STUDY OF A PARENT-COMPLETED DEVELOPMENTAL SCREENING INVENTORY

by

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Many research studies in early childhood assessment have addressed the importance of quality assessment services. Such services involve gathering information on children through direct observation of functional skills in natural settings, which requires considerable time and effort. Due to the unavailability of sufficient resources for the quality assessment services, a new approach needs to be undertaken.

Current research has suggested that parent-completed screening utilizing parental knowledge about their child is valid and reliable in appraising current and observable behaviors (Bodnarchuk & Eaton, 2004; O'Neill, 2007). There has been, however, little investigation on in-depth standardized assessments completed by parents for young children aged 18 to 36 months. This study examined validity and reliability of in-depth

parental report on child development with the Ages and Stages Questionnaire Inventory for Toddlers (ASQ-IT) for children aged 18-36 moths old.

Fifty child-caregiver dyads were divided into two groups, non-risk and risk based on environmental factors including maternal age at the child's birth, family income, and maternal education. In examining psychometric information of the parent-completed measure, acceptable outcomes were found. Accuracy was supported by two examinations for concurrent validity; (1) the Battelle Developmental Inventory, 2nd Edition (BDI-2) administered by professionals and the ASQ-IT completed by parents ($r = .63$ - $.83, p < .01$), and (2) the same two measures completed by professionals ($r = .72$ - $.92, p < .01$). Findings of both reliability studies, test-retest reliability with the ASQ-IT completed by parents, and inter-observer reliability between parents and professionals, suggested substantial consistency, $\rho = .79$ - $.93$ and $\rho = .65$ - $.88$ respectively. In differential item functioning (DIF) (i.e., 3% of DIF items) and known-group validity analyses ($p < .0005$ at 36 months), the ability of the ASQ-IT to detect changes in the children's development was confirmed. Results from the social validity examining parent perception of the ASQ-IT completion identified efficiency of the ASQ-IT (e.g., reasonable time to complete) as well as many benefits.

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I dedicate this dissertation to my husband.
His love, dedication, and insight
enabled me to succeed.

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CHAPTER I

INTRODUCTION

Learning Experience During Early Years of Life

Early intervention (EI) and early childhood special education (ECSE) have evolved to serve a growing number of young children with disabilities or developmental delays and their families. Since the enactment of the Education of the Handicapped Act and its amendments (Public Law 94-142 in 1975 and Public Law 99-457 in 1986), intervention services have been ensured for young children with special needs (Gilliam, Meisels, & Mayes, 2005; Guralnick, 2005). For the last three decades, EI and ECSE services have focused on diminishing the impact of these children's developmental difficulties and increasing positive changes in their developmental outcomes (Gilliam & Zigler, 2000; Guralnick, 2005; Smith, 2000; Yaillen & Blair, 2006; Yell & Strecker, 2003). Despite inconsistent reports regarding the effectiveness of EI and ECSE services, researchers and professionals in the early childhood field have agreed that enormous progress is possible for young children with special needs (Bowe, 2004; Guralnick, 2005; Hanson & Lynch, 2004).

According to Schonkoff and Phillips (2000), during the first few years of life, early brain functions can be maximized in response to experience. These functions, which include storing, using, and creating information, are completely related to numerous synapse connections between nerve cells. The number of connections naturally declines

as children approach adolescence. However, depending upon the presence or absence of experience, the synapse connections can be over-produced or lost, which cause an increase or loss in brain functions respectively. Additionally, any environmental stimuli at early ages are likely to have long-lasting effects on a child's brain development, behaviors, and learning.

In their recent report, *A Benefit Cost Study of a New Preschool Program Based on Neuroplasticity,* Yaillen and Blair (2006) noticed the effects of early learning practice. In this study, a follow-up study of the Chicago Child Parent Centers Project (CCPCP) for children in low income families beginning in 1967, they reported: (1) low rates of grade retention and special education placement, (2) reduced crime rates, (3) decreased numbers in child welfare recipients, and (4) increased income in the participants. This project included three intervention services at different ages: (a) a preschool group of 3-5 year-olds, (b) an extended preschool group of 4-6 year-olds, and (c) a school group of 7-9 year-olds. In the cost benefit analysis of the study conducted when the participants were 21 years of age, the intervention services for the youngest groups provided the highest benefit per dollar invested - $7.14 for the preschool group and $6.11 for the extended preschool program, compared with $1.66 for the school group. These figures specify that the younger children are when they receive intervention services, the more the effects of intervention are observed, particularly in social costs for individuals with special needs and in their later learning experiences.

Experiences at an early age are seen as critical in life. As developmental psychologists state, experiences are indispensable to brain growth and potential learning

capability. The follow-up study of the CCPCP also inferred that intervention experiences in the first few years of life can promise prolific and positive outcomes in future learning experiences (Yaillen & Blair, 2006). Accordingly, it is not surprising that intervention services offered at an early age can yield advantageous consequences.

Screening Services in Early Intervention/Early Childhood Special Education

In the Individuals with Disabilities Education Act (IDEA), screening is defined as a brief assessment designed to identify children who need further intensive diagnostic assessments, or those who are potentially eligible to receive EI and ECSE services (Bagnato, Neisworth, & Munson, 1997; Bowe, 2004; Guralnick, 2005; McLean, 2004). In accordance with this explanation, one main purpose for screening in early childhood settings is to identify, as early as is possible, young children who may be in need of specialized services (Bowe, 2004; Gularnick, 2004; McLean & Crais, 2004).

For early detection, much attention has been focused on screening and referral systems in the community, such as the Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program and the child-find systems which are designed to access young children at earlier ages (Bowe, 2004; Guralnick, 2005; Ratner & Silverman, 2000; Rescorla & Alley, 2001). Compared to school-age children, the assessment of infants and toddlers has been limited, due to their lack of exposure to public programs. For this reason, EPSDT, which serves children in poverty, is administered by community medical personnel. Child-find systems, which are implemented primarily by educational agencies, have recruited children through a variety of personnel who frequently encounter young children, such as social workers, public health nurses, and medical doctors (Dunkle &

Vismara, 2004; Kontos & Diamond, 2002; Reilly, Williams, & Cox, 1998). Such efforts at streamlining screening services have resulted to a certain degree in an increase in the number of children with developmental difficulties. Between the 1st of December in 1995 and the 1st of December in 2000, the number of infants and toddlers (birth to three years) who were under Part C of IDEA increased 40% (from 165,351 in 1994 to 230,853 in 2000) (http://www.nectac.org). Between 1992 and 2001, the rates of children served under IDEA expanded 44% for three-year-old children, 37.6% for four-year-old children, and 22.4% for five-year-old children.

Epidemiological reports for young children with disabilities, however, still reveal that child-find efforts are not locating all children in need of services. According to the 24th Annual Report to Congress, the prevalence rate of EI/ECSE services for children younger than school age was substantially lower than that for special education services for school-age children. Only 2.3% of infants and toddlers and about 5.6% of preschoolers received EI services, while about 12% of school-age children received special education services (http://www.nectac.org). Even considering that some disabilities, such as developmental delays, may not be noticeable at early ages, these figures (2.3% and 5.6%) imply that many children who are eligible for specialized services are underidentified and underserved. This implication is further supported by information about average ages at the first detection of disability. The average age at initial identification reported by parents of high school students in special education programs was 5.9 years (http://www.ed.gov). Significant numbers of the high school students (72%) were identified after five years of age, and around half of the children

detected (43%) were aged between seven and ten years. These figures clearly show that many young children with special needs missed opportunities to receive intervention services during the ages that EI/ECSE services were offered.

Although the number of children who receive EI/ECSE services has been increasing, the statistics in the 24th Annual Report connote a considerable need to increase early identification of young children. Enhancement of screening services is the most important factor that can assist in improved identification and early intervention.

Issues in Early Childhood Measurement

Several critical issues arise related to improvement in early childhood screening services. First, the lack of support of community professionals for the screening and referral systems has markedly decreased opportunities for children to be screened. According to Gilliam, Meisels, and Mayes (2005), only about 40% of children served by community medical personnel received screening services, and as many as 28 states failed to offer these screening and referral services at all. Dunkle and Vismara (2004) also reported that only 15% of pediatricians in the United States use screening tools, and about 70% of medical doctors screened children solely based upon their own clinical knowledge and experience. Additionally, in the child-find systems in each state, serious problems have occurred. In recent years, the decreased support of federal and state governments for education services has resulted in a severe lack of resources for child-find systems; consequently, a corresponding decline in the effective and collaborative functions in child-find systems has been observed (Guralnick, 2005; Kuncl, 2004; Smith, 2004; Solomon, 2004).

Another critical issue pertains to screening tools. Several screening instruments employ traditional norm-referenced assessments designed to estimate the skills of school-age children. Not only the questions and assessment materials, but also the test procedures themselves were developed for an older population; thus, assessment outcomes may be inaccurate and irrelevant where young children's skills are concerned (Brink, 2000; McLean & Crais, 2004). If children have delays or disabilities, conducting such traditional assessments may be challenging even for skilled professionals (Neisworth & Bagnato, 1996). In addition, it is uncertain how reliably the psychometric information of these instruments, which are aimed at predicting the skills of older children, can be applied to evaluate the young children's developmental issues (Meisels & Atkins-Burnett, 2000). Any decisions based on unreliable information acquired from such invalid screening tools may easily lead to identification errors (Guralnick, 2005; McLean & Crais, 2004).

A third measurement issue is related to young children. Many researchers identified four main factors that might commonly cause difficulties in assessing young children: (1) impulsivity and distractibility, (2) attention span, (3) caution toward strangers or isolated conditions, and (4) incoherent performance in different settings or with different individuals (Bagnato & Neisworth, 1999; Bowe, 2004; Fewell, 2000; Greenspan & Meisels, 1997; Hanson & Lynch, 2004; McLean & Crais, 2004; Meisels, 1997; Meisels & Atkins-Burnett, 2000; Popper, 1997). These features may become exaggerated in conventional screening tests which examine children in clinical settings, separated from their parents, and which follow rigid screening procedures that prohibit

the adaptation of assessment materials and activities according to their interests or conditions. Fewell (2000) emphasizes that only assessment tests which have been modified, depending upon the young children's diverse conditions, promise to obtain satisfying assessment outcomes.

A further issue is associated with cultural dissimilarities. As children's growth is often affected by their parents' cultural values and beliefs, children's cultural backgrounds should be taken into account (Banks, Santos, & Roof, 2003; Barrera, 1999, 2000). In standardized tests employing the same procedure or materials across various ethnic groups of children, children's lack of understanding of, or unfamiliarity with, the assessment procedure or materials may fail to show their genuine skills. In such tests, evaluation reports may be inaccurate and underestimate the skills or behaviors, which may yield biased perspectives on the children's development (Hampton, Whitney, & Schwartz, 2002; Hanson & Lynch, 2004; Santos, Fowler, Corso, & Bruns, 2000; Schuman, 2002).

Given the many issues which may potentially influence assessment, conducting screening tests of young children may be challenging. Particularly, in the conventional measurement model, it may be more difficult to specify young children's actual developmental levels. To address this problem, current legal mandates (PL 102-119, PL 105-17, and PL 108-446) and many research studies strongly promote parental involvement in the EI/ECSE assessment services (Brinks, 2002; Fewell, 2002; Hanson & Lynch; Schuman, 2002; http://wrrc.uoregon.edu). These requirements and studies state that parents' comprehensive knowledge about their children, accumulated from many

observations of their children's behaviors across diverse settings, can be an invaluable source in collecting assessment data. Especially, their perceptions can play a major role in determining the children's developmental status or needs for specialized services (Meisels & Atkins-Burnett, 2000).

Parental Report in Early Childhood Assessment

Neisworth and Bagnato (1996) wrote that assessment originally meant "to sit or sit beside" the child, which suggested "a process of getting to know" (p. 24) the child. A traditional assessment model looks only at the child's existing skills in a contrived setting, while current assessment models detail all information related to the child in natural settings, such as his or her developmental level, strengths, parental concerns, medical history, and the environmental factors affecting the child's development (Brink, 2002; Guralnick, 2005; McConnell, 2000). In this current assessment model, the test examiners' thorough understanding of the child and the relationships between the child and his or her environment can lead to identification of what a child truly needs. This recognition permits planning intervention services which can secure positive changes in the child's development (Fewell, 2000; McConnell, 2000).

The inclusion of parents in early childhood screening and assessment appears to be a reliable way to collect valuable information about children. Parents' in-depth knowledge about their children over time enables them to assist in data collection activity (Guralnick, 2005; Merisels, 1997). According to Ratner and Silverman (2000), many parents of children with speech delays were able to exactly describe words, vocabularies, and gestures that their children used. Furthermore, they acknowledged their children's

language problems. On the strength of parents' reliable knowledge, several screening tools have been designed to involve parents in the screening process. The Utah Collaborative Medical Home Project team (http://www. medhomeportal.org), consisting of developmental pediatricians, identified several high-quality parental-report tools which consider the cost and efficacy of screening procedures, such as the Ages and Stages Questionnaire (Bricker & Squires, 1999), the Child Development Inventories (Ireton, 1992), and Parent's Evaluation of Developmental Status (Glascoe, 1997). Dunkle and Vismara (2004) remarked that with high-quality parental-report tools, parents could identify 70 to 80% of children with problems and their repeated or periodic screenings could increase these percentages. In a word, reliable screening outcomes can be gained from parental report with high-quality parental instruments.

There are two major rationales supporting parental report in screening services (Dunkle & Vismara, 2004; Gilliam, Meisels, & Mayes, 2005; Guralnick, 2005; Neisworth & Bagnato, 2004). One rationale relates to the culturally appropriate and considerate knowledge parents have about their child (McLean & Crais, 2004; Neisworth & Bagnato, 2004). The other rationale refers to parents' monitoring of target behaviors over time. For young children who are at risk for delays or disabilities but are not served by EI and ECSE professionals, constant surveillance with repetitive screening tests on a regular basis is recommended (Bowe, 2004; Gilliam, Meisels, & Mayes, 2005; Gularnick, 2005; MeLean & Crais, 2004). In professional-completed screening tests conducted in clinical settings or the children's homes, the high cost prohibits repeated assessments. In addition, the validity of the tests may be compromised due to children's anxiety about

unfamiliar persons or settings. As an alternative, parent-completed screening tests can dramatically decrease costs and increase accuracy (McLean & Crais, 2004; Schuman, 2002). With a simple-to-use screening tool (e.g., the ASQ), parental reports can be successfully made at regular intervals (Bodnarchuk & Eaton, 2004; Guralnick, 2005; Ratner & Silverman, 2000).

Summary

Learning ability in the early years can be considerably enhanced by high-quality early experiences. Advanced skills and rich experiences during the first years of life can make an enormous difference for young children during their later academic and social experiences (Yaillen & Blair, 2006). However, it may be argued that many children miss these opportunities for enriched experiences.

Barriers to these early enriched services include lack of effective and comprehensive early screening and identification services. Failure to use accurate assessments may prevent accurate identification of children at risk for delays or disabilities. Two suggestions are discussed for successfully conduct of effective screening services. First, parental administration of screening tests is recommended to reliably assess a child's performance (Bodnarchuk & Eaton, 2004; Brink, 2000; Ratner & Silverman, 2000). Second, the use of measurement practices that offer a developmentally appropriate procedure is advised to estimate a young child's developmental skills (Guralnick, 2005; McLean & Crais, 2004). As Neisworth and Bagnato (1996) emphasized, increased efforts to "really understand a child" can lead to gathering reliable information and delivering enriched early services. Evidence indicates that effective

assessment services can be provided through parental involvement in early assessment including assessment practices focused on each child in his/her natural environment.

CHAPTER II

REVIEW OF LITERATURE

Family involvement in early intervention (EI) and early childhood special education (ECSE) has a relatively short history. Even thirty years ago, the involvement of parents who had children with disabilities in their children's intervention services was not allowed at all; only the parents' compliance with professionals' opinions was required (Ferguson, 2002; Gallagher, Rhodes, & Darling, 2004; Hanson & Lynch, 2004; Turnbull & Turnbull, 2001; Wehman, 1998). However, with the emergence of family-centered philosophical and theoretical frame works (e.g., the ecological theory) and legal enactments (e.g., PL 99-457) in the late 1980's and 1990's, the recognition of the family's significant role in a child's development has rapidly increased. Such acknowledgement contributed to a shift of the EI/ECSE service model from child-centered to family-centered approach. As part of this paradigm shift, the family has gained the right to participate in their child's educational services. Currently, the inclusion of the family in the entire process of EI/ECSE service delivery is regarded as a matter of course.

In this chapter, literature that supports family involvement in EI/ECSE services, particularly assessment services, will be reviewed. Specifically, theoretical underpinnings, legislative mandates, and research studies for family participation will be addressed.

Together with discussions of parental reporting in measurement practices, the purpose of this dissertation study will be explained.

Theoretical Perspectives for Family Involvement

In the 1970s, several important theoretical perspectives appeared to highlight the family's roles in their children's growth. These theories have provided the perception of how families, as an essential environmental factor, simultaneously affect and are affected by their children's development status (Hanson & Lynch, 2004; Wehman, 1998). Two theories, Bronfenbrenner's ecological model (1979) and Sameroff and Chandler's transactional theory (1975), will be introduced to describe the relationships between children's development and their families.

Ecological Approach

The ecological approach (Bronfenbrenner, 1979) views a child's development in the broader context of the environment that surrounds him or her (Aber, Jones, & Cohen, 2000; Hanson & Lynch, 2004; Unger, Jones, Park, & Tressell, 2001; Wacharasin, Barnard, & Speiker, 2003; Wehman, 1998). This approach constitutes four systems: the microsystem, the mesosystem, the exosystem, and the macrosystem.

Each system relates to a different range of the child's surroundings. The microsystem refers to interaction within the child's immediate settings. For a young child, the family of the child is the primary microsystem. Other factors can be the child's daily care and early education programs. The mesosystem pertains to the interrelationships among these microsystems. For young children, there are interrelationships between home and a childcare program, and home and hospitals. In the exosystem, events in the

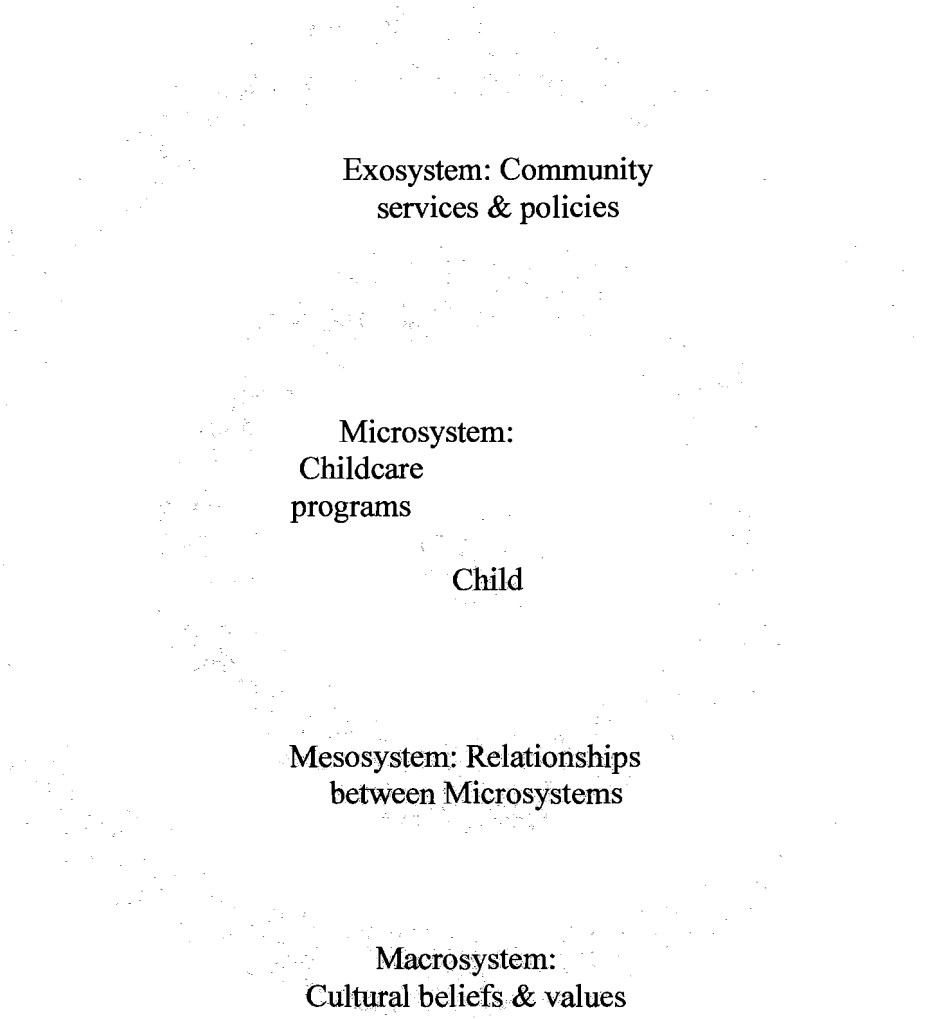


Figure 1. Bronfenbrenner's Ecological Approach (1979). Adapted from "Theoretical Perspectives for Understanding Families," by M. J. Hanson & E. W. Lynch, 2005. *Understanding families: Approaches to diversity, disability, and risk.* p. 46. Baltimore, MA: Paul H. Brookes Publishing Co.

environment, such as policies for childcare and education programs, parent's employment policies, and family's social networks, affecting the family of the child are included. The macrosystem involves societal and cultural beliefs and values, which influence all of the systems. These values are also reflected in the family's child-rearing practices.

This theoretical perspective gives a picture of the entire surroundings of a child which directly and indirectly influences the child's development. It suggests that the entire environment of a child, including the home, community, and society, be supportive of constructive changes in his or her developmental outcomes. Figure 1 provides an illustration of the ecological approach.

Transactional Theory

The transactional theory (Sameroff & Chandler, 1974) regards interactions between children and their caregiving environments as an important scaffold to improve the children's skills. Individuals are seen to engage in the construction of their own worlds through a continual and progressive interplay with their surroundings (Bowe, 2004; Bricker & Pretti-Frontczak, 2004; Hanson & Lynch, 2004; Sameroff & Fiese, 2000). In other words, the family environments, which are determined by the family characteristics, serve a primary role in shaping the development of the family members as well as the children (Wolery, Anthony, Caldwell, Snyder, & Morgante, 2002; Woods, Kashinath, & Goldstein 2004). For example, a 13-month old girl, who is actively communicating with her mother or other speakers using gestures and a couple of words, can develop her communication skills earlier than other children who are not communicating with gestures and words. The vocabulary used by her parents or other

family members can also become more diverse and complicated as the girl's interactive skills advance over time. Figure 2 provides a visual representation of the transactional theory.

These two theories explain the strong relationship between a child's growth and his or her surroundings, the family. With these views in mind, many attempts to understand young children's development in the context of their family and to involve the parents in EI/ECSE services have been made. Particularly, the theoretical foundations have been greatly influential on the formation of family support legislation.

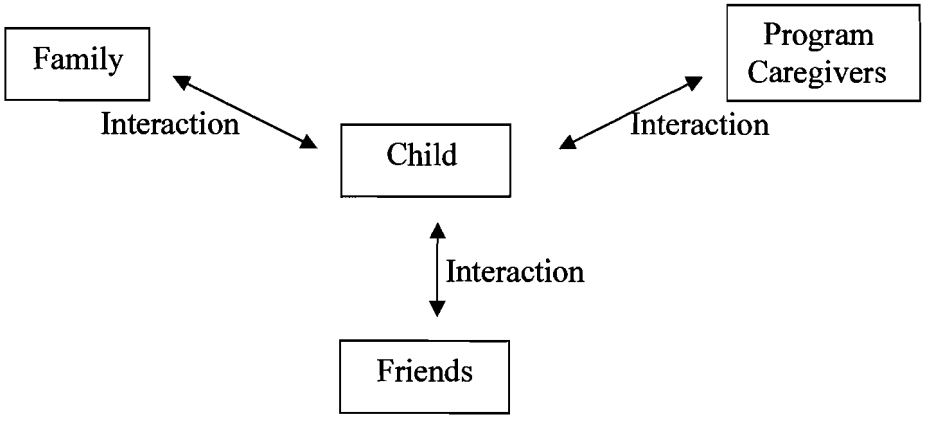


Figure 2. Illustration of Sameroff and Chandler's Transactional Theory (1975).

Legislation for Family Involvement in EI/ECSE Services

Substantially meaningful legislation has been enacted since the 1980s to assist parent involvement in EI/ECSE services. In fact, initial legal enactment did not assure the parents' full participation in their child's educational services. With subsequent legislative stipulations, however increased power was given to parents for their complete engagement in their child's intervention (Turnbull & Turnbull, 2001).

