CHAPTER FOUR

RESULTS

This chapter presents the results of the data analysis. First, it introduces the demographic characteristics of the sample and the descriptive statistics of the independent variables and the dependent variable. Results of correlational analysis and hierarchical logistic regression are presented next to investigate the research questions of the study. Results of additional t-test analysis, which aim to develop profiles at intake for children and adolescents with high risk of future out-of-home placements, are also illustrated.

Characteristics of the Sample

A sample of 75 children and their families in the Children's Partnership were screened to determine their eligibility for this study. Participants were considered suitable for the present study if they completed an intake interview and were enrolled in the program before June 30, 2002, allowing a 12 month period of follow-up for out-of-home placements (the dependent variable in this study). From this initial screening, a total of five children and their families were considered ineligible due to missing information on diagnostic information at intake. Data analysis is based on a total of 70 participants who met the inclusion criteria.

Demographic characteristics of the final study sample (N=70) are presented in Table 7. Boys (69 %) are twice more represented in the sample than girls (31%). Over-representation of the boys in the target population is fairly consistent with the national findings (71%, MACRO, 2002) and the overall participants of the Children's Partnership (67%, Haynes, Springer, Casey, Yoo, & Yeung, 2003).

Regarding racial composition, Hispanics (39%) are the largest group in the sample, followed by Whites (31%) and Blacks (29%). About half of the total sample were referred from school systems (26%) and mental health agencies (24%). Juvenile Court (20%), Child Protective Services (CPS, 11%), and correctional facilities (6%) were also referral sources. Other referral sources (13%) include referrals from family members, friends, or local collaborative agencies, such as Community Resource Coordination Group (CRCG) and TRIADS.

The children' age at intake ranged from 7 to 19 years, with an average of 13.2 years (SD=2.93).

Table 7. Demographic Characteristics of the Sample (N=70)

Gender		Frequency	Percent
	Boy	48	68.6
	Girl	22	31.4
Race			
	Hispanic	27	38.6
	White	22	31.4
	African American	20	28.6
	Native American	1	1.4
Referral Source			
	School/Education	18	25.7
	Mental Health		
	Agency/Clinic	17	24.3
	Juvenile Court	14	20.0
	CPS	8	11.4
	Corrections	4	5.7
	Other*	9	12.9
Age at Intake		Mean	SD
		13.2	2.93

Note 1. * Other referral sources include referral sources from CRCG, Triads, family members or friends of family.

Descriptive Statistics of the Independent Variables

Diagnostic Information

Every child and adolescent who participated in the study was diagnosed with at least one or more (Mean=1.96, SD = .91) Axis I diagnoses within the DSM criteria. As shown in Table 8, about 37 percent of the sample was diagnosed with only one Axis I DSM diagnosis. 40 percent of the children had two diagnoses and 17 percent had three different Axis I diagnoses. Five (7%) children were diagnosed with four different Axis I diagnoses. When analyzed as an aggregated number (N= 137, the sum of all Axis I diagnoses from 70 children), Attention-Deficit Hyperactivity Disorder (ADHD, 25.5%) and Depression (18.2%) were the most pervasive disorders of the sample. Conduct Disorder (9.5%) and Oppositional Defiant Disorder (9.5%) were the next and Bipolar (8.0 %), Post-Traumatic Stress Disorder (PTSD, 5.1 %), Adjustment Disorder (3.6 %), and Substance Use Disorder (3.6 %) followed. Other categories in Axis I included diagnoses of Attachment Disorder, Cognitive Disorder, Schizophrenia and/or Psychotic Disorder, Identity Disorder, Impulse Control Disorder, and some V Codes in Axis I.

Table 8. Diagnostic Information of the Sample

Number of Axis I Diagnoses	Frequency (N=70)	Percent
One	25	35.7
Two	28	40.0
Three	12	17.1
Four	5	7.1
Types of Diagnoses	Frequency (N=137)	Percent
ADHD	35	25.5
Depression	25	18.2
Conduct Disorder	13	9.5
Oppositional Defiant Disorder	13	9.5
Bipolar Disorder	11	8.0
PTSD	7	5.1
Adjustment Disorder	5	3.6
Substance Use Disorders	5	3.6
Other ¹	23	16.9
Disruptive Behavior Disorders ²	Frequency (N=70)	Percent
Yes	54	77.1
No	16	22.9

Note 1. Other diagnoses include: Attachment Disorder, Cognitive Disorder, Schizophrenia & Psychotic Disorder, Identity Disorder, Impulse Control Disorder, and some V-codes in Axis I.

2. Disruptive Behavior Disorders are operationalized as any presence of ADHD, Conduct Disorder, Oppositional Defiant Disorder, Impulse Control Disorder, or Bipolar Disorder.

In order to make a binary grouping variable for the hierarchical logistic regression, the sample was divided into two groups (i.e., Disruptive Behavior Disorder group vs. Non Disruptive Behavior Disorder group) based on their diagnostic information. Disruptive Behavior Disorders (DBD) are operationalized as having any presence of ADHD, Conduct Disorder, Oppositional Defiant Disorder,

Impulse Control Disorder, and Bipolar Disorder. Thus, the children who had an Axis I diagnosis of any of the above five disorders were classified as a group with Disruptive Behavior Disorders (n=54, 77.1%) and the children who had no DBD on Axis I diagnoses were classified as Non-Disruptive Behavior Disorders group (n=16, 22.9%).

Risk Factors

Indicators of risk factors in this study came from the Descriptive Information Questionnaire (DIQ), which is answered by the caregivers at intake. As illustrated in Table 9, a total of eleven risk indicators were asked in binary response format (choice of ‘yes’ or ‘no’ for a question like “Has the child ever had a previous psychiatric hospitalization?”). The univariate statistics for each indicator and the sum of all risk indicators, which will be used in the hierarchical logistic regression analysis, are presented in Table 9 below.

<u>Table 9. Risk Factors of the Sample</u>		
Risk Indicators	Frequency (N=70)	Percent
Previous psychiatric hospitalization	30	42.9
Physically abused	25	35.7
Sexually abused	23	32.9
Runaway history	38	54.3
Suicide attempt	22	31.4
Substance use	17	24.3
Sexually abusive	10	14.3
History of family violence	38	54.3
Felony conviction of parent/caregiver	34	48.6
History of family mental illness	42	60.0
History of family substance abuse	46	65.7
Sum of Eleven Risk Indicators	Mean 4.64	SD 2.35

The statistics show that the majority of the sample (65.7%) originated from a family whose biological family members had a history of substance use (65.7%) and a history of mental illness (60.0%). About half of the children had a history of family violence (54.3%) and their biological parents were convicted of a crime (48.6%).

More than half of the sample (54.3%) had a previous runaway history and 42.9 percent of the children had a previous psychiatric hospitalization. About a third of the sample showed a history of being physically abused (35.7%), sexually abused (32.9%), and a suicidal attempt (31.4%). The results also showed a quarter of the sample (24.3%) had a history of substance abuse including alcohol and drugs, and 10 children (14.3%) had been sexually abusive to others. For data analysis of the proposed study, risk factors are operationalized as the sum of the 11 risk indicators with possible scores ranging from 0 to 11. The sample, as an average, had more than 4 different risk indicators (Mean = 4.6, SD = 2.35).

Pathological and Protective Indicators – CBCL, CAFAS, BERS, and FAD

In addition to diagnostic information and risk factors, four other standardized measures of the independent variables, answered by the caregivers at intake, were analyzed at a univariate level. Table 10 below provides univariate statistics of each independent variable - the two measures for pathological indicators [behavioral/psychological impairment measured by the Child Behavior Checklist (CBCL) and functional impairment measured by the Child and Adolescent Functional Assessment Scale (CAFAS)] and two protective indicators [children's strengths measured by the Behavioral and Emotional Rating Scale (BERS) and family functioning measured by the Family Assessment Device (FAD)].

<u>Table 10. Pathological and Protective Indicators of the Sample</u>		
Measures	Mean	SD
CBCL (total problem score)	70.77	9.59
CAFAS (sum score)	111.57	47.26
BERS (strength quotient)	85.37	16.21
FAD (global functioning scale)	2.85	0.38

The sample showed a mean of 70.8 on the CBCL total problem score (a standardized T score ranging from 0 to 100; the higher the score the more severe the behavioral and emotional problems), indicating that their average problem score is seven points higher than the clinical range (T scores over 63). When the sample was divided into three clinical categories [nonclinical (T scores under 60), borderline (T scores between 61 and 63), and clinical (T scores over 63)] of the CBCL total problem scores, only 7 children (10%) were classified as being in the non-clinical range; 53 children (76%) were in the clinical range and 10 children (14%) were located within the borderline range.

For the CAFAS, a total score was generated by summing the eight subscale scores, resulting in a total score with a range between 0 and 240. Based on the

author's classification (Hodges, 1997), the overall levels of dysfunction (or functional impairment) as indicated by the total CAFAS scores are as follows:

<u>Total CAFAS Score</u>	<u>Level of Functional Impairment</u>
0 – 10	None/Minimal (2.9%)
20 – 40	Mild (7.1%)
50 – 90	Moderate (25.7%)
100 – 130	Marked (34.3%)
140 – 240	Severe (30.0%)

The sample scored a mean of 111 on the total CAFAS score at intake. About one-third (34.3%) of the children showed a 'Marked Impairment' and 30 percent of the sample was at 'Severe Impairment', where children likely need intensive treatment and multiple sources of care beyond outpatient care (Hodges, 1999). A quarter of the sample (25.7%) falls in 'Moderate Impairments', where children 'may' need additional services beyond outpatient care. Only 10 percent of the sample scored below 40 (Mild or None/Minimal Impairments) on the total CAFAS, where children likely can be treated on an outpatient basis or they exhibit no noteworthy functional impairment. Overall the CAFAS mean score at intake shows that children and adolescents, on an average, entered the program at the 'Marked Impairment' category on the CAFAS.

