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以國際功能、失能與健康分類系統-兒童青少年版理論架構探討學前自閉症兒童母親之親職壓力預測因子

The Predictors of Parenting Stress in Mothers of

Preschoolers with Autism Spectrum Disorders based on the

perspective of the International Classification of Functioning,

Disability and Health for Children and Youth Framework

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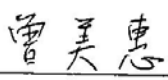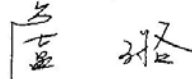中華民國 101 年 8 月

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Children and Youth Framework

本論文係邱資皇在國立臺灣大學職能治療學研究所完成之碩士學位論文，經考試委員審查合格並口試通過，特此證明。

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<div align="right">資皇　謹致</div>

Abstract

Background: Autism Spectrum Disorders is characterized by qualitative impairments in communication and social interaction, along with restricted, repetitive and stereotyped interests. Besides the core symptoms, children with ASD also have various associated deficits such as atypical sensory processing, impaired intellectual function, behavior problems, and difficulty in self-care skills or participation in family activities, which may have greatly affected parenting stress. Because of the complex nature of problems in children with ASD, employing a holistic framework to identify the factors influencing maternal stress is crucial. The World Health Organization advocates a uniform framework and terminology, the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY), for the description of health and health-related states in children and youth population. ICF-CY has changed the previous concept and definition about health. It not only focuses on disability but also on function, and considers the interaction between disease, function, environmental and personal factors. To date, studies examining the predictors of maternal stress in children with ASD only included factors from two or three specific dimensions without taking into account the possible factors from all the dimensions of ICF-CY simultaneously. Moreover, previous studies employed participants with a wide age range (e.g., from preschoolers to adults) such that the results may not be applicable to children in a specific age range, such as preschoolers. Furthermore, using the ICF-CY framework to

investigate the predictors of maternal stress in children with ASD is essential for a comprehensive understanding of factors associated with maternal parenting stress.

Purposes: The purpose of this study was to investigate the factors related to the maternal parenting stress in preschoolers with ASD using the ICF-CY framework by considering the potential factors from all dimensions of the ICF-CY.

Methods: Preschoolers with ASD were recruited from developmental centers, pediatric rehabilitation clinics, and child psychiatry and rehabilitation departments of general hospitals in Taiwan. The inclusion criteria included (1) preschool children were diagnosed with autistic disorder, Asperger's disorder, or PDD-NOS by child psychiatrists based on criteria of the DSM-IV-TR, and (2) children's mother agreed to participate and give the informed consent. The exclusion criteria were (1) children with sensory limitations such as blindness, deafness, and severe motor limitations which hindered adequate testing, and (2) children's mother unable to communicate in Mandarin or Taiwanese. The child with informed consent received a one-to-one assessment using the Chinese Psychoeducational Profile-third edition (CPEP-3) by a researcher. Another researcher rated the child's behaviors using the Childhood Autism Rating Scale. Meanwhile, the child's mother was interviewed by a third researcher using the Vineland Adaptive Behavior Scale-Chinese classroom edition. After completion of the CPEP-3, a package of questionnaires including a basic information questionnaire, the Behavior Style Questionnaire-Chinese version, the Child Behavior Checklist for Ages 1.5-5 -

Chinese version, the Short Sensory Profile-Chinese version, Positive Affect Index, and the Parenting Stress Index-Chinese Short Form were given to the mother.

Statistical analysis: Descriptive analysis and Pearson Product Moment Correlation analysis were conducted for the observed variables in ICF-CY framework. Multiple linear regression models were fitted to identify the significant factors of parenting stress in mothers of preschooler with ASD.

Results: Eighty-nine preschoolers with ASD aged from 3 to 5 years old were recruited. Pearson correlation demonstrated that maternal parenting stress was significantly positively correlated with the severity of symptoms, emotional and behavior problems. But maternal parenting stress was significantly and negatively correlated with mother's positive affect, child's rhythmicity, sensory processing, cognitive, expressive language and communication, daily living skills, and socialization. The strongest predictors of parenting stress in mothers of preschoolers with ASD were child's internalizing problems, high rhythmicity, the severity of symptoms, and mother's positive affect.

Conclusion: This is the first study investigating the parenting stress in mothers of preschoolers with ASD adopting the conceptual framework of the ICF-CY. Findings suggest that early diagnosis and interventions, coping strategies and social support should be provided to mothers of preschooler with ASD to assist their stress relief and psychological adjustment.

*Keywords***:** Autism spectrum disorders, parenting stress, ICF-CY, preschooler, predictor.

中文摘要

研究背景：自閉症障礙類群(Autistic Spectrum Disorders, ASD)的核心症狀為溝通與社交方面質的異常、重複且侷限的興趣與行為。除上述核心症狀外，此類兒童也同時具有感覺處理異常、智能不足、行為問題、無法執行自我照顧活動或參與家庭活動。照顧自閉症障礙類群對兒童，父母不僅必須面對症狀所帶來的困擾，更面臨長期照顧而累積的壓力。由於自閉症障礙類群兒童功能及障礙的複雜性，使用一個理論架構幫助我們完整釐清影響自閉症障礙類群兒童母親之親職壓力的相關因子是極為重要的。世界衛生組織(World Health Organization, WHO)於 2007 年倡導使用「國際功能、失能與健康分類系統-兒童青少年版」(International Classification of Functioning, Disability and Health for Children and Youth, ICF-CY)的理論架構及專門術語來描述兒童健康及健康相關的狀態。ICF-CY 改變以往對於健康的定義與概念，由疾病的焦點轉移到功能的重視，並考量環境與個人因素的影響程度。目前探討影響自閉症障礙類群兒童母親之親職壓力相關因子的研究並未全面地探討健康狀況、身體功能及構造、活動與參與、個人及環境因素，多數僅探討其中兩至三個面向的相關因素。此外，之前研究樣本診斷的異質性高，樣本的年齡範圍較廣，由嬰幼兒至青少年甚至成人。對於學齡前自閉症障礙類群兒童的研究樣本數較少，有的兒童發展程度偏低且多數具有中度到極重度的智力不足，影響到研究結果的應用性。

研究目的：本研究的目的將依據 ICF-CY 架構，探討影響學齡前自閉症障礙類群兒童母親之親職壓力的影響因子，並了解學齡前 ASD 兒童母親之親職壓力的預測因子。

研究方法：招募來自全台灣的幼稚園、兒童復健科診所、發展中心、醫院之復健科或兒童精神科的學齡前自閉症障礙類群兒童。納入條件包括：(1)兒童被兒童精神科醫師依據 DSM-IV-TR 診斷為自閉症(autistic disorder)、亞斯伯格症(Asperger disorder)或待分類的廣泛性發展障礙(Pervasive Developmental Disorder Not Otherwise Specified, PDD-NOS)；兒童年齡為 3 歲 0 個月至 5 歲 11 個月 31 天;(3)兒童的母親同意兒童參與此研究並簽署同意書。排除條件包括：(1)兒童有感覺功能的障礙，如視障或聽障，或兒童有嚴重的動作障礙會影響接受施測;(2)兒童的母親無法以中文或台語溝通。符合收案標準且母親簽署同意書的兒童接受研究者一對一施測中文兒童心理教育量表-第三版(Chinese Psychoeducational Profile-third edition)。接著兒童與研究人員或手足進行 15-20 分鐘的自由遊戲，另一名研究者觀察兒童評估及自由遊戲時的表現並使用兒童自閉症評量表(Childhood Autism Rating Scale)計分。同時，第三位研究者將使用中文版文蘭適應行為量表(Vineland Adaptive Behavior Scale)訪談兒童之母親。所有評估及訪談結束後，請母親填寫問卷，包括基本資料表、兒童行為調查問卷(Child Behavior Checklist/1.5-5, ABAC/1.5-5)、中文版兒童氣質量表(Behavior Style Questionnaire-Chinese, BSQ-C)、感覺處理能力剖析表-簡短版(Short Sensory Profile, SSP)、正向情緒指數(Positive Affect Index)、親職壓力表-中文簡短版(Parenting Stress Index-Chinese Short Form, PSI-CSF)，請母親於兩週後將問卷寄回。

資料分析：針對兒童健康狀態、身體功能及構造、活動及參與、個人、環境因素等變項進行描述性統計及皮爾森相關(Pearson Product Moment Correlation)分析。並以多元線性

迴歸模式(Multiple liner regression models)探討學齡前自閉症障礙類群兒童母親之親職壓力的重要預測因子。依變項包括 PSI-CSF 分數，獨立變項包括所觀察到兒童健康狀態、身體功能及構造、活動及參與、個人及環境因素等變項。

結果：共有 89 位三至五歲的自閉症障礙類群兒童參與本研究。皮爾森相關分析顯示自閉症障礙類群兒童母親之親職壓力與孩子的症狀嚴重度、行為情緒問題呈顯著正相關，與母親的正向情緒、孩子氣質的規律性、感覺處理功能、認知程度、表達與溝通能力、日常生活技巧或社會化程度呈顯著負相關。自閉症障礙類群兒童母親之親職壓力之顯著預測因子為孩子的內化問題、症狀嚴重度、規律性與母親的正向情緒。

結論：本研究為第一個採用「國際功能失能與健康分類系統-兒童青少年版」架構調查學齡前自閉症障礙類群兒童母親之親職壓力的研究。研究結果有助於專業人員瞭解影響學齡前自閉症障礙類群兒童母親之親職壓力的相關及預測因子，以訂定有效的治療與支持計劃，教導母親應對策略及尋求社會支持以舒緩壓力及協助心理調適，並可作為政府制定施政方針的參考。

關鍵字：自閉症障礙類群、親職壓力、國際功能失能與健康分類系統-兒童青少年版、學齡前兒童、預測因子。

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CHAPTER 1

INTRODUCTION

Autism Spectrum Disorders (ASD) is a neurodevelopmental disorder which is

characterized by qualitative impairments in communication and social interaction, along

with restricted, repetitive and stereotyped interests (American Psychiatric Association,

2000). Besides the core symptoms, children with ASD also have many associated deficits

such as atypical sensory processing (Chung, Tseng, Lu, & Shieh, 2012; Kern et al., 2006),

impaired intellectual function (Peter-Scheffer, Didden & Korzilius, 2012), behavior

problems (Hastings, 2003; Rao & Beidel, 2009), deficits in self-care skills (Estes, Munson,

Dawson, Koehler, Zhou & Abbott, 2009; Honey, Hastings & Mcconachie, 2005; Osborne

& Reed, 2010) or restricted participation in family activities (Larson, 2006), which often

cause an increase in parenting stress.

Parenting is not only the aspect of raising a child but also the process of promoting

and supporting the physical, emotional, social, and intellectual development of a child

from infancy to adulthood (Davies, 2000). Traditionally, mother has been expected to take

the major role in child care. Caring a child with ASD often presents significant challenges

which incur much higher levels of stress than caring typically developing children

(Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005).

According to Abidin's theoretical model of parenting stress, which was a function of

child characteristics, parent characteristics, and situational variables related to the role of

being a parent (Abidin, 1992). Various factors may influence parenting stress in caring for

children with ASD. Based on the World Health Organization's International Classification

of Functioning, Disability and Health for Children and Youth (ICF-CY), a person's

functioning and disability is conceived as a dynamic interaction between health conditions

and contextual factors (including personal and environmental factors). Environmental

factors interact with all the components of functioning and disability (WHO, 2007). The

ICF-CY encompasses all aspects of human health and provides a well-integrated and

standardized approach to health care. Therefore, the ICF-CY can serve as a framework for

studies investigating possible factors that influence the parenting stress in mothers of

children with ASD from a holistic perspective.

Over the past few decades, many studies investigated the factors related to parenting

stress in children with ASD. However, most of them mainly focused on factors from one

or two dimensions of the ICF-CY, such as behavior problems (Hastings, 2003; Tomanik,

Harris, & Hawkins, 2004; Hastings et al., 2005), cognition or language ability

(Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005; Konstantareas & Homatidis, 1989)

from the body functions and structures dimension, adaptive behavior functioning

(Hastings et al., 2005; Honey, Hastings & Mcconachie, 2005; Tomanik, Harris, &

Hawkins, 2004) from the activity and participation dimension, children's age (Dumas,

Wolf, Fisman, & Culligan, 1991; Estes et al., 2009; Holroyd, Brown, Wikler & Simmons, 1975; Koegel, Screibman, Loos, Dirlich-Wilhelm, Dunlap, Robbins, & Plienis, 1992; Konstantareas & Homatidis, 1989; Mori, Ujiie, Smith & Howlin, 2009; Phetrasuwan & Miles, 2009; Siman-Tov & Kaniel, 2011; Wolf, Noh, Fisman & Speechley, 1989; Tomanik, Harris, & Hawkins, 2004) from the personal dimension, the severity of symptomatology (Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005; Hastings, Kovshoff, Ward, Espinosa, Brown & Remington, 2005; Konstantareas & Homatidis, 1989; Tobing & Glensick, 2002) from the health condition dimension, and social support resources (Matthews, 2010; Mori, Ujiie, Smith & Howlin, 2009, Konstantareas & Homatidis, 1989) from the environmental dimension, without considering possible factors from the entire scope of the ICF-CY simultaneously.

Moreover, some limitations were noted in previous studies. (1). Participants were not homogeneous in diagnosis subtypes (Estes, et al., 2009; Mori, et al., 2009; Peters-Scheffer, et al., 2012; Siman-Tov & Ksnirl, 2011; Tobing & Glensick, 2002; Tomanik, et al., 2004), and across a wide range in age which from preschoolers to adolescents or adulthood (Bouma & Schweitzer, 1990; Hastings, 2003; Hoffman, et al., 2009; Holroyd, et al., 1975; Koegel, et al., 1992; Konstantareas & Homatidis, 1989; Konstantareas & Papageorgiou, 2006; Lecavalier, et al., 2006; Osborne & Reed, 2010; Tobing & Glensick, 2002; Wolf, et al., 1989). (2). Most studies employed a relative small sample size (n =15-60)

(Baker-Ericzén, et al., 2005; Bouma & Schweitzer, 1990; Davis & Carter, 2008; Dumas, et al., 1991; Epstein, et al., 2008; Estes, et al., 2009; Hastings, 2003; Hastings, et al., 2005; Holroyd, et al., 1975; Honey, et al., 2005; Koegel, et al., 1992; Konstantareas & Homatidis, 1989; Matthews, 2010; Rao & Beidel, 2009; Tobing & Glensick, 2002; Wolf, et al., 1989). (3). In some studies, the majority of children with ASD also having mental retardation, even from moderate to profound intellectual disability (Dumas, et al., 1991; Hoffman, et al., 2009; Peters-Scheffer, et al., 2012). Since children in different ages may have different developmental issues, the factors influence parenting stress may vary with ages. Small sample size may have weak statistical power. Since a large percentage of children with ASD also having moderate to profound intellectual disability, the results cannot be generalized to less severe children with ASD. Therefore, this study investigated the factors associated with parenting stress in mothers of preschoolers with ASD, not only taking into account the subtypes of ASD, but also adopting the ICF-CY framework by considering the possible factors from all dimensions of the framework.

Many children were diagnosed as ASD before 3-year-old or at preschool age. Many mothers would have to face such great stress in parenting their children. Knowledge of the factors influencing parenting stress in preschoolers with ASD is important for clinicians to set effective goals and appropriate treatment plans, to provide psychological support for stressful mothers, and to help the government make suitable polices.

CHAPTER 2

LITERATURE REVIEW

2.1 The diagnostic criteria of autism spectrum disorders

According to the Diagnostic and statistical manual of mental disorders- 4th ed.

(DSM-IV-TR; American Psychiatric Association, 2000), the diagnostic criteria for ASD are

listed as following:

2.1.1 Diagnostic criteria for 299.00 Autistic Disorder

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one

each from (2) and (3):

(1) qualitative impairment in social interaction, as manifested by at least two of the follows:

(a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye

gaze, facial expression, body postures, and gestures to regulate social interaction

(b) failure to develop peer relationships appropriate to developmental level

(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with

other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

(d) lack of social or emotional reciprocity

(2) qualitative impairments in communication as manifested by at least one of the follows:

(a) delay in, or total lack of, the development of spoken language (not accompanied by

an attempt to compensate through alternative modes of communication such as

gesture or mime)

(b) in individuals with adequate speech, marked impairment in the ability to initiate or

sustain a conversation with others

(c) stereotyped and repetitive use of language or idiosyncratic language

(d) lack of varied, spontaneous make-believe play or social imitative play appropriate to

developmental level

(3) restricted repetitive and stereotyped patterns of behavior, interests, and activities, as

manifested by at least one of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted patterns of

interest that is abnormal either in intensity or focus

(b) apparently inflexible adherence to specific, nonfunctional routines or rituals

(c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or

twisting, or complex whole-body movements)

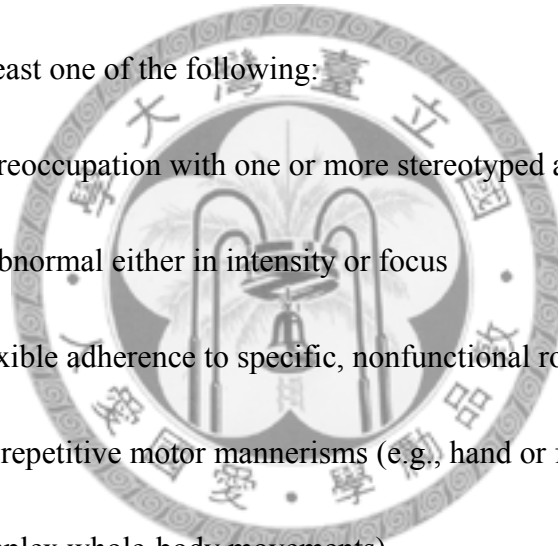(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to

age 3 years: (1) social interaction, (2) language as used in social communication, or (3)

symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative

Disorder.

2.1.2. Diagnostic criteria for 299.80 Asperger's Disorder

A. Qualitative impairment in social interaction, as manifested by at least two of the following:

    (1) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction

    (2) failure to develop peer relationships appropriate to developmental level

    (3) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)

    (4) lack of social or emotional reciprocity

B. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

    (1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

    (2) apparently inflexible adherence to specific, nonfunctional routines or rituals

    (3) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)

    (4) persistent preoccupation with parts of objects

C. The disturbance causes clinically significant impairment in social, occupational, or other

important areas of functioning.

D. There is no clinically significant general delay in language (e.g., single words used by age

2 years, communicative phrases used by age 3 years).

E. There is no clinically significant delay in cognitive development or in the development of

age-appropriate self-help skills, adaptive behavior (other than in social interaction), and

curiosity about the environment in childhood.

F. Criteria are not met for another specific Pervasive Developmental Disorder or

Schizophrenia.

2.1.3. Diagnostic criteria for 299.80 Pervasive Developmental Disorder Not Otherwise

Specified (PDD-NOS) (Including Atypical Autism)

This category should be used when there is a severe and pervasive impairment in the

development of reciprocal social interaction associated with impairment in either verbal or

nonverbal communication skills or with the presence of stereotyped behavior, interests, and

activities, but the criteria are not met for a specific Pervasive Developmental Disorder,

Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder. For

example, this category includes "atypical autism"-presentations that do not meet the criteria

for Autistic Disorder because of late age at onset, atypical symptomatology, or subthreshold

symptomatology, or all of these.

2.2 Introduction to International Classification of Functioning, Disability and Health for

Children and Youth (ICF-CY)

The ICF-CY is derived from the International classification of Functioning, Disability

and Health (ICF; World Health Organization, 2001) and has the addition of content and

greater detail specific to infants, toddlers, children and adolescents (WHO, 2007). The

ICF-CY offers a conceptual framework and a common language and terminology for

recording problems involving functions and structures of the body, activity limitations and

participation restrictions, and environmental factors important for children and youth (WHO,

2007). The ICF-CY covered the age range from birth to 18 years of age.

The ICF framework has two parts: Part 1 deals with Functioning and Disability, and Part

2 covers Contextual Factors (Figure 1). Each part has two components. The two components

of Functioning and Disability are Body Functions and Body Structures, and Activities and

Participation (WHO, 2007). The two components of Contextual Factors are Environmental

Factors and Personal Factors. Body functions are the physiological functions of body systems

including mental, sensory, speech, physiological, neuromusculoskeletal, and psychological

functions. Body structures are anatomical parts of the body such as organs, limbs and their

components. Activity is the execution of a task or action by and individual. Participation is

involvement in a life situation. Environmental Factors include the physical, social and

attitudinal environment in which people live and conduct their lives. Personal Factors are the

particular background of an individual's life and living including gender, race, age, others

health conditions, fitness, lifestyle, habits, upbringing, coping styles, social background,

education, profession, past and current experience, overall behavior pattern and character

style, individual psychological assets and other characteristics (WHO, 2007).

An individual's functioning and disability is a dynamic interaction or complex

relationship between the health condition and contextual factors. The person-environment

interaction implicit in the paradigm shift from a medical to a broader biopsychosocial model

of disability requires special attention to environmental factors for children and youth (WHO,

2007). A central issue is that the nature and complexity of children's environments change

dramatically with transitions across the stages of infancy, early childhood, middle childhood

and adolescence (WHO, 2007). Changes in the environments of children and youth are

associated with their increasing competence and independence (WHO, 2007).

The ICF-CY may be used in various ways including in clinical, administrative,

surveillance, policy or research applications (WHO, 2007). In clinical applications, the

ICF-CY can provide a summary of assessment findings, clarifying diagnostic information and

help to develop treatment plans (WHO, 2007). In administration, the ICF-CY codes can

record information related to eligibility, service provision, reimbursement and follow-up

(WHO, 2007). In surveillance applications, the ICF-CY may assist standardize data collection

procedures across instruments and over time to document prevalence of conditions, projects

service needs and service utilization patterns (WHO, 2007). In research, the ICF-CY may be

used to standardize the characteristics of participants, the selection of assessment measures

and the definition of outcomes (WHO, 2007).