In 1986, Congress passed the first legislation that called for the inclusion of parents in EI services. Part C (formerly Part H) of Public Law 99-457 encouraged a family-centered model in EI/ECSE services by imposing several legal requirements for parent participation (Bruder, 2000; Malone, Straka, & Logan, 2000). First, PL 99-457 protected several parent rights including: (a) consent as a prerequisite for the individual family service plan (IFSP); (b) access to their child's records; and (c) confidentiality concerning information about children and their families (Bowe, 2004; Turnbull & Turnbull, 2001; Wehman, 1998). Second, in order to address the involvement of parents from minority cultures, this policy explicitly identified cultural differences in the definitions and interpretations of many aspects, including disabilities, family coping styles, and parental interaction styles. Cultural variations in expectations of parental participation and advocacy for their children were also recognized (Bruder, 2000; Ferguson, 2002; Gallagher, Rhodes, & Darling, 2004; Harry, 2002). Although PL 99-457 guaranteed minimal involvement of parents in the EI/ECSE services, the foundation was laid for future parental engagement.

Legal mandates in the 1990s supported an equal partnership between families and EI/ECSE professionals (Gallagher, Rhodes, & Darling, 2004). In 1991, PL 102-119 facilitated individualized services by addressing the family concerns, priorities, and resources as well as the child's characteristics. As a result, the family has been a key resource in developing individualized intervention services and has been encouraged to participate in all of the intervention services, including gathering information, making decisions, setting IFSP goals, and developing objectives, implementing service, and evaluating programs (Bowe, 2004; Bruder, 2000; Ferguson, 2002; Gallagher, Rhodes, & Darling, 2004; Hanson & Lynch, 2004; Harry, 2002; McConnell, 2001; Thompson et al., 1997; Turnbull, Turbiville, & Turnbull, 2000; Turnbull & Turnbull, 2001; Wehman, 1998). Moreover, PL 105-17 passed in 1997, reemphasized the establishment of due process to respect parents' opinions and decisions on their children's intervention services, and encouraged parent training services in order to improve the parents' ability to make confident decisions on the children's education (Wehman, 1998).

For the last three decades, legislation has triggered a dramatic change of family roles in EI/ECSE services, from the passive receiver of expert advice to an equal collaborator with other professionals. With PL 99-457 and its successive reauthorizations, the rights of parents to engage in the IFSP or IEP services have been protected. As a result, many parents are currently encouraged to participate throughout their child's intervention services, from information acquisition to program evaluation.

Research Studies on Family Involvement Practices

Two themes have appeared in EI/ECSE research studies related to family involvement: (a) the relationship between a child and his or her caregiving environment (i.e., family) and (b) interactions between children and their environment (i.e., parents or caregivers).

Studies of the first theme have attempted to explain how the family or caregiving environment influences a child's development or behaviors. Each family has its own philosophies, values, and beliefs in child rearing practices (Banks, Santos, & Roof, 2003; Bruder, 2000; Guralnick, 2001; 2005; Hanson & Lynch, 2004; Meisels, 1997; Van Hooste & Maes, 2003). Thus, it is apparent that the child's growth reflects his or her family's unique characteristics (Bruder, 2000; Buysse, et al., 1998; Buysse, et al., 2001; Gettinger, 1999; Kaiser & Hancock, 2003; Simpson, et al., 2003). Diamond and Kontos (2004) contended that the children's environmental variables, particularly family needs, income level, and any disabilities, could become major determinants that impacted the children's learning and growth; therefore, EI/ECSE services should consider family characteristics.

In a meta-analysis study of 48 published articles that presented 56 intervention studies ($N = 7350$), Bakermans-Kranenburg, Jzendoorn, and Bradley (2005) found strong correlations between the children's development and their surroundings. In the study, the Home Observation for Measurement of the Environment Inventory (HOME; Caldwell & Bradley, 1984) was used to examine the participating children's home environment. Findings of the study revealed that the children of middle-income class who had non-

teenage parents offering appropriate learning materials and environments showed better performance in the intervention treatments than those of teenage parents and those of low-income class who had fewer learning materials (effect size = .20, $p < .001$).

The second theme refers to interactions between a child and his or her caregiver. In this view, differences in each child's development are associated with the quality of interplay between the child and his or her parents or caregivers (Blair, Peters, & Lawrence, 2003; Gallagher, Rhodes, & Darling, 2004; Hanson & Lynch, 2004; Justice, Kaderavek, & Bowles, 2005; Kelly & Bernard, 2000; Kelly, Buehlman, & Caldwell, 2000; Osborne, Garland, & Fisher, 2002; VanHooste & Maes, 2003). In a study on mentoring maternal behaviors and child outcomes, Dieterich, Landry, Smith, Swank, and Hebert (2006) asserted that responsive parenting increased productive changes in the child's development. The interactive behaviors of 117 mother-child dyads were assessed by two measures: (a) the maternal behaviors scale developed by the researchers which evaluated mothers' verbal scaffolding and (b) the Bayley Scales of Infant Development, second edition (Bayley, 1993), which estimated the children's developmental abilities. This study concluded that the children of the mothers who had attentive and considerate verbal responses to their children's behaviors presented an increase in their cognitive skills, such as problem solving, language uses, and simple number concepts, $F(1, 88) = 5.05$, $p = .0271$.

Conversely, several research studies reported that negative or careless interaction by parents with their children could be a source of the children's behavioral disturbances (Baxter, Communis, & Yiolitis, 2000; Calderon & Greenberg, 1999; Flaherty & Masters-

Gliddn, 2002; Hastings, 2002; Jackson & Turnbull, 2004; Kelly, Bernard, Caldwell, 2000; Lin, 2000; Pipp-Siegel, Sedey, & Yoshinaga-Itano, 2002). With a model of cyclic relationships among parent stress, parent behaviors, and child problem behaviors, Hastings (2002) remarked that the parents' stress inhibited them from paying appropriate attention to their children's behaviors; the parents' inattentive and irresponsible reactions to the children in turn were likely to result in their children's problem behaviors. The parents' secondary stress induced by the behavioral troubles drove the parents to have defensive and careless parenting, which then exacerbated the behaviors. Hastings suggested supporting parents' abilities to cope with their stresses in order to break this negative cycle.

Investigating 419 African-American and Hispanic children and their families, Mistry, Vandewater, Huston, and McLoyd (2002) found that parents' inefficient discipline attributed to financial strain impacted their children's social behaviors. A tool for measuring parents' psychological distress related to financial worry and depression, the Positive Behavior Scale for Children's Social Competence, and a scale for children's conduct problem behaviors were used in the study. Results indicated that distressed parents presented less warmth and affection in their interactions with their children (-.37, $p < .01$). Furthermore, the children were less socially competent and showed more challenging behaviors (-.52 to .16, $p < .01$).

The above research studies clarify strong relations between children's emotional actions and their parents' attitudes. As described in the ecological (Bronfenbrenner, 1979) and transactional theoretical approaches (Sameroff & Chandler, 1974), the

children's family can become a major environmental element for variations in developmental outcomes. It is apparent that parents or caregivers who are a critical part of their children's life will have considerable influence. Consequently, it is no longer possible to think about the children separately from their families when delivering EI/ECSE services.

Family Involvement in Early Childhood Assessment

Guralnick (2005) recognized "parents are most knowledgeable about, interested in, and concerned about their child" (p.143). Parents are currently regarded as essential informers who possess comprehensive and in-depth knowledge about their child, and as competent supporters who are able to advocate effective assessment practices for their children (Bagnato & Neisworth, 1999; Brown & Barrera, 1999; Guralnick, 2005; McLean & Crais, 2004; Wolraich, Gurwitch, Bruder, & Knight, 2005). McLean and Crais (2004) noted that many advantages resulting from using parental reports included gathering essential information about the children's abilities, such as developmental skills, motivation, interactive skills, and learning styles, as well as determining any special needs of the children. In assessment services, such benefits can be obtained from parents in two types of roles: assistants and test administrators. An assistant role can occur in professional-completed evaluations, while an administrator role can take place in parent-completed assessments. The following will discuss the benefits from these roles in detail.

Benefits in Professional-Completed Measurement

In professionally-administered assessment practices, there are many benefits when parents take on "assistant roles." In certain types of assessments, such as diagnostic

or curriculum-based assessments which require expert knowledge about assessment tools and procedures, parent supplemental information can be useful in deciding eligibility for services or planning intervention services. The types of parental involvement may vary; selected examples are described below.

Preassessment. Two benefits in working with families can be found even prior to their children's assessment. One benefit refers to the acquisition of valuable information on children's characteristics, special needs, and developmental and medical histories, as well as the families' preferred language, priorities, and routine activities (Banks, Santos, & Roof, 2003; Wolraich et al., 2005). Additionally, from conversation with families, the test examiners' knowledge can be expanded in the areas of appropriate assessment questions, materials, and procedures as well as the children's environmental and cultural influences that may support, facilitate, or impede their development (Meisels, 1997; Santos, Fowler, Corso, & Bruns, 2000). Such in-depth knowledge about the children's background and the selection of appropriate measurement practice allow the development of a successful assessment protocol, fitting for the children's developmental conditions and environments, which may lead to more accurate appraisal of the children's needs (Bailey, 2001; Bagnato & Neisworth, 1999; McLean & Crais, 2004; Meisels & Atkins-Burnett, 2000).

An additional benefit relates to the unprejudiced understanding of a child's behaviors which stems from the test examiners' awareness of the cultural preference of the child and his or her family (Bagnato & Neisworth, 1999; Banks, Santos, & Roof, 2003; Hampton, Whitney, & Schwartz, 2002; Lee, Ostrosky, Bennett, & Fowler, 2003).

This knowledge helps to select culturally suitable assessment instruments and activities as well as to modify the assessment procedure, context, and questions so as to correctly estimate the child's skills (Barrera, 1997, 2000; Brown & Barrera, 1999; Hemmeter, Joseph, Smith, & Sandall, 2001; Hansen & Lynch, 2004; McLean & Crais, 2004; Santos, Fowler, Corso, & Bruns, 2000; Schuman, 2002). In addition, test examiners may be able to perceive the parent interpretation of their child's development based on their cultural values through communications with the parents. This can lay the foundation for developing an affirmative relationship with the parents (Barrera, 1997, 2000; Brown & Barrera, 1999; Schuman, 2002; Wolraich et al., 2005).

During the assessment. Three types of benefits of parent involvement can be identified during the assessment: (a) improved understanding between the child and the test examiners through interpreting the child's behaviors or skills and the assessment activities and questions, (b) data collection on child's typical behaviors through validating representative behaviors and assessment procedures, and (c) easy-to-administer assessment practices by facilitating the assessment process (Brink, 2002; Brown & Barrera, 1999; Gularnick, 2005; Hanson & Lynch, 2004; Harbin, McWilliam, & Gallagher, 2000; McLean & Crais, 2004).

The first benefit relates to increased understanding between the children and the test examiners by interpretation (a) for the examiners, of the child's unique behaviors that are difficult to understand and (b) for the child, on questions or activities requiring multifaceted information-processing skills that the child does not understand (Dunlap,

Newton, Fox, Benito, & Vaughn, 2001; Greenspan & Meisels, 1997; Hanson & Lynch, 2004; Harbin, McWilliam, & Gallagher, 2000).

The second benefit includes gathering reliable information through parental validation of the children's typical behaviors during the assessment process. Many researchers report young children's inconsistent behaviors in various settings or with different people, which may complicate testing results (McConnell, 2000; Lynch & Hansen, 2004; Popper, 1997; Schuman, 2002). However, parents' knowledge accrued from diverse approaches, such as observation, play, and conversation, and from various sources involving program caregivers and medical personnel, may assist in ascertaining child's representative behaviors (Brink, 2002; Fewell, 2000; Meisels & Atkins-Burnett, 2000; Neisworth & Bagnato, 1999; Ratner & Silverman, 2000).

The third benefit refers to easy-to-administer assessment procedures due to parental facilitation of an assessment. In the beginning of the evaluation, parents who ease the child's uneasy feelings due to strange examiners or unfamiliar environments may assist the child to more quickly attend to the assessment practice (Brown & Barrera, 1999; Gularnick, 2005; McLean & Crais, 2004). Parents who are sensitive to the signals of their child's distraction or boredom can also prompt their child to concentrate on assessment tasks by offering preferred activities or short breaks (McConnell, 2000). In the arena assessment model, Meisels and Atkins-Burnett (2000) note that parents are able to appropriately reinforce, prompt, and reward the child's behaviors, as well as present his or her effective interaction skills with the child.

The last benefit pertains to a more complete understanding of a child as a result of observation in the child's natural environment (Banks, Santos, & Roof, 2003; Bowe, 2004; Gilliam, Meisels, & Mayes, 2005; Dunlap, Newton, Fox, Benito, & Vaughn, 2001; Fewell, 2000; Hampton, Whitney, & Schwartz, 2002; Meisels & Atkins-Burnett, 2000; Schuman, 2002). Since natural environments are often more comfortable and familiar, test examiners may have more opportunities to examine the children's actual behaviors at play and in daily activities by approaching the children as families do (Fewell, 2000; Meisels & Atkins-Burnett, 2000; Neisworth & Bagnato, 1999). Additionally, this observation permits examiners to acquire knowledge about the families' characteristics including the values, philosophies, needs, resources, and concerns (Banks, Santos, & Roof, 2003; Bowe, 2004; Dunlap, Newton, Fox, Benito, & Vaughn, 2001; Hampton, Whitney, & Schwartz, 2002; Schuman, 2002). Individually appropriate assessment services based on such understanding of child-family relationships can assist in reliable and valid assessment decisions (Beverly & Thomas, 1999; Keilty, 2001; Meisels & Atkins-Burnett, 2000).

Advantages of Parent-Completed Measurement

In addition to the previous advantages, McLean and Crais (2004) proposed two benefits from an active parental role in the administration of screening assessments. These two benefits include: longitudinal monitoring of children's development and parent-professional collaboration. More detailed descriptions of these benefits are given below.

Monitoring system. By employing parents or caregivers in an on-going basis, continuing surveillance of children's growth and development can occur (Gularnick, 2005; McLean, 2004). For children at risk for delays or disabilities who are not served under Part C of the IDEA, a repetitive and periodic screening service may be the most effective way to support their needs (Gilliam, Meisels, & Mayes, 2005; McLean & Crais, 2004). Unlike other measurement services, such as diagnostic assessment which involves a lengthy and intensive examination of the disability using professional knowledge, many screening tests can quickly be completed (e.g., the ASQ needs around 10-15 minutes). For quick and simple repeated tests, the professional's efforts may even not be needed. In fact, many research studies reveal parents' successful conduct of screening tests with minimal or no support (Bodnarchuk & Eaton, 2004; Squires, Katzev, & Jenkins, 2002; Squires, Potter, Bricker, & Lamorey, 1998). Findings of these studies suggest that parental reports are not only as reliable as those of professional examiners, but are often more accurate, due in part to their increased length of time to observe the children (Dinnebeil & Rule, 1994; Henderson & Meisels, 1994; Ratner & Silverman, 2000).

Collaboration. A mode of collaboration with parents during screening is through assisting with the administration of their child's test (Bagnato & Neisworth, 1999; McLean & Crais, 2004). Many researchers in the EI/ECSE field voice that parents' lack of knowledge about their child's developmental conditions and needs can diminish their eagerness to engage in EI/ECSE services (Bagnato & Neisworth, 1999; Guralnick, 2001 & 2005; McLean & Crais, 2004). However, parents' understanding of their child's developmental levels may be increased by asking them to observe their child's

performance and share information with EI/ ECSE professionals (Bagnato & Neisworth, 1999; File, 2001; Sileo & Practer, 1998). This improved knowledge can play a vital role in increasing their feelings of competence and self-worth in working for their children; this in turn may be groundwork for the parents' equal partnership with the intervention team members as well (Bruder, 2000; File, 2001; Gallagher, Rhodes, & Darling, 2004; Hanson & Lynch, 2005; Hanson, et al., 2000; Lovett & Haring, 2003; Thompson, et al., 1997; Wesley, Buysse, & Tyndall, 1997). When parents realize that EI/ECSE professionals want to collaborate in order to support their child's particular needs, this may encourage them to work with EI/ECSE professionals. Table 1 illustrates the advantages of inclusion of family in the assessment process.

Much is known about the many benefits generated from parental participation in their children's assessment. Such advantages function as evidence that the parents' knowledge accumulated from their continuing experiences with their child has been a significant component in effectively and reliably estimating their child's skills. Who else can have such information? It may be difficult to find other experts in addition to the parents who so completely understand their child.

Table 1

Types and Advantages of Family Involvement in Assessment

Types of involvement	Advantages
Assistance in professionally administered assessments	Preassessment: 1. Gathering of information of family interests, resources, needs, and the children's developmental histories. 2. Perspectives on children's performance by identifying cultural differences from families with different cultural backgrounds. During the assessment: 1. Mutual understanding between children and test examiners. 2. Reliable assessment information. 3. Easy-to-administer assessment. 4. Observation of target behaviors in natural environments.
Administration in parent-completed assessments	1. Mutual understanding between children and test examiners. 2. Reliable assessment information. 3. Easy-to-administer assessment. 4. Observation target behaviors in natural environments. 5. Monitoring of children's growth. 6. Development of collaboration between parents and test examiners.

Research Studies on Parent Completed Assessments

Research studies on child assessments completed by parents have provided convincing evidence of parents' accuracy in assessing their child's skills (Bodnarchuk & Eaton, 2004; Ratner & Silverman, 2000). In spite of these findings, there have been many concerns about parental assessments due to their lack of experiences and knowledge about assessment practices. However, the results of numerous empirical investigations (e.g., Wetherby, Allen, Cleary, Kublin, & Goldstein, 2002) have demonstrated that parental report can be reliable and valid if professionals structure the format of the test by providing correct instructions on how to use the measurement tool and by asking parents to report on current and observable behaviors (Bodnarchuk & Eaton, 2004; Szatmari, Archer, Fisman, & Streiner, 1994). Information on reliable and valid report of parents will be detailed below.

Bodnarchuk and Eaton (2004) examined the level of agreement between mothers and professional examiners about infants' gross motor development. A group of mothers ($N = 95$) who had infants from 2.5 months to 15.7 months old completed the daily Parent Checklist (PC) for infants' gross motor skills, such as sitting and walking, while examiners used the Alberta Infant Motor Scale (AIMS; Piper & Darrah, 1994) to evaluate the same children. The mothers included well-educated Caucasians with an average age of 31 years and income between $60,000 and $80,000. With coefficients ranging from .31 (on the walks supported item) to .96 (on the hands-and-knees crawl item), fair to extremely robust agreement was found. The researchers explained that the low level of agreement on the walking item (i.e., $k = .31$) reflected the professionals' mistaken

assumption on previous motor skills, such as pulling to stand. Except for these walking skills, almost perfect agreement between the parents and the professionals on residual gross motor skills was observed at .96.

In a study exploring the communication skills of 30 children whose ages ranged from 27 and 47 months, Ratner and Silverman (2000) found that parental estimation was an efficient technique for assessing language skills in young children. Two groups of child-parent dyads participated, stuttering and non-stuttering. The test examiners conducted standard measures, such as the Goldman-Fristoe Test of Articulation (GFTA; Goldman & Fristoe, 1987) and the Peabody Picture Vocabulary Test-R (PPVT-R; Dunn & Dunn, 1981). The parents completed the Speech and Language Assessment Scale (SLAS; Hadley & Rice, 1993) and the MacArthur Communication Development Inventory-Toddler (CDI; Fenson, et al., 1993). Robust correlations were reported between the parents of stuttering children and the professional examiners; correlations between the SLAS and the GFTA were .67 - .81 (p = .023 - .014) and between the CDI and the PPVT-R were .63 to .88 (p = .038 to .003). However, weaker correlations were observed between the parents of non-stuttering children and the examiners. These outcomes suggested that the parents of stuttering children were more aware of words and vocabularies that their children used than were those of non-stuttering children. Moreover, these researchers concluded that the parents' accuracy in evaluating stuttering children exceeded that of the professionals' due to the short duration of the professionals' home visits (i.e., 30 minutes). This may have resulted in a lack of accurate information about the children.

Another examination of concordance between parents and professionals' report on the children's language abilities was made by Wetherby, Allen, Cleary, Kublin, and Goldstein (2002). The Communication and Symbolic Behavior Scale-Developmental Profile (CSBS-DP) and three measures, (a) the parental report checklist (PR), (b) the caregiver questionnaire (CQ), and (c) the behavior sample (BS) were used to assess 2454 children's language skills. Parents demonstrated reliable reporting skills as measured by the test-retest reliability at the four month CSBS-DP interval of .87 to .91. Wetherby et al. (2002) found both parent over- and underestimation, however, and concluded that parents with less education were likely to overestimate the children's language abilities, while those with more education underestimated the abilities. Other factors, such as low income and low educational level, did not appear to affect the parental estimation. These researchers, therefore, recommended gathering assessment data from multiple sources, such as teachers, test examiners, and parents, in order to yield reliable assessment outcomes.

When identifying children's problem behaviors, parental judgments have been found to be accurate. Szatmari, Archer, Fisman, and Streiner (1994) studied the assessment of parents and preschool teachers on the behaviors of 83 four to six year olds who had received a clinical diagnosis of the pervasive developmental disorders (PDD). Two measures were completed by these participants: the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchett, 1984) and the Autism Behavior Checklist (ABC; Krug, Arick, & Almondi, 1980). These researchers found a wide range of agreement for both groups on the VABS, .42 - .83. Several possible reasons for these

differences were discussed. First, the ABC was not originally designed to be completed by parents. Second, measurement in different settings, for example home and preschool, might cause varying expectations about the children's behaviors in the differing environments. Third, several questions in the ABC, such as "looks through people" and "has no social smile," were not clearly understood by the parents, which yielded many inferences and possibly led to measurement errors.

Findings in a meta-analysis research study conducted by Dinnebeil and Rule (1994) also confirmed parents as reliable reporters of their children skills. Twenty-three research articles were reviewed to study the relationships between scores of parents and test examiners on the development of children who were less than six years of age. These studies employed 37 kinds of measures involving 28 correlation coefficients and 9 percentages. An average of the 28 correlation coefficients was .73 (from .36 to .97) and the mean percentage from the residual measures was 82.4% (from 75% to 92%). An overall effect size was obtained from the 11 studies including the mean scores of parents and assessors and the standard deviations of parental scores. It showed a moderate level of congruence between the participants, .33 (.99 from mothers of boys with developmental delays to -.33 from parents of an infant with atypical development). A half of the studies found that parents estimated higher scores than test examiners (15.8 points). This figure implied that the parents might have had a more comprehensive idea about their child's developmental repertoire perhaps because they had more opportunities to observe their children's skills than the professionals.

Outcomes from the studies above support the validity and reliability of the developmental evaluations reported by parents. Methodological complications, such as the use of measurement tools developed for professional examiners, and variables including parents' varied educational levels, influence the reliability and effectiveness of assessments of their children (Wetherby et al., 2002). Thus, successful assessments can be completed by parents if guidelines for collecting accurate data are carefully considered.

Developmental Screening Instruments for Parental Administration

The value of the parents in the developmental screening area has been validated by many researchers (Bricker & Squires, 1999; Ireton & Thwing, 1992; Hresko, Miguel, Sherbenou, & Burton, 1994; Reuter, Katoff, & Wozniak, 1990). Parents' wide-ranging and in-depth knowledge about their child has been valuable in assessing the child's current developmental skills. Moreover, it is reported that if high quality screening tools with psychometric adequacy are used with parents, increased numbers of children who are in need of intervention services may be identified (Bodnarchuk & Eaton, 2004; McLean & Crais, 2004; Gilliam, Meisels, & Mayes, 2005; Ratner & Silverman, 2000). Five tools will be reviewed and are summarized in Table 2.

The Child Development Inventory (CDI; Ireton & Thwing, 1992) is a revision of the Minnesota Child Development Inventory (MCDI) (Ireton & Thwing, 1972). The CDI is a 300 item test over eight developmental domains, expressive language, language comprehension, social, self-help, motor, letters, and numbers. Forty minutes for administration and 25 minutes for scoring time are needed. Efficacy of the inventory for identifying high-risk infants includes 70% sensitivity and 75% specificity. However,

several researchers suggest caution in using the CDI since data from 568 middle-class children living in one area, Minneapolis, are unlikely to generalize to other groups of diverse children in the US (Kirnam & Crespo, 1998; Stein, 1998).

A second parent-completed developmental screening tool, the Developmental Checklist (DC; Hresko, Miguel, Sherbenou, & Burton, 1994), is one of the three scales in the Developmental Observation Checklist System (DOCS; Hresko, Miguel, Sherbenou, & Burton, 1994). The DC was designed to identify developmental delays or deficits of children from birth to six years of age and has 475 items to assess young children's cognitive, language, social, and motor skills. A nationally representative sample of 1400 children was recruited from 30 states (Bernet, 1998). However, varying psychometric data, such as concurrent validity correlations (i.e., .35 to .83), suggest further revision is necessary (Schwarting, 1998).

The Developmental Profile, 2nd edition (DP-II; Alpen, Boll, & Shearer, 1986), a third parent-completed test, is a comprehensive assessment for children from birth to nine years of age that appraises motor, language, personal/self-help, social, and intellectual skills. A 20 to 40 minute administration time for 186 items and about a five minute scoring time are required. The standardization sample consisted of 3008 children recruited from urban areas in Indiana and Washington in the 1970's and excluded all minority ethnic groups but African Americans (Huebner, 1989). Therefore, generalization of the norms may be limited. Additionally, Hightower (1989) and Huebner (1989) stated that psychometric evidence (.78 - .87 internal consistency reliability and .35 - .83 concurrent validity) fell below the desirable standard for determining eligibility for

intervention services and planning individualized programs. For these reasons, reviewers strongly recommended using the DP-II for the purpose of screening only and not for comprehensive assessments.