Strengths of the children were assessed using the Behavioral and Emotional Rating Scale (BERS). The BERS provides a strength quotient (SQ), which is a standardized sum score of the five subscales of the BERS. The SQ ranges between 34 and 164, with higher strength quotient scores representing that children have more strengths to cope with struggles and difficulties that they face. The average SQ among children in the sample was around 85 points, indicating that the sample children are located ‘Below Average’ in terms of their behavioral and emotional strengths and that they tend to have a ‘high’ probability of having serious emotional disturbance (SED) and/or emotional and behavioral disorders (EBD) (Epstein & Sharma, 1998) (see Table 11).

<u>Table 11. Strength Quotient of the BERS</u>			
Strength Quotient	Strength Level	Probability of Having SED or EBD	N=70 (Percent)
> 130	Very Superior	Extremely Low	0 (0.0 %)
121 – 130	Superior	Extremely Low	1 (1.4 %)
111 – 120	Above Average	Very Low	4 (5.7 %)
90 – 110	Average	Low	25 (35.7 %)
80 – 89	Below Average	High	8 (11.4 %)
70 – 79	Poor	Very High	22 (31.4 %)
< 70	Very Poor	Extremely High	10 (14.3 %)

Table 11 above presents a frequency distribution of the strength quotient of the BERS with seven ordinal categories (Epstein & Sharma, 1998). About 36 percent of the children are at the ‘Average’ strength level and 57.1 percent of the sample falls under the categories of ‘Below Average’ (11.4%), ‘Poor’ (31.4%) or ‘Very Poor’ (14.3%). No children were classified as having a ‘Very Superior’ strength and only 5 children scored either at ‘Above Average’ (5.7%) or ‘Superior’ (1.4%).

Family functioning was measured by the global functioning scale of the Family Assessment Device (FAD-GFS). The FAD-GFS incorporates items from each of the six McMaster Model dimensions for a total of 12 items. Response options, ranging on a 4-point Likert scale, are “strongly disagree” (1), “disagree” (2), “agree” (3), and “strongly agree” (4). To prevent biases associated with the response set, half of the FAD-GFS items are negatively worded and require reverse coding. The FAD-GFS is generated by taking a mean of the 12 items assessing overall family health and functioning (MACRO, 2003).

The sample of this study showed a very similar level of overall family functioning (Mean = 2.85) with a relatively small standard deviation (SD = 0.38), when compared to the national sample (N= 5006, mean = 2.90) of the CMHS study (MACRO, 2003). Unfortunately, there is no established cut-off score for the global functioning scale of the FAD. Overall, the sample was located about the 71st percentile [mean (2.85) divided by the highest mean (4.00) of the FAD-GFS] on the maximum positive family functioning. About 53 percent of the sample showed a

lower level of family functioning (i.e., mean of FAD-GFS less than 2.90) compared to the national average.

Descriptive Statistics of the Dependent Variable

Out-of-Home Placement

The dependent variable of this study, out-of-home placement, is operationalized as a binary code. If children and adolescents experienced or stayed at any of the six out-of-home placements or restrictive settings (residential treatment center, psychiatric hospitalization, foster home, emergency shelter, juvenile detention center, or correctional facility) at the 12-month follow-up, the sample was coded as 1 (Placement group). Children without any of the six placements were coded as 0 (No placement group).

Two local agencies, Austin Travis County Mental Health and Mental Retardation (ATCMHMR) and Austin Travis County Juvenile Probation (ATCJP), provided data for out-of-home placement history at 12 months following intake. They derive their data either from their administrative records or archival data provided by the contracted agencies (see Table 12).

Table 12. Descriptive Statistics of Out-of-Home Placement				
Types of Placements	Number of Child. Experienced (N=70)	Number of Episodes	LOS <i>per child</i> (Days)	LOS <i>per episode</i> (Days)
RTC	5 (7.1 %)	7	149	106
Psych. Hosp	11 (15.7 %)	16	35	24
Foster Home	3 (4.3 %)	3	183	183
Emr. Shelter	2 (2.9 %)	2	12	12
Juv. Detention	24 (34.3 %)	38	29	18
Corrections	3 (4.3 %)	3	16	16
Sum ¹	33 (47.1 %)	69		
Total Mean			74	35
Number of Placements	Frequency (N=70)	Percent		
None	37	52.9 %		
1	17	24.3 %		
2	6	8.6 %		
3	6	8.6 %		
4	1	1.4 %		
5	1	1.4 %		
6	1	1.4 %		
7	1	1.4 %		
Note 1. Sum means sum of a number of unduplicated children who had multiple out-of-home placements.				

As presented in Table 12 above, about half of the children and adolescents (n=37, 52.9%) did not experience any of the six out-of-home placements during the 12-month follow-up period, while 33 children (47.1%) had at least one or more out-of-home placements for the same period. For those 33 children, their average number of out-of-home placements was 2.1 (total of 69 episodes divided by 33 children); 17 children (24.3%) had only one out-of-home placement and 16 children (22.8%) experienced two or more placements.

The juvenile detention center was the most common out-of-home placement [24 children (34.3%) with 38 total episodes], and psychiatric hospitalization [11 children (15.7%) with a total of 16 episodes] and residential treatment center [5 children (7.1%) with a total of 7 episodes] were the next most common out-of-home placements for the sample. Very few children placed in a foster home [3 children (4.3%) with a total of 3 episodes], correctional facility [3 children (4.3%) with a total of 3 episodes], and emergency shelter [2 children (2.9%) with a total of 2 episodes].

As an average, the children who had any placement spent 74 days (total of 2434 out-of-home days divided by 33 children) out of their homes or communities. In terms of the average length of stay (LOS) *per* child, foster home was the longest (183 days averaged by 3 children) and residential treatment center was the next longest (149 days averaged by 5 children). When children stayed at an emergency shelter, their average stay was the shortest (12 days averaged by 2 children). The children stayed a little longer than a month at psychiatric hospitals (35 days averaged

by 11 children) and about a month at juvenile detention centers (29 days averaged by 24 children).

When the length of stay was analyzed *per* episode, the same trend was observed. As an average, any episode of out-of-home placement resulted in a out-of-home or community stay for 35 days (total of 2434 days of out-of-home placements divided by 69 episodes). Foster home (183 day averaged by 3 episodes) and residential treatment center (103 days averaged by 7 episodes) were the longest types of out-of-home placement per episode. The average length of stay for psychiatric hospitalization per episode was 24 days (averaged by 16 episodes) and each episode of juvenile detention placement lasted 18 days (averaged by 38 episodes).

Correlational Analysis of Independent Variables

A series of bivariate correlation analyses was conducted to examine research question 3 and its corresponding hypotheses (i.e., whether each individual predictor is significantly correlated with each other). Correlational analysis investigates directions and magnitudes of relationships among all predictors and it tests whether or not each relationship is statistically significant. Since this study has six independent variables, a total of 15 [$n(n-1)/2$, where n represents the number of independent variables] separate hypotheses were tested with bivariate correlations.

Screening of Assumptions of the Analysis

Statistical assumptions associated with this series of correlation analyses are the same as in any multivariate analysis (i.e., normality, homoscedasticity, and linearity). For normality, the Kolmogorov-Smirnov statistic, the test for the difference from a normal distribution, was used along with normal P-P plot, skewness, and kurtosis statistics. Though one variable, the BERS score, violated a normality assumption (Kolmogorov-Smirnov statistic = .110, $p < .05$), no remediation or transformation procedure was adopted because both skewness and kurtosis statistics showed no violation of the univariate assumption of the BERS scores.

To screen for any heteroscedasticity between the diagnostic grouping variable and the other 5 predictors, homogeneity of variance tests (also known as Levene statistic) were performed along with graphical examinations of scatter plots. Both Levene statistics and scatter plots showed no violation of the homoscedasticity, implying that the two diagnostic groups are assumed to have equal variances across the other five metric-type predictors.

Two graphical methods (scatter plot and residual plot) were used to investigate any non-linearity among all pairs of predictors. Since both graphical methods did not detect any strong evidence of non-linearity, no remediation or transformation procedure was needed.

Results of the Correlational Analysis

As presented in Table 13 below, six pairs of predictors (out of a possible total of 15 pairs) showed statistically significant relationships.

Table 13. Relationships among Six Predictors						
Variables	Diagnostic Group ¹	Risk Factors	CBCL	CAFAS	BERS	FAD-GFS
Diagnostic Group						
Risk Factors	-.200					
CBCL	.055	.334**				
CAFAS	-.141	.221	.599**			
BERS	.228	-.209	-.507**	-.514**		
FAD-GFS	.186	-.101	-.275*	-.176	.316**	
* significant at .05 level (2-tailed) ** significant at .01 level (2-tailed) Note 1. Since diagnostic group is a binary variable (0=Non-disruptive behavior disorder group and 1= disruptive behavior disorder group), Eta coefficient, which is a better estimate for relationships between variables of limited ranges and interval or ratio variables, was used.						

Although the diagnostic grouping variable showed weak relationships with the number of risk factors (Eta = -.200), the CAFAS (Eta = -.141), the BERS (Eta = .228), and the FAD global functioning scale (Eta = .186), none of these relationships were statistically significant at the .05 level. Almost no relationship

was detected between the diagnostic grouping variable and the CBCL problem scores ($\eta^2 = .055$).

Nonetheless, directions of the relationships brought unexpected findings for further discussion. The diagnostic grouping variable (Non-DBD group vs. DBD group) showed negative relationships with the number of risk factors and the CAFAS score, implying that samples with disruptive behavior disorders (DBD group) tend to have fewer risk factors and less-severe functional impairment at intake. Also, its positive relationship with the BERS and FAD scores suggest that the children with disruptive behavior disorders tend to have more strength and better family functioning. Despite the fact that these relationships are not supported by the statistical significance test, these findings are interesting to note because the researcher originally expected the opposite result – for example, children with any disruptive behavior disorder (DBD group) would have a greater number of risk factors, a lower level of functioning, fewer strengths, and a lower level of family functioning than the Non-DBD group.

