國立臺灣大學醫學院職能治療學系暨研究所

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Master Thesis

泛自閉症障礙學前孩童行為及情緒問題之危險因子

Risk Factors for Behavioral and Emotional Problems in Pre-school Children with Autism Spectrum Disorders

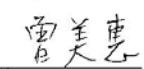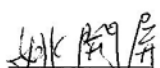歐婉儀

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學位考試審查表

泛自閉症障礙學前孩童行為及情緒問題之危險因子
Risk Factors for Behavioral and Emotional Problems in Preschool Children with
Autism Spectrum Disorders

　　本論文歐婉儀在國立台灣大學醫學院職能治療學研究所碩士學位
論文，經考試委員審查合格，並口試通過。

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致謝

　　在研究、收案以及撰寫論文的過程中，遇到許多挑戰和挫折，但幸虧有我碩班好同學們的情義相挺，以及學姐們的鼓勵及協助，讓我能面對種種考驗，順利完成這篇論文。此外，尤其要感謝我的指導教授曾美惠老師，在我收案的過程中給予非常大的支持，並不厭其煩的與我討論，為我解惑；而老師也像媽媽一樣地關心我，讓人備感溫馨，從老師身上，我不僅學習到做研究的學問，更感受到殷殷關懷的溫暖。當然，還有我最重要的家人，他們總是默默在背後支持我、做我的後盾，讓我能無後顧之憂地專心做研究。最後，要感謝參與本研究的五十三位孩童及家長們，若沒有你們，我是無法完成這篇論文的！由衷地感恩並祝福你們。

　　　　　　　　　　　　　　　　　　　　婉儀 謹致　民國九十九年八月

泛自閉症障礙學前孩童行為及情緒問題之危險因子

中文摘要

泛自閉症障礙者是具有行為及情緒問題的高風險群，這些行為及情緒問題可能對他們在學習及社交關係上造成負面的影響，並且會進一步地干擾介入的成效及長期預後。本研究目的為探討泛自閉症障礙學前孩童行為及情緒問之危險因子。受試者來自大台北地區的發展中心、綜合醫院的復健部、兒童心智科門診及日間病房，共有 53 位三至五歲的泛自閉症障礙孩童參與本研究。我們將檢視孩童的性別、年齡、自閉症症狀嚴重度、適應性行為、認知功能、表達性語言，以及與家長相關的危險因子，如親職壓力和家長心理健康狀態等，與孩童的行為及情緒問題間之相關性。家長根據孩童的行為及情緒問題填寫兒童行為調查問卷/1.5-5 歲(Child Behavior Checklist 1.5-5)。並以多元線性迴歸模式(Multiple linear regression models)來探討泛自閉症障礙學前孩童行為及情緒問題的重要預測因子。結果顯示親職壓力及家長心理健康狀態與孩童的外化問題呈顯著正相關，而孩童的出生順序(Birth order)和是否接受職能治療與其外化問題呈顯著負相關；親職壓力及家長心理健康狀態與孩童的內化問題呈顯著正相關，而孩童的出生順序與其內化問題呈顯著負相關。研究發現認為泛自閉症障礙學前孩童的行為及情緒問題與家長的社會心理狀態(psychosocial status)間為雙向影響，而這也凸顯了我們必須教導家長應對策略(coping strategies)或提供社會支持來協助他們的社會心理調適(psychosocial adjustment)及壓力紓解之重要性。

關鍵字: 泛自閉症障礙、行為及情緒問題、危險因子、學前孩童

Risk Factors for Behavioral and Emotional Problems in Preschool Children with Autism Spectrum Disorders
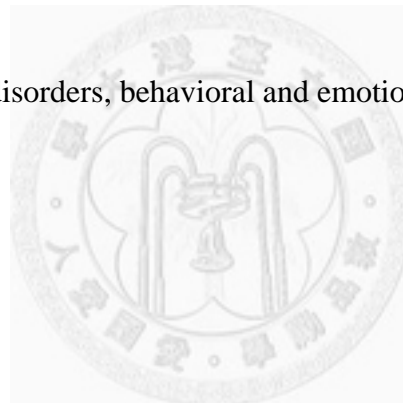
Abstract

Individuals with autism spectrum disorders (ASD) are at high risk for behavioral and emotional problems which may lead to huge negative impacts on their learning, and social relationships, and further interfering with intervention efforts and the long-term prognosis. The aim of this study was to identify risk factors for the behavioral and emotional problems in preschool children with ASD from both the perspectives of subject characteristics and of environmental factors. Fifty three children with ASD aged from 3 to 5 years were recruited from developmental centers, pediatric rehabilitation clinics and child psychiatric department in general hospitals in the Greater Taipei area. The relationship between behavioral/emotional problems and the following variables was examined: child gender, child age, socioeconomic status, severity of autistic symptoms, adaptive behaviors, cognitive functioning, expressive language and parent-related risk factors, including parenting stress and mental health. Parents rated their child's behavioral and emotional problems using the Child Behavior Checklist 1.5-5 (CBCL1.5-5). Multiple linear regression models were fitted to identify the important predictors of behavioral and emotional problems as measured by the CBCL1.5-5 in children with ASD. Results of multiple linear regression analyses showed that parenting stress and parental mental health were associated with higher scores on externalizing problems, whereas

birth order and receiving occupational therapy service were associated with lower scores on externalizing problems; parenting stress and parental mental health were associated with higher scores on internalizing problems whereas younger birth order was associated with lower scores on internalizing problems. Findings suggest that the impact of behavioral and emotional problems in preschool children with ASD on parental psychosocial status may be viewed as bidirectional which highlights the need to teach coping strategies or provide social supports to parents of preschool children with ASD to help with their psychosocial adjustment and stress relief.

Keywords: Autism spectrum disorders, behavioral and emotional problems, risk factors, Child and preschool

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Introduction

Autism is a neurodevelopmental disorder characterized by severe qualitative impairments in reciprocal social interaction, communication, and restricted, repetitive behavior, interests and activities (American Psychiatric Association, 2000). Studies indicated that 13 to 30% of young children with developmental disabilities, particularly those with limited communication skills and/or poor social skills, are at risk for the development of behavioral and emotional problems, while not essential to the diagnosis, that cause serious distress for both the child and the family (Borthwick-Duffy, 1996; Koegel, Koegel, & Dunlap, 1996; Emerson, 1995; McDougal & Hiralall, 1998). Comorbid behavioral and emotional symptomatology in children with ASD can lead to increased difficulty with behavior management, learning, and the development of social relationships (Pearson et al., 2006), and it can also interfere with intervention efforts and thereby impact the long-term prognosis of children with ASD. Osborne & Reed (2009) found that a stronger relationship existed between parenting stress and behavioral problems in preschool children with ASD even when controlling for the influence of such other factors as the autistic severity, intellectual abilities, and adaptive behavioral functioning.

Children's behavioral and emotional problems were referred to as psychopathology earlier that, according to Krueger's 2-factor dimensional model (Krueger, 1999), and informed by the work of Achenbach (Achenbach & McConaughy, 1987), fell into externalizing and

internalizing behavioral problems. The externalizing problems has been labeled as undercontrolled or "involving conflicts with others and with social norms" and includes attention problems and aggressive behaviors; the internalizing dimension has been labeled as overcontrolled or "involving inner distress" and includes such behaviors as social withdrawal, somatic complaints, anxiety, and depression (Maddux & Winstead, 2008).

Previous studies revealed that children aged 3 to 5 years with ASD exhibited more frequent or severe internalizing behaviors and externalizing behaviors than children with intellectual disability (ID) caused by other aetiologies and non-ASD clinic and community samples of children with average intelligence (Eisenhower, Baker, & Blacher, 2005; Gadow et al., 2004, 2005; Weisbrot, Gadow, DeVincent, & Pomeroy, 2005). Hartley, Sikora, & McCoy (2008) also indicated that one-third of 169 1.5 to 5.8-year-old young children with autistic disorder had a CBCL Total Problems score in the Clinically Significant range.

Although considerable evidence is accumulating that children and adolescents with ASD are at high risk for behavioral and emotional problems which may impact negatively not only on children and adolescents with ASD themselves, but also on their parents and families, only two studies examined the risk factors of behavioral and emotional problems in preschool-age children with ASD (Baghdadli, Pascal, Grisi, & Aussilloux, 2003; Hartley et al., 2008).

Preschool-age children are often not sufficiently verbal to be able to express their symptoms. Parents may not be so concerned with their child's maladaptive behaviors and believe

that early social-emotional and behavioral problems are developmentally transient and likely to diminish as the child grow older. These facts raise an issue of under-identification of preschool-age children with behavioral and emotional problems. The delay in diagnosis and treatment of emotional and behavioral problems in these children may result in family disturbances and long-term sequelae of the progression and development of further psychopathology (McDonnell & Glod, 2003).