Another relatively brief and easy-to-use parent-completed screening tool for infants aged birth to 15 months is the Kent Infant Development Scale (KIDS; Reuter, Katoff, & Wozniak, 1990). Infants' communication, cognitive, self-help, motor, and social skills are assessed in 252 items that can be completed in 30 to 40 minutes. Normative scores were standardized from 706 healthy infants, mostly from Caucasian families of high socioeconomic class. The KIDS reflects adequate levels of reliability and validity; internal consistency reliability between .91 and .95, test-retest reliability at a 69-day interval between .91 and .93, inter-rater reliability between .71 and .95, and concurrent validity with Bayley scale for high-risk infants at .75. Despite the non-representative sample, Stainback (2001) valued the KIDS' usefulness in assessing culturally different children.

The Ages and Stages Questionnaire (ASQ; Bricker & Squires, 1999) is a first level comprehensive screening tool involving five developmental areas: communication, gross motor, fine motor, problem solving, and personal-social. It was designed to be completed by primary caregivers or individuals who know the child well. This tool consists of 19 questionnaires that include the age intervals 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 42, 48, 54, and 60 months. Ten to twenty minutes are necessitated to complete 30 items on each questionnaire. The validity sample of 2,326 children reflected diverse ethnic and socioeconomic classes. Psychometric data on the ASQ reflect

94% agreement on test-retest reliability, 94% agreement on inter-observer reliability, 84% agreement for concurrent validity studies, 72% sensitivity, and 86% specificity. Boyce (2005) and Poteat (2005) reviewed the ASQ and due to its normative sampling and technical adequacy found it to be a high-quality screening tool for the identification of children at risk for disabilities or delays.

Five developmental screening tools completed by parents were reviewed. These instruments are proposed to maximize cost effectiveness and enhance accurate assessment through parental reporting of their children's current skills. However, inadequate psychometric evidence or non-representative sampling found in many of the inventories (e.g., the CDI, the DP-II, & the KIDS) may limit the purpose of the tools. These findings imply that the development of additional effective parent-completed screening tools with representative sampling and strong psychometric data will benefit young children with developmental concerns and their families. Table 2 summarizes these findings.

Table 2

Developmental Screening Tests

Screening Test	Age Phase	Domains/Total items	Norm Sample	Test form-at	Reliability/ Validity	Comments
The Child Development Inventory (Ireton & Thwing, 1992)	Birth - 6 years	Social, self-help, motor, expression, & comprehension languages, letters, & numbers. 300 items	568 middle class children from Minneap-olis	Yes or no Dich-otom -ous data	No or little information of psychometric evidence	1. 30 - 50 minute administration. 2. Absence of social areas in CDI requires test examiners' cautious interpretation & judgment (Guralnick, 2005).
The Developmental Checklist (Hresko, Miguel, Sherbenou, Burton, 1994)	Birth – 6 years	Social, cognitive, motor, language. 475 items with 10 starting points	1400 children from 30 states	Yes or no Form at	Strong test-retest & interrater reliability. Modest concurrent validity	1. 30 minute administration 2. An appropriate screening measure for parental administration (Bernt, 1998; Schwarting, 1998)
The Developmental Profile-II (Alpen, Boll, & Shearer, 1986)	Birth - 9 years	Motor, language, personal/self-help, social, & intellectual domains. 186 items with ceiling & basal levels	3008 children from urban areas in Indiana & Washingto n states	Ratin -g scale	Inadequate Psychometric evidence	1. 20 - 40 minute administration 2. Not nationally representative. Except for African Americans, other ethnic groups were excluded. 3. Proper for screening not assessment (Bagnato, Neisworth, &Munson, 1997) 4. Computerized scoring available.

Table 2 (continued)

Developmental Screening Tests

Screening Test	Age Phase	Domains/Total items	Norm Sample	Test form-at	Reliability/ Validity	Comments
The Kent Infant Development Scale (Reuter Katoff, & Wozniak, 1990)	Birth – 15 months	Cognitive, self-help, motor, communication, & social domains. 252 items	706 healthy Caucasian infants, & high level of SES.	Rati-ng scale	Sound levels of reliability & validity.	1. 30 - 40 minute administration 2. Non-representative sampling requires test reviewers' cautious interpretation of the screening outcomes(Sawyer, 2001; Stainback, 2001)
The Ages and Stages Questionnaire (Bricker & Squires, 1999	4 – 60 months	Communication, problem solving, personal-social, gross & fine motors, 19 age intervals from 4 to 60 months. 30 items in each age interval.	2326 children nationally representat-ive considering gender, ethnicity, & SES.	Rati-ng scale	Adequate psychometric data.	1. 10 - 20 minute administration 2. High rates of false negative (48.98%) & false positive (18.67%). 2. A cultural and language adaptations (Boyce, 2005; Poteat, 2005).

The Purpose of the Current Study

Research studies have supported effective screening and assessment services based on parent report (Brink, 2002; Ring & Fenson, 2000). The outcomes of these studies suggest that parents provide reliable reporting about their children if professionals ask for current, observable skills. Additionally, Dunkle and Vismara (2004) stated that parental estimation with high-quality parent-report tools can assure reliable screening outcomes.

To add to the current database on the validity and reliability of parent-completed assessments, this study examined in-depth reporting by parents on their child's developmental skills using the Ages and Stages Questionnaires-Inventory for Toddlers (ASQ-IT). The ASQ-IT is a newly developed parent-completed developmental inventory derived from the ASQ intervals from 12 to 60 months; it differs from the ASQ in that more items are asked about children's current skills and that standard scores will be available for developmental monitoring. This inventory was designed to have parents or caregivers observe the child's performance in a home or community setting so that data regarding children's typical behaviors could be gathered. Illustrations were used to assist the parents in understanding the meaning of the questions. Approximately 125-150 items were on the ASQ-IT covering five domains of development including communication, gross motor, fine motor, problem solving, and personal social (each domain includes about 25-30 items).

Psychometric properties including test validity, test reliability, and item statistics were investigated on this newly-developed inventory in the following seven questions.

1. What is the concurrent agreement between the ASQ-IT domain and total scores completed by parents and the BDI-2 domain and total scores completed by a trained examiner?

2. What is the concurrent agreement between two tests, the ASQ-IT domain and total scores and the BDI-2 domain and total scores completed by a trained examiner?

3. What is the test-retest reliability of the ASQ-IT measured as the agreement between the ASQ-IT total scores completed by parents at a two-three week interval?

4. What is the inter-observer reliability of the ASQ-IT measured as the agreement between the total scores of the ASQ-IT completed by parents and trained examiners on a child?

5. Do the ASQ-IT scores completed by parents discriminate between non-risk and risk children?

6. Do the ASQ-IT items invariantly function across non-risk and risk groups of children?

7. What is the satisfaction level of parents who have completed the ASQ-IT?

CHAPTER III

METHOD OF STUDY

The present study examined the psychometric properties of a newly-developed parent-completed screening inventory. For this purpose, the Ages and Stages Questionnaires-Inventory for Toddlers (ASQ-IT), integrated from the 12-60 month Ages and Stages Questionnaires (ASQ; Bricker & Squires, 1999), was used to measure the overall development of toddlers ranging in age from 18 to 36 months. Caregivers' and professionals' responses to the ASQ-IT were analyzed to address the seven research questions regarding:

1. The concurrent agreement between the ASQ-IT domain and total scores completed by parents and the BDI-2 domain and total scores completed by a trained examiner.
2. The concurrent agreement between two tests, the ASQ-IT domain and total scores and the BDI-2 domain and total scores completed by a trained examiner.
3. The test-retest reliability of the ASQ-IT measured as the agreement between the ASQ-IT scores completed at a two-three week interval.
4. The inter-observer reliability of the ASQ-IT measured as the agreement between the ASQ-IT scores completed by parents and trained examiners on a child.
5. The discrimination of ASQ-IT scores between non-risk and risk children.

6. The function of ASQ-IT items across non-risk and risk groups of children.

7. The satisfaction level of parents who have completed the ASQ-IT.

In this chapter, information on subjects, measures, experimental procedures, and data analyses will be explained in detail.

Participants

Participants for this study included two groups: risk and non-risk. For the risk group, 25 parent-child dyads that had at least one environmental risk factor were recruited. Based on previous studies, three major risk factors were included: poverty, maternal education level, and maternal age at the time of labor (Oxford & Spieker, 2006; Stanton-Chapman, Chapman, Kaiser, & Hancock, 2004; Weatherholt, Harris, Burns, & Clement, 2006). These factors were translated into the following participant characteristics: (a) income below the Oregon state poverty level as defined by federal guidelines ($20,000 per year for a family of four in 2006), (b) maternal education level, and (c) maternal age younger than 19 at the time of the infant's birth. The non-risk group included 25 parent-children dyads with no identified environmental risk factors. All children in both groups were between the ages of 17 and 37 months and were not receiving intervention services under Part C in the Individuals with Disabilities Education Act (IDEA). Children with medical risk factors, such as prematurity (less than 37 weeks), low birth weight, and chronic lung disease, were also excluded from both groups. In this present study, "parents" included primary caregivers who took care of the child throughout the day; parents, grandparents, and foster parents were eligible to participate in this study.

Protection of Human Subjects

A protocol for this research study was submitted to the University of Oregon Institutional Review Board prior to recruiting subjects. Procedures to defend subjects from potential harm were strategically planned and developed. For instance, to protect participant's personal information, all relevant documents remained locked in the researchers' file cabinet and confidential papers were classified with encryptions (e.g., using numbers for participant names). All personnel handling the data were instructed to maintain confidentiality. Five years after a study is completed, all related materials will be discarded. A consent form, which is presented in Appendix A, explained the study procedure, potential effects, and subjects' voluntary participation. Participants received $20 compensation (e.g., gift certificate) for their participation.

Measures

For the purpose of investigating the research questions, the following measures were used: (1) family demographic survey, (2) Ages and Stages Questionnaires-Inventory for Toddlers (ASQ-IT), (3) Battelle Developmental Inventory, 2nd edition (BDI-2), and (4) Parent Satisfaction Survey (PSS).

Family Demographic Survey

A family demographic survey asked for personal information, such as maternal age at the time of birth, annual family income, the mother's final education level, the number of children, and the number of adults who took care of the children. Information concerning the child, such as age, gender, date of birth, and ethnicity were gathered. Two additional questions were asked: (a) whether the child received Part C of the IDEA

intervention services and (b) whether he or she was born more than three weeks prematurely. The family demographic survey form is presented in Appendix B.

Ages & Stages Questionnaires-Inventory for Toddlers (ASQ-IT)

The Ages and Stages Questionnaires-Inventory for Toddlers (ASQ-IT) is one of the three intervals adapted from the Ages & Stages Questionnaires (ASQ; Bricker & Squires, 1999) and is experimentally designed to provide screening of the in-depth developmental skills of children ranging in age from 18 to 36 months. This screening inventory covers the same five domains as the ASQ: communication, gross motor, fine motor, problem solving, and personal-social. Like the ASQ, three response selections are included: "Yes," "Sometimes," and "Not yet." For scoring, the numeric values are 2 for "Yes," 1 for "Sometimes," and 0 for "Not yet." Additionally, the ASQ-IT is designed to be a parent-friendly and in-depth screening tool. The reading level is fourth to sixth grade and accompanying illustrations assist in providing a clear user-friendly format. When parents complete the ASQ-IT, they can observe their child doing the items, such as "Drawing a face containing at least three features of the following: head, eyes, nose, mouth, hair, arms, hands, legs, or feet," can be conducted at the child's natural environment, such as the home or the childcare program. (This item is taken from the ASQ 48 month interval.)

The ASQ-IT was initially studied with two drafts, field test draft A and B (Clifford, 2006). Draft A included 25 to 30 items per domain; the total number of items was in the range of 125 to 150, derived from the ASQ age intervals from 12 to 48 months. Draft A items were randomly arranged (i.e., not placed in developmental order) to

decrease the possibilities of any order effects and to address the item functioning research questions (e.g., item difficulty question which estimates the difficulty of each item based on the participants' ability to correctly respond to the item). Parents were asked to mark each question independently regardless of the order. Moreover, parents who were not certain of whether their child had the target skills were encouraged to observe their child performing the skills before answering. In the first investigation of 19 parental completions of the ASQ-IT draft A, easy items that all children could correctly answer were replaced with more difficult items taken from the 54- and 60-month age intervals, making draft B.

Items in draft B were ordered in hierarchy using the Item Response Theory (IRT) analysis and were used to investigate technical adequacy (e.g., reliability) and item functioning (e.g., item difficulty). The sample included 96 parents in the first phase and 57 parents in the second phase, with 32 children with environmental risk factors and 79 children with no risk factors. Pearson Product Moment correlations for concurrent validity in comparing total domain scores of the ASQ-IT with those of the BDI-2 illustrated favorable results (.75 to .94, $p < .01$ in two tailed test). For known-group validity, scores from the analysis of covariance (ANCOVA) between non-risk and risk groups (risk group: $M = 180.9$ to 233.8; non-risk: $M = 172.2$ to 296.70) suggested that the ASQ-IT could successfully distinguish differences in the development of these groups of children. Construct validity analysis examined intercorrelations among domains; Pearson Product correlations were in the range from .63 to .94. Inter-rater reliability analysis compared scores of the parents and the test examiner; *t*-value for intraclass correlations

ranged from -7.05 to .2.08, ρ_I = .78 to .93. Internal consistency investigated the relationships of items within domains and ranged from .88 to .93 (Cronbach's alpha). Additionally, item difficulty and item discrimination values computed through the RASCH model proposed an additional hierarchical arrangement of the ASQ-IT items, which was used to structure the current version of ASQ-IT.

Based on a previous study (Clifford, 2006) in which ASQ-IT items were hierarchically ordered, a third draft of the ASQ-IT was developed for this study. Two features made this draft distinct from the previous ASQ-IT A and B drafts. The first feature was the addition of three start points that were grouped in 6 month ranges between 1½ years and 3 years of age: (a) 1½-2 years, (b) 2-2½ years, and (c) 2½-3 years of age. Parents could begin at the start point questions corresponding to the age of their child. The second feature included a basal and ceiling rule. Parents answering items started when their child could do three items in a row. Parents stopped answering items when the child failed to do three items (e.g., receiving "Not Yet" answers) in a row. For children who did not achieve the basal of three "Yes" answers, parents could begin with the start point question for the previous younger age. For example, one and a half to two year-old-children, the youngest age group, who received a score of zero (Not Yet) on the start question (e.g., number 7 in Figure 3), should begin with question number one of each domain. With the start point and the basal and ceiling rule, the administration time of the ASQ-IT should be considerably diminished by more narrowly focusing on the child's current developmental level. Figure 3 illustrates a start point and a guideline for setting up basal and ceiling levels.

1. Find your child's starting point based on his or her age:

Example:	Not yet	Sometimes	Yes
6. Does your child point to, pat, or try to pick up pictures in a book? 4-14	○	□	Δ
1 1/2 to 2 years old begin with question 7:			
7. Does your child shake his head when he means "no" or "yes"? 6-12	○	□	Δ
8. When you ask her to, does your child go into another room to find a familiar toy or object? You might ask, "Where is your ball?" or say, "Bring me your coat" or "Go get your blanket." 6-14	○	□	Δ

*2. **Answer the questions:***

* Beginning at your child's starting point, continue to answer questions until you have checked 3 circles (Not yet) in a row.
* Look back over your answers to see if you have also checked 3 triangles (Yes) in a row.
* If you have not checked three triangles in a row, go back to your child's starting point and answer questions in reverse order until you have checked 3 triangles in a row.

Figure 3. Guideline for start point and basal and ceiling levels.

Battelle Developmental Inventory, 2nd Edition (BDI-2)

The Battelle Developmental Inventory, 2nd edition (BDI-2, Newborg, 2005) which was used to measure concurrent validity. The BDI-2 is a norm-referenced and standardized assessment designed for children from birth to seven years of age. The inventory assesses adaptive, personal-social, communication, motor, and cognitive areas in order to identify developmental delays and plan an appropriate intervention. There are 450 items on the test. Three scoring options (e.g., 0, 1, and 2) are offered to describe a child's absent, emerging, and present skills. Age equivalents, percentile ranks, scaled scores, and developmental quotients are given for the child's developmental status. Administration time is recorded from one hour (for ages below two and above five) to one and a half hours (for ages two to five).

There are three types of procedures for collecting data: structured, observation, and interview procedures. The structured procedure implies direct testing. An example is a specific instruction to the child to encourage the demonstration of a gross motor skill (e.g., hopping on one foot). For skills that are not examined in a test session, observation and interview are alternative procedures. For example, interviews with the parents or caregivers can be used for the adaptive or personal-social skills, such as toileting skills or playing cooperatively with peers.

The BDI-2 examiner's manual reports adequate psychometric properties which assure reliable measurement outcomes (Newborg, 2005). The normative base was established with a nationally representative sample of 2,500 children. Internal consistency reliability, which compared the 13 sub-domain scaled scores with the total score ranged

from .90 to .96. The interrater agreement between two or more test examiners (Pearson coefficients) ranged from 94% to 99%, demonstrating strong correlations. Test-retest reliability, with 252 test examiners working with two age groups of 2- and 4-year-old children between 2 and 25 day intervals (i.e., the 2-year-old group: 93%, while the 4-year-old group: 94%) and interrater reliability (94 - 99%) also showed sound levels of agreement.

Three types of validity were examined. Content-related validity consisting of professional judgment on content and constructs and use of classical and item response theory methods ensured that the test was grounded on knowledge central to child developmental theory. For concurrent validity evidence, the BDI-2 was compared with many measures such as the Denver Developmental Screening Test-II (Frankenburg & Dodds, 1968) (between 83 and 90%), the Preschool Language Scale, 4th edition (Zimmerman, Steiner, & Pond, 2002) (convergent validity of 72% and divergent validity of 37%), and the Vineland Social-Emotional Early Childhood Scales (Sparrow, Balla, & Cicchetti, 1998) (between 71% and 73%). Lastly, construct validity was reported with three analytical methods. The first method looked at the relationship between children's age and ability. This was examined to confirm whether the BDI-2 could recognize any changes in children's development across time. Growth curves demonstrated that mean scores increased as the children matured. The second method referred to Pearson Product Moment correlations between sub-domains, domains, and total scores which varied from acceptable to perfectly sound. The last method scrutinized correlations between domains which included strong relationships between connected domains (e.g., communicative

and cognitive domains) and weak relationships between unconnected domains (communicative and fine motor domains). In addition, the BDI-2's information concerning construct validity obtained from confirmatory and exploratory factor analyses described fitting relationships among the five domains.

Parental Satisfaction Survey

The Parental Satisfaction Survey (PSS; Clifford, 2006) was used to evaluate parental satisfaction with completing the ASQ-IT. The five questions on the PSS asked about (1) administration time, (2) ease of completion of the questionnaire (3) cultural appropriateness, (4) any benefits resulting from completing the ASQ-IT, and (5) comments for improving the questionnaire. The PSS can be found in Appendix D.

Procedures

Recruitment

Fifty child-parent dyads were recruited from local childcare centers, parent support programs, and other locations. For the recruitment of the non-risk group of children and their parents, directors of local childcare programs in Eugene and Springfield were contacted, such as the Vivian Olum Center, Spencer View Family center, Sheldon Childcare Program, Eugene and Springfield Christian childcare programs, and other childcare programs for toddlers. For the risk group of children and their parents, the program staff of the Young Parenting Program for teen parents, social workers who served children and families living in poverty, and directors of Head Start programs were phoned or emailed. With their approval, parents of toddlers between 17 months and 37 months of age received a written invitation or were verbally invited at parent meetings to

participate in this study. Parents who volunteered to participate were given a packet including a consent form, a family demographic form, the ASQ-IT, and the PSS.

Experimental Procedure

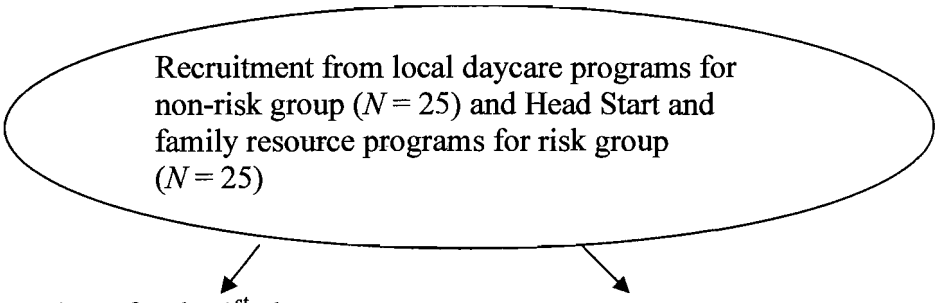
This study was conducted in the following three phases. In the first phase, parent signatures on the consent form and information concerning the family demographic form, the ASQ-IT, and the PSS form were gathered. Parents or caregivers were asked to complete the family demographic form before completing the ASQ-IT in order to confirm risk status. In completing the ASQ-IT, parents were instructed to start at the start point questions in accordance with the child's age and to establish basal and ceiling levels. After the parent-completed ASQ-IT, the PSS form was completed. The packet including all the forms was returned by mail or gathered in person.

The second phase included an assessment of the child's developmental skills by the research assistants. The researcher contacted the parents after the packet was returned to ask if they would like to participate in an observational assessment. The location for the visit was determined by the parent, either in the home or another convenient place, to observe the child for the completion of the ASQ-IT and the BDI-2. This visit began with a simple introduction of this study to the parents including a description of tasks for the assessment visit and a time for questions from the parents. The research assistants attempted to establish a relationship with the child, through reading a book and playing with the child before beginning the assessment session (approximately 5-10 minutes). The BDI-2 items were administered through the standard structure-observation, or interview procedures suggested by the BDI-2 manual. Like the ASQ-IT, start points and

basal and ceiling rules were used. Corresponding items of the ASQ-IT were answered, based on information obtained from the completed BDI-2. The intent was to avoid redundant testing between the ASQ-IT and the BDI-2. The ASQ-IT items not appearing in the Battelle-2 were directly administered or observed. The administration of the two tests by the research assistant occurred one to two weeks after the parent returned the packet.

In the third phase, the parent completed the ASQ-IT a second time. This took place immediately after the research assistant's assessment, or two weeks after the first parent-completed ASQ-IT, depending upon the parent's preference. A $20 gift certificate for the parent's completion of the study was delivered in the mail or in person.

Subjects and measures for the research questions are described in Figure 4. Research assistants with a Master's degree from the University of Oregon's Early Intervention Program and experience with the BDI-2, ASQ, and the Assessment, Evaluation, and Programming System (AEPS; Bricker, Capt, & Pretti-Frontczak, 2002) were employed.



Phase 1: Procedures for the 1st phase

Non-Risk Group ($N = 25$)	Risk Group ($N = 25$)
Parental completion: 1. Consent form 2. Demographic survey 3. The ASQ-IT 4. The PSS	Parental completion: 1. Consent form 2. Demographic survey 3. The ASQ-IT 4. The PSS

Phase 2: Procedures for the 2nd phase

Non-Risk Group ($N = 20$)	Risk Group ($N = 20$)
Test examiner's completion: 1. The BDI-2 2. The ASQ-IT	Test examiner's completion: 1. The BDI-2 2. The ASQ-IT

Phase 3: Procedures for the 3rd phase

Non-Risk Group ($N = 25$)	Risk Group ($N = 25$)
Parental completion: 1. The ASQ-IT 2. $20 Compensation	Parental completion: 1. The ASQ-IT 2. $20 Compensation

Figure 4. General procedures for recruitment and completion of measures during the study.

Data Analysis

Several types of data analyses were used to investigate the relationships of the independent and dependent variables for each dissertation question. Detailed analytical methods and measures appropriate for each research question are presented below and summarized in Table 3.

Research Question 1: What is the agreement between the ASQ-IT domain and total scores completed by parents and the BDI-2 domain and total scores completed by a trained examiner?

Research Question 2: What is agreement between the ASQ-IT domain and total scores and the BDI-2 domain and total scores completed by a trained examiner?

For the examination of concurrent validity, the accuracy of the ASQ-IT in measuring a child's developmental skills were investigated. The BDI-2 scores completed by the test examiner were the independent variable for both questions, 1 and 2.

The ASQ-IT scores completed by the parents and by the test examiner were dependent variables. Domain scores (communication, gross motor, fine motor, problem-solving, and personal-social) and total scores of the ASQ-IT and the corresponding BDI-2 scores were compared to ascertain how strongly those scores correlated with each other. Pearson Product correlation coefficients demonstrated the relationship between the ASQ-IT and the BDI-2.

Research Question 3: What is the test-retest reliability of the ASQ-IT measured as the agreement between the ASQ-IT total scores completed by parents at a two-three week interval?

The third question explored the agreement between the results of the ASQ-IT completed by parents at time 1 and time 2. Independent and dependent variables were children's scores on the ASQ-IT completed by the parents in the first week and the third-fourth week respectively. Using intraclass correlations (ICC) mean scores and standard deviations in each domain and the total ASQ-IT scores from both tests were compared to determine the relationship between the two measures.