The number of risk factors was positively associated with the CBCL score ($r = .344$, $p < .01^{**}$), indicating that children with a greater number of risk factors tend to have severe behavioral/psychological impairment as measured by the CBCL. Weak relationships were observed between the number of risk factors and the CAFAS ($r = .221$), the BERS ($r = -.209$), and the FAD ($r = -.101$) scores. Though directions of these relationships support the proposed conceptual framework of the study [for example, the number of risk factors are expected to be positively

correlated with pathological measures (the CBCL and the CAFAS) and negatively associated with protective measures (the BERS and the FAD)], all test statistics of these relationships failed to reach statistical significance ($p > .05$).

The CBCL total problem score showed a statistically significant relationship with all other predictors, except the diagnostic grouping variable - the number of risk factors ($r = .334$, $p < .01^{**}$), the CAFAS ($r = .599$, $p < .01^{**}$), the BERS ($r = -.507$, $p < .01^{**}$), and the FAD ($r = -.275$, $p < .05^{*}$). Directions of each relationship were congruent with the conceptual framework, which confirms that the CBCL problem score is anticipated to be positively correlated with the other pathological indicator (the CAFAS) and negatively associated with the protective measures (the BERS and the FAD).

The CAFAS score, which measures functional impairment of the children, was positively associated with the CBCL ($r = .334$, $p < .01^{**}$) and negatively related to strengths measured by the BERS ($r = -.514$, $p < .01^{**}$). Although the CAFAS score showed expected relationships with the number of risk factors ($r = .221$) and the FAD ($r = -.176$), test statistics failed to show that these relationships were statistically significant.

The strength of the children (the BERS) was negatively associated with two pathological measures [the CBCL ($r = -.507$, $p < .01^{**}$) and the CAFAS ($r = -.514$, $p < .01^{**}$)] and was positively associated with the other protective measure, the FAD ($r = .316$, $p < .01^{**}$). Its relationships with the diagnostic grouping variable ($r = .228$)

and the number of risk factors ($r = -.209$) were weak and statistically insignificant at the .05 level.

The level of family functioning, which is measured by the FAD global functioning scale (FAD-GFS), had a negative relationship with the CBCL scores ($r = -.275$, $p < .05^*$) and a positive relationship with the BERS ($r = .316$, $P < .01^{**}$).

Though the FAD showed expected negative relationships with the number of risk factors ($r = -.101$) and the CAFAS ($r = -.176$), these relationships were not statistically significant at the .05 level.

Hierarchical Logistic Regression

The purpose of this study is to examine a set of indicators to predict out-of-home placements for children and adolescents with serious emotional disturbances (SED). A series of hierarchical logistic regression analyses was performed to test research questions 1, 2, and 4, and their corresponding hypotheses. Logistic regression is the most suitable statistical procedure when the purpose is to predict a dichotomous dependent variable from a set of predictor variables (Hair, Anderson, Tatham, & Black, 1998; Stevens, 1996).

Based on the literature review and the conceptual framework, this study adopted a model comparison approach for logistic regression by inputting a set of predictors in a hierarchical manner: 1) the first stage with two descriptive indicators (diagnostic grouping variable and number of risk factors), 2) the second stage with two pathological indicators (behavioral impairment measured by the CBCL and

functional impairment measured by the CAFAS), and 3) the third stage with two protective indicators (strengths of children measured by the BERS and family functioning measured by the FAD).

Screening of Assumptions of the Analysis

As discussed in the methodology section of Chapter III, a multiple logistic regression is robust to violations of three major statistical assumptions (normality, homoscedasticity, and linearity) (Hair, Anderson, Tatham, & Black, 1998). In addition to the three major assumptions associated with multivariate analysis described above, multicollinearity is a key issue in interpreting results of any regression analysis. Multicollinearity occurs when there are high intercorrelations (commonly $r = .90$ or higher) among the predictors (Hair, Anderson, Tatham, & Black, 1998; Stevens, 1996). Acknowledging the advantages of logistic regression (absence of violation in homoscedasticity and linearity and robustness over the problems with normality), this study focused on the issue related to multicollinearity among all independent variables.

Multicollinearity among all six independent variables was tested with two common measures [tolerance value and its inverse - the variance inflation factor (VIF)] for assessing both pair-wise and multiple-variable collinearity (Hair, Anderson, Tatham, & Black, 1998). A common cutoff threshold is a tolerance value of .10, which corresponds to a VIF value above 10 (Hair, Anderson, Tatham, & Black, 1998). Table 14 below shows all tolerance values were greater than .10 and

the corresponding VIF values were smaller than 10, indicating that no strong evidence of multicollinearity was present among all the independent variables.

<u>Table 14. Screening of Multicollinearity of Independent Variables</u>		
Independent Variables	Tolerance Value	VIF
Diagnostic Group	.820	1.219
Risk Factors	.838	1.193
CBCL	.489	2.046
CAFAS	.567	1.764
BERS	.612	1.633
FAD-GFS	.855	1.170

The other conventional way to detect multicollinearity is to check the size of bivariate correlation coefficients (i.e., Pearson's $r = .90$ or higher). The largest bivariate correlation among all independent variables was .599 between the CBCL and the CAFAS, which is much smaller than that cut-off score of .90. This examination also confirms an absence of multicollinearity and as a result, little chance of having a biased estimation for the dependent variable of the study.

Results of Hierarchical Logistic Regression Analysis

Using a hierarchical inputting method, research question 2 (i.e., whether or not each stage with two variables significantly predict out-of-home placement for children with SED) was first examined. When each stage was added to the full model that included all six independent variables, research question 1 (i.e., whether or not all six independent variables, as a set, significantly predict future out-of-home placements) and research question 4 (i.e., whether or not each independent variable has a significant individual relationship with future out-of-home placement for children with SED) were tested respectively.

The overall fit of each logistic regression model was assessed by means of its chi-square as well as goodness of fit indices (Tabachnik & Fidell, 1996). Specifically, model chi-square and step chi-square were evaluated to determine the improvement observed in a model with the predictors, relative to the constant-only model or the model that preceded it. This chi-square test is comparable to the overall *F* test for linear multiple regression (SPSS, 1999). In logistic regression, the overall measure of how well the model fits the data is given by the likelihood value (commonly referred to as -2LL or -2 log likelihood). A well fitting model would have a small value for -2LL, which is similar to the residual or error sum of squares for linear multiple regression (Hair, Anderson, Tatham, & Black, 1998). For the practical usefulness of each model, tables of classification accuracy were also used to determine the relative success of each model in predicting membership in a future out-of-home placement grouping.

In addition to indices for the overall model fit, Nagelkerke's R^2 was evaluated as an approximate estimate of the amount of variance in the dependent variable accounted for by the model. This is very similar in intent to the R^2 in a linear regression model that quantifies the proportion of explained variation with the predictors (Hair, Anderson, Tatham, & Black, 1998). To test whether each individual predictor has a significant relationship with the future out-of-home placement group, Wald statistics were used. The Wald test provides the statistical significance for each estimated coefficient of predictors so that hypothesis testing can occur just as in multiple regression (Hair, Anderson, Tatham, & Black, 1998). Once a significant relationship was detected by the Wald test, interpretation of the coefficient was followed by the odds ratio, the ratio between the probability that the event (out-of-home placement) would occur to the probability that it would not.

Model 1 - Two Descriptive Variables as Predictors

Two descriptive variables, diagnostic grouping and risk factors, were first entered in the logistic regression model to predict future out-of-home placement for children with SED. The two variables in this first stage were found to be insignificant predictors of the dependent variable (Table 15.1). The -2LL of the initial null model (96.81) was compared to the -2LL of the model containing the constant and two descriptive variables (95.55). As the model chi-square statistic showed in Table 15.1, the -2LL for Model 1 was not significantly smaller than that of the null model, indicating that inclusion of two descriptive variables did not

provide increased predictability of the future out-of-home placement compared to the null model. The model chi-square is the difference between the -2LL for the model with only a constant and the -2LL for the current model.

Table 15.1 Summary Statistics of Model 1					
Variables	B	S.E	Wald	Sig.	Odd-Ratio
Diagnostic Group	.390	.586	.441	.506	1.476
Risk Factors	.080	.107	.566	.452	1.083
Indices	Null Model		Model 1		
-2 Log Likelihood	96.81		95.55		
Model Chi-square ²	N/A		1.26 (df=2, ns)		
Nagelkerke R ²	N/A		.024		
Classification Accuracy	52.9%		58.6%		
Note 1. * p<.05, ** p<.01, *** p<.001, ns = no significance at .05 level 2. The model chi-square is the difference between the -2LL for the model with only a constant and the -2LL for the current model.					

From the Nagelkerke R^2 , it could be seen that the descriptive variables as a set were not significant predictors of the dependent variable, explaining only 2.4 percent of the variation of the dependent variable. Although Model 1 improved its

classification accuracy in predicting future out-of-home placement membership (from 52.9% to 58.6%), Wald statistics indicated that both descriptive predictors did not have an individual significant relationship with the dependent variable. That is, regardless of status in the diagnostic grouping or the number of risk factors, the probability of having a future out-of-home placement remained the same or it was not affected by the two descriptive indicators.

Model 2 – Adding Two Pathological Indicators to Model 1

The next stage of the hierarchical logistic regression was to assess if including the pathological indicators improved the predictability of future out-of-home placement. As a set, two pathological variables (the CBCL and the CAFAS) were added into the earlier model which contained the two descriptive variables (Table 15.2).