2.3 Definition and importance of parenting stress in mothers

Parenting is not only the aspects of raising a child but also the process of promoting and

supporting the physical, emotional, social, and intellectual development of a child from

infancy to adulthood (Davies, 2000). According to Abidin's theoretical model of parenting

stress, which was a function of child characteristics, parent characteristics, and situational

variables related to the role of being a parent (Abidin, 1995). Abidin believed higher levels of

parenting stress led to increased dysfunctional parenting. Furthermore, based on the ICF-CY

framework, a person's functioning and disability is conceived as a dynamic interaction

between health conditions and contextual factors (including personal and environmental

factors). Accordingly, environmental factors interact with all the components of functioning

and disability (WHO, 2007) such that child's body functions and structures, activity and

participation, and personal factors may have influences on parenting stress, an environmental

factor. Traditionally, mother plays a major role in child care. Thus, parenting stress in mothers

has an important impact on children's development, health conditions and participation.

Knowledge of parenting stress in mothers of children with ASD is important for both clinical practice and research.

2.4 Parenting stress in mothers of children with ASD

Caring for a child with ASD often presents significant challenges and may cause elevated levels of stress. Numerous studies explored parenting stress between mothers of children with ASD and those of children with other developmental disabilities or typically developing children. Wolf et al. (1989) investigated 31 parents of children with autism, 31 parents of children with Down syndrome, and 62 parents of children with typically developing found that mothers of children with autism scored significantly higher levels of parenting stress and depressive symptomatology than any other groups. Bouma and Schweitzer (1990) also found that autism and cystic fibrosis groups each contained 24 mothers reported greater stress overall than the control group, and autism contributed more to family stress than cystic fibrosis.

Beside, Dumas et al. (1991) examined four groups, which were autism, Down syndrome, behavior disorders and normal development, and found that mothers of children with autism and behavior disorders scored significantly higher stress level in the Parenting Stress Index parent domain subscale and the Beck Depression Inventory (BDI) than nondisabled group, but there was no significant group difference in fathers' scores. A number of studies found that

parenting stress of mothers of children with ASD was higher than that of mothers of children with other DD or typically developing children (Baker-Ericzén et al., 2005; Epstein et al., 2008; Estes et al., 2009; Hoffman et al., 2009; Lecavalier et al., 2006; Mattews, 2010; Tomanik et al., 2004). Furthermore, Wolf et al. (1989) found that parenting stress was the only variable significantly related to depressive symptoms in parents. Thus, parenting stress in mothers of children with ASD is a common and critical issue in this population.

2.5 Factors associated with parenting stress in mothers of children with ASD

Identifying factors influencing parenting stress in mothers of children with ASD is important for clinicians to set effective goals, design appropriate treatment plans, provide psychological support for stressful mothers, and help the government make suitable polices. Table 1 shows a summary of studies on the factors related to the parenting stress in children with ASD. In short, behavior problems (Hastings, 2003; Tomanik, Harris, & Hawkins, 2004; Hastings et al., 2005), cognition or language ability (Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005; Konstantareas & Homatidis, 1989) from the body functions and structures dimension, adaptive behavior functioning (Hastings et al., 2005; Honey, Hastings & Mcconachie, 2005; Tomanik, Harris, & Hawkins, 2004) from the activity and participation dimension, children's age (Dumas, Wolf, Fisman, & Culligan, 1991; Estes et al., 2009; Holroyd, Brown, Wikler & Simmons, 1975; Koegel, Screibman, Loos, Dirlich-Wilhelm,

Dunlap, Robbins, & Plienis, 1992; Konstantareas & Homatidis, 1989; Mori, Ujiie, Smith & Howlin, 2009; Phetrasuwan & Miles, 2009; Siman-Tov & Kaniel, 2011; Wolf, Noh, Fisman & Speechley, 1989; Tomanik, Harris, & Hawkins, 2004) from the personal dimension, the severity of symptomatology (Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005; Hastings, Kovshoff, Ward, Espinosa, Brown & Remington, 2005; Konstantareas & Homatidis, 1989; Tobing & Glensick, 2002) from the health condition dimension, and social support resources (Matthews, 2010; Mori, Ujiie, Smith & Howlin, 2009, Konstantareas & Homatidis, 1989) from the environmental dimension, were significant factors associated parenting stress in children with ASD.

2.5.1 Factors in body functions and structures dimension

Previous studies examined factors in body function and structures dimension such as child's behavior problems, executive functioning skills, and sensory processing abilities relating to parenting stress were described as follows:

A vast amount of research examined the relationship between child's behavior problems and parenting stress in mothers of children with ASD. Hastings (2003) found that the behavior problems of 18 autism children aged 8-17 years old was significantly associated with their maternal stress. Hastings et al. (2005) also found that the behavior problems of 48 preschoolers with autism were positively correlated with their maternal stress. The behavior

problems not only strongly positively predicted maternal stress and accounted for 37% of the

variance, but also were the significant and only predictor of the maternal stress. Konstantareas

and Homatidis (1989) found that autistic child's self-abusive behavior was the best predictor

of stress for mothers, followed by hyperirritability and age. Thus greater parenting stress in

mothers associated with self-abusive behaviors, hyperirritable mood and older children.

Dumas et al. (1991) found that significantly higher levels of parenting stress in mothers of

children with autism were associated with behavior intensity and mothers' depressive

symptoms. Tomanik (2004) investigate 60 mothers of children with PDD which aged 2 to 7

found that both child's aberrant and adaptive behavior significantly predicted scores on the

Parent Distress subscale and accounted for 32% of the variance in maternal stress. Matthew

(2010) also found general difficulties with social skills and behavior problems among children

with high functioning ASD were associated with higher parenting stress. However, Estes et al.

(2009) found that a stronger relationship between maternal parenting stress and child

problems behaviors in the developmental delay group than in the ASD group. Estes et al.

(2009) explained that it may be additional factors such as SES, parental education, life events,

spousal relationship quality, social support, and quality of education and intervention services

for children had influence on parents. Konstantareas and Papageorgiou (2006) noted that

higher child activity, lower flexibility, lower quality of mood, the greater the autism child's

rhythmicity in daily habits, the less rhythmicity in sleep, and the greater level in task

orientation had significantly fair to moderate positive correlation with maternal stress. In sum, general activity level and mood, along with the CARS symptom severity scores accounted for 53.6% of the total variance in maternal stress. Davis and Carter (2008) also found that ASD children's social relatedness and dysregulation were the unique predictors of mothers' overall parenting stress.

As for the executive functioning skills, Epstein et al. (2008) reported that among 38 mothers of school age children with Asperger's syndrome, 92.1% rated their children as having clinically elevated levels of executive dysfunction, which were significantly correlated with mother's total stress level.

With regard to sensory processing abilities, Konstantareas and Homatidis (1989) found that mothers of 44 children with ASD below 12-year-old were more stressed by their children's near-receptor preoccupations such as smelling, licking and rubbing. Epstein et al. (2008) also reported that mothers found 82.6% of their school aged children with Asperger's syndrome had clinically significant levels of sensory sensitivity, and it had significant correlation with mother's total stress level. Furthermore, 78% of children according to mothers and 60% of children according to fathers had significant difficulties with sensory sensitivity. And significant relationship was noted between parenting stress and executive functioning skills or sensory processing abilities.

2.5.2 Factors in activity and participations dimension

Previous studies examined factors in activity and participations dimension such as

language abilities and adaptive behavior functioning related to parenting stress were reviewed

as follows:

With respect to language abilities, Konstantareas and Papageorgiou (2006) found that

mothers of non-verbal children reported significantly greater stress than mothers of the verbal

children. There was a negative relationship between level of functioning and total maternal

stress, with the lower-functioning children being more stressful for their mothers.

Regarding adaptive behavior functioning, Honey et al. (2005) found that children's

adaptive behavior functioning measured by the VABS was significantly correlated with the

stress of mothers of preschooler children with ASD, and those who had higher VABS scores

reported less stress. However, Peters-Scheffer et al. (2012) found that no associations between

maternal stress and children's adaptive behavior. The difference may be because a higher

proportion of participants with moderate to profound intellectual disabilities in

Peters-Scheffer et al.'s study than in Honey et al.'s study.

2.5.3 Factors in environmental dimension

Regarding child's placement, Holroyd et al. (1975) found that mothers of

institutionalized autistic children scored higher than mothers with children at home on a few

of stress scales, and these mothers also reported more problems related to the severity of the child's problems subscale in the Questionnaire on Resources and Stress (QRS). However, Hastings (2003) concluded that high proportion of children not living with their families did not influence parental stress or mental health. Mori et al. (2009) found that parenting stress decreased slightly when parents expected that the child would be in services such as residential care, or hospital care.

About socioeconomic status, Phetrasuwan and Miles (2009) found that mothers with lower education levels and income reported higher overall parenting stress, and mothers with higher overall or symptoms-related parenting stress reported more depressive symptoms and lower levels of well-being.

As for the family and community resources, Konstantareas and Homatidis (1989) found that mothers' stress was negatively correlated with the degree of support they felt they had received. Honey et al. (2005) found that there were significant correlations between mothers' stress and the helpfulness of informal social support such as acquiring social support coping, and positive reframing coping. More helpful social support sources and more use of the coping strategy were associated with lower stress level. However, Matthew (2010) found that social support didn't moderate any of the other variables' effect on parenting stress.

But other environmental factors such as parents raising concerns for the child's behavior or development at an earlier age, the father less involved in parenting, parents with a positive

family history of psychiatric disorders, parents expecting a heavier dependency from the child

in adult life were related to higher stress levels (Mori, et al., 2009).

2.5.4 Factors in personal dimension

With regard to age, Holroyd et al. (1975) found that four of the seven families in the

younger group than none of six families in the older group were rated low stress from the

study in 29 families with autistic children aged 1-18 years old. However, Osborne and Reed

(2010) collected 138 parents with ASD children aged 2-year-6-month-old to 16 years old

found that parental stress of the youngest age group (2- to 3-year-old) was significantly higher

than three older age groups (4-6, 7-11, above 12-year-old), parental stress significantly

reduced as age increased. The discrepancy may perhaps be due to the larger sample size and

larger percent (94%) completed by fathers in Osborne and Reed's study. Besides, significant

higher score in the BAS general cognitive ability score was noted in the two older groups

(86-88) than in the two younger groups (57-65).

2.5.5 Factors in health condition dimension

With regard to the subtypes of ASD, Tobing and Glensick (2002) found that mothers of

children with autism (n=22) reported significantly more total stress on the PSI than

PDD-NOS group (n=19). For PDD-NOS group, a significant positive correlation between

children's age and their severity of impairment and between children's impairment and mothers' child-related stress were noted. But no significant relations were found between children's severity of impairment and the various maternal stress scores in the autism group. Tobing and Glensick explained that the statistical significance might be due to small sample size reduce statistical power and limit the study's findings. Baker-Ericzén et al. (2005) also found that child's cognitive functioning and symptoms of autism significantly predicted and accounted for 41% of the variance of maternal child-related stress while ASD children entering an early intervention program. But only social interaction score in Gulliam Autism Rating Scale (GARS) was a significant independent predictor of maternal stress. Mori et al. (2009) found that mothers of Asperger's syndrome reported significantly higher levels of parental stress than mothers of autism children. Rao and Beidel (2009) also found that parents of school age children with high function autism had significantly higher scores on the total parenting stress than the parents of children without disorder.

As to the severity of ASD, Hastings et al. (2005) found that mothers of 48 preschooler children with autism reported the severity of autism symptoms was significantly positively correlated with stress ratings, as well as the findings presented by Honey et al. (2005) that parents of children with more severe symptoms of autism reported more stress. Hoffman et al. (2009) found that Children's stereotyped behavior and social interaction scores were related to both child and parent domain Stress, but communication scores were not. Matthews (2010)

found that the general symptomatology for high functioning ASD was a significant predictor

of parenting stress and explained 21% of the variance in parenting stress, but not all of the

individual symptom variables were significant predictors.

2.6 Limitation of the previous studies

A review of the studies examining the factors related to the parenting stress in mothers of

children with ASD showed several limitations as follows:

(1) Nearly a quarter of previous studies adopted participants with a wide age range (Bouma &

Schweitzer, 1990; Hastings, 2003; Hoffman, et al., 2009; Holroyd, et al., 1975; Koegel, et al.,

1992; Konstantareas & Homatidis, 1989; Konstantareas & Papageorgiou, 2006; Lecavalier, et

al., 2006; Osborne & Reed, 2010; Tobing & Glensick, 2002; Wolf, et al., 1989). Since

demands at different developmental stage are different, results of studies using participants

from a wide age range may not be applicable to children at a specific age range such as

preschoolers.

(2) Few studies (n=7) adopted preschoolers with ASD. None of them considered possible

factors from the entire scope of the ICF-CY. These studies only included factors from one to

four dimensions when investigating the factors associated with parenting stress (Table 2).

CHAPTER 3

PURPOSE AND HYPOTHESIS

3.1 The purpose and hypothesis of this study

The purpose of this study was twofold: (1) to investigate the factors related to the

parenting stress in mothers of preschoolers with ASD using the ICF-CY framework by

considering the potential factors from all dimensions of the ICF-CY, such as health condition,

body function and structures, activities and participation, personal and environmental factors,

and (2) to investigate the significant predictors of parenting stress in mothers of preschoolers

with ASD. The knowledge of the predictors of the parenting stress in mothers of preschoolers

with ASD can inform clinicians' decision making processes to set effective goals and

appropriate treatment plans, and it also can help the government make suitable polices. Thus,

our hypothesis was the potential factors from all dimensions of the ICF-CY were

hypothesized to be associated with parenting stress in mothers of preschoolers with ASD.

CHAPTER 4

METHODS

4.1 Participants

Eighty-nine 3- to 6-year-old children were recruited from developmental centers,

pediatric rehabilitation clinics, and child psychiatry and rehabilitation departments of general

hospitals in Taiwan. The inclusion criteria included: (1) Children were diagnosed with autistic

disorder, Asperger's disorder, and PDD-NOS by child psychiatrist based on criteria in the

DSM-IV-TR. (2) Children's age was 3- to 6-year-old. (3) Children's mother agreed to

participate and gave the informed consent. The exclusion criteria include: (1) Children who

had sensory limitations such as blindness, deafness, and severe motor limitations which

hindered adequate testing were be excluded. (2) Children's mother who can not communicate

in Mandarin or Taiwanese was being excluded.
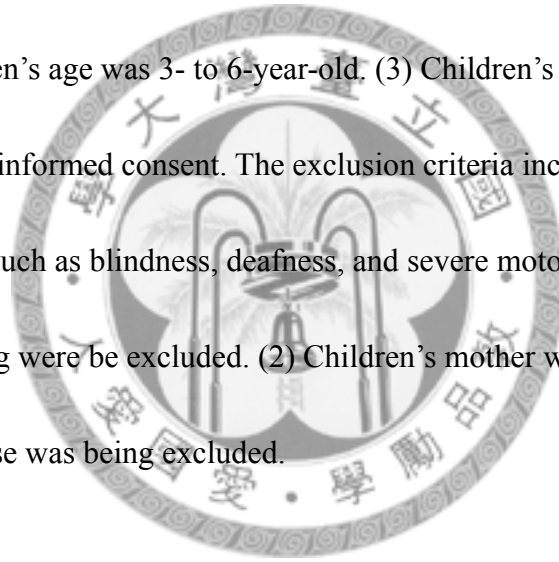
4.2 Measures (Table 3)

Health condition:

The measures were chosen following the definition of each domain in the ICF-CY.

According to the ICF-CY, health condition is defined in terms of disease and severity of

disease (WHO, 2007). Thus, both child's diagnosis of ASD and its severity as measured by

Childhood Autism Rating Scale (CARS) were the independent variables.

Activity and Participation dimension:

Communication (d310-d369) is defined as general and specific features of communicating by language, signs and symbols, including receiving and producing messages, carrying on conversations, and using communication devices and techniques (WHO, 2007). Thus, the Chinese Psychoeducational Profile-third edition (PEP-3) Expressive Language (EL) which measure a child's ability to express himself or herself by speaking or gesturing and Receptive Language (RL) subtests which measures a child's ability to understand spoken language (Fu, et al., 2010) through observation by researchers in evaluation room will be represented as children's communication in activity dimension. Besides, the Vinland Adaptive Behavior Scale-Chinese version (VABS-C) Communication domain which evaluates the receptive, expressive, and written communication skills of the child (Wu, Chang, Lu & Chiu, 2004) through observation by their parents in home will be represented as participation in communication in children with ASD.

In ICF-CY, mobility (d410-d489) is defined as moving by changing body position or location or by transferring from one place to another (WHO, 2007). Therefore, the CPEP-3 Fine Motor (FM) and Gross Motor (GM) domain which assess children's ability to control different parts of their bodies (Fu, et al., 2010) through researchers' observation in evaluation room will be represented as children's motor in activity dimension, and the VABS-C motor

domain which evaluated gross and fine motor skills (Wu, et al., 2004) through parents'

observation in home will be represented as participation in motor. In ICF-CY, daily living

skills included self-care (d510-599), domestic life (d610-669) and community, social and

civic life (d910-d999). Self-care (d510-599) is defined as caring for oneself, washing and

drying oneself, caring for one's body and body parts, dressing, eating and drinking, and

looking after one's health (WHO, 2007). Domestic life (d610-669) is defined as carrying out

domestic and every day actions and tasks (World Health Organization, 2007). Community,

social and civic life (d910-d999) is defined as actions and tasks required engaging in

organized social life outside the family, in community, social and civic areas of life (WHO,

2007). Therefore, the VABS-C Daily Living Skills domain that measures personal behavior as

well as domestic and community interaction skills (Wu, et al., 2004) will be represented as

participation in daily living skills. In ICF-CY, play is labeled as recreation and leisure (d920)

and is defined as engaging in any from of play, recreational or leisure activity (WHO, 2007).

Thus, the VABS-C Play and Leisure Time subdomain which measures how children play and

use the their leisure (Wu, et al., 2004) will be represented as participation in play skills.

Copying (d130) in basic learning which is defined as imitating or mimicking as a basic

component of learning, such as copying, repeating a facial expression, a gesture, a sound or

the letters (WHO, 2007) is measured by the CPEP-3 Visual-Motor Imitation (VMI) subtest

which assesses children's ability to imitate visual and motor tasks (Fu, et al., 2010).

In ICF-CY, socialization is labeled as interpersonal interactions and relationship (d710-d799) and is defined as carrying out the actions and tasks required for basic and complex interactions with people in a contextually and socially appropriate manner (WHO, 2007). Thus, the VABS-C Socialization domain which measures children's play and leisure time, interpersonal relationships, and various coping skills (Wu, et al. 2004) through parents' observation in home will be represented as participation in socialization.

Body function/structure dimension:

In body functions dimension of the ICF-CY, intellectual functions (b117) are defined as general mental functions, required to understand and constructively integrate the various mental functions (WHO, 2007) and are measure by the CPEP-3 Cognitive Verbal/Preverbal (CVP) subtest which measures children's cognition and verbal memory (Fu, et al., 2010). Moreover, in the ICF-CY, attention functions (b140) which are defined as specific mental functions of focusing on an external stimulus or internal experience for the required of time (WHO, 2007). Emotional functions (b152) which are defined as specific mental functions related to the feeling and affective components of the processes of the mind (WHO, 2007) are measured by the Child Behavior Checklist 1.5-5 which measures children's emotional problems such as Emotionally Reactive, Anxious/Depressed, Somatic Complaints, and withdrawn and behavior problems such as Attention Problems (Chen, Huang & Chao, 2009).

Dispositions and intra-personal functions (b125) in the ICF-CY which are defined as

disposition to act or react in a particular way, characterizing the personal, behavioral style of

an individual that is distinct from others (WHO, 2007) are measure by the Behavior Style

Questionnaire-Chinese version (BSQ-C) which measures children's temperament such as

Activity level, Rhythmicity, Approachability, Adaptability, Response intensity, Mood,

Persistence, Distractibility, and Threshold (Hsu, 2006). Sleep function (b134) which are

defined as general mental functions of periodic, reversible and selective physical and mental

disengagement from one's immediate environment accompanied by characteristic

physiological changes (WHO, 2007) are measured by items related to sleep problems in the

information questionnaire. In ICF-CY, perceptual functions (b156) in mental functions which

are defined as recognizing and interpreting sensory stimuli (WHO, 2007), and sensory

functions and pain (b210-b289) which are defined as the functions of the sense, seeing,

hearing, tasting and the sensation of pain (WHO, 2007) are measured by the Short Sensory

Profile-Chinese version (SSP-C) which measures children's responses to sensory events in

everyday life (Tseng & Cheng, 2008). Emotional functions (b152) which are defined as

specific mental functions related to the feeling and affective components of the processes of

the mind (WHO, 2007) are measured by the CPEP-3 Affective Expression (AE) subtest which

measures the degree to which the child displays appropriate affective responses (Fu, et al.,

2010). Global psychosocial functions (b122) in global mental functions which are defined as

general mental functions that lead to the formation of the personal and interpersonal skills

needed to establish reciprocal social interactions (WHO, 2007) are measured by the CPEP-3

Social Reciprocity (SR) subtest which measures the social interactions between the child and

others (Fu, et al., 2010).

Environmental factors:

With regard to the environmental factors, it is defined as the physical, social and

attitudinal environment in which people live and conduct their lives (WHO, 2007). In services,

systems and polices (e510-e599), social dimension of the environmental factors, services are

defined as providing benefits, structured programs and operations designed to meet the needs

of individuals, systems are defined as administrative control and organizational mechanisms

and are established by governments, and policies are defined as rule, regulations, conventions

and standards established by governments (WHO, 2007). Thus, the social economic status

(SES), the types, frequency and duration of the treatment in information questionnaire are

represented as the social dimension of the environmental factors. Attitudes (e410-e499), the

attitudinal dimension of the environmental factors, are defined as observable consequences of

customs, practices, ideologies, values, norm, factual beliefs and religious beliefs (WHO,

2007). Therefore, the Parenting Stress Index-short Form which measure parenting stress based

on the interrelationship between the child's and the parents' characteristics (Weng, 2003), the

positive Affect Index (PAI) which evaluated mother's perceptions of positive affect with their

children (Bengtson, 1990) are represented as the attitudinal dimension of the environmental

factors.

Personal factors:

In ICF-CY, personal factors that are defined as contextual factors related to the individual

(WHO, 2007) such as age and gender are measured by basic information questionnaire.