Previous studies investigating risk factors for behavioral and emotional problems in children with intellectual disabilities (ID), including autism spectrum disorders, consistently revealed that cognitive functioning, adaptive behaviors, parenting stress, and parental mental health were significant predictors (Eisenhower et al., 2005; Hartley, S. L., Sikora, D. M., & McCoy, R., 2008; Herring et al., 2006; Holden & Gitlesen, 2006; Lecavalier, Leone, & Wiltz, 2006; McClintock et al.,2003; Murphy et al., 2005; Murphy, Healy, & Leader, 2009). However, the participants in previous studies were mainly children with a mixture of diagnoses from a wide age range (Chadwick, Walker, Bernard, & Taylor, 2000; Eisenhower et al., 2005; Holden & Gitlesen, 2006; Lecavalier, Leone, & Wiltz, 2006; Murphy, et al., 2005, Murphy, Healy, & Leader, 2009). The results may not be applicable to preschool children with ASD. Moreover, despite that Hartley et al. (2008) investigated the risk factors including child's age, sex, ethnicity, cognitive functioning, expressive language and adaptive behavior for behavioral and emotional problems in toddlers with autistic disorder, the study did not include parental

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factors as predictors. In Baghdadli et al. (2003), they investigated the risk factors for

self-injurious behaviors in young children with autistic disorder, and the risk factors included

child's age, sex, adaptive behavior, speech level, associated medical condition, severity of au-

tistic symptoms, and parental socioeconomic status as the environmental factor. Thus, the ex-

tent to which parent-factors, such as level of distress and parental mental health, influenced

parents' ratings of behavioral and emotional problems could not be determined.

Moreover, Briggs-Gowan and colleagues (2006) reported that infant-toddler so-

cial-emotional/behavioral problems were not transient, and the persistence of behavioral

problems may even be remarkable. A growing body of longitudinal studies of individuals

with a ASD had indicated the stability of behavioral and emotional problems during middle

and late childhood (Herring et al., 2006; Lecavalier, Leone, & Wiltz, 2006), with some beha-

vioral and emotional problems (e.g. disruptive behavior and anxiety problems) persisting into

adolescent and young adulthood (Tonge, Einfeld, Laraine, & Glidden, 2003). Thus, know-

ledge of the risk factors of behavioral and emotional problems in preschool children with

ASD is essential for early identification and intervention of children with ASD at-risk for later

conduct or behavioral disorder.

Literature Review

1.1. Introduction to autism spectrum disorders (ASD)

The autism spectrum disorders (ASD) is a spectrum of psychological conditions characterized by widespread abnormalities of social interactions and communication, as well as severely restricted interests and highly repetitive behavior (World Health Organization, 2006). The three main forms of ASD are autism, Asperger syndrome, and pervasive developmental disorder not otherwise specified (PDD-NOS) (sometimes called atypical autism). Autism forms the core of the autism spectrum disorders. Asperger syndrome is closest to autism in signs and likely causes (Lord, Cook, Leventhal, &Amaral, 2000); unlike autism, people with Asperger syndrome have no significant delay in language development (American Psychiatric Association, 2000). PDD-NOS is diagnosed when the criteria are not met for a more specific disorder. Some sources also include Rett syndrome and childhood disintegrative disorder, which share several signs with autism but may have unrelated causes; other sources combine ASD with these two conditions into the pervasive developmental disorders (Lord et al., 2000; National Institute of Mental Health. 2009).

Although the older term pervasive developmental disorder and the newer term autism spectrum disorder largely or entirely overlap (National Institute of Mental Health. 2009), the former was intended to describe a specific set of diagnostic labels,

whereas the latter refers to a postulated spectrum disorder linking various conditions

(Klin, 2006). ASD, in turn, is a subset of the broader autism phenotype (BAP), which

describes individuals who may not have ASD but do have autistic-like traits, such as

avoiding eye contact (Piven, Palmer, Jacobi, Childress, & Arndt, 1997).

1.2. The diagnosis criteria of autism spectrum disorders

According to the *Diagnostic and Statistical Manual of Mental Disorders, fourth*

edition, Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000), the di-

agnostic criteria for Autism Spectrum Disorders (ASD) are listed as below:

1. 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 fol-

lowing

(a) marked impairment in the use of multiple nonverbal behaviors, such as

eye-to-eye gaze, facial expression, body postures, and gestures to regulate so-

cial 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 following:

(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

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(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 commu-

nication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's disorder or childhood disinte-

grative disorder.

2. **Asperger's Disorder**

Qualitative impairment in social interaction, as manifested by at least two of the fol-

lowing:

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

following:

(1) marked impairment in the use of multiple nonverbal behaviours such as eye-to-eye

gaze, facial expression, body postures and gestures to regular 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 behaviour, 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, non-functional routines or rituals

(3) stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twist-

   ing, 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.

(1) 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).

(2) There is no clinically significant delay in cognitive development or in the develop-

   ment of age-appropriate self-help skills, adaptive behaviour (other than in social

   interaction), and curiosity about the environment in childhood.

(3) Criteria are not met for another specific Pervasive Developmental Disorder or

   Schizophrenia.'

3. Pervasive Development Disorder Not Otherwise Specified including Atypical Autism

This category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction or verbal and nonverbal communication skills, or when stereotyped behaviour, interests and activities are present, but the criteria are not met for a specific Pervasive Developmental Disorder, 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 of onset, atypical symptomatology, or sub-threshold symptomatology, or all of these.

1.3.   The prevalence of autism spectrum disorders

The prevalence of autism is 1–2 per 1,000 and close to 6 per 1,000 for ASD (World Health Organization, 2006; Freitag, 2007). Moreover, recent epidemiological studies from the United States and Great Britain pointed to dramatically increased rate of ASD, from 1/152 to 1/100 (Caronna, Milunsky, &Tager-Flusberg, 2008). PDD-NOS's prevalence has been estimated at 3.7 per 1,000, Asperger syndrome at roughly 0.6 per 1,000, and childhood disintegrative disorder at 0.02 per 1,000 (Fombonne, 2009). The number of reported cases of autism increased dramatically in the early 2000s. This increase is largely attributable to changes in diagnostic practices, referral patterns, availability of

services, age at diagnosis, and public awareness (Fombonne, 2009; Wing & Potter, 2002).

1.4. *The psychopathology in young children*

Psychopathology in young children is often conceptualized as falling along the three broad domains of internalizing, externalizing, and dysregulation (National Center for Toddlers and Families, 1994; Zeanach, 2000). Furthermore, previous studies   indicated that the common forms of psychopathopogy in children were behavioral and emotional problems and could largely be conceptualized along two major dimensions (Achenbach & McConaughy, 1987; Krueger, 1999). One dimension had been labeled as undercontrolled or externalizing, including various acting out, disruptive, delinquent, hyperactive, and aggressive behaviors. The second broad dimension of childhood psychopathology had been labeled as overcontrolled or internalizing, including such behaviors as social withdrawal, anxiety, and depression. The basic distinction between internalizing and externalizing problems has been well supported by a number of factor analytic studies (Krueger, 1999). Information about clusters of social-emotional/behavioral problems can be assessed in each domain and examined dimensionally or by assigning a cutpoint. Scores above the cutpoint reflect the presence of multiple behaviors within a given domain, which is used to indicate psychopathology. Research investigating psychopathology in children with intellectual disability ages 4 to 18 years had identified that

clinically significant emotional and behavioral problems were 2-3 times more prevalent

than in the general population (Einfeld & Tonge, 1992). In our study, we adopted the de-

finition of psychopathology as social-emotional/ behavioral problems which fell in the

clinically significant range and may impede the social relationship, skill learning, and

adaptive functioning in children with ASD.

Young children who exhibited behavioral and emotional problems were at in-

creased risk for exclusion and isolation from educational settings, social relationships,

typical home environments, and community activities (Sprague & Rian, 1993). Their en-

gagement in age-appropriate activities and peer interaction may be compromised such

that their opportunities to learn how to follow directions, control aggressive impulses

when frustrated by peer interactions, and establish social relationship with others were

restricted (Briggs-Gowa et al., 2006).

For ASD, their core symptoms of communication, social interaction difficulties

may worsen the behavioral and emotional problems. According to Matson, Hess, &

Boisjoli (2010) which investigated comorbid psychopathology in very young children

with autism and PDD-NOS, they found that infants and toddlers with autism had more

tantrum/conduct disorder, avoidance behavior, inattention/impulsivity, eating prob-

lems/sleep, anxiety/repetitive behavior problems than the ones with PDD-NOS and other

developmental disorders, and infants and toddlers with PDD-NOS had more tan-

trum/conduct behavior, avoidance behavior, inattention/impulsivity, eating problems/sleep, anxiety/repetitive behavior problems than the ones with other developmental disorders. Studies with preschool children with PDD still found that they exhibited more severe comorbid psychopathology, such as oppositional defiant disorder symptoms, anxiety and depression, than children in regular and special early childhood programs (Gadow, DeVincent, Pomeroy, & Azizian, 2004). Comorbid psychopathology result in a more complex diagnostic and treatment picture. Moreover, the additional stress and burden to care providers make the overall constellation of problems more severe and treatment resistant.

1.5. Risk factors for behavioral problems in children with ASD in previous studies

The identification of "risk factors" is crucial if preventative interventions are to be appropriately targeted and may, in addition, point to possible social and/or biological causal mechanisms. In general, we considered both the personal characteristics and environmental contributions to the behavioral and emotional problems exhibited by children with ASD. The following was a brief summary of evidence regarding some of the correlates of behavioral and emotional problems in children with ASD (Tables1 and 2).