Two pathological indicators, as a set, significantly improved the overall model fit. Both model chi-square and step chi-square values were found to be statistically significant, implying that inclusion of two pathological indicators enhanced predictability of the future out-of-home placement compared to the null model (model chi-square = 16.96, $df=4$, $p<.01$) and Model 1 (step chi-square = 15.70, $df=2$, $p<.001$).

Table 15.2 Summary Statistics of Model 2					
Variables	B	S.E	Wald	Sig.	Odd-Ratio
Diagnostic Group	-.083	.699	.014	.905	.920
Risk Factors	.078	.129	.371	.543	1.082
CBCL	-.077	.040	3.820	.051	.926
CAFAS ¹	.298	.086	11.973	.001**	1.347
Indices	Model 1		Model 2		
-2 Log Likelihood	95.55		79.85		
Model Chi-square	1.26 (df=2, ns)		16.96 (df=4)**		
Step Chi-square ²	1.26 (df=2, ns)		15.70 (df=2)***		
Nagelkerke <i>R</i> ²	.024		.287		
Classification Accuracy	58.6 %		74.3 %		
<p>Note 1. To reflect actual one unit change (i.e., CAFAS score changes from 0 to 240 with 10 point interval) in the CAFAS scoring system, the total CAFAS score was divided by 10. Without affecting any other statistics, this procedure helps readers better understand the odd-ratio.</p> <p>2. The step chi-square is the difference between the -2LL for the previous model and the -2LL for the current model, whereas the model chi-square is the difference between the -2LL for the model with only a constant (null model) and the -2LL for the current model.</p>					

With the two added pathological indicators, -2LL in Model 2 showed a significant reduction from 95.55 to 79.85. Notable improvement was also found in Nagelkerke R^2 and classification accuracy. Nagelkerke R^2 in model 2 indicated that the second model explained about 29 percent of the variation of future out-of-home placement – this is a big gain from Model 1 that only explained about 2 percent of the variation in the dependent variable. When practical usefulness of the model was examined by the classification accuracy, two pathological indicators in Model 2 considerably enhanced its prediction accuracy from 58.6 % to 74.3 % for the group membership of future out-of-home placement.

Wald statistics were used to see if each predictor had a significant individual relationship with future out-of-home placement. Among four predictors in Model 2, the CAFAS (which measures functional impairment) was found to be a significant predictor (Wald = 11.973, $p = .001^{**}$) of the dependent variable. After accounting for other indicators in the model, the odd-ratio of 1.35 indicates that an increase in one unit of functional impairment, which is equivalent to a 10 point increase in the total CAFAS score, increases the probability of having future out-of-home placement by 35 percent.

The other pathological indicator, the CBCL problem score, was close to a significant predictor (Wald = 3.820, $p = .051$) in this model. After controlling the other 3 indicators in the current model, its odd-ratio value (.926) implies that one unit increase in the CBCL problem scores may reduce the probability of having future out-of-home placement by 7 percent. In other words, children with more

severe symptoms in the CBCL may have less chance of future out-of-home placement. Even though this finding was not fully supported by the statistical significance test, this result was unexpected and justifies a further discussion.

When correlational analysis examined bivariate relationships among all independent variables (see Table 13), the CBCL score was positively associated with the CAFAS score ($r=.599$); thus, the researcher expected that the CBCL would have the same direction of relationship with the dependent variable as the CAFAS score might have – that is, unit increases in both pathological indicators would bring a higher chance of having future out-of-home placement. However, the direction of the relationship of the CBCL with future out-of-home placement was the opposite compared to the relationship between the CAFAS and future out-of-home placement. Since this is not a final stage of the analysis, a further discussion will follow with the final or alternative parsimonious model of predicting future out-of-home placement.

Overall, the second model with the additional two pathological indicators achieved a much better model fit compared to both the null model (Null Model with no indicators) and the earlier model (Model 1 with two descriptive indicators). Model 2 explains much more variation in the dependent variable and more correctly classifies group membership for future out-of-home placement.

Model 3 – Adding Two Protective Indicators to Model 2

At the third stage of the hierarchical logistic regression (Model 3), two protective indicators (the BERS and the FAD) were added to the previous model to

investigate if these protective measures, as a set, additionally improve the predictability of the future out-of-home placement.

<u>Table 15.3 Summary Statistics of Model 3</u>					
Variables	B	S.E	Wald	Sig.	Odd-Ratio
Diagnostic Group	-.124	.786	.025	.875	.883
Risk Factors	.096	.134	.511	.475	1.100
CBCL	-.082	.045	3.344	.067	.921
CAFAS	.348	.096	13.025	.000***	1.416
BERS	.032	.024	1.841	.175	1.033
FAD-GFS	-1.112	.068	2.701	.100	.894
Indices	Model 1		Model 2		Model 3
-2 LL	95.55		79.85		75.85
Model Chi-square	1.26 (df=2, ns)		16.96 (df=4)**		20.96 (df=6)**
Step Chi-square	1.26 (df=2, ns)		15.70 (df=2)***		4.00(df=2, ns)
Nagelkerke R^2	.024		.287		.345
Classification Accuracy	58.6 %		74.3 %		72.9 %

As presented in Table 15.3, Model 3 showed a mixed result regarding its overall model fit. Although its model chi-square (20.96, df=6, $p < .01$) and Nagelkerke R^2 value (.345, explaining about 35% of the variation in the dependent variable) was significantly improved from the null model with no indicators, inclusion of the two protective measures failed to show a statistical improvement of the overall model fit against the previous model (step chi-square = 4.00, df=2, $p = .136$). By adding two protective indicators as a set, Model 3 minimally reduced -2LL by 4.00 and explained an additional 6 percent of variation in the dependent variable.

When the two protective indicators were examined as to their individual associations with future out-of-home placement, Wald statistics and the associated p-values failed to find any significant individual relationship between the dependent variable with BERS (Wald = 1.841, $p = .175$) and with the FAD-GFS (Wald = 2.701, $p = .100$). This finding implies that the strengths of children and family functioning at intake, after accounting for the impact of two descriptive indicators and two pathological indicators in the same model, do not have an additional individual contribution to predicting the future out-of-home placement.

Summary of Three Stages of Hierarchical Logistic Regression

Three stages of hierarchical logistic regression analysis have shown that two descriptive variables (diagnostic grouping and risk factors) in the first stage played a very minimal role to explain future out-of-home placement. Two pathological variables (the CBCL and the CAFAS) in the second stage were the strongest predictors of future out-of-home placement in children with SED. Two protective variables (the BERS and the FAD) at the last stage were the next important predictors for future out-of-home placement. While the overall sizes of the model improvement statistics (such as reductions in -2LL and changes in Nagelkerke R^2) were smaller than those of the pathological variables in the second model, the protective indicators showed a greater gain in explaining variations in the dependent variable and reduced a larger -2LL compared to the two descriptive variables in the first stage.

At an individual predictor level, only the CAFAS score was a statistically significant predictor of future out-of-home placement, indicating that severe functional impairment at intake is strongly associated with presence of future out-of-home placement. None of the indicators, except the CAFAS, showed a significant individual relationship with future out-of-home placement, after controlling for all other five predictors in the model (Model 3).

An interesting finding was discovered from interpretation of classification accuracy. Classification accuracy of the last model (Model 3 with all six variables) was slightly decreased from the previous model (Model 2) by 1.4 percent, implying

that adding more predictors to the earlier model does not necessarily improve the predictability of group membership for future out-of-home placement. This finding limits the practical usefulness of Model 3 and suggests more careful selection of predictors based on a practical standpoint as well as statistical criteria.

Parsimonious Alternative Model with Four Variables – Model 4

In addition to the main purpose of this study that examines a set of indicators and factors to predict out-of-home placement for children with serious emotional disturbance (SED), this study also aims to find an alternative parsimonious logistic regression model that represents sampled data in a more efficient way. Minimal contribution of the two descriptive indicators in the first stage and mixed findings in Model 3 in the third stage accelerates development of a more parsimonious alternative prediction model that has an equivalent ability to explain the variation in the dependent variable and, at the same time, has better accuracy in predicting future out-of-home placement membership.

Selection of the alternative model was based on both a statistical standpoint and practical usefulness of the model. Three main criteria were used to compare each model to each other: 1) reduction in residual in logistic regression measured by the -2 Log Likelihood and the model chi-square statistic, 2) size of the explained variations of the dependent variable measured by Nagelkerke R^2 , and 3) the model's practical usefulness measured by its classification accuracy.

Although it was already found that the CAFAS was the strongest and the two descriptive indicators were the least influential predictors of future out-of-home placement, searching the most parsimonious model was a trial and error process – comparing models with every possible set of indicators to any possible combination of others. In the interest of parsimony, each model was compared to each other based on the three criteria described above, and finally the alternative parsimonious model (Model 4) was derived from the combination of the two pathological indicators and the two protective indicators.

Table 15.4 below summarizes the alternative parsimonious model (Model 4) and compares it to the earlier models (Model 1, Model 2, and Model 3). When four predictors (the CBCL, the CAFAS, the BERS, and the FAD-GFS) were entered together as a set, this alternative model showed a much better model fit than observed in Model 1 and Model 2. With a fewer number of the predictors, this alternative model produced the same good model fit as found in Model 3 with all six variables. Its -2 log likelihood value (76.38) was smaller than those of Model 1 (95.55) and Model 2 (79.85), and it was very close to the value of Model 3 (75.85). Model chi-square of the alternative model was significant at the .001 level (chi-square = 20.44, df =4) and the model explained 34 % (Nagelkerke R^2 = .338) of the variation in the dependent variable, allowing less than a 1 % difference to the maximum variation (Nagelkerke R^2 = .345, 35%) explained by Model 3 with all six variables.