The measures selected according to the ICF-CY framework were listed as follows:

4.2.1. Measures administered directly to the child

4.2.1.1. *Chinese Psychoeducational Profile-third edition (CPEP-3; Fu, et al., 2010)*

 The CPEP-3 was translated from the Psychoeducational Profile-third edition (PEP-3,

Schopler, Lansing, Reichler & Marcus, 2005). The PEP-3 is a standardized, norm-referenced

scale, specifically designed for children with ASD, aged from 2 years to 7.5 years, to assist

clinicians or educators in planning treatment or educational programs (Schopler, et al., 2005).

The PEP-3 consists of 172 items, which are combined to form 10 subtests [cognitive

verbal/preverbal (CVP), expressive language (EL), receptive language (RL), fine motor (FM),

gross motor (GM), visual-motor imitation (VMI), affective expression (AE), social reciprocity

(SR), characteristic motor behaviors (CMB), and characteristic verbal behaviors (CVB)] and

3 composites (communication, motor, and maladaptive behavior)(Schopler, er al., 2005).

Higher score indicated better performance or less maladaptive behaviors (Schopler, er al.,

2005). The internal consistency ranges form 0.92 to 0.98 for the subtests and from 0.92 to

0.95 for the composites (Fu, et al., 2010). The inter-rater reliability ranges form 0.57 to 0.94

for the subtests, and from 0.63 to 0.89 for the composites (Fu, et al., 2010). The confirmatory

factor analysis has confirmed that the PEP-3 contains three factors: communication, motor,

and maladaptive behaviors (Schopler, er al., 2005).

4.2.2. Observational measures rated by researchers

4.2.2.1. *Childhood Autism Rating Scale (CARS, Schopler, Reichler & Renner, 1988)*

The CARS is a 15-item behavior rating scale which is developed to help identify and

diagnose autism in individuals aged over 2 years and older and to estimate the severity of the

autistic disorder (Schopler, et al., 1988). It is completed by professional based on direct

observation or parent interviews (Schopler, et al., 1988). Each of the 15 items is given a rating

from 1 to 4, *1* indicated that a child's behavior is *within normal limits* for a child of that age, *2*

means that the child's behavior is *mildly abnormal*, 3 indicated that the child's behavior is

moderately abnormal, and *4* indicated that the child's behavior is *severely abnormal*.

Additionally, the midpoints (1.5, 2.5, & 3.5) between four ratings are to be used when the

behavior appears to fall between two categories. The total CARS score is computed by

summing the 15 individual ratings, ranging from 15 to 60. Higher score indicated more

autistic behaviors (Schopler, et al., 1988). Children with scores below 30 are categorized as

nonautistic. Scores ranging from 30 to 36.5 indicated mild to moderate autism while scores

ranging from 37 to 60 indicated severe autism. The internal consistency is 0.94 (Schopler, et

al., 1988). The average inter-rater reliability is 0.71 and the test-retest reliability is 0.88

(Schopler, et al., 1988). The diagnoses made by CARS were in agreement with those made

independently by child Psychologist and psychiatrists (Schopler, et al., 1988).

4.2.3. Measures rated with parent interviews

4.2.3.1. Vineland Adaptive Behavior Scale-Chinese classroom edition (VABS-C; Wu, et al.,

2004)

The VABS-C is translated from the Vineland Adaptive Behavior Scale (VABS) and

designed to measure a child's day-to-day adaptive functioning from 3 to 12 years of age (Wu,

et al., 2004). The VABS-C assesses four domains of adaptive behaviors: Communication,

Daily living skills, Socialization, and Motor skills (Wu, et al., 2004). The raw scores can be

converted to age equivalent, standard scores, and a Composite Overall score can be derived,

based on the sum of the sub-scale standard scores (mean = 100; standard deviation = 15).

Higher score indicates better performance. The split-half reliability of the whole scale is

0.91-0.99 (Wu, et al., 2004). The test-retest reliability is 0.62-0.95, and the inter-rater

reliability is 0.74-0.89 (Wu, et al., 2004). The discriminate validity is also examined (Wu, et al., 2004).

4.2.4. Parent questionnaires

4.2.4.1. Basic information questionnaire

The basic information questionnaire includes child's personal factors such as age, gender, birth order, total number(s) of children in the family, epilepsy, medical condition, types of early intervention services (e.g. occupational therapy, speech therapy, or others), types of educational settings, hour(s) of early intervention/per week, and parental information such as educational level, occupation, age.

4.2.4.2. Child Behavior Checklist for Ages 1.5-5-Chinese version (Chen, et al., 2009)

The Chinese version of Child Behavior Checklist for Ages 1.5-5 (CBCL-C/1.5-5) was translated from the Child Behavior Checklist for Ages 1.5-5 in Achenbach System of Empirically Based Assessment (Achenbech & Rescorla, 2000). The CBCL-C/1.5-5 is a 99-item caregiver report which examines children's emotional and behavior problems in children aged form 1.5 to 5 years by using 3-point scale which *0 for not true* of the child, *1 for somewhat true or sometimes true*, and *2 for very true or often true* based on preceding 2 months (Chen, et al., 2009). The CBCL-C/1.5-5 contains seven syndrome scales (Emotionally

reactive, Anxious/depressed, Somatic complaints, Withdrawal, Sleep problems, Attention

problems, and Aggressive behaviors) and the seven scales merged into two broad band

syndrome scales (Internalizing and Externalizing) (Chen, et al., 2009). Internalizing problems

consisted of the four syndrome scales, Emotionally reactive, Anxious/depressed, Somatic

complaints, and Withdrawal. Externalizing problems consisted of the two syndrome scales,

Attention problems, and Aggressive behaviors. Internalizing problems, Externalizing

problems, and Sleep problems are combined to form the Total Problems composite score. The

severity of one syndrome of and individual is counted by summing the scores of its items. A T

score $\geq$ 70 (at least two standard deviations above the mean for the general population) for a

syndrome scale or a T score $\geq$ 63 for internalizing or externalizing problems were in the

clinical range. Higher score indicates more emotional and behavioral problems. The internal

consistency coefficients range from 0.66-0.95 (Achenbech & Rescorla, 2000). The test-retest

reliability ranges form 0.80s-0.90s (Achenbech & Rescorla, 2000).

4.2.4.3. Behavior Style Questionnaire-Chinese version (BSQ-C; Hsu, 2006)

The Behavior Style Questionnaire – Chinese version (BSQ-C) was translated from the

Behavior Style Questionnaire (McDevitt & Carey, 1978) by the child development research

group of the Child Mental Health Center of National Taiwan University Hospital. The BSQ-C

is a 72-item caregiver report which measures preschool children's temperament (Hsu, 2006).

The BSQ-C contains 9 temperamental dimensions: Activity level (the amount of physical movement during daily routines), Rhythmicity (consistency of physiological functions, such as sleeping or toileting), Approachability-Withdrawal (the tendency to approach new objects or experiences), Adaptability (the ability to adjust or change behavior in socially desirable ways), Response intensity (the depth or magnitude of emotional response), Mood (the quality of an emotional reaction in either a positive or negative direction), Persistence (pursuit of challenging tasks), Distractibility (the effectiveness of extraneous environmental stimuli in interfering with ongoing behaviors), Threshold (the minimal amount of sensory stimulation necessary to elicit a response).

Parents rate their child on each item using a 7-point scale from 1 (the child almost never demonstrates a particular behavior) to 7 (the child almost always exhibits that behavior). Higher scores for each dimension are indicative of greater difficulty. Specifically, if the dimension score is one standard deviation above the mean, the child is scored in the difficult range. The difficult temperament refers to high activity level, withdrawal form new stimuli, irregularity, low adaptability, high intensity, and negative mood (Hsu, 2006). Contrary, the easy temperament consists of adequate activity level, approach to new stimuli, regularity, intensity, high adaptability, and a positive mood (Hsu, 2006). The internal consistency is 0.84 (Wang, 2002) and the test-retest reliability is 0.38-0.73 (Chen, 1980).

4.2.4.4. Short Sensory Profile-Chinese version (SSP-C; Tseng & Cheng, 2008)

The SSP-C was translated from the Short Sensory Profile (SSP; Dunn, 1999). The SSP-C is as 38-item caregiver questionnaire and the items were selected from the Sensory Profile which was the most indicative in measuring children's response to sensory events in everyday life (Tseng & Cheng, 2008). The SSP-C is used for children from 3 to 10 years of age and it is composed of 9 sections, i.e. Tactile sensitivity, Taste/smell sensitivity, Movement sensitivity, Underresponsive/seeks sensation, Auditory Filtering, Low energy/weak, and Visual/auditory sensitivity (Tseng & Cheng, 2008). Caregivers render their answers through a 5-point Likert scale (almost never = 5, seldom = 4, occasionally = 3, frequently = 2, almost always = 1) and higher scores indicated better sensory procession abilities (Tseng & Cheng, 2008). The test-retest reliability is 0.79 with a 3-week interval, and Cronbach alpha for internal consistency ranger from 0.62-0.90 (Tseng & Cheng, 2008). The results of the discriminative validity study showed that all the section and factor scores of the SSP-C were significantly different between children with and without autism (Tseng & Cheng, 2008).

4.2.4.5. Parenting Stress Index-Chinese Short Form (PSI-CSF; Weng, 2003)

The PSI-CSF was translated from the Parenting Stress Index- short form (Abidin, 1995). The PSI-CSF is a 36-item questionnaire which is designed to measure parenting stress based on the interrelationship between the child's and the parents' characteristics (Weng, 2003). The

target population of PSI-CSF is the patents of children aged from 1 month to 12 years (Weng, 2003). Parenting stress was reported on each item using a 5-Likert point scale that ranged from 1, strongly disagree, to 5, strongly agree. The total stress score is calculated by the summing the all item and provides a figure for overall level of parenting stress. The PSI-CSF consists of three subscales: Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child (Weng, 2003). The Parental Distress subscale is designed to measure an impaired sense of competence in the parenting role, lack of social support, role-restriction, depression, and conflict with one's spouse. The Parent-Child Dysfunctional Interaction subscale presents that child fails to meet parents' expectations, and interactions with the child are not reinforcing. The Difficult Child Subscale assessed the characteristics of the child that make him/her easy or difficult to manage. Higher scores on the subscales and PSI-CSF total score indicated greater levels of stress (Weng, 2003). While a raw score of total parenting stress ≥ 115 (or at of above the 90th percentile), or score of the Parental Distress ≥ 41, or score of the PCDI ≥ 37 or score of the Difficult Child ≥ 38, all strongly indicates Clinically Significant stress in the parent-child dyad and their parents should seek professional counseling. A raw score of total parenting stress within 65-103 (or within 15-80th percentile) indicates Normal range. The following internal reliability alpha coefficients have been reported: 0.947 for total stress, 0.902 for Parental Distress, 0.908 for P-CDI and 0.856 for the Difficult Child subscale (Weng, 2003).

4.2.4.6. Positive Affect Index (PAI; Bengtson, 1990)

The PAI is a 15-item caregiver report which is used to evaluate mothers' perceptions of positive affect in their relationship with their son or daughter with ASD (Bengtson, 1990). The PAI contains ten items of positive affect toward the son or daughter with an ASD and five items of positive affect perceived to be reciprocated (Bengtson, 1990). Higher score indicates more positive affective relationship perceived by their mothers (Bengtson, 1990). Cronbach's alpha was 0.88 for the Taiwanese mothers and 0.83 for the U.S. families (Lin, 2008)

4.3. Procedure

The child with mother's informed consent received a one-to-one assessment using the Chinese Psychoeducational Profile-third edition (CPEP-3) in a quiet room. At the same time, another researcher rated the child's behaviors using the Childhood Autism Rating Scale (CARS). Meanwhile, the mother was interviewed by a third researcher using the Vineland Adaptive Behavior Scale-Chinese version (VABS-C). It took 1 to 1.5 hours to complete the assessment. After completing the CPEP-3, a package of questionnaires including a basic information questionnaire, the Parenting Stress Index-Chinese Short Form (PSI-CSF), the Child Behavior Checklist/1.5-5 (CBCL-C/1.5-5), the Behavior Style Questionnaire-Chinese (BSQ-C), the Short Sensory Profile-Chinese version (SSP-C), and the Positive Affect Index

(PAI) was given to the mothers whom were asked to return the questionnaires in two weeks.

4.4. Statistical analysis

Statistical analyses were performed using the SPSS 17.0 (SPSS Inc., Chicago, IL, U.S.A.). Two-sided $p \leq 0.05$ was considered statistically significant.

(1) Descriptive statistical methods were used to characterize the demographic and clinical features of participants.

(2) Multiple linear regression models were fitted to identify the significant predictors of the parenting stress in mothers of children with ASD. The PSI-C short form as the dependent variable and the independent variables were all the observed variables in health condition, body functions and structures, and activity and participation, environmental and personal dimensions. To ensure the quality of analysis, model-fitting techniques for variable selection, goodness-of-fit (GOF) assessment, and regression diagnostics was used in regression analyses. Specifically, the stepwise variable selection procedure was applied to obtain the candidate final regression model. All the univariate significant and non-significant relevant covariates were put on the variable list to be selected and the significance levels for entry (SLE) and for stay (SLS) were set to 0.15.

CHAPTER 5

RESULTS

5.1 Characteristics of the participants

Table 4 presents the demographic data of participants. The participants for the study

included 89 children aged 36-71 months old (mean age= 54.53, SD=9.73). The mean age at

diagnosis was 33.48 months (SD=10.32, range 13.2-60.0). Eighty-two percent of the children

were male. Most children (76.1%) were diagnosed as Autistic disorder and few were

Asperger's Syndrome (7.9%) or PDD-NOS (16%). Most of them were diagnosed by child

psychiatrists (80.9%). The most common co-morbidity was ADHD (11.2%). Over half (n=52,

58.4%) of participants attended regular kindergarten, 18 (20.2%) children in special education

kindergarten, 14 (15.7%) children in developmental center, 4 (4.5%) children in hospitals for

day care, and one child was unschooled.

Descriptive statistics of independent variables as presented in Table 5. The mean score of

CARS were 29.29 (SD = 6.68) which was within the range of non-autistic diagnostic category.

However, 5.62% (n = 5) of children were at the range of mild to moderate autism, and 16.85%

(n = 15) at the range of severe autism. About the child's emotional and behavior, the mean of

T scores in Internalizing problems was 64.28 (SD = 8.77) which within the clinical range ($\geq$

63), but the mean of T scores in Externalizing problems was 57.93 (SD = 11.51) which within

the normal range. As to the temperament, the mean of each behavioral category was within

±1SD, except the threshold in female participant was exceeded +1SD. Higher threshold

means that female participants need higher amount of sensory stimulation to elicit a response.

In Short Sensory Profile-Chinese version, the mean of scores in underresponsive,

auditoty filtering, and low energy sections were within definite difference range and others

were within probable difference range. In CPEP-3, the mean age equivalent in each subtest

was within 31.79 month to 41.11 month. In VABS-C, the mean age equivalent in each domain

was within 18.5 month (socialization) to 52.98 month (motor).

5.2 Parenting stress in mothers of children with ASD

Scores of parenting stress were displayed in Table 5. Despite the fact that the mean total

stress score was 101.09 (SD= 17.49, range 47-142) which was below the Clinically

Significant range (=115), nearly one quarter of mothers (n=20, 22.5%) rated their total stress

level in the Clinically Significant range. Thirty-seven mothers (41.6%) rated their stress level

in the Clinically Significant range on the Difficult Child subscale, 27.0% on the Parental

Distress subscale, and 7.9% on the Parental-Child Dysfunctional Interaction subscale. No

group differences ($t = .286, p = .594$) were noted in the mean total stress scores between

mothers of girls and boys.

5.3 Correlations between potential predictors and maternal parenting stress

As Table 5, the severity of symptoms was significantly and positively correlated with maternal parenting stress. Both Internalizing problems and Externalizing problems were significantly and positively correlated with maternal parenting stress level. As to the temperament, child's higher activity level and higher response intensity were positively correlated with maternal parenting stress level. Child's higher rhythmicity, higher approachability, higher adaptability, more stable mood, and lower distractibility were all significantly negatively correlated with maternal parenting stress. With regard to sensory processing ability, all subscales were significantly and negatively correlated with maternal parenting stress level except movement sensitivity and low energy.

About the activity and participation dimension, only child's cognitive verbal and expressive language subtests in the CPEP-3 were significantly and negatively correlated with maternal parenting stress level. Four domains (communication, daily living skills, socialization, and motor) in the VABS-C were significantly and negatively correlated with maternal parenting stress level. Lastly, mothers' positive affect was significantly and negatively correlated with their parenting stress level.

5.4 The predictors of parenting stress

As shown in Table 6, multiple regression analysis revealed that child's Internalizing Problems, severity of symptoms, rhythmicity, and mother's positive affect were the significant

predictors of parenting stress in mothers of children with ASD, and accounted for 54% of the

variance. That is, maternal parenting stress would be higher when children with ASD scored

higher on internalizing problems or symptom severity. However, maternal parenting stress

would be lower when children with ASD scored higher on rhythmicity or mother had higher

scores on the PAI.

CHAPTER 6

DISCUSSION

This study investigated parenting stress in 89 mothers of preschoolers with ASD who were between 3 and 6 years old. Furthermore, this study examined the predictors of parenting stress, considering the possible factors from the entire scope of the ICF.

Our results showed that although the average maternal parenting stress in this sample was within the Normal range (i.e., below 80th percentile), there were still nearly one-quarter of mothers rated their total stress in the Clinically Significant range, indicating a relatively high stress level. Among the three subscales of PSI-CSF, nearly half of mothers presented a Clinically Significant level on the Difficult Child subscale, which assessed the characteristics of the child that made him/her easy or difficult to manage. According to the Chung et al.'s (2012) study, children with ASD had a higher activity level, were more withdrawn, less adaptable, had more negative mood, were less persistent, had lower distractibility, and higher threshold than typically developing children. The temperament or behavior characteristics of children with ASD may easily make their mothers feel that their children were difficult to manage . Our study showed that child's temperament was related to maternal parenting stress and was consistent with the McBride, Schoppe, and Rane's study (2002) found that higher maternal parenting stress was significantly and positively correlated with child's higher activity level and higher emotional intensity. Therefore, providing individualized parenting or

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caring skills for mothers based on child's temperament or behavior characteristics may

decrease parenting stress. In addition, one-quarter of mothers showed a Clinically Significant

level on the Parent Distress subscale, indicating an impaired sense of competence in the

parenting role, lack of social support, role-restriction, depression, and conflict with one's

spouse. Therefore, improving mother's confidence in parenting is a critical issue. Lastly, less

than ten percent of mothers scored their stress level at the Clinically Significant range on the

Parental-child Dysfunctional Interaction subscale, indicating some children were unable to

meet their mothers' expectations or mother felt disappointing in interacting with the child.

Thus, providing parenting knowledge and skill training may help mothers have suitable

expectations for their child and thereby improve parenting function.

The present study lends partial support to the hypothesis that the factors from all

dimensions of the ICF-CY were associated with parenting stress in mothers of children with

ASD. The discrepancies of the results between univariate and multivariate analysis were due

to the confounding effects of the other uncontrolled variables in the univariate analysis.

Therefore, the discussions were primarily based on the results of the multivariate analysis.

The significant predictors of parenting stress in mothers of preschoolers with ASD were

child's internalizing problems, rhythmicity, severity of symptoms, and mother's positive

affect, which encompassed the dimensions of the body function, the environmental factors,

and the health condition in the ICF-CY model. Our findings were consistent with previous

studies that mothers had increased parenting stress when their child with ASD showed more

internalizing problems behaviors (Dumas et al., 1991; Hastings et al., 2005; Konstanatareas &

Homatidis, 1989; Konstanatareas & Papageorgiou, 2006; Matthew, 2010; Tomanik, 2004) or

had severer autism symptoms (Hastings et al., 2005; Hoffman et al., 2009; Honey et al., 2005;

Konstanatareas & Homatidis, 1989; Matthew, 2010). The core symptoms of children with

ASD usually cause an increased burden of caregivers (Hastings et al., 2005; Honey, et al.,

2005). Internalizing problems behaviors and autism symptoms may not only affect children's

functioning (Lecavalier, 2006) but also have a great influence on maternal parenting stress in

everyday life (Davis & Carter, 2008).

Findings of the study showed that higher rhythmicity of preschoolers with ASD and

more positive affect of mothers toward their children were related to decreased maternal

parenting stress. Rhythmicity describes the regularity of physiological functions, such as

sleeping or toileting. It is usually easier for parents to take care of children with higher

rhythmicity in daily life and such that parenting stress may decrease accordingly. Furthermore,

before this present study, no studies have investigated the relationship between that mothers'

positive affect towards their ASD children and parenting stress. Based on the theoretical

model of the relative probability of effective parental functioning in all possible conditions of

parenting system (Belsky, 1984), parents function most effectively when each subsystem (i.e.

parental personality and psychological well-being, contextual subsystems of support, child

characteristics) operates in the supportive mode and least competently when each subsystem

operates in the stressful mode. In our study, we had demonstrated the relationship that mother

showed more positive perceptions to their ASD children, or more understanding, trust,

fairness, respect, and affection they feel about their ASD children, or more positive interaction

with their ASD children, then the stress decreased.