1.3.1. The personal (subject) factors:

A vast of studies investigating the risk factors for challenging behaviors (e.g.

aggression, destructiveness, self-injurious behaviors(SIBs), and stereotyped beha-

viors) in children aged 2 to 15 years with intellectual disabilities or ASD revealed

that younger children tended to have severer behavioral problems (Baghdaali, Pascal,

Grisi, & Aussilloux, 2003; Chadwick, Kusel, & Cuddy, 2000; Holden & Gitlesen,

2006; Murphy et al., 2005). For example, Baghdaali et al. (2003) investigated 222

children, under 7 years of age, with autistic disorder, found that children with

younger age were more likely to have SIBs. In contrast, Hartley et al. (2008) reported

that internalizing problems composite score was significantly positively correlated

with age. Other studies had not found an association between age and the likelihood

of behavior problems (e.g. Einfeld & Tonge, 1996). As for gender, it was indicated

that boys tended to have more aggressive behaviors, sleep problems, and emotionally

reactive than girls (McClintock et al., 2003; Hartley, Sikora, & McCoy, 2008). Re-

garding self-injurious behaviors, there was no significant difference between boys

and girls (Holden & Gitlesen, 2006; Murphy et al., 2005; Murphy, Healy, & Leader,

2009). Gadow et al. (2004) found that 36.1% of boys and 42.9% of girls with ASD,

aged 3 to 5 years, scored above the Symptom Criterion (i.e. the minimum symptoms

necessary for a DSM-IV diagnosis) for Attention-Deficit/ Hyperactivity Disorder.

However, most studies focused on challenging behaviors (such as SIBs), and no stu-

dies investigated age and gender differences on behavioral and emotional problems

in preschool children with ASD while taking in account the effects of the other covariates. Thus, the associations between age, gender, and behavioral/emotional problems warrant further studies.

Studies consistently revealed that the degree of intellectual disabilities was positively associated with the challenging behaviors, including aggression, destructiveness, self-injurious behaviors, stereotyped behaviors, and a range of other behaviors (McClintock et al.,2003; Murphy et al., 2005; Holden & Gitlesen, 2006; Murphy et al.,2009). Whether or not communication ability was associated with behavioral problems was still controversial (Achenbach & Resorla, 2000; Baghdadli et al., 2003; Chadwick et al., 2000; McClintock et al., 2003). Baghdadli et al. (2003) had shown that the degree of severity in autistic symptoms was positively associated with self-injurious behaviors (SIBs), whereas Hartley et al. (2008) revealed that the severity of autistic behaviors was neither a significant risk factor for externalizing nor for internalizing problems.

Hartley et al. (2008) examined risk factors for maladaptive behaviors and found that the non-verbal cognitive functioning emerged as the strongest predictor of the CBCL externalizing problems, and the adaptive behavior as the strongest predictor of the CBCL Internalizing problems.

1.5.2. The environmental factors:

In addition to possible effects of personal factors, the environment factors such as characteristics of the parents, (e.g., age, occupation, educational level, socioeconomic status (SES), parenting stress, and psychosocial status), types of educational settings and early intervention services may affect the behavioral and emotional problems in children with ASD. In children with developmental delay, behavioral problems were positively associated with parental mental health symptoms (Baker et al., 2003; Blacher & McIntyre, 2006). Furthermore, parents of children with ASD suffered from much more stress than those of children with other clinical disorders (Eisenhower et al., 2005). Thus the parenting stress which influenced parenting styles and the interactions between the parents and the child may affect the behavior of the child with ASD (Osborne & Reed, 2009).

Studies investigating the characteristics of parents or family indicated that parental stress, family functioning, and parental mental health were significantly associated with behavioral and emotional problems in children (Eisenhower et al., 2005; Herring et al., 2006; Lecavalier, Leone, & Wiltz, 2006). Nevertheless, only three studies investigated how the parent factors, such as parenting stress, level of depression and anxiety, or socioeconomic backgrounds, were related to behavioral problems in preschool children with ASD (Herring, et al., 2006; Lecavalier, Leone, & Wiltz, 2006; Osborne & Reed, 2009). Herring et al. (2006) examined the association

between behavioral/emotional problems and parental mental health in preschoolers with PDD, and they found that child's emotional and behavioral problems contributed significantly more to mother stress, parent mental health problems, and perceived family dysfunction than child's diagnosis (PDD/non-PDD), delay or gender.

Lecavalier, Leone, & Wiltz, (2006) which investigated the impact of behavioral problems on caregiver stress in young people with ASD showed that a specific group of externalized problems, such as Conduct problem, Compliant/calm, and Self-isolated/ritualistic subscales on the Nisonger Child Behavior Rating Form (NCBRF), that are the most strongly associated with both parents' stress. However, the sample in Lecavalier et al. (2006) was children/adolescents with ASD across a wide age range of 3 to 18 years such that the result might not reflect the characteristics of preschool-age children with ASD. Moreover, they didn't include the severity of the core symptoms of autism.

1.6. Limitations of the previous studies

Although considerable evidence was accumulating that children and adolescents with ASD were at high risk for behavioral and emotional problems and several risk factors had been identified (Baghdaali et al., 2003; Hartley et al., 2008; Murphy et al., 2009), some limitations were noted as follows:

1. The age of the participants in previous studies was across a wide age band, from pre-schoolers to adolescents. As children with ASD in different developmental stages may encounter different social and academic demands such that the contributing factors of behavioral and emotional problems will be different.

2. The sample used in previous studies was mainly children with a mixture of diagnoses rather than adopting children with ASD exclusively. Children with ASD have distinctive core symptoms which are quite different from other diagnostic groups. Without considering the ASD group separately, the results of previous studies may merely reflect the average of discrepant profiles of risk factors for behavioral and emotional problems in a group of children with heterogeneous diagnoses.

3. No studies investigated risk factors for behavioral and emotional problems in children with ASD from the perspectives of both subject (personal) characteristics and environmental factors (such as parent factors) simultaneously. In addition to the possible effects of subject characteristics such as age, gender, and severity of autistic symptoms, the environmental factor such as parental stress, parental mental parent factors, and educational settings, may ameliorate or exacerbate behavioral and emotional problems in children with ASD. For example, it is possible that psychological characteristics of parents, including a genetic predisposition to psychopathology, may contribute to child problems.

To date, results of studies on the risk factors of behavioral /emotional problems in children with ASD were inconsistent. It could be attributed to different age ranges, sub-types of ASD samples, types of emotional/behavioral problems investigated and different measures used. A study investigating the risk factors of emotional and behavioral problems adopting preschool children with ASD exclusively and including both subject and environmental characteristics is warranted. As behavioral and emotional problems is not transient, results of the study could provide the knowledge of the risk factors for emotional and behavior problems in preschool children with ASD and thereby could ensure a better prevention and early intervention plan.
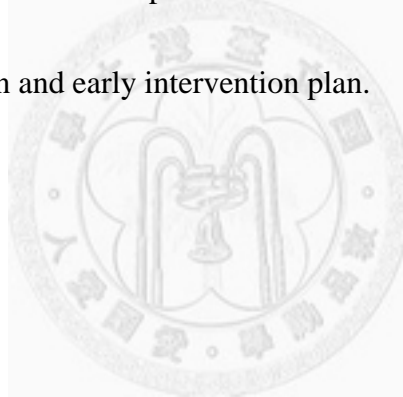
The aim of this study

The aim of the study was to investigate the risk factors of behavioral and emotional problems in preschoolers with ASD using both subject characteristics (including child gender, child age, severity of autistic symptoms, adaptive behaviors, cognitive functioning, expressive language) and environmental factors (including parenting stress and mental health, types of educational settings and early intervention services, hour(s) of early intervention/per week, SES, father's age, mother's age, educational level, and employment status, and total number(s) of children in the household) as predictors.

Hypotheses of this study

Our hypotheses were as follows:

1. Adaptive behaviors, cognitive functioning, and expressive language were hypothesized to be negatively associated with behavioral and emotional problems.

2. Severity of autistic symptoms, parenting stress, and parental mental health were hypothesized to be positively associated with behavioral and emotional problems.

3. The severity of Internalizing problems was hypothesized to increase with age.

Methods

Participants

A sample of 53 3- to 5- year-old (mean age =53.51 months; SD = 8.59; range 36-70)

children diagnosed with autistic disorder, Asperger disorder, or PDD-NOS by child psychiatr-

ists based on criteria in the DSM-IV-TR , were referred from developmental centers or hos-

pitals in the Greater Taipei area. All children had informed parental consent. Forty nine were

boys and four were girls. They were primarily from middle-class socioeconomic backgrounds.

Exclusion criteria included 1. sensory limitations: blindness, deafness, and severe motor limi-

tations which hindered adequate testing, 2. primary caregivers who could not communicate in

Mandarin or Taiwanese.
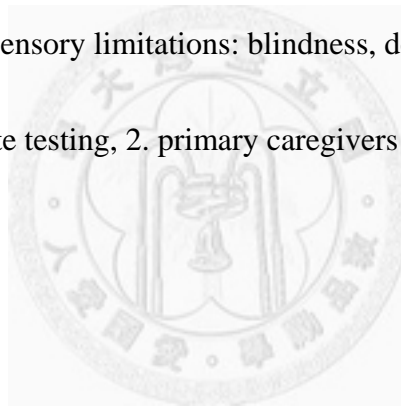
Measures

Sociodemographic Variables

Parents answered questions about sociodemographic factors , such as child age, gender,

birth order, parental educational level, occupation, age, types of early intervention services