Research question 4: What is the inter-observer reliability of the ASQ-IT measured as the agreement between the ASQ-IT completed by parents and by trained examiners on a child?

The inter-observer reliability between the scores of parents and examiners was analyzed by calculating intraclass correlations (ICC). Comparison of mean scores in each domain and the total ASQ-IT completed by parents with corresponding scores completed by test examiners indicated the level of the agreement. Independent variables were the ASQ-IT scores completed by a trained examiner, while dependent variables were the ASQ-IT scores completed by parents.

Research Question 5: Do the ASQ-IT items function invariantly across non-risk and risk groups of children?

The differential item functioning (DIF) analysis was employed to verify whether the ASQ-IT items were invariant for assessing the skills of the risk and non-risk groups

of children. Item difficulty parameters of the two groups on the exact same set of ASQ-IT items were estimated independently. The DIF analysis tested the hypothesis that the difference between the item parameter estimates for the two groups equaled zero. Using WINSTEPS, a statistical test was completed with alpha equal to .05.

Research question 6: Do the ASQ-IT scores completed by parents discriminate between non-risk and risk groups of children?

Measuring known-group validity constituted an additional attempt to examine the accuracy of the ASQ-IT. An analysis of covariance (ANCOVA) was used to determine whether ASQ-IT scores could distinguish between risk and non-risk populations. Mean score of risk and non-risk groups were compared. The independent variable related to the children's risk conditions, the dependent variable involved the ASQ-IT total scores completed by parents, and the covariate was the children's age.

Research question 7: What is the satisfaction level of parents who have completed the ASQ-IT?

Five questions investigated parental satisfaction with their experience completing the ASQ-IT, including: (a) administration time, (b) ease of completing the questionnaire, (c) cultural appropriateness, (d) any benefits resulting from completing the ASQ-IT, and (e) any comments on developing the ASQ-IT. Descriptive statistics summarized the extent of the parents' satisfaction with the completion of the ASQ-IT. Table 3 presents the analysis and measures about these seven research questions.

Table 3

Analyses and Measures for Research Questions

Research Questions	Measures	Analyses
1. What is the agreement between the ASQ-IT total and domain scores completed by parents and the BDI-2 total and domain scores completed by a trained examiner?	ASQ-IT & BDI-2	Correlation Coefficient
2. What is the agreement between the ASQ-IT total and domain scores and the BDI-2 total and domain scores completed by a trained examiner?	ASQ-IT & BDI-2	Correlation Coefficient
3. What is the test-retest reliability of the ASQ-IT measured as the agreement between the ASQ-IT total scores completed by parents at a two-three week interval?	ASQ-IT	Correlation Coefficient
4. What is the inter-observer reliability of the ASQ-IT measured as the agreement between the total scores of the ASQ-IT completed by parents and trained examiners on a child?	ASQ-IT	Correlation Coefficient
5. Do the ASQ-IT items function invariantly across non-risk and risk groups of children?	ASQ-IT	IRT Differential Item Functioning
6. Do the ASQ-IT scores completed by parents discriminate between non-risk and risk groups of children?	ASQ-IT	ANCOVA
7. What is the satisfaction level of parents who have completed the ASQ-IT?	Parent Satisfaction Survey	Descriptive Statistics

CHAPTER IV

RESULTS

This chapter presents the results of the research study, including specific data answering the seven research questions which address psychometric properties of the ASQ-IT (i.e., concurrent validity, test-retest reliability, and social validity). The data are described with correlation coefficients, averages, and percentages calculated from total and domain raw scores of the ASQ-IT and the BDI-2. A description of study participants is provided first, followed by findings derived from the psychometric data.

Participants

A total of 50 child-parent dyads participated in this study, divided into risk and non-risk groups depending upon family risk conditions (e.g., poverty, low maternal education, or teen at child's birth). The recruitment of young children who were 17-37 months of age and their parents was completed at local early childhood programs including the childcare and development center, Head Start, and Relief Nursery, and locations that both young children and their families often attended together, such as family resource centers, public libraries, public health care programs, social service organizations, and local churches. Website advertisement (e.g., Craigslist) was another excellent source for recruiting young children and families. Fliers, prepaid postcard fliers, and the presentation of the study to parents at local programs, such as story time in public libraries and toddler programs in family resource centers were used to elicit parent

Table 4

Demographic Characteristics of the Participants

Demographic Variable	Non-Risk ($N = 25$)	Risk ($N = 25$)	Total
Child Characteristics			
Age			
17-23 months	11(44%)	8(32%)	19(38%)
24-30 months	7(28%)	7(28%)	14(28%)
31-37 months	7(28%)	10(40%)	17(34%)
Gender			
Male	8(32%)	10(40%)	18(36%)
Female	17(68%)	15(60%)	32(64%)
Ethnicity			
Asian	2(8%)	2(8%)	4(8%)
Caucasian	15(60%)	15(60%)	30(60%)
African American	0	1(4%)	1(2%)
Hispanic	1(4%)	3(12%)	4(8%)
Pacific Islander	0	1(4%)	1(2%)
Multi-ethnic	7(28%)	3(12%)	10(20%)
Parent Characteristics			
Maternal Education Level			
Less than High School	0	5(20%)	5(10%)
High school	0	7(28%)	7(14%)
Associate's Degree	0	1(4%)	1(2%)
Some College	6(24%)	10(40%)	10(20%)
Bachelor's Degree or Above	19(76%)	2 (8%)	2(4%)
Family Characteristics			
Family Income			
0-$12,000	0	14(56%)	14(28%)
$12,000-$24,000	0	10(40%)	10(20%)
$24,000-$40,000	7(28%)	1(4%)	8(16%)
$40,000-$60,000	10(40%)	0	10(20%)
Over $60,000	8(32%)	0	8(16%)

Table 4 (continued)

Demographic Characteristics of the Participants

Demographic Variable	Non-Risk ($N = 25$)	Risk ($N = 25$)	Total
Home			
Number of Caregiver Living in Home	2	1.84	1.92
Number of Children Living in Home	1.64	1.8	1.72
Person who completed the ASQ-IT			
Mother	25(100%)	23(92%)	48(96%)
Father	0	1(4%)	1(2%)
Grandparent	0	1(4%)	1(2%)

interest in the study. Packets, including the consent form, demographic information, satisfaction survey, and ASQ-IT were given to 110 parents; of these 66 parents returned the packets. Fifteen families subsequently dropped out of the current study due to personal issues, such as moving, financial difficulties, and child custody problems. Fifty remaining children and 49 parents (one family had twins) participated in pre- and post-tests over three-four weeks. All participants received a $20 gift certificate to a local department store for compensation. Table 4 presents the family demographic information in the two groups of families.

Children

Fifty children aged 17 to 37 months with an average age of 26.8 months (SD = 5.8) participated in this study. More girls ($N = 32$) than boys ($N = 18$) were involved. The non-risk group consisted of 17 girls and 8 boys, and the risk group consisted of 15 girls

and 10 boys. An average age of girls was 27.7 months (SD = 5.5) and that of boys was 25.0 months (SD = 6.1). An analysis of covariance (ANCOVA) comparing ASQ-IT scores of these girls and boys with a covariate of age provided no evidence for any differences between ASQ-IT scores of boys and girls, $F(1, 46) = 0.01$, $p > .90$.

The majority ethnic group was Caucasian (N = 30, 60%) and the minority groups were Hispanic (N = 4, 8%), Asian (N = 4, 8%), African American (N = 1, 2%), and Pacific Islander (N = 1, 2%). In addition, 20% of children (N = 10) were multiethinic. Table 5 presents this distribution with the comparison of estimated rate in population of the United States, Oregon, Eugene, and Springfield (http://www.factfinder.census.gov). As can be seen in the table, a larger percentage of minorities appeared in the sample compared to the US and Oregon state census figures.

Parents

Forty-nine caregivers completed the ASQ-IT within a two-three week interval. These families were sorted into two groups based on the recruitment criteria that included the family annual income, the maternal education level, and maternal age at the child's birth. The non-risk caregivers were all mothers (N = 24), one of whom had twins. The risk group consisted of 23 mothers, one father, and one grandmother. All of the parents in the non-risk group had higher education attainment levels; 19 mothers had Bachelor degrees or above (76%) and 6 mothers had some college experience (24%). The risk group was comprised of parents with diverse educational levels. Two mothers had Bachelor degrees or above (4%); 10 mothers had some college education (20%); 1

mother had an associate degree (4%); 7 mothers had a high school diploma (28%); and 5 did not complete high school (20%).

The assignment of participants to the two groups was also based on family income, the 2007 Federal Poverty Guideline for Oregon State was less than $20,650 gross yearly income for a family of four (http://www.ocpp.org). In the non-risk group, 8 families (32%) had income levels over $60,000, 10 families (40%) between $40,000 and $60,000, and 7 families (28%) between $24,000 and $40,000. In the risk group, 15 families (30%) had yearly incomes of less than $12,000, 8 families (32%) between $12,000 and $24,000, and 1 family (4%) between $24,000 and $40,000.

Differences were found between the groups in the number of caregivers per child. Caregivers in the non-risk group had fewer children (2 caregivers per 1.6 children) than in the risk group (1.8 caregivers per 1.8 children). Such differences were attributed to 8 single caregivers in the risk group, while there were 24 joint caregivers in the non-risk group.

Table 5

Estimated Rate in Population of the United States, Oregon, Eugene, and Springfield ($N = 50$)

	United States	Oregon	Eugene	Springfield	Study
Male	49.0%	49.4%	48.4%	48.9%	36%
Female	51.0%	50.6%	51.7%	51.1%	64%
Caucasian	74.7%	86.8%	85.5%	89.6%	60%
Hispanic	14.5%	9.9%	6.3%	6.9%	8%
Asian	4.3%	3.5%	5.9%	1.1%	8%
African American	12.1%	1.6%	1.0%	0.7%	2%
Native American	0.8%	1.3%	0.9%	1.4%	0%
Pacific Islander	0.1%	0.2%	0.1%	0.3%	2%
Two or more races	1.9%	3.0%	2.7%	3.8%	20%

Note. Data for United States, Oregon State, Eugene, and Springfield were derived from the U.S. Census Bureau, 2005 American Community Survey.

Trained Examiners

Two trained examiners with early intervention Masters degrees took part in the research study. One examiner had administered the Battelle-2 and the ASQ more than 50 times; the second examiner received class instruction on the two measures and had four additional hours of training. The training consisted of a one-hour instruction from a professional examiner working in a local early intervention organization, another one-hour observation of the experienced examiner's administration of the Battelle-2 and the ASQ-IT, and a one-hour practice with the Battelle-2 and the ASQ-IT with a young child and a parent. Prior to the first administration of the Battelle-2 and the ASQ-IT, the examiners demonstrated strongly reliable agreement in conducting the BDI-2 (i.e., .95) and the ASQ-IT (i.e., .90).

Examiners administered the Battelle-2 and the ASQ-IT to 40 families. The remaining ten families had personal issues, such as moving or unemployment, or could not work out a schedule with the examiners and did not receive the second set of assessments.

Psychometric Statistics

A variety of statistics may be used to describe the psychometric information and outcomes from tests and measures. Proper selection of statistical method depends upon the types of psychometric data being gathered (Gall, Gall, & Borg, 2003).

The current study focused on psychometric properties of the ASQ-IT. Three types of psychometric statistics were examined: test validity, test reliability, and item statistics. The first two research questions examined test validity, the following two questions

explored test reliability, and the last three questions investigated item statistics and test validity.

Test Validity

Test validity pertains to how accurately a test measures the variable that it is intended to measure (Salvia & Ysseldyke, 2004). Validity statistics center on the measurement actually performing the functions that it is supposed to perform, and avoiding as much as possible errors attributable to the imperfect nature of measurement (Gall, Gall, & Borg, 2003; McLean, Wolery, & Bailey, 2004). Validity studies often confirm a scale as "valid or invalid" compared to a measure with which it is correlated.

This study included two types of validity: concurrent validity (research questions 1 and 2) and known group validity (research question 6). Concurrent validity analyses attempt to understand whether a test functions in ways predicted by the background construct theory. This function is validated by comparing scores of the measure being investigated with those of a criterion measure as a standard. Known group validity attempts to determine how well the measure discriminates between two groups by comparing the scores of the groups. In this research question, it was hypothesized that the groups might possess different levels of skills or performance. Meaningfulness and appropriateness of the ASQ-IT scores could be verified through these validity questions.

Research Question 1: "What is the agreement between the ASQ-IT total and domain scores completed by parents and the BDI-2 total and domain scores completed by a trained examiner?"

The independent variable for this question was children's performance scores on the BDI-2 completed by the trained examiner and the dependent variable was children's scores on the ASQ-IT completed by parents. One or two weeks after the ASQ-IT was completed by the parents in the home environment, an examiner administered the BDI-2 at the child's home or at the University of Oregon.

Total domain scores of the ASQ-IT and corresponding domain scores of the BDI-2 from 40 children were calculated to evaluate correlations between the two measures. To match domains of the ASQ-IT, several sub domains of the BDI-2 (e.g., adult and peer interactions) were integrated. For the ASQ-IT social-adaptive domain, five sub-domains of the BDI-2 were combined: self-care, personal responsibility, adult interaction, peer interaction, and self-concept and social role. These procedures were previously used by Clifford (2006).

Concurrent validity was examined using Pearson Product Moment correlations that compared scores between the two measures. Findings presented positive linear correlations between .63 and .83 at $p < .01$ levels, as shown in Table 6. Relationships between different domains, such as communication and gross motor, also demonstrated moderate to strong correlations (.45 - .80). The results suggested that the ASQ-IT be able to accurately identify children's developmental status. Figure 5 shows a scatter plot graph for the relationship between the ASQ-IT and the BDI-2.

Table 6

Pearson Correlations between Children's ASQ-IT Completed by Parents and BDI-2 Scores Completed by Trained Examiners

	BDI-2					
ASQ-IT Domain	Commun-ication[a]	Motor (Gross)	Motor[b] (Fine)	Cognitive[c]	Adaptive & Personal-Social[d]	Total
Communication	**.77**	.55	.69	.72	.80	.81
Gross Motor	.55	**.68**	.47	.45	.62	.60
Fine Motor	.60	.61	**.63**	.65	.62	.67
Problem Solving	.79	.60	.77	**.80**	.79	.83
Personal-Social	.69	.76	.63	.64	**.75**	.76
Total	.77	.75	.72	.74	.81	**.83**

Note. The following BDI-2 sub domains were combined: [a]Communication was integrated with the Receptive and Expressive communication; [b]Fine motor domain was integrated with fine and perceptive motor domains; [c]Cognitive domain was integrated with Attention & Memory, Reasoning & Academic Skills, & Perception and Concepts; [d]Adaptive & Personal-Social domain was integrated with five sub domains, Self-Care, Personal Responsibility, Adult Interaction, Peer Interaction, and Self-Concept and Social Role domains.

$p < .01$ (two tailed test).

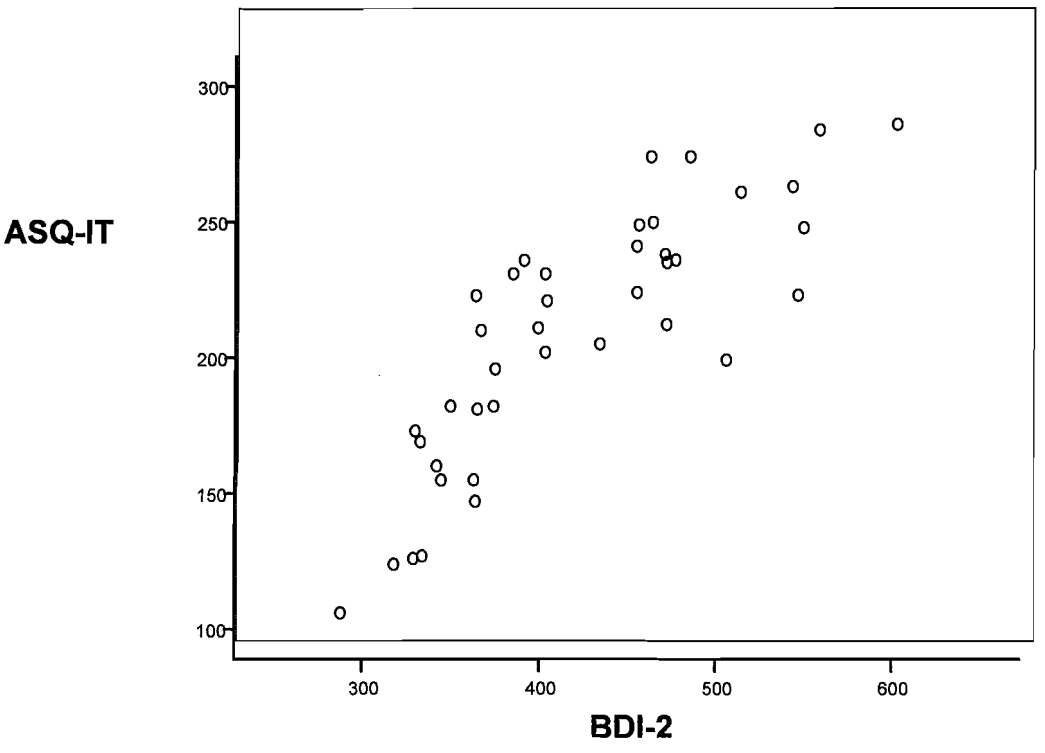


Figure 5. A scatter plot for the relationship between the ASQ-IT total scores completed by parents and the BDI-2 total scores completed by trained examiner.

Research Question 2: *"What is the agreement between the ASQ-IT total and domain scores and the BDI-2 total and domain scores completed by a trained examiner?"*

The performance of 40 children was assessed with the ASQ-IT and the BDI-2 at the test examiner's visit. Due to time limits imposed by the approximately one-hour visit, the BDI-2, a standardized measure, was administered at the beginning of the visit. While administering the BDI-2, the examiner completed corresponding items on the ASQ-IT, which allowed observation in the natural environment based on knowledge obtained from the BDI-2 test. This procedure was done to make test administration more efficient when observing the similar skills asked from the two measures (e.g., "Walks up and down stairs without assistance" from the Battelle-2 and "Does your child walk up or down stairs at least two steps by himself?" from the ASQ-IT). Only ASQ-IT items that were not matched to those of the BDI-2 were observed separately.

The degree of agreement between total and domain scores of the ASQ-IT and equivalent scores of the BDI-2 was investigated using Pearson Product Moment correlation coefficients. Robust correlations between the both test domain scores (.72 - .89) and test total scores (.92) were revealed at $p < .01$ levels. Acceptable correlations between different domain scores (e.g., gross motor scores of the ASQ and communication scores of the BDI-2) were also presented in a range of .63 - .89. A table and a scatter plot graph demonstrate the relationships between scores on these two measures in Table 7 and Figure 6 respectively.

Table 7

Pearson Correlations between Children's ASQ-IT and BDI-2 Scores Completed by Trained Examiner

	BDI-2					
ASQ-IT Domain	Commun-ication[a]	Motor (Gross)	Motor[b] (Fine)	Cognitive[c]	Adaptive & Personal-Social[d]	Total
Communication	**.85**	.77	.82	.82	.85	.89
Gross Motor	.67	**.72**	.72	.59	.74	.74
Fine Motor	.67	.63	**.81**	.67	.70	.74
Problem Solving	.82	.65	.79	**.82**	.87	.88
Personal-Social	.83	.75	.79	.80	**.89**	.90
Total	.86	.78	.87	.83	.90	**.92**

Note. The following BDI-2 sub domains were combined: [a]Communication was integrated with the Receptive and Expressive communication; [b]Fine motor domain was integrated with fine and perceptive motor domains; [c]Cognitive domain was integrated with Attention & Memory, Reasoning & Academic Skills, & Perception and Concepts; [d]Adaptive & Personal-Social domain was integrated with five sub domains, Self-Care, Personal Responsibility, Adult Interaction, Peer Interaction, and Self-Concept and Social Role domains.

$p < .01$ (two tailed test).

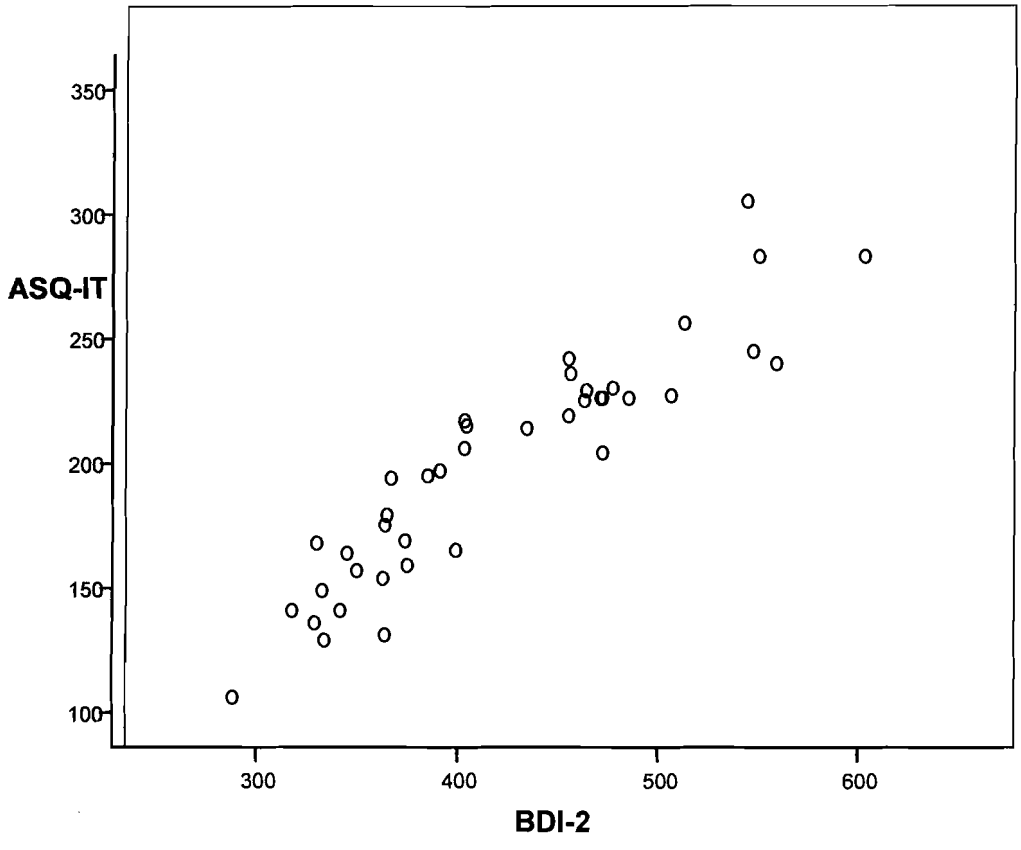


Figure 6. A scatter plot for relationship between the ASQ-IT total scores and the BDI-2 total scores completed by examiner.

Test Reliability

Test reliability refers to "the consistency, stability, and precision of a set of tests" (Gall, Gall, & Borg, 2003, p. 149). A study is reliable when consistent data under similar conditions can be collected across different examiners or times (Salvia & Ysseldyke, 2007). With any test producing scores, there is the possibility of measurement error. There is, therefore, a tendency to admit a small amount of error as reliable. Studies on reliability examine how many errors are attached to a particular score based on reliability coefficients or standard errors of measurement.

This present study examined two types of reliability for the third and fourth research questions, test-retest reliability and inter-observer reliability. Test-retest reliability applies the same measure to the same people at least two times and a high degree of association between the sets of tests is expected. There is a key issue to consider in determining the time interval between test sets. Administering the test sets two weeks apart is common practice because it can prevent parents from remembering and simply repeating the same responses, which may happen if the test sets are given within a shorter interval. The two week interval can also exclude probabilities that real changes in skills or behaviors of participants have occurred.

Inter-observer reliability focuses on the extent to which two or more observers agree on the same phenomenon, using the exact same measure. A study is reliable if two or more observers produce similar ratings to the same behaviors. To enhance consistent outcomes from observers, a research investigator, such as in this case, offers training and monitoring of scoring skills in the examiners.

Research Question 3: "What is the test-retest reliability of the ASQ-IT measured as the agreement between the ASQ-IT total scores completed by parents at a two-three week interval?"

One hundred sets of ASQ-IT scores from 50 children and 49 parents who participated in Test 1 and Test 2 two or three weeks apart were gathered. The ASQ-IT was completed by parents in the first week (i.e., the independent variable). The same parents completed the ASQ-IT on the same children two or three weeks later (i.e., the dependent variable). Total and domain raw scores from the two sets of the ASQ-IT were analyzed for test-retest reliability.

Unlike the previous correlation questions which measured the tendency of two test scores to increase or decrease together, this test-retest stability question attempted to understand the extent of agreement as well as relationships between the two tests (Wuensch, 2007). Intraclass correlation analysis was employed to find mean scores, standard deviations, and correlation coefficients from total and domain scores of the ASQ-IT.