This study had several limitations. First, cross-sectional data provide some understanding

of the potential factors for parenting stress in mothers of preschoolers with ASD, but

longitudinal measures would provide more precise and robust conclusions. Second, although

we included the possible factors in the ICF-CY model for parenting stress in mothers of

preschoolers with ASD, further research is needed to identify additional possible factors such

as parenting styles or family and social support.
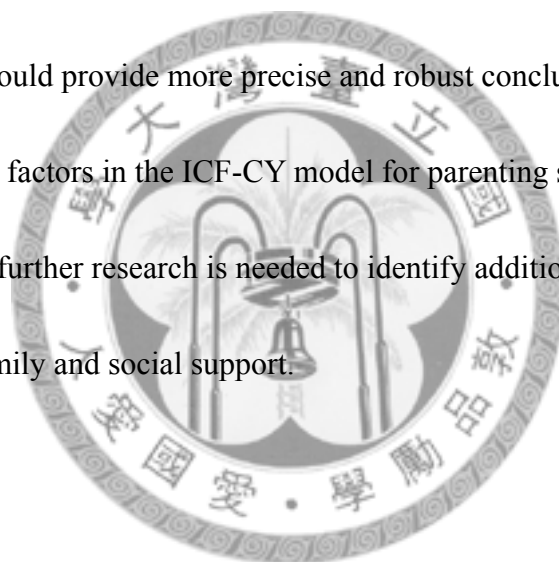
CHAPTER 7

CONCLUSION

This is the first study investigating the parenting stress in mothers of preschoolers with ASD adopting the conceptual framework of the ICF-CY. Our study found that when children with higher rhythmicity and mother with more positive affect toward children, mothers would have decreased parenting stress. Furthermore, when children had more internalizing problems behaviors and severer symptoms in ASD, mother would have increased parenting stress. Findings of the study highlighted the importance of early diagnosis and intervention, and the need of providing coping strategies and parent support group to mothers with preschoolers with ASD to decrease stress levels in parenting children with ASD.
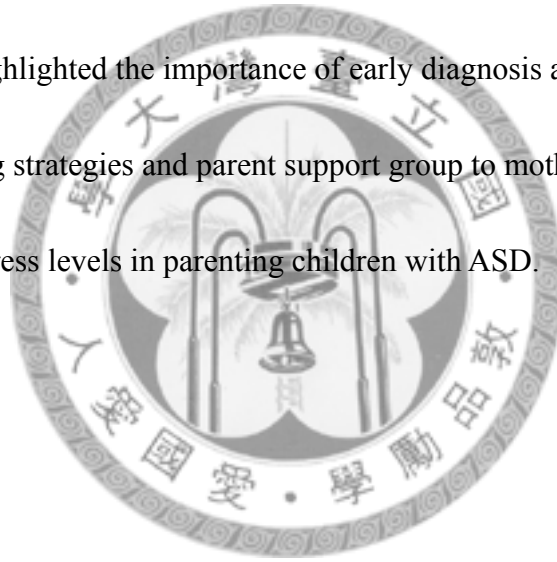
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Table 1. Studies investigating factors associated with parenting stress in children with ASD

Authors & titles	Participants	Statistical methods	Dependent variables	Independent variables	Results	Limitations
1. (Holroyd, Brown, Wikler & Simmons, 1975) Stress in families of institutionalized and noninstitutionalized autistic children. *Journal of Community Psychology, 3, 26-31.*	• Parents in 29 families with autistic children (28 mothers and 22 fathers), • 29 autistic patients' mean age were 10.5Y (SD=4.4, 1-18Y & 24Y), 78% were male, **Inclusion**: Diagnosed as autistic by one of the author with following characteristics (1) bizarre, stereotyped self-stimulation, (2) language difficulties, (3) problems in synthesis of information, (4) lack of concern for social amenities or self care, (5) unusual patterns of play, and (6) isolation from others.	• The relationship between QRS scales and the interview rating of family stress: t test • The stress of parents of institutionalized and noninstitutionalized children matched for children's age: t test	• **The Questionnaire on Resources and Stress (QRS)**: parent report, 285 items to assess 15 variables pertinent to families caring for chronically ill or handicapped individuals, three clusters were: ✓ Parent problems (Scales 1-7) ✓ Family Problems (Scales 8-10) ✓ Child Problems (Scales 11-15)	• **Interview ratings of Stress**: interviewer (two social worker) estimated a family's functioning in three levels: ✓ High Stress: top 25% of all the families on current stress level ✓ Medium Stress: Middle 50% ✓ Low Stress: Bottom 25% • **Child placement**: Home vs. institutionalized • **Age**: divided at the median age (9.5), one adult autistic case was removed, older vs. younger	• Relationships between the QRS and Interview ratings of Stress ✓ Interviewer classified 14% of the families as High Stress, 59% as Medium Stress, and 24% as Low Stress. ✓ Mothers of families classified as High Stress families scored higher on five QRS scale than mothers of Low Stress families. Five scales were in the area of Parents Problems (Scale 5 & 7) and Family Problems (Scale 8, 9, &10). ✓ None of the scales reflecting severity of impairment in the child (Scale 11-15). Family stress level may be independent of the severity of the child's problems, as measured by the QRS. ✓ Only one father from High Stress families and could not compared with fathers from Low Stress Families. • Parents of Institutionalized vs. Parents of Noninstitutionalized Children ✓ It is no difference in distribution of interviewer stress ratings between families of institutionalized and noninstitutionalized children matched for age distribution of the autistic child. (Home vs. Institutionalized with H/M/L Stress: 1/7/1:2/8/2) ✓ Mother of institutionalized autistic children scored higher than mothers with children at home on three scales: Scale 7, 11, & 15. ✓ Father on institutionalized children scored higher than fathers of children at home on three scales: Scale 11, 13, & 15. ✓ Except Scale 7, parents of institutionalized children reported more problems related to the severity of the child's problems. • Parents of Older Children vs. Parents of Young Children ✓ Most families (4 of 7) with young autistic children were rated Low Stress while none with older group. ✓ Mothers of older children only scored higher on the Financial Problems Scale of the QRS. ✓ No differences on QRS scale for the fathers.	• Inter-rater reliability was not ascertained for the stress level judgments. • Small sample in comparison between High and Low Stress. • The range in age of the children was broad.
2.	• 44 autistic children:	• The degree of	• **The sum of the 14**	• **Childhood Autism**	• **Symptom ratings**	• Other variables

| (Konstantareas & Homatidis, 1989)

Assessing child symptom severity and stress in parents of Autistic Children

Journal of child Psychology and Psychiatry, 30, 459-470. | mean age 6Y10M (2Y4M-12Y7M), 32 (73%) were boys and 12 (27%) were girls, 18 were firstborn or only children and 26 were later-born,

__Inclusion__:
Diagnosed based on DSM-III by a child psychologist and a child psychiatrist.
• Maternal age: mean 34.7Y(23-46Y). One mother attempted to commit suicide by an overdose of sedatives 6 months before the child's assessment.
• Paternal age: mean 37.9Y (23-52Y). One father was in therapy for unipolar depressive illness during the child's assessment. | child's symptom that parents perceive and the difference between fathers' and mothers' ratings: MANOVA, multiple comparisons t tests
• Child and family characteristics related to total stress: Pearson correlation & stepwise regression analysis. | **stress ratings on CARS:**
semi-structured interview, 4-point scale (1-4), each symptom stress score and total stress score. | **Rating Scale (CARS)**: rated by a clinician and parents, to measure the severity of autistic symptom.
• **Child characteristics**: sex, age (below 6Y6M vs. above 6Y7M), cognitive level (lower-functioning vs. higher-functioning), verbal ability (verbal: 2-word phrases vs. nonverbal), hyperirritability (the degree of restlessness and non-goal-directed behavior), facial oddity, birth order, self-abusive behaviors, seizure and sleep disturbance.
• **Family characteristics**: family size, the family's SES (Blishen scale: below 39.99/40.00-54.99/55-69.99/above 70.00) and maternal working status.
• **Total number of supportive agents (0-10) and degree of support experienced (0-20)**: parent report
• **Total number of aggravating agents (0-10) and degree of aggravation(0-20)**: parent report | ✓ Impairment in verbal communication was rated highest in severity by all raters. Followed were unevenness in cognitive functioning and impairment in human relations
✓ Fathers differed from the clinicians in 9 symptoms and mothers in 6 ones.
✓ Multiple comparisons showed that the clinician ratings were higher than the ratings of both mothers and fathers.
✓ All three raters assessed the children as more symptomatic if they were lower-functioning, nonverbal, hyperirritable, odd-looking, and self-abusive or seizuring.
✓ Younger children were rated by their mothers and fathers as less symptomatic than by the clinician. For older children, parental ratings did not differ from the clinicians'.
• **Symptom-related stress and related characteristics**
✓ Mothers and fathers reported similarity in the degree of stress. Only two symptoms were differentially stressful to parents: Mothers were more stressed by their children's near-receptor preoccupations (smelling, licking rubbing), while fathers worried more about their children's inability to speak.
✓ A stepwise regression analysis showed that lack of verbal communication and anxiety reaction accounted for 38% of the fathers' total stress. Inappropriate use of body, visual preoccupations and inappropriate affect accounted for 38.5% of mothers' total stress.
✓ For fathers & mothers, child's self-abusive behavior was the best predictor of stress. But for mothers, hyperirritability and age were the followed stress predictors. Greater stress associated with self-abusive, hyperirritable and older children.
✓ Maternal stress scores were more likely to correspond to symptom perception than paternal stress scores. 78% of mothers had higher stress scores than their husbands, but only 47% fathers had higher stress scores than their wives.
• **Family and community resources and their effect on** | that may influence the parenting stress were not taken into account. |

					stress ✓ Pearson correlation coefficients revealed that fathers' stress was negatively correlated with the number of supports, as well as the degree of support they reported to have received. Mothers' stress was negatively correlated with the degree of support they felt they had received, but it was positively related to the number of aggravations their husbands reported. ✓ Spouse-related support and closeness: 24 mothers and 3 fathers of autistic children expressed the need for additional support from their spouse. Mothers wished for support from their husbands were: (a) to provide them with some relief from caring for the autistic child; (b) to assume more responsibility in disciplining; (c) to have the husbands helping spontaneously with daily chores and responsibilities rather than having to be asked. Both mothers and fathers gave the maximum rating in 92% of the closeness to their spouse.	
3. (Wolf, Noh, Fisman & Speechley, 1989) Brief report: psychological effects of parenting stress on parents of autistic children *Journal of Autism and Developmental Disorders, 19, 157-166.*	• 31 autistic: mean age 9.34Y (SD=4.16, 4.5-19.5Y), IQ<70: 61% of autistic **Inclusion**: ✓ DSM-III criteria ✓ Diagnosed by a multidisciplinary team and reassessed by a child and adolescent psychiatrist • 31 Down syndrome: mean age 9.11Y (SD=4.21), diagnosed after birth, IQ<70: 100% • 62 developmentally average children: mean age 7.62Y (SD=4.43), 31 matched for CA and 31 for MA, recruited	• Sociodemographic variables by diagnostic groups: descriptive statistic • Comparison of means of major variable for four groups of mothers and fathers: ANOVA • The experienced dysphoria was association with parenting stress: regression • Perceived social support conditioned the relationship between stress and dysphoria differently for each	• **The Parenting Stress Index Form 6**: parent report, 120-item to measure relative stress in the parent-child system and identifying sources of stress. ✓ Child domain (only used) ✓ Parent Domain	• **Beck Depression Inventory**: parent report, to measure depressive symptoms • **The Revised Kaplan Scale**: parent report, to measure perceived social support. • **Sociodemorgraphic variable**: ✓ Child (age, gender) ✓ Mother & Father (age, education) ✓ Family income	• Depressive Symptomatology ✓ The mean score for dysphoria in mothers of autistic children was significantly higher than the average samples. But no significant differences were observed across the samples of fathers. ✓ Mothers had higher mean scores than fathers in all four groups. The gender difference was more evident among families of developmentally handicapped children. • Parenting Stress ✓ Among mothers and fathers, the autistic sample mean scores were significantly higher than those of controls. ✓ Mothers and fathers within all samples reported similar amounts of stress. • Parenting Stress and Depressive Symptoms ✓ Parenting stress was the only variable significantly related to dysphoria. ✓ No significant interaction effect of stress on depression was observed among the subsamples of mothers. ✓ Among fathers, a significantly more powerful role of	• Other variables that may influence the parenting stress were not taken into account.

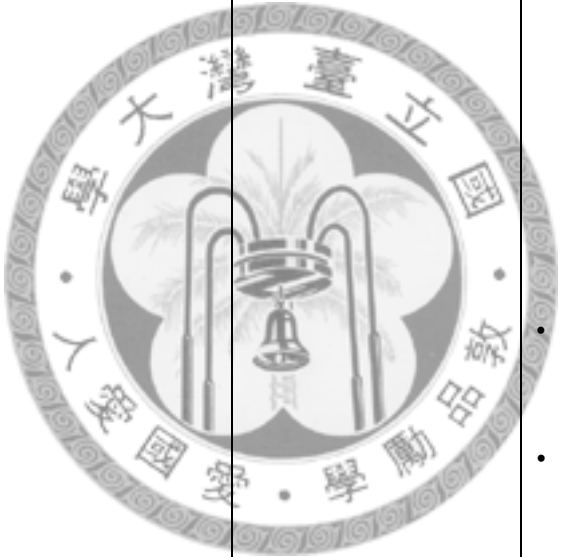|						
	from Physicians and a public health clinic • All children lived with at least one natural parent. • Each parent completed the questionnaires independently.	parent: regression			parenting stress was observed for the autistic group. An increased level of parenting stress induced psychological consequences on autistic group fathers more so than fathers of average children. • Role of Social Support ✓ The inclusion of social support in the regression equation increased the amount of explained variance in depression from 24 to 27% for mothers, and from 18 to 25% for fathers. ✓ For mothers, stress impact on depression was suppressed by social support. ✓ For fathers, the impact of parenting stress on dysphoria remained significant. A significant interaction effect showed the stress impact was moderated as the level support increased.	
4. (Bouma & Schweitzer, 1990) The impact of chronic childhood illness in family stress: a comparison between autism and cystic fibrosis. *Journal of Clinical Psychology, 46, 722-730.*	• Each sample consisted of 24 mothers of children between the ages of 5-12. • Cystic fibrosis group: mean age 7.7Y (SD=2.5), 17 males and 7 females, mean number of sibling is 1.12, 4 mother were single parents. • Autism group: mean age 7.7Y (SD=2.23), 20 males and 4 females, mean number of sibling is 1.42, 1 mother was single parent. **Inclusion**: ✓ Diagnosed as autism based on DSM-III ✓ Moderate to severe mental retardation • Control group: mean age 8.3Y (SD=2.39), 13 males and 11 females, mean number of sibling	• Differences among three groups on QRS-SF: ANOVA • Differences among three groups mean score on QRS-SF scales: F-test • Differences within each of the clinical groups according to the number of other siblings in the family: ANOVA	• **The Questionnaire on Resources and Stress- Short Form (QRS-SF)**: parent report, an overall score and scores on 11 factors were used. ✓ Dependency & management ✓ Cognitive impairment ✓ Limit on family opportunities ✓ Life span care ✓ Family disharmony ✓ Lack of personal Reward ✓ Terminal illness stress ✓ Physical limitations ✓ Financial stress ✓ Prefer institutional care ✓ Personal burden	• **Diagnosis:** three groups (autism, cystic fibrosis, and control) • **The number of other siblings in the family**	• Each clinical group reported greater stress overall than the control group, and autism contributes more to family stress than cystic fibrosis. • The Mothers of children with autism scored significantly higher than the mothers of the control group on 6 of the 11 scales with the more conservative Scheffé test, such as dependency and management demands, physical limitations, cognitive impairment, limits on family opportunities, terminal illness stress, and life span care. • The Mothers of children with cystic fibrosis scored significantly higher than the mothers of the control group on 3 of the 11 scales, such as physical limitations, terminal illness stress, and life span care. • There were no significant differences in overall stress scores found between mothers with 0, 1, 2, or 3 other children within the autistic or cystic fibrosis group. Family stress is not influenced significantly by the number of other siblings either in the autism or cystic fibrosis family.	• Small sample size and limited representativeness such as matching marital status or the number of other siblings in the family. • Other variables that may influence the parenting stress were not taken into account.

	is 1.04, 8 mothers were single parents.		for respondent			
5. (Dumas, Wolf, Fisman, & Culligan, 1991) Parenting stress, child behavior problems, and dysphoria in parents of children with autism, Down syndrome, behavior disorders and normal development *Exceptionality, 2, 97-110.*	• 30 autism: mean age 9.16 Y (SD=4.10), 61% had mental retardation (IQ,70) **Inclusion:** ✓ diagnosed as autistic children based on DSM-III by one of the authors, a child and adolescent psychiatrist • 30 Down syndrome: : mean age 8.81 Y (SD=3.93) **Inclusion:** ✓ adaptive functioning & IQ <70 • 30 behavior disorders: mean age 7.27 Y (SD=2.89) **Inclusion:** ✓ diagnosed as autistic children based on DSM-III by one of the authors, a child and adolescent psychiatrist • 60 normal development: mean age 7.46 Y (SD=4.18) • 149 mothers and 123 fathers	• Group differences on the parenting stress, child behavior problems, and dysphoria: multivariate analyses of covariance (MANCOVA) • Multiple regression analyses: step 1 by entering dummy group variables, step 2 by entering the measures not in the equation.	• **Parenting stress index (PSI):** 101 items, parent report, to measure perceived stress in the parent-child relationship. ✓ Parent domain ✓ Child domain	• **Sociodemographic variables:** diagnosis, child age, child sex, mother age, father age, marital status, mother education, father education, family size, family income. • **The Eyberg Child Behavior Inventory (ECBI)**: 36 items, parent report, to measure parental perception of behavior problems in children with diverse dysfunction. ✓ Intensity scale (severity) ✓ Problem scale (extent) • **The Beck Depression Inventory (BDI)**: 21 items, parent report, to measure common affective, cognitive, and behavior symptoms of depression	• **Mother-Father differences** ✓ Both mothers and fathers of children with autism and behavior disorders scored significantly higher in PSI child domain than other two groups. ✓ Both mothers and fathers of children with behavior disorders scored significantly higher in ECBI intensity and problem scale than other three groups. ✓ Mothers of children with autism and behavior disorders scored significantly higher in PSI parent domain and BDI than nondisabled group, but there is no significant difference on fathers' scores. • **Children's age and gender differences** ✓ There is no significant group difference attributed to children's age or gender. ✓ Only mothers of younger children with autism scored significantly higher in BDI than nondisabled group. ✓ Mothers of boys with behavior disordered scored significantly higher in PSI parent domain than nondisabled group. • **Accounting for group differences** ✓ Parenting stress: Parents of children with autism and behavior disorders perceived themselves as experiencing significantly more stress than other two groups, and this was significantly associated with the ECBI intensity scale and the BDI for mothers and the ECBI intensity and problem scales for fathers. But this association could not account for the differences and these differences were still existed after controlling these variables. ✓ Child behavior: The difference on the ECBI intensity and problem scales between behavior disordered children and the other groups was significantly associated with the PSI child domain, but this association could not account for it. Parents of children with behavior disorders perceived their children having more behavior problems than all other children, even after controlling the stress variable.	• Did not consider the extent to which some parents may have had more than one exceptional child to care for • Did not take into account additional psychiatric diagnoses that some children may have had. • Other variables that may influence the parenting stress were not taken into account.

Study	Sample	Purpose/Analysis	Measures	Variables	Results	Limitations
					✓ Dysphoria: PSI child domain significantly associated with the differences on the BDI between the autistic and behavior disordered groups, and this association could account fot this difference. But these differences were no longer significant after controlling this variable.	
6. (Koegel, Screibman, Loos, Dirlich-Wilhelm, Dunlap, Robbins, & Plienis, 1992) Consistent Stress Profiles in Mothers of Children with Autism *Journal of Autism and Developmental Disorders, 22, 205-216.*	• 50 families of children with autism, broad range in geographic/ cultural location, age of child (Range 3.1Y-23.1Y, the majority were school age), and functioning level of the child.. **Inclusion**: Diagnosed as autism by DSM II-R • Some of the mothers worked outside of the home, but the majority were full-time homemakers.	• Compare the stress profiled across mothers who lived in different cultural and geographic environments, who had children of different ages, and who had children with different functioning levels: correlation	• **Holroyd's 11-scale 66-item QRS**: parent report, to measure a possible pattern of stress level in parents of children with autism. ✓ Dependency & management ✓ Cognitive impairment ✓ Limit on family opportunity ✓ Life-span care ✓ Family disharmony ✓ Lack of personal reward ✓ Terminal illness stress ✓ Physical limitations ✓ Financial stress ✓ Preference for institutionalization ✓ Personal burden	• **Socioeconomic status (SES)**: ✓ Mother's age (20-30, 31-40, >40) ✓ Mother's educational level (below 9th grade, high school/college) ✓ Age of child (Preschool age, school age, Adult) ✓ Child's functioning level (IQ<50, IQ>50)	• Visually and statistically, the autism subpopulations all were very similar and all were consistently different from the norms, especially on dependency and management, cognitive impairment, limits on family opportunity, and life-span care subscales. • The correlations for mothers of autistic children in each of the three geographic locations were very high (.886-.957) and were highly statistically significant. • The stress profiles for mothers with younger (<7Y) versus older autistic (≥7Y) children revealed a very high correlation coefficient of .932. • The stress profiles of mothers of low (IQ>50) versus high (IQ>50) functioning autistic children revealed a very high coefficient of .964. • The correlation coefficients for the normative group versus the autism groups were all very low, and none of these correlations were statistically significant.	• Child's age range was too wide and had a large proportion with moderate to severe mental retardation. • Only consider environment and personal factors, other variables which may influence the parenting stress were not taken into account.
7. (Tobing & Glensick, 2002) Relation of Childhood Autism Rating Scale-Parent version to	• 41 children with PDD: mean age 6.5Y, range from 2 to 12Y, 39 males and 6 females, 22 children were autism, 19 children were PDD-NOS. **Inclusion**:	• Coefficient α and splint-half reliability for the entire sample • Gender and diagnostic differences on the CARS-P and PSI: t	• **Parenting Stress Index-Third Edition**: parent report, to measure mothers' level of stress. Total Stress, Child Domain, Parent Domain scores were	• **Childhood Autism Rating Scale- Parent version (CARS-P):** parent report, to measure parents' perception of children's level of functional impairment.	• Internal consistency coefficient α of .86, splint-half reliability was .85. • Gender: Mothers of males did not differ from mothers of females on the CARS-P or PSI. • Diagnostic group: significant differences on children's level of functioning and mothers' Total Stress score. ✓ Children with autism were rated as more severely impaired on the CARS-P than PDD-NOS group.	• Sample sizes were relatively small, reducing statistical power and thereby potentially limiting the study's findings.