(e.g. occupational therapy, speech therapy, or others), types of educational settings, hour(s) of

early intervention/per week, total number(s) of children in the household. Socioeconomic sta-

tus (SES) was assessed using the Hollingshead Two-Factor Index of Social Position (Hol-

lingshead, 1957),

Behavioral and Emotional Problems

    The Chinese version of Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5) (Chen, Huang, & Chao, 2009), a translation of the CBCL/1.5-5 (Achenbach & Rescorla, 2000). However, the Taiwanese norms of CBCL/1.5-5 are not yet established. The CBCL/1.5-5－a revision of the CBCL/2-3 (Achenbach, 1992)－is completed by parents, parent surrogates, and others who see children in family settings, and the respondents should have at least fifth grade reading skills. The CBCL/1.5-5 is a standardized rating of diverse aspects of behavioral, emotional, and social functioning. The respondent is asked to rate 99 problems items as *0* for *not true* of the child, *1* for *somewhat true or sometimes true*, and *2* for *very true or often true*, based on the preceding 2 months. For several items, respondents are asked to provide descriptions of the problems. In addition, item 100 requests respondents to write in any additional problems that were not previously listed. In addition, unlike many standardized forms, CBCL/1.5-5 also requests explanatory details, plus open-ended descriptions of the best things about the child and greatest concerns about the child. There are seven syndrome scales (seven factors) of CBCL/1.5-5, and the scales were designated as *Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawal, Sleep Problems, Attention Problems,* and *Aggressive Behaviors.* In addition to the syndrome scales, the CBCL/1.5-5 can be classified into two broad groupings of syndromes. One grouping, designated as *Internalizing*, consisted of the four syndromes, including *Emotionally Reactive, Anxious/Depressed, Somatic Com-*

plaints, and Withdrawal. The second grouping, designated as *Externalizing*, consists of the

two syndrome scales, including *Attention Problems* and *Aggressive Behaviors*. The *Emotion-*

ally Reactive, Anxious/Depression, Somatic Complaints, and *Withdrawal* scales combine to

yield the *Internalizing Problems* composite score. The *Attention Problems* and *Aggressive*

Behaviors scales combine to yield the *Externalizing Problems* composite score. The syndrome

scales, as well as 32 items which were not grouped into any of the syndrome scale inquiring

about additional problematic behaviors, and the one item for which caregivers can write in

other behavioral problems are combined to form the *Total Problems* composite score. The se-

verity of one syndrome of an individual is counted by summing the scores of its items. For

example, attention problems syndrome consists of five items, including items such as "can't

concentrate," "can't sit still" or "clumsy." A T score $\geq$ 70 (at least two standard deviations

above the mean for the general population) for a syndrome scale (e.g. attention problems syn-

drome) or a T score $\geq$ 63 for internalizing or externalizing grouping were in the clinical range.

All internal consistency statistics of the syndrome subscales of the CBCL/1.5-5 were satis-

factory (Cronbach's alpha coefficients for the syndrome scales were above 0.70), with the ex-

ception of the two subscales of anxious/depressed and attention problems (Cronbach's alpha

coefficients were 0.66 and 0.68). Regarding the 1-week interval test-retest reliability, the ICCs

were high for most scales, ranging from 0.80s-0.90s.

Cognitive Functioning and Expressive Language

The Chinese Psychoeducational Profile- Third Edition (CPEP-3) (Fu, Hsieh, Tseng, Chen, Huang, Wu et al., 2010) translated from Psychoeducational Profile: Third Edition (PEP-3) (Schopler, Lansing, Reichler, & Marcus, 2005) , is an individualized assessment for children with ASD aged from 2 years to 7.6 years, allowing educationalists, psychologists and health professionals to assess the skills and behaviors of children with autism and communicative disabilities with a developmental age between 6 months and 7 years. The CPEP-3 yields 3 composite scores (communication, motor, and maladaptive behaviors) and features 10 performance 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)*. The internal consistency of the CPEP-3 was satisfactory (Cronbach's alpha coefficients ranged from 0.92 to 0.98 for 10 performance subtests, and 0.92 to 0.95 for 3 composites). With respect to the inter-rater reliability of the CPEP-3, the ICC ranged from 0.57 to 0.94 for the performance subtests, and 0.63 to 0.89 for the composites. All the subtests, except for the CVB (ICC = 0.57), the CMB, and the AE subtests (ICC = 0.61), had ICCs higher than 0.8. All the composites except for the maladaptive behaviors composite (ICC = 0.61) had ICCs higher than 0.8. In this study, we used the Cognitive Verbal/Preverbal and Expressive Language subtests of the CPEP-3 to assess the cognitive functioning and expressive language of the children. Percentile ranks are suggested to interpret the

results of CPEP-3 subtests because the standard scores were derived from highly skewed distribution. The percentile ranks can be used to provide examiners with the child's developmental/ adaptive level in each area measured by the test. Percentile ranks greater than 89 are within the adequate developmental/adaptive level range; percentile ranks from 75 to 89 are within the mild developmental/adaptive level range; percentile ranks from 25 to 74 are within the moderate developmental/adaptive level range, and percentile ranks below 25 are within the severe developmental/adaptive level range.

Adaptive Behaviors

The Vineland Adaptive Behavior Scales (VABS) is one of the most popular assessment tests used to diagnose developmental disorders in infants and children, including autism, mental retardation, and various learning disorders. The Vineland Adaptive Behavior Scale has three forms, the Survey-Interview Form, the Expanded-Interview Form, and the Classroom Edition. In the study, we use the Chinese version of VABS-Classroom Edition translated and edited by Wu, Chang, Lu, & Chiu (2004). The Classroom edition can be used with children aged from 3 to 12 years old. It has 244 items, measuring four domains in adaptive functioning, 1) Communication, 2) Daily Living, 3) Socialization, and 4) Motor Skills. Each item is rated "2" (behavior is usually or habitually performed), "1" (sometimes or partly performed), or "0" (never performed). The sub-domain raw scores are obtained by summing the numerical values of the responses. Using tables in the manuals, the raw scores can be converted into

standard scores (with a mean of 100 and standard deviation of 15), percentile ranks, stanines, and age equivalents. The sum of the domain standard scores is used to obtain the composite standard score. A table is then used to obtain the stanines and percentile rankings for the composite from the standard scores. The age equivalents for the composite score can be either the mean or median of the domain age equivalents. The coefficient α of the VABS were obtained as following: communication, 0.87~0.97; daily living, 0.78~0.98; Socialization, 0.73~0.96; motor skills, 0.66~0.96; the Adaptive Behavior Composite, 0.91~0.99, indicating a degree of internal consistency (Wu at al., 2004). According to the related theory and internal consistency, the correlation coefficient of all sub-domains of the VABS was ranging from 0.44~0.97 (p< 0.01), indicating the composite had accepted construct validity.

Severity of Autistic Symptoms

The Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner, 1988) is a 15-item behavioral rating developed to identify children with autism, and to distinguish them from developmentally handicapped children without the autism syndrome. It further distin-guishes children with autism in the mild to moderate range of from children with autism in the moderate to severe range. After the child has been rated on each of the 15 items, total score is computed by summing the 15 individual ratings. The lower the score, the fewer autistic beha-viors the child exhibits; the higher the score, the more autistic behaviors the child exhibits. The total CARS score may range from a low of 15 to a high of 60. Children with scores below

30 categorized as non autistic. Scores falling in the autistic range (30-60) can be divided into

two categories which have been assigned descriptive labels indicating the severity of the aut-

ism. Scores ranging from 30 to 36-6.5 indicate mild to moderate autism while ranging from

37 to 60 indicate severe autism. The coefficient alpha of the CARS was 0.94, indicating a

high degree of internal consistency. An average inter-rater reliability was 0.71, indicating

good agreement between the raters. The test-retest reliability of CARS was 0.88, and the re-

sults indicated that the CARS was stable over times.

Parenting Stress

The Parenting Stress Index-Short Form (PSI-SF) (Abidin, 1995) is a 36-item question-

naire designed to measure stress in the parent-child system and identify those families most in

need of follow-up services. The PSI-SF consists of three subscales: Parental Distress, Par-

ent-Child Dysfunctional Interaction, and Difficult Child. Each subscale consists of 12 items

rated from 1 (strong disagree) to 5 (strongly agree). The total stress score summarizes the

three subscale scores, and provides an overall indication of parenting stress that a parent was

experiencing. High scores on the subscales and PSI-SF total score indicate greater levels of

stress. A parenting stress total raw score of $\geqq 90$ (i.e. at or above the 90th percentile) strongly

indicates significant stress in the parent-child dyad and that parents and their child should

seek professional counseling. The Cronbach's α of PSI-SF for Parental Distress, Par-

ent-Child Dysfunctional Interaction, Difficult Child, and total score were obtained as follow-

ing: 0.88, 0.88, 0.89, 0.95, indicating the PSI-SF had very good to excellent internal consis-

tency (Reitman, Currier, & Stickle, 2002).

Parental Mental Health

The Chinese Health Questionnaire (CHQ) (Cheng & Williams, 1986) is

self-administered screening instrument used to identify non-psychotic psychiatric disorders in

community settings. The CHQ contains 60 items: the 30-item General Health Questionnaire

(GHQ) (Goldberg, 1972) (with two-stage translation) and 30 newly designed items taking ac-

count of the socio-culture characteristics of the Chinese and their ways of expressing psycho-

logical difficulties (Cheng & Williams, 1986). In the study, we used the CHQ-30 developed

by Cheng & Williams (1986) for the assessment of parents' mental health problems. The

Cronbach's alpha coefficient of CHQ-30 was 0.90 (Cheng, Wu, Chong, & Williams, 1990).

The sensitivity and specificity of CHQ-30 were 76% and 77% respectively (Chong & Wil-

kinson, 1989). Questionnaire was scored using the General Health Questionnaire method of

0-0-1-1. Four factors extracted from the CHQ-30 included somatic symptoms, anxiety and

worrying, social dysfunction, and depression and poor family relationship (Cheng et al., 1990).