Test-retest reliability was reflected by correlations between the two tests in a range of .79 - .93. With a 95% confidence interval (i.e., an alpha of .05), no significant differences in the ASQ-IT total score were found between Test 1 and Test 2, which implied very strong agreement between these tests, $F(1, 48) = 0.18, p > .64$. In examination of test-retest reliabilities of the risk group (.68 - .92) and the non-risk group (.76 - .96), few differences appeared between these groups. However, these reliabilities also indicated acceptable correlations between Test 1 and Test 2. Mean scores and

Table 8

Agreement between Children's Test 1 and Test 2 ASQ-IT Scores

ASQ-IT Domains (Maximum Points)	Test 1 Mean (*SD*)	Test2 Mean (*SD*)	Mean Difference (*p*)	ρ_I
Communication (64)				
Total Group	42.46 (13.00)	42.96 (13.13)	-0.50(.49)	.92
Non-risk Group	43.52 (13.39)	43.28 (13.16)	0.24(.74)	.96
Risk Group	41.40 (12.79)	42.64 (13.35)	-1.24(.33)	.89
Gross Motor (60)				
Total Group	41.88 (8.75)	41.48 (9.33)	0.40 (.64)	.79
Non-risk Group	42.35 (8.68)	41.60 (9.61)	0.76 (.56)	.76
Risk Group	41.40 (8.99)	42.64 (9.23)	-1.24 (.97)	.82
Fine Motor (70)				
Total Group	34.70 (9.33)	35.76 (10.18)	-1.06 (.23)	.80
Non-risk Group	35.72 (10.78)	37.72 (11.75)	-2.00 (.11)	.86
Risk Group	33.68 (7.69)	33.80 (8.09)	-0.12 (.93)	.68
Problem Solving (66)				
Total Group	41.56 (11.53)	41.32 (11.49)	-0.24 (.75)	.89
Non-risk Group	43.04 (12.99)	43.56 (12.95)	-0.52 (.58)	.94
Risk Group	40.08 (9.91)	39.08 (9.55)	1.00 (.41)	.81
Personal-Social (66)				
Total Group	45.22 (12.05)	45.40 (11.33)	-0.18 (.81)	.90
Non-risk Group	44.68 (13.61)	45.68 (12.59)	-1.08 (.34)	.91
Risk Group	45.84 (10.50)	45.12 (10.17)	0.72 (.48)	.88
Total (326)				
Total Group	203.52 (48.66)	204.74 (50.12)	-1.22 (.64)	.93
Non-risk Group	209.24 (55.34)	211.84 (55.93)	-2.60 (.51)	.94
Risk Group	202.4 (43.13)	202.00 (44.84)	0.40 (.91)	.92

Note. $p < .05$ (two-tailed test).

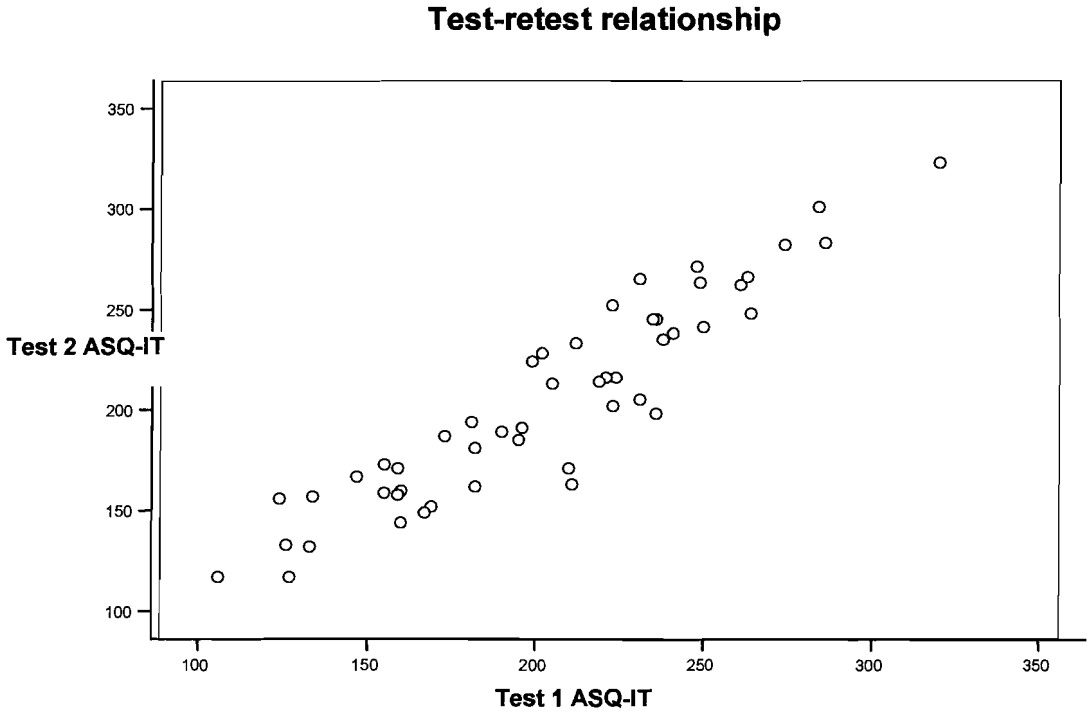


Figure 7. A scatter plot graph for the test-retest reliability of the ASQ-IT total scores from 49 parents.

standard deviations between Test 1 and Test 2 are presented in Table 8, and a scatter plot graph for the test-retest reliability appears in Figure 7.

Research Question 4: *"What is the inter-observer reliability of the ASQ-IT measured as the agreement between the ASQ-IT completed by parents and by trained examiners on a child?"*

Agreement between parents and trained examiners on the ASQ-IT was examined. Forty parents scored the ASQ-IT based on knowledge and observation of the child's performance in natural environments, such as at home, in the park, or in the child's childcare program. The parent-completed ASQ-IT was completed first; one or two weeks later, examiners scored the ASQ-IT on the same children.

Intraclass correlation (ICC) coefficients were calculated to ascertain a degree of agreement and linear association between the two groups of raters. Findings from the ICC coefficients (.64 - .88, $p < .01$) and small mean differences (0.05 - 9.73) for ASQ-IT total and domain scores indicated reliable relationships between these groups. Additionally, ICC coefficients of the risk group (.58 - .88) and the non-risk group (.71 - .89) presented moderately acceptable to robust agreements. A statistic summary including mean scores and standard deviations for each group of evaluators, mean differences, and ICC coefficients for each domain is in Table 9. ASQ-IT scores of examiners and those of two groups of parents, non-risk and risk, can be compared in Table 10. Figure 8 shows a scatter plot graph for the inter-rater reliability between parents and examiners.

Table 9

Agreement between ASQ-IT Scores of Parents and Examiners

ASQ-IT Domains (Maximum points)	Professional Mean (SD)	Parent Mean (SD)	*Mean Diff.* (*p*)	ρ_I
Communication (64)	40.18 (11.96)	43.25 (12.57)	-3.07* (.0089)	.83
Gross Motor (60)	37.95 (8.67)	42.33 (8.89)	-4.38* (.0001)	.69
Fine Motor (70)	34.05 (10.13)	34.60 (8.38)	-0.55 (.6646)	.64
Problem Solving (66)	41.00 (10.20)	42.13 (10.82)	-1.13 (.2526)	.83
Personal-Social (66)	45.85 (10.42)	46.45 (11.62)	-0.60 (.5858)	.81
Total (326)	199.03 (46.46)	208.75 (46.73)	-9.73* (.0106)	.88

Note. $p < .01$ (two-tailed test).

Table 10

Agreement between ASQ-IT Scores of Parents and Examiners for Non-risk and Risk Groups

ASQ-IT Domains (Maximum points)	Non-risk Group				Risk Group			
	Professional mean (*SD*)	Parent mean (*SD*)	Mean diff. (*p*)	ρ_I	Professional mean (*SD*)	Parent mean (*SD*)	Mean diff. (*p*)	ρ_I
Com. (64)	41.60 (13.90)	44.45 (12.54)	-2.85 (.07)	.88	38.75 (9.81)	42.05 (12.81)	-3.30 (.07)	.80
GM (60)	37.4 (9.18)	41.85 (8.41)	-4.45 (.01)	.72	38.50 (8.33)	42.80 (9.53)	-4.30 (.02)	.62
FM (70)	34.35 (12.52)	34.80 (8.75)	-0.45 (.82)	.71	33.75 (7.33)	34.40 (8.22)	-0.65 (.68)	.58
PS (66)	43.25 (10.30)	43.25 (11.56)	0.00 (1.00)	.79	38.75 (9.83)	41.00 (10.19)	-2.25 (.06)	.88
P-S (66)	46.35 (12.08)	45.35 (12.99)	1.00 (.47)	.89	45.35 (8.74)	47.55 (10.28)	-2.20 (.22)	.68
Total (326)	202.95 (53.61)	209.70 (50.06)	-6.75 (.26)	.88	195.10 (39.05)	207.80 (44.44)	-12.70 (.01)	.88

Note. Com. = communication domain; GM = gross motor domain; FM = fine motor domain; PS = problem solving domain; and P-S = personal-social domain.

$p < .01$ (two-tailed test).

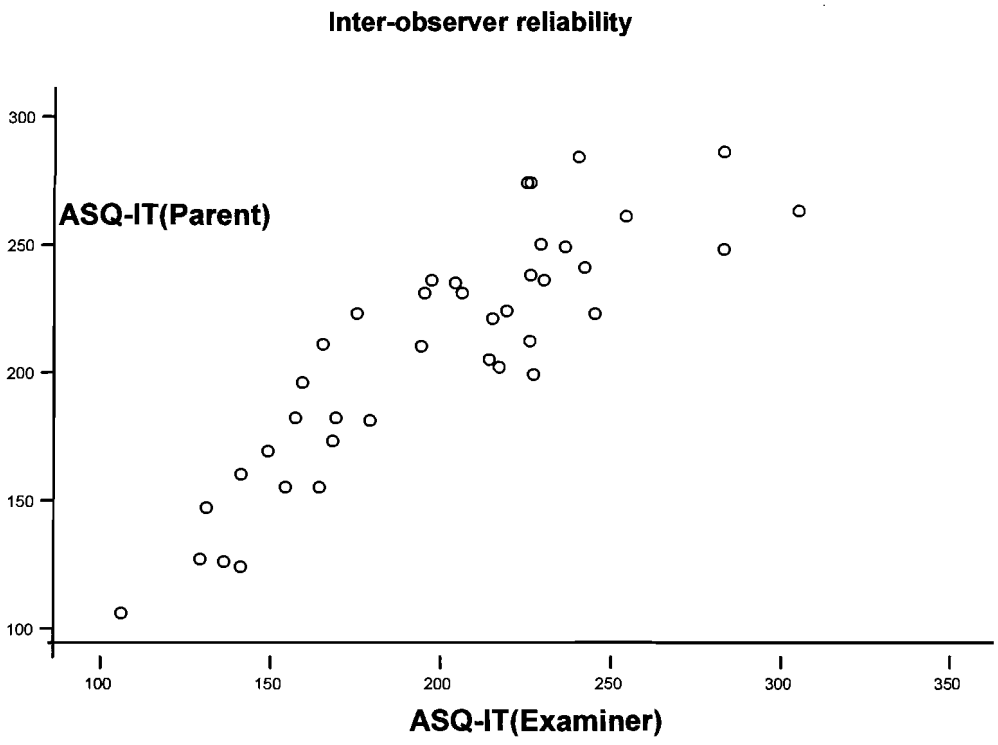


Figure 8. A scatter plot graph for the inter-rater reliability between parents and examiners.

Item Statistics

Item response theory (IRT) relates characteristics of individuals (latent traits) and characteristics of items (item parameters) to the probability of a correct response. Item statistics entail three assumptions: (a) an individual's correct response to a test item reveals an ability; (b) individuals having different abilities will perform differently on the item; and (c) a mathematical logistic function is used to specify the probability of a distinct outcome (i.e., a correct or incorrect answer to an item) in terms of person and item parameters (Embretson & Reise, 2000; Gall, Gall, & Borg, 2003). Person parameters refer to the respondent's ability or the strength of a person's attitude. Item parameters involve item difficulty, item discrimination, and guessing probability parameters (Embretson & Reise, 2000). The item difficulty parameter refers to the proportion of people who correctly answer the item; the item discrimination parameter refers to the degree to which the item discriminates between persons who can or cannot correctly answer to the item; and the guessing probability parameter refers to effects of guessing on the probability of a correct response.

IRT is mainly used to develop or revise a measure or a test by identifying any problems, such as inability of items to discriminate an individual's performance. Item response theory based differential item functioning (DIF) analysis is used to identify any test items which variantly function to certain cultural, ethnic, organizational, and gender groups (Kyriakides, Kaloyirou, & Lindsay, 2006). A DIF value can be confirmed through detecting a difference in the probability of endorsing an item for people who had the same standing on the latent trait measured by a test (Embretson & Reise, 2000).*Research*

Question 5: "Do the ASQ-IT items consistently function across non-risk and risk groups of children?"

DIF analysis was employed to determine whether individual ASQ-IT items are reasonable and appropriate for assessing the knowledge of two groups of parents, non-risk and risk. An underlying assumption is that parents who have similar knowledge or ability should perform in similar ways on individual ASQ-IT items, regardless of their different environmental conditions (i.e., poverty, low maternal education, and teenage parent at birth). The risk group, the focal group, was a subpopulation of interest to the researcher; the non-risk group, the reference group, served as the standard for comparison in this research question. ASQ-IT scores of the two groups were calculated using a one parameter logistic RASCH rating scale model with WINSTEPS 3.59 software program (Linacre, 2006). The RASCH model estimated item difficulty, only. Discrimination and guessing parameters were constrained to one and zero respectively.

Item fit statistics were investigated prior to the DIF analysis to confirm whether the RASCH model fit the ASQ-IT data by examining infit mean-square (MNSQ) values which indicated misrepresentation of the measurement. Generally, an appropriate MNSQ range is from 0.5 to 1.5. An item with an MNSQ value less than 0.5 or more than 1.5 is considered less productive or unproductive (Linacre, 2006). An MNSQ value near 1 is believed to hardly distort the measurement system. Through ASQ-IT item calibration, several misfit items were excluded: items 15 and 28 in the gross motor domain and items 33 and 35 in the fine motor domain. It was theorized that the misfits were due to few

responses. The remaining items were in an expected range at a .99 MNSQ average score with a .33 standard deviation and were used in the DIF analysis.

DIF analyses identified 4 out of 326 items that worked differently for each group at an alpha value .05, showing a significant difference. Three DIF items were found to calibrate higher for the risk group, while one DIF item calibrated higher for the non-risk group. Items higher for the risk group involved one item in the communication, the fine motor, and the personal-social domains respectively and the non-risk group involved one item in the personal-social domain. Table 11 demonstrates *t* values, DIF items and the contents, and the domains of the risk and non-risk groups.

Table 11

DIF Items and Contents, t Values, and Associated Domains of Risk and Non-risk Groups

Group	*t*	Item	Domain	Content
Risk	0.4*	# 19	Communication	Correct use of the following words, me, I, mine, or you
	0.2*	# 23	Fine Motor	Unbutton one or more buttons
	0.1**	# 25	Personal-Social	Serving oneself, taking food from one container to another using utensils
Non risk	0.2*	#32	Personal-Social	Telling the following, such as age, boy, girl, first name, or last name

Note. * $p \leq .05$. ** $p \leq .01$.

Research Question 6: "Do the ASQ-IT scores completed by parents discriminate between non-risk and risk groups of children?"

Total raw scores of ASQ-IT completed by parents in the first week were analyzed to identify whether the scores were able to distinguish between the performance of the two groups. It was hypothesized that a child's environmental risk conditions (e.g., family low income, teenage parent at birth, and low maternal education) adversely affect growth. Such types of disadvantages in a child's life may be related to a delay in development. It was hypothesized that children experiencing environmental risks would have poorer developmental outcomes than those having no risks. An analysis of covariance was used; risk conditions were used as the independent variable and age was used as a covariate. The dependent variable was ASQ-IT scores.

Statistically significant outcomes were found in the interaction between the risk conditions and age, $F(1, 46)$, $p < .05$. As age increased from 17 months to 37, considerable differences in the development appeared between the groups. Figure 9 presents these outcomes with line graphs. Table 12 presents F and p values and Table 13 presents least mean scores of the two groups and p values.

Table 12

Fixed Effects for Risk and Age

Source	df_N	df_D	F	p
Risk	1	46	2.53	.1185
Age	1	46	192.42**	<.00001
Age x Risk	1	46	5.48*	.02361

*$p < .05$. **$p < .01$.

Table 13

Least Squares, Means, and the Differences between Risk Status and Age

Age (Months)	*M*		*Difference*	SE_{Diff}	*t*	*p*
	Non-risk	Risk				
20.00	157.11	153.72	3.39	9.75	0.35	.7295
26.85	217.40	196.60	20.80	6.30	3.30*	.0018
36.00	298.00	253.92	44.08	11.77	3.74*	.0005

*$p < .01$ (two-tailed).

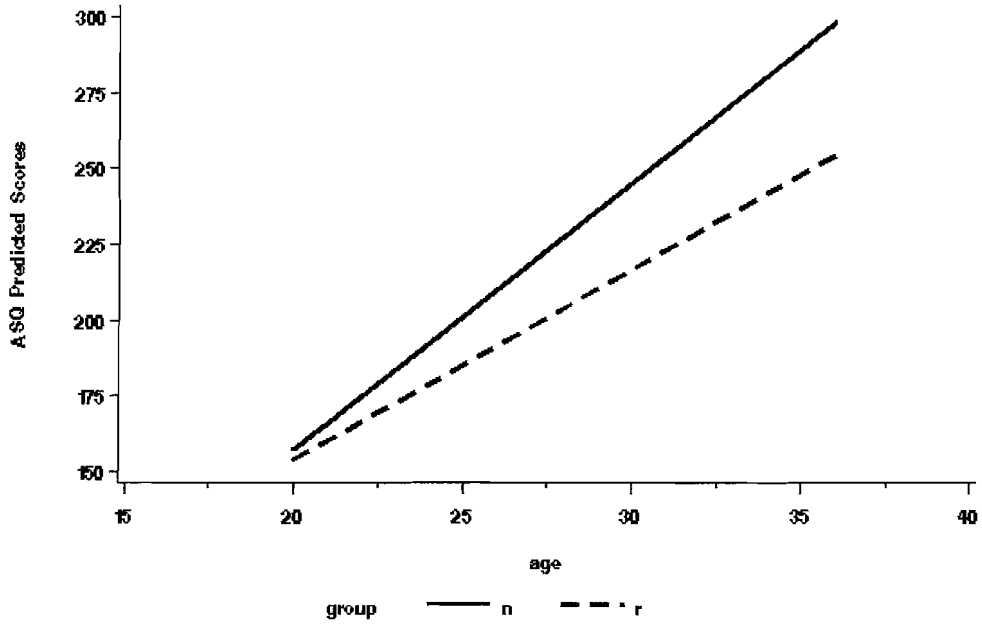


Figure 9. A graph illustrating the relationship between age and the ASQ-IT total scores for non-risk and risk groups ($N = 50$).

Social Validity

Social validity refers to "consumers' access to and satisfaction with the assessment procedures" (Salvia & Ysseldyke, 2001, p. 46). Access indicates how the assessment was administered, including convenient physical location and schedule for consumers. Satisfaction is implied by consumers' agreeable responses to questionnaires and interviews. Data for social validity are collected after the assessment is conducted.

Research Question 7: "What is the satisfaction level of parents who have completed the ASQ-IT?"

The final question, parental satisfaction with the ASQ-IT, was measured using the ASQ-IT Family Satisfaction Survey. This survey included four questions related to administration time, ease of completing the ASQ-IT, difficulty in completing the questionnaire, and benefits from completing the ASQ-IT. Additional comments on improving the ASQ-IT were solicited. Appendix B includes the Family Satisfaction Survey. Percentages were calculated for the 50 parent responses.

Administration time. Parents were provided with four choices regarding completion time on the ASQ-IT: less than 20 minutes, 20-40 minutes, 40 minutes-1 hour, and more than 1 hour. Forty-nine parents out of 50 responded; 16% of the parents (N = 8) indicated less than 20 minutes for completion of the ASQ-IT, 52% (N = 26) specified 20-40 minutes, 20% (N = 10) specified 40-60 minutes, 10% (N = 5) specified more than one hour, and 2% (N = 1) did not responded. A graph demonstrating these results is contained in Figure 10.

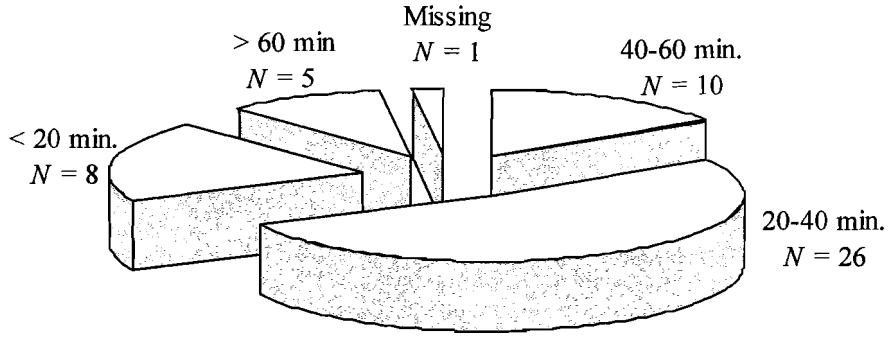


Figure 10. Parent estimation of administration time for the ASQ-IT.

Ease of completing the questionnaire. Fifty parents reported their perceptions on ease of completing the ASQ-IT with three choices: yes, sometimes, and no. Approximately three-quarters of parents ($N = 39$, 78%) found the questionnaire easy, ten (20%) thought it sometimes easy, and only one parent (2%) thought it difficult. This information is presented in Figure 11.

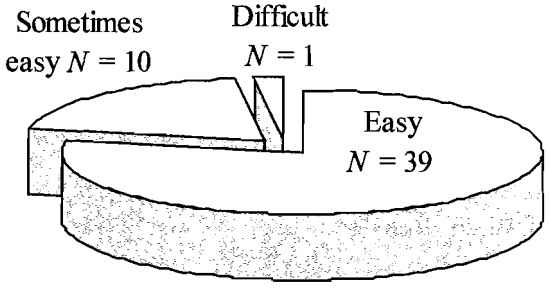


Figure 11. Parent perception of ASQ-IT ease of completion.

Difficult items. This question asked whether any items were difficult to complete. Information on individual items was requested with five potential reasons for difficulty including: (1) difficult to understand, (2) not an activity our family does, (3) didn't have materials, (4) child wouldn't try skills, and (5) other. A space was provided for additional explanations. Nine parents provided item numbers and reasons that these items were difficult to complete. One parent identified two items that were difficult to understand. Four parents specified seven items comprising activities the families normally would not do. Three parents stated that three items required materials that they did not have at home. Two parents recognized four items their child would not try. In addition, four parents mentioned three items that were difficult to complete for several reasons. For instance, an item offering a toy seemed more appropriate for young children than her child. Table 14 presents difficult items and their content, reasons for difficulties, and the number of parents who identified the difficulties.

Table 14

Difficult ASQ-IT Items Reported by Parents

Reason for difficulty	# of parent	# of Item/domain	Content
Difficult to understand	1	#20 in PS	Copying the bridge with blocks, boxes, or cans after watching a bridge
		#25 in PS	Saying a word meaning a person (e.g., boy, man) after watching the figure like a snowman
Not an activity our family does	4	#20 in GM	Standing on one foot for 1second
		#21 in GM	Jumping with both feet
		#22 in GM	Jumping forward 3 inches with
		#19 in FM	Cutting paper with child-safe scissors
		#23 in FM	Unbutton one or more buttons
		#26 in FM	Cutting a paper in half on a straight line
		#29 in FM	Drawing a line across a piece of paper
Didn't have materials	3	#19 in FM	Cutting paper with scissors
		#20 in FM	Threading a shoelace through a bead or an eyelet of a shoe
		#20 in PS	Copying the bridge with blocks, boxes, or cans after watching a bridge
Child wouldn't try skill	2	# 27 in FM	Copying a cross design with a pencil or crayon without tracing
		#28 in FM	Copying at least three shapes
		#31 in FM	Copying the letters, V, H, & T
		#8 in PS	Putting things away where they belong, e.g., blanket & dish
Others	4	#18 in FM	Drawing a line from one side of paper to the other side
		#21 in PS	Drawing a line from the top of the paper to the bottom
		#17 in PerS	Offering a toy to his image when looking at himself in the mirror

Note. GM = gross motor domain; FM = fine motor domain; PS = problem solving domain; and PerS = personal social domain.

Gains from completing the ASQ-IT. Parents were encouraged to select as many advantages from completing the ASQ-IT as they could from seven options: the questionnaire (a) was fun to do, (b) was interesting, (c) alerted me to skills or activities my child could do that I was not sure about, (d) gave me new ideas about how to interact or play with my child, (e) took too long, (f) didn't tell me much, and (g) was a waste of my time. Most participating caregivers positively rated the ASQ-IT as fun, interesting, or beneficial for their parenting. Few negative responses were given. Table 15 displays outcomes from this question.