diagnosis, stress and age. *Research in Developmental Disabilities, 23, 211-223.*	✓ Diagnosed by clinician.	test • The relationship among the CARS-P, PSI, and age between autism and PDD-NOS group: Pearson's correlation. • Possible predictors of children's severity of impairment and parenting stress: simultaneous regression analyses.	used.		• Mothers of children with autism reported significant more total stress on the PSI than PDD-NOS group. But there were no significant group differences on the child-related or parent-related stress • The relations among the variables ✓ For the autism group, significant correlations only among the PSI Total Stress, Child Domain, and Parent Domain scores. But no significant relations were found between children's severity of impairment and the various maternal stress scores. ✓ For the PDD-NOS group, a significant positive correlation between children's age and their severity of impairment, and between children's impairment with mothers' child-related stress. Significant positive correlations between PSI Total Stress and Child Domain score, and between PSI Total Stress and Parent Domain (but not between Child Domain and Parents Domain scores). Controlling the age, the relations between the CARS-P and PSI Child Domain subscales (reinforces parent, mood, and acceptability) remained significant • Predicting child-related parenting stress ✓ Age, diagnosis, and functional impairment accounted for 26% of the variance, but only the children's severity of impairment was the significant predictor. • Predicting children's level of functioning ✓ Age, stress, diagnosis significantly accounted for 61% of the variance. All of the individual predictors were significant contributors to the variance.	• The response rate was not very high and affected the sample's representativeness. • Only six of the children were female. • There was no research protocol to establish the accuracy of children's diagnoses. • Psychometric soundness of the CARS-P. • Other variables that may influence the parenting stress were not taken into account.
8. (Hastings, 2003) Child behavior problem and partner mental health as correlated of stress in mothers and fathers of children with	• 18 autism children: mean age 11.8Y (SD=2.6, 8-17Y)，13 male and 5 female。All attended a school for autism, 8 children resided at home, the remainder lived in full-time residential provision or weekly boarders at the school. • 18 biological parents	• Compare the distributions of teachers' DBC ratings, and mothers' and fathers' mental health and stress scores to a normal distribution: one-sample Kolmogorov-Smirnov test	• **Parent and Family Problems subscale of the QRS-F**: parent report, to measure impact on the parent and family. 5 items measuring depression were removed to prevent overlap between the measures of stress	• **Developmental Behavior Checklist (DBC)**: teacher report, to measure the severity of behavior problems displayed by the children, DBC Total Behavior Score was used. • **Hospital Anxiety and Depression Scale (HADS)**: parent	• Mothers reported more significant anxiety symptoms than fathers on the HADS. • Associations between child, mother and father variables ✓ Stronger associations between mothers' and fathers' reports of stress than between their reports of general mental health symptoms. ✓ Stronger associations between the child's behavior problems and mothers' as opposed to fathers' stress and mental health rating. • The association between parental stress and teacher-reported behavior problems (controlling for	• Small sample size then lacked statistical power. • Homogeneity of the sample at the level of etiology limits the generalization of the results. • Behavior problems are often expressed

autism *Journal of Intellectual Disability Research, 47, 231-237*	of children with autism, married and resided together in the family home. • Mother mean age 41.2Y (SD=4.6)，22% had a university education. • Father mean age 43.4Y (SD=5.0)，28% had a university education.	• Differences between mothers' and fathers' stress and mental health scores: related-samples t-test。 • Associations between child, mother and father variables: Pearson's correlation	and of mental health. Total stress score was used.	report, to measure parental mental health, contains 14 and 4-pooint items, two subscales: ✓ Depression ✓ Anxiety (internal consistency had been confirmed in this study)	parental mental health) ✓ Maternal stress is significantly associated with the child's behavior problems. [r(18)=0.67, p=0.002] ✓ For fathers, no association with behavior problems. • The associations between parental stress and mental health (controlling for child behavior problems) ✓ Maternal stress is significantly associations with paternal anxiety [r(18)=0.46, p=0.049] and depression. [r(18)=0.67, p=0.002] ✓ For fathers, marginally significantly association with maternal depression[r(18)=0.44, p=0.07], but not maternal anxiety. [r(18)=0.38, p=0.13] • High proportion of children not living with their families (rather stayed in residential provision), didn't change the pattern of results.	differently depending on the context, and the dimensions of behavior reported by teacher might not be those that affect fathers' well-being. • Other variables that may influence the parenting stress were not taken into account.
9. (Tomanik, Harris, & Hawkins, 2004) The relationship between behaviors exhibited by children with autism and maternal stress. *Journal of Intellectual & Developmental Disability, 29, 16-26.*	• 60 mothers having a child with PDD: mean age 35.75Y (26-46Y) • 60 children with PDD: mean age 5.05Y (SD=1.57, 2-7Y), 47 were autism, 12 were PDD-NOS, 1 was Asperger's disorder. **Inclusion**: ✓ Diagnosed as PDD based on DSM-IV ✓ received diagnosis before 5Y ✓ Diagnosed by developmental pediatrician, psychologist, neurologist, psychiatrist, or pediatrician. ✓ Receiving services for autism: average of 38 hours (8-63h)	• Comparison of correlation coefficients between PSI, ABC, and ABS. • Predict maternal stress with child's aberrant and adaptive behaviors: regression analysis (5 subscale of the ABC and 3 factor scores of ABS were entered, 2 restricted models were tested to evaluate the independence contributions)	• **Parenting Stress Index-short form (PSI-SF)**: 36 items, parent report, to measure parent's stress in caring children under the age of 12, a total stress score and three subscale scores were used. Scores on the PD subscale were used in the regression analyses. ✓ Parental distress (PD) ✓ Parent-child dysfunction interaction (P-CDI) ✓ Difficult child (DC)	• **Demographic questionnaire**:26items ✓ Children with autism (age, gender, ethnicity, diagnosis, age at diagnosis, communication) ✓ Parents (age, ethnicity, marital status, education) ✓ Family (annual income and family size). ✓ **Aberrant Behavior Checklist (ABC)**: 58 items with 4-point Likert scale, parent report, to measure inappropriate and maladaptive behaviors of school-age children. ✓ Irritability, agitation ✓ Lethargy, social withdrawal	• Correlations between the child's aberrant and adaptive behaviors ✓ Lethargy and stereotypy were negatively correlated with all three of the ABS factor scores. ✓ Hyperactivity was negatively related to personal/social responsibility scares. ✓ Age was significantly correlated with adaptive behavior; older children with greater self-help skills ✓ No other significant differences in the demographic variables, and neither total stress nor parental distress scores were significantly related to any of the demographic variables. ✓ The mean score in total stress scores on PSI was 97 indicating the clinically significant levels of stress, two-thirds of the mothers were in this range. • Predict maternal stress with child's aberrant and adaptive behaviors ✓ Child aberrant and adaptive behavior significantly predicted scores on the PD subscale, accounting for 32% of the variance in maternal stress. ✓ First restricted model included only five subscales of the ABC: ABC significantly accounted for 19% of the variance in maternal stress. ✓ Second restricted model included three adaptive	• Other variables such as intellectual functioning were not taken into consideration. • Sample size and mother's characteristics for generalization of the findings. • Receiving intensive applied behavior analysis may increase the stress.

	a week, received approximately four different services including special education, speech therapy, applied behavior analysis (ABA), occupational therapy, regular school placement and sensory integration.			✓ Stereotypic behavior ✓ Hyperactivity, non-compliance ✓ Inappropriate speech • **AAMR Adaptive Behavior Scales-school, 2nd ed (ABS-S:2)**: parent report, to measure the ability of school-aged children (3-16Y) who have emotional maladjustments, intellectual impairments, or developmental disabilities to cope with environment, only the first part of the scale was used. ✓ Personal sufficiency ✓ Community self-sufficiency ✓ Personal/social responsibility	behavior factors (ABS): ABS accounted for nearly 16% of the variance in maternal stress. ✓ No significant difference between the two restricted models, and both aberrant and adaptive behavior accounts for the greatest proportion (32%) of variance in maternal stress.	
10 (Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005) Stress levels and adaptability in parents of toddlers with and without autism spectrum disorders. *Research &*	• 37 children with Autism spectrum disorders (ASD): mean age 28.35M (SD=5.2), mean length of time in program was 8 months (SD=3.53), including 37 mothers and 27 fathers **Inclusion:** ✓ Diagnosed as ASD by an clinician based on DSM-IV ✓ Confirm by the third author through observation &	• Examine stress level after participation in the CTS program for mothers and fathers by groups (ASD & TDC): ANCOVA • Compare the mean stress level reported by the two groups of mothers and fathers: independent sample t-test with	• **Parenting stress index (PSI)**: parent report, to measure the impact of the parenting role on an individual's stress level, a cutoff of the 75th percentile to identify parents who reported significantly elevated stress. ✓ Child domain ✓ Parent domain	• **Bayley Scale of Infant Development, 2nd edition(BSID-II)**: standardized test of developmental functioning administered by psychologist, Mental Development Index (MDI) was used • **Gilliam Autism Rating Scale (GARS)**: a norm-referenced assessment, to measure the severity of autistic symptom, autism	• Overall parental stress by groups (ANCOVA) ✓ A significant overall effect for mothers on the child domain score and on the parent domain score. ✓ For fathers, it was also significant for the child domain score and for the parent domain score. • Mothers' stress ✓ Mothers of children with ASD report significantly higher levels of stress in the child domain and parent domain than parents of TDC at entry and exit. ✓ At entry, 59% of mothers of children with ASD reported significantly elevated levels of child domain stress (>75) compared to 17% of mothers of TDC. At program exit, 46% of mothers of children with ASD reported significantly elevated levels of child domain stress compared to 13% of mothers of TDC. ✓ At entry, 24% of mothers of children with ASD	• Without an ASD control group, can't conclude that the reductions in stress seen mothers of children with autism were due to the inclusion nature of the grogram or merely comprehensive early intervention in itself. • The length of time

practice for Persons with Severe Disabilities, 30, 194-204.	GARS • 23 typically developing children (TDC): mean age 24.35M (SD=5.03), mean length of time in the program was 11.04 months (SD=5.49), 23 mothers and 16 fathers **Exclusion:** ✓ Exhibited significant cognitive delays, communicative or motor delays. • Time 1: entry the program, Time 2: exit the program.	Bonferonni correction • Changes in stress from pre to post participation in the CTS within groups: paired sample t-test • Child characteristics (cognitive functioning and symptoms of autism) predict stress levels in mothers and fathers of children with autism; regression analysis		quotient (AQ) was used. ✓ Stereotyped behaviors ✓ Communication ✓ Social interaction ✓ Developmental disturbances (optional subtest)	reported significantly elevated levels of parents domain stress compared to 9% of mothers of TDC. At program exit, 24% of mothers of children with ASD reported significantly elevated levels of stress compared to 8.7% of mothers of TDC. • Fathers' stress ✓ Fathers of children with ASD reported significantly higher levels of child domain stress than fathers of TDC at entry and exit. However, father of children with ASD showed significantly higher parent domain stress than fathers of TDC at entry, but not at exit. ✓ At entry, 35% of fathers of children with ASD reported significantly elevated levels of child domain stress compared to 13% of fathers of TDC. At program exit, 46% of fathers of children with ASD reported significantly elevated levels of child domain stress compared to 25% of fathers of TDC. ✓ At entry, 15% of fathers of children with ASD reported significantly elevated levels of parent domain stress compared to 0% of fathers of TDC. At program exit, 18% of fathers of children with ASD reported significantly elevated levels of parent domain stress compared to 0% of fathers of TDC. • Changes in parental stress levels ✓ Only mothers of children with ASD reported significant decreases in overall child-related stress after participation in the toddler school program. • Predictors of parental stress ✓ Child cognitive functioning and symptoms of autism significantly predicted Child Domain stress at entry for mothers and accounted for 41% of the variance. Only Social Interaction score (GARS) was a significant independent predictor of maternal stress. ✓ Child characteristics did not significantly predict Parent Domain stress for mothers or fathers, or Child Domain stress for fathers.	didn't control, TDC spending on average an additional three months in the program. • The information on the specific amount of time mothers and fathers spent providing direct care to the children was not available. • Other variables that may influence the parenting stress were not taken into account.
11. (Hastings, Kovshoff, Ward, Espinosa, Brown &	• 48 children with autism: mean age 37M (SD=4.40, range 28-45M), 41 male & 7 female, 25 enrolled in	• Examine the normality of the child and parent variables: Kolmogorov-	• **Parent and Family Problem sub-scale of the Questionnaire on Resources and Stress Friedrich**	• **Developmental Behavior Checklist (DBC)**: parent report, 96 items to measure the severity of problem	• Differences between mothers' and fathers' stress, mental health, and positive perceptions ✓ Mothers reported more significant depression symptoms on the HADS and high levels of positive perceptions (KIPP-PC) than fathers.	• Cannot rule out the possibility that parents collaborated in the completion

Remington, 2005) System analysis of stress and positive perceptions in mothers and fathers of pre-school children with autism *Journal of Autism and Developmental Disorders, 35, 635-644.*	an ABA home program, 23 were a comparison sample. All lived in the family home. **Inclusion**: ✓ Diagnosed by a pediatrician or a multidisciplinary diagnostic clinic ✓ A team member confirmed Dx by using the Autism Diagnostic Interview-Revised (ADI-R) • 48 families: 45 couples, 3 single parents • 48 mothers: mean age 34.46Y (SD=4.07), 33% with university education • 41 fathers: mean age 38.02Y, (SD=5.14), 44% with university education	Smirnov one-sample test • Parental differences on measures of stress, mental health, and positive perception: t-test • Associations between child, mothers, and fathers variables: Pearson's correlations • Confirm parental mental health improve the prediction of parental stress from child variable: regression analyses	**short Form (QRS-F)**: parent report, 20 items to measure impact on the parent and family, removed 5 items to measure depression, a total stress score was used.	behavior exhibited by each of the children, the DBC Total Behavior Score was used. • **Vineland Adaptive Behavior Scale-Survey Form (VABS)**: semi-structured interview measure, but completed only by mothers in the present study, 297 items to measure adaptive behavior across four domains, the VABS composite score was used. ✓ Socialization ✓ Communication ✓ Daily Living Skills ✓ Motor Skills • **The Autism Screening Questionnaire (ASQ)**: parent report, 40 items to measure the severity of the children's autistic symptoms, the total score on the ASQ was used. ✓ Language 0-39 ✓ Non-language 0-34 • **Hospital Anxiety and Depression scale (HADS)**: parent report, 14 four-point items to measure parental mental health ✓ Depression: 7-tiem ✓ Anxiety: 7-item • **Kansas Inventory of Parental Perception**	• Associations between ratings of the child and parents' reports of well-being (HADS) ✓ There were no significant correlations between the child's adaptive skills and any of the parental well-being measures. ✓ For Mothers, the severity of autism symptoms was significantly positively correlated with stress ratings, but no correlations were found between ASQ scores and parental well-being measures. Child's behaviors positively correlated with anxiety, stress, and depression, but not with positive perception. ✓ For fathers, child's behaviors positively correlated with their own and their partners' reported stress. ✓ Mothers' positive perception were not related to their partners' well-being, but fathers' positive perceptions were negatively correlated with their partners' stress and depression. ✓ Mothers' stress ratings were positively correlated with their partners' depression scores, and fathers' stress was positively correlated with both maternal anxiety and maternal depression. • Predicting maternal stress and positive perception ✓ Neither the child variables nor paternal anxiety and depression predicted mothers' positive perception. ✓ Child behavior problems strongly positively predicted maternal stress and accounted for 37% of the variance. Paternal depression increased 13% of the variance in Model 2. ✓ Both child behavior problems and paternal depression made significant independent contributions to the prediction of maternal stress. • Predicting paternal stress and positive perception ✓ Maternal depression significantly accounted for the total variance in the regression models for both stress and positive perceptions, and it also the independent predictor.	of these questionnaires • A high proportion of parents with a university education. Parental education was not incorporated a broader representation of socio-economic circumstances • Other variables that may influence the parenting stress were not taken into account.

				Positive Contributions scale (KIPP-PC): 50 items to measure the positive impact on the parent and the wider family, and the positive characteristics for the children with disability, only the total score was used.		
12 (Honey, Hastings & Mcconachie, 2005) Use of the Questionnaire on Resources and Stress (QRS-F) with parents of young children with autism. *Autism, 9, 246-255.*	• Children with autism spectrum disorder: between 26 and 82 month-old. • Study 1: 120 mothers (mean age=36.30 Y, SD=4.18, range 26-48) were recruited from a support group whose members are carrying out Applied Behavior Analysis programmes with their child with autism. • Study 2: 54 mothers (mean age=34.90 Y, SD=5.38, range 24-46) and 43 fathers (mean age=36.05 Y, SD=6.23, range 27-61) participated, children were recruited to an evaluation of the More Than Words course for parents. **Inclusion:** ✓ The Autism Diagnostic Interview-Revised (ADI-R) ✓ The Autism	• Examine the factor structure of the QRS-F for parents of children with autism: factor analysis • Reliability of the 31-item QRS-F: the Kuder-Richardson codffficient • Establish the construct validity of the QRS-F: ✓ Scores of mothers and fathers from study 2: paired sample t-test ✓ The relations between QRS-F scores and parental adaptation in Study 2 & between social support and coping scores of mothers in Study 1: correlations	• **Friedrich short form of the Questionnaire on Resources and Stress (QRS-F):** parent report, to measure parents' feelings about their child.	• **Dunst et al.'s Family Support Scale (FSS):** parent report, to measure social support for the respondent's family. Applied in study 1, two scores represent: ✓ informal sources of support ✓ support from professionals and services • **The Family Crisis Orientated Personal Evaluation Scales (F-COPES):** parent report, to measure parents' coping strategies, applied in study 1, 5 subscales: ✓ Reframing ✓ Passive appraisal ✓ Acquiring social support ✓ Seeking spiritual support ✓ Mobilizing the family • **The Autism Behaviour Checklist (ABC):** parent report, to	• Factor analysis ✓ Could not derive a two- or three-factor structure that had any resemblance to the existing QRS-F scales. ✓ A total QRS-F score based on all 31 items was explored in the remainder of the analyses. • Reliability of the 31-item QRS-F ✓ The Kuder-Richardson coefficients for mothers in Study 1 (0.85), and for both mothers (0.93) and fathers (0.88) in study 2, indicate that the total score based on the 31 QRS-F items has a good level of internal consistency for parents of young children with autism. • Convergent validity ✓ No significant difference between the mothers' and fathers' scores in Study 2. ✓ Adaptation (Judson scale) was significantly correlated with maternal stress and paternal stress (QRS-F) in Study 2. Parents with a more positive adaption to their child reported less stress. ✓ In Study 1, there were also significant correlations between mothers' stress and the helpfulness of informal social support (FSS), acquiring social support coping, and positive reframing coping. More helpful social support sources and more use of the coping strategy were associated with lower stress scores on the QRS-F. • Association between severity measures and parental stress: ✓ In Study 1, maternal stress was significantly correlated with ABC total score. ✓ In Study 2, ADOS scores and the Vineland	• The parents were on average and advantaged group and are therefore not representative of all parents of young children with ASD. • All of these parents were living in the UK, it is possible that the structure of the QRS-F for parents of young children with autism varies between cultures. • Not assess other sources of stress that may have affected parents' responses on the QRS-F, ex significant life events participation in an intensive intervention program. • Other variables

	Diagnostic Observation Schedule (ADOS)	✓ Validity analyses between the severity measures and parental stress: correlations		• measure the severity of autism, applied in study 1, an overall index was used. • **ADOS**: to measure the severity of autism in study 2, a total score was used. • **The Vineland Adaptive Behavior Scale (VABS)**: parent report, to measure the adaptive function in autism. Applied in study 2, a composite score was used. • **The Judson Scale**: 22-item maternal self-rating scale, to measure parents' adaptation to the child. Applied in study 2, a total score was used.	composite score were significantly correlated with both fathers' and mothers' stress. ✓ Those parents with children with more severe symptoms of autism reported more stress, and those who had higher VABS scores reported less stress.	that may influence the parenting stress were not taken into account.
13 (Lecavalier, Leone & Wiltz, 2006) The impact of behavior problems on caregivers stress in young people with autism spectrum disorders. *Journal of Intellectual Disability Research, 50,*	• 293 children and adolescents with ASD: mean age 9.0Y (SD=3.4, range 3-18), 243 were boys, 64% of the sample obtained composite scores on the SIB-R in the range of ID (≤70), 35% were preschool or kindergarten, 24% were grades 1-3, 13% were grades 4-6, 8% were grades 7-12, 20% were unspecified or none. • Parent ratings: 86% were mother, mean age 39.9Y (SD=7.1), 48	• Adaptive behavior raw score were transformed to W scores for correlation analyses. • Paired-sample t test and intraclass correlation coefficient were calculated. • Spearman ranked correlation • Multiple hierarchical regression: ✓ first step: entered the	• **The Parental Stress Index-Short Form (PSI-SF)**: parent report, 36 items to measure potentially dysfunctional parent-child systems. ✓ Parental distress ✓ Dysfunctional interaction ✓ Difficult child • **The index of teaching stress (ITS)**: teacher report, 90 items to assess the level of teacher distress in relation to a specific child.	• **Nisonger Child Behavior Rating Form (NCBRF)**: parent and teacher report, to assess social competence and behavior problems in children and adolescents with developmental disabilities. Social competence: (10 items) ✓ Compliant/calm ✓ Adaptive/social. Behavior problems: (66 items) ✓ Conduct problem ✓ Insecure/anxious ✓ Hyperactive	• Parent and teacher agreement on the NCBRF ✓ 158 children rated by both parents and teachers, mean time between rating was 9.4 days (SD=9.0, 0-39). ✓ No significant difference between parent and teacher ratings on any of the seven subscales. ✓ Only Compliant/calm and Self-isolated/ritualistic subscale scores were not significant correlations. • Parent ratings ✓ 57.7% of parents scored in the clinically significant range in PSI-SF. ✓ Child's gender and chronological age, parent's age, education level and familiarity with ABA and ASDs were not statistically associated with stress. ✓ All 8 NCBRF subscale scores were significantly (p<0.001) associated with stress, with the exception of the Insecure/anxious and Overly sensitive subscales (p<0.01). The strongest associations were	• Loss of diagnostic specificity. • Lack of child's activity dimension.