Table 15.4 Summary Statistics of Alternative Model 4					
Variables	B	S.E	Wald	Sig.	Odd-Ratio
CBCL	-.073	.041	3.161	.075	.929
CAFAS	.347	.095	13.284	.000***	1.415
BERS	.031	.023	1.839	.175	1.032
FAD-GFS	-.107	.066	2.664	.103	.898
Indices	Model 1	Model 2	Model 3	Model 4	
-2LL	95.55	79.85	75.85	76.38	
Model Chi-square ¹	1.26 (df=2, ns)	16.96 (df=4)**	20.96 (df=6)**	20.44 (df=4)***	
Nagelkerke <i>R</i> ²	.024	.287	.345	.338	
Classification Accuracy	58.6 %	74.3 %	72.9 %	78.6 %	
Note 1. The model chi-square is the difference between the -2LL for the model with only a constant (null model) and the -2LL for the current model					

Practical usefulness of the alternative model was examined by the classification accuracy. Model 4 showed the highest accuracy (78.6%) of predicting future out-of-home placement among all other models – Model 1 (58.6 %), Model 2 (74.3 %), and Model 3 (72.9 %). With the same number of variables, Model 4 gained 4.3 percent more accuracy than Model 2. With the fewer number of variables, it achieved a better accuracy rate than Model 3 by 5.7 percent.

The alternative Model 4 showed very similar results regarding each predictor's individual relationships with future out-of-home placement, as found in Model 2 and Model 3. After controlling for the other three predictors in the model, only the CAFAS had a statistically significant individual relationship with the dependent variable (Wald = 13.28, $p < .000$). Its odd-ratio value (1.415) indicates that one unit increase in functional impairment (i.e., 10 point increase in total CAFAS score) brings a 41.5 percent higher chance of having a future out-of-home placement. In other words, children with the total CAFAS score of 100 at intake have a 1.42 times greater chance of being placed in out-of-home placement compared to those with the total CAFAS score of 90.

Wald statistics and the associated p-values in Model 4 failed to find any significant individual relationship between future out-of-home placement with the CBCL (Wald = 3.161, $p = .075$), the BERS (Wald = 1.839, $p = .175$), and with the FAD-GFS (Wald = 2.664, $p = .103$). Individual level statistics are very consistent with those found in Model 2 and Model 3. Findings in individual-level relationships imply that the CAFAS is the strongest indicator of future out-of-home placement and

that the other three variables do not have a significant individual relationship with the dependent variable after accounting for the impact of the CAFAS.

Overall, development of Model 4 seems to be quite satisfactory and its model fit statistics support the idea of searching for the parsimonious model that fits data in a more efficient way. By combining two pathological and two protective indicators, alternative Model 4 produces the highest accuracy rate of classifying future out-of-home placement in children with SED. Even with fewer predictors in the equation, Model 4 reduced the same level of residuals of logistic regression and it explained the same amount of variation in the dependent variable observed in the full model with all six variables.

Intake Profiles of Children with Future Out-Of-Home Placements

Previous correlational analysis and hierarchical logistic regression analysis examined four major research questions proposed by this study (see below for each research question). Research question 3 was answered by the correlational analysis and research questions 1, 2, and 4 were examined through a series of hierarchical logistic regression analyses.

Research Question 1: Will all six predictors (diagnostic grouping, risk factors, behavioral impairments, functional impairments, strength-based indicator, and family functioning), as a set, significantly predict future out-of-home placements for children with SED receiving care from the Children's Partnership?

Research Question 2: Will each stage, as a group, have an individual ability to predict future out-of-home placements for children with SED receiving care from the Children's Partnership?

Research Question 3: Will there be statistically significant relationships among six predictors?

Research Question 4: Will each predictor variable, after controlling for the other five predictors, have a statistically significant relationship with out-of-home placement?

In addition to testing each research question and corresponding hypotheses, this study plans to develop profiles at intake for children and adolescents with high risk of future out-of-home placements and seeks to provide clinical implications for

the early intervention and service planning for those who have high risk of future out-of-home placements. In order to develop profiles of high risk children for out-of-home placement, this study contrasts each predictor variable based on future binary status of out-of-home placement. This profile analysis attempts to examine whether children who had out-of-home placement at the 12 month follow-up (Placement group) show a different status or scores on each predictor at intake compared to those without any out-of-home placement (No placement group).

Profile analysis is somewhat redundant with the analysis done for research question 4 and associated hypotheses. However, unlike relationships observed in the hierarchical regression analyses that focused on how predictors were affecting future out-of-home status at the multivariate level, relationships examined in this back-tracking profile analysis are based on univariate analysis without controlling impacts of other predictors. While the hierarchical logistic regression mainly investigated probability of having future out-of-home placement, analyses for the intake profiles focuses on how each predictor's scores are different at intake based on future binary status of out-of-home placement.

For the dichotomous diagnostic grouping variable, two by two cross tabulation analysis (i.e., 2 statuses of future placement and 2 diagnostic groupings at intake) was conducted to see if two events (future out-of-home placement and the presence of disruptive behavior disorder) are independent of each other. For the other five predictors, an independent t-test was adopted to see whether children with future out-of-home placement (Placement group) would have statistically different

scores on each predictor at intake, compared to those who did not experience any out-of-home placement at follow-up (No placement group).

Results of Crosstab Analysis

No specific trend was observed between future out-of-home placement and diagnostic grouping at intake. Test statistics showed that the two variables are independent of each other (see Table 16.1). That is, children with disruptive behavior disorders (DBD) did not show a different distribution (i.e., frequencies and percentages) on future out-of-home placement when compared to children without DBD. About half of each diagnostic group was placed in out-of-home placement at the 12-month follow-up period. While 56 percent of children without any DBD at intake experienced out-of-home placement over a one-year period, 44 percent of children with DBD had an out-of-home placement after intake. Although the non-DBD group seemed to have a higher (by 12 percent) chance of being placed in out-of-home placement, the chi-square statistic and associated p value failed to indicate that this trend was statistically significant at the .05 level ($X^2=.690$, $p=.406$). When association between these two variables was assessed by the Phi coefficient, which measures a correlation between two nominal variables, its value indicated that there was an ignorable weak and negative relationship ($\Phi = -.099$, $p=.406$) between the diagnostic grouping variable and future out-of-home placement.

<u>Table 16.1 Crosstab between Diagnostic Group and Future Placement</u>			
	Placement Status at 12 Month		Total
Diagnostic Group at Intake	Absence of Placement	Presence of Placement	Frequency (%)
Children without DBD ¹	7 (43.8%) ²	9 (56.2 %)	16 (100%)
Children with DBD	30 (55.6 %)	24 (44.4 %)	54 (100%)
Sub-Total	37 (52.9 %)	33 (47.1 %)	70 (100%)
$X^2=.690$, $\Phi = -.099$ $p = .406$ (ns)			
<p>Note 1. Disruptive Behavior Disorder (DBD) notates any diagnoses of ADHD, Conduct Disorder, Oppositional Defiant Disorder, Bipolar Disorder, and Impulse Control Disorder.</p> <p>2. Percent was calculated within each diagnostic group to contrast future placement status based on diagnostic grouping at intake.</p>			

In sum, crosstab analysis of the two binary variables reveals that about half of the children with SED (47.1 %) had out-of-home placement over the one-year follow-up, regardless of their intake diagnoses. The size and direction of the Phi coefficient reassures the findings of hierarchical logistic regression analysis regarding the relationship between specific diagnoses and future out-of-home placement.

Results of Independent T-test Analysis

Since the other five predictors are interval level measures, separate independent t-tests were conducted to see if any mean differences would exist in each predictor variable based on group differences in future out-of-home placement. Results of the five independent t-tests are summarized in Table 16.2.

The most notable mean difference at intake was found in the CAFAS score. Being consistent with the findings of the hierarchical logistic regression analysis, children who would have out-of-home placement at follow-up showed much more severe functional impairment (131.8) at intake than those (93.5) who would not have any out-of-home placement in the future. The mean difference (38.3) between these two groups was almost four units in the actual CAFAS scoring system and this difference was statistically significant at the .001 level ($t=-3.680$, $df=68$, $p=.000$).

Table 16.2 T-test between Future Placement and Five Predictors						
	Risk Factors	CBCL	CAFAS	BERS	FAD-GFS	N=70
No Placement Group	4.41 ¹	70.16	93.51	86.22	2.91	n=37
Placement Group	4.91	71.45	131.82	84.42	2.78	n=33
Mean Diff ² .	.50	1.29	38.30	-1.80	-.13	
t statistic	-.895	-.560	-3.680	.459	1.365	
Df	68	68	68	68	68	
Eta ³	.108	.068	.407 ***	-.056	-.101	
p value	.374 (ns)	.577 (ns)	.000 ***	.648 (ns)	.177 (ns)	
<p>* p<.05, ** p<.01, *** p<.001, ns= insignificant at .05 level (2-tailed).</p> <p>Note 1. Mean value(s) of each predictor based on future placement group.</p> <p>2. Mean difference was calculated by subtracting mean scores of no placement group from placement group.</p> <p>3. Eta coefficient is an estimate of association between the nominal variable and interval variables. Since placement group is a binary nominal variable (0=children with no placement at follow-up, 1= children with placement at follow-up), Eta coefficient was used. It can be interpreted in the same way Pearson's r is for correlations between numeric (interval or ratio) variables.</p>						

In addition to the CAFAS, children who experienced any out-of-home placement at follow-up showed negative profile scores at intake across all predictors when compared to those who had no out-of-home placement for the follow-up. The placement group had a greater number of risk factors (mean = 4.91) than the no placement group (mean = 4.41), more severe behavioral and psychological symptoms (mean = 70.2) than the no placement group (mean = 71.5) as measured by the CBCL, lower level of strengths (mean = 84.4) than the no placement group (mean = 86.2) as measured by the BERS, and lower level of family functioning (mean = 2.78) than the no placement group (mean = 2.91) as assessed by the FAD global functioning scale.