Table 15

Gains from Completing the ASQ-IT as Reported by Parents

Gains	Amount of response
Fun questionnaire to do	36 (72%)
Interesting questionnaire	39 (78%)
Alerted to new skills	26 (52%)
New ideas about interaction	24 (48%)
Long time to do	2 (4%)
Not much information on development	2 (4%)
Waste time	0 (0%)
Missing	1 (2%)

Comments on improvement of the ASQ-IT. Comments from 20 parents were summarized into roughly four categories. One category described the ASQ-IT as great and easy to understand with nothing to be changed. Another category suggested different approach to effectively work with children (e.g., for a child having short attention span, dividing the ASQ-IT into two or three sections was offered.). The third category of comments was related to the caregiver's better understanding and ease of access to the questionnaire including suggestions, such as adding more pictures, providing a multi-lingual version, and offering online service. The last category of comment referred to the structure of the ASQ-IT, including item rearrangement and less repetition in content. Table 16 presents categories of comments and numbers of parents providing comments.

Table 16

Comments from Parents on Improving the ASQ-IT

Category of comments	Number of parents
Well done	5
For child's short attention: Division of the ASQ-IT into 2-3 sections Professional's administration	7
For caregiver's use Cultural based test More pictures Easy access	5
For the ASQ-IT Better arrangement of items Less repetition	5

CHAPTER V

DISCUSSION

A growing research base in early intervention screening systems supports using parents as screeners of the child (Bodnarchuk & Eaton, 2004; Dieterich, Landry, Smith, Swank, & Hebert, 2006; O'Neill, 2007; Rescorla & Alley, 2001). Results of numerous studies about screening tests have indicated the accuracy of parental information accumulated from numerous opportunities to observe the child. Additionally, parental report about their child's performance has been considered an optimal way to deliver effective screening services (Clifford, 2006; Guralnick, 2005; McLean, 2004; O'Neill, 2007).

Parental input in assessment is necessary for quality measurement. Bagnato and Neisworth (2004) stated that quality measurement representing authenticity and directness can be generated with performance assessment based on direct observation, if time and effort are expended. There are two implications for quality assessment. First, professionals should strive to provide meaningful interpretation that takes into account each family's values. Second, a satisfactory determination of the child's performance should be made with the most accurate description of the child gathered from a variety of sources, such as medical and childcare personnel. Such an approach should be responsive to the concerns of the family and be sensitive to their culture (Hampton, Whitney, & Schwartz, 2002).

This research study attempted to suggest a quality assessment process with in-depth and comprehensive parental knowledge about the child, using the ASQ-IT designed for parents. ASQ-IT items were integrated from the 12-60 month intervals of the ASQ (Bricker & Squires, 1999) that utilized the caregiver's information gained from direct observations about behaviors of their children in natural environments and with efficient use of time and effort. A primary focus in the current study was to examine the validity and reliability of parental report on the child's development when children were between 18 and 36 month olds of age. A secondary intent was to gather evidence in support of the use of an effective assessment tool, the ASQ-IT, by demonstrating its accuracy.

This chapter discusses interpretations and implications of the results obtained from the use of the ASQ-IT. Suggestions for future research studies and a conclusion are also included.

Interpretation of Results

Participants

A total of 50 parent-child dyads were recruited for this research study. Based on the environmental conditions including maternal education, family income, and maternal age at the child's birth, the participants were split into two groups, non-risk and risk. The non-risk group participants were recruited through local childcare programs, internet advertisement (e.g., Craigslist Website), and the recommendation of other parents who chose to participate.

The risk group was recruited primarily at family resource centers (e.g., Brattain House), social community organizations (e.g., First Place & Relief Nursery), and local

preschool programs (e.g., Head Start). Compared with the non-risk group (i.e., three month period for recruitment), recruitment of this group took a longer period of time, approximately six months. Many families who returned the ASQ-IT packets late appeared to have several issues related to financial burden, child custody problems, unemployment, and homelessness.

Participating children showed a relatively well-balanced distribution in the overall age range of 17 to 37 months. In the age range of 17-24 months, the non-risk group included 11 children and the risk group included 8 children. Fewer children ($N = 7$) in the age range of 31-37 months were represented in the non-risk than in the risk group ($N = 10$); however, the age range of 25 to 30 months had an identical number of participants in each group ($N = 7$).

The two groups, assigned by the recruitment criteria, varied widely in family characteristics, although families in the risk group shared many risk factors. Stanton-Chapman, Chapman, Kaiser, and Hancock (2004) report that a combination of multiple risk factors, such as father absent, large family size, and low maternal education, are frequently present in the environments of children living in poverty. In the current study, all parents in the non-risk group attained a higher level of education and had a higher family income level (i.e., more college and bachelor degrees and more than $24,000 annual income), while half of parents in the risk group ($N = 12$, 48%) had lower educational attainment and lower family incomes (i.e., high school diploma or incomplete high school, and less than $24,000 annual income). Moreover, the risk group averaged 1.7 parents (eight single mothers) taking care of 1.8 children, while the non-risk group

averaged two caregivers taking care of 1.6 children. Risk group families appeared more likely to encounter multiple challenges, such as financial difficulty and less support in rearing the children from the family. Table 17 illustrates differences in the number of caregivers and children between the groups.

Table 17

Numbers of Caregivers and Children in Non-Risk and Risk Groups

Group	Number of Caregivers			Number of Children in Families		
	1	2	3	1	2	3
Non-risk	0	25	0	10	14	1
Risk	8	16	1	9	12	4

Demographic characteristics of the sample failed to reflect the estimated local population in terms of ethnicity and gender. Compared with national and local demographic data and previous studies, a larger percentage of ethnically diverse participants took part in this research. In particular, involvement of multiracial children might be attributed to the recruitment location, a college town that might provide opportunities to meet people from different cultures. A limitation included more girls (N = 32, 64%) than boys (N = 18, 36%) in the sample. Counteracting this limitation was a finding acquired from ANCOVA for these groups indicating no discrepancy ascribed to the unequal amount in gender, $F(1, 46) = 0.01, p > .90$.

Another potential limitation may be associated with recruitment locations. The need of establishing appropriate assessment places and coordinating schedules between parents and trained examiners might have limited recruitment locations to areas in close proximity to the college. All of the participants were recruited from towns within 30 miles from the college city. A more balanced sample including a variety of rural and urban families with diverse demographic variables should be recruited in the future to augment these results.

Research Question 1: Concurrent validity between parent-completed ASQ-IT and examiner-completed BDI-2. A parent-completed ASQ-IT was followed by an examiner's administration of the BDI-2 after two to three weeks. Outcomes of this concurrent analysis were consistent with those of the study by Squires and her associates (1998), which presented favorable relationships in a comparison of parent-completed tests and professionally administered standardized assessment.

In agreement with the body of literature that discusses challenges in assessing some young children due to their diverse characteristics, such as the child's distractibility, lack of endurance, and limited socialization, the trained examiners described difficulties they encountered, such as the child's short attention span, noncompliance, and stranger anxiety (Bowe, 2004; Guralnick, 2005; McLean, et al., 2004). An additional challenge included the limited time (i.e., 50-60 minute home visit) in which to observe the child's behaviors. In considering these challenging assessment conditions, the findings from this validity study appeared to support parent-completed measures rather than professionally-administered measures to assess a child's developmental status.

Research Question 2: Concurrent validity of the ASQ-IT and the BDI-2 completed by trained examiner. A Pearson Product correlation coefficient comparing the total scores of the ASQ-IT and the BDI-2 indicated almost perfect agreement (r = .92). Domain scores of the ASQ-IT and corresponding domain scores of the BDI-2 were also highly correlated in a range from .72 to .89. These outcomes provided to support the proposition that ASQ-IT and BDI-2 items cover very similar content; the ASQ-IT could be used with confidence for the purpose of screening and further establishing eligibility.

The assessment procedure was begun with administration of the BDI-2 test, followed by completion of the ASQ-IT. Completion of the ASQ-IT was primarily made by the examiner with the knowledge obtained from conducting the BDI-2 test, as the BDI-2 is a standardized test that is performed with predetermined activities and materials. Consideration of limited time (50-60 minutes) also discouraged completing the ASQ-IT first. With this assessment condition, the strong correlations and similar content of the two measures would be an expected outcome. However, there were some possibilities that if the administration procedure of these measures had been different, the agreement might not have been so high.

Research Question 3: Test-retest reliability of the ASQ-IT. Time 1 and Time 2 total and domain scores of the ASQ-IT completed by parents in a two-three week interval were analyzed to estimate test-retest reliability. Results from ICC analysis demonstrated robust correlations at .93 and a smaller mean difference between total scores of the two measures, $F(1, 48) = 0.18, p > .64$. Each domain score also showed few differences between the two tests with p values from .23 to .81 in a two-tailed test.

In the examination of group interaction over two weeks, only a few differences between ASQ-IT total and domain scores of the non-risk and the risk groups were found, $p = .24$ - .67. In the non-risk group, ASQ-IT total scores from 15 parents slightly increased at Time 1 test ($M = 13.2$), 9 parents' scores decreased ($M = 16.8$), and 1 parent scored the same on both. In the risk group, 10 parents presented slightly increased scores ($M = 16.9$), 15 had decreased ones ($M = 12$), and no one presented the same score as before. Overall, out of 163 items (total score: 326) these differences were minor. Table 18 presents mean scores of the Time 1 and Time 2 tests between the non-risk and the risk groups.

Table 18

Mean Scores of Non-Risk and Risk Groups at Time 1 and Time 2

Group	Time 1 mean score	Time 2 mean score	Difference
Non-risk	209.24	211.84	2.60
Risk	202.40	202.00	-0.40
Total	203.52	204.74	1.22

Note. A maximum score of the ASQ-IT is 326.

There were several possible explanations on the small changes between Time 1 and Time 2 ASQ-IT administrations. As demonstrated in findings of O'Neill's study (2007), the pace of development in young children could be one reason for the increase in the later test scores. In the current study, there was an increased mean score in the Time 2 test. Particularly, there was a difference between Time 1 and Time 2 in the non-risk group; the risk group children were scored almost the same at Time 1 and Time 2.

A second explanation, supported by a study of Squires and her associates (1998), was that parents who were aware of the child's weaknesses in developmental skills might encourage strengthening of those skills in the child. A mother of twin girls who believed the girls were indistinguishable in development skills stated that she discovered different strengths and weaknesses in their development while completing the ASQ-IT at Time 1. After two weeks, it was found that the one twin who had a lower score at Time 1 showed more progress in development than the other twin (ASQ-IT score: 21 vs. 9).

Another explanation revolves around a lack of parental understanding about the child's emerging skills, as addressed in results of the previous study by Clifford (2006). Indeed, the ASQ-IT at Time 1 was independently completed by parents, using knowledge from their direct observation and experiences with the child, while the Time 2 ASQ-IT was completed just before the trained examiner's administration of the BDI-2 and the ASQ-IT. Although no interaction occurred between the trained examiner and the parent, it was more likely for parents to do the Time 2 administration based on information gained while observing the examiner's administration, which might clarify their grasp of the child's emerging skills.

Taking into consideration a small degree of measurement error, the findings related to test-retest constancy supported evidence of reliable parent report. Additionally, it was suggested that the ASQ-IT would be appropriate for monitoring changes in children's development over time.

Research question 4: Inter-observer reliability of the ASQ-IT scores. Parent completed test scores and professionally administered test scores on the same children were compared to estimate inter-observer consistency. Fewer differences between mean scores of ASQ-IT completed by parents and examiners, and the intraclass correlation (ICC) coefficients from .64 to .88 suggested a substantial level of concordance and relationship between the two groups of raters.

Interestingly, higher scores in all of the domains of behaviors (0.55 - 4.38 points) were obtained from the parents rather than from the professionals. Wetherby and her associates (2002) noted a pattern of parent evaluation of young children's developmental repertoires. These researchers described that parents with low socio economic status (SES) were inclined to overestimate the child's skills and those with high SES were inclined to underestimate the skills. The current study suggested similar results, although participating groups were small. The non-risk group of parents reported means 5.6 points higher than the examiners' scores, while the risk group reported means 10.16 points higher.

The study by Bodnarchuk and Eaton (2004) explained that parental report was made from their memories, whereas the professional examiners scored children from direct observation. The participating parents in the current study completed the ASQ-IT

with the knowledge accumulated from multiple occasions and were supposed to try ASQ-IT items they were not sure. Meanwhile the examiner completed the ASQ-IT based on a single 50-60 minute observation. One trained examiner discussed that it was challenging to identify skills of the child at a relatively brief home visit. More challenges existed when assessing a child who demonstrated little interest in the assessment activities. There was a possibility that the child's unfamiliarity with, or lack of knowledge of the standardized materials or activities used for the BDI-2 affected their performance. This potential issue might limit the trained examiner's capacity to develop an accurate picture of the child's developmental status.

The impact of different family philosophies and values on child rearing practices may be another variable that lowered consistency between the raters. An examiner recalled that a mother who emphasized "manliness" to her two-year old boy gave no points on an item asking the child, "to pretend to rock a stuffed animal or doll, feed it, change its diapers, and put it to bed," even if he could do the skill. The examiner described another family in which a mother who emphasized independence to her 30-month-old girl offered a full point on an item requiring her, "to brush her teeth by putting tooth paste on the toothbrush without help" despite her daughter's failure to do it.

Uneven assignment of the participants to the two examiners may have worked against finding perfect concordance between these examiners. One examiner completed 12 assessments and the other completed 28. However, a blind strategy in assigning the parents and the trained examiners and a high agreement between the examiners on the ASQ-IT (.90) might decrease a concern about this issue.

ASQ-IT scores of a large number of parents were highly correlated with the examiners even though several potential limitations appeared. It was suggested that many parents were capable of reliably assessing their child's performance skills.

Research Question 5

Differential item functioning (DIF). DIF may assist in designing a more efficient measure for individuals having different family backgrounds, philosophies, and values. This research question was intended to examine whether ASQ-IT individual items might be differentially functioning for participants of the risk group or the non-risk group.

Findings of this research question indicated that three ASQ-IT items were apt to favor the non-risk groups of participants. Item 19 in the communication domain (i.e., "Correctly using at least two words like me, I, mine, and you"), item 23 in the fine motor domain (i.e., "Unbuttoning one or more buttons"), and item 25 in the personal-social domain (i.e., "Serving herself, taking food from one container to another using utensils") functioned differently when assessing the risk group of children. Alternatively, one DIF item (item 32 in the personal-social domain) malfunctioned for the non-risk group, "Telling at least four from the following: first name, last name, age, boy or girl, city she lives in, and telephone number."

The research study conducted by Sheppard, Han, Colarelli, Dai, and King (2006), identified 37 - 38% of DIF items to gender and race from the Hogan Personality Inventory. In this study, only 2% of DIF items (4 items out of 163) were identified. ASQ-IT items appeared to perform adequately over both groups with a few exceptions.

Research Question 6: Known group validity. The current research question investigated how accurately ASQ-IT differentiates developmental differences between the non-risk and risk groups of children. Known group validity was tested using ANCOVA. Risk conditions and age were significantly interrelated, $p < .024$. As a child aged, the environment of the child significantly affected his or her development. In a study examining preschoolers' motor development by Giagazoglou, Kyparos, Fotiadou, and Angelopoulou (2007), lower skills were observed in children in risk environments than in those in low or risk-free environments. Oxford and Spieker (2006) also found that risk conditions were critical variables impacting the child's undesirable outcomes in their longitudinal study. Consistent with these outcomes, the results of the current research question suggested that environmental risk conditions are associated with less optimal developmental outcomes in children. The findings also supported accuracy of the ASQ-IT in identifying developmental dissimilarities between the performance of children of the non-risk and the risk group.

Research Question 7: *Social validity.* Another effective way to explore appropriate functioning of the ASQ-IT as a screening tool involves investigation of parental perception of the ASQ-IT. It is important to note that the ASQ-IT has been experimentally designed for this research study. Two new elements, starting points and a basal and ceiling rule, were added to the current ASQ-IT version based on the findings of the previous ASQ-IT study (Clifford, 2006). These features allowed children to continue performing skills until they reached a ceiling level. Thus, the amount of ASQ-IT items for each child was determined by the child's developmental capability. Even with written

instructions and illustrations, further assistance was necessary for some participating parents. All except one parent identified completion of the ASQ-IT as easy.

Parent responses concerning completion of the ASQ-IT were gathered on the Parent Satisfaction Survey after the ASQ-IT was completed in phase one. Responses included estimations of administration time, difficult items to complete, and gains from completing the ASQ-IT, and comments on improving the ASQ-IT.

Administration time. Forty nine answers out of 50 were collected for this question. All of the caregivers were requested to begin the first item at the starting point designated for the child's age and stop at the third consecutive "No" answer. For accurate completion of the ASQ-IT, careful reading and thoughtful answering of the parents were asked. Direct observations were encouraged if parents were uncertain whether the children had certain target skills.

Even with such demands and features, the results supported the idea of time efficiency for the ASQ-IT. About 70% of parents ($N = 34$) reported they did the ASQ-IT within 40 minutes. Thirty percent of parents ($N = 15$) reported more than 40 minutes. Several parents who needed more than 60 minutes reported difficulties in holding their child's short attention span and working with a Spanish translator.

Difficult items to complete the questionnaire. Nine parents ($N = 7$ in the non risk group and $N = 2$ in the risk group) described reasons for difficulties. The findings of the current question revealed that many difficulties in the ASQ-IT completion emerged from different family values and cultural backgrounds and characteristics of young children. Several caregivers reported that a few items (e.g., "Standing on one foot for one second

or cutting paper with child-safe scissors") asked about skills that they had not addressed for the child's safety. For parents who believed young children should be supported by adults until the children reached preschool ages, it was not surprising to see the child's lack of adaptive skills, such as "Unbuttoning one or more buttons". In addition to activities that rarely occurred at home, there was another type of difficulty attributable to lack of availability of assessment materials at home, such as scissors or beads.

While parents completed the ASQ-IT, another challenge they encountered was the child's lack of interest in assessment activities. Young children who lacked experience in holding crayons or pencils or copying letters or shapes were less likely to engage in the activities.

Gains from completing the ASQ-IT. A question concerning advantages or disadvantages from completing the ASQ-IT was discussed with 48 caregivers. Many parents offered supportive replies to this question. Approximately three quarters of parents thought the ASQ-IT fun (N = 36, 72%) and interesting (N = 39, 78%). Fifty percent of parents reported an increase in ideas for encouraging skills in the child and in ideas of various ways to interact with the child. However, a negative response of a very few parents (N = 2, 4%), such as obtaining no information on development or spending too much time to do the ASQ-IT, was important to consider. No one believed ASQ-IT completion wasted time.

Comments on improvement of the ASQ-IT. Remarks of 20 parents were encouraging. Five parents (10%) demonstrated their satisfaction with the current ASQ-IT. It was reported that they enjoyed doing the ASQ-IT with the child and had no suggestions

for changes. The remaining 15 parents provided several practical comments on their experiences.

The comments were grouped into three categories. The first category denoted effectively working with the child. For example, for children who were frequently distracted or bored with assessment activities, separation of the ASQ-IT into two to three parts, or a professional examiner's involvement to get the child's attention for the assessment was suggested. There were additional comments on use of culturally bias-free materials rather than materials that favored Western culture (e.g., beads and blocks). The second category for active participation of caregivers in assessment services included inserting more illustrations in the ASQ-IT items that might elucidate their understanding of the target skills, providing an online ASQ-IT service for every caregiver, and offering multi-lingual versions of the ASQ-IT. The last category was pertinent to structure of the ASQ-IT involving rearrangement of the ASQ-IT with small amount of items in a less repetitive way. Discussion of an instructive sign, "Stop" was given, that should be placed at the top of the page versus the bottom in order to easily see it. Developing a more family friendly ASQ-IT may be possible if these comments are acted upon.

Implications for Research

Many research studies in the early childhood assessment field have strived for supporting parent completed measures (Bodnarchuk & Eaton, 2004; Ratner & Silverman, 2000; Wetherby, et al., 2002). Empirical efforts to utilize parents' in-depth and comprehensive knowledge about their child in the assessment with efficient measures have diminished, to a larger degree, apprehension about inaccurate reports by the parents.

Common features of these studies entailed prevailing correlations and a few differences between professional examiners and parents. In the study conducted by Squires, Potter, Bricker, and Lamorey (1998), two groups of child-parent dyads, low and middle socio-economic status (SES) groups participated to complete a developmental measure, the ASQ. An acceptable agreement between examiners and parents was reported, irrespective of the family SES. A recent study found support for validity in a parent completed measure when comparing the professional examiner's report to the parental report (Clifford, 2006). The current study adds to the research literature supporting parents as dependable reporters. Use of a valid measure, the ASQ-IT designed for parental use, facilitated accurate judgment of parents about the child.

However, further research on parental report is still needed, taking into account a variety of confounding variables. Environmental factors involving family SES, educational levels, marital status, and cultural backgrounds, may directly influence accordance between parents and examiners. Other variables in assessment services, such as assessment length, familiarity with materials, and examiners' prejudice toward a child's behaviors, may result in incongruent findings between examiners and parents. An examination considering such variables may further support validity and reliability in a parental report on their child.

Implications for Practice

Previous research on parental report of their child's skills found parental competency related to assessment of current skills (Bodnarchuk & Eaton, 2004; Ratner & Silverman, 2000). Outcomes of these research studies have contributed to developing a

better assessment service for parental uses (Clifford, 2006). The findings of the current study also may be used to support current and future assessment practices using parent report.

The ASQ practice. Outcomes from item statistics indicated several misfit items regarding the Rasch rating scale model. These misfit items, which might be incorrectly placed in the item order, suggested rearrangement of ASQ-IT items. For instance, item 30 in the communication domain (item 6 in the 60 month interval of the ASQ) followed by two more items, "Repeating the sentence after being told without mistakes, Jane hides her shoes for Maria to find" which was the most difficult item in the domain, was rarely scored. Additionally, items that were inconsistently scored depending upon environmental conditions may need to be adjusted or removed in order to accurately measure individuals having different environmental backgrounds. For example, it is recommended to modify or eliminate an item asking "First and last names, age, and boys or girls," that functioned differently for participants of the risk group.

Authentic assessment. Neisworth and Bagnato (2004) who attempted to identify the child's actual skills, asserted that authentic assessment must be used. Conventional assessment collects data in a laboratory setting and often fails to attain a true assessment of functional skills of children, while authenticity in measurement is defined by natural observation of functional skills in the natural environment. The assessment is believed to be most accurate if done by familiar persons who have known the child. The ASQ-IT examination satisfies these conditions. ASQ-IT data were gathered, based on knowledge of parents about the child's skills, as observed in the home or preschool settings.

Moreover, many ASQ-IT items involved functional skills such as taking turns or waiting while a child or adult takes a turn.

Monitoring children's progress. Ongoing surveillance of the child by parents and sensitivity of the measurement tool to detect any changes in growth are necessary for monitoring variations in development (Guralnick, 2005; McLean, 2004). The ASQ-IT investigation suggested that parents were sensitive to the child's performance with the ASQ-IT, which may enable program evaluation in an efficient manner. The ASQ-IT was derived from the ASQ designed to identify at-risk children from a large pool of typically developing children. Accordingly, it is uncertain if the ASQ-IT would be able to accurately evaluate progress of children with disabilities.

Collaboration. Early childhood assessment services foster sharing in-depth knowledge of parents and professional experiences of early interventionists about the child. Parents' lack of information about the child's developmental conditions and needs, however, may cause them to hesitate to work with professionals (File, 2001; Guralnick, 2005). The current study ensured parents' ability to judge the child's performance skills, as well as enhanced their understanding of the child's current developmental status. This might increase their confidence about the child's developmental status and encourage establishment of equal partnerships with professionals.

Individualized service. Intervention service delivery based on characteristics of each child and family addressed by federal foundation law (i.e., IDEA, 1986) resulted in involvement of parents in the assessment process (Bowe, 2004). Such individualized services generally reflect the family cultural differences, philosophies, and values

(Neisworth & Bagnato, 2004). Diverse values of each family were respected in the current ASQ-IT investigation. ASQ-IT items asking about functional skills require observation in the child's natural settings reflecting the family culture and values (Lynch & Hanson, 2004).

Future Directions

Findings from the current study support reliable parent reporting on the child, though it will be advantageous if limitations in the current evidence base are addressed through a variety of future research studies. A follow-up study may focus on rearrangement of ASQ-IT items using item response theory with modified items that functioned differentially for the risk or the non-risk groups. It may be worthwhile if a future study considers parents' different cultural backgrounds, philosophical values, and beliefs. Sampling distribution reflecting US national estimates in gender, ethnicity, and locations, may also assure more robust results. Additionally, a study including more children with and without developmental delays may help establishment of cutoff scores for an early identification decision. Eligibility examination for receiving intervention services with the ASQ-IT may be of great interest to early intervention personnel.

Conclusion

Conducting quality assessment in the early childhood field requires time and effort (Neisworth & Bagnato, 2004). Unfortunately, inadequate and limited resources are common to many screening programs. Quality assessment services, however, may be made with the parents' direct evaluation of their children using an assessment tool with sound psychometric properties. Through parent-completed measures, early intervention

professionals may obtain a more complete picture of the child and perform efficient screening services in terms of time and effort.