172-183.	with college level • Teacher ratings: 93% were female, mean age 37.5Y (SD=10.6), mean teaching experience 10.2Y (SD=9.0), 53% with Baccalaureate & 47% with Master's degree.	SIB-R social and communication score, ✓ second step: all significant NCBRF subscales at the p<0.001 level were entered in a stepwise fashion.	Containing Part A (47 items) and B (43 items), but only part B was used. 4 subscales: ✓ Self-doubt ✓ Loss of satisfaction ✓ Disrupts teaching ✓ Frustrating parent	✓ Self-injury/ stereotypic ✓ Self-isolated/ ritualistic ✓ Overly sensitive (parent version) or Irritable (teacher). Analyses were not conducted due to fewer than 40% of the items were common to both versions. • **The Scale of Independent Behavior-Revised (SIB-R)**: parent report, to assess adaptive behavior, four areas included: ✓ Motor skills ✓ Social and communication skills ✓ Personal living skills ✓ Community living skills • **Familiarity with applied behavior analysis** and **familiarity with autism spectrum disorders**: parent and teacher report, to measure familiarity, experience, and exposure to ABA and ASD.	found with the Compliant/calm (-0.45) and Conduct problem (0.40) subscales. ✓ Only Social and Communication Skills (adaptive behavior domain) reached statistical significance. ✓ Predicting parental stress: SIB-R social and communication score only accounted for 4% of the variance. The Compliant/calm, Conduct problems, and self-isolated/ritualistic subscales accounted for an additional 26% of the variance. ✓ At the 12-month follow-up, only the scores on the Adaptive/social subscale of the NCBRF had a slight statistical increase. ✓ First multiple regression: the total stress score at time 1 (step 1) accounted for 63% of the variance of the total stress score at time 2, and the total behavior problems score at time 1 and changes in behaviors problems scores from time 1 to time 2 (step 2) accounted for an additional 9% of the variance. Although stress scores were stable over the 12-month period, the child's initial behavior problems and change in behavior problems accounted for additional variance. Behavior problems exacerbated stress over the 1-year period. ✓ Second multiple regression: the total problems behavior score at time 1 accounted for 68% of the variance of the total problems behavior score at time 2, and the total stress scores at time 1 and changes in stress scores form time1 to time 2 accounted for an additional 4% of variance. Although behavior problems were stable over the 1-year period, the initial stress levels and change in stress levels accounted for additional variance. It means stress exacerbated behavior problems. • Teacher ratings ✓ The teacher's age, years of experience, education level, length of time they knew the student and familiarity with ABA were not associated with stress level. Familiarity with ASD was significant negatively associated with the total stress score. ✓ Child's gender was not associated with teacher's stress, but chronological age was.	

				✓ Only NCBRF Insecure/anxious subscale was not associated with stress, all other scores reached statistical significance at the $p<0.001$ level. The strongest correlations were found with the Compliant/calm (-0.45) and Conduct problems (0.53) subscales. There is no significant correlation between the total stress score and the SIB-R. ✓ Predicting teacher stress: child's age and familiarity with ASD accounted for 9% of the variance and Conduct problems, Irritable, and Self-isolated/ ritualistic subscales accounted for an additional 34% of variance. ✓ No significant difference on teacher ratings between 2 years follow-up. ✓ Only 21% of the variance was accounted for by the first model (dependent variable were time 2 stress scores) and 54% of the variance was accounted for by the second model (dependent variable were time 2 behavior scores). Stress and problems behavior scores didn't contributed any additional variance in their respective models, means behavior problems or teacher stress didn't exacerbate each other.	
14. (Konstantareas & Papageorgiou, 2006) Effects of temperament, symptom severity and level of functioning on maternal stress in Greek children and youth with ASD. *Autism, 10,*	• 43 children: mean age 122.6M (SD=71.8, range 2Y3M to 26Y1M), 36 males and 7 females, diagnosed with autistic disorder by a child psychiatrist. **Inclusion**: CARS≥30 Representative SES Varied school placement	• The temperament of children with ASD, would be related to maternal stress, which high activity level, low rhythmicity, low mood and high behavior rigidity being more stressful to mothers: t-test • Children of higher ability would create less stress. • The greater the sympomatology, the higher the maternal stress.	• **The Clarke modification of the Holroyd Questionnaire on Resources and Stress (QRS)**: parent report, to measure perceived resources and stress in families of children with ASD and/or developmental disabilities, 9 subscales are child characteristics, community reaction, time demands, family sharing, presenting symptoms, sacrifice/martyrdom,	• **The children Autism Rating Scale (CARS)**: clinician's observation, to measure the symptom severity • **Verbal vs. non-verbal communication ability assessment**: clinical evaluation, to measure child's language ability ✓ Verbal: more than one-word vocabulary ✓ Non-verbal: only single word • **The Psychoeducational Profile (PEP)**: direct evaluation, to measure child's imitation,	• Relationship of child's characteristics to maternal stress ✓ There is no difference in the stress experienced by mothers of boys versus those of girls. ✓ Mothers of the non-verbal children reported significantly greater stress than mothers of the verbal children. ✓ The correlation between age and stress was not significant. ✓ There was a negative relationship between level of functioning on the PEP and total maternal stress on the QRS, with the lower-functioning children being more stressful for their mothers. • Dimensions of temperament and maternal stress ✓ Higher child activity, lower flexibility, lower quality of mood, the greater the child's rhythmicity in daily habits, less rhythmicity in sleep, and greater level in task orientation had significantly related to greater maternal stress. • The relationship of the nine QRS subscales to total QRS	• Age range was to board • Not use a typical intelligence scale • A better measure of communication ability was recommended.

					score	

593-607.		• Verbal children would be easier to manage than non-verbal children, because of their better communication ability.
		• Of all child characteristics, the temperament dimensions were expected to be the best predictors of stress: hierarchical multiple regression analysis
			supports, family enrichment and existential issues.	perception, motor ability, eye-hand integration, cognition, cognitive verbal skills and idiosyncratic behavior.
				• **The Dimensions of Temperament Scale-Revised (DOT-R-Child)**: parent report, 9 dimensions including activity level in general, activity on sleep, rhythmicity in eating, rhythmicity in daily habits and task orientation.
					✓ A large number of subscales of the QRS were highly correlated with the QRS total score, particularly those for community reaction, time demands, family enrichment, existential issues, presenting symptoms, and sacrifice/martyrdom.
					• Child's characteristic and temperament as predictors of maternal stress
					  ✓ In step 1, the child's general activity level accounted for 34% of the total variance in stress. In step 2, mood accounted for another 11% of the total variance in stress. In step 3, the introduction of the total symptom score of the CARS accounted for 8% of additional variance in maternal stress. In Sum, general activity level and mood, along with the CARS symptom scores, accounted for 53.6% of the total variance in maternal stress.
					  ✓ There was no significant correlation between the DOTS activity level and the CARS symptom scores.	

15. (Davis & Carter, 2008)
 	
Parenting stress in Mothers and Fathers of Toddlers with Autism Spectrum Disorders: Associations with Child Characteristics
 	
Journal of Autism and Developmental Disorders, 38, 1278-1291.
	• 54 families: 54 mothers (mean age 36.5Y, SD=4.8, 26.3-58.1Y) and 54 fathers (mean age 37.9Y, SD=6.3, 28.8-59.3Y) were the biological parentis of the child with ASD, but one family was fostered since child birth.
	Inclusion:
	  ✓ Both mother and father completed questionnaires, mother also received interview
	  ✓ Only one child per family
	• 54 children with ASD: mean age 26.9M
		• T-test for continuous variables and chi square analyses for categorical variables to determine if mothers informants included in this report (n=54) differed from the mother informants in the large study in families in which the child's father didn't complete a questionnaire booklet (n=44).
		  ✓ Multi-stage analytic
			• **The Parenting Stress Index-Short Form (PSI/SF)**: parent report, to assess parental feelings and experiences in caring of children from ages 3 mothers to 10 years.
			  ✓ Parental Distress
			  ✓ Parent-Child Dysfunction Interaction
			  ✓ Difficult Child
				• **The Beck Anxiety inventory (BAI)**: parent report, to measure common symptoms of anxiety.
				• **The Center for Epidemiologic studies Depression Inventory (CES-D)**: parent report, 20-item to assess depressive symptoms in adults.
				• **Autism Diagnostic Observation Schedule-Generic (ADOS-G)**: semi-structured, interactive observation schedule, to assess social and communicative functioning in
					• Demographic variables
					  ✓ No differences were found on mothers' age, mothers' level of education, and children's race.
					  ✓ Significant differences between the groups on children's age at the time of the study and mother-reported family income.
					  ✓ Father didn't participated in the study were on average slightly older than fathers did participate.
					• Diagnostic and Cognitive Measures
					  ✓ Mean scores on the Communication scale were 4.26 (SD=1.5) and on the Reciprocal Social scale were 10.31 (SD=2.7). These scores were included in analysis as an index of core autism symptoms.
					  ✓ Cognitive testing on the Mullen Scales of Early Learning showed performance below age expectations across all domains.
					• Parenting stress
					  ✓ No significant group differences between mothers and fathers in the PSI total or scale scores.
					  ✓ Differences between mothers and fathers approached statistical significance for the Difficult Child scale and the Parent Distress scale, with trends supporting
						• A relatively small convenience sample and a single assessment point,
						• Generalizability of the findings is limited because the sample is relatively homogeneous with respect to ethnicity, race, and socioeconomic status and the high level of autism-specific services were receiving.

(SD=4.2), 74% boys, 26% girls. Diagnosed with ASD: mean age 23.7Y (SD=5.1, range 11-33M). Began receiving early intervention services at 18.4M (SD=6.5, range 0-33). Began receiving intensive, specialized early intervention services for ASD at 24.6M (SD=4.8, 14-35M) **Inclusion**: ✓ ADI-R ✓ ADOS **Exclusion**: ✓ With a genetic disorder ✓ Autism-related medical disorder ✓ Physically handicapping condition	strategy: examine the correlations between the total PSI score and the three PSI scales with each of the child and parent variables of interest ✓ the child and parent variable were grouped into four conceptual domains (1)autism spectrum symptoms (2)child problem behaviors and competencies (3)child cognitive functioning (4)parental affective symptoms ✓ preliminary regression to determine the relative contributions of the variables with each of theses domains to the four PSI outcomes		individuals suspected of having an ASD. Used Module 1 for this study. • **The Autism Diagnostic Interview-Revised (ADI-R)**: investigator-based, semi-structured informant interview for the diagnosis of autism. • **Mullen Scales of Early Learning**: to assess overall development ✓ Gross & fine motor skills ✓ Visual reception ✓ Receptive & expressive language • **Infant Toddler Social Emotional Assessment (ITSEA)**: parent report, to assess young children's social and emotional problems and competencies in four domains: ✓ Externalizing ✓ Internalizing ✓ Dysregulation ✓ Competence Three indices: ✓ Atypical ✓ Maladaptive ✓ Social relatedness	greater stress for mothers. • Parental Affective Symptoms ✓ Significantly more mothers (33%) than fathers (17%) reported depression symptom levels in the clinical range, and a trend toward higher depressive symptoms among mothers in comparing to fathers. ✓ No significant differences between mothers (6%) and fathers (6%) on the measure of anxiety. • Child Behaviors ✓ Strong agreement between mothers and fathers on their ratings of their children in the areas of Internalizing behaviors (r=.59), Externalizing behaviors (r=.51), Dysregulation (r=.72), Competence (r=.60), Social Relatedness (r=.50) and Atypical behaviors (r=.43, all ps<.001). ✓ Significant differences in the Of Concern cutpoint scores on the Internalizing domain between maternal and paternal reports, but others were not. Differences between maternal and paternal continuous scores on the Internalizing domain approached significance, supporting of mothers rating children with more internalizing symptoms. ✓ No significant relationships between maternal and paternal self-ratings of depression and ratings of children's behaviors on the ITSEA. • Predicting overall parenting stress ✓ For mothers, ITSEA Social Relatedness, ITSEA Dysregulation, ITSEA Competence and maternal depression accounted for 56% of the variance in parenting stress. ITSEA Social Relatedness, ITSEA Dysregulation and maternal depression were the unique predictors of mothers' parenting stress. ✓ For fathers. The core autism measures (ADOS Reciprocal Social and Communication, as well as ITSEA Atypical Behaviors and ITSEA Social Relatedness), ITSEA Externalizing, ITSEA Competence, and paternal depression accounted for 58% of the variance in stress. ADOS Reciprocal Social, ITSEA Externalizing and paternal depression were the unique predictors of parenting stress. • Predicting mothers' parenting stress	

					✓ In the Parent-Child Dysfunctional Interaction domain, ITSEA Social Relatedness, ITSEA Dysregulation, and ITSEA Competence accounted for 42% of the variance. ITSEA Social Relatedness and ITSEA Dysregulation were unique predictors. ✓ In the Parent Distress domain, ITSEA Social Relatedness (20%) and parental depressive symptoms (42%) accounted for 62% of the variance. ✓ In the Difficult Child domain, ITSEA Internalizing Dysregulation, and Competence accounted for 44% of the variance, and were also significant unique predictors. • Predicting fathers' parenting stress ✓ In the Parent-Child Dysfunctional Interaction domain, ADOS Reciprocal Social, ADOS Communication, ITSEA Social Relatedness, ITSEA Competence, and Nonverbal IQ scores accounted for 43% of the variance. Only ADOS Reciprocal Social score was the only significant unique predictor of parent-child stress. ✓ In the Parent Distress domain, ADOS Reciprocal Social and depression scores accounted for 57% of the variance. Paternal depressive symptoms were a unique predictor. ✓ In the Difficult Child domain, ITSEA Atypical Behaviors, ADOS Reciprocal Social and Communication scores, and ITSEA Externalizing Behaviors accounted for 36% of the variance. ADOS Reciprocal Social and ITSEA Atypical Behavior were the unique predictors. Externalizing behaviors contributed and additional 11% of the variance.	
16. (Epstein, Saltzman-Benaiah, O'hare, Goll & Tuck, 2008) Associated features of Asperger Syndrome and	• 39 AS children: mean age 9.42Y (SD=2.4, 5-12Y), diagnosis mean age 7.15Y (SD=2.57), 92% male, 92% within a mainstream setting, 79% having difficulty with motor skills and 62% received occupational therapy.	• Descriptive statistics were calculated for each dependent variable. • Compare mothers' and fathers' ratings on the questionnaires and compare single mothers with	• **Parenting stress index-short form(PSI/SF)**: parent report, 36-item to assess parental feelings and experiences in caring of children ✓ Parental Distress ✓ Parent-Child	• **Behavior Rating Inventory of Executive Function-Parent Form (BRIEF)**: parent report, 86-item to assess children's executive functioning skills. Only the overall score was used. • **Short Sensory Profile**	• Stress levels of parents of AS children ✓ 75.7% of mothers and 75% of fathers reported high stress levels on the Total Stress score. ✓ No significant difference between mothers and fathers on the Total or any PSI/SF subscales scores. ✓ Mothers' and fathers' scores were significantly correlated on Total Stress, PD and P-CDI, but not on DC. ✓ Neither a clinical nor statistical difference between single mothers and mothers in a parenting dyad.	• A small sample size, particularly for fathers. • Selection bias with only those parents who are most stressed agreeing to take part in the research.

their relationship to parenting stress *Child: care, health and development, 34, 503-511.*	**Inclusion**: ✓ Based on ICD-10 & DSM-IV criteria ✓ By a multidisciplinary team assessment using GARS and ADOS • 39 families (38 mothers and 24 fathers), 23 two-parent families, 2 mothers responded but father not, 13 single mothers and 1 single fathers.	mothers in a parenting dyad: paired sample t-test • The relationship between parents' stress ratings and ratings of their child's difficult behavior: Pearson correlation, *α* level at 0.01.	Dysfunction Interaction ✓ Difficult Child	**(SSP)**: parent report, 38-item to assess children's sensory procession in everyday situations. The Total Score was used.	• Executive dysfunction and sensory sensitivies ✓ 92.1% of mothers and 81.8% of fathers rated their children as having clinically elevated levels of executive dysfunction. ✓ Statistically significant correlation between mothers' and fathers' overall (GEC) score on the BRIEF. ✓ Mothers reported 82.6% of children had clinically significant levels of sensory sensitivity, and fathers reported 62.5% of children. ✓ Significant correlations between mothers' and fathers' Total Score on the SSP. ✓ 78% of children according to mothers and 60% of children according to fathers had significant difficulties with both executive functioning and sensory sensitivity. • Relationship between children's difficulties and parenting stress ✓ Significant relationship between parenting stress and child characteristics was found only for mothers. ✓ Mothers' Total Stress scores on the PSI/SF were significantly correlated with their GEC scores on the BRIEF, and with their Total Score on the SSP. ✓ No significant correlations were between fathers' levels of parenting stress and their ratings of their children's difficulties in the domains of executive functioning or sensory sensitivities.	• The possibilities that parent ratings do not accurately reflect true levels of executive dysfunction and sensory sensitivity. But, directly measuring children's executive functioning skills and sensory sensitivities is challenging in a research and may lost ecological validity.
17. (Estes, Munson, Dawson, Koehler, Zhou & Abbott, 2009) Parenting stress and psychological functioning among mothers of preschool children with autism and	• 51 children with ASD: mean age 43.88M (SD=4.26), 36 autism and 15 PDD-NOS, four single mother **Inclusion**: ✓ DSM-IV diagnoses ✓ ADI-R & ADOS-G ✓ Assessed by a licensed clinical psychologist or doctoral students in clinical psychology under supervision. • 23 children with DD:	• Differences between two groups in parenting stress and psychological function: t-test. • Relationship between child characteristics and maternal parenting stress and psychological function: linear regression model.	• **Questionnaire on Resources and Stress (QRS):** parent report, 78 items to measure stress and burden of care in families of children with disabilities, parenting stress summary score was used.	• **Child variables**: age, gender, race, non-verbal mental age, VABS std score. • **Mother variables**: age, education level. • **Family variable**: number of siblings, and their average age, family SES, negative life changes scale • **Life Experiences Survey (LES)**: parent report, 57 items to measure the prevalence	• Characteristics of the two groups ✓ No significant difference between ASD and DD groups in child's age, race, non-verbal mental age, mothers' age or education level, socioeconomic status, or on the occurrence of negative life changes. ✓ Significantly more girls in the DD group than ASD. • Group differences in parenting stress and psychological function ✓ Mothers of children with ASD group showed significantly higher parenting stress scores and increased psychological distress than the DD group. • Group differences in child problem behavior and daily living skills ✓ Children with ASD demonstrated high levels of problem behavior and lower daily living skills	• Lack of subtype of autism • Lack of severity of symptoms, verbal, or other body function variables • Only daily living skills domain was used

developmental delay. *Autism, 13, 375-387.*	mean age 43.32M (SD=4.44), matched to the ASD group on chronological age and on a measure of non-verbal mental age (the Mullen Scale of Early Learning visual reception and fine motor scales) **Inclusion**: ✓ Without ASD Dx ✓ Mullen early learning composite standard scores & VABS ≤ 80. (one exception Mullen=82, VABS=70) • **Exclusion** on both groups: ✓ serious traumatic brain injury, ✓ significant sensory/ motor impairment, ✓ major physical abnormalities, ✓ neurological disease			of stressful life events before 12 months from a list of 47 common events. • **The Aberrant Behavior Checklist (ABC)**: parent report, 58-item to measure child's behavior over the previous 4 weeks, used problem behavior composite score. • **The Vineland Adaptive Behavior Scales Interview Edition:** interview, 297 items to measure adaptive behavior in children from birth to 18Y11M, the daily living skills domain was used. • **Brief Symptom Inventory (BSI)**: parent report, to measure symptoms of psychological distress.	scores than the DD group. • Relationship between child characteristics and maternal parenting stress and psychological function ✓ Child problem behaviors were positively associated with both parenting stress and psychological distress. ✓ Neither child diagnosis nor child daily living skill was significantly related to parenting stress or mothers' psychological distress. ✓ A stronger relationship between parenting stress and child problem behaviors in the DD group than in the ASD group.	
18. (Hoffman, Sweeney, Hodge, Lopez-Wagner, Looney, 2009) Parenting Stress and Closeness *Focus on Autism and Other Developmental*	• 104 children with autism: mean age 8.61Y (SD=2.77, 3-16y), 48 had autism only, 40 had autism with mental retardation, and 16 had autism with at least one other coexisting condition. Mothers' mean age 37.52Y (SD=7.63, 18-57Y). **Inclusion**: ✓ DSM-IV-TR	• Compare the stress levels reported by mothers between two groups: t test. • Two 2×2 between-subjects, Group (autism vs. community) × Child Gender (MANOVAs) to examine differences in mean scores on the	• **Parenting Stress Index (PSI)**: parent report, 101-item to assess stress in parent-child systems. Two domains were: ✓ Child domain (Distractibility/H yperactivity, Adaptability, Reinforces Parent, Demandingness,	• **Gilliam Autism Rating Scale (GARS-2)**: professional and patent report, to assess autism symptoms. Scores combined on three domains yield an Autism Index score (M=100, SD=15) ✓ Stereotyped Behavior ✓ Communication ✓ Social Interaction	• Group differences in mothers' stress ✓ Mothers of children with autism reported significant higher levels of stress on the Child Domain and Parent Domain of PSI than did mothers of typically developing children. ✓ On the Child Domain, the means were at the 99th percentile for mothers in the autism group and approximately at the 40th percentile for mothers in the community group. ✓ On the Parent Domain, the means were at the 75th percentile for mothers in the autism group and approximately at the 45th percentile for mothers in the community group.	• Only considerate gender, age, and the severity of autism, other variables that may influence the parenting stress were not taken into account.