Although these mean differences were not supported by the statistical significance test, results of t-tests clearly shows that children who would have a high risk of future out-of-home placement started with a more negative situation across all five standardized measures. This finding not only delivers useful information for clinicians who want to develop profiles of high risk children for future out-of-home placement, but also provides implications for frontline workers to inform clinical decisions for the early intervention and service planning for children who have a high risk of future out-of-home placements.

The Eta coefficient, which measures directions and magnitudes of association between a nominal placement grouping variable and the five interval predictors, presented additional useful information regarding a conceptual framework. At the univariate level, all negative indicators (i.e., risk factors and two pathological

variables) at intake were positively correlated with future out-of-home placement: number of risk factors (Eta = .108), behavioral/psychological impairment as measured by the CBCL (Eta = .068), and functional impairment as measured by the CAFAS (Eta = .407 ***). The two protective indicators were negatively associated with the presence of future out-of-home placement - strength measured by the BERS (Eta = -.056) and family functioning measured by the FAD (Eta = -.101). These observations provide supporting evidence for the conceptual framework proposed by this researcher regarding relationships between future out-of-home placement and individual predictors.

CHAPTER FIVE

DISCUSSION AND IMPLICATIONS

The purpose of the present study was to examine a set of indicators and factors to predict out-of-home placement for children and adolescents with serious emotional disturbance (SED). Using characteristics of children and families at intake, this study predicted future out-of-home placements after participation in the Children's Partnership, a systems of care program funded by the Center for Mental Health Services (CMHS) that serves children and adolescents with SED and their families in Travis County, Texas.

Conventional approaches to predict utilization of services within restrictive settings and out-of-home placement in children's mental health have failed to include strength-based measurements or protective indicators in their prediction modeling. Despite the fact that the systems of care approach emphasizes a strength-based approach, there have been very few studies in systems of care research that included strength-based measurements (or protective indicators) to explain their relationships to outcomes of children with SED (Harniss, Epstein, Ryser, & Pearson, 1999; Lindemann, 2000; Reid, Epstein, Pastor, & Ryser, 2000).

To address this current gap in the knowledge base, a total of six predictors were selected based on the literature review as well as the conceptual framework of the study. These six variables were grouped as three sets of blocks for model

comparison in the hierarchical logistic regression analysis: 1) two descriptive indicators (diagnostic information and risk factors), 2) two pathological indicators (behavioral/psychological impairment measured by the CBCL and functional impairment measured by the CAFAS), and 3) two protective indicators (children's strength measured by the BERS and family functioning measured by the FAD).

This study, using a model comparison approach, examined the impact of a strength-based indicator and family functioning along with diagnostic information, risk factors, and behavioral and functional impairments. By adding a different set of predictors in a hierarchical manner, this study aimed: 1) to examine the relationships between a set of independent variables (diagnostic grouping, risk factors, behavioral and functional impairments, strength-based indicators, and family functioning) and the dependent variable (out-of-home placement); 2) to find an effect of the strength-based measure and family functioning on the dependent variable; and, 3) to develop profiles at intake for children and adolescents with high risk for out-of-home placement.

Discussion

A series of hierarchical logistic regression analyses were conducted to evaluate both individual predictors and conceptual models. Research question 1, which tested whether all six indicators as a set predict future out-of-home placement in children and adolescents with SED, was supported by Model 3 of the hierarchical logistic regression analysis as presented in Table 15.3. Findings of Model 3 imply

that selection of the six predictors based on the conceptual framework was reasonable, and partly support that some of the predictors can be used for further studies with the same or similar research questions.

Regarding research question 2 and its corresponding hypotheses – testing whether each stage with two indicators has a significant individual relationship to predict future out-of-home placement, the analysis produced a mixed result. Contrary to expectation, descriptive indicators (diagnostic information and risk factors) and protective indicators (the BERS and the FAD) were not statistically significant predictors of future out-of-home placement, indicating that hypothesis 2a and hypothesis 2c of research question 2 were not supported by Model 1, Model 3, and Model 4 (please refer to page 82-84 for each research question and its corresponding hypotheses). When included in the prediction model with two pathological indicators (the CBCL and the CAFAS), they did not provide a significant gain in model improvement either at the group or individual level. The finding of no significant relationship in two descriptive variables (diagnostic grouping and risk factors) for the outcomes of placement is different from the findings of previous studies (Chung, 2000; Rosenblatt, Rosenblatt, & Biggs, 2000). Only two pathological indicators, as a set, showed a significant contribution to predicting future out-of-home placement. Hypothesis 2b of this study was confirmed by the significant and strong relationship between a set of two pathological variables and future out-of-home placement, and this result supported findings from previous

research (Brown & Greenbaum, 1995; Hodges, Doucette-Gates, & Kim, 2000; Newton, Litrownik, & Landsverk, 2000; Quist & Matshazi, 2000).

When each independent variable was examined by research question 4 and its corresponding hypotheses (hypothesis 4a, 4b, 4c, 4d, 4e, and 4f), the logistic regression analysis confirmed only one hypothesis (hypothesis 4d) while disregarding the other five hypotheses proposed by the study. After controlling for all of the other indicators in the model, only the CAFAS, which measures functional impairment of children with SED, demonstrated a strong individual relationship with future out-of-home placement as shown in Model 2, Model 3, and Model 4 (see Table 15.4).

When each logistic model was compared to each other in the interest of parsimony, the alternative parsimonious model (Model 4) was derived from the combination of the two pathological indicators and the two protective indicators. Compared to the full model with all six indicators (Model 3), this alternative model, which included only four indicators, showed an equivalent ability to explain the variation in the dependent variable and, at the same time, demonstrated better accuracy in predicting future out-of-home placement membership. Though two protective indicators (the BERS and the FAD) did not show any individual significant relationship with the dependent variable in this alternative parsimonious model, they did contribute to establishing the model with the highest accuracy rate in predicting future out-of-home placement. Findings in this alternative model 4 imply that we cannot simply ignore the impact of two protective indicators based on their

statistical relationship with the dependent variable. The protective indicators demonstrated their practical usefulness with a higher accuracy of predicting future out-of-home placement in children with SED, after accounting for the impact of the two pathological indicators.

Examination of research question 3 and its corresponding hypotheses, which tested relationships among all predictors without considering the relationship with the dependent variable, has rarely been done in previous research. The results of the correlational analysis (see Table 13) found that six pairs of predictors (out of a possible 15 pairs total) had a statistically significant relationship. Each individual predictor, except diagnostic grouping variable, has at least one or more significant relationships with other predictors in the expected direction posed by the conceptual framework of the study. Only the diagnostic grouping variable, a binary grouping variable differentiating children with disruptive behavior disorder from children with no disruptive behavior disorder at intake, showed no significant relationships with any other variables in the model. Although the diagnostic grouping variable showed a weak relationship with the number of risk factors, the CAFAS, the BERS, and the FAD, none of these relationships were statistically significant at the .05 level. This finding was unexpected and contradictory to the conceptual framework as well as to the findings from previous studies (Rosenblatt, Rosenblatt, & Biggs, 2000; Teplin, Abraham, McClelland, Dulcan, & Mericle, 2002).

In addition to examining a set of indicators to predict out-of-home placement for children with SED, this study also developed profile scores of each predictor at

intake for children and adolescents with high risk of future out-of-home placement. This was done by a series of independent t-tests that contrasted mean scores of each predictor by the future binary status of out-of-home placement (i.e., children with out-of-home placement at 12 month follow-up vs. children without any out-of-home placement at 12 month follow-up).

Results of the independent t-tests were quite consistent with the findings observed in the multivariate logistic regression analysis. The children who had out-of-home placement at the follow-up period showed much more severe functional impairment at intake measured by the CAFAS, compared with those who did not have any out-of-home placement. The mean difference in the intake CAFAS score between the two groups was very large and statistically significant at the .001 level (mean difference = 38.3, $t=-3.680$, $p=.000$). Across all other predictors, such as the number of risk factors, the CBCL, the BERS, and the FAD, the placement group demonstrated more negative profile scores at intake than the no placement group. That is, children in the placement group enrolled in the Children's Partnership with more severe symptoms and lower levels of protective factors, compared to children without any out-of-home placement.

By revisiting findings of each individual variable both at the multivariate and univariate levels, the next section provides an expanded discussion on each predictor, as well as implications for the social work profession and future research.

Diagnostic Information

The diagnostic grouping variable was operationalized as binary, which differentiates a group of children diagnosed with disruptive behavior disorders (DBD group with any presence of conduct disorder, oppositional defiant disorder, impulse control disorder, attention-deficit hyperactivity disorder, or bi-polar disorder) from the group with non-disruptive behavior disorders (Non-DBD group). Contrary to the anticipated association proposed by the study, findings of both the logistic regression and crosstab analysis indicated that presence (or absence) of any disruptive behavior disorders (DBD) had almost no relationship with future out-of-home placement. Although the researcher expected that children with DBD would have a higher risk than the Non-DBD group due to their acting out behaviors, both tests failed to confirm the proposed hypothesis. About half of both groups were placed in out-of-home placement during the one-year follow-up period after intake, meaning that both groups had the same high (about 50%) risk of having out-of-home placement, regardless of their diagnostic category at intake.