Mental health status was dichotomized by an optimum cutoff point of 9/10 based on Receiver

Operating Characteristic curves. Individuals scored nine or above were more likely to have

mental health problems (Chong & Wilkinson, 1989).

Procedure

Parents of children with ASD in developmental centers, pediatric rehabilitation clinics and child psychiatric department of general hospitals were invited to participate in the study. The child with informed parental consent received one-to-one assessment using the PEP-3 by one researcher in a quiet room, and at the same time, another researcher rated the child using the CARS. Meanwhile, the parent was interviewed by the third researcher using the VABS. It took 1 to 1.5 hours to complete the assessment. Afterwards, a package of questionnaires including a demographic information questionnaire, the CBCL, the PSI-SF, and the CHQ was given to parents to take home. The questionnaires were returned in two weeks.

Statistical analysis

Statistical analyses were performed using the SPSS 15.0 (SPSS Inc., Chicago, IL, U.S.A.) and SAS 9.1.3 (SAS Inc., Cary, NC, U.S.A.) software. Two-sided $p \leqq 0.05$ was considered statistically significant. Univariate analysis was conducted using descriptive statistical methods to characterize the basic properties of the observed variables. Pearson Product Moment Correlation analysis was performed for the CBCL Externalizing Problems, the Internalizing Problems composite scores, and subject characteristics (including age, sex, cognitive functioning, expressive language, severity of autistic symptoms, and adaptive behavior) and parent-related factors (parenting stress and parental mental health). In multivariate analysis, multiple linear

regression models were fitted to identify the important predictors of behavioral and emotional

problems as measured by the CBCL/1.5-5 in children with ASD. Specifically, we conducted

two multiple linear regression models using the CBCL/1.5-5 Externalizing Problems and the

CBCL/1.5-5 Internalizing Problems as dependent variables respectively. The independent va-

riables considered in the variable selection procedure included all variables in "Measures".

The goal of regression analysis was to find one or a few parsimonious regression models

that fitted the observed data well for outcome prediction or effect estimation. To ensure the

quality results, basic model-fitting techniques for (1) variable selection, (2) goodness-of-fit

(GOF) assessment, and (3) regression diagnostic were used in our regression analyses. Spe-

cifically, the stepwise variable selection procedure (with iterations between the forward and

backward steps) was applied to obtain the candidate final egression 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. Then, with the

aid of substantive knowledge, the best final regression model was identified manually by re-

ducing the significance levels to 0.05 corresponding to the chosen α level. Any discrepancy

between the results of univariate analysis and multivariate analysis was likely due to the con-

founding effects of the uncontrolled covariates in the univariate analysis. The goodness-of-fit

(GOF) measure, R^2, was used to assess the adequacy of the fitted final model. And genera-

lized additive models (GAM) were applied to detect nonlinear effects of continuous cova-

riates if necessary. Lastly, the statistical tools for regression diagnostics such as residual anal-

ysis, detection of influential cases, and check for multicollinearity were used to discover

model or data problems.

Results

Demographic & Behavioral characteristics

The results of the univariate analyses were listed in Tables 3, 4 and 5. Table 5 displays

the mean *T*-scores of each behavioral syndrome derived from the CBCL/1.5-5, and the mean

T-scores of the Withdrawal subscale and the Internalizing Problems were in the clinical range

($\geqq 70$ and $\geqq 63$ respectively). Figure 1 displays the percentage of young children with ASD

rated by their parents to have Clinically Significant CBCL/1.5-5 composite or syndrome scale

score. For the CBCL/1.5-5 composite scores, 52.83% of children with ASD had Clinically

Significant Internalizing Problems and 33.96% had Clinically Significant Externalizing Prob-

lems. About one-half (45.28%) of children with ASD had a Total Problems score in the Clini-

cally Significant range. There were 3 syndrome scales with the highest percentage of children

with ASD scored in the clinically significant range, i.e., Withdrawn (84.91%), Emotionally

reactive (28.30%) and Anxious/depressed (22.64%). Figure 2 displays the percentage of par-

ents of children with ASD scored above the cut-off points on the PSI-SF and the CHQ-30.

The results indicated that 25% and 32% of parents of children with ASD experienced a high

level of parenting stress and mental health problems respectively.

Correlation Analyses

As shown in Table 6, the CBCL Externalizing Problems composite score was signifi-

cantly positively correlated with parenting stress and parental mental health. There was no

significant correlation between the CBCL Externalizing Problems composite score and age, gender, cognitive functioning, expressive language, severity of autistic symptoms, or adaptive behavior. The CBCL Internalizing Problems composite score was significantly positively correlated with severity of autistic symptoms, parenting stress and parental mental health and significantly negatively correlated with expressive language and adaptive behavior. There was no significant correlation between the CBCL Internalizing Problems composite score and age, gender, or cognitive functioning.

Regression Analyses

Correlates of externalizing problems

As shown in Table 7, multiple linear regression analysis revealed that parenting stress, parental mental health, birth order, and receiving occupational therapy service were significantly associated with externalizing problems ($p < 0.05$). Specifically, after controlling the effects of the other covariates in the model, the children whose parents had higher scores on parenting stress or mental health problems would have severer externalizing problems, but the children with younger birth order or receiving occupational therapy service would have milder externalizing problems.

Correlates of internalizing problems

Multiple linear regression analysis revealed that parenting stress, parental mental health, and birth order were significantly associated with the internalizing problems ($p<0.05$) (Table

8). Specifically, after controlling the effects of the other covariates in the model, the children whose parents had higher scores on parenting stress or parental mental health problems would have severer internalizing problems, but the child with younger birth order would have milder internalizing problems.

Discussion

In our study, we examined the prevalence of parent-rated Clinically Significant behavioral and emotional problems in preschool children with ASD. About one-half of preschool children with ASD had a CBCL/1.5-5 Total Problems score in the Clinically Significant range, indicating a relatively high level of behavioral and emotional problems. 84.1% of preschool children with ASD exhibited a Clinically Significant level of withdrawn behavior. The impairment in social relatedness is a core feature of ASD, and thus it was not surprising that the majority of children with ASD were reported to have difficulty in social play with peers. A similar prevalence of withdrawn behavior had been reported for younger children with autistic disorder (AD) (Hartley et al., 2008). Clinically Significant levels of emotionally reactive were reported by parents for 28.3% of preschool children with ASD. Compared with Hartley et al. (2008) which showed that 18.2 % of younger children with AD had a Clinically Significant emotionally reactive score, our study indicated more preschool children with ASD had Clinically Significant levels of emotionally reactive. The reason for the discrepancy may be sample differences. The sample in Hartley et al. (2008) was with autistic disorder, however, our study also recruited children with high functioning PDD, including Asperger disorder, high-functioning autism and PDD-NOS. According to Myles, Hagiwara, Dunn, Rinner, & Reese (2004) which investigated sensory issues in children with Asperger syndrome (AS) and autistic disorder they found that children with AS performed more poorly in Emotional/ So-

cial Response (items in this section indicated the child's psychological coping strategies, e.g. has fears that interfere with daily routine) than children with autistic disorder. The possible interpretation of the finding of Myles et al. (2004) was that children with AS (or high-functioning autism) had higher awareness of their own behavior and greater interaction and language capacity than children with autistic disorder. Thus they had more opportunities to participate in social interactions and might therefore encounter more challenges in socio-emotional expressions. And it was possible that children with AS (or high-functioning autism) expressed their emotional response in ways such as rage, tantrums at a higher rate than children with autistic disorder (Myles et al., 2004). In addition, 22.64% of preschool children with ASD had Clinically Significant levels of anxious/depression, and the finding was similar to Kim, Szatmari, Bryson, Streiner, & Wilson (2000) which found that high-functioning PDD children (mean age= 12 years old) were at greater risk for mood and anxiety problems than the general population. Overall, our study indicated that preschool children with ASD showed more internalizing problems than Hartley et al. (2008). Thus, in early intervention, assessment of internalizing problems in preschool children with ASD should also be addressed. As for parenting stress and parental mental health problems, our study showed that relatively high percentage of parents of children with ASD experienced clinically significant range of parenting stress (25%) and mental health problems (32%). The outcome was consistent with previous studies which indicated that parents of children with

ASD were at elevated high risk for high stress (Eisenhower et al., 2005) and showed high levels of potential mental health problems (Hastings & Brown, 2002; Herring et al., 2006). Thus follow-up evaluation and/or referral should be planned.

Several subject characteristic and parent related correlates of behavioral and emotional problems in preschoolers with ASD were identified in the present study. The strongest predictors of externalizing problems were birth order, therapeutic service (occupational therapy), parenting stress, and parental mental health problems, whereas the strongest predictors of internalizing problems were birth order, parenting stress, and parental mental health. The present study lends support to the hypothesis that when parents had higher parenting stress or more mental health problems, children with ASD demonstrated severer behavioral and emotional problems. The findings were consistent with previous studies investigating the associations between parental mental health or parenting stress and behavioral problems in children with ASD (Herring et al., 2006; Osborne & Reed, 2009). However, our findings were different from Hartley et al. (2006) which found that the non-verbal cognitive ability and adaptive behavior were the strongest predictors for externalizing and internalizing problems respectively. Explanation for the discrepancy could be that Hartley et al. (2006) only investigated subject characteristic correlates, namely, age, sex, ethnicity, cognitive functioning, expressive language and adaptive behavior. Other variables such as early intervention services and parent-related factors were not taken into account. In our study, not only subject characteristics

but also environmental factors such as parent-related factors were taken into account. After controlling for the effects of the other covariates, parenting stress and parental mental health were significantly associated with the severity of the child's behavioral and emotional problems, over and above the impact of the cognitive functioning, adaptive behavior, expressive language, and severity of autistic symptoms.