Disorders, 24, 178-187	✓ GARS-2 AI scores ≥ 85 (M=102.13, SD=12.7, 85-139) • Community group: 136 female & 205 male children, mean age 8.03Y (SD=3.61, 3-16Y). 342 mothers' mean age 34.85Y (SD=8.15, 18-63Y) • No significant difference on children's age between two groups. But significant difference on mother's age between two groups.	six PSI Child Domain subscales and, in the second MANOVA, on the seven Parent Domain Subscales, subscales as the dependent variable • Two 2×2 (Group × Child Gender) MANCOVAs, with adjustment made for both mothers' age and children age, were conducted for the Child and Parent Domain subscales. • Pearson correlations examining the relationship between the level of children's autism and mothers' reports of their stress. • Prediction of both mothers' Child Domain and Parent Domain stress: regression analysis • The relationship between children's AI scores (Step 1) and Child Domain subscales scores (Step 2) and mothers' Attachment subscale scores:	Mood, and Acceptability) ✓ Parent domain (Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse Related Stress)		✓ The means on the six Child Domain subscales for the autism group were significant higher than the community group. There was no effect for child gender and no interactive effect. With adjustments made for both mothers' and children's age, only the group effect was significant. ✓ The means on the six of the seven Parent Domain subscales for the autism group were significant higher than the community group. No child gender or interactive effect was obtained. Only the means on the Attachment subscales were not significantly different between two groups. With adjustments made for both mothers' and children's age, only the group effect was significant. • Autism and mothers' stress ✓ GARS AI scores were related to both PSI Child Domain and Parent Domain Stress. ✓ Children's Stereotyped Behavior & Social Interaction scores were related to both Child and Parent Domain Stress, but Communication scores were not. ✓ GARS AI accounted for 11% of the variance on mothers' Child Domain and 7% of the variance on the Parent Domain stress scores. • Mothers' stress and Attachment subscale scores ✓ Both significant relationships between Child Domain scores and Attachment subscale scores, 36% for the community and 23% for the autism group. ✓ For autism group, children's AI scores were significantly correlated with mothers' Attachment subscale scores. ✓ AI scores predicted Attachment scores on Step 1 (5%), and Child Domain stress scores accounted for 21% of the variance on Step 2. But AI no longer significant once Child Domain scores were entered.	

		hierarchical regression analysis				
19. (Mori, Ujiie, Smith & Howlin, 2009) Parental stress associated with caring for children with Asperger's syndrome or autism *Pediatrics International, 51, 364-370.*	• 193 Children: mean age 7.39Y (SD=2.77), aged up to 12 years old diagnosed with either Asperger's syndrome or autism **Inclusion**: ✓ Based on DSM-IV ✓ Psychological assessment by experienced child psychiatrists with the agreement of child psychologists **Exclusion**: ✓ PDD not otherwise specified ✓ Others diagnoses within PDD • Asperger's group: 30 children with mean age 8.4Y (SD=2.28) • Autism group: 163 children with mean age 7.2Y (SD=2.81) • A total of 93.7% of informants were mothers, 5.3% were both parents and 1.0% were fathers.	• A comparison of the levels of parenting stress between the two groups: ANCOVA, statistically significant at a level of 0.05, effect size $r=\sqrt{(t^2/[t^2=df])}$	• **Parenting Stress Index/short form (PSI/SF)**: parent report, 36-item to measure parental stress. Total stress score provides a figure for the overall level of parenting stress. Three subscales were: ✓ Parental Distress (PD) ✓ Parent-Child dysfunctional Interaction (P-CDI) ✓ Difficult Child (DC)	• **Child factors**: child's age, gender, age at diagnosis, and child's age when parent first raised her or his concern about the child's behavior or development, the gap between the first sign of concern and diagnosis, comorbid mental halth-related disorders and the most recent IQ scores (WISC-III or Tanaka-Binet intelligence scale) • **Family factors**: mother's age, father's age, number of siblings, living with grandparents, family history of psychiatric disorders, socioeconomic status (mother's education levels, mother's job status, and fathers' occupation), informant's perception of parenting share (informant's perception of the percentage of the mother's contribution to parenting), and parental expectation for the child (dependency, academic achievement, and job status in adult hood). • **Social factors**: the	• Characteristics of the Asperger's and autism groups ✓ No significant differences observed between the two groups with regard to child's gender, age of mothers, age of fathers, number of siblings, whether living with grandparent(s), family history of psychiatric disorders, mother's educational levels, mother's job status, parenting share, or availability of other support. ✓ Asperger's group was higher in the mean age of children and mean IQ scores, later in the mean age at which diagnosis was made and parents were first concerned about child's behavior and development, than in the autism group with greater variability in mean IQ scores. ✓ The average gap between the first sign of parental concern and diagnosis was nearly twice as long in the Asperger's group as in the autism group. ✓ Commorbidity was found more commonly in the Asperger's group than in the autism group. Attention-deficit-hyperactivity disorder was the commonest commorbidity in both groups, and followed by social withdrawal, obsessive-compulsive disorder, tic, and epilepsy. In the autism group, epilepsy was the second commonest comorbidity. ✓ Fathers in the Asperger's group tended to have higher level professions compared with those in the autism group. • Parental stress within the Asperger's and autism groups ✓ The mean score of total parental stress levels was significantly higher in the Asperger's group than in the autism group. It was between the 95th and the 99th percentiles in the Asperger's group, and about 90th percentile in the autism group. ✓ Parents who raised concerns for the child's behavior or development at an earlier age, the father was less involved in parenting, parents with a positive family history of psychiatric disorders, parents expected a heavier dependency from the child in adult life	• High responding rate and higher stress level in Asperger's group may be associated with service-seeking behavior. • Higher IQ may be the potential selection biases and might affect the internal validity of the findings. • The validity of the Japanese version of PSI/SF has not been fully established, may not reflect actual parenting stress accurately.

				availability of support from friends, neighbors and others was included.	reported higher stress levels. But stress decreased slightly when the parents expected that the child would be in services such as residential care, or hospital care. ✓ There were trends of association with parental stress levels for the gap between the first sign of concern and diagnosis and commorbidity. ✓ There was no evidence of association between the other co-variables and parental stress levels. ✓ The mean scores of total parental stress were higher in the Asperger's group than in the autism group. ✓ With adjusted for the confounders (age at the first sign of concern, gap between the first sign of concern and diagnosis, commorbidity and expectation of the child's dependency in adult hood), the adjusted mean scores of total parental stress remained significantly higher in the Asperger's group than in the autism group. ✓ The Asperger's group had significantly higher scores in the adjusted DC subscale, compared to those in the autism group. But there were no difference in the adjusted PD and P-CDI subscale scores between two groups.	
20. (Phetrasuwan & Miles, 2009) Parenting stress in mothers of children with autism spectrum disorders *Journal of Specialists in Pediatric Nursing, 14, 157-164*	• Children with ASD: mean age 6Y (SD=2.2Y, 3-10Y), 86% were boys, all diagnosed with ASD at a major university-based autism center. • 106 biological and 2 adoptive mothers: mean age 37Y (SD=6.6, 22-62Y), 81% married, 75% more than a high school education, 56% full or part time job.	• The sources of parenting stress in mothers of children with ASD: Descriptive statistics. • The relationship between maternal and child characteristics and parenting stress: correlation. • The relationship between parenting stress and maternal psychological status: correlation.	• **Parental Stressor Scale: Developmental Disabilities (PSS:DD)**: parent report, 27-item to measure level of stress associated with parenting a child with autism including basic caregiving, socialization, teaching, and protecting the child, advocating on behalf of the child, a mean total score is used. • **Childhood Autism**	• **The Center for Epidemiologic Studies Depression Scale (CES-D)**: parent report, 20-item to assess depressive symptoms, the frequency of the occurrence of feelings or behaviors including guilt and worthlessness, loss of appetite, psychomotor retardation, sleep disturbance, and feelings of helplessness and hopelessness, total score ranging form 0-60 was used.	• Psychological status ✓ CESD: mean score 15.73 (SD=11.42, 4-27), indicating a wide range of scores from low to very high depressive symptoms. ✓ Psychological Well-Being scale: mean score 80.65 (SD=11.25, 69-92), indicating a moderated to high sense of well-being. ✓ Significant negative correlation between the CESD and Psychological Well-Being scale, higher depressive symptoms reported lower well-being. • Sources of parenting stress ✓ PSS:DD: mean score 2.68 (SD=.81), slightly below midpoint of the scale, indicating between somewhat and moderated levels of stress. ✓ CARS-P: mean score 32.1 (SD=8.1), • Relationship of parenting stress to personal characteristics ✓ Significant relationship between PSS:DD scores and	• PSS:DD was a newly developed tool for measuring overall parenting stress, further studies of the tool's validity are needed. • CARS-P may not adequately reflect symptom-related parenting stress for children with the variety of diagnoses that fall under ASD.

| | | | **Rating Scale-Parent version**: parent report, to measure the level of parenting stress in connection with each of 14 behavioral symptoms with autism, total score ranging from 14 to 56 was used. | • **The Psychological Well-Being Scale**: parent report, 18-item to measure six dimensions of psychological well-being: environmental mastery, purpose on life, self-acceptance, personal growth, autonomy, and positive relations with others
• Maternal demographic characteristics: age, race, education level, income.
• Child demographic characteristics: age, gender, the severity of symptoms assessed using the Childhood Autism Rating Scale-Parent version, total scores ranging from 14-56, 30-37 mild to moderated severity, >37 severe autism. | maternal education (r=-.24, p<.05) and maternal income (r=-.26, p<.01).
✓ Mothers with lower education levels and income reported higher overall parenting stress.
✓ Significant relationship between the CARS-P parenting stress and maternal education (r=-.26, p<.001) and maternal income (r=-.30, p<.001).
✓ No relationships between either of the parenting stress variables and child characteristics of age, gender, and severity of ASD.
• Parenting stress, depressive symptoms and well-being
✓ Significant correlation of the PSS:DD with the CES-D (r=.61, p<.01). Mothers with higher overall parenting stress reported more depressive symptoms.
✓ Significant correlation between the PSS:DD and the Psychological Well-Being scale (r=-.47, p<.01). Mothers reporting more parenting stress also reported lower levels of well-being.
✓ Significant relationship between the CARS-P and the CESD (r=.44, p<.01).and Psychological Well-Being scale (r=-.33, p<.01). Mothers with higher symptom-related parenting stress reported higher levels of depressive symptoms and lower levels of well-being. | |
| 21. (Rao & Beidel, 2009)

The Impact of children with high-functioning autism on parental stress, sibling adjustment, and family functioning

Behavior | • HFA group: 15 male children (8-14y), diagnosed as HFA with ADI-R, 12 mothers and 3 fathers (mean age=42.5Y), and siblings (4 sisters & 3 brothers, mean=10.6, 8-16Y). IQ score was 91-129, mean= 118.
• Control group: 14 male children with no disorder were interviewed with the | • Differences between HFA and normal control families: t test
• Adjust significance level by Bonferroni correction for the number of variables:0.05/17= 0.003
• CBCL between target children and siblings: ANOVA | • **Parenting stress Index (PSI)**: parent report, to measure parent's stress in caring children under the age of 12, total parental stress and child domain score were used.
• **Stress Index for Parents of Adolescents**: parent report, to measure parent's stress in | • **Family Environment Scale (FES)/ Children's version of the Family Environment Scale (CVFES)**: to assess family functioning from the perspective of all family members, CVFES for siblings under the age of 12
✓ Relationship
✓ Personal growth
✓ System maintenance | • Parent stress: HFA group had significantly higher scores than the control group on the total parenting stress and the child domain.
• Family functioning:
✓ There was a trend toward significance on the personal growth dimension, with HFA families scoring lower than the control families. (a trend toward a group difference in independence and active recreational orientation: control group higher than HFA group in independence, HFA group lower than control group in social and recreational activities)
✓ There were no significant between-group differences on either the relationship or the system maintenance | • The sample size in siblings was small.
• Not include a comparison group with other different psychological disorders or internalizing behavior problems.
• Limited variable. |

Modification, 33, 437-351.	ADIS-C/P (Anxiety Disorders Interview Schedule for Children), 12 mothers & 2 fathers (mean age=41.6Y), and siblings (2 sisters & 6 brothers, mean age= 11.5, 8-15Y). IQ score was 96-137, mean=120. • Neither statistically significant between-group differences in parent age or family income, nor differences in age, race or gender between the sibling groups. • Subjects received a $25 check for participation.	with Bonferroni post hoc analyses	nurturing their adolescent children (12-18Y), total parental stress score was used.	• **Symptom Checklist-90-Revised (SCL-90-R)**: to measure nine dimension of parental psychopathology, a global severity index(GSI) was used • **Short Form 36 Health survey (SF-36)**: to measure general physical and mental health. • **Piers-Harris Children's Self-concept Scale-2nd ed. (Piers-Harris 2)**: to measure the adjustment of siblings, a total self-concept score was used. • **Child Behavior Checklist (CBCL)**: parent report, to measure child's behavior problems. ✓ Internalizing problems ✓ Externalizing behaviors ✓ Total behavior ✓ Social competence	domains. ✓ There were no significant between-group differences in sibling ratings of family functioning on the CVFES. • Psychological problem and psychopathology: The mean score of HFA group was higher than the control group, but the difference was not statistically significant. • General physical and mental health: The HFA group scored lower than the control group in aggregate scores of physical and mental health on the SF36, but the differences were not statistically significant. • Sibling adjustment: There were no significant differences in self-concept scores between two groups. • Child behavior problems: ✓ The mean score for total behavioral problems for the HFA group was significantly higher than the control group, the sibling control group, or the HFA sibling group. ✓ HFA parents rated the target children significantly higher in internalizing behavior problems than with the control children or their siblings. HFA parents also rated the target children significantly higher in externalizing behavior problems than did parents of sibling controls, but not significantly higher than the matched control children in the family. ✓ The difference in parental ratings of total behavioral problems between the HFA group and the matched controls was accounted for by significantly higher ratings on the internalizing behavior scale.	
22. (Matthews, 2010) Predicting parenting stress by the symptomatology of children with high functioning	• 55 children with high functioning autism spectrum disorder: 8-12Y **Inclusion:** ✓ Parent complete the Social Communication Questionnaire	• Difference of PSI between HFASD and normative group: descriptive statistics, z-test, • Prediction of parenting stress with HFASD child symptomatology:	✓ **The Parenting Stress Index-Third Edition (PSI)**: parent report, 120-item, 5-point Likert-type scale, ✓ Total stress ✓ Child Domain ✓ Parent Domain	• **The Social Communication Questionnaire (SCQ)**: parent report, to measure child's communication skills, level of social functioning, and the presence of autistic	• Q1: Do parents of children with HFASD experience higher levels of parenting stress than the normative population? ✓ There were significant differences in the Total Stress scores and Child Domain between parents of children with HFASD and the normative population. ✓ Parents of children with HFASD experience higher levels of parenting stress than the normative population.	• The sample used in this study does not necessarily reflect the full demographic population of parents of children with HFASD.

autism spectrum disorder *Dissertation*	(SCQ), the High Functioning Autism Spectrum Screening Questionnaire (ASSQ), and the Childhood Asperger Syndrome Test (CAST) to corroborate ASD diagnosis ✓ Verbal Comprehension Index (VCI) score ≥ 85 on the WISC-IV ✓ T score ≤70 on the Aggression Scale of the Child Behavior Checklist (CBCL)	hierarchical linear regression. ✓ Block 1: included parental social support and child behavior problems ✓ Block 2: included social difficulties, communication difficulties, and restricted, repetitive, and/or stereotyped behaviors, interests, and activities. • Moderation of HFASD Symptom's relationship with parenting stress by parental social support: hierarchical linear regression ✓ Model 1: Social support, behavior problems, and three HFASD symptoms were entered ✓ Model 2: social support × three symptoms interaction were added		mannerisms ✓ Communication/ Abnormal language ✓ Stereotyped behavior • **The High Functioning Autism Spectrum Screening Questionnaire (ASSQ)**: parent report, to measure child's social interaction, communication problems, and restricted and repetitive behaviors. • **The Childhood Asperger Syndrome Test (CAST)**: parent report, to screen high functioning autism spectrum disorders • **Verbal Comprehension Index (VCI) of the Wechsler Intelligence Scale for Children- Fourth Edition (WISC-IV)**: to measure word knowledge and retrieval , verbal concepts and reasoning, and social knowledge and awareness. • **The Child Behavior Checklist Parent Form (CBCL)**: parent report, to measure behavior problems and competencies • **The Social Skills Rating System (SSRS)**:	• Q2: Are behavior problems of children with HFASD a significant predictor of higher parenting stress after controlling for parental social support? ✓ The linear and quadratic behavior problems variables explained 30.39% of the variance in parent stress. • Q3: Do the social difficulties of children with HFASD predict higher parenting stress after controlling for behavior problems and parental social support? ✓ Social skills variable significantly explained 10% of the total variance in the parenting stress variable. ✓ The beta weight for social skills shows that a one standard deviation increase in social skills difficulties predicts a .38 standard deviation decrease in parenting stress, after controlling for parental social support and behavior problems. • Q4: Do the communication difficulties of children with HFASD predict higher parenting stress after controlling for behavior problems and parental social support? ✓ The communication/abnormal language variable explained 2% of the variance, above and beyond parental social support, behavior problems (linear), behavior problems (quadratic), and social skill. ✓ A standard deviation increase in communication/abnormal language predicts a .16 standard deviation increase in parenting stress, but this bets weight is no significantly different from zero. • Q5: Do the restricted, repetitive, and/or stereotyped behavior, interests, and activities of children with HFASD predict higher parenting stress after controlling for behavior problems and parental social support? ✓ The stereotyped behavior variable explained 3% of the variance, above and beyond parental social support, behavior problem (linear), behavior problems (quadratic), social skills, and communication difficulties. ✓ A standard deviation increase in stereotyped behavior predicts a .18 standard deviation decrease in parental stress, but this beta weight is not significantly different from zero. • Q6: Is the total HFASD symptomatology (combined	(excluded IQ<85, aggression scale>70 of the CBCL) • Low number of female child participants, 54 males to 1 female in this sample. • Large proportion of White participants, approximately 90%. • All studies using a correlational design, the causation cannot be proved using the results. • HFASD symptomatology and behavior issues are complicated and often interrelated. • Only one rater for all the variables. • There could be other factors affect parenting stress. • This study utilized normative data from PSI rather a control group.

				parent report, to measure child's social skills and behaviors in the home and community. ✓ Social domain (cooperation, assertion, responsibility, empathy, self-control) ✓ Problems behavior domain (internalizing problems, externalizing problems, & hyperactivity) • **The Family Support Scale (FSS)**: parent report, to measure parents' satisfaction with the support in raising a child.	difficulties in social, communication, and restricted, repetitive, and/or stereotyped behaviors, interest, and activities) of children with HFASD a significant predictor of high parenting stress after controlling for behavior problems and parental social support? ✓ The semi-partial squared multiple correlation for the set showed that the general symptomatology for HFASD was a significant predictor of parenting stress, the set as a whole explained 21% of the variance in parenting stress, but not all of the individual symptom variables were significant predictors. • Q7: Does social support moderate the relationship between child characteristics and parenting stress? ✓ In step one, the six terms from the original model [social support, behavior (linear), behavior (quadratic), social skills, communication/abnormal language, and stereotyped] were entered to partial you their effects on parenting stress. In the second model, the interaction terms were added and their unique effects examined. ✓ The original model explained 52% of the variance in parenting stress. With the addition of the interaction terms, 57.8% of the variance was explained by the new model, but this increase in the amount of variance was not significantly different from zero. ✓ Supplemental analysis: The SSRS social skills scale explained 35% of the variance significantly greater than zero, but the Social Interaction subscale of the SCQ explained the amount of variance was not significantly different from zero.	
23. (Osborne & Reed, 2010) Stress and self-perceived parenting behaviors of parents of children with autistic	• 138 children with ASC: mean age 6.0 Y (SD=3.8, 2Y6M-16Y), 135 male & 14 female **Inclusion:** ✓ diagnosed as ASC based on DSM-IV ✓ undergoing teaching/education intervention	• Differences of child measures, parental stress & parenting behavior scores at baseline and follow-up: t-test, ANCOVA • Semi-partial, time-lagged correlation	• **Questionnaire on resources and stress (QRS-short form)**: caregiver report, to measure parental perceptions of the impact of a developmentally delayed, or chronically ill, child	• **Gilliam Autism Rating Scale (GARS)**: to measure the severity of ASC, including 4 subscales (stereotyped behavior, communication, social interaction, developmental disturbance)	• Baseline ✓ GARS score was slightly milder than average for children with ASC, but no difference across the four age groups. ✓ BAS General Cognitive Ability score: much lower than the average for the general population, higher in the two older groups. ✓ Vineland Overall Composite score was very low and was similar across all groups. ✓ QRS-F was high for the sample; the youngest age	• Volunteer sample • Rather self-report parenting behavior measure as directive observation

spectrum conditions
 	
Research in Autism Spectrum Disorders, 4, 405-414
	• Time 1: baseline
	• Time 2: 9-10 months later
		(GARS, BAS, VABS were controlled): stress (baseline) & behavior (follow-up), behavior (baseline) & stress (follow-up).	on the family members, including 4 subscales (parent and family problems, pessimism, child characteristics, physical incapacity), Total stress score was used
			• **Parent-child relationship inventory (PCRI)**: caregiver report, to measure parenting behaviors, standardized T-score
			✓ Involvement
			✓ Communication
			✓ Limit Setting
			✓ Autonomy
				• **British Abilities Scale (BAS II)**: to measure cognition, General Cognitive Ability scale was used
				• **Vineland Adaptive Behavior Scale (VABS)**: to measure daily adaptive functioning, Composite Overall score was used
				✓ Communication
				✓ Daily living skills
				✓ Socialization
					group was significantly higher than three older age groups, significantly reduced as age increased. (ANCOVA)
					• Follow-up
					  ✓ Only BAS scores differed significantly across the age group.
					  ✓ Parenting stress significantly reduced as the age increased (ANCOVA)
					• There were no significant difference in perceived parenting behaviors scores between the follow-up and the baseline.
					  ✓ *Involvement*: significantly lower than the general population mean, but constant across all groups.
					  ✓ *Communication*: significantly much lower than the general population mean, significantly increased across the four age groups both at baseline and follow-up. (ANCOVA)
					  ✓ *Limit Setting*: significantly lower than the general population mean, but low score in older age group. There was significantly decreased across the age group. (ANCOVA)
					  ✓ *Autonomy*: no difference between the general population mean, and no change across all groups.
					• Both at baseline and at follow-up: significant negative correlation between parenting stress and *Involvement, Communication, Limit Setting,* but *Autonomy* showed this negative correlation only at follow-up.
					• Semi-partial, time lagged correlation:
					  ✓ Significant relation between parenting stress (baseline) and *Involvement, Communication,* & *Limit Setting* parenting behavior (follow-up)
					  ✓ Significant relation between perceived parenting behavior of *Involvement, Communication, & Limit Setting* (baseline) and parenting stress (follow-up)
					  ✓ The relationships between parenting stress (baseline) & *Involvement* (follow-up), and between parenting stress (baseline) & *Communication* (follow-up) were stronger than the relationship between perceived parenting behavior (baseline) and parenting stress (follow-up).
					  ✓ For the youngest group: significant negative	