The current study examined psychometric information of an experimental measure for children ages 18-36 months to support parental competency in estimating the child's developmental skills and to develop a more efficient screening tool. Although more research is needed with larger numbers of children and parents reflecting national demographic distributions, the findings of this study described much strength in parent-completed assessment and identified results authenticating the validity of the ASQ-IT. It is hoped that these findings will serve to deliver better screening services to young children and their families.

APPENDIX A

RECRUITMENT MATERIALS

Child Development Study

Early Intervention Program
University of Oregon

Young children ages 18-36 months old

Parents of children 18-36 months old:
You are invited to participate in a research study with a parent-completed survey.

Families who participate in the study will receive a $20 gift certificate.

For more information,
Please Call
Hyeyoung Bae (541) 346-7673
or email me at hbae2@uoregon.edu

APPENDIX B

CONSENT FORM

Consent Form
ASQ-IT Study

Dear Parent/Legal Guardian,

You are invited to participate in a research study conducted by Hyeyoung Bae, a doctoral student in the Early Intervention Program at the University of Oregon. This study will investigate the accuracy of a parent-completed assessment tool, The Ages & Stages Questionnaire: Inventory for Toddlers (ASQ-IT). You were selected as a possible participant for this study because you have a toddler between the ages of 18 and 36 months. Participation in this study involves the completion of three questionnaires and one developmental assessment (unless your child has received a developmental evaluation in the last 6 months, in which case results from the current evaluation could be used in place of the developmental assessment). There are three phases to the study. Phase one is likely to take 20 – 35 minutes, phase two is likely to take 40 to 60 minutes, and phase three is likely to take 10 – 15 minutes. Research procedures are outlined in the table below:

Phase One:	Approximate Time	Location
1. You complete: a. A Family Information Form. b. The ASQ:IT c. A Satisfaction Survey.	 5 -10 minutes 10 – 15 minutes 5 -10 minutes	Your home
Phase Two:		
2. A trained evaluator (a graduate of the UO's Early Intervention Master's Program) administers a developmental assessment to your toddler with you present (unless there has been a developmental evaluation within the last 6 months).	35 - 50 minutes	Your home or the Clinical Services Building on the UO Campus (you choose).
3. The trained evaluator administers the Ages & Stages Questionnaire: Inventory for Toddlers with you present.	5 – 10 minutes	Your home OR Clinical Services Building
Phase Three:		
4. You complete: a. The ASQ:IT	10 -15 minutes	Your home

Benefits: In recognition and appreciation of your and your child's participation, you will receive a check for $20.00. Other benefits to participating in this study include the opportunity to participate in assessment, receive information about your child's development, and contribute to early intervention assessment research. In addition, an accurate parent-completed assessment tool may improve the quality of life for some children and their families by including parents in the assessment process and qualifying children for early intervention services.

Potential Risks: The potential risks or discomforts of participating in this study may include but are not limited to the presence of the researcher in the child's home, and inconvenience to the parent and/or child's schedule.

All information that is obtained in connection with this study and can be identified with you will remain confidential and will be disclosed only with your permission except as required by law. Confidentiality will only be broken if there is evidence of child abuse. Researchers are required to notify the appropriate agency if child abuse is suspected. Participant identities will be kept confidential by using initials and numbers rather than real names on documents. In addition, all data will be analyzed according to groups rather than by individual case.

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with the University of Oregon or your child's current educational placement. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time.

If you have any questions please call me, Hye Young Bae, at: (541)346-7673, or e-mail me at hbae2@ uoregon.edu. You can also contact my advisor, Dr. Jane Squires at (541)346-2634, or e-mail her at jsquires@uoregon.edu. If you have questions about your rights as a participant in a research project, or in the event of a research-related injury, please contact the Human Subjects Compliance Office, University of Oregon, at (541) 346-2510 or Juliana_Kyrk@orsa.uoregon.edu. You will be offered a copy of this form to keep.

Your signature below indicates that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation at any time without penalty, and that you are not waiving any legal claims, rights or remedies.

Sincerely,

Hye Young Bae, M.S.

Jane Squires, Ph.D., Advisor

_____ I have read this consent form and agree to participate in the study.

Your Signature: _____ Date: _____

Your name (please print) _____

Child's name (please print) _____

APPENDIX C

MEASURES

ASQ-IT Family Information Form

1. Date questionnaire completed: _____

2. Child's date of birth: _____

   a. Was your child born more than 3 weeks premature? ☐ Yes ☐ No

   b. If yes, how many weeks premature was hi/she? _____

3. Child's gender: ☐ Male ☐ Female

4. Child's race or ethnic group (Please check all that apply):

☐ Asian ☐ White ☐ Native American

☐ Black ☐ Hispanic ☐ Hawaiian or Pacific Islander

☐ Other (Please specify_____

5. Number of children (including child) residing in the child's home:_____

6. Number of caregivers (e.g., mother, father, grandparent) living in child's home:_____

7. Mother's level of education:

☐ Less than high school ☐ Some college

☐ High school ☐ Bachelor's degree or above

☐ AA degree ☐ Don't know

8. Was mother younger than 19 at child's birth? ☐ Yes ☐ No ☐ Don't know

9. Family income:

Yearly	OR	Monthly
☐ 0 - $ 12,000		☐ 0 - $ 1,000
☐ $ 12,000 - $ 24,000		☐ $ 1,000 - $ 2,000
☐ $ 24,001 - $ 40,000		☐ $ 2,001 - $ 3,333
☐ $ 40,001 - $ 60,000		☐ $ 3,333 - $ 5,000
☐ $ Over $ 60,000		☐ $ Over 5,000
☐ $ Don't know		☐ $ Don't know

10. Person answering questions:

☐ Mother ☐ Father ☐ Guardian ☐ Grandparent

☐ Foster parent ☐ Other_____

11. Did someone assist you with the completion of the questionnaire? ☐ Yes ☐ No

If yes, how did they assist? ☐ Training ☐ Reading items/interviewing

☐ Other _____

12. Does your child have a disability, such as a developmental or a communication delay?

☐ Yes ☐ No

If yes, what is his/her disability?_____

13. Does your child receive special services? ☐ Yes ☐ No

If yes, what type of service does he/she receive? _____

Thank you for completing the Family Information Survey!

Please complete the Ages and Stages Questionnaires: Inventory for Toddlers (ASQ-I) next, followed by the ASQ-IT Satisfaction Survey.

ASQ:IT Satisfaction Survey

Instructions: Please complete this survey **after** filling out the ASQ:IT on your child.

1. How long did it take you to complete the questionnaire? **Please check one.**

   ☐ Less than 20 minutes
   ☐ 20 - 40 minutes
   ☐ 40 minutes to 1 hour
   ☐ More than one hour

2. Was it easy to complete the questionnaire? **Please check one.**

   ☐ Yes ☐ Sometimes ☐ No

3. Please provide information on any items that were difficult to complete in the table below:

Please select all that apply:

Question Number	Difficult to understand	Not an activity our family does	Didn't have materials	Child wouldn't try skill	Other (please explain)	Please provide additional comments or explanation in space below. Continue on back if necessary.

4. The questionnaire: (Please check all that apply).

   ☐ was fun to do.
   ☐ was interesting.
   ☐ alerted me to skills or activities my child could do that I was not sure about.
   ☐ gave me new ideas about how to interact or play with my child.
   ☐ took too long.
   ☐ didn't tell me much.
   ☐ was a waste of my time.

5. How would you change this questionnaire to make it better?

_____

Thank you for participating in the ASQ:IT study!

Instructions for participating in the ASQ-IT Study

This study will be conducted in the following three phases. In the phases 1 and 3, parents will complete questionnaire and surveys. In the phase 2, a research assistant will complete questionnaires.

Phase 1:

Please complete the following documents in this order:	Estimated time
1. Consent form	
2. ASQ-IT Family Information Form	5-10 minutes
3. Ages and Stages Questionnaires: Inventory for Toddlers	15-30 minutes
4. ASQ-IT Satisfaction Survey	5- 10 minutes

After you have completed all documents, please return them in the self addressed stamped envelope. After the envelop returns, next assessment by the research assistant will be arranged in 1-2 weeks.

Phase 2:

The research assistant will complete two measures in this order:	Estimated time
1. Battelle Developmental Inventory-2	40-50 minutes
2. ASQ-IT	10-15 minutes

You may be asked to complete a second ASQ-IT during the assistant visit. Otherwise, the second ASQ-IT will be mailed after a week.

Phase 3:	Estimated time
1. A second ASQ-IT	10-15 minutes

Please return the second ASQ-IT in the self addressed stamped envelope.
Your compensation will be issued upon receipt of the second ASQ-IT.

Do you know other parents who would like to participate in the ASQ-IT Study?
Several flyers are included for you to share with other parents!

If you know of other parents of children ages 18-36 months that live in the Eugene/Springfield area and who might be interested in participating in the ASQ-IT study, please give them an information flyer or ask them to contact Hyeyoung Bae at 346-7673, or hbae2@uoregon.edu.

Ages & Stages Questionnaires: Inventory for Toddlers
Pilot Version
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Ages and Stages Questionnaires: Inventory for Toddlers

(For children ages 18 through 36 months)

Communication

On the following pages are questions about activities children do. Your child may be doing some of the activities described here, and there may be some activities your child is not yet doing.

After finding your child's starting point, please read each question carefully and check the box that tells whether your child is doing the activity regularly, sometimes, or not yet. Be sure to try each activity unless you are certain that your child can already do the item or cannot yet do the item. Instructions for finding your child's starting point are on the following page.

Please note: there may be some activities that your child used to do, but has replaced with a more advanced skill (for example, most children no longer crawl after they learn to walk). Answer these items as "Yes".

Tips for completing the ASQ:IT

- Try to make completing this questionnaire a game that is fun for you and your child.
- Make sure your child is rested, fed, and ready to play.
- If you have any questions or concerns about your child or about this questionnaire, please call _____

Thank You!

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How to Start and Stop on the ASQ:IT:

1. *Find your child's starting point based on his or her age*:

Example:

4. When your child wants something, does she tell you by pointing to it?

1 ½ - 2 year olds begin with question 5:

5. Does your child say four or more words in addition to "Mama" and "Dada"?

2. *Find your child's stopping point:*

✓ Beginning at your child's starting point, continue to answer questions until you have checked 3 circles (Not yet's) in a row.

Starting Point →

✓ Look back over your answers to see if you have also checked 3 triangles (Yes's) in a row.

✓ If you have not checked three triangles in a row, go back to your child's starting point and answer questions in reverse order until you have checked 3 triangles in a row.

A completed ASQ:IT should have at least 3 marked triangles and at most 3 marked circles in a row as in the example on the right.

Stopping Point →

	YES	SOMETIMES	NOT YET	
3.	△	□	○	___
4.	△	□	○	___
5.	▲	□	○	___
6.	▲	□	○	___
7.	▲	□	○	___
8.	▲	□	○	___
9.	△	■	○	___
10.	△	□	●	___
11.	△	■	○	___
12.	△	□	●	___
13.	△	□	●	___
14.	△	□	●	___
15.	△	□	○	___
16.	△	□	○	___

COMMUNICATION

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		YES	SOMETIMES	NOT YET	
1.	Does your child follow one simple command, such as "Come here," "Give it to me," or "Put it back," *without* your using gestures? 5-10	△	□	○	___
2.	Does your child say one word in addition to "Mama" and "Dada"? (A "word" is a sound or sounds the child says consistently to mean someone or something, such as "baba" for bottle.) 6-10	△	□	○	___
3.	When you ask, "Where is the ball (hat, shoe, etc.)?" does your child look at the object? Make sure the object is present. Check "yes" if he knows one object. 4-12	△	□	○	___
4.	When your child wants something, does she tell you by *pointing* to it? 5-12	△	□	○	___

Start with item 5 if your child is 1 1/2 to 2 years old:

5.	Does your child say four or more words in addition to "Mama" and "Dada"? 5-14	△	□	○	___
6.	Does your child point to, pat, or try to pick up pictures in a book? 4-14	△	□	○	___
7.	Does your child shake his head when he means "no" or "yes"? 6-12	△	□	○	___
8.	When you ask her to, does your child go into another room to find a familiar toy or object? You might ask, "Where is your ball?" or say, "Bring me your coat" or "Go get your blanket." 6-14	△	□	○	___
9.	Without giving him clues by pointing or using gestures, can your child carry out at least *three* of these kinds of directions? 6-20 a. "Put the toy on the table." b. "Close the door." c. "Bring me a towel." d. "Find your coat." e. "Take my hand." f. "Get your book."	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

COMMUNICATION (Continued)

YES SOMETIMES NOT YET

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Start with item 10 if your child is 2 to 2 ½ years old:

10.	Without showing him first, does your child *point* to the correct picture when you say, "Show me the kitty" or ask, "Where is the dog?" (He needs to identify only one picture correctly.) 5-18	△	□	○	___
11.	If you point to a picture of a ball (kitty, cup, hat, etc.) and ask your child, "What is this?" does your child correctly *name* at least one picture? 5-20	△	□	○	___
12.	When you ask her to point to her nose, eyes, hair, feet, ears, and so forth, does your child correctly point to at least *seven* body parts? (She can point to part of herself, you, or a doll.) 4-22	△	□	○	___
13.	Does your child say eight or more words in addition to "Mama" and "Dada"? 6-16	△	□	○	___
14.	Does your child imitate a two-word sentence? For example, when you say a two-word phrase, such as "Mama eat," "Daddy play," "Go home," or "What's this?" does your child say both words back to you? (Check "yes" even if his words are difficult to understand.) 5-16	△	□	○	___
15.	Does your child say two or three words that represent different ideas together, such as "See dog," "Mommy come home," or "Kitty gone"? (Don't count word combinations that express one idea, such as "Bye-bye," "All gone," "All right," and "What's that?") 6-18 Please give an example of your child's word combinations: _____ _____	△	□	○	___
16.	Without giving him help by pointing or using gestures, ask your child to "Put the shoe *on* the table" and "Put the book *under* the chair." Does your child carry out both of these directions correctly? 6-27	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

COMMUNICATION (Continued)

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		YES	SOMETIMES	NOT YET	
17.	When talking about something that already happened, does your child use words that end in "ed," such as walked, jumped, or played? Ask your child questions, such as "How did you get to the store?" ("We walked.") "What did you do at your friend's house?" ("We played.") 6-54 Please write an example: _____ _____	△	□	○	___
18.	Show your child how a zipper on a coat moves up and down, and say, "See, this goes up and down." Put the zipper to the middle, and ask your child to move the zipper *down*. Return the zipper to the middle, and ask your child to move the zipper *up*. Do this several times, placing the zipper in the middle before asking your child to move it up or down. Does your child consistently move the zipper up when you say "up" and down when you say "down"? 5-33	△	□	○	___
19.	Does your child correctly use at least two words like "me," "I," "mine," and "you"? 6-22	△	□	○	___
20.	When looking at a picture book, does your child tell you what is happening or what action is taking place in the picture? (For example, "Barking," "Running," "Eating," and "Crying") You may ask, "What is the dog (or boy) doing?" 6-30	△	□	○	___
21.	Without giving help by pointing or repeating, does your child follow three directions that are unrelated to one another? For example, you may ask your child to "Clap your hands, walk to the door, and sit down." 5-42	△	□	○	___
	Start with item 22 if your child is 2 ½ to 3 years old:				
22.	Does your child make sentences that are three or four words long? 5-27 Please give an example: _____ _____	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

COMMUNICATION (Continued)

YES SOMETIMES NOT YET

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23. Does your child answer the following questions: △ □ ○ ___

"What do you do when you are hungry?"
(Acceptable answers include: "Get food," "Eat," "Ask for something to eat," and "Have a snack.")

Please write your child's response:

_____

"What do you do when you are tired?"
(Acceptable answers include: "Take a nap," "Rest," "Go to sleep," "Go to bed," "Lie down," and "Sit down.")

Please write your child's response:

_____

Mark "sometimes" if your child answers only one question. 2-48

24. Does your child name at least three items from a common category? For example, if you say to your child, "Tell me some things that you can eat," does your child answer with something like, "Cookies, eggs, and cereal"? Or if you say, "Tell me the names of some animals," does your child answer with something like, "Cow, dog, and elephant"? 1-48 △ □ ○ ___

25. Does your child use four- and five-word sentences? For example, does your child say, "I want the car"? 5-54 △ □ ○ ___

Please write an example:

_____

_____

26. Does your child use endings of words, such as "s," "ed," and "ing"? For example, does your child say things like, "I see two cats," "I am playing," or "I kicked the ball"? 4-48 △ □ ○ ___

27. Does your child use all of the words in a sentence (for example, "a," "the," "am," "is," and "are") to make complete sentences, such as "I *am* going to *the* park," or "*Is* there *a* toy to play with?" or "*Are* you coming, too?" 6-42 △ □ ○ ___

Remember to STOP when you have checked 3 circles in a row.

COMMUNICATION (Continued)

YES SOMETIMES NOT YET

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28. Does your child tell you at least two things about common objects? For example, if you say to your child, "Tell me about your ball," does he say something like, "It's round. I throw it. It's big"? 3-48 △ □ ○ ___

29. When you ask, "What is your name?" does your child say both her first and last names? 6-33 △ □ ○ ___

30. Does your child repeat the sentences shown below back to you, without any mistakes? You may repeat each sentence one time. Mark "yes" if your child repeats both sentences without mistakes or "sometimes" if your child repeats one sentence without mistakes. 6-60 △ □ ○ ___

    Jane hides her shoes for Maria to find.
    Al read the blue book under his bed.

31. Does your child use comparison words, such as *heavier*, *stronger*, or *shorter*? Ask your child questions, such as: △ □ ○ ___

    "A car is *big*, but a bus is _____" (bigger);
    "A cat is *heavy*, but a man is _____" (heavier);
    "A TV is *small*, but a book is _____" (smaller). 60-4

32. If you ask her to, does your child play at least one nursery game even if you don't show her the activity yourself (e.g., "bye-bye," "Peekaboo," "clap your hands," "So Big")? 4-10 △ □ ○ ___

Total: ____

Remember to STOP when you have checked 3 circles in a row.

Ages & Stages Questionnaires: Inventory for Toddlers
Pilot Version
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Ages and Stages Questionnaires: Inventory for Toddlers

(For children ages 18 through 36 months)

Gross Motor

On the following pages are questions about activities children do. Your child may be doing some of the activities described here, and there may be some activities your child is not yet doing.

After finding your child's starting point, please read each question carefully and check the box that tells whether your child is doing the activity regularly, sometimes, or not yet. Be sure to try each activity unless you are certain that your child can already do the item or cannot yet do the item. Instructions for finding your child's starting point are on the following page.

Please note: there may be some activities that your child used to do, but has replaced with a more advanced skill (for example, most children no longer crawl after they learn to walk). Answer these items as "Yes".

Tips for completing the ASQ:IT

- Try to make completing this questionnaire a game that is fun for you and your child.
- Make sure your child is rested, fed, and ready to play.
- If you have any questions or concerns about your child or about this questionnaire, please call _____

Thank You!

GROSS MOTOR

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		YES	SOMETIMES	NOT YET
1.	While holding onto furniture, does your child bend down and pick up a toy from the floor and then return to a standing position? 4-10	△	□	○ ___
2.	While holding onto furniture, does your child lower himself with control (without falling or flopping down)? 5-10	△	□	○ ___
3.	If you hold both hands just to balance him, does your baby take several steps without tripping or falling? (If your baby already walks alone, check "yes" for this item.) 4-12	△	□	○ ___
4.	When you hold *one hand* just to balance her, does your child take several steps forward? (If your baby already walks alone, check "yes" for this item.) 5-12	△	□	○ ___

Start with item 5 if your child is 1 1/2 to 2 years old:

5.	Does your child stand up in the middle of the floor by himself and take several steps forward? 6-12	△	□	○ ___
6.	Does your child climb onto furniture? 4-14	△	□	○ ___
7.	Does your child bend over or squat to pick up an object from the floor and then stand up again without any support? 5-14	△	□	○ ___
8.	Does your child move around by walking, rather than by crawling on his hands and knees? 6-14	△	□	○ ___
9.	Does your child run fairly well, stopping herself without bumping into things or falling? 5-20	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

GROSS MOTOR (Continued)

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		YES	SOMETIMES	NOT YET
10.	Does your child walk well and seldom fall? 5-16	△	□	○ ___
11.	When you show him how to kick a large ball, does your child try to kick the ball by moving his leg forward or by walking into it? (If your child already kicks a ball, check "yes" for this item.) 6-18	△	□	○ ___
12.	Does your child climb on an object such as a chair to reach something she wants? 6-16	△	□	○ ___
13.	Does your child walk down stairs if you hold onto one of her hands? (You can look for this at a store, on a playground, or at home.) 5-18	△	□	○ ___

Start with item 14 if your child is 2 to 2 ½ years old:

14.	Does your child walk either up or down at least two steps by himself? You can look for this at a store, on a playground, or at home. (Check "yes" even if he holds onto the wall or railing.) 6-20	△	□	○ ___
15.	While standing, does your child throw a ball *overhand* by raising his arm to shoulder height and throwing the ball forward? (Dropping the ball or throwing the ball underhand does not count.) 6-33	△	□	○ ___
16.	Without holding onto anything for support, does your child kick a ball by swinging his leg forward? 6-22	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

GROSS MOTOR (Continued)

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		YES	SOMETIMES	NOT YET	
17.	Does your child climb the rungs of a ladder of a playground slide and slide down without help? 6-42	△	□	○	___
18.	Does your child walk up stairs, using only one foot on each stair? (The left foot is on one step, and the right foot is on the next.) He may hold onto the railing or wall. (You can look for this at a store, on a playground, or at home.) 6-27	△	□	○	___

Start with item 19 if your child is 2 ½ to 3 years old:

19.	While standing, does your child throw a ball *overhand* in the direction of a person standing at least 6 feet away? To throw overhand, your child must raise her arm to shoulder height and throw the ball forward. (Dropping the ball, letting the ball go, or throwing the ball underhand should be scored as "not yet.") 3-48	△	□	○	___
20.	Does your child stand on one foot for about 1 second without holding onto anything? 6-30	△	□	○	___
21.	Does your child jump with both feet leaving the floor at the same time? 5-22	△	□	○	___
22.	Does your child jump forward at least 3 inches with both feet leaving the ground at the same time? 5-27	△	□	○	___
23.	Does your child catch a large ball with both hands? You should stand about 5 feet away and give your child two or three tries. 5-42	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

GROSS MOTOR (Continued)

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		YES	SOMETIMES	NOT YET	
24.	Does your child walk on his tiptoes for 15 feet (about the length of a large car)? You may show him how to do this. 6-54	△	□	○	___
25.	Does your child jump forward at least 6 inches with both feet leaving the ground at the same time? 6-36	△	□	○	___
26.	Without holding onto anything, does your child stand on one foot for at least 5 seconds without losing his balance and putting his foot down? You may give your child two or three tries before you mark the question. 6-48	△	□	○	___
27.	Does your child hop up and down on either the right or left foot at least one time without losing his balance or falling? 4-48	△	□	○	___
28.	Does your child skip using alternating feet? You may show her how to do this. 6-60	△	□	○	___
29.	Does your child jump forward a distance of 20 inches from a standing position, starting with her feet together? 5-48	△	□	○	___
30.	Does your child hop forward on one foot for a distance of 4-6 feet without putting down the other foot? You can give him two tries on each foot. Mark "sometimes" if he can hop on one foot only. 5-60	△	□	○	___

Total: ____

Remember to STOP when you have checked 3 circles in a row.

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Ages and Stages Questionnaires: Inventory for Toddlers

(For children ages 18 through 36 months)

Fine Motor

On the following pages are questions about activities children do. Your child may be doing some of the activities described here, and there may be some activities your child is not yet doing.

After finding your child's starting point, please read each question carefully and check the box that tells whether your child is doing the activity regularly, sometimes, or not yet. Be sure to try each activity unless you are certain that your child can already do the item or cannot yet do the item. Instructions for finding your child's starting point are on the following page.

Please note: there may be some activities that your child used to do, but has replaced with a more advanced skill (for example, most children no longer crawl after they learn to walk). Answer these items as "Yes".

Tips for completing the ASQ:IT

- Try to make completing this questionnaire a game that is fun for you and your child.
- Make sure your child is rested, fed, and ready to play.
- If you have any questions or concerns about your child or about this questionnaire, please call _____

Thank You!