One of the concerns regarding this diagnostic grouping variable lies in the characteristics of the DSM coding scheme. The researcher and colleagues spent a significant time on what would be the best way to operationalize the diagnostic

grouping variable. Two competing schemes were debated – “any” presence of DBD versus “primary” diagnosis of DBD. Unfortunately, there was no guarantee that the diagnostic information of the sample could be identified as “primary”, “secondary”, and so on. If the diagnostic information of the sample was clearly recorded to indicate which one was a primary or major diagnosis, group selection based on “primary” diagnosis would be a better solution for the analysis, specifically for children who had multiple diagnoses (64.3 % of the sample). Lack of clarification on “any” versus a “primary” diagnosis of DBD of this study advocates for a more deliberate recording process by clinicians and frontline workers dealing with the target population. This discussion highlights how clinicians’ practices are closely related to the evaluation process for the services that they are providing, and how clinicians can be informed by the research to deliver better service for the target population. It is also recommended that researchers examine whether two competing coding schemes, when both are available, would generate the same result in predicting future out-of-home placement.

Risk Factors

Risk factors such as physical and sexual abuse history, family history of mental illness or substance abuse, and family history of criminal activities have been documented as significant predictors of SED and subsequent out-of-home placement (Stroul, Cormack, & Zaro, 1996). Unlike findings in previous research (Chung, 2000; Rosenblatt, Rosenblatt, & Biggs, 2000; Todd, 1994), a sum of eleven risk

factors in the present study was not a significant predictor of future out-of-home placement. Even though the placement group had more numbers of risk factors (mean = 4.91) at intake than the no placement group (mean = 4.41), the mean difference was small and it was not supported by the statistical test, nor its correlation coefficient ($\text{Eta} = .108$, $p = .374$) for future out-of-home placement.

This study followed the similar scheme that Rosenblatt and her colleagues (2000) conceptualized for risk factors for children with SED. Rosenblatt et. al. (2000) presented two sets of risk factors – one set of items for assessing risk factors concerning the child and the other set of items for measuring risk factors of the family where the child maintains daily life. However, the present study summed all eleven items together in order to make one single variable while ignoring the difference between individual risk factors and family risk factors. Making a single variable with a sum of eleven items was a practical decision based on the issue of ratio between the number of independent variables and sample size. Yet we do not know whether dividing risk factors into two independent variables (i.e., one for individual risk factors and the other for family risk factors) would bring a different result than the present study. Differentiating individual risk factors from family risk factors seems a more legitimate conceptual scheme for the ecological perspective. It is worth comparing results of a model with two separate sets of risk factors against a model with summed risk factors. This comparison would provide useful implications from a conceptual framework as well as from a practical stand-point.

Behavioral Impairment - CBCL

The Child Behavior Checklist (CBCL) is one of the most widely used measures in child psychology (Lindemann, 2000). Numerous studies adopted the CBCL to show program effectiveness either in a systems of care context or in other clinical settings (Manteuffel, Stephens, & Santiago, 2002; Rosenblatt, 1998). Previous research showed that scores on the CBCL were significantly correlated with the outcomes of out-of-home placement (Brady & Caraway, 2002; Brown, & Greenbaum, 1995; Heflinger, Simpkins, & Combs-Orme, 2000; Massey, & Murphy, 1991).

When the CBCL was entered with the CAFAS in hierarchical logistic regression analysis, the CBCL total problem score provided a considerable gain in overall model fit and classification accuracy to predict future out-of-home placement (i.e., Model 2, Model 3, and Model 4). Its individual relationship with the dependent variable was very close to significant at the .05 level in each model (i.e., $p=.051$ in Model 2, $p=.067$ in Model 3, and $p=.075$ in Model 4), after controlling for the impact of other predictors in the model. However its odd-ratio values were always smaller than 1 in each prediction model, indicating that children with more severe symptoms in the CBCL might have less chance of future out-of-home placement. Although this finding was not supported by the statistical test, it was totally anti-evidence with the proposed hypothesis.

When examined with Eta coefficient in the profile analysis, the result indicated that the relationship between the CBCL and future out-of-home placement

was very weak ($\eta^2=.07$, almost no association) and the direction was positive, implying that changes in the CBCL score would not really affect future out-of-home placement status, and if it would, the direction should be in the positive direction (i.e., as children's CBCL score increases, they might have a slightly higher chance of having future out-of-home placement). In sum, contradictory findings between the multivariate level (logistic regression) and the univariate level (profile analysis using t-test) indicate that the present study did not show a clear picture regarding direction of the relationship between the CBCL and the dependent variable. Another focus for future research is to find more concrete evidence of the relationship between these two variables, both for the direction and the magnitude.

Functional Impairment - CAFAS

One of the clearest findings of this study was reconfirming the strong impact of the CAFAS on the outcome studies of children with SED. Based on the previous studies (Hodges, Doucette-Gates, & Kim, 2000; Hodges & Kim, 2000; Hodges & Wong, 1997; Quist & Matshazi, 2000), it was expected that children with a greater functional impairment of the CAFAS at intake would have a higher chance of having out-of-home placements for the 12-month follow-up period. Both hierarchical logistic regression and the profile analysis clearly demonstrated the expected result.

Entered with the other pathological predictor, the CBCL, into the logistic model, the CAFAS demonstrated the strongest impact on predicting future out-of-home placement. It brought the largest improvement in model fits and classification

accuracy in every prediction model (Model 2, Model 3, and Model 4). The CAFAS was the only predictor that showed a statistically significant individual relationship with future out-of-home placement, after accounting for the impact of the other predictors in each model. For example, one unit increase (a 10 point increase in the actual CAFAS score) in functional impairment would bring a 1.4 times greater chance of being placed out-of-home (Model 4).

Profile analysis also indicated that the CAFAS was strongly associated with future out-of-home placement. The children who had out-of-home placement at follow-up showed much severer functional impairment (Mean = 132) at intake than those who had no out-of-home placement in the future (Mean = 94). The mean difference between the two groups was very large and statistically significant at the .001 level. The size of the relationship (Eta = .41) between the two variables was moderate. About 16 percent of the variation in the CAFAS was explained by the future binary status of out-of-home placement.

Strengths-Based Indicator - BERS

One uniqueness of the present study is inclusion of a strength-based measure in its prediction model for future out-of-home placement. Unlike the traditional approaches that ignored the impact of strengths, competency, or resilience factors on outcomes of children with SED, this study included two protective indicators (strengths measured by the BERS and family functioning measured by the FAD) to predict future out-of-home placement. The study anticipated that children with a

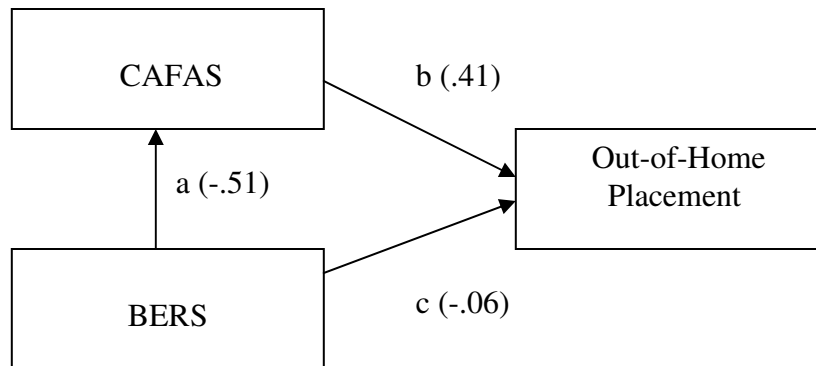
higher level of strengths would have a lower chance of having out-of-home placement at follow-up.

Contrary to anticipation, the BERS did not show a significant individual relationship with the dependent variable in the hierarchical logistic regression. However, when combined with the two pathological predictors and the FAD, it helped to establish an alternative parsimonious model (Model 4) that demonstrated the highest classification accuracy with the same amount of variations explained in the dependent variable. As briefly discussed in the previous section, this finding indicates that the strength-based indicator did show practical usefulness in predicting out-of-home placement. It also warns clinicians and researchers not to discount simply from a statistical standpoint.

In correlational analysis, strengths of the children as measured by the BERS was negatively correlated with the two pathological measures [the CBCL ($r = -.507$, $p < .01^{**}$) and the CAFAS ($r = -.514$, $p < .01^{**}$)] and it was positively associated with the other protective measure, the FAD ($r = .316$, $p < .01^{**}$). The directions of the relationship were in the predicted way and the sizes of the relationships were moderate. These findings not only support the theoretical framework of the present study, but also trigger an alternative analysis method for further study.

Given that we knew three pieces of information: a) the BERS is negatively related to the CAFAS ($r = -.51$); b) the CAFAS was the strongest predictor and it had a positive relationship ($\text{Eta} = .41$) with the out-of-home placement; and, c) the BERS had very weak negative relationship ($\text{Eta} = -.06$) with the out-of-home placement. By drawing the following simple figure, we can trace an indirect effect of children's strengths on out-of-home placement through the CAFAS.

Figure 2. Alternative Path Analytic Method



As presented in Figure 2 above, b represents the direct effect of the CAFAS on the dependent variable while c represents the direct effects of the BERS. In addition to the direct effects of each predictor, this alternative analysis technique (commonly called a path analysis) allows us to capture an indirect effect of the

BERS on the dependent variable by simply multiplying a and b [here $a \times b = -.209$, and it means that an indirect impact of the BERS (-.209) through the CAFAS is much greater than its own direct impact (-.06) on future out-of-home placement]. If a conceptual framework claims that correlation between the BERS and the CAFAS could be viewed as a directional one (i.e., strength of the children would affect their functioning in their home and communities), then this path analytic method would be a better option to investigate every possible relationship among predictors and the dependent variable. This option was considered from the beginning of the present study. However, it was not adopted because it required a much bigger sample size, compared to the logistic regression analysis, to get stable estimates for additional parameters and residuals in the model. Given that the situation is allowed (i.e., Graphical notation is theoretically valid and the sample size is large enough), this alternative path analytic method is preferable for future research. Its finding would provide a useful implication for building a new conceptual relationship between the pathological indicators and the strength-based measures.