					relationships between parenting stress (baseline) and *Involvement & Communication* (follow-up), between *Limit Setting* (baseline) and parenting stress (follow-up). ✓ For three older age groups: significant negative relationships between parenting stress (baseline) and *Communication & Limit Setting* (follow-up), between *Communication & Limit Setting* (baseline) and parenting stress (follow-up).	
24. (Siman-Tov & Kaniel, 2011) Stress and personal resource as predictors of the adjustment of parents to autistic children: a multivariate model *Journal of Autism and Developmental Disorder ,41, 879-890.*	• PDD children: mean age 10.3Y (SD=3.1, 6-16Y), 81% PDD and 19% PDDNOS, 86% boys, 56.3% first-born **Inclusion**: ✓ Diagnosed by clinical psychologists or medical doctors **Exclusion**: ✓ Rett's Disorder ✓ Childhood Disintegrative ✓ Asperger's Disorder • 65.1% received integrative therapeutic approach, 34.9% with a specific therapeutic approach. 49.4% had a moderate level of functioning, 31% at a low level, 19.5% at a high level. • One-third children need supervision for most of the day, 30% need supervision 24h a day, 12.6% only need a few hours of supervisiona day. • 176 biological fathers	• Perform separate SEM path analyses for mothers and fathers for simultaneous estimation of the relationships among the variables: using the structural equation modeling program within the AMOS 5 procedure. • Present the path model and path coefficients for the variables when parents are analyzed as individuals.	• **The Questionnaire of Resources and Stress (QRS-F)**: parent report, 51-item to measure the negative and positive impact of the autistic child on the family • **The Sense of Coherence Scale (SOC)**: parent report, 29-item to measure sense do coherence including ✓ Comprehensibility ✓ Manageability ✓ meaningfulness。 • **Locus of control scale**: parent report, 14-item to measure individuals ' explanations about events in their lives ✓ Internal ✓ External • **Social support scale**: parent report, 20-item to measure the amount of support that each	• **The Mental health scale**: parent report, 38-item to measure a global feeling of distress and physical health. • **The Quality of marriage scale**: parent report, 95 items to measure the quality of the marriage in 9 dimensions: ✓ Personality traits ✓ Communication between the couple ✓ Conflict resolution ✓ Financial management ✓ Spending leisure time ✓ Sexual contact and affection ✓ Parenting and child care ✓ Relationships with extended family members ✓ Role equality • **The Autism Behavior Checklist (ABC)**: parent and caregiver report, 57-item to	• Path model and path coefficients for fathers and mothers ✓ The path coefficients of the resources of social support and internal locus of control and external locus of control to stress are high and significant. ✓ Sense of coherence is not correlated with stress but with both variables of parental adjustment, mental health and marriage quality. ✓ Parental mental health has no path coefficient to child symptom severity but quality of marriage has a negative path coefficient to child symptom severity. ✓ The intensity of parental stress is positively correlated with child symptom severity. • Separate path analysis for fathers and mothers ✓ The fit of the model for fathers was good, as well for the mothers. ✓ There are only two minor differences between the two models. The first difference relates to internal locus of control and quality of marriage. In the fathers' model there is no relationship between internal locus of control and quality of marriage, while in the mothers' model there is a negative path coefficient between internal locus of control and quality of marriage. ✓ The second difference relates to sense of coherence and parental stress. In the fathers' model there is no relationship between sense of coherence and parental stress while in the mothers' model there is a negative path coefficient between sense of coherence and parental stress.	• The participants were not a representative sample due to the constraints of accepting only those who agreed to participate. • Most of the subjects were above average on the socio-economic variable.

	and mothers (88 married couples): mean age 35.39Y (SD=6.22, 22-50Y). 70.7% with college education and belong to the middle and upper class. 79.3% live in towns and the rest live in non-urban settlements. 46% have 2 children, 43.7% have 3 children, 3.4% have 1 child, 6.9% have 4 or more children. • Economic status: 66.7% is above average, 28.7% is average, 4.6% is low.		parent felt they had from family, friends and different institutions.	measure the severity of autistic symptoms including 5 dimensions: ✓ Using senses ✓ Social connections ✓ Using objects and body ✓ Language ✓ Help seeking • **Demographics**: residence, age, education, family income, children's age, gender, school, diagnosis of autism and treatment history.	
25. (Peters-Scheffer, Didden & Korzilius, 2012) Maternal stress predicted by characteristics of children with autism spectrum disorder and intellectual disability *Research in Autism Spectrum Disorders, 6, 696-706*	• 104 mothers of children with ASD (82 autism, 22 PDDNOS) and ID (17 profound, 33 severe, 33 moderate, 19 mild, 2 borderline): developmental mean age 23.13 M (SD=7.85) **Inclusion:** ✓ Diagnosis of ASD was confirmed by ADOS & CARS ✓ Diagnosis of ID was confirmed by the Mullen Scale of Early Learning (MSEL) ✓ VABS administered by the first author at baseline ✓ All children attended a preschool	• ASD & ID group vs. Norm group: t-test • Two-year repeated measure: ANOVA • Relation between child variables and maternal stress: Pearson correlation • Emotional and behavior problems predict maternal stress: regression analysis	• **Parental Stress Index short form (PSI-SF)**: caregiver report, six-point Likert-type scale, to measure the stress regarding upbringing of their child.	• **Mullen Scales of Early Learning (MSEL)**: a standardized measure to assess the developmental level of children from birth to 68 m/o, IQ ratio= (DA/CA)*100 ✓ Visual perception ✓ Fine motor ✓ Receptive and expressive language • **Autism Diagnostic Observation Schedule (ADOS)**: semi-structured observation to assess social and communicative functioning in individuals suspected of having an ASD. • **Childhood Autism**	• Maternal stress ✓ No significant differences between the five assessments (ANOVA repeated measures). ✓ No significant differences between the mean of the clinical norm group and the five assessments in the ASD & ID group. ✓ Significantly higher than the mean of the non-clinical norm group of the PSI. • Child variables associated with maternal stress ✓ Small to moderate effects between maternal stress and the initiation of social initiation, moderate effect on behavioral flexibility, and large effects on emotional and behavioral problems. ✓ No associations between maternal stress and children's level of cognitive functioning, adaptive behavior, language, responding to and initiating behavior requests and joint attention. • Developmental age and adaptive behavior ✓ No significant difference between maternal stress and the categories of developmental age, or on the severity of ID, or on the categories of adaptive behavior.	• Small sample size and long measurement period may not be able to detect the change between maternal stress and emotional behavioral problems. • Children with moderated to profound intellectual disability may not be representative.

or school for children with ID
• Baseline, 6, 12, 18, 24 months
				Rating Scale (CARS): a measure of symptom severity.
				• **Wing Subgroup Questionnaire (WSQ)**: parent report, to measure child's behavior and indicate the ASD subtype.
				✓ Aloof
				✓ Passive
				✓ Active-but-odd
				• **Vinland Adaptive Behavior Scale-survey form (VABS)**: to measure adaptive behavior, a composite score was used
				✓ Socialization
				✓ Communication
				✓ Daily living skills
				• **Child Behavior Checklist (CBCL)**: the CBCL 1.5-5 years was used, scores on internalizing, externalizing and total scale were calculated.
				✓ Emotional reactive
				✓ Anxiety
				✓ Somatic complaints
				✓ Withdrawn
				✓ Sleep problems
				✓ Aggressive behavior
				✓ Attention deficits
				• **Behavioral Flexibility Rating Scale-revised (BFRS-R)**: parent report, to measure the severity of challenging behavior to specific and
					• Autism severity and subtype
					  ✓ No significant effect of autism severity on maternal stress.
					  ✓ No significant differences in maternal stress between subgroups.
					• Emotional and behavioral problems
					  ✓ Emotional and behavioral problems accounted for 30.1% of the variance in maternal stress.
					  ✓ Emotionally reactive, withdrawn and attention problems accounted for 34.2% of the variance in maternal stress.
					• Behavioral flexibility
					  ✓ Only behavioral flexibility toward objects significantly contributed to maternal stress, it accounted for 13.6% of the variance. (stepwise multiple regression analysis)
					• Early social communication and language
					  ✓ Only initiating social interaction significantly predicted maternal stress with 5.5% of the variance accounted for.
					• Relative contribution of characteristics to maternal stress
					  ✓ Emotionally reactive behavior, withdrawn behavior and attention problem accounted for 35% of the variance in the maternal stress (hierarchical regression).	

				unexpected events and changed routines, three-point Likert-type scale(0-2) ✓ Flexibility toward objects ✓ Flexibility toward the environment ✓ Flexibility toward persons • **Early Social Communication Scales (ESCS)**: first author administered and four raters scored, to measure nonverbal communication behavior during a videotaped semi-structured observation. • Peabody Picture Vocabulary Test (PPVT): to measure receptive language • Schlichting Test for language production: to measure expressive language.		

Table 2. Relationship between the studies examining the factors related to child's characteristics and parenting stress in children with ASD and the dimensions of ICF-CY

Studies examining the factors related to child's characteristics and parenting stress in children with ASD	ICF-CY dimension				
	Body functions and structures	Activity and participation	Environmental	Personal	Health condition
(Holroyd, Brown, Wikler & Simmons, 1975)			✓	✓	
(Konstantareas & Homatidis, 1989)	✓		✓	✓	✓
(Wolf, Noh, Fisman & Speechley, 1989)			✓		
(Bouma & Schweitzer, 1990)			✓		
(Dumas, Wolf, Fisman, & Culligan, 1991)	✓		✓		
(Koegel, et al., 1992)	✓		✓	✓	
(Tobing & Glensick, 2002)				✓	✓
(Hastings, 2003)	✓		✓		
(Tomanik, Harris, & Hawkins, 2004)	✓	P	✓	✓	
(Baker-Ericzén, et al., 2005)	✓				✓
(Hastings, et al., 2005)	✓	P	✓		✓
(Honey, Hastings & Mcconachie, 2005)		P	✓		✓
(Lecavalier, Leone & Wiltz, 2006)	✓	AP	✓	✓	
(Konstantareas & Papageorgiou, 2006)	✓	A(PEP)		✓	✓
(Davis & Carter, 2008)	✓	A(MSEL)	✓		✓

(Epstein, et al., 2008)	✓				
(Estes, et al., 2009)	✓	P			
(Hoffman, et al., 2009)					✓
(Mori, Ujiie, Smith & Howlin, 2009)	✓		✓	✓	✓
(Phetrasuwan & Miles, 2009)			✓	✓	✓
(Rao & Beidel, 2009)					✓
(Matthews, 2010)	✓	P	✓		✓
(Osborne & Reed, 2010)			✓	✓	
(Siman-Tov & Kaniel, 2011)			✓	✓	✓
(Peters-Scheffer, Didden & Korzilius, 2012)	✓	P			✓

Table 3. Measures for the factors of each dimension of the ICF-CY model

Measures for health condition related factors			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Disease	Doctor's diagnosis		Medical history
Severity for ASD	CARS	Over 2Y	Observation
Measures for body function and structures related factors			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Cognition	CPEP-3	2Y-7.5Y	Direct administration
Emotional and Behavioral problems	CBCL-C/1.5-5	1.5Y-5Y	Caregiver report
Temperament	BSQ-C	3Y-7Y	Caregiver report
Sleep problems	basic information questionnaire		Caregiver report
Seizure	basic information questionnaire		Caregiver report
Birth condition	basic information questionnaire		Caregiver report
Sensory processing	SSP-C	3Y-10Y	Caregiver report
Affective expression	CPEP-3	2Y-7.5Y	Direct administration
Social reciprocity	CPEP-3	2Y-7.5Y	Direct administration
Measures for activity related factors			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Receptive language	CPEP-3	2Y-7.5Y	Direct administration
Expressive language	CPEP-3	2Y-7.5Y	Direct administration
Gross motor	CPEP-3	2Y-7.5Y	Direct administration
Fine motor	CPEP-3	2Y-7.5Y	Direct

			administration
Imitation	CPEP-3	2Y-7.5Y	Direct administration

Measures for participation			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Communication	VABS-C	3Y-12Y	Interview
Daily living skills	VABS-C	3Y-12Y	Interview
Socialization	VABS-C	3Y-12Y	Interview
Motor	VABS-C	3Y-12Y	Interview

Measures for environmental factors			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Social economic status	basic information questionnaire		
Parents' attitude	PSI-CSF	Under 12Y	
Mother-child interaction	PAI		Caregiver report
Treatment (type, frequency, duration)	Basic information questionnaire		Caregiver report

Measures for Personal factors			
Evaluation Contents	**Measures**	**Age for target population**	**Evaluation form**
Age	Basic information questionnaire		Caregiver report
Gender	Basic information questionnaire		Caregiver report
Age receiving diagnosis	Basic information questionnaire		Caregiver report

Table 4. Descriptive statistics of demographic variables (N=89)

Characteristics	
Age in months: mean (SD), range	54.53 (9.73), 36-71
Gender (M/F): n (%)	75 (84.3)/14 (15.7)
Age receiving diagnosis (year): mean (SD), range	2.79 (0.86), 1.1-5.0
Diagnosis: n (%)	
Autism	67 (76.1)
Asperger's disorder	7 (7.9)
PDD-NOS	15 (16)
Co-morbidities: n (%)	
ADHD	10 (11.2)
Attention Deficit Disorder	2 (2.2)
Visual problem	1 (1.1)
Emotional problem	1 (1.1)
Sleep problem	1 (1.1)
Diagnosis doctor: n (%)	
Pediatric psychiatrist	72 (80.9)
Pediatric rehabilitation	12 (13.5)
Pediatrics	1 (1.1)
Birth order: n (%)	
1	61 (68.5)
2	23 (25.8)
3	2 (2.2)
4	2 (2.2)
Number of children in the family: n (%)	
1	35 (39.3)
2	45 (50.6)
3	6 (6.7)
4	2 (2.2)
Grade: n (%)	
Regular kindergarten	52 (58.4)
Special education kindergarten	18 (20.2)
Developmental center	14 (15.7)
Day care in hospital	4 (4.5)
unschooled	1 (1.1)
Therapy (hour per week): n, mean (SD), range	87, 5.41 (7.76), 0-39.5
Mother age (year): n, mean (SD), range	84, 35.80 (4.32), 24-46
Socioeconomic status: n (%)	

1 (highest)	13 (14.6)
2	43 (48.3)
3	11 (12.4)
4	11 (12.4)
5 (lowest)	3 (3.4)

Table 5. Descriptive statistics of parenting stress and potential predictors of parenting stress and their correlations with parenting stress in mothers of children with ASD

Mother variable	Mean	SD	Range	≥90th
PSI-CSF total stress	101.09	17.49	47-142	20 (22.5%)
Parent distress	36.37	7.81	16-54	24 (27.0%)
Parental-child dysfunctional interaction	29.02	6.24	14-49	7 (7.9%)
Difficult child	35.70	8.65	15-57	37 (41.6%)
			Parenting stress in mothers	
Child variables	Mean	SD	r	p
CARS	29.29	6.68	0.344	0.001
CBCL-C/1.5-5 (T score)				
Internalizing problems	64.28	8.77	0.579	0.000
Externalizing problems	57.93	11.51	0.428	0.000
BSQ-C (Female/Male/Total)				
Activity level	4.11/4.39/4.34	0.83/0.86/0.86	0.365	0.000
Rhythmicity	4.29/4.68/4.61	0.78/0.94/0.92	-0.396	0.000
Approachability	4.00/4.16/4.14	1.31/0.79/0.89	-0.359	0.000
Adaptability	4.50/4.78/4.73	1.38/0.87/0.96	-0.459	0.000
Response intensity	4.14/4.19/4.18	0.74/0.62/0.65	0.394	0.000
Mood	4.70/4.50/4.53	0.94/0.60/0.66	-0.329	0.001
Persistence	3.55/3.69/3.66	0.87/0.75/0.77	0.148	0.084
Distractibility	4.34/4.16/4.19	1.36/0.92/0.99	-0.479	0.000

Threshold	4.18/3.74/3.81	0.76/0.89/0.88	0.168	0.059
SSP-C				
Tactile sensitivity	27.83	4.69	-0.300	0.002
Taste/smell sensitivity	14.79	4.13	-0.355	0.000
Movement sensitivity	12.25	2.47	-0.167	0.059
Underresponsive/seeks sensation	21.27	5.06	-0.359	0.000
Auditory filtering	17.85	4.90	-0.344	0.001
Low energy/weak	20.66	7.21	-0.051	0.319
Visual/auditory sensitivity	18.26	3.62	-0.186	0.042
CPEP-3 (month)				
Cognitive verbal/Preverbal	41.11	17.32	-0.201	0.030
Expressive language	32.09	17.89	-0.210	0.025
Receptive language	36.51	20.47	-0.137	0.101
Fine motor	40.08	10.85	-0.121	0.130
Gross motor	34.34	4.70	-0.081	0.227
Visual-motor imitation	31.79	8.08	-0.151	0.080
VABS-C (month)				
Communication	44.30	16.87	-0.242	0.012
Daily living skills	33.82	13.91	-0.209	0.025
Socialization	18.50	18.61	-0.235	0.014
Motor	52.98	19.12	-0.183	0.044
PAI	64.47	10.61	-0.431	0.000

PSI-CSF: Parenting Stress Index-Chinese Short Form

CARS: Childhood Autism Rating Scale

CBCL-C/1.5-5: Child Behavior Checklist for Ages 1.5-5-Chinese version

BSQ-C: Behavior Style Questionnaire-Chinese version

SSP-C: Short Sensory Profile-Chinese version

CPEP-3: Chinese Psychoeducational Profile-third edition

VABS-C: Vineland Adaptive Behavior Scale-Chinese classroom edition

PAI: Positive Affect Index

Table 6. Multiple regression models of the parenting stress in preschoolers with ASD (N=88)

| Covariate	Parameter Estimate	Standard Error	t value	P value
Constant	83.07	16.34	5.085	<.001
CBCL-C/1.5-5 Internalizing problems	.83	.17	5.00	<.001
PAI	-.57	.13	-4.49	<.001
CARS	.59	.20	2.91	.005
BSQ Rhythmicity	-3.49	1.53	-2.27	.026

Note: R^2=.537

CBCL-C/1.5-5: Child Behavior Checklist for Ages 1.5-5-Chinese version

PAI: Positive Affect Index

CARS: Childhood Autism Rating Scale

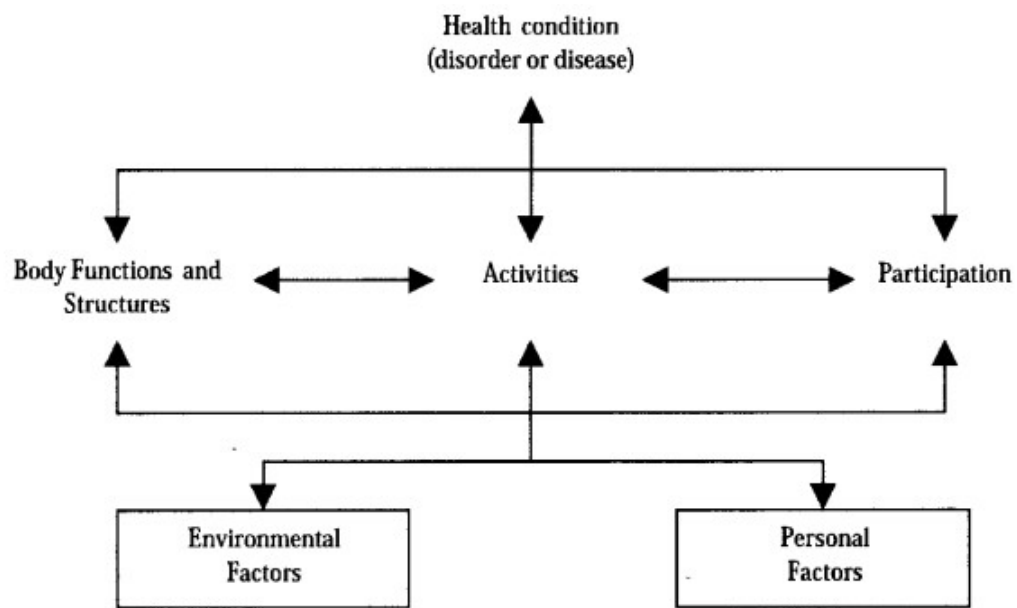BSQ: Behavior Style Questionnaire-Chinese version
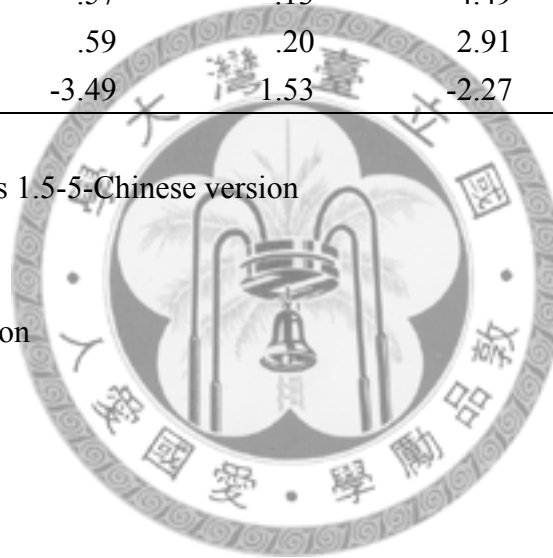
Figure 1. The International Classification of Functioning, Disability
and Health (ICF) model.