FINE MOTOR

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		YES	SOMETIMES	NOT YET
1.	After one or two tries, does your child pick up a piece of string with her first finger and thumb? (The string may be attached to a toy.) 4-10	△	□	○ ___
2.	Does your child pick up a crumb or Cheerio with the *tips* of his thumb and a finger? He may rest his arm or hand on the table while doing it. 5-10	△	□	○ ___
3.	Does your child set a small toy down, without dropping it, and then take her hand off the toy? 6-10	△	□	○ ___
4.	Without resting his arm or hand on the table, does your child pick up a crumb or Cheerio with the tip of his thumb and a finger? 4-12	△	□	○ ___
Start with item 5 if your child is 1 1/2 to 2 years old:				
5.	Does your child help turn the pages of a book? (You may lift a page for her to grasp.) 6-12	△	□	○ ___
6.	Does your child turn the pages of a book by himself? (He may turn more than one page at a time.) 6-16	△	□	○ ___
7.	Does your child get a spoon into her mouth right side up so that the food usually doesn't spill? 6-18	△	□	○ ___
8.	Does your child make a mark on the paper with the *tip* of a crayon (or pencil or pen) when trying to draw? 5-14	△	□	○ ___
9.	Does your child throw a small ball with a forward arm motion? (If he simply drops the ball, check "not yet" for this item.) 5-12	△	□	○ ___
Start with item 10 if your child is 2 to 2 ½ years old:				
10.	Does your child stack a small block or toy on top of another one? (You could also use spools of thread, small boxes, or toys that are about 1 inch in size.) 4-14	△	□	○ ___

FINE MOTOR (Continued)

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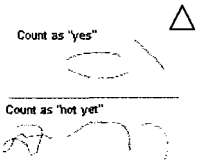
		YES	SOMETIMES	NOT YET	
11.	Does your child stack three small blocks or toys on top of each other by herself? 6-14	△	□	○	___
12.	Does your child flip light switches off and on? 5-22	△	□	○	___
13.	Does your child use a turning motion with her hand while trying to turn doorknobs, wind up toys, twist tops, or screw lids on and off jars? 6-20	△	□	○	___
14.	Does your child turn pages in a book, one page at a time? 6-30	△	□	○	___

Start with item 15 if your child is 2 ½ to 3 years old:

15.	Does your child stack six small blocks or toys on top of each other by himself? 5-20	△	□	○	___
16.	Does your child stack seven small blocks or toys on top of each other by himself? (You could also use spools of thread, small boxes, or toys that are about 1 inch in size.) 5-24	△	□	○	___
17.	When drawing, does your child hold a pencil, crayon, or pen between her fingers and thumb like an adult does? 6-36	△	□	○	___
18.	After she watches you draw a line from one side of the paper to the other side, ask your child to make a line like yours. Do not let your child trace your line. Does your child copy you by drawing a single line in a horizontal direction? 6-27	△	□	○	___
19.	Does your child try to cut paper with child-safe scissors? She does not need to cut the paper but must get the blades to open and close while holding the paper with the other hand. (You may show your child how to use scissors. Carefully watch your child's use of scissors for safety reasons.) 6-33	△	□	○	___



Remember to STOP when you have checked 3 circles in a row.

FINE MOTOR (Continued)

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			YES	SOMETIMES	NOT YET	
20.	Does your child thread a shoelace through either a bead or an eyelet of a shoe? 6-22		△	□	○	___
21.	After he watches you draw a line from the top of the paper to the bottom with a pencil, crayon, or pen, ask your child to make a line like yours. Do not let your child trace your line. Does your child copy you by drawing a single line in a vertical direction? 3-27	Count as "yes" Count as "not yet"	△	□	○	___
22.	After he watches you draw a single circle, ask your child to make a circle like yours. Do not let him trace your circle. Does your child copy you by drawing a circle? 5-30		△	□	○	___
23.	Does your child unbutton one or more buttons? Your child may use his own clothing or a doll's clothing. 4-48		△	□	○	___
24.	Does your child put together a six-piece interlocking puzzle? (If one is not available, take a full-page picture from a magazine or catalog and cut it into six pieces. Does your child put it back together correctly?) 5-42		△	□	○	___
25.	Ask your child to trace on the line below with a pencil. Does your child trace on the line without going off the line more than two times? (Mark "sometimes" if your child goes off the line three times.) 4-54		△	□	○	___
26.	Using child-safe scissors, does your child cut a paper in half on a more or less straight line, making the blades go up and down? (Carefully watch your child's use of scissors for safety reasons.) 2-48		△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

FINE MOTOR (Continued)

YES SOMETIMES NOT YET

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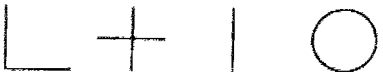
27. Using the shape below to look at, does your child copy it using a pencil or crayon, without tracing? Your child's drawing should look like the design of the shape, except it may be different in size. 6-42 △ □ ○ ___

(Copy shape here.)

28. Using the shapes below to look at, does your child copy at least three shapes without tracing? Your child's drawings should look similar to the design of the shapes below, but they may be different in size. 3-48 △ □ ○ ___



(Copy shapes here.)

29. Draw a line across a piece of paper. Using child-safe scissors, does your child cut the paper in half on a more or less straight line, making the blades go up and down? (Carefully watch your child's use of scissors for safety reasons.) 6-54 △ □ ○ ___

30. Does your child draw pictures of people that have at least three of the following features: head, eyes, nose, mouth, neck, hair, trunk, arms, hands, legs, or feet? 5-48 △ □ ○ ___

31. Using the letters below to look at, does your child copy the letters without tracing? Cover up all of the letters except the letter being copied. Mark "yes" if your child can copy four of the letters, and you can read them. Mark "sometimes" if your child can copy two or three letters, and you can read them. 5-60 △ □ ○ ___

V H T C A

(Copy letters here.)

Remember to STOP when you have checked 3 circles in a row.

FINE MOTOR (Continued)

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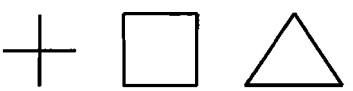
YES SOMETIMES NOT YET

32. Does your child color mostly within the lines in a coloring book? Your child should not go more than 1/4 inch outside the lines on most of the picture. 6-48 △ □ ○ ___

33. Ask your child to draw a picture of a person on a blank sheet of paper. You may ask your child to "Draw a picture of a girl or a boy." If your child draws a person with head, body, arms, *and* legs, mark "yes." If your child draws a person with only three parts (head, body, arms or legs), mark "sometimes." If your child draws a person with two or fewer parts (head, body, arms, or legs), mark "not yet." Be sure to attach the sheet of paper with your child's drawing to this questionnaire. 5-54 △ □ ○ ___

34. Using the shapes below to look at, does your child copy the shapes in the space below without tracing? Your child's drawings should look similar to the design of the shapes below, but they may be different in size. (Mark "yes" if she can copy all three shapes; mark "sometimes" if your child can copy two shapes.) 4-60 △ □ ○ ___



(Copy shapes here.)

35. Print your child's first name. Can your child copy the letters? The letters may be large, backward, or reversed. Mark "sometimes" if your child copies about half of the letters. 6-60 △ □ ○ ___

(Space for adult's printing)

(Space for child's printing.)

Total: ____

Remember to STOP when you have checked 3 circles in a row.

Ages & Stages Questionnaires: Inventory for Toddlers
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Ages and Stages Questionnaires: Inventory for Toddlers

(For children ages 18 through 36 months)

Problem Solving

On the following pages are questions about activities children do. Your child may be doing some of the activities described here, and there may be some activities your child is not yet doing.

After finding your child's starting point, please read each question carefully and check the box that tells whether your child is doing the activity regularly, sometimes, or not yet. Be sure to try each activity unless you are certain that your child can already do the item or cannot yet do the item. Instructions for finding your child's starting point are on the following page.

Please note: there may be some activities that your child used to do, but has replaced with a more advanced skill (for example, most children no longer crawl after they learn to walk). Answer these items as "Yes".

Tips for completing the ASQ:IT

- Try to make completing this questionnaire a game that is fun for you and your child.
- Make sure your child is rested, fed, and ready to play.
- If you have any questions or concerns about your child or about this questionnaire, please call _____

Thank You!

PROBLEM SOLVING

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		YES	SOMETIMES	NOT YET
1.	After he watches you hide a small toy under a piece of paper or cloth, does your child find it? (Be sure the toy is completely hidden.) 6-10	△	□	○ ___
2.	If you put a small toy into a bowl or box, does your child copy you by putting in a toy, although she may not let go of it? (If she already lets go of the toy into a bowl or box, check "yes" for this item.) 4-12	△	□	○ ___
3.	After you scribble back and forth on paper with a crayon (or a pencil or pen), does your child copy you by scribbling? (If she already scribbles on her own, check "yes" for this item.) 6-12	△	□	○ ___
4.	Does your child drop several (six or more) small toys into a container, such as a bowl or box? (You may show him how to do it.) 5-14	△	□	○ ___
5.	Without first showing him how, does your child scribble back and forth when you give him a crayon (or pencil or pen)? 5-16	△	□	○ ___
6.	Does your child drop two small toys, one after the other, into a container like a bowl or box? (You may show him how to do it.) 5-12	△	▤	○ ___

Start with item 7 if your child is 1 1/2 to 2 years old:

7.	If you give your child a bottle, spoon, or pencil upside down, does he turn it right side up so that he can use it properly? 4-20	△	□	○ ___
8.	If you do any of the following gestures, does your child copy at least one of them? 3-20 a. Open and close your mouth. b. Blink your eyes. c. Pull on your earlobe. d. Pat your cheek.	△	□	○ ___
9.	Does your child put things away where they belong? For example, does he know his toys belong on the toy shelf, his blanket goes on his bed, and dishes go in the kitchen? 4-24	△	□	○ ___
10.	Does your child drop several (six or more) small toys into a container, such as a bowl or box? (You may show him how to do it.) 3-16	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

PROBLEM SOLVING (Continued)

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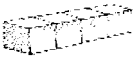
		YES	SOMETIMES	NOT YET	
11.	Can your child drop a crumb or Cheerio into a small, clear bottle (such as a plastic soda-pop bottle or child bottle)? 4-14	△	□	○	___
12.	When looking in the mirror, ask "Where is _____?" (Use your child's name.) Does your child point to her image in the mirror? 3-27	△	□	○	___
13.	After a crumb or Cheerio is dropped into a bottle, does your child turn the bottle upside down to dump it out again? (You may show her how.) 6-16	△	□	○	___
14.	Does your child pretend objects are something else? For example, does your child hold a cup to his ear, pretending it is a telephone? Does he put a box on his head, pretending it is a hat? Does he use a block or small toy to stir food? 3-22	△	□	○	___
15.	After a crumb or Cheerio is dropped into a small, clear bottle, does your child turn the bottle upside down to dump out the crumb or Cheerio? (Do not show her how.) 6-18	△	□	○	___
16.	While your child watches, line up four objects like blocks or cars in a row. Does your child copy or imitate you and line up at least *two* blocks side by side? (You can also use spools of thread, small boxes, or other toys.) 5-20	△	□	○	___

Start with item 17 if your child is 2 to 2 ½ years old:

17.	If your child wants something she cannot reach, does she find a chair or box to stand on to reach it? 6-20	△	□	○	___
18.	After you have shown her how, does your child try to get a small toy that is slightly out of reach by using a spoon, stick, or similar tool? 6-14	△	□	○	___
19.	While your child watches, line up four objects like blocks or cars in a row. Does your child copy or imitate you and line up *four* objects in a row? (You can also use spools of thread, small boxes, or other toys.) 6-24 	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

PROBLEM SOLVING (Continued)

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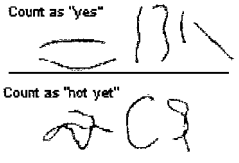
		YES	SOMETIMES	NOT YET	
20.	When you say, "Say seven three," does your child repeat *just* the two numbers in the correct order? *Do not repeat the numbers.* If necessary, try another pair of numbers and say, "Say eight two." Your child must repeat just one series of two numbers for you to answer "yes" to this question. 5-30	△	□	○	___

Start with item 21 if your child is 2 ½ to 3 years old:

21.	Show your child how to make a bridge with blocks, boxes, or cans, like the example. Does your child copy you by making one like it? 5-36	△	□	○	___
22.	After he watches you draw a line from the top of the paper to the bottom with a crayon (or pencil or pen), does your child copy you by drawing a single line on the paper in *any direction?* (Scribbling back and forth does not count as "yes.") 5-18 	△	□	○	___
23.	Without giving help by pointing, does your child follow three different directions using the words "under," "between," and "middle"? For example, ask your child to put a book "under the couch." Then ask her to put the ball "between the chairs" and the shoe "in the middle of the table."3-48	△	□	○	___
24.	Does your child dress up and "play-act," pretending to be someone or something else? For example, your child may dress up in different clothes and pretend to be a mommy, daddy, brother or sister, or an imaginary animal or figure. 6-42	△	□	○	___
25.	When you say, "Say five eight three," does your child repeat *just* the three numbers in the correct order? *Do not repeat these numbers.* If necessary, try another series of numbers and say, "Say six nine two." Your child must repeat just one series of three numbers for you to answer "yes" to this question. 6-36	△	□	○	___

Remember to STOP when you have checked 3 circles in a row.

PROBLEM SOLVING (Continued)

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		YES	SOMETIMES	NOT YET
26.	When you point to the figure and ask your child, "What is this?" does your child say a word that means a person? Responses like "snowman," "boy," "man," "girl," and "Daddy" are correct.6-27 Please write your child's response here: _____	△	□	○ ___
27.	After she draws a "picture," even a simple scribble, does your child tell you what she drew? You may say, "Tell me about your picture," or ask, "What is this?" to prompt her. 6-30	△	□	○ ___
28.	When shown an object and asked, "What color is this?" does your child name five different colors like red, blue, yellow, orange, black, white, or pink? Answer "yes" only if your child answers the question correctly using five colors. 4-48	△	□	○ ___
29.	If you place five objects in front of your child, can he count them saying, "One, two, three, four, five," in order? Ask this question *without* providing help by pointing, gesturing, or naming. 6-48	△	□	○ ___
30.	When asked, "Which circle is the smallest?" does your child point to the smallest circle? Ask this question *without* providing help by pointing, gesturing, or looking at the smallest circle. 5-42	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

PROBLEM SOLVING (Continued)

YES SOMETIMES NOT YET

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31. Is your child able to finish the following sentences using a word that means the opposite of the word that is italicized? For example: "A rock is *hard*, and a pillow is *soft*." Please write your child's responses below: △ □ ○ ___

A cow is *big*, and a mouse is _____.

Ice is *cold*, and a fire is _____.

We see stars at *night*, and we see the sun during the _____.

When I throw the ball *up*, it comes _____.

Mark "yes" if she finishes three of four sentences correctly. Mark "sometimes" if she finishes two of four sentences correctly. 4-60

32. Does your child know the names of numbers? Mark "yes" if he identifies the three numbers below. Mark "sometimes" if he identifies two numbers. 6-54 △ □ ○ ___

3 1 2

33. Does your child name at least four letters in her name? Point to the letters and ask, "What letter is this?" *Point to the letters out of order.* 6-60 △ □ ○ ___

34. Does your child count up to 15 without making mistakes? If so, mark "yes." If your child counts to 12 without making mistakes, mark "sometimes." 5-54 △ □ ○ ___

Total: ____

Remember to STOP when you have checked 3 circles in a row.

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Ages and Stages Questionnaires: Inventory for Toddlers

(For children ages 18 through 36 months)

Personal Social

On the following pages are questions about activities children do. Your child may be doing some of the activities described here, and there may be some activities your child is not yet doing.

After finding your child's starting point, please read each question carefully and check the box that tells whether your child is doing the activity regularly, sometimes, or not yet. Be sure to try each activity unless you are certain that your child can already do the item or cannot yet do the item. Instructions for finding your child's starting point are on the following page.

Please note: there may be some activities that your child used to do, but has replaced with a more advanced skill (for example, most children no longer crawl after they learn to walk). Answer these items as "Yes".

Tips for completing the ASQ:IT

- Try to make completing this questionnaire a game that is fun for you and your child.
- Make sure your child is rested, fed, and ready to play.
- If you have any questions or concerns about your child or about this questionnaire, please call _____

Thank You!

PERSONAL-SOCIAL

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		YES	SOMETIMES	NOT YET
1.	When you hold out your hand and ask for her toy, does your child offer it to you even if she doesn't let go of it? (If she already lets go of the toy into your hand, check "yes" for this item.) 4-10	△	□	○ ___
2.	When you dress him, does your child push his arm through a sleeve once his arm is started in the hole of the sleeve? 5-10	△	□	○ ___
3.	When you hold out your hand and ask for her toy, does your child let go of it into your hand? 6-10	△	□	○ ___
4.	Does your child come to you when she needs help, such as with winding up a toy? 6-16	△	□	○ ___
Start with item 5 if your child is 1 1/2 to 2 years old:				
5.	Does your child copy the activities you do, such as wipe up a spill, sweep, shave, or comb hair? 6-18	△	□	○ ___
6.	When you dress her, does your child lift her foot for her shoe, sock, or pant leg? 4-12	△	□	○ ___
7.	Does your child feed herself with a spoon, even though she may spill some food? 4-14	△	□	○ ___
8.	Does your child roll or throw a ball back to you so that you can return it to him? 5-12	△	□	○ ___
9.	Does your child push a little shopping cart, stroller, or wagon, steering it around objects and backing out of corners if he cannot turn? 6-22	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

PERSONAL-SOCIAL (Continued)

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		YES	SOMETIMES	NOT YET
10.	Does your child play with a doll or stuffed animal by hugging it? 6-12	△	□	○ ___
11.	Does your child get your attention or try to show you something by pulling on your hand or clothes? 6-14	△	□	○ ___
12.	Does your child use a spoon to feed himself with little spilling? 2-30	△	□	○ ___
13.	If you do any of the following gestures, does your child copy at least one of them? 2-22	△	□	○ ___
	a. Open and close your mouth. b. Blink your eyes. c. Pull on your earlobe. d. Pat your cheek.			
14.	Does your child eat with a fork? 6-20	△	□	○ ___
15.	Does your child drink from a cup or glass, putting it down again with little spilling? 5-18	△	□	○ ___
16.	Does your child help undress himself by taking off clothes like socks, hat, shoes, or mittens? 5-14	△	□	○ ___
17.	While looking at himself in the mirror, does your child offer a toy to his own image? 4-16	△	□	○ ___

Start with item 18 if your child is 2 to 2 ½ years old:

18.	When playing with either a stuffed animal or doll, does your child pretend to rock it, feed it, change its diapers, put it to bed, and so forth? 5-20	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

PERSONAL-SOCIAL (Continued)

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		YES	SOMETIMES	NOT YET
19.	When he is looking in a mirror and you ask, "Who is in the mirror?" does your child say either "Me" or his own name? 6-30	△	□	○ ___
20.	Does your child take turns by waiting while another child or adult takes a turn? 6-36	△	□	○ ___

Start with item 21 if your child is 2 ½ to 3 years old:

21.	Does your child usually take turns and share with other children? 6-60	△	□	○ ___
22.	Does your child call herself "I" or "me" more often than her own name? For example, "I do it," more often than "Juanita do it." 6-24	△	□	○ ___
23.	Does your child tell you the names of two or more playmates, not including brothers and sisters? Ask this question without providing help by suggesting names of playmates or friends. 4-48	△	□	○ ___
24.	After you put on loose-fitting pants around her feet, does your child pull them completely up to her waist? 5-30	△	□	○ ___
25.	Does your child serve herself, taking food from one container to another using utensils? For example, can your child use a large spoon to scoop applesauce from a jar into a bowl? 5-42	△	□	○ ___
26.	Using these exact words, ask your child, "Are you a girl or a boy?" Does your child answer correctly? 6-33	△	□	○ ___

Remember to STOP when you have checked 3 circles in a row.

PERSONAL-SOCIAL (Continued)

YES SOMETIMES NOT YET

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27. Does your child put on a coat, jacket, or shirt by himself? 6-27 △ □ ○ ___

28. Does your child wash his hands and face using soap and dry off with a towel without help? 6-42 △ □ ○ ___

29. Does your child brush her teeth by putting toothpaste on the toothbrush and brushing all her teeth without help? You may still need to check and rebrush your child's teeth. 5-48 △ □ ○ ___

30. Does your child dress or undress himself without help (except for snaps, buttons, and zippers)? 6-48 △ □ ○ ___

31. Does your child use the toilet by himself? (He goes to the bathroom, sits on the toilet, wipes, and flushes.) Mark "yes" even if he does this after you remind him. 5-60 △ □ ○ ___

33. Does your child tell you at least four of the following: △ □ ○ ___

a. First name
b. Age
c. City she lives in
d. Last name
e. Boy or girl
f. Telephone number

Please circle the items your child knows. 2-48

34. Does your child dress and undress himself, including buttoning medium-size buttons and zipping front zippers? 6-54 △ □ ○ ___

Total: ____

Remember to STOP when you have checked 3 circles in a row.

APPENDIX D

DIF TABLES

Table 19

Differential Item Functioning and Item Fit for ASQ-IT: Communication Domain

Item	DIF	Fit	Item	DIF	Fit
1	.91	1.19	17	-2.29	.76
2	INESTIMABLE: LOW		18	.60	1.21
3	INESTIMABLE: LOW		19	-.04	.53
4	.42	1.08	20	-1.17	.50
5	1.05	.68	21	1.56	.98
6	1.18	.78	22	-.74	.45
7	.23	1.45	23	1.79	.82
8	.91	.67	24	-.93	.84
9	-1.14	.89	25	-.87	.73
10	.60	.79	26	1.08	.81
11	.83	.73	27	-1.19	1.00
12	.60	.82	28	-.93	.85
13	1.50	.69	29	-.87	.71
14	1.35	.87	30	1.08	1.88
15	.23	.70	31	-1.19	.61
16	-.57	1.30	32	.27	.73

Note. Reference group = non-risk group; Focal group = risk group.

Table 20

Differential Item Functioning and Item Fit for ASQ-IT: Gross Motor Domain

Item	DIF	Fit	Item	DIF	Fit
1	INESTIMABLE: LOW		17	-1.67	1.12
2	INESTIMABLE: LOW		18	-.56	1.45
3	INESTIMABLE: LOW		19	2.77	1.75
4	INESTIMABLE: LOW		20	.92	1.45
5	INESTIMABLE: LOW		21	.20	1.01
6	INESTIMABLE: LOW		22	-.37	1.16
7	INESTIMABLE: LOW		23	-1.00	.99
8	INESTIMABLE: LOW		24	1.28	1.49
9	-.07	.88	25	-.40	.91
10	-.57	.94	26	-.61	.98
11	-.57	.96	27	1.75	1.26
12	-.07	.88	28	-2.64	1.58
13	.54	.93	29	-1.83	1.12
14	.21	1.14	30	-1.43	1.24
15	1.76	1.76			
16	2.71	1.70			

Note. Reference group = non-risk group; Focal group = risk group.

Table 21

Differential Item Functioning and Item Fit for ASQ-IT: Fine Motor Domain

Item	DIF	Fit	Item	DIF	Fit
1	INESTIMABLE: LOW		19	.48	.98
2	INESTIMABLE: LOW		20	1.30	1.11
3	-.86	1.09	21	.79	.96
4	INESTIMABLE: LOW		22	.51	.87
5	INESTIMABLE: LOW		23	-.02	.96
6	.45	1.06	24	-.51	1.22
7	.25	.91	25	-.26	.75
8	-.69	.92	26	.63	1.06
9	.23	.93	27	1.02	.68
10	1.13	1.33	28	.01	.04
11	.56	.85	29	-.35	1.25
12	.75	1.00	30	-.19	.64
13	-1.71	1.54	31	.11	.29
14	.43	1.11	32	.11	.29
15	.40	1.05	33	.01	.04
16	.54	1.18	34	.11	.29
17	-.44	1.60	35	.01	.04
18	.80	.75			

Note. Reference group = non-risk group; Focal group = risk group.

Table 22

Differential Item Functioning and Item Fit for ASQ-IT: Problem Solving Domain.

Item	DIF	Fit	Item	DIF	Fit
1	INESTIMABLE: LOW		19	.48	1.07
2	INESTIMABLE: LOW		20	1.30	1.04
3	INESTIMABLE: LOW		21	.79	.95
4	INESTIMABLE: LOW		22	.51	.83
5	.57	.99	23	-.02	.84
6	.45	.93	24	-.51	1.11
7	.25	.93	25	-.26	.95
8	-.69	1.31	26	.63	.80
9	.23	1.41	27	1.02	.82
10	1.13	1.63	28	.01	.94
11	.56	1.55	29	-.35	.63
12	.75	.79	30	-.19	.84
13	-1.71	1.04	31	.11	1.13
14	.43	.63	32	.11	.82
15	.40	.49	33	.01	1.77
16	.54	.97			
17	-.44	1.57			
18	.80	1.13			

Note. Reference group = non-risk group; Focal group = risk group.

Table 23

Differential Item Functioning and Item Fit for ASQ-IT: Personal- Social Domain

Item	DIF	Fit	Item	DIF	Fit
1	.33	.75	19	-1.22	.90
2	INESTIMABLE: LOW		20	-.88	1.06
3	.30	.73	21	-.31	1.29
4	INESTIMABLE: LOW		22	-.10	.90
5	-.57	1.06	23	.58	1.20
6	INESTIMABLE: LOW		24	-.41	1.00
7	.75	1.15	25	-.01	1.13
8	-1.00	1.34	26	.66	.61
9	-.57	.94	27	-1.82	1.18
10	-.57	1.05	28	-1.18	.93
11	-1.44	1.22	29	-2.41	.83
12	-1.89	1.18	30	-.34	.96
13	-1.38	.95	31	-.54	1.07
14	.22	1.25	32	.02	.68
15	-2.94	1.22	33	-.11	.84
16	-.13	1.50			
17	-.59	1.39			
18	-1.02	1.53			

Note. Reference group = non-risk group; Focal group = risk group.

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