From previous longitudinal studies (Herring et al., 2006; Osborne & Reed, 2009), we can infer that the impacts of behavioral/emotional problems in children with ASD on parental mental health/ parenting stress could be viewed as bidirectional based on results of longitudinal regression. The parent-child dyad is likely to include cyclical patterns of behavioral influence in which the child's difficult behavior affects the parents' psychological status, which in turn affects the manner in which the parents interacts with their child (Hessl et al., 2001). According to Gau et al. (2010), parental interaction with autistic children was in a less affectionate/ caring and more overprotective/controlling way which could be explained by parental psychological distress. Furthermore, it is possible that the behavior of children with ASD had an impact on the quality of the interaction by affecting the level of stress of parents and financial resources for the home, and so on (Hessl, et al., 2001).

Birth order was a risk factor for externalizing as well as internalizing problems in this study. The children with younger birth order demonstrated milder behavioral and emotional problems. This result was interesting for birth order had been reported as a potentially impor-

tant variable associated with physical and cognitive differences between siblings and differential access to parental resources during childhood (Courtiol, Raymond, & Faurie, 2009), which may in turn influence behavioral styles of children and parental attitude toward to their children. With respect to the impact of birth order on the sibling relationships, the older siblings usually acted as a mentor when interacting or playing with the younger siblings (Vandell, Minnett, & Santrock, 1987). Interactions with one's siblings provide opportunities for experiencing and expressing many emotions, as well as for the practice, and perhaps mastery, of skills such as self-control, sharing, listening, conflict resolution, and fair play (Gibbs, 1993). For preschool children, their siblings may play an important role in their learning and development before they enter school. Especially for children with ASD who have difficulties establishing peer relationships, their older siblings provide extra important supports for they may have more knowledge of how to interact with children with ASD or use a problems-focused coping strategy when engaging with their siblings with ASD (Orsmond, Kuo, & Seltzer, 2009; Roeyers & Mycke, 1995). On the other hand, child's birth order may impact parental attitude towards to the child. For example, parents tended to cater to the youngest child's every need or to become so permissive that they had high tolerance of their child's behavioral and emotional problems (Sulloway, 1996). Another possible explanation is that parents who had experiences of raising children may develop coping strategies for responding to the younger child's needs or demanding behaviors.

Occupational therapy was significantly and negatively associated with externalizing problems (attention and aggression). The result was not surprising because the scope of occupational therapy practice included managing the clients' behavioral and emotional problems in order to promote their better participation in meaningful and purposeful everyday life activities (Tomchek & Case-Smith, 2009). Thus compared with speech therapy or other therapeutic services, occupational therapy is more significantly negatively associated with externalizing problems in children with ASD.

The third hypothesis in our study was that the severity of internalizing problems increased with age. However, the findings in the present study didn't support the hypothesis. Age was not significantly associated with internalizing problems. The result was inconsistent with that of Hartley et al. (2008). The discrepancy may be due to the fact that the participants in our study were older (mean age: 4 years 3 months) than those of Hartley et al. (2008) (mean age: 3 years 6 months). Eisenhower et al. (2005) found that the frequency of occurrence of CBCL/1.5-5 total behavioral problems was highest in the autism group in ages 3 and 4 compared to other groups(cerebral palsy, developmental delay, Down syndrome, and typically developing children), and a significant decrease was noted from ages 4 to 5 in externalizing problems and total behavioral problems. Moreover, the study of Hartley et al. (2008) and the present study are cross-sectional studies, thus the relationship between age and internalizing problem deserves further longitudinal study.

Conclusion

This is the first study investigating both the personal and environmental risk factors for behavioral and emotional problems in preschool children with ASD. Our study found that when parents with higher parenting stress or more mental health problems, their children with ASD would have severer externalizing and internalizing problems. Children with ASD with younger birth order or receiving occupational therapy service would have milder externalizing problems, and children with ASD with younger birth order would have milder internalizing problems. Findings from this study highlighted that the impacts of behavioral and emotional problems in children with ASD on parenting stress and parental mental health could be bidirectional based on results of the longitudinal regression. To avoid the vicious circle, we should not only address the behavioral and emotional problems in children with ASD but also provide parents with children with ASD with parenting strategies to reduce their stress. Moreover, psychosocial supports for parents should also be provided, e.g. parent support groups, to serve as an access to exchanging information or relieving stress. Besides, occupation therapy was significantlly and negatively associated with the behavioral problems in young children with ASD. However, the descriptive research design of the study does not make it possible to examine causal relationships between variables. Experimental studies are needed to examine the causal link between OT service and the decrease in behavioral problems. Additionally, birth order as a correlate of behavioral and emotional problems gave us implications about the im-

portance of social interaction or the support of siblings and parents' experience in raising children upon behavioral and emotional problems in preschool children with ASD.

This study had several limitations. First, we adopted a convenience sample from the hospitals and developmental centers in the Greater Taipei area, so that the findings in the present study may not be able to generalize to preschool children with ASD in other areas of Taiwan. Second, cross-sectional data provided some understanding of the risk factors for behavioral and emotional problems in children with ASD, but longitudinal measures would provide more robust conclusions. Third, although we included the parent related risk factors in our study in addition to subject characteristic factors, further research is needed to identify additional risk factors for behavioral and emotional problems in preschool children with ASD as the risk factors included in our study accounted for only 54 to 57% of variance. Factors such as sensory processing function, temperament, parenting styles, or home environment which may be associated with the behavioral and emotional problems in preschool children with ASD deserve further studies.

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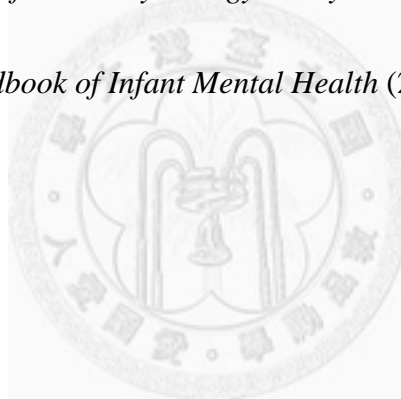
Table 1. The risk factors for behavioral problems in children with intellectual disabilities (including ASD)

(The format refers to McClintock et al., 2003)

Author(s)	Measures/ behaviors investigating	Risk factors (risk markers)	Type of study	Method of data collection	Study sample
Chadwick et al. (2000) Factors affecting the risk of behaviour problems in children with severe intellectual disability	**(1) Disability Assessment Schedule (DAS): `behavior problems' section /** **(2) Aberrant Behaviour Checklist (ABC) /** Aggressive and destructive behaviors, overactivity, attention-seeking behaviors, self-injuries, wandering/running away, screaming, temper tantrums, sleep problems, difficult or objectionable personal habits, and scattering or throwing objects, irritability, lethargy/social withdrawal, stereotypies, hyperactivity, inappropriate speech	1. mobility 2. age 3. sex 4. sensory disabilities and epilepsy 5. socio-economic disadvantage 6. aetiological condition or syndromes 7. level of functioning/skills	Prevalence/survey	a. Questionnaires b. Interview	114 children with severe intellectual disability aged 4-11 years

Table 1. The risk factors for behavioral problems in children with intellectual disabilities (including ASD) (cont.)

Author(s) & Title	Measures/ behaviors investigating	Risk factors (risk markers)	Type of study	Method of data collection	Study sample
McClintock et al. (2003) Risk markers associated with challenging behaviours in people with intellectual disabilities: a meta-analytic study	self-injurious behavior, stereotyped behavior, aggression, and destructive behavior	1. gender 2. degree of ID 3. diagnosis of autism 4. expressiv1e and receptive communicative ability	Review articles (meta-analytic)	(from original articles) a. Questionnaires b. Observations c. Interview d. Review of case notes/databases e. Administration of published assessments	Individual with ID (autistic disorder, developmental disabled, schizophrenic)
Baghdadli et al. (2003) Risk factors for self-injurious behaviours among 222 young children with autistic disorders	Self-injurious behaviors (SIBs)	1. chronological age 2. sex 3. adaptive skills 4. speech level 5. associated medical condition (epilepsy, perinatal condition, genetic syndrome) 6. degree of autism 7. parental social class	Prevalence/cohort	a. questionnaires b. interview c. review of medical records d. administration of standardized tests	222 children with autistic disorders aged under 7 years

Table 1. The risk factors for behavioral problems in children with intellectual disabilities (including ASD) (cont.)

Author(s) & Title	Measures/ behaviors investigating	Risk factors (risk markers)	Type of study	Method of data collection	Study sample
Murphy et al. (2005) Chronicity of challenging behaviours in people with severe intellectual disabilities and/or autism: a total population sample	**Handicaps, Behaviours and Skills (HBS) schedule /** Abnormal response to sounds, abnormal response to visual stimuli, abnormal proximal sensory stimulation, abnormal bodily movements, routines and resistance to change, behavior problems with limited social awareness, behavior problems with social awareness, and sleeping problems	1. age 2. gender 3. IQ 4. diagnosis 5. comprehension of speech 6. expressive language 7. quality of social interaction	Longitudinal study/cohort	a. Interview b. Administration of psychometric tests	166 children with severe intellectual disabilities aged 2.2 –8.1 years
Holden & Gitlesen (2006) A total population study of challenging behaviour in the county of Hedmark, Norway: Prevalence, and risk markers	**Challenging behaviour survey: Individual schedule /** Attacking others, self-injurious behavior, destructive behavior, and other difficult disruptive or socially unacceptable behavior	1. gender 2. age 3. level of mental retardation 4. diagnosed with autism 5. syndromes 6. residence 7. other characteristics (epilepsy, vision, or mobility)	Prevalence/survey	a. Questionnaires	826 participants with mental retardation (90 aged 0-9 years; 53 diagnosed with autism)

Table 1. The risk factors for behavioral problems in children with intellectual disabilities (including ASD) (cont.)