Family Functioning - FAD

Although one of the most attractive elements of systems of care is a family-focused approach, a review of the literature in children's mental health revealed that very little information is available to explain the relationship between family factors and children's outcomes, and that minimal attention has been given to family functioning as a predictor of placement outcome for the target population (Chung,

2000; Gonzalez, 1997; Reay, 1999). To overcome the paucity of studies and shortcomings of traditional approaches framed largely under the pathological paradigm, the present study included the family functioning measure and categorized it under protective indicators in the prediction model.

When entered with the BERS, the family functioning measure (FAD) helped to set up the parsimonious alternative model that had the highest accuracy in predicting future out-of-home placement. The FAD did not show a significant individual relationship with the dependent variable, after accounting for the impact of the two pathological indicators (Model 4). Nevertheless, family functioning demonstrated the expected relationships with other predictors [the CBCL ($r = -.275$, $p < .05^*$), the CAFAS ($r = -.176$, $p = .144$), and the BERS ($r = .316$, $p < .01^{**}$)] and with the future out-of-home placement ($\text{Eta} = -.101$, $p = .177$). Though some of the relationships were not large enough to achieve statistical significance, their directions were supportive of the conceptual framework and the proposed hypotheses of the study.

Profile analysis demonstrated that the placement group showed a slightly lower level of family functioning (mean = 2.78) than the no placement group (mean = 2.91), but the mean difference was too small and was not statistically significant. Overall, inclusion of family functioning in the prediction model of out-of-home placement did not seem satisfactory. This might be due to insensitivity of the instrument itself. Or an impact of family functioning might be adjusted by the other predictors in the model, similar to the case illustrated in Figure 2. For future

research, different options recommended are: 1) adopting a different analysis technique, such as path analysis, that can illustrate all kinds of interwoven relationships among all variables in the model, 2) using a sum of all FAD (60 items) scores as a predictor, which is supposed to have more variation than a mean score of only 12 items of FAD-GFS, or 3) choosing a different family functioning measure.

Limitations of the Study

The findings of the present study must be understood within the context of several limitations. A primary limitation of this study was the limited sample size available for the analysis. Even though the study meets the minimum ratio of 5 to 1 or 10 to 1 (ratio between total observations versus the number of variables, Hair et. al., 1998) required for any multivariate analysis, the final sample size of 70 children was too small to claim any generalization to the whole population of children and adolescents with serious emotional disturbance (SED). This limited sample size resulted in spite of an extensive recruitment strategy spanning a period of more than two years.

Another limitation to the study might also be in the source of data. Despite that the study examined the relationship between the characteristics of children and adolescents at intake and future out-of-home placement, all independent variables, except diagnostic information, were captured by responses from the caregivers. No input was made by the children themselves for risk factors, the CBCL, the CAFAS, the BERS, and the FAD. Caregivers' responses might be somewhat different from

how the children and youth see themselves and their environments. Heavy reliance on caregivers' responses did not allow the examination of differences in each respondent's perception, providing a more comprehensive picture of a child's functioning. Although the children and youth's versions were available for the CBCL and the FAD, the present study could not take advantage of adopting these two instruments that were designed to be administered for children who are 11 years of age or older. It would make the sample size much smaller by excluding younger children under 11 years.

The overly simplified definition of the dependent variable could be another limitation of the study. The conceptual definition of "out-of-home placement" might be regarded as too simplistic. In the study, out-of-home placement was operationalized as stays in "any" of the six restrictive settings (psychiatric hospitalization, residential treatment center, foster home, emergency shelter, juvenile detention center, and any correctional facility), regardless of their length of stay. For example, a 3-day stay in an emergency shelter was equally weighted as a 60-day stay in the juvenile detention center in this study. The two examples could be totally different in terms of their nature (supportive services vs. punitive services) and severity. However, this limitation opens a new opportunity for researchers and practitioners to re-examine the relationship between the same independent variables with "each" of six different placements. It seems plausible to conduct a separate study to examine a set of predictors affecting future "juvenile incarceration" or a study to investigate a set of predictors associated with "re-admission to psychiatric

hospitals.” By narrowing the dependent variable to one specific placement, findings of future studies can not only be free from debates regarding over-simplicity in defining the dependent variable, but also provides a reference of how different predictors behave differently for the different types of out-of-home placements.

Implications

The results from this study have implications for social work practice, education, policy and research. To be consistent with a “coordinated” systems-oriented framework, this implications section will be woven together rather than discussed independently from one another.

The results of both the hierarchical logistic regression and the profile analyses provide useful information for clinicians and frontline workers dealing with children and adolescents with SED. Examining a set of predictors and their scores at intake, this study helps clinicians identify children with high risk of out-of-home placement from the beginning and assists them to utilize profile information for their service planning and early intervention. Intake scores of children with high risk of future out-of-home placement generated by the profile analysis are especially helpful for clinicians because mean score difference might be much easier to understand than odd-ratio or probability statistics produced in multivariate logistic regression. Findings regarding the CAFAS deliver a concrete message for clinicians and social workers working with children and adolescents with SED. If a child comes in the program with severe functional impairment (i.e., 130 or above) measured by the

CAFAS, they need to acknowledge that this child has an imminent risk of out-of-home placement and he or she requires more attention for early intervention and for coordinated service planning.

The systems of care approach emphasizes “strength-based” and “family-focused” principles. The major reason for including the two protective indicators in the prediction model was to overcome disadvantages of traditional approaches that have been largely framed from a pathological paradigm while ignoring the strengths and resilience of children and their families. The findings of the study revealed that the two protective indicators did not show a significant “statistical” relationship with the dependent variable. However, they indeed showed a considerable “practical” usefulness when establishing the alternative parsimonious model (Model 4) and when developing profile scores at intake of high-risk children for future out-of-home placement.

This finding provides a meaningful implication for both social work practice and education. It highlights the fact that a balanced emphasis is necessary and that a comprehensive approach (integrating both a pathological paradigm and a strength-based approach) is better practice to assess the target population, to design coordinated services, and to evaluate the outcomes of the intervention. Though the philosophies of the social work profession are congruent with the principles of the systems of care movement in the mental health field, social work practice and education have failed to give balanced attention to both approaches - it is hard to find curricula or courses specifically designed to also teach dynamics of strengths,

competency, resilience, and protective indicators for populations with multiple needs. Without a balanced emphasis both on challenges and strengths, the social work profession will be hampered in its effort to provide successful assessments, effective services, and accurate evaluation of the services delivered. Social work, like other professions, still tends to embrace the “medical paradigm” or “pathological paradigm.”

The conceptual framework of the study was partly supported by the findings of the study and it provides a theoretical reference for further research. When the Eta coefficient in the profile analysis was used to assess directions and magnitudes of relationships between out-of-home placement and each predictor at the univariate level, the results confirmed the expected relationships proposed by the conceptual framework of the study. All negative indicators at intake (the number of risk factors, the CBCL, and the CAFAS) showed a positive correlation with having a future out-of-home placement and the two positive indicators (the BERS and the FAD) were negatively associated with the dependent variable. Although not all of these relationships were significant from a statistical stand-point (see Table 16.2 for details), directions of the relationships were clear and the magnitudes of the relationships were sizable enough to provide implications for further research. From a research stand-point, the findings in the profile analysis also suggest that combining both multivariate and univariate analysis techniques is preferable to gain a better understanding of each relationship observed in both analysis methods.

The findings of this study demonstrate the interrelatedness between social work practice, education, policy, and research. The findings of the study not only deliver useful information regarding clinical decisions, but also provide references for agency policy makers and administrative staffs to help them find the most efficient way to allocate available resources and funding by investigating the relative importance of a set of predictors and associated outcomes of placements. However, as discussed in the diagnostic information section, clinicians should be aware of how the daily practice of social work is closely connected to the policies and evaluation processes of the services they are delivering to the target population. We cannot expect that all clinicians should fully develop research “know-how,” but that they take ownership of any evaluation and research. Social work practitioners provide crucial information that can determine the success or failure of the research study. They provide raw materials for any research and should use the findings of studies they fund to inform themselves so that they can enhance their practices, services, and program policies. Clinicians should be aware that the target population can be better understood and that services can be improved by their active understanding of the study findings as well as active participation in the process of research and evaluation.

Discussion on the interrelatedness between practice and research also poses issues for researchers to consider. In criticizing separation between practice and research activity, Kirk (1999) stated, “research literature is not user-friendly any way” (p.302). Research literature is not fully understood by the clinicians and

front-line workers. Its true purpose, however, is to build the social work knowledge base and to inform social work professionals to use it to enhance practices, programs and policies.

Researchers should be aware that their language is not easy to understand for front-line workers and that they need to invest their best effort to deliver and share their findings in a user-friendly way. For clinicians and practitioners, it would be much more difficult to understand statistics presented in forms of odd-ratios in logistic regression analysis, than mean differences in profile analysis showed in a simple bar chart. In this study, the main reason for developing profile scores for children with high-risk of future out-of-home placement was to help the clinicians and practitioners understand the findings more easily and to help them use this information in their daily practice. Researchers and evaluators should be aware that their findings could be best utilized when social work professionals fully understand the practical meaning of the findings. The most efficient way to help clinicians understand the meaning of their research findings starts with “user friendly” language. It is hard to expect that social work practitioners would use findings that they cannot understand.

One of the unique principles of the systems of care approach is its emphasis on “coordination,” that demands real cooperation and partnership among all participants and entities in the process. A common theme of this dissertation is also “coordination” – coordination between “pathological and protective indicators”, coordination between “multivariate and univariate techniques”, coordination

between “statistical and practical significance”, and coordination between “practice, education, policy, and research.” This researcher experienced both the ups and downs of the coordination process for more than four years in this project. Clinicians, practitioners, researchers, and educators together need to invest significant effort to coordinate ourselves to better serve the populations that need coordinated services. The day we professionals truly coordinate will be the day the populations we serve receive truly effective services.

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