Author(s) & Title	Measures/ behaviors investigating	Risk factors (risk marker)	Type of study	Method of data collection	Study sample
Hartley et al. (2008) Prevalence and risk factors of maladaptive behaviour in young children with Autistic Disorder	**Child Behavior Checklist (CBCL/1.5-5)** / Emotionally reactive, anxiety/depressed, somatic complaints, withdrawal, aggression, attention, and sleep problems	1. gender 2. age 3. ethnicity 4. non-verbal cognitive functioning 5. expressive language 6. severity of autistic behaviours 7. adaptive behavior	Prevalence/survey	a. Questionnaires b. Interview with parents a. Formal assessment (cognitive, language, severity of autistic behaviours) by professionals	169 children with AD (1.5-5.8 years)
Murphy et al. (2009) Risk factors for challenging behaviors among 157 children with autism spectrum disorder in Ireland	Self-injurious behavior, stereotypic behavior, and aggressive/destructive behavior	1. gender 2. age 3. level of intellectual disability 4. type of intervention 5. the hours of intervention received per week	Prevalence/survey	a. Questionnaires c.	157 children with ASD aged 3 to 14.2 years

Table 2. The risk factors for behavioral problems

Categorization	The associations between risk factors and behavioral problems	Summary
Biological factors & subject characteristics factors	Results emerging from different studies	
Age	▪ Younger children tended to show somewhat more behavioral problems than older children (Baghdadli et al., 2003; Chadwick et al., 2000; Holden & Gitlesen, 2006; Murphy et al., 2005). ▪ Age was significantly positively correlated with the CBCL Somatic Complaints and withdrawal syndrome scales (Hartley et al., 2008). ▪ No correlation between age and the presence of challenging behavior (Murphy et al., 2009).	More studies indicated that age was negatively correlated to behavioral problems. However, Hartley et al. found that age was positively correlated to CBCL internalizing syndrome.
Gender	▪ Males were significantly more likely to show aggression than females (McClintock et al., 2003); boys with AD had significant higher scores than girls in CBCL Somatic Complaints and Withdrawal syndrome scales (Hartley et al., 2008). ▪ There were no significant differences on any of the behavioral measures between boys and girls (Baghdadli et al. 2003; Chadwick et al., 2000; Holden & Gitlesen, 2006; Murphy et al., 2005; Murphy et al., 2009).	There were some studies which found that gender was significantly related to specific behavioral problems, while other studies indicated that gender was not a significant risk factors for behavioral problems. Hence, it still requires further studies.
Mobility	▪ Children who were ambulant showed a significantly greater number of severe behaviour problems on the DAS than children who were non-ambulant (such as overactivity, wandering/running away, destructive behavior, scattering/throwing objects, temper tantrums and attention-seeking behavior) (Chadwick et al., 2000). ▪ No significant associations were found between mobility and challenging behavior (Holden & Gitlesen, 2006).	The samples in the two studies considering mobility as the risk factor were individuals with mental retardation. However, mobility may not be a main risk factors for behavioral problems in ASD.

Table 2. The risk factors for behavioral problems (cont.)

Categorization	The associations between risk factors and behavioral problems	Summary
Biological factors & subject characteristics factors	Results emerging from different studies	
Epilepsy	▪ No significant associations was found between epilepsy and challenging behavior (Baghdadli et al. 2003; Holden & Gitlesen, 2006).	The studies showed that epilepsy was not a significant risk factor for behavioral problems in people with mental retardation (including ASD).
Sensory disabilities	▪ Impaired hearing was associated with challenging behavior (Holden & Gitlesen, 2006).	There is still a dearth of studies investigating the relationship between sensory disabilities and behavioral problems. Furthermore, depending on different behavior problems, the impact of sensory function may be discrepant.
	▪ There were no significant differences on any of the behavioral measures between children with poor hearing and those with normal hearing (Chadwick et al., 2000). ▪ No significant associations were found between vision and challenging behavior (Holden & Gitlesen, 2006).	
Aetiological condition or syndromes	▪ Teachers rated children with autism as showing somewhat more severe behavioral problems (especially in "lethargy/social withdrawal") than the group of children with no identified condition (Chadwick et al., 2000). ▪ Individuals with a diagnosis with autism were significantly more likely to show self-injury, aggression, and disruption to the environment (McClintock et al., 2003). ▪ Abnormal behavior at time 2 (12 years later) was predicted by a diagnosis of autism/ autistic continuum at time 1(Murphy et al., 2005). ▪ Challenging behavior occurred far more frequently among people with than without autism (Holden & Gitlesen, 2006).	The studies supported that ASD had more behavioral problems compared with other aetiological condition or syndrome.
Level of functioning/skills (adaptive behaviors)	▪ Limitations in daily living skills were predictors of behavioral problems (Chadwick et al., 2000). ▪ Daily living skill was a significant risk factor for SIBs (Baghdadli et al., 2003). ▪ Adaptive behavior emerged as the strongest predictor for the CBCL Internalizing Problems (Hartley et al., 2008)	The emerging evidences showed that adaptive functioning were predictors for behavioral problems.

Table 2. The risk factors for behavioral problems (cont.)

Categorization	The associations between risk factors and behavioral problems	Summary
Biological factors & subject characteristics factors	Results emerging from different studies	
Degree of intellectual disability (ID) (cognitive functioning)	▪ Individuals with a severe/profound ID were significantly more likely to show self-injury and stereotypy than individuals with a mild/moderate degree of ID (McClintock et al., 2003). ▪ Better cognitive skill (IQ) was associated with lower levels of abnormal behavior (Murphy et al., 2005). ▪ Challenging behavior increased with severity of mental retardaton (Holden & Gitlesen, 2006). ▪ There was no significant correlation between level of intellectual disability and aggression and stereotyped behaviors (excepted for self-injurious behavior) (Murphy et al., 2009).	The most studies indicated that lower levels of cognitive functioning were significantly correlated with more behavioral problems (mainly challenging behaviors)
Speech level, comprehensive & expressive language	▪ Individuals with deficits in receptive and expressive communication were significantly more likely to show self-injury (McClintock et al., 2003). ▪ Better language skills were associated with lower levels of abnormal behavior (Murphy et al., 2005). ▪ The CBCL Externalizing Problems composite score was significantly negatively correlated with expressive language (Hartley et al., 2008). ▪ The communication skills were not a significant risk factor for self-injurious behaviors in comparison with chronological age, daily liing skills, degree of autism, and perinatal condition (Chadwick et al., 2000). ▪ Speech delay and communication were not significant risk factors for SIBs (Baghdadli et al., 2003).	The results of speech (language) level as the risk factor for the behavioral problems (mainly SIBs) were still in discrepancies.
Perinatal condition	▪ Associated perinatal condition was a significant risk factor for SIBs (Baghdadli et al., 2003).	
Degree of autism	▪ Degree of autism (rated by CARS) was a significant risk factor for SIBs (Baghdadli et al., 2003). ▪ There was not a significant correlation between severity of autistic behaviors (rated by ADOS-G) and CBCL Externalizing and Internalizing problems composite scores (Hartley et al., 2008).	
Quality of social interaction	▪ Abnormal behaviors tended to correlate highly to quality of social interaction (Murphy et al., 2005).	

Table 2. The risk factors for behavioral problems (cont.)

Categorization	The associations between risk factors and behavioral problems	Summary
Environmental factors	Results emerging from different studies	
Socio-economic disadvantage (parental social class)	▪ There were few associations between various indices of socio-economic disadvantage, such as large sibship size, lone parenthood, house tenure, overwhelming etc (Chadwick et al., 2000).	
	▪ There were no significant differences between children with SIB and without SIB in parental social class (Baghdadli et al., 2003).	
Parental stress	▪ Child emotional and behavioral problems contributed significantly to mother stress (Herring et al., 2006).	
Family functioning	▪ Child emotional and behavioral problems contributed significantly to perceived family dysfunction (Herring et al., 2006).	
Parental mental health	▪ Child emotional and behavioral problems contributed significantly to parent mental health problems (Herring et al., 2006).	

Table 3. Personal (Subject) characteristics of participants (n=53)

Variables	ASD
Age (months)	
Mean (SD)	53.51 (8.59)
Range	36-70
Gender	
Male	49 (92.45%)
Female	4 (7.55%)
Birth order	
1 (eldest)	37 (69.8%)
2	13 (24.5%)
3	2 (3.8%)
4 (youngest)	1 (1.9%)
On medication	
Yes	2 (3.8%)
No	51 (96.2%)
CARS　(Total scores)	
Mean (SD)	30.21(7.92)
VABS　(Standard scores)	
Mean (SD)	74.32 (17.44)
CPEP-3 (Standard scores)	
CVP (Mean, SD)	12.40 (3.49)
EL　(Mean, SD)	12.00 (3.72)

CARS, Childhood Autism Rating Scale; VABS, Vineland Adaptive Behavior Scales; CPEP-3, Chinese Psychoeducational Profile- Third Edition; CVP, Cognitive Verbal/Preverbal; EL, Expressive Language.

Table 4. Descriptive statistics of environmental factors

Variables	
Parenting stress	
Mean (SD)	99.68 (19.14)
Parental mental health	
Mean (SD)	6.83 (7.70)
No. child	
Mean (SD)	1.8 (0.7)
Range	1-4
Hour(s) of early intervention/per week	
Mean (SD)	6.40 (9.49)
Range	0-39.5
Father's age (years)	
Mean (SD)	38.52 (4.92)
Range	27-53
Mother's age (years)	
Mean (SD)	35.21 (4.34)
Range	24-44
Mother's educational level	
Senior high or lower	13 (24.5%)
College or higher	40 (75.5%)
Mother's employment	
Employed	26 (49.1%)
Unemployed	27 (50.9%)
Socioeconomic status	
1 (highest)	28 (53.8%)
2	14 (26.9%)
3 (lowest)	10 (19.2%)
Type of early intervention services	
Occupational Therapy	45 (84.9%)
Speech Therapy	38 (71.7%)
Others	33 (62.3%)
Type of educational settings	
Regular class	25 (47.2%)
Inclusive class	3 (5.7%)
Others (Daycare/developmental center)	25 (47.2%)

Table 5. Behavioral and emotional problems (n=53)

CBCL: T score	Mean±SD
Emotionally reactive	61.13±15.37
Anxious/depressed	57.74±12.47
Somatic complaints	52.24±10.71
Withdrawal	83.80±17.98
Sleep problems	55.08±12.08
Attention	63.26± 9.82
Aggression	55.65±12.03
Internalizing problems	66.77±13.72
Externalizing problems	57.97±11.40

Table 6. Correlation matrix (Pearson correlation coefficients) of the CBCL/1.5-5 composite and syndrome scale scores, subject characteristics and parent-related factors in children with ASD (n=53)

	Age	Gender	Cognitive Functioning	Expressive Language	Severity of Autistic Symptoms	Adaptive Behavior	Parenting Stress	Parental Mental Health Problems
CBCL/1.5-5								
Externalizing Problems	0.18	-0.13	-0.13	-0.21	0.13	-0.20	**0.55**[**]	**0.48**[**]
Attention problems	0.06	0.08	-0.26	**-0.30**[*]	0.24	**-0.28**[*]	**0.36**[**]	**0.49**[**]
Aggressive behavior	0.19	-0.04	-0.08	-0.17	0.09	-0.16	**0.54**[**]	**0.79**[**]
Internalizing Problems	0.09	0.07	-0.24	**-0.30**[*]	**0.30**[*]	**-0.36**[**]	**0.64**[**]	**0.53**[**]
Emotionally reactive	0.13	-0.34	-0.13	-0.21	0.20	-0.18	**0.61**[**]	**0.52**[**]
Anxious/Depressed	-0.02	-0.08	-0.22	-0.26	0.15	-0.26	**0.35**[**]	**0.49**[**]
Somatic complaints	0.01	0.14	0.04	0.00	0.04	0.01	**0.31**[*]	**0.46**[**]
Withdrawal	0.02	0.26	**-0.33**[*]	**-0.36**[**]	**0.49**[**]	**-0.38**[**]	**0.57**[**]	**0.35**[*]
Sleep problems	-0.03	-0.17	-0.03	-0.06	0.03	-0.16	**0.34**[*]	**0.71**[**]

Note. CBCL/1.5-5=Child Behavior Checklist for Age 1.5-5

*Correlation is significant at the .05 level (two-tailed).

**Correlation is significant at the .01 level (two-tailed).

Table 7. Multiple linear regression analyses of the risk factors associated with Externalizing Problems

Covariate	Parameter Estimate	Standard Error	t Value	Pr > $|t|$	Variance Inflation
Intercept	46.07	6.76	6.82	<.0001	–
Parenting stress	0.29	0.08	3.66	0.0006	1.32
Parental mental health	0.53	0.17	3.10	0.0033	1.40
Birth order	-4.26	1.76	-2.42	0.0193	1.07
Occupational therapy	-10.33	3.11	-3.32	0.0017	1.01

Multiple linear regression model: $n = 53$, $R^2 = 0.5380$

Table 8. Multiple linear regression analyses of the risk factors associated with Internalizing Problems

Covariate	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variance Inflation
Intercept	38.73	7.34	5.28	<.0001	–
Parenting stress	0.37	0.09	4.04	0.0002	1.32
Parental mental health	0.80	0.20	4.03	0.0002	1.39
Birth order	-4.71	2.02	-2.33	0.0240	1.06

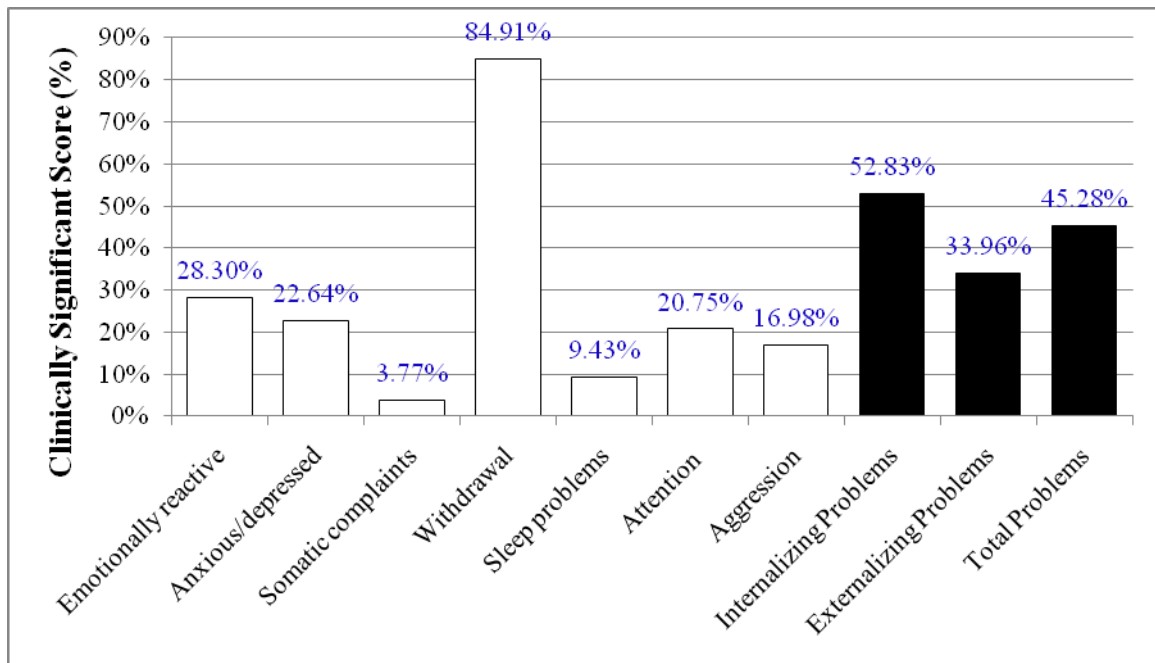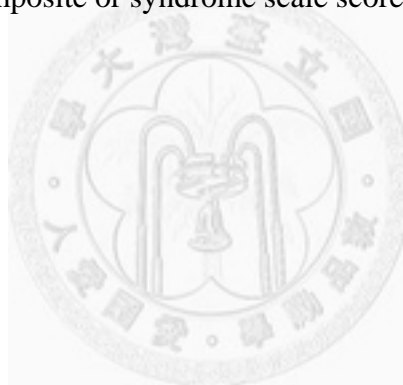Multiple linear regression model: $n = 53$, $R^2 = 0.5682$.

Figure 1. Percentage of children with autism spectrum disorder with a Clinical Significant Child Behavior Checklist composite or syndrome scale score
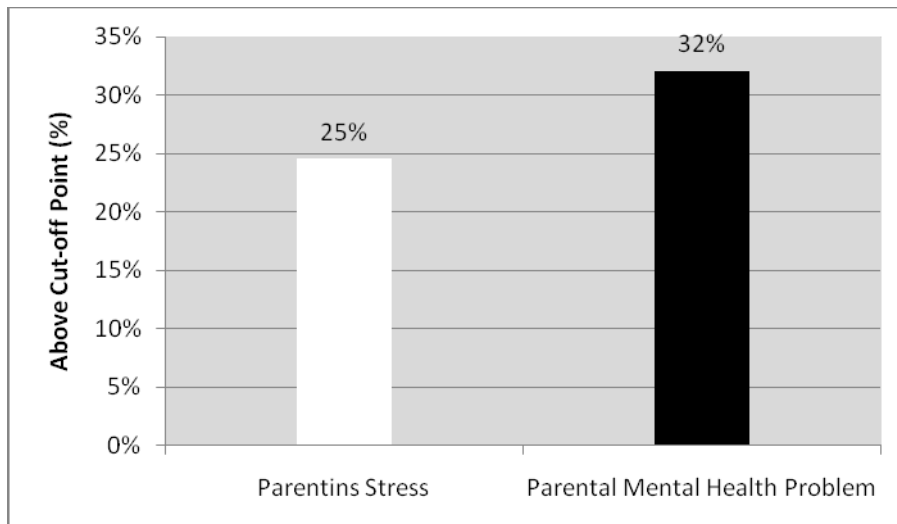
Figure 2. Percentage of parents of children with ASD scored above the cut-off points on the PSI-SF and the CHQ-30

Note: PSI-SF=Parenting Stress Index-Short Form; CHQ-30=Chinese Health Questionnaire (30-item version)